

Abstract

Local Implementation of the State Wildlife Action Plan in Coastal North Carolina

July 2015

By: Jamie L. Heath

Major Department: Geography, Planning and Environment

Director of Thesis: Traci L. Birch, Ph.D., AICP

Because of a congressional mandate, all states have created a State Wildlife Action Plan (SWAP) in line with the goals of ecosystem management. The SWAPs are intended to present a coordinated action agenda at the state level for preventing wildlife from becoming endangered. While ecosystem management requires support from all levels of government, implementation must occur at the local level in development decision making processes. There are a number of challenges involved in implementing a state plan at the local level. It is vital that barriers to local implementation of the SWAPs be addressed if the plans are to be successfully implemented.

The NC SWAP was developed by the NC Wildlife Resources Commission (WRC) and little is known about local implementation of the plan. This research focuses on local implementation of the NC SWAP in the three coastal counties of Beaufort, Carteret and Craven. I used qualitative interviewing to determine whether local governments were aware of the NC SWAP, whether local governments had taken action towards implementation of the NC SWAP, whether WRC has contacted or worked with local governments in the study area, and to identify barriers to implementation of the NC SWAP in the study area. Fifty-two interviews were conducted including interviews with local planners, employees of WRC, and employees of supporting state government agencies and non-profits.

In general, I found that the NC SWAP does not have the level of local implementation needed to be successful in the study area. Most local governments have heard of the NC SWAP,

but most have not taken steps towards implementation. However, I found that most planners personally support the plan, but do not have the support of their governing bodies to take steps toward implementation. Since governing bodies tend to respond to voters, this indicates a lack of support for the goals of ecosystem management from the public. There has been limited outreach from WRC in the study area. WRC cited a need for more staff as the reason for limited outreach, as funding cuts from both the state and federal level have caused a staff cap to be initiated within the entire agency.

The top barrier to implementation of the NC SWAP identified by all three groups of interviewees was the need for more education and outreach (local government and public). The second most common barrier identified was capacity issues (lack of staff and funding), the third was population and development pressure, and the fourth was the need for stronger regulations.

Based on these findings, my recommendations for improving local implementation of the NC SWAP include granting WRC more funding to hire full time staff to focus on education and outreach, and shifting the responsibilities of some other WRC employees to education and outreach if this is not a possibility. In addition, I recommend that WRC and local governments reach out to supporting agencies for assistance with education and outreach. I also recommend that the SWAP be used to develop state level policy to guide local implementation of habitat conservation in development decision making.

This research provides valuable insight into how the NC SWAP is being implemented in the study area, what barriers to implementation exist, and potential strategies for overcoming barriers and increasing implementation of the plan. This research also provides a guideline for studies on local implementation of the NC SWAP in other counties and local implementation of SWAPs in other states.

Local Implementation of the State Wildlife Action Plan in Coastal North Carolina

A Thesis

Presented To the Faculty of the Department of Geography, Planning and Environment

East Carolina University

In Partial Fulfillment of the Requirements for the Degree

Master of Science in Geography

By

Jamie L. Heath

July 2015

Copyright Page

© Jamie Heath, 2015

Local Implementation of the State Wildlife Action Plan in Coastal North Carolina

By

Jamie Heath

APPROVED BY:

DIRECTOR OF THESIS: _____

Traci Birch, Ph.D.

COMMITTEE MEMBER: _____

Anuradha Mukherji, Ph.D.

COMMITTEE MEMBER: _____

Jeff Popke, Ph.D.

COMMITTEE MEMBER: _____

Karen Mulcahy, Ph.D.

CHAIR OF THE DEPARTMENT: _____

Burrell Montz, Ph.D.

DEAN OF THE GRADUATE SCHOOL: _____

Paul Gemperline, Ph.D.

Acknowledgements

First and foremost I would like to thank my thesis advisor Dr. Traci Birch for her encouragement, guidance and advice throughout the process. I would also like to thank those on my thesis committee for their support, including Dr. Anuradha Mukherji, Dr. Jeff Popke and Dr. Karen Mulcahy.

I would like to thank the local planners, the employees of the NC Wildlife Resources Commission, and employees of various supporting state government and non-profit agencies who allowed me to interview them for this study. Without their participation, this research truly would not have been possible.

I would also like to acknowledge East Carolina University's Department of Geography, Planning and Environment and NC Sea Grant for providing the financial support necessary for me to carry out this research.

Last but not least, I am grateful to my family. They have been encouraging and patient through the long nights and busy weekends.

Table of Contents

Title Page	i
Copyright Page.....	ii
Signature Page	iii
Acknowledgements.....	iv
Table of Contents	v
List of Tables	vii
List of Figures	viii
Chapter 1: Introduction.....	1
Chapter 2: Literature Review.....	6
2.1: Introduction.....	6
2.2: Biodiversity.....	6
2.3: Endangered Species Act	8
2.4: Ecosystem Management	11
2.5: State Wildlife Action Plans.....	15
2.6: Policy Implementation – State to Local.....	18
2.7: North Carolina State Wildlife Action Plan	24
Chapter 3: Research Design & Methods.....	28
3.1: Introduction.....	28
3.2: Research Questions.....	28
3.3: Study Site.....	29
3.4: Research Design	37

3.5: Data Analysis.....	42
Chapter 4: Results and Discussion.....	47
4.1: Introduction.....	47
4.2: Research Question One Results and Discussion	47
4.3: Research Question Two Results and Discussion.....	62
4.4: Research Question Three Results and Discussion.....	80
4.5: Research Question Four Results and Discussion.....	95
Chapter 5: Conclusion.....	104
5.1: Problem Statement and Findings	104
5.2 Recommendations.....	109
5.3 Limitations and Further Research.....	115
References.....	118
Appendices.....	128
Appendix A: NC SWAP Implementation Reports	128
Appendix B: Consent Statement.....	136
Appendix C: Planner Interview Questions	137
Appendix D: NC Wildlife Resources Commission Interview Questions.....	140
Appendix E: Supporting Agency Interview Questions.....	143
Appendix F: Support Provided for Habitat Conservation by Agency	146
Appendix G: Institutional Review Board (IRB) Approval.....	153

List of Tables

Table 2.1: Definitions of Ecosystem Management.....	13
Table 2.2: Grumbine’s Ten Themes of Ecosystem Management.....	14
Table 2.3: Goals & Key Themes of NC SWAP and Themes of Ecosystem Management Addressed by Each.....	25
Table 3.1: Demographic Information for NC and Beaufort, Carteret, and Craven County.....	34
Table 3.2: Unemployment Rate and Employment by Industry for NC and Beaufort, Carteret and Craven County.....	35
Table 4.1: Local Conservation Related Policies that Exceed State Requirements	58
Table 4.2: WRC Average Rating for Progress Made towards Each SWAP Goal & Variance in Responses	80
Table 4.3: WRC Average Rating for Use of Key Themes & Variance in Responses	82
Table 4.4: Local Government & Supporting Agency Average Rating for Support of SWAP Goals & Variance in Responses.....	84

List of Figures

Figure 3.1: North Carolina Regions	30
Figure 3.2: Base Map of Study Area	33
Figure 4.1: Awareness of SWAP or GGT	48
Figure 4.2: Awareness of SWAP or GGT by County.....	49
Figure 4.3: Action Taken Towards Implementation.....	51
Figure 4.4: Local Government Action Taken Towards Implementation by County	52
Figure 4.5: Type of Conserved Land in Land Use Plans	56
Figure 4.6: Conservation Support Provided by Supporting Agencies	62
Figure 4.7: Actions in WRC Implementation Reports.....	64
Figure 4.8: Implementation Steps Reported by WRC	66
Figure 4.9: How Often Employees of Supporting Agencies Work with Local Governments.....	73
Figure 4.10: Supporting Agency Contacts with WRC.....	79
Figure 4.11: Top Barriers to Implementation	89
Figure 4.12: Education and Outreach Subcategories	90
Figure 4.13: Capacity Subcategories	92

1: Introduction

Because of a U.S. Congressional mandate, all states have created a State Wildlife Action Plan (SWAP) in line with the goals of ecosystem management. The SWAPs are intended to present a coordinated action agenda at the state level for preventing wildlife from becoming endangered. While ecosystem management requires support from all levels of government, implementation must occur at the local level in development decision-making processes. There are a number of challenges involved in implementing a state plan at the local level. It is vital that barriers to local implementation of the SWAPs be addressed if the plans are to be successfully implemented.

