**Attitudes and Perceptions of Stakeholders in the Rookery Bay Reserve Watershed:
Qualitative Case Study Research**

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Executive Summary

This research report is the second component of a Nova Southeastern University (NSU) social science study which was conducted as part of the "Restoring the Rookery Bay Estuary" (RRBE) project. The study was commissioned by the Rookery Bay National Estuarine Research Reserve (RBNERR) to inform its management of the Henderson Creek/Rookery Bay watershed in southwest Florida in a manner that contributes to the restoration of the Rookery Bay Estuary. The social science research project was conducted as an instrumental case study (Creswell, 2013), with the goal of enhancing the RBNERR's capacity to work collaboratively with community stakeholders in their watershed management efforts.

 The purpose of this case study was threefold:

1. to understand attitudes and behaviors related to water usage among residents in the RBNERR watershed;
2. to explore community members' interest and experience in engaging in water-related decision-making in personal and professional contexts; and
3. to describe community members' experiences of receiving and responding to information about water-related issues.

Potential participants had to meet the following inclusion criteria:

- 18 years of age and older
- Lives or works in the RBNERR watershed area
- Able to speak and understand English
- Express willingness to participate

15 participants were interviewed via in-depth, qualitative interviews. The participants were divided roughly in half between two categories: diverse community stakeholder groups and those directly engaged in water management decision-making at the agency and governmental levels.

Data analysis followed the standards for qualitative case studies and included two cycles of coding (Saldaña, 2013), followed by the development of themes. The findings are organized by a summary of the individual participants' perspectives followed by thematic results related to the objectives presented above. Study findings will contribute to the development of collaborative problem-solving approaches addressing local water issues and to the design of public educational initiatives related to water conservation/ management in the RBNERR watershed. A summary of the themes is presented below:

Water-related Attitudes and Beliefs

Theme 1. Participants perceive availability, quantity, cleanliness, and quality as the most important aspects of water.

Theme 2. Participants identify a range of benefits and uses of water.

Theme 3. Participants highly value natural features of local environment.

Theme 4. Participants perceive water to be a primary draw for the community.

Theme 5. Participants perceive tension between stakeholders.

Theme 6. Participants perceive tension between economic, social, and environmental interests.

Theme 7. Participants do not see common ground between environmentalists and developers.

Water-related Behaviors and Decisions

Theme 8. Participants' water-related decisions seemed to be based on belief systems.

Theme 9. Conservation-related professional behavior seems to positively impact personal conservation-related behavior.

Theme 10. Participants link scientific data to water-related decision making.

Theme 11. Participants consider economic factors when making decisions about water use.

Perceptions and Experiences of Water Management

Theme 12. Lack of understanding of water management practices contributes to conflict.

Theme 13. Participants seem to view water management in terms of "us vs. them."

Theme 14. Participants perceive water-related regulations as both necessary and frustrating.

Theme 15. Participants perceive unequal enforcement of water-related regulations.

Theme 16. Participants believe better communication would foster collaboration related to water management.

Theme 17. Participants would like to see more inclusive water management practices.

Receiving Water-related Information

Theme 18. Participants seek unbiased information.

Theme 19. Participants seek convenient information.

Theme 20. Participants receive much environmental information through personal communication.

Theme 21. Participants appreciate electronic channels of information.

Analysis of the findings led to the identification of several implications and recommendations related to the objectives of the RRBE project. These are presented below:

Implications of Case Study Findings
Appeal to sense of "place"
Emphasize appeal of water-based features of region
Appeal to positive emotions associated with local environment
Appeal to belief systems that support conservation
Link restoration and conservation efforts to economic benefits
Target business and professional audiences
Include more scientific data in information
Support regulations that would enhance RRBE project
Promote more consistent and impartial enforcement of existing regulations
Broaden PAG to include more stakeholder groups (e.g., farming, mining, diversity)
Initiate collaboration with upstream neighbors and politicians
Promote personal distribution networks of restoration/conservation/RBNERR info
Utilize additional electronic channels of communication
Increase access to raw, livestreaming data
Target adjacent properties with data on water conditions
Promote shared values approach to restoration/conservation efforts

Introduction

This research report is the second component of a Nova Southeastern University (NSU) social science study which is being conducted as part of the "Restoring the Rookery Bay Estuary" (RRBE) project. The study was commissioned by the Rookery Bay National Estuarine Research Reserve (RBNERR) to inform its management of the Henderson Creek/Rookery Bay watershed in southwest Florida in a manner that contributes to the restoration of the Rookery Bay Estuary. The social science research project was conducted as an instrumental case study (Creswell, 2013), with the goal of enhancing the RBNERR's capacity to work collaboratively with community stakeholders in their watershed management efforts. In addition to the stakeholder interviews and qualitative data analysis described in this document, the NSU research team previously conducted a systematic literature review, which helped shape the research design described in this report and informed the interpretation of the findings, as presented in the discussion section in this report.

Rookery Bay Estuary

The Rookery Bay Estuary is located in southwest Florida, south of Naples and at the western edge of the Everglades. An estuary is a coastal body of water that is partially enclosed in which freshwater from a river or creek mixes with saltwater to create a unique habitat and highly productive ecosystem. Estuaries effectively process a wide range of organic waste through their unique ability to filter and recycle. This environment creates a solid platform for the breeding and development of a wide range of animals including birds, fish, invertebrates, and marine mammals. This waste disposal process and animal habitat depends on a blend of key features including various aquatic vegetation, water quantity, and quality, variance of the freshwater inflows, and appropriate nutrient levels (Olsen, Padma & Richter, n.d.). This sensitive balance can be affected by direct and indirect human interaction that can be both immediate and systemic.

Lammers et al. (2013) described historical changes in Rookery Bay extending back 300 years. These changes included a localized natural alteration of vegetation around 1750, a change in the stability of estuary conditions in the late 1800s aligned with initial Henderson Creek settlements, and a shift in water inflows in the Bay that coincided with the period of population growth in Collier County during the1960s. Concurrent with the newfound pressures to the estuary, a report from the Conservation Foundation (Clark, 1975) identified the importance of viewing Rookery Bay as part of a much larger water system with the establishment of consistent water policies.

Rookery Bay National Estuarine Research Reserve

By 1980, the federal government was involved in Rookery Bay with the creation of an estuarine sanctuary at the site. The Rookery Bay National Estuarine Research Reserve (RBNERR), which comes under the purview of the Florida Department of Environmental Protection, is considered an almost-pristine example of a subtropical mangrove-forested estuary (nerrs.noaa.gov, 2013). The area encompassed within the RBNERR extends beyond Rookery Bay itself. It boasts 70,000 acres of open water, as well as another 40,000 acres comprised of mangroves, marshes, hammocks, and scrub. Approximately 150 species of birds inhabit the reserve, as well as numerous threatened and endangered animals. Yet the estuary has experienced the impacts of population growth and associated development in Collier County.

Restoring the Rookery Bay Estuary Project

The Restoring the Rookery Bay Estuary (RRBE) project is a research project that will support the Rookery Bay National Estuarine Research Reserve's (RBNERR) efforts to manage the Henderson Creek/Rookery Bay watershed and contribute to the broader goal of restoring the Rookery Bay Estuary to optimal conditions. The project encompasses several facets, including hydrologic modeling to present historic and current conditions of the Rookery Bay Estuary watershed; the identification of ecological indicators to aid in establishing desired outcomes and specific targets in terms of aquatic conditions and wildlife and vegetation in the estuary; and social science research, which is the focus of this report.

Using an instrumental case study approach (Creswell, 2013), this research seeks to assist the RBNERR in establishing mechanisms for working collaboratively with the community on adaptive water management decision-making. The project has encompassed two phases to date: a) a systematic literature review; and b) qualitative data collection and analysis involving stakeholder interviews. Both facets of the project are intended to inform the development and implementation of communication and engagement strategies to support the restoration of the Rookery Bay Estuary. It is important to note that while the existing literature includes research on natural features of the Rookery Bay Estuary, it appears that no social science research has been conducted on the watershed; thus, the RRBE study is making a significant contribution to this gap in the research literature. This document presents the methodology and results of the qualitative data collection and analysis which included in-depth stakeholder interviews.

Methodology

The review of literature addressing attitudes, beliefs, and behaviors related to water in Florida highlighted the importance of determining local attitudes about water prior to an intervention. Using an instrumental case study approach (Creswell, 2013), this study was designed to assist the RBNERR in establishing mechanisms for working collaboratively with the community on adaptive water management decision-making. The purpose of this case study is threefold:

4. to understand attitudes and behaviors related to water usage among residents in the RBNERR watershed;
5. to explore community members' interest and experience in engaging in water-related decision-making in personal and professional contexts; and
6. to describe community members' experiences of receiving and responding to information about water-related issues.

Study findings will contribute to the development of collaborative problem-solving approaches addressing local water issues and to the design of public educational initiatives related to water conservation/management in the RBNERR watershed. This research project will assist the RBNERR in its effort to establish one or more mechanisms for working collaboratively with the community on adaptive management decision-making in the context of fresh water usage. Study findings will also support effective water-related decision-making in the region, in order to support the water needs of the estuary while also meeting the water needs of the watershed's human residents.

Olsen, Padma, and Richter (n.d.) note that an integrated approach to water resource management has been adopted by international organizations, including the United Nations system. Hoehn and Thapa (2009) suggest that active participation of local communities in protected area management is now a priority for conservation programs across the globe. They note that communities are encouraged to participate in the implementation of conservation initiatives but may be excluded from decision-making related to design and development.

It is important to understand stakeholders' attitudes and perceptions because they influence water management decisions (Bischof, 2010; Rockloff & Lockie, 2004). Scholars have also noted the importance of including local knowledge in the design of water management mechanisms (de Vries, 2005) and conservation educational initiatives (Robelia & Murphy, 2012). Assessing the opinions and potential areas of conflict among stakeholders will contribute to the development of more effective strategies for water management and conservation in the RBNERR.

Research Design

In addition to lending support for the plan to collect data regarding the attitudes and behaviors of stakeholders in the Rookery Bay Reserve watershed, the literature also supported the viability of the planned methodology for the next phase of social science research, namely, case study research. The benefits of qualitative research include its ability to provide more in-depth description and a more holistic explanation of what is taking place in a particular community as it pertains to water-related attitudes and behaviors. Among the benefits of case study methodology, are the inclusion of multiple sources of data and a focus on the context of the case (Creswell, 2013). As Ferreyra, de Loe, and Kreutzwiser (2008) observed,

> Water management issues, often embedded in seemingly endless ecological, social and political interactions across temporal and spatial scales, are context-dependent, socially constructed and technically uncertain. They are shaped, among other things, by the interplay of multiple legitimate perspectives and problem definitions, and grounded in the wide range of stakeholder values, worldviews and histories found in increasingly pluralistic and fragmented societies. (pp. 304-305)

As this quote suggested, when addressing water management issues, it is critical to recognize and understand the range of perspectives among stakeholders within a community, and the case study methodology is ideally suited to identify and understand such perspectives. In this case, a qualitative approach will enable the researchers to identify stakeholders' understandings of water, and the ways in which their water-related attitudes and behaviors may differ between personal and professional contexts. The characteristics of qualitative case study research are summarized in Box 1 below.

***Box 1*. Characteristics of Qualitative Case Study Research**

- Flexible research design
- Natural context (not controlled, as an experiment)
- Contemporary (not historical research)
- Case is bounded by time and/or place
- Focus may be on individuals, groups, organizations, process, system, activity, partnerships, communities, relationships, decisions
- Goal is analytic generalization, rather than statistical generalization
- Research questions for case study begin with How, Why, What
- Purposive sampling
- Multiple sources of data: documents, interviews, observation
- Holistic analysis, thematic emphasis
- Report of findings: Narrative augmented by tables and figures

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Sample

The research literature noted that it is important to collect data specific to the local community prior to implementing a conservation-related intervention (Hoehn & Thapa, 2009). In addition, within any region, there are multiple attitudes and perspectives related to water and conservation among the stakeholders (Sang, 2008). These findings in the literature supported the decision to gather primary data from a range of stakeholders to better understand the attitudes, perceptions, and behaviors related to water of individuals living and working in the Rookery Bay Estuary watershed.

There are many definitions of what constitutes a stakeholder (Mitchell et al., 1997) and many descriptions tie back to the definition offered by Freeman: "A stakeholder is any group or individual who can affect or is affected by the achievement of the organization's objective" (Freeman, 1984, p. 46). In fact, Reed et al. (2009) applied this definition to stakeholders in natural resource management. "Most conservationists focus on engaging those who hold a stake (whether directly or indirectly) in the scope of their initiative, rather than attempting to meaningfully engage with the wide public" (Reed, 2008, p. 2418). Another common description of a stakeholder is: "Any group of people organized, who share a common interest or stake in a particular or system" (Grimble and Wellard, 1997).

In terms of research participants to consider for the qualitative interviews, the literature indicated that it may be helpful to include leaders of homeowners associations due to their local influence (Wyman et al., 2012), those associated with nature-based

tourism (Shrestha et al., 2007), as well as both farmers and residents, urban and rural stakeholders (Sang, 2008). The qualitative research process itself acts as an intervention in the sense that it allows the voices of community members to be heard, both in the interview process and in the published findings; thus, it is useful to consider whose voices in the community have not been heard on water and conservation related issues in the Rookery Bay watershed. All of these considerations stemming from the systematic literature review were taken account in the recruitment process described below. At a minimum, potential participants had to meet the following inclusion criteria:

- 18 years of age and older
- Lives or works in the RBNERR watershed area
- Able to speak and understand English
- Express willingness to participate

The sampling process was also designed with input from the Project Advisory Group (PAG) members. While some PAG members wanted interviews only with policy-makers with the goal of impacting water management decision-making, other PAG members highlighted the importance of the final educational and outreach goals of the project, and thus felt it was important to include a broader range of community members. The discussion reinforced the NSU team's view that it is important to include interviewees from both arenas: diverse community stakeholder groups and those directly engaged in water management decision-making at the agency and governmental levels.

Recruitment.

The recruitment process encompassed several steps, as presented in Figure 1 and described in detail below.

Figure 1. Steps of recruitment process

Recruitment began in April 2014 and continued through the month of May for the first group of participants: diverse community stakeholders. Recruitment began in June

and continued through mid-August for the second group of participants: those engaged in water-related decision-making or water management at the governmental/agency level. Several of the potential participants had been initially identified with the assistance of the PAG; other potential participants were identified through participant referrals and web-based research. Potential participants were contacted by the Principle Investigator (PI) or Co-Investigators (Co-Is) by telephone and/or email. Dozens of potential participants were contacted. These potential participants represented multiple stakeholder groups throughout the Rookery Bay Estuary Watershed, including agricultural interests, building developments, home owners associations, golf courses, fishing interests, various levels of government, and many others, thus providing a purposive sample in keeping with the research goals of this instrumental case study.

A member of the research team called potential participants to describe the study and invite them to participate in the study by taking part in an interview. Following the initial phone call, any potential participant who indicated an interest in being in the study was sent a follow-up email (see Appendix A) which summarized the study goals, provided important information about the process, as well as the participant's right to leave the study at any time. The email invited those who decided to participate to respond by email or phone to ask any questions and/or schedule the interview; thus, participants had an opportunity to consider whether they wished to participate and contacted the research team directly. Those who did not respond were presumed to have chosen not to participate.

When a potential participant responded to the email, the researcher answered any questions and then scheduled the interview. If the interview took place face-to-face, prior to starting the interview, the researcher provided the consent form (see Appendix B), explained the contents, and allowed the participant to take as much time as desired to review the form and ask any questions. The researcher answered all questions to their satisfaction and informed the participant that he or she could withdraw from the study at any time, and that he or she had control over what information to share and what information to keep private. Anyone who agreed to participate in the study signed the consent form prior to the start of the interview. If the participant was interviewed by telephone, the researcher provided instructions on how to access the conference call in advance. For those who preferred a telephone interview, the consent forms were provided by email/regular mail. Four of the participants in the study opted to conduct the interview by telephone; the rest were conducted face to face.

Participants.

Our expectation was to interview 12-15 participants, up to a maximum of 20 participants. During the preliminary period of recruitment, we contacted numerous individuals representing stakeholder groups identified by the Project Advisory Group.

The interviews that were completed in April included an irrigation manager in a large agricultural business, a golf course superintendent at a golf and country club in Naples near Rookery Bay Estuary, and someone from the Community Association of Managers of Marco Island. The interviews that were completed in May included someone from a local environmental organization, a leader in a homeowners' association, someone from the road construction business, someone from an irrigation company, and someone from the tourism industry. In June, July, and August our recruitment efforts focused on those in government or agency positions more directly engaged with water management or water-related decisions. Initially we encountered resistance among this category of stakeholders. Providing the interview protocol increased the level of comfort among those working in government agencies or related organizations, as did communication supportive of the study from individuals at the RBNERR.

