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SOCIAL NETWORKS AND STAKEHOLDER PERCEPTIONS: THE RI SHORELINE CHANGE SPECIAL AREA MANAGEMENT PLAN

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SOCIAL NETWORKS AND STAKEHOLDER PERCEPTIONS: THE RI SHORELINE CHANGE SPECIAL AREA MANAGEMENT PLAN

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ABSTRACT

Collaborative processes for natural resource management have emerged in the past four decades as a response to ineffective environmental policies developed by top-down, centralized regimes. As more people have become involved in these processes, governance has shifted from single sector approaches to networks of stakeholders that include state and federal agencies, environmental organizations, the public, and others. Evaluating the success of these participatory processes involves examining not only the outcomes of the process, but also the process itself. Rhode Island has a history of public participation in coastal policy development, especially through the development of Special Area Management Plans (SAMPs). Recently, the RI Coastal Resources Management Council (CRMC), the University of Rhode Island (URI), RI Sea Grant, and the URI Coastal Resources Center (CRC) have initiated the planning process for a new SAMP, the Shoreline Change SAMP, in order to address issues of erosion, inundation, and storm flooding along the coastline.

The purpose of this study was to investigate the network structure and stakeholder perceptions of process quality in the early stages of the Shoreline Change SAMP, and to explore relationships between network structure and perceptions of process quality. An online survey of 232 stakeholders involved in the SAMP process was conducted during the fall of 2013. Twenty-seven stakeholders responded, representing state and federal agencies, local officials and board members, non-profit organizations, environmental organizations, and members of university and academia. Results of this research indicate that overall, survey respondents had positive perceptions of the quality of the Shoreline Change SAMP process, and that the social

network supports positive initial interaction between actors. However, respondents expressed some doubt as to how decisions will be made in the process and if people from all relevant interests are participating. Furthermore, the density of the overall network was low, but the structure indicates a core-periphery network, which is a network defined by a core of densely connected actors and a periphery of actors who are more connected to the core than to each other. This structure has the potential to increase information sharing and connect the network to a larger number of people as the process evolves. Finally, findings indicate that people within the core of the network tended to have more positive perceptions of the process than people who were not as well connected.

Findings provide SAMP coordinators and other coastal management practitioners valuable insight into developing and conducting high quality participatory processes. Understanding relationships between network structure and process quality highlights how stakeholders' positions within a network can influence their perceptions of the process.

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LIST OF ACRONYMS

SNA……..……..……Social Network Analysis

SAMP……...…….……..Special Area Management Plan

CRC……..Coastal Resources Center

CRMC……...Coastal Resources Management Council

URI ……..……..University of Rhode Island

CZMA……..Coastal Zone Management Act

CMP…….Coastal Management Plan

NOAA……..National Oceanic and Atmospheric Administration

USDA……United States Department of Agriculture

SAS…….……Statistical Analysis System

CHAPTER 1: INTRODUCTION

Environmental issues span social, geographic, political, and economic boundaries and involve a multitude of stakeholders, including state and federal agencies, environmental organizations, non-governmental organizations, and the public (Schneider et al. 2003). Environmental decision making processes have begun to evolve from top-down centralized regimes, where government agencies define resource management initiatives and impose policies on resource users, without much, if any, collaboration with the users or other organizations affected by decisions (Adger et al. 2005), into more diverse networks of people and organizations (Hartley 2010). Governance networks are groups of public and private actors including federal and state agencies, non-governmental organizations, and members of the public coming together to address complex problems (Dedeurwaerdere 2005). This change from top down regimes into governance networks may be due to increasing public knowledge of environmental issues, or could be due to the perception that environmental protection directives made in top down regimes have produced little or negative results (Bodin and Crona 2009).

Rhode Island has a history of public participation in coastal policy development processes, especially through the development of it's seven special area management plans (SAMPs), which are plans for areas with significant natural and economic resources or that are threatened by coastal hazards and climate change (CZMA 1972). Currently, the Rhode Island Coastal Resources Management Council (CRMC), in collaboration with the University of Rhode Island's Coastal Resources Center (CRC) and Rhode Island Sea Grant, is working on the development of a new SAMP, the Shoreline Change SAMP. Different from the other SAMPs which have focused on specific areas of

RI's coastline, the CRMC is attempting to develop a policy plan for the entire coast of Rhode Island to address issues of erosion, inundation, and sea level rise. These issues have happened with increasing frequency and intensity in RI over the past few decades. The CRMC is partnering with state and federal agencies, environmental organizations, realtors, university academics and other researchers, and the public in the development of the plan, since these issues are so widespread. This case study will focus on the development of the Shoreline Change SAMP, specifically the emerging governance network and stakeholder perceptions of the planning process in its early stages.

1.1 Objectives

Sea level rise, erosion, and inundation in Rhode Island are problems that are happening with increasing frequency and force, and are affecting more citizens and business owners each year (Save the Bay 2013). From 2010-12, there were three major flooding events in RI: 2010 flooding (March, 2010), Hurricane Irene (August, 2011) and Hurricane Sandy (October, 2012). Developing innovative policies to help Rhode Island, and other states, adapt to a changing climate will involve building strong governance networks of people from different organizations, state and federal agencies, and the public, and integrating the knowledge and experiences of those affected.

The objective of this study is to examine the governance network in the early stages of the Shoreline Change SAMP process, stakeholder perceptions of collaboration and process quality, and relationships between the network and stakeholder perceptions of the process. Findings from this study will provide insights for coastal policy makers working to develop governance networks and participatory processes, and improve coastal management. It may also provide insights to CRMC, CRC, and Rhode Island Sea

Grant on ways to improve the Shoreline Change SAMP process as it continues to develop in the upcoming years.

1.2 Research Questions

This case study focuses on three core research questions: (1) What is the governance network structure in the initial stages of the Shoreline Change SAMP process? (2) What are stakeholder perceptions of process quality in the early stages of the process? (3) What is the relationship between network structure and perceptions of process quality?

The next chapter will present background on the Shoreline Change SAMP process, participatory processes, stakeholders, stakeholder perceptions, and social network analysis. Chapter 3 will present the methodology used to conduct this analysis, including why the Shoreline Change SAMP process was chosen for this study. Chapter 4 will provide results of the analysis. Chapter 5 will provide a discussion and recommendations for future work. Finally, Chapter 6 will provide concluding remarks.

CHAPTER 2: BACKGROUND

2.1 The Case Study: The Shoreline Change SAMP

The CRMC implements the coastal management program (CMP) for the state of Rhode Island under the Coastal Zone Management Act (CZMA) of 1972. The CZMA encourages coastal and Great Lakes states to develop programs to effectively manage human activities and achieve conservation and sustainable development goals for the terrestrial and water resources within their coastal zones (CZMA 1972). According to the CZMA, the plans should manage, among other things, coastal development to mitigate flooding and erosion, water quality issues, public access to the coast, coordination of procedures for decision-making, and assistance to support planning, conservation, and management (CZMA 1972). As part of its CMP, RI CRMC has developed several SAMPs for managing human uses and environmental issues in specific parts of Rhode Island's coastal zone. The CZMA encourages states to develop SAMPs as part of their CMPs to provide "for increased specificity in protecting significant natural resources, reasonable coastal-dependent economic growth, improved protection of life and property in hazardous areas, including those areas likely to be affected by land subsidence, sea level rise, or fluctuating water levels of the Great Lakes, and improved predictability in governmental decision making..." (CZMA 1972). The CRMC has worked in direct partnership with the CRC and Rhode Island Sea Grant to develop the seven SAMPs. The SAMPs are meant to be adaptive, in that the CRMC plans to continuously evaluate and revise policies and regulations based on monitoring results and the outcomes of similar cases (e.g., McLeod and Leslie 2009). The Shoreline Change SAMP will be the eighth SAMP developed in Rhode Island.

RI CRMC, in partnership with URI's CRC, recently initiated the Shoreline Change SAMP to address issues of erosion, inundation, and sea level rise. The SAMP area encompasses the whole coastline of RI, and the SAMP development process will be carried out in three phases (Figure 1). The first phase will address issues along the south shore and Block Island, areas that are experiencing erosion and flooding to a greater degree than the rest of the state due to their coastal geology and low-lying topography. The second phase will focus on the inner bay and Providence area, which are affected most by storm flooding and the threat of future sea level rise. The third phase will focus on Aquidneck Island and the Sakonnet River, areas that experience erosion to a much lesser degree but that still deal with flooding and sea level rise issues. Over these three phases, coastal change issues in all 21 coastal communities will be addressed.

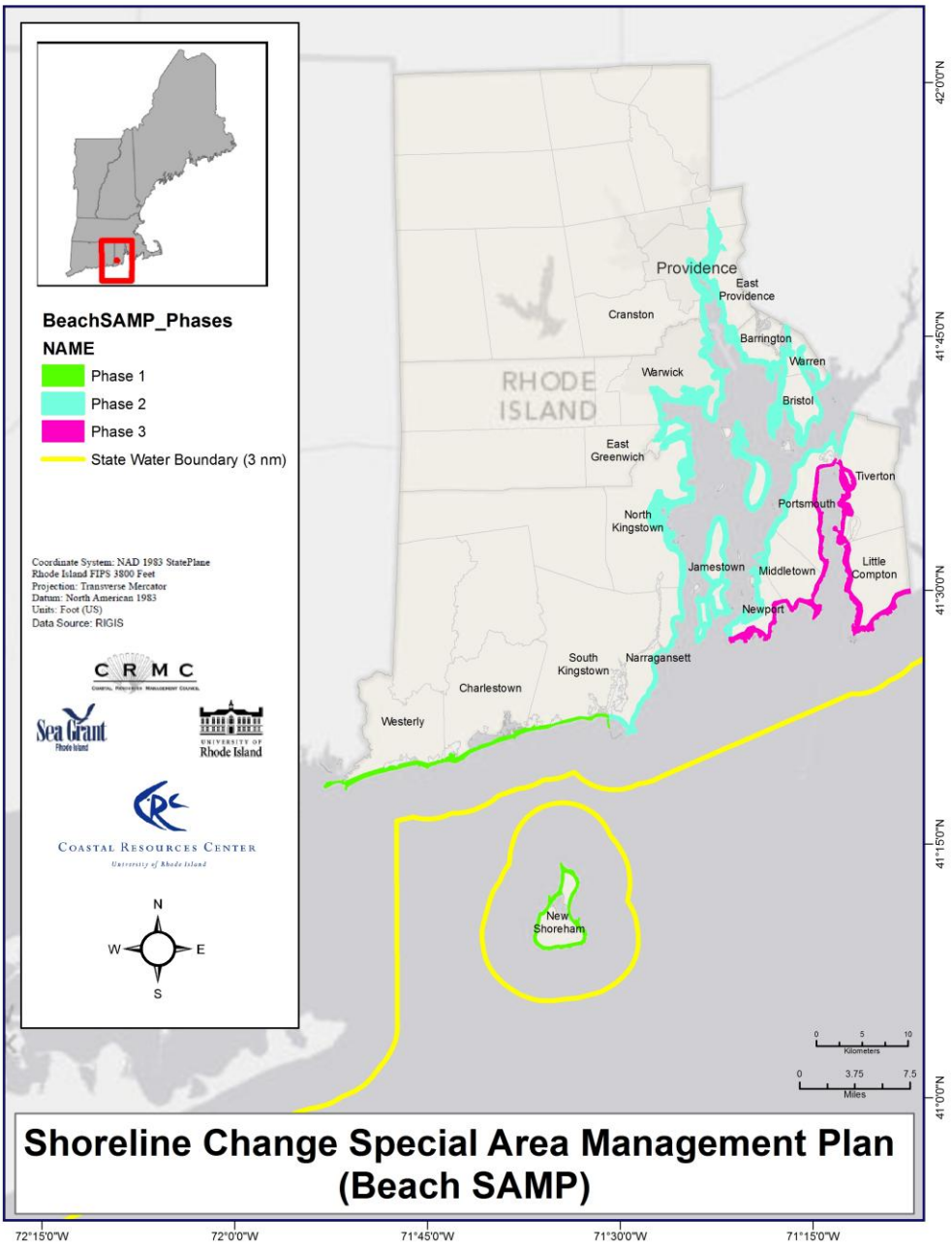

Figure 1: Map of Shoreline Change SAMP planning area (Source: BeachSAMP.org)

The purpose of the new SAMP is to increase public understanding of how the shoreline is changing, and to identify and explore the potential impacts that these changes will have in the coastal communities of Rhode Island. Gathering new and historical data of these coastal impacts and determining what areas are most vulnerable is one of the first

steps of the project. The project will also identify options for adapting to these changes and vulnerabilities, including studying what has worked in other places around the world and solutions that could work for Rhode Island. Through a public process involving multiple stakeholder groups that include state and federal agencies, non-profit organizations, environmental organizations, recreational and commercial users, university members and other scientists, and citizens, CRMC plans to develop and improve policies to better address the impacts of climate and shoreline change in Rhode Island.

The devastation of Hurricane Sandy in 2012 caused advocates for Narragansett Bay including Save the Bay, the University of Rhode Island, and CRMC to realize that existing policies regulating coastal activities to control erosion and coastal flooding were not adequate. CRMC teamed with CRC and RI Sea Grant to start exploring planning and funding options to address these issues. In April 2013, a public kickoff meeting was held to inform community members in and around Rhode Island of the three-phase plan. The second public meeting was held in July 2013, and the third was scheduled for October 2013 but was cancelled due to the federal government shutdown. Also, during the summer and fall months, CRC held various other meetings with municipalities, state and federal agencies, and the specialized SAMP teams, which will be discussed to a greater extent in Chapter 3.