The NC SWAP was developed by the NC Wildlife Resources Commission (WRC) and little is known about local implementation of the plan. This research focuses on local implementation of the NC SWAP in the three coastal counties of Beaufort, Carteret and Craven. I used qualitative interviewing to determine whether local governments were aware of the NC SWAP, whether local governments had taken action towards implementation of the NC SWAP, whether WRC has contacted or worked with local governments in the study area, and to identify barriers to implementation of the NC SWAP in the study area. Fifty-two interviews were conducted including interviews with local planners, employees of WRC, and employees of supporting state government agencies and non-profit agencies.

The SWAPs have the potential to protect biodiversity if implementation of the plans is successful. Biodiversity is the variety of life within an ecosystem. Biodiversity is important because it increases the resilience and productivity of ecosystems and provides humans with ecosystem services as well as medical, scientific, recreational and commercial benefits. Marine and coastal regions contain diverse habitats that support high levels of biodiversity. Although

coastal regions in the U.S. account for only 17% of the total land mass, on average they contain more than four times the population density of inland regions.

A consequence of these high levels of development pressure is biodiversity loss. Biodiversity loss is important because losing species disrupts the balance of the ecosystem and the functions associated with ecosystem health. This research addresses the issue of maintaining healthy coastal ecosystems, with a focus on habitat and biodiversity conservation and ecosystem management in three coastal counties in NC.

Early wildlife management efforts focused on single species conservation, which based management decisions on the needs of one endangered species versus managing for the whole ecosystem (Grumbine 1994, Brody 2003b). Passage of the Endangered Species Act in 1973 was intended to protect critically endangered species and their habitat. However, there has been much conflict in implementing ESA at the local level.

The seemingly endless legal actions taken to enforce or prevent enforcement of the law and its associated conservation planning are particularly acute in coastal areas where there is extreme development pressure compared to inland areas. The average density of coastal shoreline counties is 446 people/sq. mi, while the overall US density is only 105 people/sq. mi (NOAA 2013). This development pressure is particularly worrisome because coastal ecosystems support high levels of biodiversity and endemism. NC currently has 52 federally endangered and threatened species, whose status is a direct or indirect result of rapid development (USFWS 2014).

Ecosystem management is a process that aims to conserve major ecosystem services and restore natural resources, while also addressing current and future socioeconomic needs. Ecosystem management addresses conservation and biodiversity through a whole-system rather

than a single-species approach. In 2000, Congress required that all state wildlife agencies develop an ecosystem-based State Wildlife Action Plan (SWAP) by 2005 (Lerner et al. 2006). Rather than decisions about species habitat being made piecemeal, or only once a species is critically threatened or endangered, SWAPs outline the steps needed to conserve wildlife habitat before it becomes too rare or too costly to restore. They are intended to present a coordinated agenda at the state-level for preventing wildlife from becoming endangered, which can then guide local development management decision-making.

Like the ESA, implementing the SWAP locally involves a number of challenges, including competing interests, a lack of commitment to addressing environmental issues, and a focus on short-term needs, costs and benefits rather than long-term environmental management (Slocombe 1993). Further, coastal counties in NC experience uneven development pressure - with inner coastal areas struggling economically and oceanfront areas developing with the expectation that they will support the entire county - making growth management and conservation decisions difficult (Lubell et al. 2005). However, NC coastal counties are mandated to have land use plans under the Coastal Area Management Act, which requires local governments to consider type and location of development, as well as potential conservation areas (Burby & May 1998).

Little is known about local implementation of the NC SWAP. The plan was developed by the NC Wildlife Resources Commission, and the Commission's Wildlife Diversity Program is in charge of implementation. The plan focuses on enhancing the ability to make management decisions for priority wildlife species, conserving and enhancing habitats and communities, fostering interagency cooperation and local partnerships, supporting educational efforts, and supporting and improving existing regulations and programs. For the purposes of this research,

the NC SWAP's stated focus on local implementation is key.

Although ecosystem management focuses on many spatial scales and requires broad interagency cooperation, implementation must occur at the local level through land use planning and decision-making (Brody 2003a). We know that local commitment to land use planning varies drastically across NC (Burby & May 1998). Little is known about whether SWAP goals and objectives are being adopted locally. Beyond land use plans, there is very limited information on how the NC SWAP is being implemented locally through other formal or informal development practices.

Since the SWAPs are relatively new, it is the right time to start assessing their effectiveness, particularly at the local level. This work focuses on implementation of the NC SWAP in the three coastal counties of Beaufort, Carteret, and Craven. My research questions include the following:

1. Are local governments aware of NC SWAP, and if so, what steps if any have the local governments taken toward implementing the plan?
2. Have employees from the NC Wildlife Resources Commission contacted or worked with local governments in the study area, and if so, in what capacity?
3. What are barriers to implementation of NC SWAP in the study area?
4. What are possible tools or strategies that can be used to overcome these barriers and increase implementation of NC SWAP in the study area?

A case study of these three counties helped answer my research questions and shed light on the larger phenomenon of SWAP implementation. This study employed a qualitative approach, focusing on historic data collection, field observations, and qualitative interviewing to analyze implementation of the NC SWAP in the study area. There were three distinct sets of

interview questions, one set for local government planners, one set for NC Wildlife Resources Commission employees, and one set for all other agencies. Interview questions were designed to address the research questions of the study. The data gathered in this study was coded, analyzed and used to recommend strategies to overcome barriers and increase implementation of the NC SWAP in the study area.

This thesis is composed of five chapters. In the next chapter I review the literature that is relevant to this thesis. In chapter three, I provide an overview of the study site and lay out my research design and methodology. In chapter four, I answer the first three research questions by presenting the results of the data coding and analysis process, discuss the results, and answer the fourth research question by making recommendations for overcoming barriers and increasing implementation of the SWAP in the study area. In chapter five, I link the results to the literature, the effectiveness of the SWAP and other efforts, summarize my recommendations, and what these findings mean to the bigger picture.

2: Literature Review

2.1 Introduction

Preserving the integrity of ecosystems is vital in coastal regions where habitats such as estuaries support high levels of biodiversity and often face high levels of development pressure. Planning for healthy coastal ecosystems includes consideration of connectivity and habitat fragmentation, wildlife health and biodiversity, supporting system resilience, maintenance of ecosystem services such as clean water and air, and knowledge sharing (Gaydos et al. 2008). This research addresses the issue of maintaining healthy coastal ecosystems, with a focus on habitat and biodiversity conservation and ecosystem-based management in three coastal counties in NC. The following provides an overview of biodiversity and biodiversity loss, the Endangered Species Act, Ecosystem Management, State Wildlife Action Plans (SWAPs), state to local policy implementation, and implementation of the North Carolina SWAP.

2.2 Biodiversity

Biodiversity is the variety of life within an ecosystem (NWF 2012). In the past biodiversity was simply viewed as species richness, but recently it has been expanded to include genes, species, populations, communities, ecosystems, and landscapes (Poiani et al. 2000). Biodiversity is important because it increases the productivity of ecosystems. Each species has a role to play, no matter how small (Shah 2014).

The human benefits of preserving biodiversity include medical, scientific and commercial benefits, as well as recreational and amenity values (Beatley 1991). For example, the biological benefits of biodiversity include food, pharmaceutical drugs, wood products and ornamental plants and the social benefits include education, recreation, tourism and cultural values (Shah 2014). In addition, biodiversity provides humans with ecosystem services such as protection of

water resources, soil formation and protection, nutrient storage and recycling and pollution breakdown and absorption (Shah 2014). However, using biodiversity to the benefit of humans is not the only reason it should be protected. "Noah's Principle" refers to the fundamental notion that species have a basic right to exist (Beatley 1991: 3).

Marine and coastal regions contain diverse habitats that support high levels of biodiversity (UNEP 2014). Marine species are among the last sources of wild food on the planet and 2.6 billion people depend on these food sources for at least 20% of their protein intake (UNEP 2014). Critical to marine species sustainability are estuaries, which support a wide variety of fish, birds, mammals, and other living organisms (NOAA 2005, DOI 1970). In fact, most of the fish taken in sport and commercial harvest are dependent on estuaries for part of their lives, as are migratory birds (NOAA 2005, DOI 1970).