In all, we contacted 76 individuals over five months between April and August, including 25 women and 51 men. 26 of those people contacted who did not participate were from community stakeholder groups, including 8 from area schools; while 35 were associated in some way with government at the agency, advisory board, or elected level. In some cases, the individuals contacted who did not participate received information about the project and decided not to take part; in many cases, there was no response to an initial contact by phone or email.

Ultimately we completed in-depth interviews with a total of 15 participants divided roughly in half between the two participant categories, as shown in Table 1, thus meeting our recruitment goals (see next page). One item of interest pertaining to recruitment was the dominance of males associated with water use or water management at the professional level.

Table 1. Participant Demographics

Participant #	Age Range	Gender	Occupation	Years in SW FL
1	30-59	M	Golf course management	14
2	60 or older	M	Farming	21
3	60 or older	M	Community association management	19
4	30-59	M	Conservation education	8
5	30-59	M	Mining & roads	30
6	60 or older	M	Realtor; HOA leader	13
7	30-59	M	Irrigation; landscaping	40
8	60 or older	M	Tourism official	35
9	30-59	M	Land use planner for county	41
10	60 or older	M	Project manager; leadership program volunteer	3.5
11	30-59	M	Environmental specialist in government agency	12
12	60 or older	M	Engineer, member of county planning commission	23
13	60 or older	M	Official for county soil and water conservation district	61
14	60 or older	M	Elected official at local level	16
15	60 or older	F	Elected official at county level	40

Data Collection

Once the informed consent process was completed, the participants took part in an interview conducted by a member of the research team either in person or by telephone.

The interview was recorded on a digital recorder if conducted in person or via freeconferencecall.com if conducted via telephone. The interviews lasted between 40 and 80 minutes. As a token of appreciation, participants received passes to the Rookery Bay National Estuarine Research Reserve, along with a RBNERR mug and pen.

The literature reviewed in Phase I of the social science research suggested including questions that addressed the participants' sense of place and understanding of the environment, as well as water-related attitudes and behaviors. The interview protocol developed for the interviews was designed to collect data on these issues (see Box 1).

The literature suggested that face-to-face interviews themselves can help to promote stakeholder engagement in water management issues (Slemp, 2006). With that in mind, the research term used a semi-structured interview guide, which allowed for flexibility in the interview process based on participant interest and responses. All interviews were transcribed verbatim by the research team.

In addition to the in-depth interviews, data collection included a review of minutes of the Project Advisory Group meetings, which provided contextual information relevant to the project.

***Box 2*. Interview Guide**

1. Would you please describe how you use water (freshwater or marine) in your daily life, both for personal and professional purposes?
2. Are there differences in the way you think about water in your personal and professional contexts?
3. How do you make decisions about how much freshwater to use at home? At work?
4. What would you say is most important to you about freshwater?
5. Do you think conserving freshwater is important or necessary? What affect would freshwater conservation have on the community?
6. How would you describe the local natural environment?
7. What would you say is most important to you about the local environment?
8. How do you feel about living in this area? What do you like about living in this area? How could this area be a better place to live?
9. What is your knowledge and relationship with the coastal waters, such as beaches, bays and waterways (in the region)? Tell me what you know about estuaries and why they are important?
10. What do you think are the biggest threats to the health of estuaries and coastal waters?
11. What experiences have you had with stormwater/rainwater management or flooding/flood control? (Home or business?)
12. Do you think community members have a responsibility to manage stormwater?
13. What recommendations would you have for water managers in this area, if any?
14. How would you like to be included in water management decisions, if at all?
15. What do you know about the Rookery Bay National Estuarine Research Reserve?
16. How do you get information about the condition of Rookery Bay?
17. How would you like to get information about Rookery Bay and water conditions?

Supplemental questions

1. What, if any, conflicts have you experienced related to water use or water management?
2. How did you handle those conflicts?
3. Do you think there is a tension between the economic, environmental, and social aspects of water use? Please explain.
4. Do you have any differences in your own attitudes about the economic, versus environmental, versus social aspects of water use? Could you share an example?
5. Do you notice any differences in your behaviors related to these different aspects of water use? Could you provide any examples?
6. How do you go about dealing with these tensions between economic, environmental, and social aspects of water use?

Data Analysis

Data analysis followed the standards for qualitative case studies and included two cycles of coding (Saldaña, 2013), followed by the development of themes. The steps of the analysis process are depicted in Figure 2 and described in detail below.
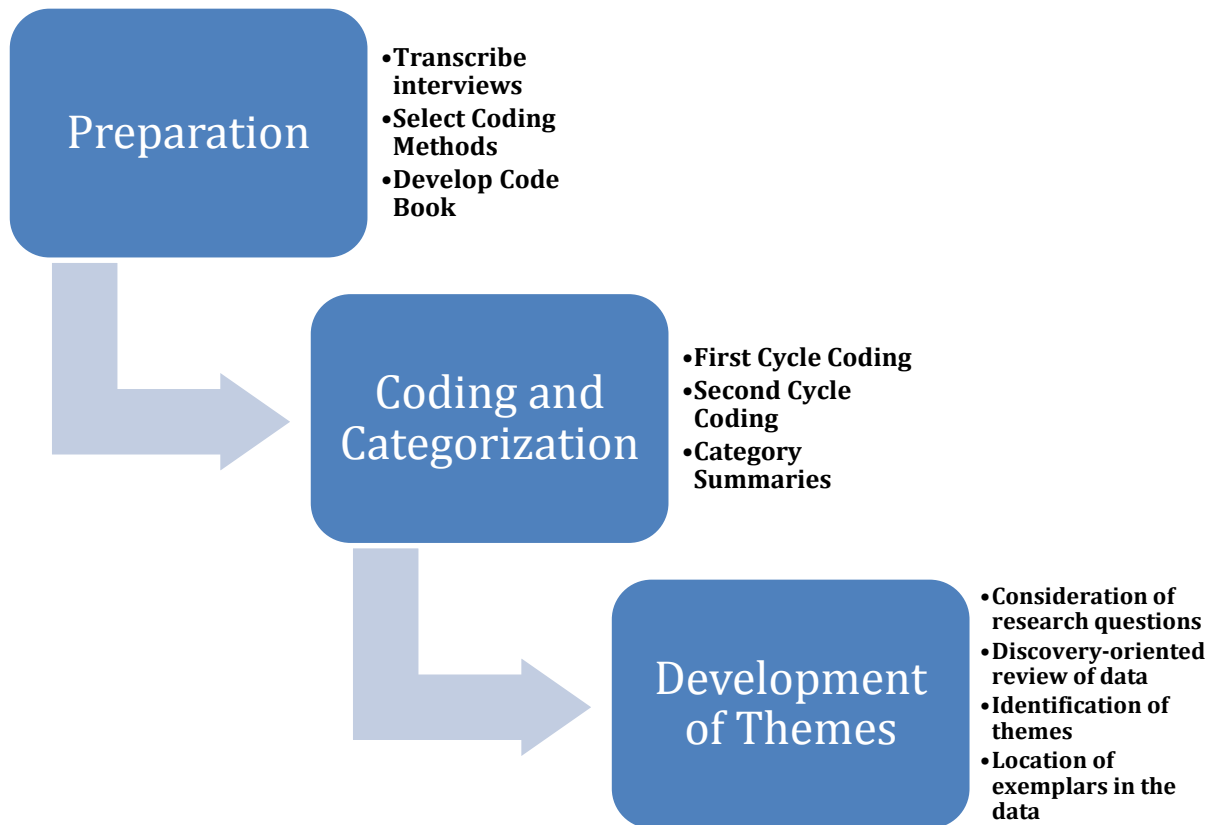
Figure 2. Steps of Data Analysis

Research team preparation.

In June, the research team took part in a data analysis workshop led by the Principle Investigator (PI), Robin Cooper, over two full days at the NSU main campus. This workshop included training in how to develop a data analysis plan for qualitative case study research, how to develop a code book for inter-rater reliability in a qualitative study, how to conduct first and second cycle coding, and how to use Microsoft Word Review Tools for coding, as well as practice coding and categorization with review and feedback as preparation for conducting analysis of the interview transcripts.

Code book.

As part of the data analysis workshop, the team created a code book for the project's data analysis (see Appendix C). A qualitative code book is a document that indicates the coding methods employed and also lists and defines the codes used in the analysis process. This technique is particularly useful in studies that involve more than one analyst; by using the code book to guide the coding process, analysts are better able to provide consistency in the coding process across the research team. For this study, five qualitative coding methods were selected as appropriate for both qualitative case study research and the research objectives of the RRBE social science research project. These included descriptive coding, values coding, emotion coding, versus coding, and in vivo coding. In addition, major codes to include in the data analysis process were identified based upon the research questions of the case study, and the associated interview protocol. These 13 key codes are listed below in Box 3:

Box 3. **Initial Codes**

1. Attitudes
2. Beliefs
3. Behaviors
4. Decisions
5. Personal/Professional
6. Collaboration
7. Intervention
8. Education
9. Threats
10. Shared Value
11. Tension
12. Conflict
13. Conflict Management

First cycle coding.

The first cycle included several coding methods, defined in Table 2.

Table 2. Definitions of Coding Methods

Coding Method	Definition	Source of Definition
Emotion Coding (E)	Emotion codes label the emotions recalled and/or experienced by the participant, or inferred by the researcher about the participant.	Saldana, 2013, p. 105
Values Coding (V)	Values coding is the application of codes onto qualitative data that reflect a participant's values, attitudes, and beliefs, representing his or her perspectives or worldview.	Saldana, 2013, p. 110
Descriptive Coding (D)	Descriptive coding summarizes in a word or short phrase-most often as a noun-the basic topic of a passage of qualitative data. Descriptive codes were used to capture the experiences of the participants.	Saldana, 2013, p. 88
Versus Coding (VS)	Versus codes identify in dichotomous or binary terms the individual's, group's, social system's, organization's, phenomena, processes, concepts, etc., in direct conflict with each other.	Saldana, 2013, p. 115
In Vivo Coding (quote marks)	In vivo codes are codes consisting of a word or short phrase from the actual language found in the qualitative data record.	Saldana, 2013, p. 91

Affective coding methods explore subjective qualities of the human experience by acknowledging and naming them. Two types of affective coding were used in this study: emotion coding and values coding. Emotion coding labels feelings participants may have

experienced related to the research topic. Values coding assesses the research participants' integrated value, attitude, and belief system and is particularly applicable to case studies and the first research question in this study. Versus coding relates to the identification of power, and identifying which individuals, groups, or systems are struggling for such power. This approach applies to situations where possible conflicts or competing goals may exist among research participants (Saldaña, 2013), and is pertinent to the second research question related to water management decision-making. Descriptive coding applies broadly to capture the experience of participants related to the topic, while In Vivo coding is a coding method which uses the participant's own words as the code; the use of quote marks indicates these codes are verbatim excerpts from the transcript.

Following the completion of the data analysis workshop, the team completed first cycle coding of the interview transcripts. All coding was done electronically, both for efficiency and as a best practice for environmentally-friendly research. The first cycle coding included the following elements:

- Identification of relevant data in the interview transcript
- Highlighting of relevant excerpt via Review Tools
- Insertion of Comment Balloon in margin
- Coding of data—coding included topical code (e.g., Behavior) as well as coding method (e.g, V for values)
- Notation of brief memo within comment balloon summarizing content of excerpt

As a measure of quality control, each research assistant sent the coded transcripts he completed to the other research assistant for review and refinement before forwarding it to the PI. The PI then provided a second review, and edited the coding within the comment balloons, in some cases adding or removing codes and comments as needed.

Second cycle coding.

Following completion of first cycle coding, the team conducted second cycle coding. For this study the team employed pattern coding, which involved categorizing the data and codes according to the major topics and patterns emerging in the data and identified as significant based on the research questions. Pattern matching and explanation building are common techniques used in the second stage of coding in case study research (Yin, 2014). To support explanation building, the team generated brief narrative summaries of the content associated with each category for each participant. These summaries constituted initial theoretical statements which contributed to the development of themes. The content summaries also provided descriptive data that was helpful in composing the participant summaries.

Development of themes.

As the final stage of the data analysis process, the research team developed multiple themes to capture the key concepts emergent in the data and identified through the analysis process. The development of themes took place in three steps: consideration of research questions; discovery-oriented review of data; and identification of themes, which included location of supporting evidence in the data.

First, the research team met to consider the entire set of data analysis documents. While first and second cycle coding had been completed on an individual level—that is, the analysis focused on the experience and perceptions of each participant—at this stage, the research team looked across all participants to identify common experiences and perspectives. As a technique to aid this process, which involved interpretation and abstraction, the research team examined the data and the analysis through the lens of each research question. Doing so assisted the team in noting those shared experiences and key concepts that were most relevant to this study. Following this step, the team also reflected upon the analysis to consider what was suprising in the data, what aspects of the experiences or perspectives of participants were unexpected or contradictory. This aspect of the analysis reflects the discovery-oriented approach of qualitative inquiry, which looks for findings grounded in the data and approaches the research questions from an open-minded stance. Finally, as preliminary themes were identified, the team then located quotes from participants that served as exemplars of each theme—thus providing evidence in the data to support the findings. These findings are presented in the following section.

Results

The analysis process described in the previous section led to the identification of several themes associated with each of the three areas of focus identified in the research questions and research objectives:

1. to understand attitudes and behaviors related to water usage among residents in the RBNERR watershed;
2. to explore community members' interest and experience in engaging in water-related decision-making in personal and professional contexts; and
3. to describe community members' experiences of receiving and responding to information about water-related issues.

These findings will be presented below, organized by a summary of the individual participants' perspectives followed by thematic results related to the objectives presented above.

Participant Summaries

Participant 1 (P1)

P1 is employed in golf course management; he is between the ages of 30 and 59 and has lived in southwest Florida for the past 14 years. He "absolutely loves" living in the region, and most appreciates the weather, the environmental complexity, and the schools and enjoys a lot of water-based recreation. The quality and cleanliness of the local freshwater is a priority for P1, and he feels frustrated with what he perceives as others' lack of concern about water quality. He believes that one should "treat the environment on the property the same as you would your other assets." P1 sees himself as a conservationist, rather than an environmentalist. P1 notes that the conservation behaviors from the golf course make an impact on his personal conservation behaviors such as turning off faucets and doing only full loads of laundry, and conducting home water testing.

The golf course is near the Rookery Bay Estuary, and testing is done to monitor the potential threat. Contaminants and pollutants, including metals and chemicals, from much of east Naples drain into the golf course area and concentrate near a single point of exit into the Rookery Bay area. P1 does extensive scientific data collection at the golf course and asserts that he goes beyond regulatory requirements related to water testing. He believes that in spite of the environmental efforts within the golf course community, the golf course industry is still trying to recover from its long-standing poor environmental image.

P1 feels that regulations have only a limited impact on the environment because

they seem focused on limited issues such as chlorides. He believes that greater consistency in enforcement, more effective regulations, and weir structure improvements are necessary. He notes that there is less one-on-one interaction with the Rookery Bay staff than he would have anticipated, and as a result he is unsure about how much science is happening at RBNERR. Because of his level of knowledge, he finds the reserve materials to be often overly simple and restating existing information. He states that most of his information about Rookery Bay comes from local fishermen. More broadly, he believes that conservation education in the local schools is effectively presented and has a positive effect on the entire community.

P1 would "absolutely" like to participate in water management decisions. He would especially like input in storm water runoff and drainage that goes through their property. He observes that resource management, including water restrictions, without consideration or understanding of the stakeholders creates conflict. Additionally, lack of consistency in enforcement, information dissemination and treatment of stakeholders is frustrating and creates conflict. Also, others who chose not to follow guidelines make life more difficult for everyone, which adds tension. P1 believes that the best way to deal with conflict is to create openness and, if necessary, go directly to the source. Decisions that consider social conscientiousness, environmental awareness, and financial resources can lead to successful outcomes and a sense of community pride.

Participant 2 (P2)

P2 is a farmer who is in the 60 or older age range. He has lived in southwest Florida for 21 years. He used to participate in saltwater recreation extensively, but now spends time RVing. P2 likes the area, but feels there is a tendency to overdo everything, and he has a concern about the population increase. This concern is tied to both an increase in numbers and the related traffic congestion, and to the growing diversity which he believes can result in community members who don't share the same ideals. Additionally, he feels that farmers are not wanted in the area. He perceives a tension between some who see (and want) the area as rural and others who see (and want) it as urban. He observes, everybody is "in this together, and we all have to do the best we can."