2.2 Participatory Processes

Environmental problems cross social, political, economic, and geographical boundaries and thus affect a wide range of people including state and federal agencies, non-governmental organizations, and the general public. In the latter half of the 20th and

into the 21st century, there has been growing interest in involving these different players, or stakeholders, in environmental policy development through participatory processes (Reed 2008, Rowe and Frewer 2005). Participation can occur at different scales, from low levels where different stakeholders might be polled about their beliefs and values or provided education about the issue, to higher levels where stakeholders are invited to be a part of the planning or decision making process. At any level, a high quality process addresses the needs, concerns, and values of those affected and involved; there is a rich body of literature that suggests that higher quality processes lead to higher quality decisions (Creighton 2005, Reed 2008).

Rowe and Frewer (2005) defined three levels of public engagement based on information flow: public communication, public consultation, and public participation. In public communication, information flows from the policy maker or sponsor to the public. In public consultation, information flows from the public to the sponsor. While communication and consultation are cooperative efforts, public participation is a more collaborative effort because information flows both ways. Creighton (2005) describes a participation continuum in a similar way with four main steps ranging from informing the public to developing agreements collaboratively.

While public participation can be achieved by a wide variety of mechanisms and therefore be defined in many ways, collaboration is defined in more specific terms. Collaborative efforts attempt to engage stakeholders in all stages of the policy development process (Koontz and Thomas 2006). O'Leary and colleagues (2006) define collaboration in terms of public management, as a process involving multiple organizations and individuals working together to solve problems that could not be

solved alone, a definition which will be used for the purposes of this study. They also define participatory governance as involving citizens in decision-making processes. However defined, levels of public participation vary by project, depending on the time and resources available, as well as the goals and outcomes of the policy or process.

The increase in participatory policy development in environmental management over the past few decades has been fueled by public mistrust in government, declining resources, and inadequate or ineffective policies (Wondolleck and Yaffee 2000). Bringing together a diverse group of stakeholders can begin to address some of these issues in the early stages of policy development. Many researchers have identified various methods of public participation, including focus groups, stakeholder meetings, community forums, and collaborative research (Rowe and Frewer 2005). Different processes attract different stakeholders based on their previous experiences, values, and associations. Each process has different goals and outcomes, and stakeholder groups involved have different perceptions of each process (Tuler and Webler 2010).

Table 1: Benefits and Challenges of Stakeholder Participation

Benefits	**Challenges**
• Increased perceptions of trust and legitimacy • Strengthened relationships between user groups and organizations • Promotion of social learning • Increased information flow between stakeholders and decision makers • More successful outcomes • Better suited policies	• Identifying and classifying stakeholders for participation • May marginalize certain groups • Consultation fatigue • Lack of resources for process

There are many potential benefits and challenges to collaborative management and stakeholder participation (Table 1). Participatory processes can provide societal benefits by increasing the public's trust and perceptions of legitimacy of policy makers, creating new and strengthening existing relationships between user groups and organizations, and promoting social learning (Reed 2008). Another benefit of high quality collaborative efforts is that they allow information flow between stakeholders and decision makers. By basing decisions on higher quality, more diverse, and more holistic information, stakeholder participation can also lead to more successful outcomes and better-suited policies (Creighton 2005, Reed 2008). Decision makers can also use public perceptions and local knowledge to promote successful implementation and long-term support of policies, including greater acceptance and uptake of new solutions and technologies (Ritchie and Ellis 2010).

However, there are also challenges to collaborative management and stakeholder participation, including how to identify and classify stakeholders, who to involve, and at what step in the process they should be involved. Stakeholder participation has the potential to marginalize some stakeholder groups that are not perceived by the managers to be as important to the process as other groups (Reed 2008). Groups can be marginalized if they cannot easily attend public meetings, if they feel like there is no incentive to participate, or if they feel that their voice would not be heard. Additionally, participatory processes that are not organized well can be costly (both time and money), and lead to "consultation fatigue," where stakeholders believe they are not getting anything out of the process (Reed 2008). Although participatory processes were developed in many cases to address problems with resource and funding shortages, these

processes take time, money, and other resources to develop (Yaffee and Wondolleck 2003). Additionally, though sometimes a participatory process is the result of a number of organizations coming together to address a problem; more often a specific agency is the leader of such a process (Yaffee and Wondolleck 2003). In these cases, the role of the leading agency can be complicated, especially when they are trying to act as stakeholder, facilitator, decision maker, and other roles in different situations; finding the proper balance can be challenging.

Measuring the effectiveness or success of participatory processes is case specific, and depends on the issue and the level of stakeholder engagement. Dalton (2005) developed a framework of features that can lead to successful processes based on themes that have arisen in the participation literature. These features include active participant involvement, positive participant interactions, efficient administration, fair decision making, and decisions based on complete information (Dalton 2005). Within her framework, and in other studies, transparency of information and decision-making processes, positive motivation and influence, and efficiency also play a role in the success of participatory processes (e.g., Dalton 2005, Reed 2008, Wondolleck and Yaffee 2000). Although high quality processes are case specific, some US agencies such as the Department of Energy, Environmental Protection Agency, and NOAA have attempted to put together best practices for public engagement (Tuler and Webler 2010). These can be a good starting point for developing participatory processes, but it should be noted that the needs and demands of specific processes often change throughout their timeline (Tuler and Webler 2010).

2.3 Stakeholders

The first step in designing a participatory process is deciding who to involve. In other words, who are the stakeholders? Stakeholders, as defined in the business literature, are those people who are affected by, or can affect, an organization's actions and decisions (Mikaleson and Jentoft 2001). Applied to environmental resource management, this could potentially include numerous people such as environmental organizations, public managers, resource users, local governments, the general public, and others. For the purpose of this thesis, stakeholders will be defined as those groups and individuals that are involved in or affected by a decision making process.

Defining and determining who should be involved begins with identification of the problem. In other words, who is being affected by the problem and who will be affected by potential solutions (Reed 2008)? When a problem is more clearly defined, it is easier to determine who is affected by the problem and who could, or should, have an influence over the decision. Defining basic characteristics of the stakeholders, including their attitudes and values about the problem, their previous involvement with participatory processes, and if they are representative of a larger group of people that hold the same values, can help in this process (NOAA 2007). However, identifying stakeholders is a complicated process. Who should be included? Who has a legitimate stake in the issue? It could be argued that everyone is affected by environmental decisions and therefore is a stakeholder; but including everyone in the policy process is impossible. With these complications, determining how to adequately represent all of the potential stakeholders becomes the next ideal step. The government is charged with representing the interests of the public; however, in the past few decades, literature has

pointed to a drastic decline in public trust for the government (Wondolleck and Yaffee 2000). This reduction in trust may be one of the drivers for trying to increase public participation in policy processes.

In addition to identifying stakeholders, there are many different ways to define and classify stakeholders into meaningful groups for involvement. NOAA (2007) defines stakeholders generally into five groups: people who live, work, play, or pray near a resource, people who use a resource, people who are interested in the decision making process affecting a resource, people who pay bills related to the resource, or people who represent citizens. In the fisheries management literature, stakeholders are defined as groups with a legitimate interest in the resource, and therefore have a right to be included in the decision making process (Mikaleson and Jentoft 2001). Reed et al. (2009) define stakeholders for natural resource management as those that are affected by or can affect the status of the resource in question.

However, it is important to not only define who stakeholders are, but also how they will be involved in the process. People who study participatory processes often point out that the quality of a decision depends on the quality of the process (e.g., Dalton 2005, Reed 2008). In fact, Dalton et al. (2012) found that positive perceptions of process quality were linked to positive perceptions of outcomes. Defining a participatory process involves deciding at what point it is most useful to engage stakeholders and how to engage them in a way that promotes fairness, transparency, and influence over the final decision (Reed 2008). Different levels of stakeholder engagement are appropriate for different projects, depending on the process and goals of the project. Reed et al. (2009) defined eight features of participatory process that lead to more successful outcomes that

continue to arise in the literature. These included adequate analysis and representation of stakeholders, defining clear objectives for the participatory process, proper facilitation, and integration of local and scientific knowledge.

2.4 Social Network Analysis

Social network analysis (SNA) is one way to study the relationships that make up social and governance networks built through participatory processes (Weber and Khademian 2008). Weber and Khademain (2008) define social networks by relationships established between involved organizations and individuals to promote information sharing and participatory decision-making. Governance networks are groups of public and private actors including federal and state agencies, non-governmental organizations, and members of the public coming together to address complex problems (Dedeurwaerdere 2005). SNA can be used to analyze different positions of people or organizations within a network, and how those specific positions contribute to influence over other actors, attitudes, and perceptions of the process (Hartley 2010). Social network research involves gathering and analyzing data from individuals or organizations involved in a policy making process. In SNA, each individual is referred to as a node, or actor (Table 2). The relationships between actors, referred to as ties, have varying characteristics that affect knowledge transfer and power structure within the network (Bodin and Crona 2009).

Table 2. Social network analysis terms used in this study (adapted from Smythe 2011)

Term	**Definition**
Actors	Individuals who make up a network
Ties	Relationships between the individual actors who make up a network
Isolates	Actors with no connections within a network
Pendants	Actors with only one connection within a network
Degree Centrality	A measure of the number of links an actor has to other actors in a network.
Betweenness Centrality	A measure of how frequently an actor lies along a path connecting a pair of actors
Network Density	A measure of how many links exist within a network compared to the total number of links that could exist
Network Centralization	A measure of the extent to which the network is centered around one or more key individuals
Clustering Coefficient	Determines degree to which actors form cliques, or closely connected groups, within the network
Bonding Ties	Ties between actors who are part of the same clique, or closely connected group
Bridging Ties	Ties between actors of different cliques, or groups. Often, the only connection between two otherwise unconnected groups or actors

The number of ties within a network is referred to as the network density (Bodin and Crona 2009). Studies have shown that the higher the network density, the greater the potential for positive collaboration and reduced conflict between and among groups and individuals (Bodin and Crona 2009). Higher density has also been linked to enhanced knowledge and information sharing between groups (Bodin and Crona 2009). For resource management efforts to be successful in reaching out to a broad range of people, they must include diverse stakeholder groups and information sources. Weaker ties within a larger network also have the potential to diversify information by connecting groups or individuals who were not previously connected (Reed et al. 2009). However, weak ties are easy to break; even if they were created through a decision making process, they do not necessarily have the lasting power that many stronger ties have.

Another characteristic of social networks is cohesion, or the degree to which different groups within the network are connected, measured in this thesis by a clustering coefficient (Bodin and Crona 2009). These groups within the network may be divided by their employment, stakeholder affiliations, community location, or other identifiers. Cohesion is measured by comparing the density of ties between sub-group members and non-members, or between different sub-groups (Bodin and Crona 2009). Strong cohesion has the potential to increase knowledge sharing and positive interactions, while weaker cohesion has the potential to reduce effective collaboration among groups (Bodin and Crona 2009). Within-group ties are referred to as bonding ties. Strong bonding ties can lead to greater acceptance of new information, and build stronger networks overall by making them more adaptive (Bodin and Crona 2009). However, networks of only bonding ties can actually constrain decision making processes by polarizing differing

values of different groups (Newman and Dale 2005). Between group ties are referred to as bridging ties. Bridging ties can help bring different sub-groups together, leading to a denser network. Bridging ties can also enhance and diversify information sharing and feelings of mutual respect for other groups, both important qualities for successful natural resource governance (Bodin and Crona 2009, Hartley 2010). Successful networks have a balance of bridging and bonding ties (Newman and Dale 2005).

Centrality is another way to measure relationships within a social network. A highly centralized network is characterized by a few key actors that have the most ties within the network, and are sometimes referred to as bridgers. Bridgers can be classified by their level of betweenness centrality depending on how many groups they connect. Alternatively, the number of ties any certain actor possesses can be measured by degree centrality. Studies have shown that actors with higher degree centrality have more influence in the decision making process than actors with fewer ties (Bodin and Crona 2009). Initial centrality can be useful in network building and in the early phases of participatory processes (Reed et al. 2009). However, centrality has the potential to be destructive to a network process, if bridgers hold back information between subgroups or use their influence in a negative way, for example, by not promoting collaboration (Bodin and Crona 2009). Long-term processes benefit from decreased centrality and increased network density between all of the stakeholders (Bodin and Crona 2009).

Social network analysis is challenging in that it requires developing an initial survey and receiving a high response rate in order to appropriately represent the full network (Hartley 2010). Additionally, choosing who to include in network analysis (defining network boundaries) is often complicated by the high number of stakeholder

groups and organizations involved in public policy processes (Hartley 2010). Network links can also be complicated by different factors of communication, including the type of information being shared, and how credible and useful that information is (Hartley 2010).

Although most social network analyses identify a population and try to conduct a census of that whole population, there are various methods for identifying a population and choosing a sample. One method is called the reputational method. This approach is used when there are key informants involved in a process that provide a list of members of the population (Scott 1991). In this method, there is a high assumed level of legitimacy for the informants, that they have a good knowledge of the people involved in the network and are reporting all of them. Another approach is to use a full network method. This method attempts to identify every person within a network, and is often costly and time consuming (Hanneman and Riddle 2005). Another constraint to this approach is defining a boundary for the network. However, the full network approach can provide a complete picture of a given network. Snowball sampling is another method, in which the researcher begins with a group of key actors and asks them to identify their connections (Hanneman and Riddle 2005). Those actors are then contacted to participate in the same identification process. The sampling continues until there are no new names identified, or more often, when the researcher chooses to stop due to resource constraints. A final approach to social network sampling is to look at the individuals in the network, rather than the network as a whole. This is called an ego-centric method (Hanneman and Riddle 2005). This method is useful when trying to determine how a network affects an individual, or examining an individual's role within a network.