Biodiversity is also important to the social-ecological system that we are all a part of, because higher levels of biodiversity lead to ecosystem resilience (Walker & Salt 2006). “Resilience is the capacity of a system to absorb disturbance; to undergo change and still retain essentially the same function, structure, and feedbacks” (Walker & Salt 2006: 32). Ecosystem resilience is very important in coastal regions where ecosystems such as estuaries are often threatened by human development to a greater extent than their inland counterparts. The average density of coastal shoreline counties which have estuarine and/or ocean shoreline is 446 persons per square mile. The average density of coastal watershed counties which drain into estuaries and/or the ocean is 319 persons per square mile, and the US overall is only 105 persons per square mile (NOAA 2013). These numbers show that coastal regions, which account for only 17% of the total land mass in the US, receive much higher levels of development pressure than their inland counter parts.

A consequence of these high levels of development pressure is biodiversity loss. Loss of biodiversity is important to consider because losing species – whether flora or fauna – disrupts the balance of the system and the functions associated with ecosystem health. This development pressure is particularly worrisome because coastal ecosystems support high levels of biodiversity and endemism.

NC currently has 52 federally endangered and threatened species, whose status is a direct or indirect result of rapid development (FWS 2014). Every state in the US has species that are threatened or endangered, and the most serious threat to these species' survival is habitat destruction (Beatley 2000, Brooks et al. 2006). Other threats to biodiversity caused by development include increasing road density (which fragments habitat and causes pollution of land and water), increasing recreation activity, altering hydrologic regimes, increasing pollution, wildfire suppression, noise pollution, and increasing urban and edge predators such as raccoons and cats (Michalak & Lerner 2008).

2.3 Endangered Species Act

A growing realization of the need to reduce the loss of critical species and protect biodiversity led to wildlife management efforts, which continue to grow and evolve over time. During the environmental movement of the 1960's, people became concerned that many of the country's native plants and animals were in danger of becoming extinct. Early wildlife management efforts focused on single species conservation (particularly high-profile imperiled species such as bald eagles and American bison), which based management decisions on the needs of one threatened or endangered species versus managing for the whole ecosystem (Grumbine 1994, Brody 2003b). Passage of the Endangered Species Act (ESA) in 1973 was intended to protect critically endangered species and their habitat. Administered by the US

Department of the Interior's US Fish and Wildlife Service (FWS) and the US Commerce Department's National Marine Fisheries Service (NMFS), the ESA is intended to protect and recover terrestrial, marine, and freshwater species (FWS 2013b).

A species can be listed as endangered or threatened under the ESA. An endangered species is one that is in danger of becoming extinct while a threatened species is one that is likely to become endangered. All species of plants and animals are eligible to be listed, with the exception of pest insects (FWS 2013b). The ESA makes it unlawful to take a listed animal without a permit, with take being defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct" (FWS 2013b: 2). The ESA also requires designation of critical habitat for listed species when possible. However, protection of these critical habitats is only required for Federal agency actions and federally funded or permitted activities. To help fill this gap, FWS and NMFS have developed tools and incentive programs to involve private landowners in protection of critical habitat (FWS 2013b).

Passage of the Endangered Species Act in 1973 was intended to protect critically endangered species and their habitat. However, there has been much conflict in implementing the ESA at the local level. A summary of the ESA and subsequent landmark court cases by the American Bar Association (2004) shows court cases to enforce or prevent enforcement of the ESA have involved the federal government, state governments, local governments, private landowners, corporations, non-profit agencies, and citizens. Within each of these stakeholder groups, the combination of defendants and plaintiffs is ostensibly unending. Lawsuits are primarily related to the Act's statement of purpose that explains that the ESA must provide protection to the ecosystems upon which endangered species and threatened species depend. This means that land use can be seriously limited in areas where endangered species are found in the

name of conservation.

The seemingly endless legal actions taken to enforce or prevent enforcement of the law and its associated conservation planning efforts are particularly acute in coastal areas where there is extreme development pressure compared to inland areas. A recent high profile case in North Carolina centers around the use of off road vehicles on Cape Hatteras National Seashore, a 67 mile section of the outer banks that is home to endangered shorebirds, water birds and sea turtles. A lawsuit filed by the Southern Environmental Law Center resulted in the Park Service coming up with a plan to manage motorized access, which limits the timing of motorized access (e.g. not during nesting season), but does not prohibit off road vehicle access. There is still heated debate about the issue and the off road vehicle interests continue to lobby for unrestricted access (Williams 2012).

There is no doubt that there has been controversy in implementing the ESA, but the question to be addressed is whether the ESA has been successful in recovering endangered species, i.e. bringing the population numbers up enough to remove them from the list. There are currently 1,403 species listed as threatened or endangered under the ESA (FWS 2015a). As of 2006 there were 1,272 species listed as threatened or endangered under the ESA (Lerner et al. 2006).

Since 2006, 19 of the threatened or endangered species have been delisted (FWS 2015b). Thirteen were delisted because their population numbers recovered, four were delisted due to an original data error and one was delisted because it became extinct. The species which became extinct is the Caribbean Monk Seal and according to NOAA biologists the seal became extinct due to overhunting by humans (NOAA 2008). The 17 species delisted because they recovered by 2015 represents only 1.3% of the threatened or endangered species of 2006. Therefore, 98.7% of

the species that were endangered in 2006 are still endangered today. While 19 species were delisted from 2006 – 2015, 150 new species were added to the threatened or endangered list.

Many argue that the ESA is basically a response that occurs too late; after one or more species has already become endangered. Once a species is on the threatened or endangered list, it becomes very difficult for their numbers to recover, and species dependent on similar habitats are likely to follow their entry onto the list.

2.4 Ecosystem Management

Ecosystem management was introduced to address conservation and biodiversity through a whole-system rather than a single-species approach. Ecosystem management is a process that aims to conserve major ecosystem services and restore natural resources, while also addressing current and future socioeconomic needs. Although ecosystem management was introduced in academic circles in the 1970s, it did not receive federal attention until two decades later.

Recognizing the need for system-wide approaches that could address the needs of multiple species and some of the shortfalls of the ESA, President Bill Clinton created the Interagency Ecosystem Management Task Force (IEMTF) in 1993 (Yaffee et al. 1996). The IEMTF studied five issue areas related to ecosystem management including budgets and financing, institutional shifts, public participation, science and information, and legal mechanisms. Numerous recommendations were made by the task force regarding improving interagency cooperation with federal and non-federal stakeholders, improving communication with the public, improving resource allocation and management, supporting the role of science, improving information and data management, and increasing flexibility for adaptive management (Yaffee et al. 1996). IEMTF marked the beginning of the US government adopting ecosystem-based management as common practice.

The US Forest Service took the lead in implementing ecosystem management at the federal level, fundamentally altering its resource-based management strategy focus to be consistent with ecosystem management (Grumbine 1994). The implementation of ecosystem management has grown quickly since this time. A 1996 survey identified over 600 ecosystem management projects across the country (Yaffee et al. 1996). Since this time ecosystem management has grown tremendously and today there are literally thousands of programs nationwide.

An ecosystem is defined as "a community of organisms and their environment that function as an integrated unit" (Szaro et al. 1998: 2). Ecosystems are dynamic (always changing), occur at broad scales (which are naturally defined) and are complex (dependent on structure, diversity and integrity) (Christensen et al. 1996). Humans (and their actions) are a part of the ecosystems in which they live (Christensen et al. 1996). Examples of ecosystems include forests, ponds, rivers, rotting logs, whole mountain ranges, and the planet (Szaro 1998). This shows that ecosystem management occurs at many spatial scales. There are also many definitions for ecosystem management, as outlined in Table 2.1.

Table 2.1: Definitions of ecosystem management.