P2 notes that farmers have always been about reuse and conservation. He uses low volume, drip irrigation from the aquifer to water crops. His water use practices also include slow fertigation, water retention, and extensive technology-based testing/monitoring. Water management practices include water quality testing, saltwater intrusion management, and participation in multiple water-related studies. Using a decision framework and an extensive technology system, the IFAS-based system allows for constant adjustments based on the continually changing environment.

P2 believes improper and over watering, over fertilizing, and runoff are all threats. He is excited about restoration projects, but feels that there is not enough action and would like more water storage. He notes that environmentally conscious actions often take financial resources to implement. SWFWMD cost sharing programs are effective at providing resources to pay for environmentally positive actions and purchases.

P2 receives his information about the water status from various news sources, online resources, and word-of-mouth. He used to also get it from the school system when his children were attending. He has found bias in the information and would like a more balanced presentation including business and scientific perspectives. He has limited knowledge of the RBNERR. P2 has limited time but would like to see someone representing agriculture interests involved in the water management decision making. He believes that agriculture should be represented in large scale decisions and that there is a need to be wary of reactionary decision making. He believes that conflict comes from misinformation and misunderstanding, and he notes that it is easy to justify your own actions and blame others. The participant believes that following regulations and maintaining good relationships avoids most conflicts.

Participant 3 (P3)

P3 is a male who is 60 or older and has resided in the Marco Island area for 19 years; he believes that Marco Island is the nicest place to live. P3 uses water for recreational activities and considers the beach a motive to live in area. He is currently employed by a community association on Marco Island; he has been in his current position for six years and has been active on the advisory board for the last 12 years. He notes that the development of land within the past two years is a direct cause of 2,500 additional businesses and houses being part of the area. This expansion has led to wildlife migrating to locations previously uninhabited.

P3 feels that the community as a whole should have a better understanding of water-related issues. He spoke of attending meetings at the city council where it was explained to members of the community that water comes from the North to the South and if the North properly treated the water, the city burden would be less since the water would need less treatment. P3 gathers most water-related information from the internet or local newspapers, but P3 wishes there were additional information on the city website to inform owners about water-related matters. P3 also wants education on the Gordon River, and additional education on water conservation.

P3 feels that residents should be creative with landscaping techniques to be eco-friendly and maximize water use. P3 is also against building additional golf courses since it also requires the building of additional residences. He believes storm water should be used to irrigate land but believes there are no tanks available to store the water. P3 makes

water consumption decisions on a monthly basis depending on needs. He noted that currently there is a tension between the city and homeowners due to increasing water rates. It is P3's perception that city officials assume that because wealthy people inhabit high rises, that they should pay higher water rates.

P3 sees a need for better communication between the community and managers on water issues and hopes that Marco Island residents can come together as a family to deal with water-related issues. He stated that the homeowners association spent time with city managers and expressed their concerns. P3 wants to be involved with management to avoid higher water rates, and wants equal fees for both houses and condos. He believes that even if the cost goes up, the process needs to be fairer to avoid conflict. P3 has limited time to be on a formal decision-making board (he has been in the past), but he would be available to attend information meetings. Also, he does interact with decision makers on a personal level to convey his opinions.

Participant 4 (P4)

P4 is between the ages of 30-59 and is currently working in a local environmental organization on conservation education. He has lived in southwest Florida for the past eight years. P4 feels that his water practices remain the same at home and at work, since one should be consistent and practice what one preaches. Water values are important at home. P4 teaches his child water conservation and takes pride in planting vegetables at his home recognizing that the environment is a part of his everyday life. At home P4 carefully watches plants to determine when they need water to minimize the use of unnecessary water. He has a drip water irrigation system to conserve water, and feels that many inhabitants of the area are not responsible since they waste water with outdated irrigation systems. P4 uses scientific information to make decisions on water-related matters at work. One way of conserving water is monitoring rainwater and re-using that water for irrigation purposes.

P4 believes the community should take responsibility in the conservation of local water. He observes that community members seem receptive to different environmental ideas, in part because the environment is one motivation for living in the area. At the same time, he notes that changing the minds of others regarding environmental issues is tough. P4 collaborates with Rookery Bay through the Greenscapes program but has no idea how the average citizen gets involved in water-related activities. He suggests that getting involved with organizations is a great way to collaborate and that education is the key to getting people involved. P4 has been involved in planting buffer zones to keep fertilizers out of ponds and shows community members the difference in appearance between water that has fertilizer in it versus water without such nutrients. P4 is interested in participating in water management decision-making. Although he is unsure how the average citizen could get involved, he does participate in multiple programs and alliances

through his professional role.

P4 believes that urbanization is a constant threat to natural areas. He notes that the economy of the city is dependent on the environment, and it is therefore in everyone's interest to preserve the environment. While P4 believes Naples is becoming a more progressive city and referred to several movements have been created to think about the environment, he also noted a tension in the community when economic resources are put towards environmental causes. P4 perceives community members as thinking that restrictions on environmental activities are unnecessary and will hurt the economy. P4 believes that man-made bodies of water are more desirable to many community members than natural habitats; this can lead to conflict in allocating financial capital for natural habitats. Education is key to changing the mind of how people perceive natural habitats and water issues. The problem with education is that the process is extremely slow to change the minds of a community at large.

Participant 5 (P5)

P5 is a 30-59 year old male who works in mining and road building. He has lived in southwest Florida for 30 years, coming from a farming community in the Midwest. P5 is happy about living in the area; he recognizes and is concerned about the tension between the wildness and the ongoing development. P5 believes that there is an abundance of water but we should still conserve anyway. He appreciates the benefits of the swamp and the filtration of the estuaries. While clean water is important, P5 believes that nature will adapt to changes in the environment.

In his personal life, P5 describes himself as minimalistic in terms of water use. His family is on well water and septic, and they also have rain barrels. Personal decisions related to water use are based on cost and plant damage. He tries to conserve and recognizes the trade off between watering the fruit trees and not watering the lawn or washing the cars. He is actively involved in water recreation including boating and swimming.

Professionally, P5 sees water as a tool and a resource to be managed. His company uses recirculating water continuously in mining for washing aggregate rock, washing trucks, watering roads to keep the dust down, and other mining efforts. Basic tools are used to monitor water levels. P5 observes that currently water management accounts for a large portion of the cost of building roads. He notes that there is a tradeoff between what some would consider a dirty industry and the need for roads and development.

P5 emphasizes that there are a lot of regulations and they are always growing, and he has conflicted feelings about these regulations. They determine what you are going to do or not do in spite of what you would like to do. The actions required by the regulations are expensive, and the public may not understand the impact/tradeoff. The

weir system installation did impact the swings in the water levels. P5 finds himself simultaneously agreeing with and fighting with the interventions. He is frustrated by what he perceives as inconsistency in regulatory enforcement. When speaking of threats to the local environment, P5 indicates that threats include exotic animals and foliage; freshwater dumping and saltwater intrusion; overfishing; and sewage and chemicals. He believes most all of these issues come from poor land management and fishing controls. Additionally, regulations/regulators allow environmentally unfriendly actions.

P5 believes that there is a lack of understanding of existing water management practices. Additionally, he believes that the news and other information providers all have a bias, that there is a lot of misinformation. P5 considers collaboration to be an effective means to both get your point across and learn from others. He notes that community projects are limited in scope and could be more effective if the scope of collaboration was much broader. P5 has limited time but would like to be included in water management decisions. He occasionally voices his opinion and has attempted to participate on committees in the past. Currently he reaches out to those who are decision makers and shares his thoughts with them.

Participant 6 (P6)

P6, age 60 or older, is a realtor and homeowners' association president who is male and has lived in southwest Florida for 13 years. P6 is a self-described farm boy from Illinois who identified himself as a church-going Christian who believes in the Ten Commandments, tries to do what is right and follow the twelve points of the Boy Scout law. He uses freshwater around his home in traditional ways. He lives directly on a saltwater canal and boats and fishes regularly on the saltwater. Before he moved to the area, he had already extensively fished throughout the surrounding area and continues to fish several times a week (including in Rookery Bay). P6 has noted a decline in fish in the Rookery Bay over the years and believes this is due to overfishing. He participated in an oyster farming initiative.

P6 used to think that "water was life," but has realized that too much freshwater can also be a problem. The continued pace of development is an issue that affects water. P6 feels that Naples manages their water better than most places but that water use at luxury venues can be excessive. He perceives that money isn't an issue for people in his community. Additionally, while nearly everyone in the community has a boat, most people do not wash their own cars and many do not live in the area full time. It costs a lot of money to live in his residential community, and the residents realize that money needs to be spent and risks need to be taken for the benefit of the environment. Most people in the community aren't overly concerned with the details of their money (economic) because someone else pays their bills for them, but they are worried about how the canals look (social).

P6 actively shares information throughout his community via email and asks for feedback. The HOA board also regularly meets and solicits feedback. He is also a member of an informal group of other community leaders that regularly hears from government officials. However, P6's efforts toward collaboration are primarily focused on information sharing. P6 receives information online and from government workers. He is satisfied with the information he is receiving and does not want raw data. He readily shares information but doesn't try to change people. P6 does not know much about RBNERR or what they do.

P6 believes the homeowner's responsibility is to pay their taxes and let the government officials figure out the water issues. Freshwater is not currently a political issue like red tide, the dead zone, and the Everglades. P6 feels that the major water-related threats in the region are population increase, red tide, the dead zone, poor surface flow, pollutants, and overfishing. P6 perceived the biggest water-related conflict to be the cost of the water bill. He perceives some competing interests. For example, there is a tension between the exorbitant water bill (economic) and the new sod/grass (environment). Another tension is between the ability of a farmer to make money (economic) and the residue in the runoff that affects the downstream watershed (environmental). Additionally, the cost of shoreline runoff containment (economic) is extreme in relation to the benefit (environmental). He notes that use of reclaimed water, retention ponds, ARS wells, and multiple other upstream initiatives are ongoing. Additionally interventions by government worker outreach and existing regulations make an impact.

P6 feels that understanding reasons for interventions helps you know what to expect and make decisions for the future, even if you do not like those interventions. P6 is open to participating in water management decisions but does not know what opportunities are available to be included and does not consider himself an expert. He does regularly reach out to government officials to share his perspectives.

Participant 7 (P7)

P7 is a male 30-59 years of age who currently works as an irrigation and landscaping specialist. He has lived in the area for about 40 years and his work spans all Collier County. P7 loves the area where he lives, as well as his profession, especially because he has a deep appreciation for the environment. P7 believes that water usage can be controlled, that water is the future and our destiny. He limits the use of water in his personal life due to other expenses, and in his professional life he limits water use because his future work is dependent on water availability. P7 is concerned that irrigation providers are not licensed and tend to not conserve water. Stricter regulation leads to better irrigation systems. He made an investment to add a better irrigation system to his personal property, and uses rock to prolong the longevity of the landscaping. P7 is a

heavy user of saltwater for recreational activities that include boating and fishing. Localized activities save residents capital by allowing them to stay local for water-related activities. P7 suspects that tourists might have the highest consumption of water resources for recreation.

P7 observes that the longevity of fresh water is the most important issue since it is necessary for survival. One of the problems the area is facing is that local contractors lack environmental knowledge and make poor decisions when doing simple irrigation practices. Consumers should realize that initial larger investments on irrigation systems are worthwhile since it helps the environment, and saves the consumer money in the long run. Short-term goals tend to be more important to people, rather than long-term goals. The current population should plan for the future to conserve water and natural resources for future generations. P7 claims that 80% of water in area is used for irrigation, and that contractors do not care about conserving water. Water regulations should be more strict, and if possible population control to avoid overuse of natural resources. In his view, continued urbanization has a negative effect on the local area. P7 feels that fresh water is one of the biggest threats to estuaries, together with the two rivers from up north bringing in pollution. He believes that better regulations are needed to maintain water quality.

P7 would also like to be included in the decision making process for local water management. He believes the draining of canals is not a good decision as it can create algae blooms and other hazards. P7 believes that the South Florida Water Management District is only present when a crisis occurs and that Water Management needs to take a more active role in the community. P7 thinks water management districts need to collaborate with the irrigation society, and that the city made a poor decision to remove the water review board. P7 believes that the city manager has too much power when it comes to water decision making and that community members want to be involved in the decision making process. Greater collaboration and long-term planning should be part of government regulation to avoid future crises.

P7 affirms that education is important so that people recognize the importance of water conservation, and he would like to see additional methods to get the public information on water-related issues. P7 has no knowledge about Rookery Bay and gets most water-related information from local publications and online networking, which he says is a great tool to find pristine spots to fish. P7 perceives that most environmental information deals with hazards currently taking place, and no prevention education is ever provided. It is important to let the consumer know that more water is not necessarily better for irrigation purposes.

Participant 8 (P8)

P8 is over 60 years old and has lived in the state of Florida for 35 years; his current profession is as a tourism official. In his personal life, P8 uses freshwater for

household activities, and his drink of choice is bottled water. At home, he follows all water guidelines as mandated by his homeowner association. He came to the Gulf Coast to enjoy the water and is an active boater; he enjoys promoting water activities to friends and as part of his profession.

P8 believes that community members have a responsibility to manage water responsibly. When one does not respect the environment, negative effects take place. P8 notes that people need to understand that the ecosystem is fragile. Man-made runoffs need to be taken care of to keep the estuary in good shape. He believes man-made diversions have disturbed the health of the estuary. P8 perceives impacts from communities to the North to be the biggest threat to the estuary. He also believes it is important to be aware of saltwater intrusion having an effect on fresh water reservoirs.

P8 acknowledges that he has limited knowledge about estuaries, but it is his perception that collaboration between Rookery Bay and the tourism center is great. Rookery Bay keeps parties informed via the use of email and through their website and newsletters. He feels that for the most part the two organizations work well together. He considers himself involved in water management decision-making in an advisory capacity and sees himself as a good partner to the RBNERR.

It is important to P8 that there is a balance between efforts for environmental preservation and availability of desired natural areas for tourist visitors. P8 notes that tourists are attracted to a clean ecosystem, and if water is not pristine there can be a potential loss of tourism. Thus, there is an economic incentive for residents and tourism to keep the area pristine so that tourists will keep wanting to come back to the area. The tourist agency has to explain to tourists when an environmental hazard occurs, so proactive intervention is necessary to avoid future bad publicity. Restoration is needed so that tourism is not affected. Both water managers and environmental groups must work together to avoid bad publicity. One way that P8 sees to collaborate is through educating members of different groups, which will contribute to positive discussion.

Participant 9 (P9)

P9 is a male land use planner between 30 and 59 who has lived in southwest Florida for 41 years. He uses water in the standard ways at home and office environments and has experienced some flooding in his yard. He sometimes kayaks, goes to the beach, and bird-watches along brackish water. Professionally he evaluates water impact in land use planning and is an advocate for conservation and wise use of water. P9 stated that individual homeowner behavior should include maintaining their local swales and storm grates.

P9 feels that the quantity, quality, and availability of water are the key considerations in terms of freshwater priorities. Conservation, storage, and filtering will be necessary to make this happen. He is satisfied with the environmental information he

receives from the news and Friends of Rookery Bay newsletter and is familiar with a wide variety of research, education, and outreach that occurs through RBNERR. However, he feels that community members can be better notified and included in opportunities to participate in local water management decisions, and he believes that public notification and input should be part of the community water management decisions. P9 believes that the existing government interventions through codes, engineering specs, government planners, etc. all serve to establish a structure to clarify expectation and limit conflict over water management. On the one hand, P9 feels the intervention should be stronger, but on the other hand is frustrated by water restrictions. He recognizes the balancing act that is required by the water management district to meet the needs of the population and the environment. He feels that water conflict management occurs through regulations.

P9 pointed to several environmental threats including invasive species, urbanization, over fishing, boat damage to aquatic habitat, and fertilizer. He suggested that the biggest issue is freshwater pollution, including the quality, quantity, and timing of freshwater flows into the estuaries. Additionally he mentioned the longer term importance of maintaining water control and retention spaces. P9 suggested that individual and community-wide conservation provides personal and community-wide benefits. He expressed a solid understanding of the importance of estuaries and pointed to the integrated aspects of the positive economic impact of people's attraction to and use of the environment and how the longterm success of each benefits the longterm success of the other. He also mentioned the supply limitations and the overlapping water demand from agriculture, industry, residents, and the environment, as well as the challenges of storage, drainage, and the seasonal nature of the weather.

Participant 10 (P10)

P10 is a male retiree who has lived in southwest Florida for three and a half years. He has a broad background ranging from military officer, lobbyist, and business owner in the energy industry. Currently, P10 is actively involved in a leadership program to teach retirees about the challenges and institutions of the area to help them respond to those needs. He notes that government, business, and environmental groups have successfully worked together to design and prioritize projects; however, these projects are limited by funding.