Policy makers can use SNA to understand the evolving relationships within network structures, better define the problem in question, decide who to involve in the decision making process, and create better suited solutions (Bodin and Crona 2009). Social governance networks are constantly evolving, dynamic structures. The patterns and relationships that emerge from network analysis are unique to that governance structure at that point in time, and differ depending on the process itself: its funding, the method of participation used, processes of communication, etc. For policy makers and natural resource managers, understanding how governance networks are built, function, and evolve will better enable them to develop better policy processes and create more adaptive solutions for the future.

2.5 Public Perceptions of Process

Participatory processes are voluntary, and need to be designed in a manner that makes people want to participate. Understanding stakeholder perceptions is an important part of designing successful participatory processes, and can help resource managers and community members build collaborative initiatives (Dalton 2006, Selin et al. 2000). Furthermore, understanding stakeholder perceptions can help measure project effectiveness. In many cases involving natural resource management, project effectiveness is measured by how the ecosystem in question responds to policy changes; however, those indicators can sometimes take years to develop (Selin et al. 2000). In long term participatory processes, understanding stakeholder perceptions about process quality can help to keep people engaged and motivated (Selin et al. 2000).

Different stakeholders may have different perceptions of what makes a process successful based on their previous involvement in participatory processes, their understanding of the issue at hand, or their desired goals and outcomes (Webler and Tuler 2006). However, many studies that have examined different factors leading to perceptions of a high quality process have found reoccurring patterns and themes (Dalton 2006, Webler et al. 2001, Webler and Tuler 2006). In the early stages of a process, factors that motivate people to become involved and engaged are important to understand. Dalton (2006) suggests that processes are more effective when they provide participants with the opportunity to be involved early on in the process and make meetings easy to attend. Other studies have found that conflicting perceptions in the beginning of a study can be challenging to address. In the early stages of some processes, different stakeholder groups may have different perceptions of process quality, including how they expect a process to be carried out, how decisions will be made, and the overall goals of a process. Additionally, they may lack trust for other stakeholder groups or the leading agency, or have a different understanding of how the issue at hand affects them (Wondolleck and Yaffee 2000). In one study in New England, Hartley and Robertson (2009) found that fishermen and scientists who initially were wary of knowledge and data used by each other were able to built trust by participating in collaborative research. Wondolleck and Yaffee (2000) identified many success factors that help overcome the conflicting perceptions that different groups may initially have toward each other, including finding common ground early in the process, focusing the problem, and providing education to increase awareness about not only the problem at hand but also the different groups that are affected by the problem.

Other factors affecting perceptions of process quality include representation of multiple interests, positive participant interactions, information exchange, and clearly defined goals (Dalton 2006, Selin et al. 2000, Webler et al. 2001). In a study of collaborative initiatives in the USDA forest service, stakeholders felt that projects were more effective if they included a broad range of stakeholder groups that represented a broad range of interests, and that everyone who was affected by the issue at hand had the opportunity to be involved (Selin et al. 2000, Webler and Tuler 2006). Additionally, interactions between and among stakeholder groups affected perceptions of process quality. Dalton (2006) highlights that positive participant interactions are linked to higher quality processes. Positive interactions allowed stakeholders the opportunity to enhance existing and create new working relationships built on mutual listening, respect, and understanding of different viewpoints. Positive feelings of trust and comfort for other stakeholder groups, and the opportunity to be heard and to hear other people led to positive perceptions of process quality (Selin et al. 2000).

Perceptions of the information used in different processes played a role in perceived effectiveness of collaborative efforts. Having access to information that is relevant, shared in useful ways, and derived from a variety of credible sources was an important factor to many participants (Webler et al. 2001). Some participants felt that decisions should be made based on a wide variety of local and technical knowledge, while others felt that decisions should be based on mainly scientific information (Dalton 2006, Webler et al. 2001). However, all participants felt that the information used in the process should be transparent and easy to understand, and that it should be clear how decisions are made (Webler et al. 2001).

Other factors affecting positive perceptions of process quality are legitimacy of the project and strong leadership. Webler et al. (2001) found that participants felt that processes were legitimate if they used consensus-based decision-making and were open to the public. Additionally, Webler found that processes were seen to be legitimate if there was a clear plan and clearly defined goals. Finally, many participants felt that strong leadership was important to process quality, including always having a key person to go to, adequate conflict resolution, and professional facilitation (Selin et al. 2000).

CHAPTER 3: METHODS

3.1 Case Study

The RI Shoreline Change SAMP was selected as a case study for this thesis to examine network structure and stakeholder perceptions in a coastal management process. Specifically, the recent start of the Shoreline Change SAMP process in late 2012 provided an appropriate opportunity to examine the network structure and stakeholder perceptions at the beginning of the process, a time when initial network growth is happening and stakeholder perceptions of process quality are forming. Network structure and stakeholder perceptions are especially important to the Shoreline Change SAMP process, as the CRMC and CRC plan to conduct a more extensive outreach program than any other SAMP to date since the issues being addressed (erosion, inundation, and sea level rise) are widespread and affect numerous RI residents, communities, agencies, and organizations.

Network growth in the beginning of a process relies on adequate interaction and places to interact, encouragement of stakeholder participation by project leaders and coordinators, and adequate funding for coordinators and the project (Schneider et al. 2003). During 2013, the Shoreline Change SAMP held four public stakeholder meetings, and multiple SAMP "team" meetings. SAMP teams include the core Project Management Team, a group from CRC, CRMC, SeaGrant, and URI; the Senior Advisors Team, a group of academics from URI, CRMC, NOAA, and SeaGrant; the Coalition of Community Leaders, a group of well known and connected members from municipalities across RI; and the Stakeholder Committee, representing a broader range of interests

around the state. A list of members of the SAMP teams was compiled with the help of CRC and used as the study population.

3.2 Data Collection

The population for this study is all of the stakeholders that were invited by CRC to participate on the SAMP teams. This included 232 people and encompassed members of state and federal agencies, business owners, non-profit organizations, environmental organizations, university and academia, recreational organizations, and other stakeholder groups. The 'reputational approach' was used to select the sample, which is a process that involves studying people on a list created by knowledgeable informants, in this case the SAMP coordinators (Scott 1991). The list is composed of people who are members of a certain population, in this case the people invited by the coordinators to participate on SAMP teams. A random sampling process is rarely used since social network analysis is trying to capture the relationships within a population.

Any social network sampling method must define population boundaries, which is a challenge when networks span many social boundaries, as the Shoreline Change SAMP process network does. In some cases, people within a certain group such as a community or organization form boundaries themselves. In these situations, a social network is already known to exist. In other cases where a network does not clearly exist, the researcher must define the population boundaries (Hanneman and Riddle 2005). In this study, it was assumed that the population boundary was created by CRC by inviting specific organizations and agencies to be members of the SAMP teams. This study did not attempt to capture a network that included the general public, who are invited to

public meetings in order to give their input and share ideas, because of the constraints of identifying and contacting all individuals in this population.

The survey instrument used in this study was administered through SurveyMonkey.com, a website that allows for the creation and distribution of an electronic survey by emailing a link to potential respondents. Before sending the link to study participants, the survey was tested on five individuals with knowledge of RI coastal issues, who provided feedback about the questions and flow of the instrument. SAMP stakeholders were sent an invitation email with the link, which brought them to the SurveyMonkey.com site. The first page was a consent form, which reminded all participants that all information was confidential. The survey was administered between 7/28/2013 and 9/15/2013. A reminder email was sent on 9/1/2013 to those who did not answer during the first month. The survey was sent out again to the same stakeholders in December 2013 to increase response rates.

3.2.1 Research Questions

This case study focuses on three core research questions: (1) What is the governance network structure in the early stages of the Shoreline Change SAMP? (2) What are stakeholder perceptions of process quality in the early stages of the process? (3) What is the relationship between network structure and perceptions of process quality?

3.2.2 Survey Design

The electronic survey used in this study was divided into several sections (Appendix A). The first section asked respondents to identify specific information about

themselves, such as how they classified themselves as a stakeholder, if they had participated in coastal management processes in RI before, and their educational background. The second section of the survey asked respondents to identify who they collaborated with in relationship to the Shoreline Change SAMP process. The third and final part of the survey asked people to rank on a five-point Likert-scale (1=strongly disagree to 5=strongly agree) how they felt about the quality of the process using items hypothesized to be indicators of process quality. These statements were separated into categories related to perceptions about (1) information shared in the process, (2) interactions with others in the process, (3) the process in general, and (4) the respondent's participation in the process. Respondents were prompted to choose from six answer choices. An example of this is:

Question: The information shared in the process was easy to understand.

Answer: 1- strongly agree 2-agree 3-neither agree nor disagree 4-disagree 5-strongly disagree 6- I don't know

At the end of the survey, respondents were invited to comment about the survey, and to share the link with anyone they thought might be interested in the study. The survey took about 15 minutes to complete.

3.3 Analysis

3.3.1 Social Network Analysis

In the second part of the survey, respondents were asked to name who they collaborated with during the Shoreline Change SAMP process. Each name was replaced

with a unique two-digit identifier. This data was aggregated in matrix form, which is the standard method of formatting for social network analysis (Hanneman and Riddle 2005).

Table 3: Example of network dataset in matrix form (fictional data) (1=individuals in the row and column collaborate, 0=individuals in the row and column do not collaborate)

	Mary	**Mike**	**Emily**	**Gus**
Mary	0	1	1	0
Mike	0	0	1	1
Emily	1	0	0	1
Gus	0	0	1	0

In Table 3, people, or actors, are listed as the headings for both rows and columns, and the cells of the table are filled with ones or zeros, where a one represents a relationship, or tie, between those people, and a zero represents no relationship. These ties are referred to as binary ties, although ties can also be weighted by frequency of interaction, importance, or some other measure defined by the researcher. Ties can also either be symmetric or directed. Symmetric ties refer to a reciprocal interaction. As shown above, Mary indicated a tie with Emily, and Emily indicated a tie with Mary. Directional ties, on the other hand, are not always reciprocated; for instance, Mike indicated a tie with Gus but Gus did not indicate a tie with Mike. For the purposes of this thesis, all ties were assumed to be symmetrical.

This data was then imported into specialized software, Ucinet (Borgatti et al. 2002) and Netdraw (Borgatti 2009), in order to produce a sociogram, or network graph,

where different actors are represented as nodes and the ties between them are represented by lines (Figure 2).

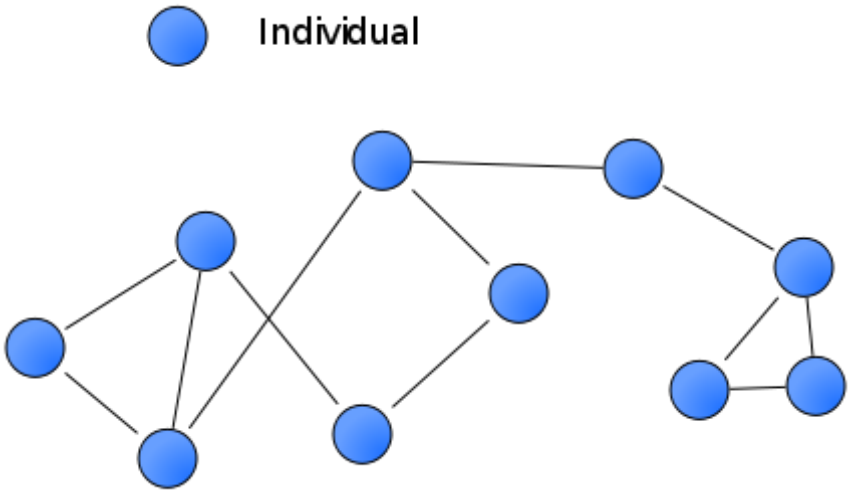

Figure 2: Example of a sociogram. Each circle, or node, represents an actor, and each line represents a tie

Netdraw and Ucinet also have the option of associating each actor with different attributes, or characteristics. Using the software, a table of attributes, such as age, level of education, or stakeholder classification can be imported and used to differentiate between nodes of the sociogram. For this study, an attribute table was created based on how respondents identified their primary stakeholder affiliation. In the survey, stakeholder affiliations were based on an audience polling exercise administered at the second Shoreline Change SAMP meeting on July 10th, 2013. These affiliations included local official/board member, state/federal agency, university/academia, non-profit group, business/insurance, interested citizen, or other. Affiliations added onto this list in the survey included environmental group, homeowner, and recreational user.

Sociograms were then created to represent the whole network, highlighting survey respondents, respondent affiliations, and affiliations of the whole network. Network characteristics (network density, network centralization, clustering, Freeman degree centrality, and betweenness centrality) were then analyzed using Ucinet. Finally, a Spearman's Rho correlation analysis was run in SPSS to determine the relationship between Freeman degree centrality and betweenness centrality. Significance for all statistical tests was determined at the commonly-accepted 5% level.