Source	Definition
Slocombe (1993: 617)	The main components of an ecosystem approach: describe parts, systems, environments and their interactions; are holistic, comprehensive, and transdisciplinary; include people and their activities in the ecosystem; describe system dynamics through concepts such as stability and feedback; define the ecosystem naturally, for example ,bioregionally instead of arbitrarily; look at different levels and/or scales of system structure, process, and function; recognize goals and take an active, management orientation; incorporate stakeholder and institutional factors in the analysis; use an anticipatory, flexible research and planning process; entail an ethics of quality, well-being, and integrity; and recognize systemic limits to action – defining and seeking sustainability.
Lackey (1998: 23)	The careful and skillful use of ecological, economic, social, and managerial principles in managing ecosystems to produce, restore, or sustain ecosystem integrity and desired conditions, uses, products, values, and services over the long term.
Yaffee (1999: 715)	Three faces of ecosystem management: 1. Environmentally sensitive multiple-use management aims at satisfying a diverse set of human needs and values, but it is acknowledged that this can only be achieved over the long term by being more sensitive to the limits of ecological systems. 2. Ecosystem-based approaches to resource management adopt many of the principles contained in the ecosystem management literature. Thus managers work with a deeper understanding of ecological systems and ecological integrity or health are explicit goals, but rarely does this involve managing whole ecosystems. 3. Ecoregional management adopts many of the principles identified in the ecosystem-based approaches but emphasizes landscape-scale management as a fundamental goal. Success comes through maintenance or restoration of ecological functions associated with those landscape units.
Cortner & Moote (1999: 1-2)	Ecosystem management reflects public awareness and acceptance of environmental values, improved scientific understanding of ecological systems, increasing emphasis on ecological concerns such as biodiversity, professional experience with new technologies and leadership models, and changing professional practices that view conditions of the land to be just as relevant as the quantities of outputs that can be produced.
Franklin (1997: 27)	Managing ecosystems so as to assure their sustainability.
Christensen et al. (1996: 667)	Management driven by explicit goals, executed by policies, protocols, and practices, and made adaptable by monitoring and research based on our best understanding of the ecological interactions and processes necessary to sustain ecosystem composition, structure, and function.
Thomas (1996: 703)	The integration of ecological, economic and social factors in order to maintain and enhance the quality of the environment to meet current and future needs.
The Society of American Foresters (1993: 1)	Management guided by explicit goals, executed by policies, protocols, and practices, and made adaptable by monitoring and research based on the best understanding of ecological interactions and processes necessary to sustain ecosystem composition, structure, and function over the long term.

All of the definitions presented mention something about ecosystem sustainability, ecosystem integrity, interactions, long term ecosystem management, or managing for the entire

system rather than the productivity of one resource or species. Ecosystem management is about the relationships within a functional landscape. Ecosystem management means that no species can be isolated and managed because its management is related to everything else.

While definitions for ecosystem management vary, there are common themes that can be observed. Table 2.2 outlines Grumbine’s (1994) ten themes of ecosystem management, which provide the foundation for current ecosystem management efforts.

Table 2.2. Ten themes of ecosystem management (Grumbine 1994).

Theme	Description
Hierarchical Context	A focus on one level of biodiversity (genes, species, populations, ecosystems, landscapes) is not sufficient. Managers must see the connections between all levels.
Ecological Boundaries	Management requires working across administrative and political boundaries.
Ecological Integrity	Protecting total native diversity (species, populations, ecosystems) and the ecological patterns and processes that maintain that diversity.
Data Collection	Requires more research and data collection (i.e. habitat inventory and classification, baseline species and populations assessments) as well as better management and use of existing data.
Monitoring	Managers must track the results of their actions so that success or failure may be evaluated quantitatively.
Adaptive Management	Assumes that scientific knowledge is provisional and allows managers to learn from the management process in order to remain flexible and adapt to uncertainty.
Interagency Cooperation	Requires cooperation between federal, state, and local management agencies as well as private parties.
Organizational Change	Implementing ecosystem management requires changes in the structure of land management agencies as well as private parties.
Humans Embedded in Nature	Humans are fundamental influences on ecological patterns and processes and are in turn affected by them.
Values	Regardless of the role of scientific knowledge, human values play a dominant role in ecosystem management goals.

A primary goal of ecosystem management is conserving biodiversity before a problem (i.e. endangered species, loss of ecosystem services, etc.) occurs by studying and managing for the complex relationships within the system. Ecosystem management strives to allow humans to meet the needs of this generation and future generations while maintaining healthy and biodiverse environments. Ecosystem management calls for all stakeholders to be involved in the planning process so that the emergent plans balance economic, social and ecological goals – one of the most difficult tasks for this new approach. Recognizing that ecosystems are dynamic in

space and time, ecosystem management demands adaptive management – a structured and iterative process that requires constant research and readjustment of management strategies – which is also a difficult task for managers with few funds and little capacity.

Ecosystem management is also difficult because there is no clear path to implementation in any given area. Every ecosystem has unique environmental and socio-political realities that make conservation strategies unique. Ecosystem management focuses on many spatial scales and requires participation from all levels of government, but effective implementation must occur at the local level with local land use planning (Brody 2003a). There are many challenges involved in implementing ecosystem management at the local level including competing interests (Brody 2003b), lack of commitment (Burby & May 1998) and informational obstacles (Slocombe 1993). However, Grumbine (1994: 35) notes that “For the moment ecosystem management provides our best opportunity to describe, understand and fit in with nature”. In order for ecosystem management to reduce the impacts of development, conservation and local planning and development decision-making must be integrated (Lerner 2006).

2.5 State Wildlife Action Plans

Recognizing the need to plan for ecosystem management and the shortcomings of the ESA, in 2000 Congress required that all state wildlife agencies develop a State Wildlife Action Plan (SWAP) by 2005 in order to receive federal funds through the Wildlife Conservation and Restoration Fund and the State Wildlife Grants Program (Lerner et al. 2006). The Wildlife Conservation and Restoration Fund is a formula grant program which provides federal assistance to states, commonwealths, territories, and districts to plan and implement projects for the benefit of a diverse array of wildlife and associated habitats, including species that are not hunted or fished (FWS 2011). The State Wildlife Grants Program provides federal grant funds for

developing and implementing programs that benefit wildlife and their habitats, including species not hunted or fished. Priority is placed on projects that benefit species of greatest conservation need. These species were determined by each state in the context of developing its wildlife conservation strategy for fauna, but not flora. A state's list may include current federal and state endangered or threatened species and other wildlife species of concern. Grant funds must be used to address conservation needs identified within the SWAP (FWS 2013b).

All 50 states plus the District of Columbia developed a SWAP by 2005 (NC WRC 2005, Michalak & Lerner 2008). These SWAPs are proactive plans which assess the health of each state's wildlife and habitats, identify the problems they face, and outline the actions that are needed to conserve them over the long term. Taken as a whole, the SWAPs present a national action agenda for restoring endangered populations and preventing wildlife from becoming endangered (AFWA 2014). This focus is important, because as mentioned in the discussion about the ESA, once a species is on the endangered list it is very difficult to restore populations to healthy numbers (FWS 2015b). Each SWAP was required to integrate information across eight required elements (NC WRC 2005: 1):

1. Information on the distribution and abundance of species of wildlife, including low and declining populations as the state fish and wildlife agency deems appropriate, that are indicative of the diversity and health of the state's wildlife;
2. Descriptions of locations and relative condition of key habitats and community types essential to conservation of species identified in (1);
3. Descriptions of problems which may adversely affect species identified in (1) or their habitats, and priority research and survey efforts needed to identify factors which may assist in restoration and improved conservation of these species and habitats;
4. Descriptions of conservation actions proposed to conserve the identified species and habitats and priorities for implementing such actions;
5. Proposed plans for monitoring species identified in (1) and their habitats, for monitoring the effectiveness of the conservation actions proposed in (4), and for adapting these conservation actions to respond appropriately to new information or changing conditions
6. Descriptions of procedures to review the Plan at intervals not to exceed ten years;
7. Plans for coordinating the development, implementation, review, and revision of the Plan with federal, state, and local agencies and Indian tribes that manage significant land and water areas within the state or administer programs that significantly affect the conservation of identified species and habitats;

8. Documentation of broad public participation during development and implementation of the Plan.

Of particular importance to the State Wildlife Grant program are the elements calling for adaptive management – or "learning by doing" (Fontaine 2011: 1403). The fifth requirement element that SWAPs must address (outlined above) includes adapting conservation actions to respond appropriately to new information or changing conditions, and the sixth required element is for the plan to be reviewed at least every ten years (NC WRC 2005). Adaptive management is a critical component of these plans because it acknowledges and attempts to address the uncertainty in ecosystem management when biological information and understanding of proper management is lacking (Fontaine 2011). As previously noted, this focus on adaptive management is one of the ten themes of ecosystem management identified by Grumbine (1994). Adaptive management is an iterative process of resource decision making in the face of uncertainty. Management is allowed to proceed with constant data collection, evaluation and adjustment. This allows uncertainty to diminish over time.

In evaluating the first round of SWAPs nationwide for incorporation of adaptive management approaches, Fontaine (2011) shows that all except one plan mention adaptive management and 83% agree that adaptive management should be incorporated into SWAP implementation. In 66% of the plans there were specific sections dedicated to adaptive management. However, no SWAP made reference to structured decision making and 47% of the plans did not provide a definition for adaptive management (Fontaine 2011). While the SWAPs outline the need for adaptive management, they don't clearly define or lay out the steps that need to be taken to achieve this objective.