P10 uses a small amount of water for standard household uses. His personal outdoor water use is comprised of recycled gray water that is managed by the development company. The community water system for outdoor use and stormwater is completely and effectively managed by the resort organization and is paid for through taxes and fees.

P10 views managing water as a serious and overwhelming challenge. He

perceives the existence and cleanliness of water as critical, along with the existence and health of the Everglades. He believes that community members are aware of the problem but that funding and personal responsibility are ongoing issues. P10 believes that public and private resources are necessary to address the challenges of urbanization. P10 feels that government should provide boundaries for water use, and community members need to take responsibility within that space. P10 believes that the rules have to be reasonable and people need to take (or be made to take) responsibility for their actions such as fertilizer, chemical, and construction runoff. He feels that better systems, rules, enforcement, and positive actions would better balance the environmental issues with the demands of growth.

P10 identifies several threats to local water; these include population increases that impact the total supply of water and seasonal weather patterns that exacerbate water problems. Additionally, he suggests that 50-60% of the glades have been developed (e.g., highways, parking lots, buildings, etc.) already thereby limiting filtration capability. Another threat comes from upstream chemicals and other contamination runoff. P10 observes, "The people in this county have to decide just how important it is that they maintain the viability of the estuaries and waterways, for the long term." In his opinion, one significant point of conflict is the policy fight between different levels of government. Potentially the largest conflict is between those in central Florida versus those on the coast relative to the source of monies needed to implement restoration projects. P10 believes that community members with similar cultural backgrounds are able to better deal with difficult government policy issues. Additionally, in his view, background information for decision making needs to be provided by a small group of scientists who have a solid understanding of what needs to be done.

P10 is not sure how widely the RBNERR public information program is distributed, but he notes that there is a mass of environmental groups in the area so it is hard to advance one specific cause, especially if it is not perceived as the worst. He believes that solutions need to be beneficial to all stakeholders including the environment and that solutions can't be a zero sum game. "A common group with an outside objective" can eliminate the sense of conflict and provide solutions.

Participant 11 (P11)

P11 is a male between 30 and 59 who is an environmental specialist working for a government body. He has lived in southwest Florida for 12 years. Personally P11 uses water in the standard ways at home and tries not to waste water but doesn't go out of his way to conserve it either. He notes that his use is often based on the costs rather than stewardship and admits that he is probably guilty of not always using water correctly. Professionally P11 is involved with evaluating freshwater and land use. He bases his decisions strictly on the rules and regulations.

P11 is concerned about the scarcity of the water and does not feel that others realize how little freshwater exists based on their unnecessary water use. He feels that people ignore the problems and threats and focus on themselves and their wants until it's too late. P11 notes that even the people who oppose development are living where there was wilderness just 10 years ago. P11 appreciates that some areas are being set aside from development; he mentioned the preserves and resource protection established throughout the area. However, it is his perception that the preserves that are set aside are often not maintained and limited enforcement occurs. Additionally, P11 believes money and political influences have been used to bend the rules. Because of the significant past water drainage it is difficult to restore and intervene toward rehydration. He believes that current water use cannot keep up with the supply. P11 believes that when changes are made to the hydrology of the area, it is usually based on how it affects people instead of how it affects the environment.

P11 noted that nearly every commercial fish spent some time in the estuaries (from the estuary to the plate!). He mentioned the following perceived threats: greed, invasive species, a lower water table, loss of barrier coastlines, changes in salinity, chemicals, overgrowth in preserve. He noted that at times, wetlands that look fine are no longer functioning as wetlands because of excessive drainage. P11 believes that people in the community often solve algae problems with chemicals and ignore water use restrictions. He feels that there is no sense of community, and it is more common to call code enforcement than talk to your neighbors.

P11 feels there is some local collaboration but would like to see more. He mentioned that collaboration could be misconstrued as collusion, which threatens the collaboration process. P11 also points to the connection between education and collaboration. He believes collaboration comes from education. In his view, real change can't be forced; it has to come through education for change to occur.

P11 stated that everything is economic here. Sacrifices and the consideration of opposing pressures are necessary to maintain the quality of life; however, greed and population increases often push the balance toward unsustainability and permanently changing the hydrology. Additionally, people don't understand the commercial value of wetlands. In spite of the challenges, P11 believes that a decent job of environmental management still happens, and that rules and regulations are a way of limiting and managing conflict.

Participant 12 (P12)

P12 is a retired male, over 60 years of age, who has lived in southwest Florida over 30 years. He currently serves on the local planning commission. P12 uses water in the standard ways at home and believes he uses less than the average homeowner. He likes to kayak in both fresh and saltwater, and raises an experimental Cyprus tree near his

home. Professionally he used to deal with storm water management. P12 feels his personal and professional behaviors align and makes his decisions in line with his engineering background. His engineering background including water management, hydrology, hydraulics, and water flow significantly affects how he views and responds to the world around him, which includes his participation on volunteer boards and public meetings. He believes people in the area are careful with water use primarily because they want to limit their costs.

P12 believes everything depends on water and that freshwater is life. He listed several threats including freshwater pollution, nutrients, and powerboats & jet skis. He specifically mentioned the challenge to fish when freshwater flows into the estuary too quickly and does not properly mix with the saltwater. P12 focused heavily on the permitting system, the power of permits, and how difficult the permits can be to receive. He also mentioned the importance of digging deep lakes for water storage as well as the dangers of allowing mitigation in a different basin. P12 would like to see more information on Rookery Bay available to the general public via electronic media.

P12 pointed to the benefit of openness and involving stakeholders in water discussions and decisions, including stakeholders representing agriculture. He noted that he participates in public meetings related to water management and tries to persuade others to align with him point of view, but he also expressed concern about the monologues that occur. He hopes that these meetings will lead to good decisions but suggests that they don't always. P12 pointed to the tension between agriculture, golf courses, residents, and the environment and to differences of perspectives regarding the level of conservation necessary, what constitutes wildness, and what constitutes an urban environment. Additionally, P12 mentioned tensions between the government and citizens who are suspicious. He believes there is a need for greater interaction between RBNERR and the upstream stakeholders. P12 has experienced water-related conflict around water drainage and digging deep lakes for water storage. He points to a lack of understanding as a source of conflict. P12 believes that the best conflict management tool is common sense, and he feels that engineers have the solutions. He suggests that you can reason with some and not with others.

Participant 13 (P13)

P13 is a male who is 60 or older who has lived in southwest Florida for over 60 years. He works with the county soil and water conservation district and a water symposium. P13 kayaks in fresh and saltwater, irrigates from a retention pond, and has a wide range of native plants that are raised naturally. P13 believes that the amount of water is what is the most important and thinks the focus should be on returning the environment back to its natural state as much as is reasonably possible so that it can achieve balance and be allowed to work effectively as it was designed. Those that don't

respect the local natural environment frustrate P13. He also pointed to the fact that conservation is part of every religion and belief system.

Professionally he is engaged in storm water management. P13 mentioned his personal behaviors to control and limit water use and pointed to the importance of matching attitudes and behaviors. P13 bases water-related decisions on both cost and personal observation to determine water conditions, and he is suspicious of biased input although he does support additional technology in decision making. He points to narrow input from environmentalists and engineers and suggests a systems-based ecological perspective is important for decisions. He also feels that recycled water is a key element to water management. He also mentioned the need for community members to observe the proper functioning of water management devices and to report related failures.

P13 feels that the community input process and access to decision makers is excellent. He cautioned against listening to experts and emphasized the importance of including the residents who care about preserving things. Additionally, he pointed to the lack of experience of many policy-based environmentalists. P13 stated that enforcement is the concern, whereas the agencies and managers have done an effective job at establishing rules (maybe too many rules). P13 believes it is important to focus on restoration over fines, and doubted in the ability of engineers to provide a solution to a problem that would consider the entire ecosystem.

P13 feels that there is a lack of education at all age levels relating to the local environment and what it means to live here. Additionally this lack of education is the basis for many conflicts. He also mentioned the importance of educating the population upstream throughout the entire watershed and pointed toward the use of collaboration in water use and stakeholders sharing their water use expertise. P13 mentioned the need for information and innovation to alleviate tensions. He suggested that food growth, transportation improvements, energy and many other things all equate to water use, which because of the limited supply adds pressure. P13 believes that conflict is natural due to people's aversion to change and lack of understanding. He deals with value conflicts by boycotting companies involved.

Participant 14 (P14)

P14 is a city official who is 60 or older and has lived in southwest Florida for 16 years. P14 makes personal decisions related to water usage based on limiting water use. He does some water-based recreation. He is very conscientious about water conservation and feels that his attitudes and behaviors are consistent. P14 thinks that water is essential and that we need to continue to improve water quality, storm water management, and the natural environment. He would like to see a lot more use of non-potable water when possible.

P14 serves on multiple boards and is knowledgeable and active in water

conservation and considers himself "very involved" in water management on the local level. He recognizes that there is an economic and scientific element of water-related decision making. P14 pointed to the strong rules that exist and the importance of continued communication and education. He also mentioned incentive-based interventions with a focus on dealing with issues at their source. P14 described the water diversion and water storage (e.g., ASR wells) initiatives. He also believes that water management enforcement is aggressive in the city and not as strong in the county.

P14 identified the following threats: man-made activities, fertilizer, copper, freshwater pollution, nutrients, saltwater intrusion, and mangrove destruction. P14 reiterated several times that education is key, including education for fertilization and storm water best practices. He also pointed to the necessity of education to help citizens understand the concept of risk and reward related to water conservation, noting the economic connection to water conservation. His preferred way to receive information is email and word-of-mouth.

P14 identified tension between economic and environmental interests. He also mentioned that people come and stay because of the environment, so there is a social tension to maintain the environment. He pointed to conflict between water resource management and the costs, but repeated that the best approach for managing conflict is education and motivation.

Participant 15 (P15)

P15 is a female who is 60 or older and has lived in southwest Florida for 40 years and serves in an elected county office. P15 uses freshwater in the standard ways at home but does not use saltwater even for recreation, although she enjoys looking at it! P15 values clean, fresh water and believes water conservation is important. She is involved in several water conservation organizations. P15 believes her personal and professional attitudes are consistent. She perceives her own water-related education as occurring through conservation involvement. She believes that communication is the key to conservation education and sees a void in the RBNERR outreach and does not believe that their potential is being fulfilled.

P15 views her community as special because of the natural beauty and a population that tends to include well-educated and retired residents. Her list of threats to the estuary includes chemicals from fertilizers, agriculture, and boating. P15 feels that close and open interaction with the community from the beginning of any water-related issue is the best way to address concerns. Additionally, collaborative tours of water-related facilities foster understanding.

P15 pointed to a large surge of development in the area that has been limited by protection through regulation and enforcement including the requirement to set aside property for preserves. She also mentioned the active water management by the county

that can be so effective that residents often don't understand when problems or restrictions occur. P15 believes that guided development and responsible conservation can coexist. She sees the economic impact of not taking care of the environment and states that if it is not taken care of now by the responsible parties then the taxpayers will have to take care of it later. P15 believes that water-related conflict is property related, especially development. This includes people, and their lawyers, who are focused on a single piece of property and do not consider the surrounding environment. She also stated that she felt her perspective was "the most healthy of all!"

P15 recognizes tension between stakeholders who are focused on money versus those who are focused on the environment. She recognizes that economics impact water use. She views compromise as possible but acknowledges that it is very difficult to work through the issues. The participant works to convince others of her conservation perspective and believes that compromise and working together is possible.

In this section of the study results, summaries of the content of individual interviews were presented, to provide an overview of the participants' perspectives and experiences associated with water-related attitudes, beliefs, behaviors, and decisions, as well as their views on water management and on receiving water-related information. In the following section of the study results, numerous themes resulting from the data analysis process are presented to offer futher insights into stakeholder perspectives.

Thematic Findings

While the participant summaries provided above focus on the views and experiences of community stakeholders at the individual level, this section presents numerous themes at the collective level. These themes reflect concepts and perspectives that cut across the participants and represent shared views of relevance to the RRBE project. The themes are organized into the following four sections:

- water-related attitudes and beliefs;
- water-related behaviors and decisions;
- perceptions and experiences of water management; and
- receiving water-related information.

Under each of these headings, several themes are presented. For each theme, a brief introduction explaining the theme is followed by representative quotes from study participants that serve as exemplars to illustrate the theme. In most cases, these quotes reflect only a portion of the available quotes pertaining to the given theme.

Water-related Attitudes and Beliefs

This section includes six themes associated with water-related attitudes and beliefs conveyed by the stakeholders interviewed in this study. Water is used, enjoyed, and interacted with in many ways. It is important to understand the attitudes toward water and water use for improved water management and for the design of future stakeholder education and interaction.

Theme 1. Participants perceive availability, quantity, cleanliness, and quality as the most important aspects of water.

Through the interviews it was clear that water represented a valued resource exemplified by the statement: "Everything depends on it!" It is important to all of the participants for a myriad of reasons. While the participants' attitudes and behaviors toward water use varied, four common attitudes were identified regarding what the participants deemed as the most important aspect of water: cleanliness, quality, availability, and quantity. These concepts were not always discrete and they were used jointly and even interchangeably at times as the participants described what was important to them about water were important. Even though the connotations varied, these four distinct priorities were clearly identified.

What is most important about freshwater to local stakeholders?			
Availability	Quantity	Cleanliness	Quality

Figure 3. What is Important about Freshwater

Availability.

Having freshwater available where you want it, when you want it, is often taken for granted—this idea was expressed by one of the participants: "Availability is just that, if I turn the tap on I want it to come out!" However, this issue was expressed as a challenge and a significant future challenge. One participant pointed out that, "We know that parts of the world that don't have quality fresh water, that's something we got to do." The very existence of freshwater is not guaranteed.

- "Most important about freshwater would be its longevity…. The more water I use today, the more water I may not have in the future." P7
- "You can't exist without it, you have to have access to freshwater." P10
- "The scarcity of it." P11
- "Freshwater is not going to last forever." P1
- "All of these homes, all of these businesses, all of this new growth, they're all going to need water…. There isn't any available." P6

These statements refer to the basic need for freshwater for existence. Additionally, these statements question the traditional conception that freshwater will always be ubiquitous, as it is often perceived in modern, western societies.

Quantity.

The idea of quantity goes beyond having some amount of water to fulfill the fore mentioned characteristic of availability. Key elements also include having the correct amount in the correct places at the correct times.

- "The amount is the most important." P13
- "It is highly seasonal so that there is an excess part of the time and a shortage the

rest…. It rained 120 inches here last year. 85-95% of that water went right back out to the ocean at the same time that we have a shortage here." P10

- "Water conservation is certainly important especially in a coastal community where we need to be cognizant of the fact, that if freshwater levels are low inland, there is a change of saltwater intrusion into the area." P8

Having the right blend of water in the estuaries is necessary and too much freshwater, sometimes referred to as freshwater pollution, can put high stress on the aquatic ecosystem. Additionally, because of the weather and population variations, where the population increases when the water table decreases, having the right amount and blend of water is a challenge.

Cleanliness.

Another area that was identified as an important aspect of water is cleanliness. What is in the water from a consumptive, visual, and functional perspective is all part of the consideration of cleanliness. For example, the participants identified a primary use of water was cleaning in many capacities, and it would be difficult to make anything else cleaner than the water that is used for washing!

- "The quality of the water, meaning cleanliness, what's in it." P1
- "Keeping nutrients, primarily phosphorus out of freshwater." P4
- "I'm probably more worried about the cleanliness of the water…. Having a clean supply." P5
- "It would be less to treat if it was coming here clean." P3
- "What's important to me is that it be clean." P9

Each of these comments by the participants specifically called out the cleanliness of the water. Although there may be many reasons for wanting clean water, this is definitely a common desire.

Quality.

In a similar attribute to cleanliness, quality was also identified as an important aspect of water. In a general sense, the differentiation in these terms, as used by the participants, seemed to be based on the chemical or structural characteristics of the water rather than turbidity or pollution.

- "How fresh is the freshwater, that definitely would be the most important part." P1

- "The most important aspect I think that I as well as all of our citizens are concerned with it is, is it fresh." P15
- "Water quality and quantity, you know, filter and storage of water." P8

From a technical viewpoint the quality of water seemed to be related to fitness for a specific use. From a more pragmatic perspective, the question, "How fresh is fresh?" and the related musing about how fresh does it need to be was an unanswered, but telling, thought about the importance of water quality.

Theme 2. Participants identify a range of benefits and uses of water.

From human, flora, and fauna sustainment to enjoyment, water is perceived as a central aspect of the local area and a vital component of life. The participants described the essence of water in several ways.