3.3.2 Perceptions Analysis

Likert-scale responses for each perception statement were averaged across the sample and standard deviations were calculated, excluding the "I don't know" responses. Additionally, frequencies of likert-scale responses were calculated in order to view responses in a different way. These basic descriptive statistics allow for easy representation of data collected from Likert scale questions. Graphs of frequency of response combined responses into three categories for simplification: (1) Agree and Strongly Agree, (2) Disagree and Strongly Disagree, and (3) Neither Disagree nor Agree and I Don't Know. Tables of frequency responses for each stakeholder affiliation were also created.

Means for the entire sample and for each stakeholder group were calculated for each of the four groupings of perception statements: information used in the process, interactions taking place in the process, the process in general, and respondents' participation in the process. A Kruskal-Wallis one-way analysis of variance was run in SAS to determine if there were differences in perceptions between stakeholder groups.

This non-parametric test is commonly used when the groups under study are of unequal size, and it does not assume a normal distribution.

3.3.3 Connecting Social Network Analysis and Perceptions Data

Few studies have attempted to link social network analysis with stakeholder perceptions. This study addresses this gap by exploring selected linkages. First, a sociogram was produced for each perception statement where over 30% of respondents did not agree (disagreed, did not know, or neither agreed nor disagreed). The sociogram used color-coding (green=agree, red=disagree, purple=neither agree nor disagree) to show respondents' answers. These sociograms were examined qualitatively to observe if there is any relationship between perceptions and placement within the network.

Second, Spearman's Rho correlation analyses were run in SPSS to determine if there was a relationship between perception means for each stakeholder group and Freeman degree centrality or betweenness centrality.

Finally, it should be noted that personal observations and participation in SAMP meetings and other activities informed the researchers' knowledge of the process and interpretation of the results.

CHAPTER 4: RESULTS

The survey was sent out to 232 people who were asked to respond between August 1, 2013 and September 15, 2013. A second survey was sent out to the same people in December to increase response rates. Seven emails bounced and 79 people responded to some part of the survey. Of those responding, 21 answered the perceptions section but not the social network section, 30 started the survey but did not complete it, one person completed the survey but used organization names instead of names of individuals in the social network section, and 27 responded to the entire survey including social network and perceptions sections. Responses from the 27 people who completed all sections of the survey were used for the final analysis, giving a response rate of 12%.

4.1 Descriptive Statistics

4.1.1 Personal Information

Out of twenty-seven respondents, twenty-three said they had been involved in a coastal management process in Rhode Island before. Examples given most often were other SAMP development processes, the North Kingstown sea level rise pilot project (2010-present), the on-going Shellfish Management Plan, and public meetings in general. Other, less frequent responses included CRMC meetings, Northeast Regional Ocean Council meetings, CZMA affairs, fisheries affairs, watershed counts, town council meetings, and harbor commission meetings.

Additionally, respondents were asked to classify themselves as a certain type of stakeholder. Responses included thirteen state/federal agency members, six local official/board members, five university/academia members, one non-profit organization

member, one environmental organization member, and one 'other' self-described as a tourism marketer (Figure 3).

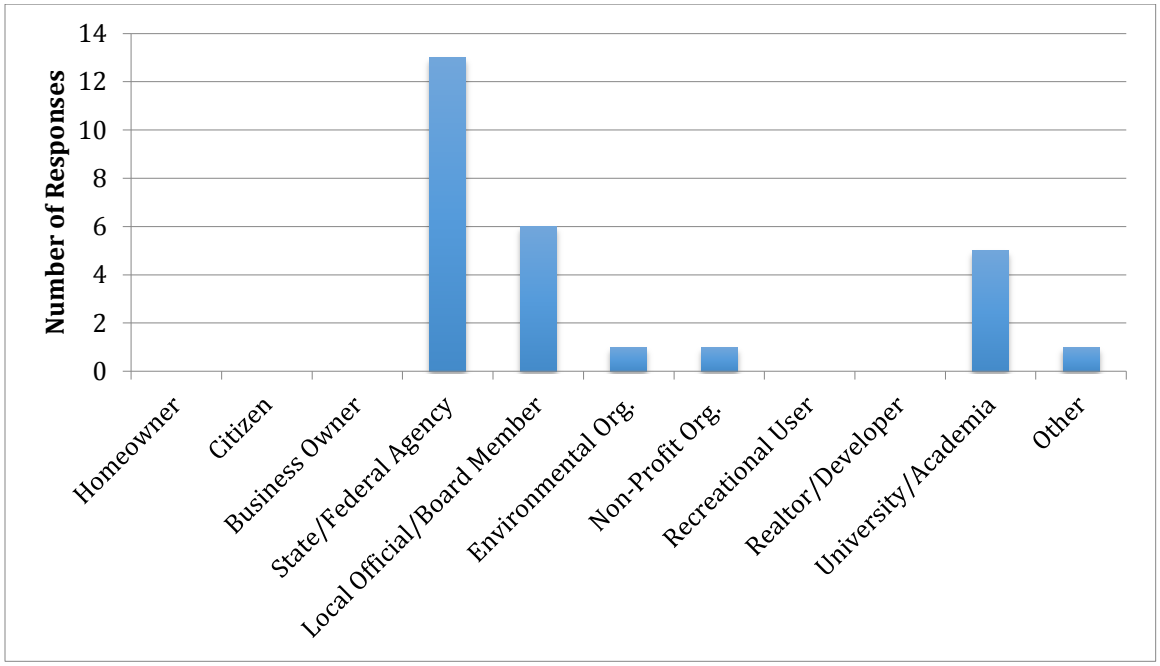

Figure 3: Primary stakeholder affiliation for respondents (n=27). The one "other" response referred to tourism marketing

Sixteen out of twenty-seven who responded had completed a graduate level degree, three had completed a college degree, one had completed some college, and one had completed high school (Figure 4). Table 4 shows level of education completed as categorized by primary stakeholder affiliation.

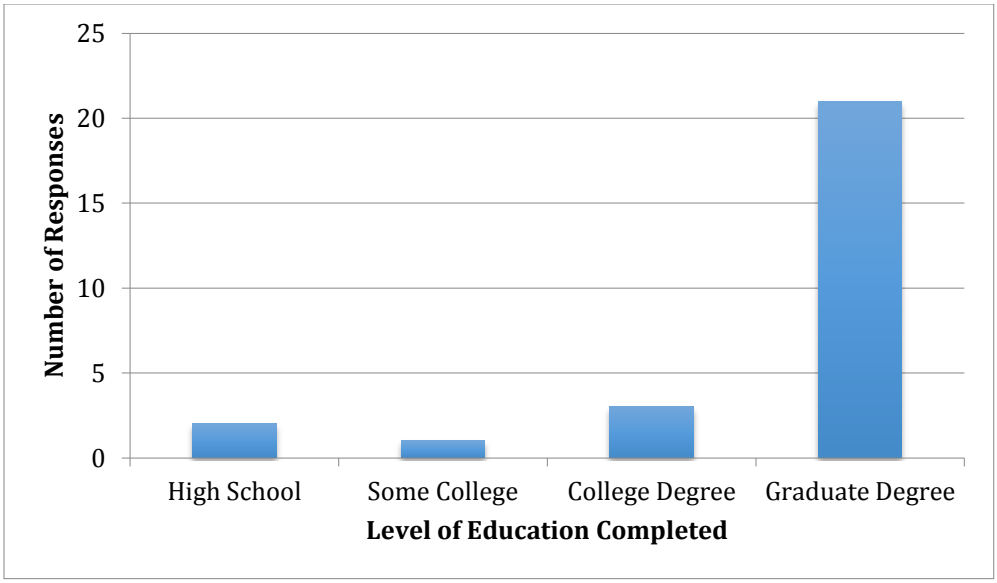

Figure 4: Highest level of education completed by each respondent. (n=27)

Table 4: Level of education completed categorized by primary stakeholder affiliation

	High School	**Some College**	**College Degree**	**Graduate Degree**
State/Federal Agency	0	0	2	11
Local Official/Board Member	1	1	1	3
Environmental Organization	0	0	0	1
Non-Profit Organization	0	0	0	1
University/Academia	1	0	0	4
Other	0	0	0	1

4.2 The social network of the Shoreline Change SAMP Process

The complete network identified by the 27 survey respondents revealed a network containing 95 actors (Fig. 5). Most survey respondents tend to be in the core of the network (Fig. 5A). Respondents who participated in coastal management processes before are more connected and embedded within the network than respondents who had not participated before (Fig. 5B). All university/academia respondents are in the core of the network, and local official/board respondents were more towards the outer edges of the core, or were on the periphery (Fig. 5D). Additionally, local officials were identified by respondents to be a big part of the whole network, but not many responded to the survey and many are on the periphery, while state/federal agency members tend to be more embedded (Fig. 5C).

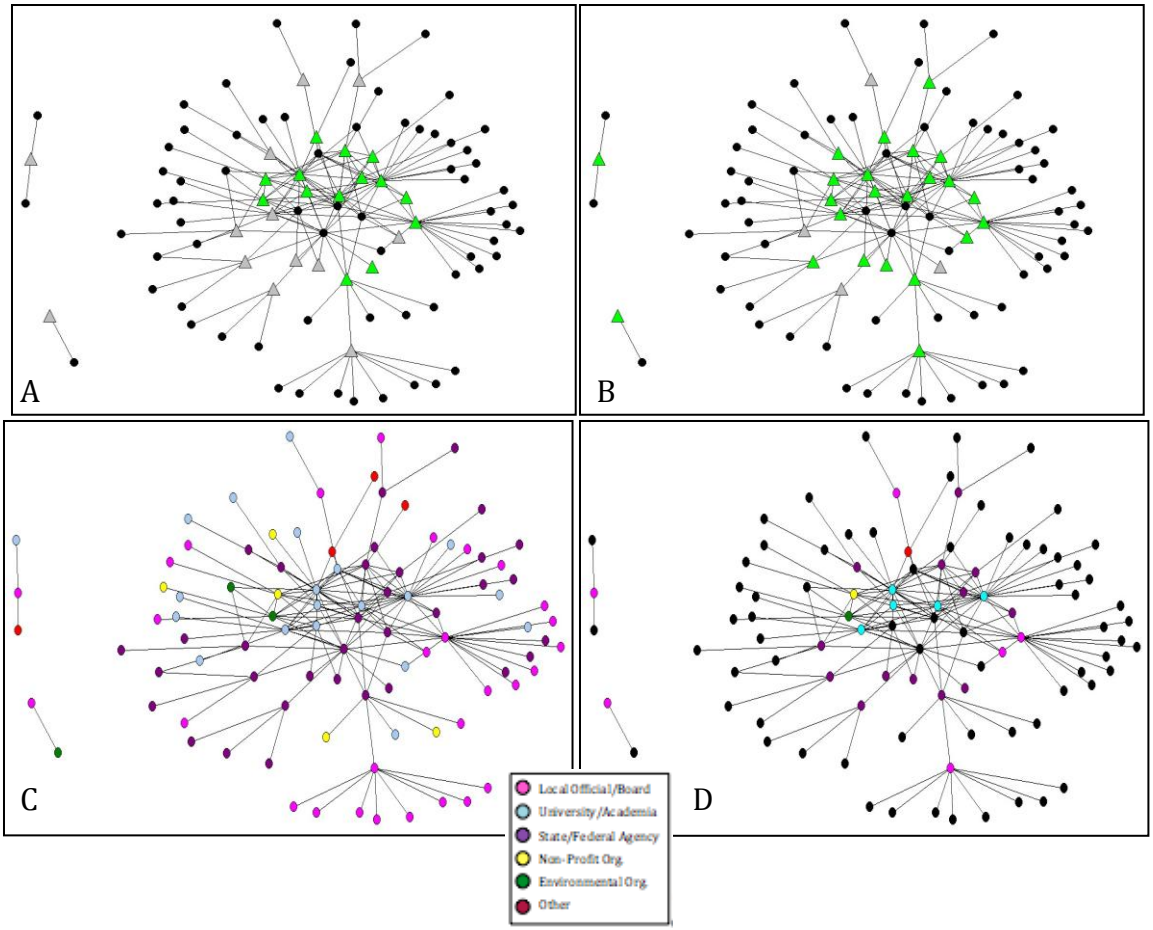

Figure 5: Sociograms for social network identified by respondents (A) Network with survey respondents highlighted. Green triangles= respondents who were ID'd by other respondents, Grey triangles=respondents who were not id-ed by other respondents, Black circles= did not respond to survey, actors id-ed by respondents (B) Respondents past participation in participatory processes in RI. Grey triangles=no, Green triangles=yes, Black=unknown (C) SAMP complete network shown by actors stakeholder affiliation (D) Respondent's stakeholder affiliation

Ucinet was used to calculate network measures of density, centralization, and the clustering coefficient (Table 5). The periphery of the network is made up of 61 pendants, which means that 64.2 % of the actors in the network are connected to only one other actor. This suggests that there are lots of other people involved in the process. Additionally, this indicates that there is a strong central core of actors. The density, which is a measure of how many connections exist within the network compared to the maximum number that could potentially exist, is 3.3 %. The centralization factor which

indicates how much the network is centralized around one or more key actors, is 20.3%. The overall clustering coefficient is a measure of how dense the "neighborhoods" are around each actor, which is a measure of cohesion. In other words, Ucinet takes the number of actors connected to a certain actor (an actor's neighborhood), and calculates the density for that neighborhood. Then, the average for the whole network is calculated. For this network, the overall clustering coefficient is 25.4%.