Challenges to implementing adaptive management include difficulty in producing useful models for resolving key uncertainties, key processes that are difficult to study, the cost of conducting studies, and adaptive management being seen as a threat to existing management

programs, rather than an opportunity for improvement (Walters 1997). However, adaptive management may be the best approach currently available to address complex problems in large systems in that it addresses uncertainty directly by using management as a tool to gain critical knowledge. The benefit of adaptive management is that action can be taken to protect ecosystems before all the needed information is gathered. Although there is the possibility that mistakes will be made, if we wait until we know everything, there is danger that it will be too late to protect ecosystems, and the species within them, because they will already have been destroyed by unregulated development. Adaptive management says that just because there is uncertainty doesn't mean you shouldn't manage.

Michalak and Lerner (2008) found that for SWAPs to address land use planning comprehensively, in a way that will reduce the impacts of development to wildlife, the following five elements must be met: integrating conservation priorities into comprehensive or master land use plans; developing model land use ordinance language for zoning regulations, site level development designs and transferable development rights programs; participating in the permit review process; coordinating residential and commercial development with existing infrastructure capacity; and coordinating with land use decision-makers within and across jurisdictional boundaries. They found that very few plans achieved these goals and even among those who did it was unclear whether the actions would be implemented.

2.6 Policy Implementation - State to Local

Although the SWAPs were created at the state level, successful implementation involves both state and local governments, because local governments are in charge of most land use and development decisions. In order for the SWAPs to be implemented successfully, development patterns must be affected. Land must be conserved in a strategic manner in order to conserve

priority wildlife habitat and provide corridors for wildlife migration. This habitat conservation is vital to the protection of biodiversity. Every development decision that is made has a cumulative effect on development patterns and whether valuable wildlife habitat and resource lands are conserved.

Local governments use planning when making land use decisions. A good, brief definition for planning is organized decision making regarding development. More specifically, the American Planning Association (APA 2015) defines planning as:

“A dynamic profession that works to improve the welfare of people and their communities by creating more convenient, equitable, healthful, efficient, and attractive places for present and future generations. Planning enables civic leaders, businesses, and citizens to play a meaningful role in creating communities that enrich people's lives. Good planning helps create communities that offer better choices for where and how people live. Planning helps communities to envision their future. It helps them find the right balance of new development and essential services, environmental protection, and innovative change.”

Generally, local governments hire trained planners to lead the planning process. Planners are the staff members of local governments responsible for creating local plans and policies (under the guidance of the local governing board), as well as enforcing land use and development related policies. Planners are generally the best people to talk with regarding local development and land use, including conservation practices. While many planners actually have that title, some have different titles, such as “development services director”. Some may wear multiple hats in smaller communities, and the person with the position of “town clerk” may also be given the responsibilities of a planner. Regardless of the title, if the local government employee is responsible for planning, they are referred to as a “planner” for the purposes of this study.

Therefore, the main actors in implementation of the SWAPs are the state wildlife agencies who created the plans and implement them at the state level, and the local governments who implement them through local land use decision making. State level implementation

includes steps such as species inventory and monitoring, priority species management, local government education and outreach, public education and outreach, land acquisition, habitat restoration and enhancement, wildlife policy enforcement and working with private landowners. Local governments implement the SWAP by regulating land use and development. However, there are other agencies that provide support toward implementation, including federal and state government agencies and non-profit organizations having an interest in conservation. These agencies provide support in a variety of ways, including support for conservation planning, grants for research or land acquisition, providing conservation data, and providing education and outreach to the public. For the purposes of this study, these groups are referred to as “supporting agencies”.

Like the ESA, there are a number of challenges involved in implementing state ecosystem management plans at the local level. High levels of participation may increase conflict by having disputing parties at the negotiating table, frustrating planners and resource managers by slowing down the decision-making process and diluting the strength of the final agreement by having to balance competing interests (Brody 2003b).

There may also be a lack of commitment by the local government to take on environmental problems (Burby & May 1998). State and local governments have expressed concern over the failure of higher-level governments to fund the costs of implementation, the lack of flexibility in requirements, and a shift to them of political blame for infringement of property rights (Burby & May 1998). As a consequence of these concerns, lower-level governments can be reluctant to participate in ecosystem management.

A related challenge is an attitude of focusing on short-term needs, costs, and benefits instead of a focus on long-term environmental management (Slocombe 1993). In addition, there

may be informational obstacles to ecosystem management at the local level, such as lack of knowledge about the biophysical environment, and lack of understanding on how ecosystems, societies, and economies interact (Slocombe 1993).

Legal and administrative barriers also exist. Existing laws may be a barrier to current ecosystem management efforts and responsibility for management of land may be divided among a myriad of agencies (Cortner et al. 1998). This could entail the need for changing laws as well as internal organizational and institutional change. Because ecosystem management calls for fundamental alteration in the institutional structures and processes that govern resource management, it will most likely cause controversy (Cortner et al. 1998). Another issue is that ecosystems are often divided by arbitrary political boundaries that have no real relationship to the natural ecological functions of the area (Cortner et al. 1998, Slocombe 1993). This further supports the notion that cooperation between jurisdictions and government agencies of different levels and type (i.e. state environmental departments, local planning departments, etc.) is necessary for successful ecosystem management.

However, providing for this type of interagency cooperation has its own challenges and there are many opportunities for conflicts, or turf fights. Turf refers to the exclusive domain of activities in which each agency has responsibility (Imperial 1999). Since ecosystem management is likely to recommend organizational changes, or at the very least recommend new policies or programs, there are likely to be conflicts over turf, as each agency has incentive to maintain or increase its turf in order to secure its long term survival (Imperial 1999). These barriers will need to be overcome for the SWAPs to be implemented successfully by local governments.

To complicate matters, there is not clear consensus on what institutional structure lends itself best to ecosystem management. Steel and Weber (2001) recommend a decentralized,

collaborative approach to ecosystem management. Using data from a 1998 public opinion survey, the researchers conclude that most citizens are “‘moderately informed’ to ‘very informed’” on ecosystem management, and are supportive of devolved management approaches. The survey also showed that more citizens trust local governments than state governments and the federal government. The researchers cite evidence that the public will resist ecosystem management when it comes from a top-down regulation, using the failure of the Clinton Administration’s Interior Columbia Basin Ecosystem Management Plan as an example. They use the success of collaborative, decentralized ecosystem management efforts to save the salmon and steelhead in the Pacific Northwest to show that decentralized efforts elicit strong stakeholder support and can be successful (Steel & Weber 2001).

However, Berke and French (1994) found that state mandates have a clearly measurable effect in enhancing local plan quality. The researchers examined the influence of state mandates on the content and quality of comprehensive plans from 139 local governments in five states (California, Florida, North Carolina, Texas and Washington). They compared these results to comprehensive plans which were not subject to state mandates. Although the design of the state mandate itself can be important in determining local plan quality, the researchers found that state mandates have forced local governments to pay greater attention to comprehensive plans and have put additional responsibility on local governments for implementing the adopted plans. They found that state mandates have a strong impact on environmental goals, as those plans subject to state mandates had a significantly higher score in this area than plans which were not subject to state mandates (Berke & French 1994).

Imperial (1999) used the institutional analysis and development (IAD) framework to better understand the institutional structures used to implement ecosystem management. The

IAD framework takes into account all costs of the policy, considers the local conditions (physical, biological, social, economic, cultural, etc.), does not show bias towards centralized or decentralized approaches, and uses a variety of criteria to identify the strengths and weaknesses in the different institutional structures used to implement policy (Imperial 1999).

He found that in some cases decentralized approaches to ecosystem management work, while in other cases centralized approaches work. To add another consideration, he found that polycentric (i.e. multiple center) approaches and market-based solutions can also work. What works depends on the local conditions and what objective is at hand. What works in one place won't necessarily work somewhere else. With knowledge of the local political climate, planners can be a valuable resource when deciding what institutional structure should be used to achieve local ecosystem management objectives (Imperial 1999).

In addition, Keough and Blahna (2006) point out that for ecosystem-based management to be successful, there needs to be an integrated balance between social, economic and ecological goals. Just as a focus on economic goals at the expense of social and ecological goals will fail over the long-term, a focus on ecological and/or social goals at the expense of the economy is also unsustainable and will provide for long-term failure (Keough & Blahna 2006). Therefore, the conflicts that present themselves when involving all stakeholders in the process may be necessary in order to create a balanced ecosystem management plan that works for the long-term.