- "Water is your main source for everything, and without water you will not make it." P3
- "Drinking water, we need it every day; you need that more than you need food." P7
- "Water is just such a big part of everything that I do." P2
- "Everything depends on water!" P12

As a surface, a mechanism, an environment, and an input, water can be used in so many ways to complement, enhance and sustain lives that it is part of the very fabric of the environment and shapes the community. The participants pointed to a wide range of ways in which water was used and detailed several of the ways that water was implemented as a resource. Several of these are highlighted briefly below.

Grow food.

- "Of course agriculture needs water." P9
- "In a broader context, all the food you eat is a product of freshwater. " P12

Energy source.

- "Water equals energy…. Water does equal energy, energy is very expensive." P13
- "Water is power" P13
- "I know we're using water to make the electric." P7

Cleaning.

- "Water is a mechanism we're using to be able to clean." P5
- "We use it as any homeowner would use freshwater. We use it to wash our clothes, clean the cars, drink, wash our laundry, and use it for our facilities in the house and…sprinkle our lawn." P6

Recreation.

- "It's awesome. There's not too many places that you can get the well-rounded fishing, saltwater and freshwater, and everything's convenient." P7
- "I live on the canal, I have boats, I go out on it a lot." P6
- "I am continuously swimming. I used to do a lot of swimming at the YMCA and that, and different pools. But I have more of a tendency to be using open water for my long swims now." P5
- "As a hobby I kayak…. I spend a lot of time on the water." P12

Aquatic habitat.

- "[Water] keeps everything alive: the fish, animals, our plant life." P3
- "It's the breeding ground for the beginning of the fish life." P5
- "[Estuaries are] one of the richest eco systems on the planet, important breeding grounds for a lot of different fish, some which are viable both to sport fishing and also commercial fishing and that's why they would be important both for their economic role and contribution to the environment in general." P9

From providing food and energy to a tool for cleaning; from a platform for recreation to an environmental habitat; water is a common resource that has a significant on the local area. The figure below lists several specific ways that participants mentioned that they use water.
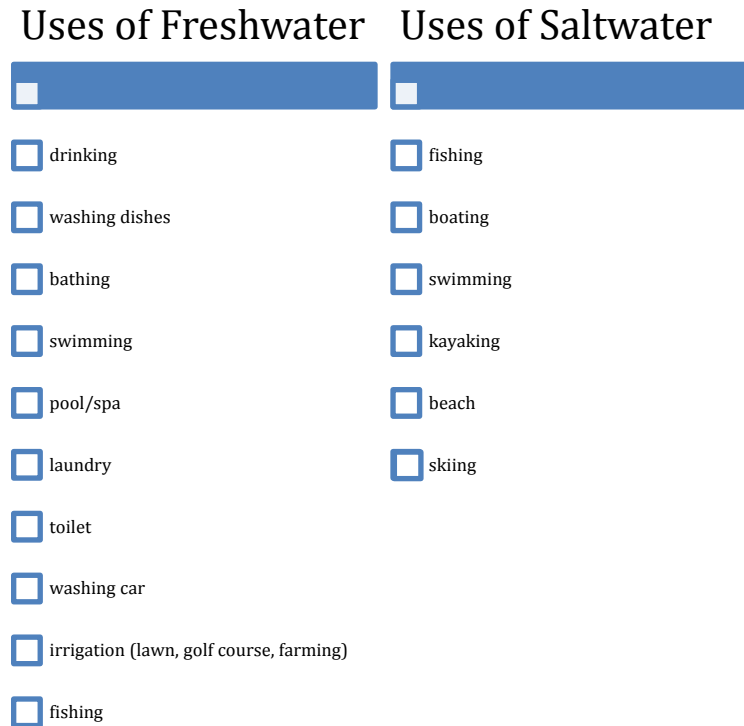
Uses of Freshwater   Uses of Saltwater

Uses of Freshwater	Uses of Saltwater
☐ drinking	☐ fishing
☐ washing dishes	☐ boating
☐ bathing	☐ swimming
☐ swimming	☐ kayaking
☐ pool/spa	☐ beach
☐ laundry	☐ skiing
☐ toilet	
☐ washing car	
☐ irrigation (lawn, golf course, farming)	
☐ fishing	

Figure 4. Participant Uses of Freshwater and Saltwater

Theme 3. Participants highly value natural features of the local environment.

The Rookery Bay area and the surrounding region is a unique environmental space with many valued features. In an attempt to describe the sense of place in the local area, one participant pointed to the photography of Clyde Butcher. "When you see those photos, you know immediately where, a general sense of that region…. It couldn't be anywhere else in the world." From the swamps to the beaches; the Cyprus trees and mangrove forests; the rivers, estuaries, and bays; and the weather that envelops it all—in one way or another the participants pointed to the positives of the local natural environment.

- "I like going to the beach. I like the fact that we have Corkscrew Swamp so close, that we've got Rookery Bay, we've got scrub habitat…. There are opportunities to get out and enjoy nature here." P4
- "Being in a prime Cyprus swamp, I really put a lot of value in that." P5
- "We have a really interesting, or cool, environmental area where animals, fish, things like that, kind of cross. Meaning we have a lot of things that typically exist only in saltwater in our area when we have the typical things that exist in and around freshwater kind of mixed all in between. I mean we've got blue crab that

are as big as dinner plates that are filled with all of our freshwater ponds and water system along with saltwater species of fish. That's pretty unique….
Mangroves growing on the sides of freshwater ponds, we've got a lot of that.
You know, so our area, very complex and we get to see the best of both sides all here together which is really cool." P1

- "We have a lot of beauty that surrounds us." P15

Some of the participants spend time on the bay frequently, and others have no interaction with saltwater. In other cases participants have intentionally chosen to live in the swamps in contrast to some whose homes overlook the beach or bay. Whether the stakeholders are drawn to the plant-life or the waterways, there is a common ground in their appreciation of the local natural environment.

Theme 4. Participants perceive water to be a primary draw for the community.

The local area is described as a "water-based environment." The many aspects of the local water, from its beauty to its functionality, are a key attraction for the region.
This water-centric perspective was interpreted in multiple ways, however the core idea was a consistent theme throughout the participant interviews.

- "I use water as one of the basic tools to promote our area to potential visitors; we are primarily a water-based community." P8
- "What I like about it is obviously the weather, the beaches, the boating, the fishing, you know the same thing everybody else does. That's what brings people down here." P10
- "A lot of people move here because we have Corkscrew Swamp and we have these great natural areas, we have the gulf, we have the beaches. People move here for those environmental things." P4
- "If we did not have relatively clean beaches and relatively healthy estuaries I think that would definitely make a difference on the number of people that would come here." P9
- "The thing we've got to do is continue to improve the water quality…every tourist that comes could go somewhere else and most of our residents could go somewhere else." P14

Both residents and visitors are attracted to this area because of the water features of the community. The management of these water elements determines the area's desirability and perceived value. The continued care of the availability, cleanliness, quality, and quantity of water is essential to the success and well being of the community.

Theme 5. Participants perceive tension between stakeholders.

There are a wide range of stakeholders demanding the use and benefits of a limited supply of water to meet each of their individual wants and needs. This dilemma generates tension among the stakeholders for a myriad of reasons and a range of perspectives. Although these conflicts are based on interests, roles, backgrounds, locations and more, the participants clearly perceived the tension that exists between stakeholders that has existed for many years and, in many cases, become entrenched.

- "Used to be our source of new residents was I-75 and people from the Midwest and people who were like-minded and they wanted a nice little community. Now we get an influx of other people that want more of an urban type environment." P2
- "The environmentalists always think they are right one hundred percent, and the engineers we know we are right." P12
- "Unfortunately they look at the high rises and say, well, those people have all the money so they should pay for it, and it's not quite the case." P3

One specific area of tension between stakeholders involved the farming community.

- "Why should we pay for all of the clean up of water that's getting dirty upstream not because of what we are doing but because of what the farmers are doing and the other people upstream; and so you got this split and, for thirty years now, they sat down and stared at each other and nothing has happened." P10
- "I'm a capitalist and I understand people need to make money and farmers have to farm…but we've got to have a better balance and a better method than we have now as far as getting rid of that leftover residue from the farmers [upstream]." P6

In another comment that was more tempered, a different participant suggested that the farms "are careful, but…Rookery Bay should be talking to them all the time." In turn, a farmer suggested that farmers "sometimes get the impression they wish we weren't here. The county, if we weren't there then they could put more golf courses and more houses and more people and have more access."

The comments reflected a range of emotions, from tempered to angry to hurt. Overall, these representative comments express the ongoing tensions that exist in the attitudes of the various stakeholders.

Theme 6. Participants perceive tension between economic, social, and environmental interests.

In addition to the tension that is perceived between stakeholders, there are also tensions that are perceived between the economic, social, and environmental interests of the stakeholders. This includes the pressure of monetary costs, general human experience and quality of life, and the ecological health of nature in relation to what is desirable to the stakeholders. For example, people want year-round green grass and landscaping (social), however "landscaping comes at a cost" (economic).

- "People put tons of fertilizer in their yards. You want this pretty green grass. I mean there's a trade off for these nice green lawns." P2
- "We put in a new lawn…and watering is expensive." P5
- "We are putting water and sewer, and they're fussing about the cost." P14
- "Because of man made diversions, we have really affected the food supply for many of the fish and wildlife." P8
- "It takes a lot of water to grow food." P13

These comments demonstrate the social-environmental tradeoffs that exemplify the need to address the tension between economic, social, and environmental goals. There are many reasons for the opposing pressures. One participant suggested: "There's always a conflict, as a society we overdo everything. We over consume, we could do less." There needs to be common ground or as a participant said, "Growth is important, but I think it needs to be done in a way that's sustainable." Another participant posed that "people have to make actual sacrifices." However these issues are addressed, the stakeholders clearly sensed the tension.
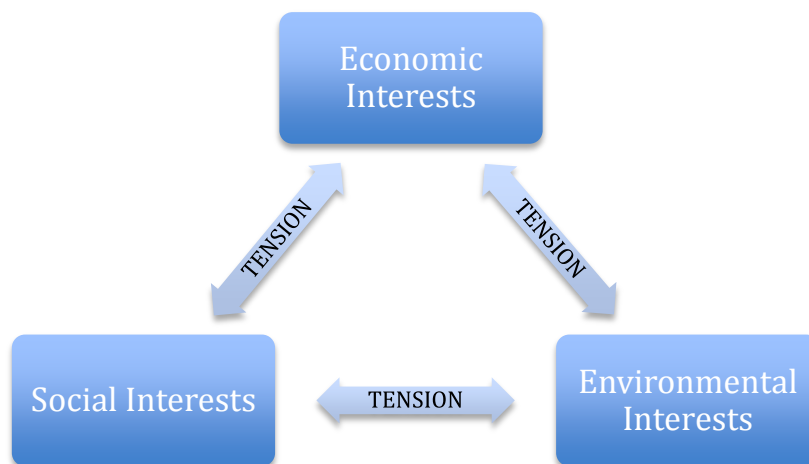

Figure 5. Perceived Tensions

Theme 7. Participants observe a lack of common ground between environmentalists and developers.

The recognition of tensions between stakeholders and between economic, social, and environmental interests suggests the need for finding common ground or shared solutions. Shared value is the intersection of relative desirability between stakeholders and their array of interests. These opposing pressures can create a springboard for improvement and can help the system to function at a higher level. Unfortunately, many times the parties to a conflict assume that they are working in a "zero-sum" scenario, when in reality finding common ground, a shared solution, and shared value does not necessarily mean compromising, giving in, or giving up.

- "There are people out there that think any time you're doing anything for the environment you are putting unnecessary restrictions and things that are going to cost money and hurt the economy." P4
- "The guys that seem to make out the best are the guys that just go in there and rape everything and just get done…. We proposed a lot of preservation…and we ended up with just a hell of a fight." P5
- "People come out and they will protest some development or another then they will go back to their gated community and its like 'where do you think your house was before like ten years ago?' You know! It was wilderness and then they go out and complain saying someone else can't build their home, you know, you already got to live in yours so…it's a complicated issue, and all that plays a huge part of it." P11
- "Is there a middle ground where we can have both development, if it is managed properly and still protect the resource base for the water? That's the fight that's going on right now, and there is not a solution in sight." P10
- "They could build X amount of houses rather than limit them to what I feel is proper and take into consideration all of the environmental aspects…. Sorry Mr. Developer! You can build on your land, but you can only build so much and no more!" P15

It was noted that many people do not realize the possibility for a healthy ecosystem to provide an economic benefit that creates a higher quality of life for its human inhabitants. The conflict surrounding water use has persisted and has not led to common ground. Rather than pursuing shared value, the perception is that an anticipated solution would require compromise and letting go of one's tightly held beliefs or priorities.

Water-related Behaviors and Decisions

It is important to understand stakeholder behaviors and decision making when it comes to the use of water before designing an intervention or educational initiative. In this section, four themes are presented that pertain to participants' water-related behaviors and decisions.

Theme 8. Participants' water-related decisions seem to be based on belief systems.

Belief systems are deeply rooted in culture, religion, and both family and political institutions. The findings in this study identify several belief systems that informed participants' decisionmaking when it comes to water use. Some of the participants mentioned religious beliefs and childhood upbringings as having a direct connection on how the participants of the study make water-related decisions.

- "I've always labeled myself as a conservationist." P1
- "People that are farmers and that grow up as farmers, years before it became fashionable, we've always reused product rather than put it into the waste stream. It's just the way we grew up." P2
- "I'm sure my upbringing has a lot to do with how I'm looking at it." P5
- "If I can follow all of those twelve points of the Scout law, then I think maybe I'm doing the right thing. I'm a Christian, I go to church every Sunday, I believe in the Ten Commandments, I try to do what I think is right." P6
- "Every religion known to man has a conservation element in it, and if people believe in those religions, people have to believe in conservation." P13

The findings as they pertain to water-related decisions demonstrate that participants have their own interpretations as to what are "best practices" when it comes to water usage. What was interesting is that participants had one commonality across their belief systems, which is the concept of "conservation," suggesting that the concept of conservation is prevalent across various belief systems.

Theme 9. Conservation-related professional behavior seems to positively impact personal conservation-related behavior.

While people are often viewed in either a personal context or a professional context, it is important to remember that these contexts do not exist in a vacuum. Throughout the interviews, participants reiterated the impact of their professional behaviors affecting their personal behaviors. Although the reasons may have varied, this theme was largely consistent for each of the participants regardless of the industry.

- "I think that conservation and things like that on the golf course business, the golf course side of things, the industry very quickly makes its way into your personal life…. The level of conservation that my professional life has taught me has increased home substantially exponentially." P1
- "I think it's practice what you preach, so I do the same at home and treat our system the same." P4
- "Water is just such a big part of everything that I do that it merges between personal and [professional]." P2

In many cases, dealing with water on a large scale in their occupational setting informed participants' personal water use. Whether the participant was an engineer, an environmental educator, or worked in the golf industry, the views of water developed in their professional space was transferred to their personal life and individual conservation of water.

Table 3. Stakeholder Efforts to Conserve Water

Conservation Efforts in Personal Life	Conservation Efforts in Professional Life
Full laundry loads	Reduced use/low flow
Quick showers	Water testing
Turn off faucets	Organic fertilizer/reduced chemical use
Rain shutoffs	Scientific water-based testing and modeling
Reduced use	Effluent water use
Native plants & low consumption landscaping	Pond aeration
Rain barrels	Water condition sensors
	Storage and reuse of storm water
	Creation of preserves
	Littoral buffer zone creation and management

Theme 10. Participants link scientific data to water-related decision making.

The participant interviews indicate a strong link between science and decision making as it relates to the treatment of water, conservation of water, and use of water. Scientific equipment facilitates water-related decisions as it measures weather-related data as well as pollutants in the water.

- "We have field examination of turf grass areas, landscape areas, we also have a number of scientific equipment on site that we use to kind of back up those initial field examinations. One of the best things about the data that we get from that, not only wind, and how much rain, and temperature stuff, we use, it gives us an evapotranspiration rate, daily rate, kinda real time thing that can tell us okay we have lost you know .1, .2, .3 tenths of an inch, how much do we need to replace tonight." P1
- "Professionally we have a framework in place, we have a program in place that we started out with the IFAS recommendations for drip irrigation. All of our irrigation is adjusted daily based on an ET derived from local weather stations and so every day we are changing the amount of water that is going to the crop based on the last twenty four hours ET rate." P2
- "My recommendation is…that before we move into creating more regulations that we use modern technology to ensure that what we got is adequate; if not, change it." P13

It is evident that the use of scientific equipment to gather data and to make water-related decisions is a priority to participants and a current and recommended practice.

Theme 11. Participants consider economic factors when making decisions about water use.