Table 5: Basic network measures for entire network

Network Measure	**Value**
Number of Actors	**95**
Number of Pendants	**61**
Density	**3.305%**
Centralization	**20.32%**
Overall Clustering Coefficient	**25.4%**

Mean Freeman degree centrality for respondents was 7.1, with an average normalized value of 7.5 (Table 6). Maximum value for Freeman degree centrality was 22, with a normalized value of 23.4; minimum Freeman degree centrality was 1, with a normalized value of 1.1. The normalized Freeman degree centrality is based on the highest possible degree of centrality, and is represented as a percentage. Normalized Freeman degree centrality is often used for comparing scores between actors. Mean betweenness centrality for respondents was 256.6, with a normalized value of 6.0 (Table 6). Maximum betweenness centrality was 1033.2, with a normalized value of 23.7, and

minimum betweenness centrality and the normalized value were 0. Betweenness centrality scores reflect the size of the network, normalized scores are a percentage based on how many possible connections could exist.

Table 6: Descriptive statistics for Freeman degree centrality and betweenness centrality for respondents, including a normalization factor

	Mean	**Max.**	**Min.**
Freeman degree Centrality	**7.1**	**22**	**1**
Normalized Freeman degree centrality	**7.5**	**23.4**	**1.1**
Betweenness centrality	**256.6**	**1033.2**	**0**
Normalized Betweenness centrality	**6.0**	**23.7**	**0**

Finally, a Spearman's Rho correlation was run to determine any relationship between Freeman degree centrality and betweenness centrality, in order to examine the relationship between the number of connections an actor has and the number of people they connect who would not otherwise be connected (Fig. 6). There was a statistically significant positive relationship ($r=0.77$, $p<0.001$) indicating that as Freeman degree centrality increases, so does betweenness centrality.

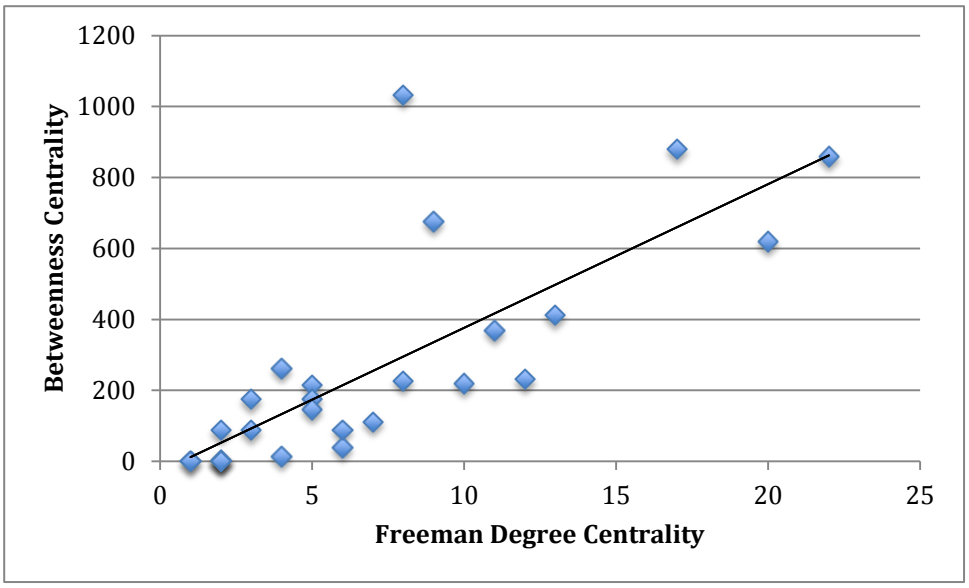

Figure 6: Correlation between Freeman degree centrality and betweenness centrality (R=0.77, p<0.001)

4.3 Individual Perceptions of the Shoreline Change SAMP Process

Overall, respondents tended to have positive perceptions of the Beach SAMP process, with mean values for most statements greater than or equal to 4 (Table 7). However, mean values for statements about the process in general were lower, ranging from 3.3-3.89.

Table 7: Means of perception responses on a scale of 1-5 with 1=strongly disagree and 5=strongly agree and standard deviations for all respondents (n=27)

Process variables by category	Average	Standard Deviation
Information Shared in the Process		
I have access to information	4.15	0.95
Information used is relevant	4.19	0.83
Information exchange is useful	4.15	0.66
Participant experiences are considered	4.11	0.93
Scientific information is credible	4.15	0.81
Interactions with Others in the Process		
Others listen to me	4.07	0.68
I listen to others	4.30	0.67
I trust others	4.00	0.73
Others trust me	4.00	0.73
There are key individuals I can go to for information	4.48	0.64
I can build new relationships	4.26	0.76
I can enhance existing relationships	4.37	0.69
Process in General		
Clearly defined goals	3.89	0.75
Clear how decisions will be made	3.30	0.72
Process is fair	3.89	0.64

All relevant interests participate	3.67	0.68
Respondent's Participation in the Process		
I can give input	4.56	0.64
I have the opportunity to be involved	4.44	0.70
My views are considered	4.37	0.74
I can attend meetings	4.00	1.00
I plan to continue participating	4.48	0.70

4.3.1 Statements about respondent's perceptions of information shared in the process (Figure 7A)

Two people (7.4%) disagreed with the statement *I have access to information* , five people (18.5%) neither agreed nor disagreed or did not know, and 20 people (74.1%) agreed. One person (3.7%) disagreed with the statement *information used in the process is relevant,* four people (14.8%) neither agreed nor diasgreed or did not know, and 22 people (81.5%) agreed. Four people (14.8%) neither agreed nor disagreed with or did not know for the statement *information used in the process is exchanged in a useful way*, and 23 people (85.2%) agreed. One person (3.7%) did not know how they felt about the statement *information and experiences of participants are considered during the process*. Five people (18.5%) neither agreed nor disagreed or did not know, and 21 people (77.8%) agreed. Six people (22.2%) neither agreed nor disagreed with or did not know for the statement *scientific information shared in the process is credible,* and 21 people

(77.8%) agreed. Breakdown of response by stakeholder category can be found in Appendix B.

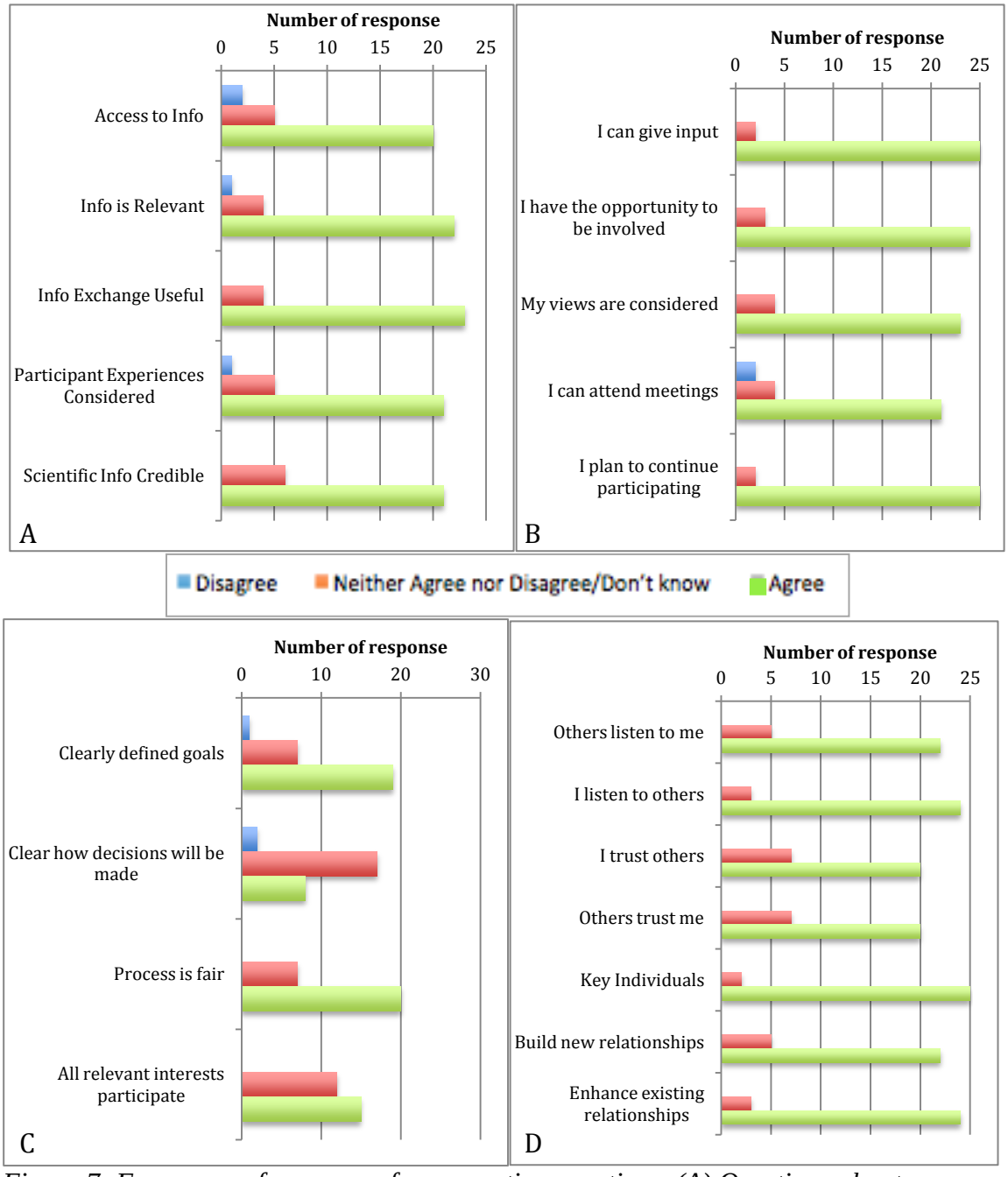

Figure 7: Frequency of responses for perception questions. (A) Questions about information shared in the process (B) Questions about respondents' participation in the process (C) Questions about the process in general (D) Questions about respondents' interaction with others involved in the process

4.3.2 Statements about respondent's perceptions of interactions with others in the process (Figure 7D)

Five people (18.5%) neither agreed nor disagreed or did not know about the statement *other participants listen to me during the process*, and 22 people (81.5%) agreed. Three people (11.1%) neither agreed nor diasgreed with or did not know for the statement *I listen to others involved in the process*, and 24 people (88.9%) agreed. Seven people (25.9%) neither agreed nor disagreed with or did not know for the statement *I trust others involved in the process*, and 20 people (74.1%) agreed. Seven people (25.9%) neither agreed nor disagreed with or did not know for the statement *other participants trust me*, and 20 people (74.1%) agreed. Two people (7.4%) neither agreed nor disagreed with or did not know for the statement *there are key individuals I can go to for information*. 25 people (92.6%) agreed. Five people (18.5%) neither agreed nor disagreed or did not know with the statement *the process allows me to build new working relationships*. 22 people (81.5%) agreed. Three people (11.1%) neither agreed nor disagreed or did not know with the statement *the process allows me to enhance existing working relationships*. Twenty-four people (88.9%) agreed.

4.3.3 Statements about respondent's perceptions of the process in general (Figure 7C)

One person (4.8%) disagreed with the statement *the process has clearly defined goals*. Seven people (25.9%) neither agreed nor disagreed or did not know. 19 people (70.3%) agreed. Two people (7.4%) disagreed with the statement *it is clear how decisions will be made in the process*, 17 people (63%) neither agreed nor disagreed or did not

know, and eight people (29.6%) agreed. Seven people (25.9%) neither agreed nor disagreed or did not know about the statement *the process is fair*, and 20 people (74.1%) agreed. Twelve people (44.4%) neither agreed nor disagreed or did not know about the statement *people from all relevant interests participate in the process*, and 15 people (55.6%) agreed.

4.3.4 Statements about respondent's perceptions of their involvement in the process (Figure 7B)

Two people (7.4%) neither agreed nor disagreed or did not know about the statement *I can give my input during the process*. 25 people (92.6%) agreed. Three people (11.1%) neither agreed nor disagreed or did not know about the statement *I had the opportunity to be involved early on in the process*, and 24 people (88.9%) agreed. Four people (14.8%) neither agreed nor disagreed or did not know about the statement *my views are considered during the process*. Twenty-three people (85.2%) agreed. Two people (7.4%) disagreed with the statement *I can easily attend meetings*, four people (14.8%) neither agreed nor disagreed or did not know, and 21 people (77.8%) agreed. Two people (7.4%) neither agreed nor disagreed or did not know about the statement *I plan to continue participating in the process*. Twenty-five people (92.6%) agreed.

Results of the Kruskal-Wallis test indicate that mean perceptions about *information used in the process* differed statistically among stakeholder affiliations ($p=0.032$) (Table 8). Mean perceptions about *participation in the process* were also found to be statistically different among stakeholder affiliations ($p=0.018$).

Table 8: Kruskal-Wallis test for mean differences in perception statements by stakeholder group.