Although ecosystem management focuses on many spatial scales and requires participation from all levels of government, implementation must occur at the local level with local land use planning (Brody 2003a). A need exists to coordinate with other jurisdictions, landowners, and organizations to create an effective local land use plan that addresses ecosystem management (Brody 2003a). Since biologists and other scientists have more education and

training regarding ecosystems than others, they need to play an active role in shaping local land use decisions to meet the goals of ecosystem management (Broberg 2003). This means that local staff, planning boards, and governing bodies need to be in close communication with scientists, and it would be beneficial if scientists were members of the local planning board (Broberg 2003).

A challenge identified by state wildlife agencies was the ability to coordinate with local governments, indicating that states recognize outreach to local governments is key to implementing the SWAPs, but they are challenged by a lack of resources to provide the level of outreach needed. Stoms et al. (2010) interviewed state wildlife agencies in all fifty states and identified the following challenges to implementation of the SWAPs:

1. In 45 of 50 states inadequate funding was the greatest challenge to implementation, and roughly half of the state coordinators identified the matching grant requirement as a challenge to implementing their strategies.
2. In half of the states lack of clear goals and priorities was identified by at least one interviewee as a challenge to implementation.
3. State coordinators and collaborators in 60% of the states feel challenged by engaging private landowners and local governments in implementation efforts. In part this is due to the limited ability of the agencies to interact with hundreds of local governments given current budgets.

In North Carolina coastal counties are mandated to have land use plans under the Coastal Area Management Act, which requires local governments to consider type and location of development, as well as potential conservation areas (Burby & May 1998). However, coastal counties in NC experience uneven development pressure – with inner coastal areas struggling economically and oceanfront areas developing with the expectation that they will support the entire county – making growth management and conservation decisions difficult (Lubell et al. 2005).

2.7 North Carolina State Wildlife Action Plan

To date, little is known about the details of local implementation of the North Carolina SWAP. The NC SWAP was developed by the NC Wildlife Resources Commission (WRC), and

the commission engaged hundreds of people across a broad spectrum of agencies and organizations in development of the plan. Five goals form the core of the plan and key themes (or strategies) were developed to help meet these goals (WRC 2005). These goals and key themes for meeting each goal are listed in Table 2.3, along with Grumbine’s (1994) corresponding themes of ecosystem management.

Table 2.3. Goals and key themes of NC SWAP (NC Wildlife Resources Commission 2005) and themes of ecosystem management (Grumbine 1994) addressed by each. (Note that if themes are listed multiple times it is because they relate to multiple goals).

NC SWAP Goals	NC SWAP Key Theme	Ecosystem Management Theme Addressed
1. To improve understanding of the species diversity in NC and enhance our ability to make conservation or management decisions for all species.	- The need to gather additional information and fill knowledge gaps in order to advance our understanding of species and their habitats.	- Hierarchical Context - Data Collection
2. To conserve and enhance habitats and the communities they support.	- The need to impact the landscape in a large-scale fashion, and to consider all components of a sustainable community of plants and animals. - The need to work cooperatively with private landowners to influence the conservation of natural resources across the majority of the state.	- Ecological Integrity
3. To foster partnerships and cooperative efforts among natural resource agencies, organizations, academia, and private industry.	- The need to strengthen partnerships among natural resource agencies, organizations, academics, and individuals in order to meet shared goals and visions.	- Interagency Cooperation
4. To support educational efforts to improve understanding of wildlife resources among the general public and conservation stakeholders.	- The need to strengthen partnerships among natural resource agencies, organizations, academics, and individuals in order to meet shared goals and visions.	- Interagency Cooperation - Values
5. To support and improve existing regulations and programs aimed at conserving habitats and communities.	- The need to educate and engage local governments, planning commissions, and urban publics about the importance of fish and wildlife conservation as a key component of successful land use planning.	- Ecological Boundaries - Interagency Cooperation - Values

The NC SWAP focuses on enhancing the ability to make management decisions for priority wildlife species, habitat conservation, fostering interagency cooperation and local partnerships, education, and improving regulations and programs. For the purposes of this research, the NC SWAP’s stated focus on local implementation is key. We know that local commitment to planning varies across NC (Burby & May 1998). Initial conversations with

planners and resource managers indicate that some communities rarely use their plans while others enforce plans very strictly; and little is known about whether SWAP goals and objectives are being adopted into local plans. Beyond plans, there is very limited information on how the NC SWAP is being implemented locally through other formal or informal development practices. These are important areas to examine in order to have a meaningful impact on species conservation.

The Green Growth Toolbox (GGT) is used by WRC to reach out to local governments to educate and assist with implementing the SWAP. The data and recommendations provided in the GGT are consistent with the goals of the SWAP. The GGT is a technical assistance tool designed to help local governments accommodate development while conserving high quality wildlife habitat and natural resources (WRC 2015). The GGT consists of a handbook, packaged conservation data (GIS and non-GIS formats), training workshops, and technical assistance from WRC. The GGT handbook includes:

- An educational component about development pressure, needs of wildlife in the state, and how planning for green growth can help.
- Steps for creating a conservation plan and incorporating conservation planning into comprehensive plans and land use plans (including example plans).
- Steps for developing conservation related ordinances, zoning ordinances incorporating conservation, and incentive programs for developers (including example ordinances and incentives).
- Information on site level design and reviewing development plans.

Local government officials and planning staff who have participated in the GGT training workshop are eligible for individualized technical assistance regarding integrating the GIS data into their GIS database, creating habitat and natural resource maps for local planning, non-regulatory review of conservation plans, land use plans, ordinances, policies and development designs, incorporating habitat conservation into land use plans, policies and ordinances,

development location, review and design, and developing habitat management plans for parks and open space.

The GGT also has a Partner's for Green Growth Program which is a grant that provides funding to local governments for updating plans and policies to include wildlife conservation, planning for conservation subdivisions, planning for high density, mixed-use development that steers growth away from valuable habitat areas, planning for low impact development, projects that implement existing plans that addresses wildlife conservation, projects that establish a local funding source for land acquisition and easements, involving the public and businesses in conservation planning, and more. Recall that Michalak and Lerner (2008) found that for SWAPs to address land use comprehensively they must integrate conservation priorities into comprehensive or master land use plans, develop model land use ordinance language for zoning regulations, site level development and transferable development rights programs, participate in the permit review process, coordinate residential and commercial development with existing infrastructure capacity, and coordinate with land use decision makers within and across jurisdictional boundaries. The GGT addresses all five of these elements. The GGT is a valuable tool for local governments interested in implementing the SWAP because it gives them the data and assistance they need to incorporate the plan into local land use planning and development regulation and decision making.

3: Research Design & Methods

3.1 Introduction

Specifically, this research will focus on implementation of the North Carolina State Wildlife Action Plan (NC SWAP) in the three coastal counties of Beaufort, Carteret and Craven. The study area was chosen based on initial conversations with the Wildlife Resource Commission (WRC). All are subject to NC's Coastal Area Management Act (CAMA) since they are coastal counties, and thus are required to have land use plans. We know that local commitment to land use planning varies drastically across NC (Burby & May 1998). Initial conversations with local governments indicate that some may not use their land use plans while others enforce their plans very strictly and little is known about whether SWAP goals and objectives are being adopted locally.

Beyond land use plans, there is very limited information on how the NC SWAP is being implemented locally through other formal or informal development practices such as zoning, floodplain management regulations, etc. These are important areas to examine in order to have a meaningful impact on species conservation. Since the SWAPs are relatively new it is the right time to start assessing their effectiveness. This following presents my research questions, study site and methodology.

3.2 Research Questions

This work will focus on implementation of the NC SWAP in the three coastal counties of Beaufort, Carteret and Craven. My research questions include the following:

1. Are local governments aware of NC SWAP, and if so, what steps if any have the local governments taken toward implementing the plan?
2. Have employees from the NC Wildlife Resources Commission contacted or worked with local governments in the study area, and if so, in what capacity?
3. What are barriers to implementation of NC SWAP in the study area?

4. What are possible tools or strategies that can be used to overcome these barriers and increase implementation of NC SWAP in the study area?

3.3 Study Site

The three counties in the study site are Beaufort, Carteret and Craven. I chose these locations for evaluation of NC SWAP implementation because they are all CAMA counties, they are in a similar geographic region (adjacent to each other and all on the coastal plain), and because there are valuable areas for conservation in each county (based on initial conversations with WRC). Since the counties are subject to CAMA, they are required to have land use plans. Having land use plans makes these counties more likely to plan for conservation land than counties without a land use plan (Burby & May 1998). This study evaluates implementation of the NC SWAP in these three counties.