A consistent theme emerging in the participant interviews was that economic considerations are a definite factor in decision-making as it relates to water. This idea was conveyed in terms of both personal and professional arenas.

- "The water bill. I'm not going to say, 'Sweetie, shut off the shower' if I'm not worried about my business and I can afford to pay another fifteen dollars. If I know that I can't pay that fifteen dollars, hey I'm not going to say 'sweetie' any more, I'm going to shut the water off for her." P7
- "As far as water consumption? It's just the idea of trying to keep the water bill down [at home, while at work] every gallon of water that we use we have to pump, and I don't have to tell you what the price of gas and diesel has gone to. We need to limit as much as we can." P2
- "I actually think I am water conscious because of I have a budget that I have to conform to every year." P3
- "Everybody wants everything until they have to pay for it, so there is always the conflict and again what you have to do is, have to demonstrate why, at least on a long-term basis, that these are good economic decisions…. The cheapest gallon of water that we can produce is the one that we can conserve." P14

- "The problem is money; it's always money." P10

Whether a business owner, public sector employee, or homeowner, it is evident that residents of the area base their decisions in large part on economic factors. As a positive limitation, the cost of freshwater, effluent, and the cost of electricity to move water limits its use and, by default, promotes water conservation. In contrast, money is also a factor in crafting and implementing water-related decisions. Financial constraints limit the remediation and proactive efforts to correct and improve environmental challenges.

Perceptions and Experiences of Water Management

This section includes six themes associated with perceptions and experiences of water management conveyed by the stakeholders interviewed in this study.

Theme 12. Lack of understanding of water management practices contributes to conflict.

The findings in this theme suggest that there is conflict associated with water management due to lack of collaboration practices, and the lack of education for the purpose of informing parties in the community as to why certain environmental decisions are made, especially when dealing with water management practices.

- "I know they have got a lot of mosquitos (laughs). And we, that has been a big thing, Collier County, it seems like every year they are treating mosquitos over Rookery Bay in a different way. There was one year that I think they did almost zero treating or didn't do any to the very later part of the season as a result that one year the mosquitos in our area were absolutely horrific, a constant complaint from members and guest, constant complaint from employees, I was going through cases of OFF a week. …I don't what happened that particular year, I heard all kind of different things from county budget, to county mosquito control director, to Rookery Bay not wanting it; who knows what was true or not, all I know is we were covered up." P1
- "The only conflicts that we have here is because we are such a high profile, the local people around here think we somehow control the rain (laughs). When their yard gets wet, it's our fault; when they hear pumps running, even though they may or may not impact them, it is easy to point the finger at us. We've had people that they go to TV station, complain, call the county commission; I've had people call 911 because their yards are wet. We don't have that kind of impact on them. When you get a four or five inch rainfall, things are going to be wet, and people

that have been here their whole life understand that; and there is a rainy season, and you've got to prepare for that." P2

- "I think most conflict between the community is because we don't know what the other guy's doing. It's like when I went to, we start putting automation on the farms, and you talk to a farmer and you say what's going on and he tells you, and when you put a 24 hour monitor out there, you find out that what you thought was happening wasn't really happening. Okay, and it's the same way. I can look at somebody else and boy, that's a wasteful thing and I look at the streets and the sprinklers getting the streets all wet instead of the foliage." P2
- "Not necessarily liking it, but understanding it better and realizing that I can do this and this is going to cost me, this is how its going to work out. I understand you can't make an exception; this is just the program as it is." P6
- "Over the years I have had a lot of arguments with people about the fine point between holding back the water and letting it go out into Rookery Bay." P12

Participants in the study feel that there is conflict due to different management styles, and a lack of understanding as to what the intentions of the different industries and public entities in the area are. Participants suggest that education and communication would facilitate the understanding of the different industries' management practices. Improved understanding could both de-escalate conflict and improve collaboration practices.

Theme 13. Participants seem to view water management in terms of "us vs. them."

When speaking of water management, many participants indicated the issues are viewed in dichotomous terms. They frame the management issues and practices in terms of one groups versus another. This oppositional perspective encompassed community stakeholders, such as those representing golf courses and farming communities, as well as those involved in policy making.

- "Through the last fifty sixty years, environmentally we are their enemy and in an essence they are ours - from a litigation standpoint. There's a lot of times that the golf course industry is over-litigated." P1
- "It's a continuous fight. You know, you go to neighborhood meetings and everybody talks about drainage and flooding." P5
- "I think there are some perceived conflicts, yes. I think there are certainly different view points…strongly environmental groups certainly might have opposition to something that perhaps the water management district wants to do." P8

- "There is a huge public policy fight between the state, the local county, the city and the county—a lot of disagreement about how to proceed…" P10
- "The county fusses all the time about not getting enough freshwater from the Tamiami Aquifer; they have to go through the Hawthorne Aquifer and do a reverse osmosis. One of the things we told South Florida Big Cypress Basin, that if we save X million gallons of water a day, we don't want you guys giving that to somebody else; we want it to stay in the ground to make the aquifer healthy and that sort of thing." P14

It is evident that members of the community, as well as individuals associated with various levels of government, seem to be taking an "us vs. them" view of water management. One of the functions of government is to create, implement, and enforce policy. If policy development and enforcement are to be effective, best practices of collaboration and communication need to be implemented. Once communication is improved among those at various levels of government, the public sector would then be in a stronger position to foster and enhance relationships with members of the private sector including the golf and farming industries, which are both important to the local economy.

Theme 14. Participants perceive water-related regulations as both necessary and frustrating.

The participant interviews revealed some of the frustrations stakeholders experience related to environmental regulation. In spite of feeling limited by such regulations, participants indicated that they appreciate the value of rules to safeguard water quantity and quality. In fact, participants indicate that it is sometimes only regulations that result in water conservation.

- "It is definitely different than it was thirty years ago to what's going on as far as, you know, we know that there's a lot of permitting that we have to do as far as water usage." P5
- "Like everybody else I get caught up with water restrictions. I guess the conflict would be we want to go out [and] water the lawn but [are] not allowed to because of water restrictions." P9
- "We are under cost pressure all the time to reduce the amount of effort that they put in, and everything is perceived…lets say creating storm water run off facilities as being an add on, is not part of the essential facility and as a result there is always pressure to limit and reduce and cutback on the facilities… and the only way to solve that is detail permitting enforcement. Set the rules and then enforce them." P10

- "You might hear it from the standpoint of people say, 'We'll do only so much,' but they are regulated to do so much and possibly a little bit more than what they'd like to." P5

The comments from participants in this section indicate a grudging recognition of the need for water-related regulations. It is suggested that regulations result in pro-environmental behavior and that stronger enforcement of standing regulations is needed.

Pros of Water Regulations	Cons of Water Regulations
Requires conservation behavior that would not otherwise be implemented	Restrictions limit desired activities
Permitting enforcement assures best practices of water management	Quantity of permitting required can be aggravating
Can be included in development of new projects	Can be enforced unequally
Community members can contribute to development of regulations	Political influence can impact enforcement

Table 4. Perceived Pros and Cons of Regulations

Theme 15. Participants perceive unequal enforcement of water-related regulations.

In spite of the recognition of the value of water-related regulations, participants indicated that these regulations are not always enforced impartially. Several of the stakeholders involved in the study felt that members of the community do not get equal treatment when it comes to regulation intervention. This is perceived in part as a result of political considerations on the part of elected officials.

- "So, and you know, nothing happened to them. Nothing. I heard they were fined, I heard they appealed; I heard the fine was dropped. So, yeah." P1
- "If I see something that's coming up I try to get my voice in there and talk to the engineers and try to get some voice in there. I do know a few people that are on the water management boards and that right now, so I do try to see what I can do to have an impact with them." P5
- "But the city of Naples is involved in non-potable, reclaimed water, they're using ARS wells and so forth and so we're well ahead of the loop but it's only on the other side of the bay and it does not appear that they will ever, in my life time, put a pipe and make that non-potable water available for irrigation for this side." P6

- "And we explained at a city council meeting that the houses they turn their water on and they get charged for meter and it costs them about sixty five dollars before they use any water." P3
- "Knowing the city manager doesn't hurt, you know, so when you talk to somebody in that department and you tell them that [Mr. X] sent you down there and said you would help me, chances are, they're going to help you. And I'm not saying that the other people don't get the same response, but I don't think everybody gets the same response." P6
- "I've seen plenty of times where it's this so and so person whose contributed this much money or has this much political influence with this particular representative or whatever wants their thing done, and they don't care about the rules." P11

Perception of inequality as it relates to regulations themselves and enforcement of regulations is a prevalent concern among participants. Addressing this perception—and changing practices as needed—may improve the perception within the community that water-related regulations are implemented wisely and fairly.

Theme 16. Participants believe better communication would foster collaboration related to water management.

Stakeholders involved in the study seemed to agree that collaboration, education, and relationship development are necessary for diminishing conflict, and managing water-related issues efficiently. This can include direct communication with decision makers.

- "Go directly to the source wherever that, I usually deal with that personally. My guys are all trained that whenever it gets to that point, they just become an information passer or communicator to me, I handle it from there. Hopefully, I know each time I'm walking into the situation I hoping that the agent, director, staffer, whoever it is actually knows the law, most of the time they don't and that ends up in a horrific situation." P1
- "Yeah, I mean what is there, back to the nutrient thing in water, what are their tests? What are the results of theirs - 200-300 miles from here? Are they watching the same things I am? Are we duplicating the same tests that we could be sharing or sending back and forth? Yeah, yeah. We are over here sampling little mosquito thing, picture right here. We are over here watching mosquito populations. Are they doing that? I assume they are, but are they? I mean, I don't know." P1

- "I actually think we have actually come a long ways. Several years ago we sort of were at each other, which was, not good because we all live on an island and we should get, be together as a family." P3
- "I think the only way you can do it is through education. You can't go up against somebody and say, 'Well, you have to do this.' That doesn't work. Just through education and slowly trying to get people to change their minds. Find out what it is about Florida that they like and why they're here and kind of use that information to help them see why what they do and their homes and communities make a difference." P4
- "The agriculture is a big part of the county and somehow those people have to be brought into everything that's done." P12

As these comments suggest, stronger community relationships, better communication among stakeholders, and greater understanding of water-related regulations and practices are perceived as contributing to greater collaboration. As discussed by study participants, there is an interconnection between information and collaboration. Improved understanding leads to more collaboration, and more collaboration enhances mutual understanding among stakeholders.

Theme 17. Participants would like to see more inclusive water management practices.

Some participants indicated a sense of disengagement and lack of opportunity to participate and collaborate in water related decisions. One means of collaboration is through participation in environmental organizations to target water-related issues. Another approach is direct engagement with policy-makers in public proceedings on water-related issues.

- "For the average citizen I don't know, I don't know, … I think how I'm involved now in Greenscape Alliance is a great way to bring all of the organizations together that are involved in the storm water and water in our region." P4
- "Little retention ponds with chain link fence around them and no connectivity to other wildlife and that. They probably have their use, but very limited as to what they're achieving. They probably could have been designed better and the water chased off in a much bigger, more useful reservoirs and better saturation uses, but its hard to have everything tied together when everything is being put together a piece at a time and all the different puzzle pieces. Some of it's being done by a minor developer, you know, one little 50 acre parcel and other ones are being done with thousands and thousands of acres and try to get them all tied together." P5

- "And then they promised us they'd start a water review board. That was two years ago. They had one meeting…. The thing that scares me is that…they gave the city manager power without a vote to go in and shut the water off. That concerns me." P7
- "South Florida Water Management is never really known until there is an epidemic. Either they're running too much water into our river and then they're taking the heat, or we're out of water and they're taking the heat. I think we would make great impacts with the South Florida Water Management or the water management districts because we'd be able to have a relationship with them that would give them our opinion, okay?" P7

The lack of available forums created by the public sector to create "awareness" of water management issues among members of the community seems to be a critical factor in population disengagement and dissatisfaction as it relates to water conservation and or water management. Some stakeholders feel that participation in water management is not readily available to the public, unless a crisis occurs. There seems to be room for improvement in collaboration practices associated with water-related decisions.

Receiving Water-Related Information

This section includes four themes associated with participants' comments pertaining to receiving water-related information. These findings may be used to inform future educational initiatives and interventions.

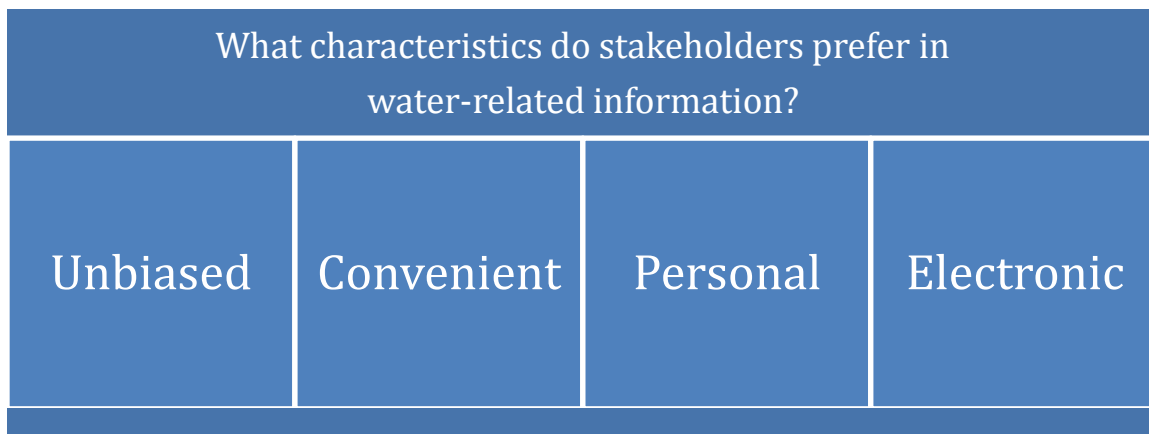| What characteristics do stakeholders prefer in water-related information?			
Unbiased	Convenient	Personal	Electronic

Figure 6. Preferred Characteristics of Water-related Information

Theme 18. Participants seek unbiased water-related information.

There was a clearly expressed desire from several participants to receive unbiased

information, unfiltered information, and multiple perspectives. Tools that allow any stakeholder to view live water quality data and compare that information to historical data were mentioned as desirable.

- "I'd like to see both sides of the equation…. What little bit we do hear about is, more or less, one sided." P2
- "Any time you get something from [the radio] you know it's probably not right." P5
- "Historical data versus real data. I think things like that are helpful." P7
- "Log on and see real time, you know, almost like a dashboard of what's going on in Rookery Bay right now!" P4

Stakeholders seek unbiased information about water. The participants identified a notable concern of bias in the information about water conditions provided through the array of sources that exist in the community. A common perception was expressed in the statement that "the sources taint it in every direction." Several participants mentioned their desire to have access to raw water quality data or at least summaries with minimal editorial remarks.

Theme 19. Participants seek convenient water-related information.

Another finding related to education was the perception that the information about water conditions and water management is not conveniently available and has competition from other environmental concerns.

- "Is it lack of looking on my part? I don't know." P1
- "We have to look for the information…. We don't get the information, I don't think, quick enough." P7
- "I think Rookery Bay has a public information program, I am not sure how broadly it is distributed." P10
- "It should be accessible and engaging." P4
- "There's over 100 environmental groups of one kind or another in the South West Florida area and so much going on that the noise level is so high that Rookery Bay is just one of many." P10

Stakeholders recognize that education is important and makes a difference. From an understanding of the quality of the water conditions in the bay and throughout the watershed to the general environmental conditions of the local area, convenient information is a common desire of participants in the study.

Theme 20. Participants receive much environmental information through personal communication.

One of the participants stated, "I think collaboration, education is all kind of tied together." As the participants discussed their viewpoints, they had specific ideas of how they wanted to be informed. One common experience described was receiving such information through personal communication.

- "When I get a chance I go out and visit the field office down there and I get word of mouth." P5
- "Really just getting it off from news clips and word of mouth." P6
- "How do I get information? Mostly personal communication." P4
- "Probably from my fishermen that are on staff. I'd say almost everything comes from that point." P1

With the wide range of media sources available, participants in this study repeatedly mentioned that personal communication or word-of-mouth is their primary source of water quality information in Rookery Bay and related waterways. As one participant mentioned, "I just go up and look, I mean, first hand experience."

Theme 21. Participants appreciate electronic channels of information.

In today's modern society the creation of social networks such as Facebook, Instagram, Twitter, and the most basic email have facilitated communication practices worldwide. Technology can be seen as a tool to share, educate, and expedite the communication process amongst community members.