Perception Statement Category	Group Mean						H-value	P-value
	State/ Federal Agency	Local Official/ Board	Environmental Group	Non-Profit Group	University/ Academia	Other		
Information used in the process	4.14	3.48	4.40	5	4.72	3.80	12.18	**0.032***
Interactions occurring in the process	4.11	3.94	4.43	5.00	4.69	3.71	8.92	0.112
The process in general	3.56	3.35	4.25	4.00	4.25	3.75	9.54	0.089
Respondents Participation in the process	4.25	4.16	5.00	5.00	4.88	3.60	13.61	**0.018***

4.4 Connecting Social Network Analysis and Stakeholder Perceptions

4.4.1 Qualitative Comparisons

To explore how the social network relates to an individual's perceptions of process quality, linkages between a respondent's perceptions and his placement in the network were qualitatively examined. For each perception question in which there were seven or more people (greater than 30%) who did not agree, sociograms were created with NetDraw to visually examine their placement within the network (Fig. 8). These perception questions are as follows:

- I have access to all information used in the process (Figure 8A)
- Others trust me (Figure 8B)
- I trust others (Figure 8C)
- The process is fair (Figure 8D)

- The process has clearly defined goals (Figure 8E)
- It is clear how decisions will be made in the process. (Figure 8F)
- People from all interests participate in the process. (Figure 8G)

One bridger, a person who connects many others to the group, disagreed with the statement *I have access to all information involved in the process.* One person who did not know is embedded in the core of the network (Fig. 8A). Respondents who are unsure about the statements *others trust me* and *I trust others* had a variety of levels of connection (Fig. 8B, 8C). In other words, many were within the core of the network and some were on the outer edges. Respondents who were unsure about the statement *the process is fair* also had varying levels of connection in the network (Fig. 8D). In general, those who neither agreed nor disagreed or did not know about the statement *the process had clearly defined goals* were not as well connected (Fig. 8E). However, the person who disagreed connects many people to the network that would not be connected otherwise. There is a mix of levels of connectness for those who were unsure about the statement *it is clear how decisions will be made in the process* responses; however, the people who disagreed were well connected (8F). Finally, there is a mix of levels of connectedness for people who are unsure about the statetement *People from all relevant interests participate in the process (8G).*

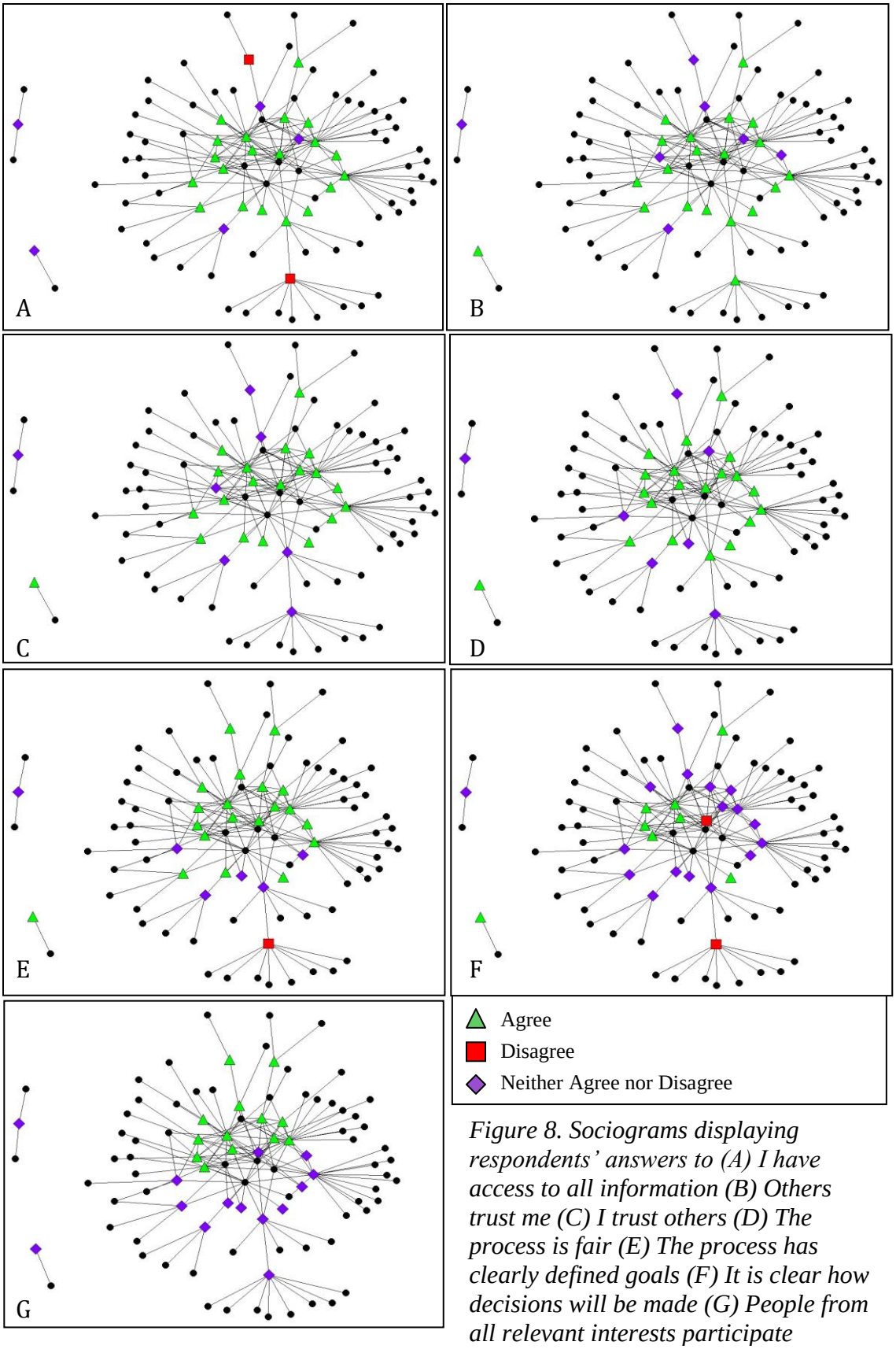

Figure 8. Sociograms displaying respondents' answers to (A) I have access to all information (B) Others trust me (C) I trust others (D) The process is fair (E) The process has clearly defined goals (F) It is clear how decisions will be made (G) People from all relevant interests participate

4.4.2 Quantititative Comparisons

Spearman's Rho correlation analyses indicate that there is a significant positive relationship between respondents' perceptions of their participation in the process and Freeman degree centrality (r=0.589, p=0.001) (Table 9). Respondents who thought they could actively participate in the SAMP process were more likely to be connected to a greater number of actors in the process. There was also a significant positive relationship between respondents' perceptions of their participation in the process and betweenness centrality (r=0.430, p=0.025) (Table 10). In other words, respondents who thought they could actively participate in the SAMP process were also more likely to serve as bridgers between other people in the network.

Table 9: Spearman's Rho Correlation for Freeman Degree Centrality with Perception Scores

	Perception Statement Category			
	Information	**Interactions**	**Process**	**Participation**
R-value	0.334	0.295	0.217	**0.589***
P-value	0.089	0.135	0.276	**0.001***

***Significant at the 0.05 level (2 Tailed)**

Table 10: Spearman's Rho Correlation for Betweenness Centrality with Perception Scores

	Perception Statement Category			
	Information	**Interactions**	**Process**	**Participation**
R-value	0.077	0.062	0.005	**0.430***
P-value	0.703	0.759	0.979	**0.025***

***Significant at the 0.05 level (2 Tailed)**

CHAPTER 5: DISCUSSION

5.1 Overview

The social network identified by the 27 respondents displays a core-periphery network, suggesting that people within the dense core are sharing information with many other people outside of the core. Network measures also suggest that there are many smaller groups nested within the network, and that the network is clustered around key individuals. Finally, the positive correlation between Freeman degree centrality and betweenness centrality suggests that the more connections people have, the more likely they are to connect people who would not otherwise be connected. These people act as bridging ties, which are important in a network for information sharing.

Generally, perceptions of process quality were positive. However, respondents expressed doubt regarding perceptions about the process in general, especially related to the process having clearly defined goals, clear decision-making, a fair process, and people from all relevant interests participating. Furthermore, there were some statistically significant differences between stakeholder affiliation and perceptions of information used in the process, and stakeholder affiliation and respondents' participation in the process.

Finally, the connections between the social network and perceptions of process quality provide some interesting qualitative and quantitative observations about respondents' perceptions based on their position within the network. Overall, respondents had positive perceptions of process quality, suggesting that the core-periphery structure of this network is useful in this context. People who were unsure about whether or not they had access to all information involved in the process, and unsure about their trust of

other participants, tended to be on the periphery of the network. People who were unsure how decisions will be made throughout the process, or if people from all relevant interests were participating, had a variety of levels of connections. Finally, correlation analysis suggests that more positive perceptions of participation tend to come from those who are more highly connected in the network.

5.2 Sampling Methods and Survey Respondents

The survey was sent out to 232 people involved in the Shoreline Change SAMP, a population determined with the assistance of CRC, the coordinating agency for the process. This is called the 'reputational approach,' where the researcher focuses on a list of people produced by informants who are knowledgeable about the process. The limits to this method, in this thesis, are that the responses may not be characteristic of everyone involved in the Shoreline Change SAMP process, such as the general public. Furthermore, responses were only collected from 27 people, which is a response rate of 11.6%. It is difficult for social network analysis to accurately represent a full network with response rates less than 85%, but these rates are not easy to achieve in social science surveying (Hartley 2010). Of course, many social network analyses have been done based on a wide range of response rates, ranging from 13%-88% (Schneider et al. 2003, Prell 2009, Hartley 2010). Due to the low response rates, results from this study may only apply to respondents themselves, but patterns that emerge can be useful to Shoreline Change SAMP coordinators and in future participatory coastal management processes.

In one meta-analysis of 45 studies on response rate, it was found that the average response rate for web based surveys was 11% lower than mail or telephone surveys (Fan

and Yan 2010). This low response rate has been attributed to a variety of factors that may help to explain the low response rate in this study of the Shoreline Change SAMP process. Generally, it has been found that surveys administered by academic and governmental agencies have a higher response rate than other sponsoring agencies (Fan and Yan 2010). SAMP coordinators preferred that the researcher did not affiliate the survey with the organization. So, although the researcher was a student at an academic institution, the lack of affiliation with a government agency could have caused a decrease in response rate. Another reason why people may have chosen to start the survey but not continue is because the second section asked respondents to list names, which is a sensitive issue. Confidentiality concerns are a common issue in surveys in general, and web based surveys take away the more personal, secure aspect of in-person surveys or other types of surveys (Couper 2000). An additional reason why people may have chosen to start but not complete the survey is survey length or presentation. Generally, people are more likely to respond to shorter surveys that have fewer screen changes, or a scrolling option rather than a page change option (Fan and Yan 2010).

Additionally, stakeholder affiliation of respondents, and the network identified by respondents, did not include people identified as homeowners, citizens, business owners, recreational users, or realtors and developers. Although respondents and other participants may identify with these stakeholder groups, it was not their stated primary affiliation. These groups may have been represented if the public had been included in the study population, but remain underrepresented in this study. Stakeholder affiliations represented in the study include a relatively high number of state or federal agency representatives, which suggest that they may be more involved than other stakeholder

groups or that they were more likely to respond to the survey. Additionally, the overall high education level of survey respondents could be because the general public was left out of the study population. Classification of stakeholders is a complicated and multi-faceted process, and there are many methods to approaching it. Stakeholders can be classified depending on their spatial relationship to the conflict or resource in question, according to their levels of power to address or affect the issue in question, who is affected by the issue or potential outcomes, and many other methods (NOAA 2007, Mikaleson and Jentoft 2001, Reed 2008).

The majority of respondents had participated in shoreline management processes in Rhode Island in the past, perhaps due to their career, positive past experiences, or their stakeholder affiliation. For instance, many respondents have jobs related to coastal planning and policy, with about 50% who are members of a state or federal agency and another 22% who are local officials or board members. There have also been many opportunities for individuals to participate in coastal management processes over the years as Rhode Island has a history of undertaking participatory coastal management processes, especially with the development of SAMPs. These coastal management processes have been bolstered by long standing relationships; for example, the CRC is based out of the University of Rhode Island, and has been advisor to the CRMC since 1971. Individuals in Rhode Island might have more opportunities to participate in processes because Rhode Island is a small state, which makes coordination among different groups and attending meetings somewhat easier than states with more people, organizations and governing bodies. Other studies have discovered that collaborative networks established in one process can lead to collaboration in future processes, which

might explain why respondents tend to participate in more than one process. For example, a partnership established between the US Bureau of Land Management, the Forest Service, and local environmental organizations in the Applegate Valley in Oregon first came together in the 1980s to solve issues with protecting an endangered owl species. Ten years later, and after the success of establishing a management plan for the endangered species, the partnership was still working together to support and promote the health of the area through other projects (Yaffee and Wondolleck 2003). In another study on the ports of New York and New Jersey's response to Hurricane Sandy, many study participants cited that longstanding relationships previously built within the port community helped to increase the success of response before, during, and after the hurricane (Smythe 2013).

5.3 The Social Network of the Shoreline Change SAMP

5.3.1 Network characteristics

The Shoreline Change SAMP network has many pendants, suggesting that many individuals are not necessarily connected to large numbers of other participants. This is not unexpected, as several groups have been established to connect individuals within the core group, and others have been created to connect individuals within the core to individuals on the periphery. For example, the Coalition of Community Members team is a special SAMP team of people who come together in meetings and then go back out into their respective communities in order to spread the word among members of the greater public. Additionally, the Senior Advisors Committee is a core group of around 20 individuals who meet regularly to discuss SAMP issues. Borgatti and Everett (1999) call

this kind of network a core-periphery network, where actors in the core are more connected to each other and pendants are connected to the actors in the core but not each other. This can have positive effects on information dissemination outward, as is the purpose of the Coalition of Community Leaders, and also on bringing new information and knowledge into the core. In one study of farming communities in Ghana, core-periphery structures were positive ways of sharing information between and within communities and local governments (Bodin and Crona 2009). This kind of information sharing allowed farmers to adopt more sustainable farming practices and increase production. For the Shoreline Change SAMP process, core-periphery networks may be a useful way to share information and ideas with the public who will ultimately be affected by any policy changes from this process, but may not be able to participate directly.