North Carolina can be divided into three general physiographic regions: the Coastal Plain, the Piedmont and the Mountains (see Figure 3.1). Beaufort, Carteret and Craven County are located in the Coastal Plain and have a low, flat topography (Riggs et al. 2011). The coastal plain can be divided into the inner and outer coastal plain. All three counties are in the outer Coastal Plain, which is lower in elevation than the inner Coastal Plain (Riggs et al. 2011).

North Carolina Physiographic Regions

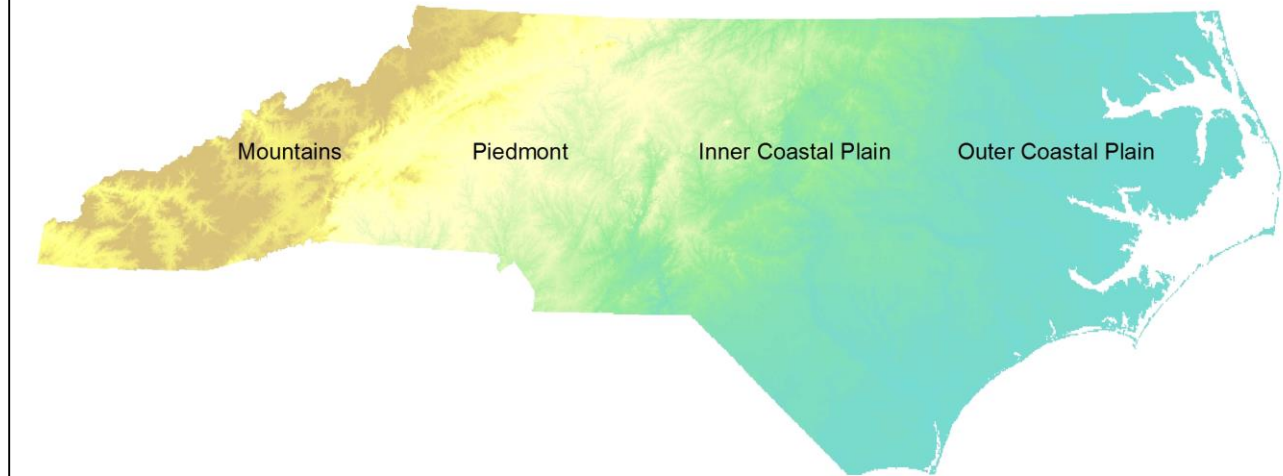


Figure 3.1: Major physiographic regions in North Carolina include the Mountains, Piedmont and Coastal Plain. Beaufort, Carteret and Craven County are in the Outer Coastal Plain.

The Neuse River basin, Tar-Pamlico River basin and Onslow Bay basin are the major watersheds in the study area. The Pamlico Sound is a large drowned river estuary. The Tar-Pamlico River widens and empties into the Pamlico Sound in Washington (Beaufort County) while the Neuse River widens and empties into the Pamlico Sound in New Bern. Beaufort County is almost entirely in the Tar-Pamlico basin and Craven County is almost entirely in the Neuse River basin. Northern Carteret County is divided between the Tar-Pamlico basin and the Neuse basin while southern Carteret County is in the Onslow Bay basin (see Figure 3.2).

Marshes and dunes are predominate vegetation types in the Outer Coastal Plain (Riggs et al. 2011). Other ecosystem types found in the coastal plain include long-leaf pine savanna, mixed pine and hardwood forest, pine flatwoods, pine plantation, pine scrubland, floodplain forests,

pocosins, sea level-controlled fringing forests, maritime forests, wetlands, coastal plain streams, coastal plain lakes, and human development including agriculture, industry, and urbanization (Luczkovich 2001). The general geology of the coastal plain is (0' – 200') sedimentary rock layers (limestone) underlying deep Ultisol soils (Luczkovich 2001).

The NC Coastal Plain has some of the richest biodiversity found anywhere in the world (Nature Conservancy 2014). NC currently has 52 federally endangered and threatened species because of rapid development (FWS 2014). Endangered species, threatened species, and species of concern in the three county study area include American alligators, Atlantic Sturgeon, Shortnose Sturgeon, American eels, bald eagles, black-throated green warblers, Carolina gopher frogs, Eastern Henslow's sparrows, Kemp's Ridley sea turtles, Green sea turtles, Hawksbill sea turtles, Kemp's Ridley sea turtles, Leatherback sea turtles, Loggerhead sea turtles, Northern diamondback terrapin, piping plovers, Rafinesque's big-eared bats, red knots, red wolves, red-cockaded woodpeckers, west Indian manatees, black rails, Buxton Woods white-footed mice, and roseate terns, which totals 24 threatened species, endangered species, or species of concern in the three county study area (FWS 2014). More common species of fauna include deer, raccoons, rabbits, foxes, ducks, bobcats, black bears, many bird species, beavers, squirrels, opossums, otters, skunks, minks, turkeys, salamanders, copperhead snakes, rattlesnakes, coral snakes, and water moccasins. (Hause 2011, WRC 2005).

The 2010 population of Beaufort County was 47,759 people (US Census 2010). With a land area of 827 square miles, there is an average population density of 58 people per square mile in Beaufort County. Washington is the county seat and only major city (defined as an incorporated area with greater than 2,500 people) in Beaufort County. The 2010 population of

Washington was 9,744 people (US Census 2010). With a land area of 8.2 square miles, there is an average population density of 1,190 people per square mile in Washington.

The 2010 population of Carteret County was 66,469 people (US Census 2010). With a land area of 506 square miles, there is an average population density of 131 people per square mile in Carteret County. Major cities in Carteret County include Beaufort, Emerald Isle and Morehead City. Beaufort is the county seat and had a 2010 population of 4,039 people (US Census 2010). With a land area of 4.6 square miles, the average population density of Beaufort is 874 people per square mile. Emerald Isle had a 2010 population of 3,655 people (US Census 2010). With a land area of 5 square miles, the average population density of Emerald Isle is 732 people per square mile. Morehead City – the county’s largest city by size and population – had a 2010 population of 8,661 people (US Census 2010). With a land area of 6.8 square miles, the average population density of Morehead City is 1,264 people per square mile.

The 2010 population of Craven County was 103,505 people (US Census 2010). With a land area of 709 square miles, there is an average population density of 146 people per square mile in Craven County. Major cities in Craven County include Havelock, New Bern and River Bend. Havelock had a 2010 population of 20,735 people (US Census 2010). With a land area of 16.8 square miles, the average population density of Havelock is 1,231 people per square mile. New Bern is the county seat and the county’s largest city by size and population (but not by population density). The 2010 population of New Bern was 29,524 people (US Census 2010). With a land area of 28.2 square miles, the average population density of New Bern is 1,046 people per square mile. River Bend had a 2010 population of 3,119 people (US Census 2010). With a land area of 2.7 square miles, the average population density of River Bend is 1,147 people.

The average population density of 58 people per square mile in Beaufort County, 131 people per square mile in Carteret County and 146 people per square mile in Craven County (US Census 2010) are all below the state average of 196 people per square mile, with Beaufort County being significantly below the state average. Figure 3.2 shows a base map of the study site, including watersheds and major cities.