- "Days are short and hours are so limited. You can get on the Internet any time and you can read information." P2
- "Whenever I think there's an issue that might be controversial or people are polarized on, I use email. I have an email list of all the members of the association here so I will just email everybody and ask for opinions." P6
- "Email is the best, yeah, email…so I know what's going on." P14
- "We feel well informed; I think we most enjoy receiving information electronically. I think through newsletters and that type of thing is a good way to communicate, and then periodically being involved in their discussions again working on their management plan. We want two-way communication with them." P8

- "They might put adds in the paper, the legal adds, those legal notices but it would be nice if they can work with media outlets to get a blip on TV news so that more people might become aware of it and have opportunity to participate." P10

It is apparent that participants feel that the use of technology to discuss water-related issues allows the public to be educated on topics and thereby become more engaged. The use of television and other media outlets is encouraged to be used by the public sector as well as by the RBNERR to increase communication among stakeholders.

Discussion

Having developed findings from the data collected in this case study, it can be helpful to compare those findings with previous research discussed in the related literature. This section includes a discussion of the findings detailed above that addresses and reflects upon the literature reviewed in the first phase of this study in the course of considering the study's overarching research questions. For reference, the list of themes is presented below.

Box 4. List of Themes

Water-related Attitudes and Beliefs
Theme 1. Participants perceive availability, quantity, cleanliness, and quality as the most
    important aspects of water.
Theme 2. Participants identify a range of benefits and uses of water.
Theme 3. Participants highly value natural features of local environment.
Theme 4. Participants perceive water to be a primary draw for the community.
Theme 5. Participants perceive tension between stakeholders.
Theme 6. Participants perceive tension between economic, social, and environmental interests.
Theme 7. Participants do not see common ground between environmentalists and developers.

Water-related Behaviors and Decisions
Theme 8. Participants' water-related decisions seemed to be based on belief systems.
Theme 9. Conservation-related professional behavior seems to positively impact personal
    conservation-related behavior.
Theme 10. Participants link scientific data to water-related decision making.
Theme 11. Participants consider economic factors when making decisions about water use.

Perceptions and Experiences of Water Management
Theme 12. Lack of understanding of water management practices contributes to conflict.
Theme 13. Participants seem to view water management in terms of "us vs. them."
Theme 14. Participants perceive water-related regulations as both necessary and frustrating.
Theme 15. Participants perceive unequal enforcement of water-related regulations.
Theme 16. Participants believe better communication would foster collaboration related to water
    management.
Theme 17. Participants would like to see more inclusive water management practices.

Receiving Water-related Information
Theme 18. Participants seek unbiased information.
Theme 19. Participants seek convenient information.
Theme 20. Participants receive much environmental information through personal communication.
Theme 21. Participants appreciate electronic channels of information.

Water-related Attitudes and Beliefs

        The participants in this study reflected water-related attitudes that were largely consistent with those found in Lamm's 2013 state-wide survey of public opinions of water (Lamm, 2013). Participants in this case study consistently emphasized the importance of water quality and of the availability of water as the most important aspects of freshwater. Having said that, as Sang (2008) noted, there can be differing views held among various stakeholder groups within the same community, such as between farmers and residents, urban and rural stakeholders. This study shows this type of distinction. For example, there was a greater emphasis on the importance of the economic implications of water quality for the tourism official, while the health ramifications of water quality were highlighted by a parent of young children, while the focus was on water as a natural resource for a government official. This reinforced the fact that there is a range of perspectives related to water within any given community, even as there is agreement on the importance of preserving water quality and quantity.

        One factor that has been highlighted in the literature as important to consider is the socially-constructed nature of water-related attitudes. Understandings of the "environment" are influenced by an individual's social, economic, and cultural context (de Vries, 2005), and stakeholder attitudes are likewise influenced by stakeholder context (Hoehn & Thapa, 2009). Thus, there is a need to incorporate stakeholders' cultural and historical perceptions in evaluating environmental interventions and to consider the cultural context of conservation efforts and natural resource management efforts (de Vries). One could consider: How might community members of different ethnic or economic backgrounds perceive this proposed intervention? Given the history of this community, would this proposed intervention resonate as being a good "fit" for the area? Community members' perception of *place* is also socially constructed (Larson, De Freitas, & Hicks, 2013; USEPA, 2002), and stakeholder attitudes regarding water usage, water conservation, and water management in their communities cannot be divorced from their attitudes and perceptions related to their communities and the culture of the communities.

        In this study, the participants' sense of "place" seemed to play a significant role in their water-related attitudes. As noted above, a common theme evident in the data was interviewees' deep appreciation of the natural elements of their local environment. They expressed this appreciation in emotional terms such as "love" and "pride." They emphasized the unique aspects of the natural environment and the importance of preserving these community assets and characteristics. Whether for environmental, cultural, or economic reasons, the preservation of the natural environment was a shared value. These findings were consistent with those presented by Larson, DeFreitas, and Hicks (2013) in their study on how the sense of place is associated with environmental well-being in coastal communities.

One of the theoretical models regarding people's beliefs about water reviewed in the literature offered valuable insights related to how people understand water, taking a cultural perspective. In her doctoral dissertation, Christine Feurt (2007) presented her findings regarding cultural models of water. Based upon her qualitative research of multiple estuaries, Feurt found six key ways in which stakeholders view and understand water:

1. Water is the basis for life on earth.
2. Water and land in a natural state, linked as a watershed, function as a water purification and storage system.
3. Water is a resource for humans to use.
4. Water is a commodity.
5. Water is landscape.
6. Water is waste.

Feurt's framework offered a useful conceptual model against which to compare the findings from the RRBE qualitative case study research. The stakeholders included in this study expressed beliefs about water that could be linked to these six ways people understand water identified by Feurt. At the same time, participants did not seem to think of water in discrete categories but their understandings of water encompassed several meanings indicated in the list above. In addition, Participant 13, involved in soil and water conservation for the county, repeatedly stated, "Water is energy." While this could be seen as fitting under the fourth entry in Feurt's typology, his understanding of what it means for water to be energy was more broad than resource alone, as he tied energy to the production of goods and services.

   A useful explanatory model reviewed in the literature focused on the categories of those holding attitudes, rather than on the categories of attitudes themselves. In this theoretical model, as described by Bischof (2010), scientists and professionals who work in watershed management can be organized into the following four categories:

1. Community and locally-centered humanists
2. Scientific idealists with globally-based perspective
3. Skeptical and utilitarian pragmatists
4. Politically-oriented positivists

According to Bischof, those in the first category, community and locally-centered humanists, typically support a "bottom-up" system of management that is community driven and community enforced and are suspicious of commercial motivations. They have a locally-centered viewpoint and use socially contextualized interpretations of the environmental problem. Those in the second category, scientific idealists with globally-

based perspective, believe pristine areas should be the focus of conservation efforts and tend to have a global, bird's-eye view of the world. They see human fallibility as the problem in achieving conservation goals. Skeptical and utilitarian pragmatists are presented as skeptical about the certainty of scientific claims, mistrust generalizations about environmental conditions and are rather pessimistic about society as a whole. Finally, politically-oriented positivists believe corruption and political coercions are the main obstacles to successful conservation efforts; they have confidence in science but do not see it as carrying political weight. Rather, they have faith in the processes of international relations and environmental conventions (description taken from Table 7, p. 610).

In comparing this theoretical model to the findings of this study, it could be argued that participants in this study reflect these different views, but their perspectives are more complex than suggested by this model and do not fit cleanly into these categories. For example, two of the participants who would fall into the category of community and locally-centered humanists—the volunteer in the local leadership program, and the community association manager—do support community engagement but also support "top-down" management. As another example, two of the participants who would fall into the category of skeptical and utilitarian pragmatists—the individual working in mining and roads and the land use planner—did not demonstrate distrust of scientific claims.

Water-related Behaviors and Decisions

Decisions about water use in participants' personal lives seemed to be driven in large part by an internal ethic, or value system. Research has been conducted on how decision-making relates to values in other locations (Rockloff & Lockie, 2004). Using a broadly inclusive stakeholder approach similar to that used in this current study, the 2004 study separated stakeholders into "institutional" and "local" categories for greater clarification. Rockloff and Lockie's research sought to capture stakeholders' coastal zone values, aspirations, and their related decision-making processes. In this current study, the values that drove water-related decisions were variously associated with religion, with future generations, with valuing of historical natural conditions, among other value systems.

In addition to the internal motivations for pro-environmental behavior, participants indicated that they would make changes in behavior if such behavioral changes had a direct impact on water quality or quantity. This finding supports those of a study by Serrano and DeLorenzo (2008) in the southeastern U.S. In their study, Serrano and DeLorenzo found that 95% of participants indicated they would alter their behaviors related to pet waste, fertilizer use, and disposal of lawn clippings in the water if it would improve water quality. All participants in this study expressed the importance of

behaving in ways that did not have a negative impact on water quality and quantity.

Jett et al. (2009) found a positive association between conservation attitudes and pro-environmental behavioral intentions in their study of boater behavior in manatee zones. Other sources focused on the linkage between pro-environmental attitudes and participation in environmental decision making (Hoehn & Thapa, 2009) or pro-environmental beliefs and values and pro-environmental decisions (Bischof, 2010). While the small sample size in this study prevents drawing any broad conclusions about the population as a whole in the Rookery Bay Estuary watershed, the participants in this study did reflect an association between conservation values and pro-environmental behaviors. While this is not surprising, a unique finding in the current study indicated the conservation-related behaviors conducted in the professional context had a positive influence on promoting conservation behaviors in participants' personal lives as well. This suggests that adherence to regulations may in turn influence individuals' value systems regarding the environment.

A valuable resource in the literature pertaining to the promotion of behavior change through education was a document by Kelly et al. (2012) that offered insights and recommendations on watershed outreach professionals' behavior change practices, challenges, and needs. One of the key recommendations was that it is important to take a positive approach in educational efforts. Several suggestions were as follows (Kelly et al., 2012):

- Appeal to positive emotions
- Use positive messaging
- Highlight intrinsic rewards
- Use extrinsic rewards (to remove a barrier to behavior rather than to motivate behavior)
- Use prompts (such as signage)
- Promote commitment (e.g., through signing a statement of commitment)
- Promote social norms

Considering these suggestions in light of the stakeholder interviews in this case study, it is possible to identify phrases, terms, and concepts shared by participants that could be incorporated into the kind of positive messaging advocated by Kelly et al. For example, participants refer to feeling such positive emotions as love and pride when asked about living in the Rookery Bay watershed, and use such positive adjectives as "really cool," "unique," and "phenomenal" to describe the local environment. Intrinsic rewards can come from protecting environmental assets that community members note they "put a lot of value in." Participants clearly indicated a recognition that people come to southwest Florida for the water-based environment, and emphasizing this can promote commitment to protecting water resources.

Perceptions and Experiences of Water Management

When asked about their interest in being involved in water management decision making, the majority of interviewees indicated that they were interested in being involved. In some cases, they wanted their interests better represented (farmer), or their input respected and listened to (irrigation), or simply to be engaged and able to participate (conservation educator). This finding supports the recent findings of Flamm, Reynolds, and Harmak (2013), who described a study set in Southwest Florida that focused on decision-making processes related to coastal management and manatee conservation. They pointed out that conservation decisions are now more collaborative and need to include more diverse stakeholders.

Authors have noted the importance of determining water management priorities, as well as the difficulties institutions may have in adapting to those priorities (Ellison, 2007). For these reasons, collaborative water management that includes a range of stakeholders can be effective in supporting effective adaptive management of water resources (Voss, 2000). In designing such a collaborative process, it should be tailored to the particular situation in question (Higgins et al., 2007; Strachan & Tomlinson, 2008). In addition, it is important to consider five core challenges (Scholz & Stiftel, 2005): (1) determining representation; (2) determining the appropriate decision rule; (3) effectively integrating science into policy making; (4) developing the public's and policy-makers' shared understanding of the issues; and (5) effective problem response (e.g., with respect to equity, sustainability, and efficiency, as well as situation-specific resource management goals).

The first of the challenges noted above, determining representation, pertains to stakeholder participation. Kessler (2004) recommended gathering and integrating diverse forms of input and expertise through such stakeholder participation. In some examples from the literature, stakeholders were separated into categories such as "institutional" and "local" (Rockloff & Lockie, 2004), but diverse perspectives were critical to the success of the collaborative process and thus it is important to have a thorough process for stakeholder identification and selection (Mutekanga et al., 2013). One particular official in the current situation specifically mentioned an existing small circle of experts utilized by officials and added, "We already have the answers." This statement highlights strong institutional knowledge yet raises questions regarding the inclusion of local perspectives and the development of a shared understanding with the community.

In connection to the second challenge highlighting appropriate decision rules, participants in this case study expressed an interest in engaging in collaborative water management. However, there was some frustration expressed with the mechanisms and processes that had been established but were not active or sufficiently inclusive, or were too narrowly focused. These issues were noted by the both the participant active in

irrigation and the participant involved with a water symposium. In addition, the stakeholder from the farming community expressed that he believed farmers did not hold the political clout of wealthy condominium owners and were not included adequately in water management decision making at the community level.

   Feurt's (2006a) research recommended including stakeholders representing seven different types of knowledge in water management processes would "facilitate science translation and technology transfer that is directly linked to actions that improve environmental outcomes" (p. 4). She also observed, "Applying an understanding of conflicting cultural models to participatory and collaborative processes can improve dialogue among stakeholders and create policies and environmental solutions that benefit from a combination of different kinds of knowledge" (pp. 7-8). Feurt explained these different kinds of knowledge as including the seven listed below:

- Ecological knowledge
- Governance knowledge
- Land use knowledge
- Educational practices knowledge
- Science knowledge
- Technology knowledge
- Local knowledge

As future decisions are made regarding participatory process, this model may be particularly useful to the RRBE project, because it was developed based upon research related to community members' views of water and water management. Feurt observed,

> People use these different knowledge domains to recognize, frame and reason about water and water protection. Expert knowledge within a domain is associated with experience and education….Effective water management requires input from all domains in this knowledge system and sensitivity to the ways water is valued and threats are perceived within the system. (p. 50).

The comments from participants in this study support the notion of including stakeholders that reflect these various domains of knowledge in water management decision making.

   While previous research has indicated that community leaders need more information to help them assess how to proceed in making water-related decisions (CNREP, 2011), the participants in this study suggested that there is plenty of information and knowledge among those involved with water management decision-making. Participants indicated that the barriers to effective water management were

attributable not to lack of information or knowledge, but rather to lack of funds, lack of buy-in from upstream counterparts, and lack of enforcement of existing regulations related to water use.

Receiving Water-related Information

It has been found that in order to be effective, conservation education needs to provide information that community members perceive as "useful" (McNie, 2007). This model defined "useful information" as information that is <u>salient</u> (relevant to specific context and timely); <u>credible</u> (perceived by users to be accurate, valid, and of high quality), and <u>legitimate</u> (perceived to be free of political bias). Participants in this study validate this perception, and thus in the development of future educational initiatives, the findings of this study suggest that these criteria be considered constructive criteria for inclusion of educational content and channels of dissemination.

The literature on the subject of conservation education indicated that people are not well informed on environmental matters; in particular, there is a lack of understanding of water management practices (Clay et al., 2007). This gap has been referred to as an "informational disconnect" between researchers, stakeholders, and the recreation community (Harley et al., 2011). Likewise, it has been noted that effective decisions are hampered by the gap in environmental knowledge (Turnhout et al., 2013), which Turnhout et al. referred to as an "information deficit" (p. 354). In this study, an interesting dichotomy presented itself: participants believed that the public had little knowledge of water management issues and practices; however, the participants themselves, representing a number of different stakeholder groups, demonstrated some knowledge in this area. Several participants understood their portion of water management, but didn't understand other components. Perhaps the fact that these individuals were willing to participate in a study on this topic in itself contributed to the sample being more knowledgable; yet there was general consensus that the general public requires additional education on conservation matters and best practices for freshwater usage.

When asked about preferences for how participants would like to receive water-related information, there were two dominant common themes: a preference for web-based and other electronic venues for information sharing, such as e-newsletters, and a desire for accurate, "unbiased" information, or at least multiple points of view that could be contrasted. The first theme supports previous research showing that there seemed to be a clear preference for unstructured learning (Clay et al., 2007). Channels for unstructured educational opportunities include websites, newspapers, and TV. Schueler (2000a) also described eight case studies in which TV and newspapers were the most influential forms of conveying water-related educational messages. In this study, an elected county official described a similar effort of using a local government broadcast to

highlight RBNERR information and efforts.

    The preference for unbiased information, particularly available through the internet, was also consistent with previous studies, such as that by Mossbauer, Schernewski, and Bock (2012), who found that information should be disseminated to the broader public, as well as tailored for specific target audiences, through web portals. This suggestion resonates with preferences indicated by participants in this study, as some wanted to be able to monitor raw data, while others preferred summary reports on a monthly basis. Participants also noted that information shared through the media can be inaccurate, and that community members assess the validity of such information based upon the level of trust held in the source, a finding also noted in previous studies (Lepesteur et al., 2008; Safford et al., 2012).