5.3.2 Density

The overall density of the network seemed fairly low, suggesting that members of the network do not often collaborate with many other actors in the network. However, these lower levels of density are not uncommon in networks in natural resource governance. Similar studies found densities ranging between 0.2-11% (e.g., Smythe 2011, Prell et al. 2009, Sandstrom and Carlsson 2008). Interestingly, in a study of other RI SAMP networks, Smythe (2011) found densities between 2-3%. In another study of natural resource governance, Prell et al. (2009) found densities to be somewhat lower, ranging from 0.2-2%; however, the network in that study had over 50% more actors than the network in this thesis. It has been found in other studies that an actor can only maintain a certain amount of ties, which could be why the larger networks were less

dense (Newig et al. 2010). Conversely, Sandstrom and Carlsson (2008) found a higher density in their study networks, which were at least 50% smaller than the network in this thesis.

The downfall to less dense networks is that information could be held within the core network and not shared with the periphery. Additionally, weaker ties that hold together a less dense network are easier to break even if they were created at a certain point in a process. They do not necessarily have the lasting power that stronger ties found in denser networks have (Reed et al. 2009). If sharing information with a wide audience is an objective of the Shoreline Change SAMP process, the coordinators should encourage more frequent interactions during the process. Exclusivity is one way to make interaction and collaboration more frequent (Axelrod 2006). Methods for achieving exclusivity include creating specialized roles, defining hierarchies, and conducting smaller more frequent group meetings. Shoreline Change SAMP coordinators take advantage of some of these methods through SAMP team meetings. However, coordinators could also ensure that the public does not lose interest by holding meetings at different scales. Dalton (2006) found that participants in coastal management processes felt that this was a valuable asset to participatory process.

A potential reason why the network was not more dense could be a lack of resources. Network development takes time, expertise, and funding, and can often be impeded in times of lacking resources. Studies suggest that networks are more dense in processes with more resources (Schneider at al. 2003, Wondollek and Yaffee 2001). During fall 2013, the federal government shutdown caused the cancellation of at least one

public Shoreline Change SAMP meeting, impeding network growth for a short period of time.

However, there are some benefits of less dense networks. Newig et al. (2010) find that an actor can only maintain a certain number of ties effectively, and thus larger networks are often less dense than smaller networks. These networks often rely on bridging ties, where one actor connects other actors who would not otherwise be connected. Less dense networks have the potential to diversify information sources by connecting groups or individuals who were not previously connected (Reed et al. 2009). The lower density network structure of the Shoreline Change SAMP could be beneficial in this sense, because there are so many pendants who could share new information and ideas with those actors within the core group.

5.3.3 Clustering and Nested Groups

The clustering coefficient (25.4%) indicates that there are some sub-groups within the network, but they are well connected to one another. Ostrom (1990) suggested that many cases of resource management are organized in layers of nested groups, or groups that are well connected with each other that exist within a larger network. Often nested groups come about from the idea that many larger environmental issues can be broken down into smaller issues defined by region, population affected, or other characteristics. Another perspective of nested groups is that in building social and governance networks, people are brought together who are already parts of certain groups, whether it is a non-profit organization, a community group, or a group of academics. Although this leads to redundancies between groups and makes interactions more complex, nested groups have

been more successful in solving resource problems than top-down, centralized governance structures (Dietz et al. 2003). This seems to be the case for the Shoreline Change SAMP, as people who were invited to be part of the process included members from various agencies and organizations around the state. Although nested governance networks can increase information diversity and sharing and create policies that are better suited to meet the needs of everyone involved, Shoreline SAMP coordinators should be cautious about the network forming into tightly clustered groups that may constrain decision-making processes by polarizing differing values of different groups (Newman and Dale 2005, Marshall 2008).

5.3.4 Centrality

The centralization factor (20.32%) indicates that the network is somewhat centralized around one or more key actors. This is not surprising, as the CRC and CRMC have taken the lead in the development of all of the SAMPs and also in various other coastal planning and management processes around Rhode Island. Centrality can be beneficial to a process in that high initial centrality can help to build networks (Reed et al. 2009). Deduerwaerdere (2005) argues that participatory processes need to be guided to avoid becoming stagnant and sustain momentum; this guidance is usually carried out by a specific organization or a few key actors. In the case of the Shoreline Change SAMP, the CRC guides the process and can serve as a network builder. However, continued high centrality can become destructive to a process, by holding back information between subgroups or actors who are not otherwise connected, or when key actors use their influence in a negative way, for example, not promoting collaboration (Bodin and Crona

2009). Long term projects benefit from decreased centrality, paired with increased network density (Crona and Bodin 2006). To avoid stagnation, the Shoreline Change SAMP coordinators should ensure that information is not being withheld from the wider network and participation of stakeholder groups and the public is still high.

5.3.5 Bridging Ties

The strong positive correlation between Freeman degree centrality and betweenness centrality suggests that the more connections a person has, the more he connects people in the network who would not otherwise be connected. These people act as bridging ties, which are important in a network for information sharing. Bridging ties can enhance and diversify information sharing and feelings of mutual respect between different sub-groups, both qualities that are important to successful natural resource governance (Bodin and Crona 2009). Bridging ties can also lead to greater adaptability and creativity of processes (Hartley 2010). In one study, researchers found that fisheries management ideas were more innovative as a result of bridging ties between fishermen and scientists (Hartley 2010). Bridging ties also have the potential to negatively affect a network, however, when those people use their position to withhold information or prevent collaboration between groups (Bodin and Crona 2009). In a study on national park management in the UK, researchers found a similar positive correlation between Freeman degree centrality and betweenness centrality; however, these ties tended to connect people of similar viewpoints rather than diversifying connections between people of different viewpoints (Prell et al. 2009). To ensure a diversity of views is captured in the process, Shoreline Change SAMP coordinators should try to bring together people

from different backgrounds to work on issues. In public meetings, it is likely that people of diverse backgrounds and interests are participating. However, the concern is that people from similar backgrounds are participating in the smaller, team meetings, which may lead to homogenization of viewpoints. It would be interesting for a future study to examine who is participating in smaller meetings and if they cover a wide range of interests.

5.4 Stakeholder Perceptions of Process Quality in the Shoreline Change SAMP

Although survey respondents felt that the quality of the Shoreline Change SAMP process was fairly high overall, there were a few specific features of the process that generated some disagreement or doubt. Two aspects of process quality that seem particularly relevant to the RI Shoreline Change SAMP are transparency and representation of interests.

5.4.1 Transparency

The most controversial of the perception statements was, "It is clear how decisions will be made." About seventy percent of respondents either disagreed or expressed doubt when responding to this statement. Dalton (2006) found that study participants felt that being able to understand how and why decisions are made was important to a process, possibly because many felt that the process they were involved in was not transparent. Rowe and Frewer (2005) discuss the importance of transparency in decision-making processes as a way to increase public trust for the coordinating agency and the process. Perhaps, Shoreline Change SAMP survey respondents felt unsure about

trust because they were also unsure how decisions will be made. Furthermore, Rowe and Frewer (2005) discuss the importance of stakeholders understanding how a process leads to a decision. They suggest that having a structured way to make decisions may increase positive perceptions of transparency and legitimacy. Since the Shoreline Change SAMP process has begun, projects have focused on gathering new information, conducting shoreline change research, doing policy and legal reviews, and informing the public of the project. By focusing on these activities early in the process, coordinators may not be focused on the decision-making that will take place later on in the process. However, decision-making happens from the beginning of a process when decisions are made about who to include in a process, methods of stakeholder engagement, and research areas to focus on. Perhaps respondents equated the perception statement to the potential policy decisions that will be made as a result of the process, rather than process decisions made throughout the process. Additionally, doubt about decision-making could be related to different perceptions of appropriate decision-making methods (Webler and Tuler 2006). Webler and Tuler (2006) identified four participation processes that each focused on different kinds of decision-making processes, and likely there are many more. This study suggests that determining how to make a decision may be challenging when involving many stakeholders. It is possible that coordinators of the Shoreline Change SAMP have not thought about decision-making in the longer term, as it is a long-term project.

5.4.2 Representation of interests

Almost half of respondents expressed doubt when asked if people from all relevant interests are participating in the process. This could be due to a few reasons. For

example, many survey respondents are involved in the SAMP in specific ways, such as participating on a SAMP team, through their job as a town official or board member, or as a project coordinator. These roles may inhibit them from collaborating with others outside of the people that they normally work with from day to day. Alternatively, it is possible that people from all relevant interests are not participating. Rowe and Frewer (2005) discuss a common concern in participatory processes that people involved should be truly representative of a larger population, or of specific groups within the population. In a study of collaborative initiatives in the USDA forest service, stakeholders felt that projects were more effective if they included a broad range of stakeholder groups that represented a broad range of interests, and that everyone who was affected by the issue at hand had the opportunity to be involved (Selin et al. 2000, Webler and Tuler 2006). However, some researchers note that practical concerns, such as resources, may limit all involved groups from participating in a meaningful and effective manner when there are too many people (Rowe and Frewer 2005). Coordinators of the Shoreline Change SAMP attempt to make sure that everyone can be involved by holding regular public meetings and other public outreach programs. Additionally, in past SAMPs, coordinators have offered proposed policies and other documents to the public for public comment periods before adoption. However, SAMP coordinators should continue to work so that all people who want to are able to participate. They could diversify their meeting times and places so that different people could attend, attempt to identify people who are not participating and find out why, or use other methods to increase the diversity of those participating.

5.5 Connections between the Social Network and Stakeholder Perceptions on Process Quality in the Shoreline Change SAMP

Few studies have focused on linking social network analysis with stakeholder perceptions in natural resource management (Prell et al. 2010). However, much of the literature on SNA and participatory processes (including perceptions of process quality), share the same ideas. For example, both topics speak to the benefits of collaboration: increased collective action, increased trust among actors, increased pathways of communication, better supported policy actions, and others (Bodin and Crona 2009, Schneider et al. 2003, Dalton 2006,).

Overall, survey respondents had positive perceptions of the Shoreline Change SAMP process, which suggests that the core-periphery structure of the network is a good structure in this context, and is useful for building collaboration in the process. Shoreline Change SAMP coordinators and facilitators of other similar coastal management processes, especially in RI, should consider building boundary-spanning networks in participatory processes.

In general, people who were unsure about many aspects of process quality had fewer connections than those who felt more positively about those aspects. People with fewer connections to others involved in the process may have greater doubts about the quality of the process because they are less involved. Alternatively, they could be less involved because of their uncertainty. For example, people who have fewer connections may have less access to various sources of information that come from having more connections. Many studies point to increased social ties leading to increased access to knowledge and information (Bodin and Crona 2009, Sandstrom 2008). In one study of

farming communities in Ghana, it was the core actors that had access to the most sources of information and knowledge, and who distributed that information to actors who were less connected (Isaac et al. 2007). Additionally, information dissemination may take some time, and because this study was conducted in the early stages of the SAMP process, these perceptions may change as the process continues.

On the other hand, people who tended to view aspects of process quality more positively had more connections within the network. Prell et al. (2010) found that people tended to share similar views with others who they were more closely connected to, and that it was these connections, rather than stakeholder affiliation, which influenced peoples' viewpoints more strongly. Identifying a broad range of stakeholders to involve in a process, or people to represent different stakeholder categories, might not be as easy as identifying different groups, organizations, or agencies (Prell et al. 2010). Many of the survey respondents in this thesis had participated in coastal management processes in RI before, and they may have worked together on these processes in the past and shared perspectives on what makes a high quality process. This "homophily," or shared viewpoints, can be good in the beginning of a process for bringing people together, but can also lead to marginalization of certain stakeholders with different viewpoints (Crona and Bodin 2006). In order to develop solutions that are based on a wide variety of viewpoints and diverse sources of information, Shoreline Change SAMP coordinators should ensure that people from all interests are participating in meaningful ways, and that SAMP teams are not composed of participants who all share the same perspectives.

In contrast, people who were unsure how decisions were going to be made were observed to have varying levels of connections in the network. It is possible that even

though the Shoreline Change SAMP process emphasizes long-term decision-making as one of the perceived outcomes of the project, process coordinators have not yet fully considered how to do this. Indeed, there is much debate about how to carry out long term planning for adapting to sea level rise, erosion, and storm hazards.

Finally, people who had more positive perceptions of their participation also tended to fill the role of bridgers, who can help to build and create a strong network at the beginning of a process. In one study by Hahn et al. (2006), strong bridging ties played a large role in building a co-management network for wetlands in Sweden. In another study, scientists who acted as bridging ties in policy processes were more likely to take active roles in the process than those who did not have such a strong bridging role (Bodin and Crona 2009). Creating more ties between peripheral actors and actors within the core could help to increase perceptions of those who had doubt about their participation in the process and other quality indicators.

5.6 Additional Limitations and Future Studies

This study highlighted the social network and stakeholder perceptions of process quality as represented by survey respondents, and some interesting connections between the two topics. This analysis is not meant to be representative of the whole population of people involved in the Shoreline Change SAMP process, or of other participatory coastal management processes. Future studies on the SAMP network should strive for higher response rates. One method that might have made the results more robust and representative would be to use a snowball sampling method (Scott 1991). In this approach, a small sample of participants who are assumed to be at the core of a process,

such as project managers, are contacted and asked about their social networks. Then, those people identified by the initial group are contacted, and so on. Interviewing continues in this way until there are few or no new names mentioned, names begin to repeat themselves, or when the researcher decides to cease sampling due to other constraints. This method can help to determine a more bounded picture of the network, and decrease the number of pendants found in more random sampling techniques. Of course, defining the boundaries in any method is also a constraint, especially with broad public processes like the Shoreline Change SAMP. Social networks are rarely completely confined, and often extend to other groups, organizations, and other formal and informal ties (Scott 1991).

For purposes of constraining the population to a manageable size, the public was not included in this study. However, it would be interesting to talk to the public and see if they feel like they have the opportunity to be involved in a meaningful way. Although the cost of network development and working with a large network can often be intimidating, involving the public in decision-making processes is important (Wondolleck and Yaffee 2000, Schneider et al. 2003). In many of the SAMP processes in RI, public meetings, public comment periods, and other techniques have been used as ways of engaging the public, but there are still other meetings and deliberations that take place without the public. In this sense, it would be interesting to assess if different aspects of a process are of higher or lower quality. For example, Dalton (2005) notes that although public meetings can be a useful way to involve many people, they may not be as useful to a process as more focused, smaller groups.

Another concern in the Shoreline Change SAMP and other participatory processes is for those people who are not participating. Because participatory processes are voluntary, there needs to be incentives for people to participate, whether it be perception of something they can gain from the process or the perception that a certain issue is affecting them directly (Yaffee and Wondolleck 2003). In many collaboration projects, incentives come in the form of a specific law or program that was enacted, such as the Endangered Species Act or the National Estuary Program (Schnieder et al 2003, Yaffee and Wondolleck 2003), or an individual's desire to learn more about a program or to support their community (Dalton et al. 2012). It would be interesting to study people who opted out of participating in the Shoreline Change SAMP, to examine reasons why they are not participating.

Another interesting idea for future work would be to conduct the same, or a similar study, in later stages of the Shoreline Change SAMP process, to examine shifts in the social network or in stakeholder perceptions of process quality. In natural resource management, participatory processes are often ongoing, dynamic discussions that affect different people at different steps throughout the process, which is why researchers and practitioners encourage stakeholder involvement during every phase of the process (Reed et al. 2009). Additionally, it would be interesting to examine if there was a link between perceptions of process quality and process outcomes of the Shoreline Change SAMP in the future, as much literature on both social network analysis and participatory processes points to better suited policies and decisions as a benefit to collaboration.

In linking perceptions of process quality and social network analysis, there were significant differences between perceptions of different stakeholder groups. However,

there were limitations to these responses due to unequal group sizes, and the challenge of classifying stakeholders. In this study, stakeholders were classified by their primary occupation, but they might also be representing personal desires and values as well as the values of the organization or group they are affiliated with. Similar to Prell's work (2010), it would be interesting to look at how long-standing working relationships affect stakeholder perceptions of the process. Most of the survey respondents said that they had participated in coastal management processes before in Rhode Island, and it would be interesting to determine if these people had worked together in the past, and compare their perceptions of process quality.

CHAPTER 6: CONCLUSION

Results from this case study provide valuable insights into SAMP participants' social network structure and perceptions of process quality, as well as connections between the two themes. Although responses are only representative of those who replied to the survey, general trends emerge that Shoreline Change SAMP coordinators could use to enhance the process as it continues, and build stronger processes in the future. Also, it provides general trends and recommendations that can be useful to other coastal management practitioners. Overall, respondents in this study felt that the Shoreline Change SAMP process quality was high, and the social network shows promising patterns for the future.

First, the majority of respondents had participated in coastal management processes before in Rhode Island, and was well educated. They represented six of ten stakeholder categories provided in the survey, which could be a factor of the sampling procedure used that did not include the public, but could also provide encouragement to Shoreline SAMP coordinators to ensure that certain stakeholder groups are not marginalized and all relevant groups are participating. Indeed, having a wide representation of stakeholder groups take part in participatory processes has shown to lead to perceptions of effective outcomes (Selin et al. 2000).

Second, the social network identified in the study represented a core-periphery network, where there is a dense central network surrounded by many pendants. Because one of the focuses of the Shoreline Change SAMP is to get many people involved and spread the word about the issues at hand, this network structure is useful to this process. Other studies have found that core-periphery networks enhance information sharing

between the periphery and the core (Bodin and Crona 2009). However, coordinators of the SAMP should ensure that the density of the core network does not increase to the point where there is homogeny of views and exclusion of outside groups. In general, much of the literature encourages diversity of network measures: a network that has neither too high nor too low density, and has a mix of bridging and bonding ties (e.g., Prell et al. 2010, Newman and Dale 2005). A diverse network will lead to processes that have greater resilience and adaptive ability, which is essential in long-term processes (Newman and Dale 2005). Additionally, continued growth and adaptive capacity of networks in natural resource governance is important, as processes are ever-changing and evolving, cross lots of borders and involve lots of people, and require information transfer between those people (Weber and Khademian 2008).

Third, respondents felt that the overall quality of the process was high, indicating that coordinators of the SAMP are doing a good job in establishing a process that promotes information exchange among participants, builds working relationships among participants, and promotes positive perceptions of individual participation. However, respondents expressed doubt about how decisions will be made, if the process had clearly defined goals, and if people from all relevant interests are participating. Decision-making in coastal management processes is a complicated topic in the literature; different people believe that decisions should be made in different ways depending on their prior experience with management processes, their perceptions of the problems, and other factors (Tuler and Webler 2010). Therefore, providing recommendations for SAMP coordinators and other coastal management practitioners about how to carry out decision-making is not clear-cut. SAMP managers and other practitioners should first ensure that

people from all relevant interests have meaningful opportunities to participate. Then, planners and others can explore how people involved in the process perceive the problem, the process, and the outcomes, and how they can structure the process and decision making to promote positive feelings about being involved.

Finally, connecting social network analysis and stakeholder perceptions has not been examined in much detail. This study explores these connections, and adds to the literature discussion on how people's position within a network can affect their perceptions of process quality, which will become increasingly important to study as networks continue to replace top-down and single-sector management. Furthermore, peoples' position within a network contributes to their influence, attitudes, how they share information, and other things (Hartley 2010). Not surprisingly, respondents' who expressed doubt about many aspects of process quality were less embedded within the network than those who felt more positively. These connections, rather than respondents' stakeholder affiliation, seemed to influence perceptions strongly. Coastal management practitioners should attempt to address these doubts, possibly by giving these people more opportunities to create connections and be involved. Additionally, they should explore more ways to bring together people of different viewpoints (Prell et al. 2010). Including stakeholders who have a broad range of perspectives about the issue at hand, the process, and the desired outcomes is an important factor of participatory processes, and should continue to be pursued by managers (Selin et al. 2000).

Conducting evaluations of participatory processes at different stages throughout a process, as this case study attempts to do in the initial stages of the Shoreline Change SAMP process, is important to build on the knowledge of how to best carry out adaptive

coastal and natural resource management in the present and future. It can allow project managers to build processes to best address issues, include stakeholders in meaningful ways, build collaborative and diverse networks, and make decisions that have widespread support throughout a community. Often, participatory process literature and social network literature mention the same benefits (and challenges) of collaborative processes, including improved information sharing, strong and lasting relationship building, and solutions that better fit the issues at hand (Yaffee and Wondolleck 2003). The findings of this study are meant to add to this literature, and also to bring the two streams of research together. Although findings cannot be generalized to all SAMP participants or to other coastal management projects, learning from experiences with collaborative processes is one of the most influential ways for practitioners to gain knowledge about what works and does not work, and can help them to build better management processes for the future. Additionally, by developing better processes, agencies and organizations will be able to develop better solutions for coastal problems such as sea level rise, erosion, and storm flooding, issues that the Shoreline Change SAMP process is addressing throughout the development of the plan.

APPENDIX A: SURVEY INSTRUMENT

Part I. Your background and involvement in the Beach SAMP

1. How are you involved in the Beach SAMP? Please check all that apply, and write in other answers.

attend at least one meeting
participate on list serve
work
volunteer
other:_____

2. Have you ever participated in any other coastal management process (or processes) before in RI?

3. What stakeholder group or interest are you most affiliated with? Please check all that apply, and write in other answers.

coastal resident
environmental group
commercial fishermen
recreational user
town manager/planner
marine trades
tourism industry
scientist
Other:_____

4. What is your highest level of education?

high school some college college degree graduate degree

Part II. Your connections to other participants in the Beach SAMP process

Please tell us about the key people you get information from or collaborate with on the development of the RI Beach SAMP.

Part III. Perceptions of the process

In this part of the survey, you will be presented with a list of statements about your perceptions of the Beach SAMP process so far.

Each answer is ranked from 1-5.

1-strongly disagree.

2-disagree.

3-neither agree nor disagree.

4-agree.

5-strongly agree.

The following five statements refer to the information shared in the process:

1. I have access to all information involved in the process.

2. The information used in the process is useful and relevant to the process.

3. The information used in the process is exchanged in a useful way.

4. Information and experiences of participants are considered during the process.

5. Scientific information shared in the process is credible.

The following six statements refer to your interactions with others in the process:

1. I feel that other participants listen to me during the process.

2. I listen to other participants during the process.

3. I trust other participants.

4. Other participants trust me.

5. There are key individuals that I can go to for information .

6. The process allows me to enhance existing working relationships.

7. The process allows me to build new working relationships.

The following five statements refer to the process in general:

1. The process has clearly defined goals.

2. It is clear how decisions will be made throughout the process.

3. The process is fair.

4. People from all relevant interests take part in the process.

The following five statements refer to your participation in the process:

1. I feel like I can give my input

2. I had the opportunity to be involved early-on in the process.

3. My views are considered in the process.

4. I can easily attend meetings.

5. I plan to continue participating in the Beach SAMP.

APPENDIX B: PERCEPTION RESPONSES BY STAKEHOLDER CATEGORY

Table B1: Responses for statements regarding the information shared in the process, by primary stakeholder affiliation. D=Disagree, A=Agree, N=Neither

Stakeholder Affiliation	Access to info.			Info. is relevant			Info. exchange useful			Part. experience considered			Scientific info. credible		
	D	A	N	D	A	N	D	A	N	D	A	N	D	A	N
State/Federal Agency	0	11	2	0	11	2	0	11	2	1	10	2	0	10	3
Local Official/Board	2	3	2	1	2	2	0	4	2	0	4	2	0	3	3
Environmental Org.	0	1	0	0	1	0	0	1	0	0	0	1	0	1	0
Non-Profit Org.	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0
University/ Academia	0	5	0	0	5	0	0	5	0	0	5	0	0	5	0
Other	0	0	1	0	1	0	0	1	0	0	1	0	0	1	0

Table B2: Responses for statements regarding interaction with others in the process, by primary stakeholder affiliation

Stakeholder Affiliation	Others listen to me			I listen to others			I trust others			Others trust me			Key individuals		
	D	A	N	D	A	N	D	A	N	D	A	N	D	A	N
State/Federal Agency	0	11	2	0	11	2	0	11	2	0	10	3	0	13	0
Local Official/Board	0	3	3	0	5	1	0	3	3	0	4	2	0	4	2
Environmental Org.	0	1	0	0	1	0	0	0	1	0	0	1	0	1	0
Non-Profit Org.	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0
University/ Academia	0	5	0	0	5	0	0	5	0	0	5	0	0	5	0
Other	0	1	0	0	1	0	0	0	1	0	0	1	0	0	0

Stakeholder affiliation	Build new relationships			Enhance existing relationships		
	D	A	N	D	A	N
State/Federal Agency	0	9	4	0	11	2
Local Official/Board	0	5	1	0	5	1
Environmental Org.	0	1	0	0	1	0
Non-Profit Org.	0	1	0	0	1	0
University/ Academia	0	5	0	0	5	0
Other	0	1	0	0	1	0

Table B3: Responses for statements regarding the process in general, by primary stakeholder affiliation

Stakeholder Affiliation	Clearly defined goals			Clear how decisions will be made			Process is fair			All relevant interests participating		
	D	A	N	D	A	N	D	A	N	D	A	N
State/Federal Agency	0	9	4	0	2	11	0	9	4	0	7	6
Local Official/Board	1	2	3	1	1	4	0	3	3	0	1	5
Environmental Org.	0	1	0	0	1	0	0	1	0	0	1	0
Non-Profit Org.	0	1	0	0	1	0	0	1	0	0	1	0
University/ Academia	0	5	0	1	3	1	0	5	0	0	4	1
Other	0	1	0	0	0	1	0	1	0	0	1	0

Table B4: Responses for statements regarding respondents' participation in the process, by primary stakeholder affiliation

Stakeholder Affiliation	I can give my input			I have opportunity to be involved			My views are considered			I can easily attend meetings			I plan to continue participating		
	D	A	N	D	A	N	D	A	N	D	A	N	D	A	N
State/Federal Agency	0	12	1	0	12	1	0	10	3	1	10	2	0	12	1
Local Official/Board	0	5	1	0	4	2	0	5	1	1	4	1	0	5	1
Environmental Org.	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0
Non-Profit Org.	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0
University/ Academia	0	5	0	0	5	0	0	5	0	0	5	0	0	5	0
Other	0	1	0	0	1	0	0	1	0	0	0	1	0	1	0

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