    Having briefly compared the findings of the RRBE case study research with findings of previous studies discussed in the published literature previously reviewed for the study, the focus of this report will now turn to implications and conclusions associated with the study findings.

Implications and Conclusions

Having presented the study findings, and having discussed those findings in comparison to the related literature, the report now concludes with the presentation of several implications stemming from the study findings. This section is organized, in keeping with the two previous sections, according to the following four areas of focus associated with the social science case study research: water-related attitudes and beliefs; water-related behaviors and decisions; perceptions and experiences of water management; and receiving water-related information.

Water-related Attitudes and Beliefs

Regardless of the particular context, profession, and background of participants, they all shared a deep appreciation for the local environment. In addition, they indicated that their water-related behaviors were in large part driven and determined by their belief systems, whether those beliefs stemmed from religious, family, or other values. Thus, messages related to water-related interventions could be crafted to explicitly appeal to this shared "sense of place" and to reinforce personal belief systems. Emphasizing the special attraction of the local water-based environment can foster pro-environmental behavior. Participants noted the unique "great natural areas" including "scrub habitat" and "prime Cyprus swamp" and "very complex," "interesting," "cool" bodies of water that include "blue crab that are as big as dinner plates." They spoke of love and pride about living in this region, and emphasized how much they enjoy and regularly take advantage of opportunities to kayak, fish, and bird watch in the Rookery Bay Estuary. All of these feelings and characteristics might be incorporated into messaging related to restoring Rookery Bay.

While there was evidence of shared values across various stakeholders, there was also evidence of a lack of understanding of the concept of shared value. Participants did not seem to be aware of the possibility to incorporate environmental, economic, and social priorities within water management strategies and restoration/conservation efforts. Educational efforts to reduce the perception that such decisions are necessarily "zero-sum," and that common ground can be found among diverse stakeholders, can encourage engagement in water management activities. Linking pro-environmental decisions to the economic health of the region, and the social quality of life for residents, might also support receptivity to restoration efforts of the RRBE project.

Water-related Behaviors and Decisions

The study findings revealed a few aspects of participants' water-related behaviors and decisions that were of special interest. One item of note was the finding that water

conservation behaviors in the professional arena (whether implemented due to regulations or for cost savings) had led participants to engage in water conservation behaviors in their personal lives and homes, as well. This suggests that educational efforts targeting the business community and other professional contexts may have a positive ripple effect on community members' water-related decisions and behaviors both at work and at home. The RBNERR might want to consider outreach specifically geared to professional audiences using the Coastal Training Program.

Another common theme was that participants' water-related decisions are impacted by both scientific data and economic considerations. In light of this finding, these two elements might be emphasized more explicitly in educational efforts and products. Rather than trying to simplify information, community members may more readily respond—and act on—information that provides specific scientific data, both historical and contemporary.

Perceptions and Experiences of Water Management

As noted in the results section, participants indicated that they sometimes felt frustrated by water regulations, due to the nuisance of the permitting process, or due to feeling restricted by them in terms of water-related activities. Nevertheless, it was interesting to see the dominant message from multiple stakeholders, that regulations act as a type of environmental "savior" because they prevent wasteful or damaging actions. Participants indicated that in spite of the frustrations associated with water regulations, they are necessary and vital to protecting the quantity and quality of water in the region. Thus, while there might be public expressions of protest if there were additional regulations, in fact, one could assume a level of understanding and support among stakeholders.

Having noted the perceived value of regulations among study participants, it is equally important to note participants' emphasis on the perception that consistent and impartial enforcement of regulations is both lacking and necessary in the watershed. It might be useful to conduct a review of city and county water and environment related regulations as well as of enforcement practices, and consider the following questions: Are there new regulations that would support the RRBE project? Are there existing regulations for which improved enforcement would support the goals of RRBE project?

Aside from regulation-related implications from the study findings, another implication of interview data is that it would be beneficial to expand the PAG to include additional stakeholder groups. Among those who might be included, and who expressed an interest in engaging in water management in some way, were individuals representing the farming, irrigation, and mining interests in the region. In addition, in light of the point noted above about the impact of professional practices on personal behavior, when it comes to conserving water, it might also be useful to include representatives of

business interests. Reflecting upon the participant comments about growing diversity in the region, it could also be beneficial to include community members reflecting greater ethnic and economic diversity.

Finally, in regard to water management, a consistent theme of participants was the belief that the source of many water-related problems is "upstream"—whether literally those living and working upstream who may be polluting the water than flows into the estuary, or those politically upstream in terms of water management decisionmaking. Thus, broadening inclusion of the PAG to include both upstream neighbors and area politicians may be a constructive step for the RRBE project. While collaborative efforts promote more effective water management, the study findings also revealed that collaboration serves as an information-sharing mechanism, which leads to the final section of this report below.

Receiving Water-related Information

The findings associated with receiving water-related information suggest several implications pertaining to the following areas: channels of information, the content of educational materials and resources, and a possible long-term strategy for restoration efforts. Regarding channels of information, participants indicated that they would like to receive water-related information through television, newspaper, email, and websites. They also indicated that they receive much of their water-related information through personal communication. In light of this latter finding, it might be beneficial to develop an outreach strategy that targets gatekeepers of various stakeholder groups and encourage them to reach out personally to those in their stakeholder groups or communities to share the information in person and/or via email and social media. In this way, the RBNERR might share information about the RRBE project through what could be described as personal distribution networks.

In terms of the content of such information, study findings suggest that stakeholders would appreciate additional scientific data, presented either as raw data or through summary; in addition, there was an expressed desire for live, web-based information, such as found via dashboards or livestreaming web cameras. It may be beneficial to explore how information related to the RRBE project might be distributed in these ways. For particular neighbors most directly impacting or impacted by the RRBE project, such as adjacent golf courses and housing developments, it might be helpful to increase data sharing of water conditions directly with those targeted properties.

Finally, it may be useful to reflect upon a longer term approach to promoting restoration and conservation efforts in the Rookery Bay Estuary watershed. Study findings indicate that participants perceive tensions between stakeholders, as well as tensions between economic, social, and environmental interests. Study findings also indicate that participants do not perceive common ground among area stakeholders,

especially environmentalists and developers. Participants did not seem aware of the concept of shared value, or an approach to water management that would involve developing collaborative, common solutions to area water-related challenges that encompass social, economic, and environmental interests through a shared approach, rather than an "us versus them" or "zero-sum" approach. Thus, it may be advisable for the RBNERR and the PAG to target various stakeholders with educational efforts related to the notion of shared value. This communication strategy would hold policy implications pertaining to guided growth through this shared value approach. Thus, in addition to community stakeholders, it would be important to include government officials in such outreach and educational efforts, which would ultimately promote both the RRBE project, as well as future restoration and conservation efforts.

Table 5. Social Science Research Implications

Implications of Case Study Findings
Appeal to sense of "place"
Emphasize appeal of water-based features of region
Appeal to positive emotions associated with local environment
Appeal to belief systems that support conservation
Link restoration and conservation efforts to economic benefits
Target business and professional audiences
Include more scientific data in information
Support regulations that would enhance RRBE project
Promote more consistent and impartial enforcement of existing regulations
Broaden PAG to include more stakeholder groups (e.g., farming, mining, diversity)
Initiate collaboration with upstream neighbors and politicians
Promote personal distribution networks of restoration/conservation/RBNERR info
Utilize additional electronic channels of communication
Increase access to raw, livestreaming data
Target adjacent properties with data on water conditions
Promote shared values approach to restoration/conservation efforts

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Appendix A – Email to Prospective Participants

Hello, my name is Dr. Robin Cooper, and I am an Assistant Professor at Nova Southeastern University (NSU). I am currently conducting a study related to the use of freshwater in Southwest Florida, specifically in the Rookery Bay area, called The Florida Freshwater Research Project: A Case Study of the Rookery Bay Region. I am sending this message to invite you to participate in this study because you indicated you might be interested during an earlier phone call.

If you agree to participate in this study, you will be asked to take part in an interview that will last no more than one hour; the interview will be conducted either face-to-face or by telephone, based upon your preference. In the interview, you will be asked questions about how you use water in your personal and professional contexts, what's important to you about your local environment, how you receive information about water in your area, and other related questions. The interview will be conducted by either me or a co-researcher from NSU on this study and will be recorded so that we can transcribe the interview for analysis. Prior to the interview, we will ask you to sign a consent form which outlines the goals of the research, any potential risks and benefits to you, and the fact that you may choose to leave the study at any time. There would be no further involvement or commitment on your part following the interview.

This study has been approved by the Institutional Review Board (IRB) at Nova Southeastern University, and I will conduct my research in keeping with the guidelines and standards approved by NSU's IRB, taking precautions to protect your confidentiality and privacy. Any report of the study's findings will make use of pseudonyms, and will not include any information through which you could be identified.

If you are interested in participating in this study and would like to schedule an interview, or if you have any questions about the study, please contact me at robicoop@nova.edu or at 954-654-8379. You are also welcome to contact the NSU IRB office at (954) 262-5369/Toll Free: 866-499-0790 or IRB@nsu.nova.edu with any questions. If I do not hear from you, I will assume that you do not wish to participate. Thank you for your consideration.

Sincerely,

Robin Cooper, Ph.D.
Assistant Professor, School of Humanities and Social Sciences
Nova Southeastern University

Appendix B – Sample Consent Form

Consent Form for Participation in the Research Study Entitled:

The Florida Freshwater Research Project: A Case Study of the Rookery Bay Region

Funding Source: Florida Department of Environmental Protection

IRB protocol #: 09261315Exp.

Principal investigator	Co-Investigator	Co-Investigator
Robin Cooper, PhD	Jorge Rice, MPA	Bruce Lilyea, MBA
Nova Southeastern University Street	780 NE 69 Street.	214 W. Belvedere
3301 College Avenue	Apt 802	Lakeland, FL 33803
Fort Lauderdale, FL 33314	Miami, FL 33138	
954-262-3048	305-206-6296	863-513-7611

For questions/concerns about your research rights, contact:
Human Research Oversight Board (Institutional Review Board or IRB)
Nova Southeastern University
(954) 262-5369/Toll Free: 866-499-0790
IRB@nsu.nova.edu

Additional Site Information:
Rookery Bay National Estuarine Research Reserve
300 Tower Road, Naples, Florida 34113

What is the study about?
The purpose of this case study research is threefold: 1) to understand attitudes and
behaviors related to water usage among residents in the Rookery Bay Estuary watershed;
2) to explore community members' interest and experience in engaging in water-related
decision-making in personal and professional contexts; and 3) to describe community
members' experiences of receiving and responding to information about water-related
issues.

Why are you asking me?
We are interested in learning about the views and experiences related to water usage of
people who live or work in the Rookery Bay Estuary watershed, who are at least 18 years
old, are willing to participate, and can speak and read in English. We will interview up to
40 people.

What will I be doing if I agree to be in the study?
If you agree to be in the study, you will participate in an interview that will ask you about

how you use water in your daily life, how you make decisions related to water use, and how you get information about the condition of the Rookery Bay. The interview will last no more than an hour, and you will be free to stop it at any time. You will have no further involvement following the interview. If it turns out that you do not live or work in the Rookery Bay watershed, we will not include your information in the study.

Is there any audio or video recording?
This research project will include audio recording of the interview. If you participate in the interview in person, the recording will be made with a digital hand-held recorder. I you participate in the interview over the telephone, the recording will be done via FreeConferenceCall.com, a secure web-based recording service. This audio recording will be available to be heard by the researchers, the IRB, and the Rookery Bay National Estuarine Research Reserve. The recording will be transcribed by one of the individuals noted at the top of this form. The recording will be kept securely in a locked cabinet in the home of the Principle Investigator for 36 months and then will be deleted. Because your voice will be potentially identifiable by anyone who hears the recording, your confidentiality for things you say on the recording cannot be guaranteed although the researcher will try to limit access to the tape as described in this paragraph.

What are the dangers to me?
This study has minimal risks for participants. There is some risk of loss of privacy, but you do not have to reveal any information that is sensitive. Additionally, the interview will be conducted in a location that affords protection from eavesdropping. There is also some risk of loss of confidentiality. To address this, we will use a pseudonym to protect your identity. The consent forms and recordings of the interviews will be kept in a locked cabinet and destroyed 3 years after the end of the study. There is some risk of loss of time, but you may choose a time for that interview that is convenient to you, and you may stop the interview at any point. If you have any questions about the research or your research rights, please contact Dr. Robin Cooper at the phone number listed above. You may also contact the IRB at the numbers indicated above with questions as to your research rights.

Are there any benefits for taking part in this research study?
You will be given a free pass to the RBNERR learning center, along with a RBNERR magnet and brochures in a Rookery Bay shopping bag. Aside from this, there are no direct benefits for participating in this research.

Will I get paid for being in the study? Will it cost me anything?
There are no costs to you or payments made for participating in this study. You will be given a free pass to the RBNERR learning center.

How will you keep my information private?
All information obtained in this study is strictly confidential unless disclosure is required by law. The Institutional Review Board or regulatory agencies have the right to review research records. All of the information you provide will be identified using a code number rather than your name. All information will stored in a locked cabinet in the

home of the Principle Investigator. Data will be destroyed 36 months after completion of the research study by securely deleting the computer files.

What if I do not want to participate or I want to leave the study?
You have the right to leave this study at any time or refuse to participate. If you do decide to leave or you decide not to participate, you will not experience any penalty or loss of services you have a right to receive. If you choose to withdraw, any information collected about you **before** the date you leave the study will be kept in the research records for 36 months from the conclusion of the study and may be used as a part of the research.

Other Considerations:
If significant new information relating to the study becomes available, which may relate to your willingness to continue to participate, this information will be provided to you by the investigators.

Voluntary Consent by Participant:
By signing below, you indicate that
* this study has been explained to you
* you have read this document or it has been read to you
* your questions about this research study have been answered
* you have been told that you may ask the researchers any study related questions in the future or contact them in the event of a research-related injury
* you have been told that you may ask Institutional Review Board (IRB) personnel questions about your study rights
* you are entitled to a copy of this form after you have read and signed it
* you voluntarily agree to participate in the study entitled: The Florida Freshwater Research Project: A Case Study of the Rookery Bay Region

Participant's Signature: _____ Date: _____

Participant's Name: _____ Date: _____

Signature of Person Obtaining Consent: _____

Date: _____

RRBE-Social Science Research Code Book

Coding Methods:

Emotion Coding (E): "Emotion codes label the emotions recalled and/or experienced by the participant, or inferred by the researcher about the participant" (Saldana, 2013, p. 105).

Values Coding (V): "Values coding is the application of codes onto qualitative data that reflect a participant's values, attitudes, and beliefs, representing his or her perspectives or worldview" (Saldana, 2013, p. 110).

Descriptive Coding (D): "Descriptive coding summarizes in a word or short phrase-hyphen most often as a noun-the basic topic of a passage of qualitative data" (Saldana, 2013, p. 88). Descriptive codes will be used to capture the experiences of the participants.

Versus Coding (VS): "Versus codes identify in dichotomous or binary terms the individual's, group's, social system's, organization's, phenomena, processes, concepts, etc., in direct conflict with each other" (Saldana, 2013, p. 115).

In Vivo Coding (quote marks): "In vivo coding as a code refers to a word or short phrase from the actual language found in the qualitative data record" (Saldana, 2013, p. 91).

Codes:

Attitudes: indicates data pertaining to attitudes of participants towards water-related issues

Beliefs: indicates data pertaining to beliefs of participants towards water-related issues

Behaviors: indicates data pertaining to actions of participants related to water

Decisions: indicates data pertaining to decision-making of participants related to water

Personal/Professional: indicates emphasis on personal or professional context

Collaboration: indicates data pertaining to collaborative processes related to water management
Interventions: indicates data pertaining to existing programs or efforts related to water consumption or management

Education: indicates data pertaining to how participants are exposed to, or informed about, water-related issues

Threats: indicates data pertaining to perceived dangers to waterways, water quality and/or quantity

Shared Value (social, environmental, economic): indicates data pertaining to the combined relative desirability as perceived by stakeholders through the lenses of social, environmental, and economic needs

Tension (social, environmental, economic): indicates data pertaining to the points of misalignment as perceived by the stakeholders through the lenses of social, environmental, and economic needs

Conflict: indicates data pertaining to interpersonal or intergroup conflict

Conflict management: indicates data pertaining to methods or practices used by participants to deal with conflict related to water

Reference:

Saldaña, J. (2013). *The coding manual for qualitative researchers* (2nd ed.). London, UK: Sage.