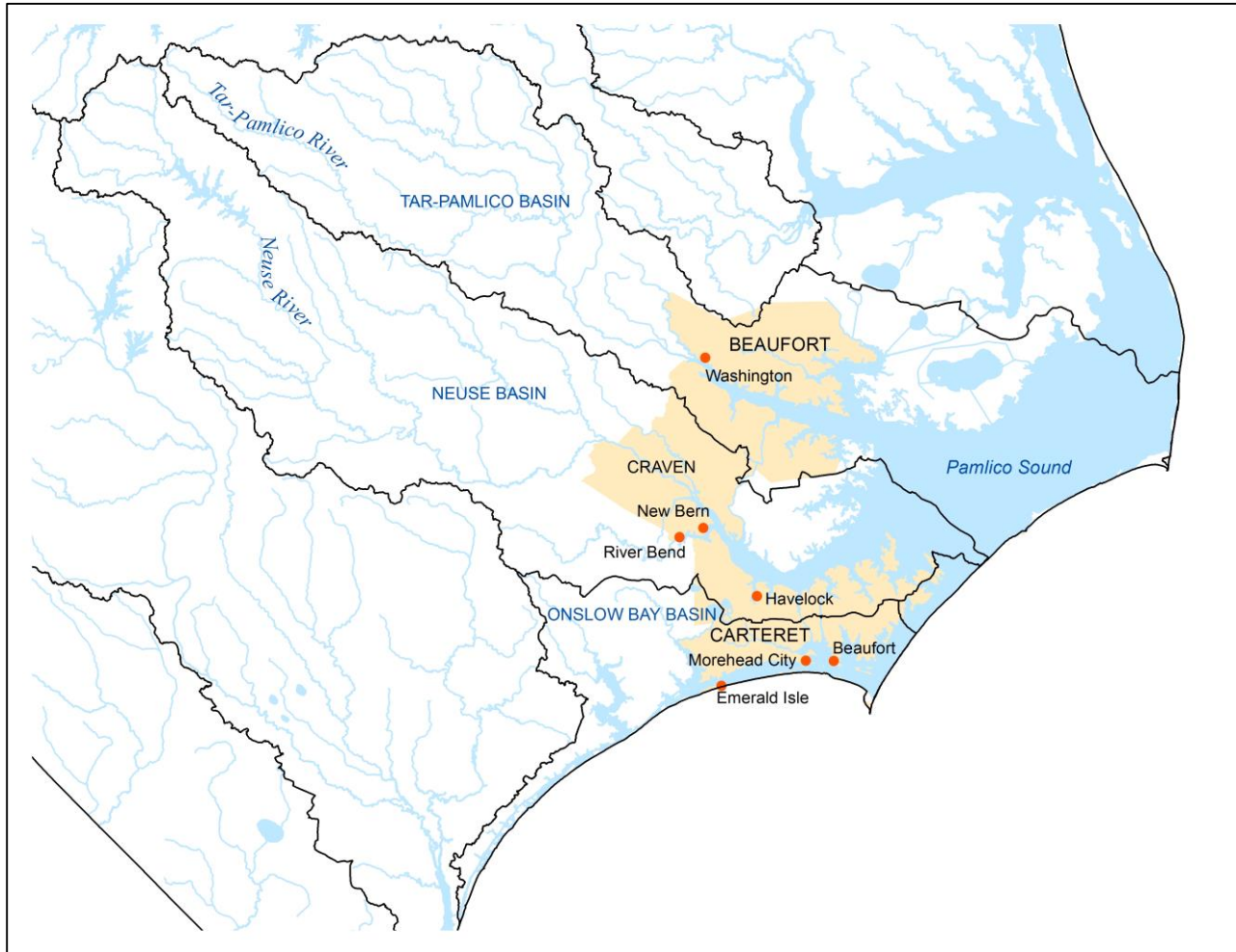


Figure 3.2. Base map, including Beaufort, Carteret and Craven County and their major cities. Also shown are the watersheds in which each county is located.

Demographic information for each county and the state is summarized in Table 3.1 (US Census 2013a) and the unemployment rate and employment by industry for each county and the state is summarized in Table 3.2 (US Census 2013b).

Table 3.1: Demographic information for NC and Beaufort, Carteret and Craven County.

Category	Description	Beaufort County	Carteret County	Craven County	NC
Age	Persons under 18 years	21.2%	18.6%	22.7%	23.2%
	Persons 65 years and up	20.9%	21%	16.6%	14.3%
Education	High school graduate or higher, persons 25 years and up	81.7%	88.3%	87.2%	84.9%
	Bachelor's degree or higher, persons 25 years and up	18.3%	23.9%	21%	27.3%
Growth	Population percent change	-0.7%	+3.1%	+0.9%	+3.3%
Income	Per capita income	\$21,636	\$27,496	\$24,260	\$25,284
	Median household income	\$40,429	\$46,534	\$47,141	\$46,334
	Persons below poverty level	21%	14.4%	16.6%	17.5%
Race	White alone	71.8%	89.8%	72.4%	71.7%
	Black or African American alone	25.4%	6.3%	21.8%	22%
	Other race alone	1.5%	1.9%	3.2%	4.3%
	Two or more races	1.3%	2%	2.5%	2%
	Hispanic or Latino	7.6%	4%	6.9%	8.9%

Table 3.2: Unemployment rate and employment by industry for NC and Beaufort, Carteret and Craven County.

Industry	Beaufort County	Carteret County	Craven County	NC
Agriculture, forestry, fishing and hunting, and mining	7.3%	1.8%	2.2%	1.4%
Construction	7.4%	9.3%	6.2%	6.8%
Manufacturing	12.6%	6.2%	10.5%	12.6%
Wholesale trade	2%	1.7%	1.6%	2.8%
Retail trade	10%	13%	11.5%	11.7%
Transportation and warehousing, and utilities	3.2%	4.6%	4.5%	4.3%
Information	0.9%	1.8%	1.2%	1.8%
Finance and insurance, and real estate and rental and leasing	4.6%	6.4%	3.6%	6.3%
Professional, scientific, and management, and administrative and waste management services	5.5%	9.3%	7.2%	9.9%
Educational services, and health care and social assistance	26.9%	20.8%	24.2%	23.6%
Arts, entertainment, and recreation, and accommodation and food services	8.8%	11.6%	10.6%	9.2%
Other services, except public administration	6%	4.8%	5%	5%
Public administration	4.6%	8.5%	11.9%	4.5%
Percent unemployed	12.3%	10.2%	13.1%	11.1%

The results from the Census data show that Carteret and Craven County are better off economically than Beaufort County. This factor alone may indicate that Carteret and Craven County are more likely to implement ecosystem management than Beaufort County. Burby and May (1998) showed that areas struggling economically generally have low commitment for tackling environmental issues. There is more commitment where there is more capacity to implement the objectives of ecosystem management.

Burby and May (1998) also found that there is more commitment by local governments when citizens demand attention towards environmental issues. With a higher percentage of its population having Bachelor's degrees or higher, this pressure from citizens may be likely to occur in Carteret County. A well-educated constituency is more likely to be concerned about environmental issues.

In addition, Burby and May (1998) found that there is more commitment from local governments when they experience an environmental issue related to the goal at hand. In this study, an issue would be high levels of development pressure threatening valuable conservation land. Carteret County has the highest level of population growth, although it is still slightly below the state average. In this study area, Carteret County may be more likely to be concerned about development pressure and therefore more likely to be committed to ecosystem management. Beaufort County is actually losing population and Craven County had less than 1% growth, indicating that development pressure is less of an issue in these counties. However, that situation could change, and proactive planning could promote coordinated conservation and prevent habitat loss associated with rapid coastal development.

Also, Beaufort County has a much higher percentage of its labor force employed in agriculture, forestry, fishing, hunting and mining than the other counties, and the state as a whole. With the possible exception of mining, all of these occupations would have some interest in environmental protection, because they depend on the environment for their work to be successful.

However, there are less people working in public administration in Beaufort County than Carteret and Craven, so there are less people available to plan for ecosystem management. Craven County has the highest percentage of its population in public administration positions,

indicating that they have the most staff capacity to implement ecosystem management. Carteret County is also well above the state average in the percentage of its population employed in public administration. Burby and May (1998) found that the quality of planning, including involving citizens in the planning process, directly relates to the level of commitment by local governments. While having more people in public administration doesn't necessarily mean ecosystem management is being planned for, it means there may be the staff capacity to do so.

3.4 Research Design

This study uses a qualitative methods approach to analyze implementation of the NC SWAP in the study area. Since the study focuses on three counties whose results will be used to understand a larger phenomenon it is considered a case study. Yin (2009) says that a case study is appropriate when the control of behavioral events is not required and there is a focus on contemporary events. In addition, Yin (2009) states that a case study is appropriate when asking how and why questions. In this study I am trying to understand how the NC SWAP is being implemented, why the plan is being implemented the way it is, and how implementation of the plan could be improved. I am trying to understand the contemporary event of wildlife habitat conservation decision-making, and have no need to control behavioral events (as in an experiment). For these reasons, a case study is justified.

In order to answer my research questions, I interviewed planners from each county and municipality, employees from WRC, and employees of state agencies and non-profits providing support towards habitat conservation and implementation of the SWAP. The following provides detailed information on who was interviewed and justification for including each in the study:

- Local government planners are in charge of local land use decision-making, which is critical for ecosystem management, as previously discussed. While planners are not required to work with any of the following groups, each is available to work with local

governments, and interagency cooperation is an indication that local governments are planning for natural resource conservation.

- The planners interviewed work for Atlantic Beach, Beaufort County, the Town of Beaufort, Bridgeton, Carteret County, Craven County, the Eastern Carolina Council of Governments, Emerald Isle, Havelock, the Mid-East Commission, Morehead City, New Bern, Newport, Pine Knoll Shores, Riverbend and Washington. The Mid-East Commission (serves Beaufort County and municipalities) and the Eastern Carolina Council of Governments (serves Carteret and Craven County) are private planning consulting firms, but they provide planning services to these counties and municipalities, and in most rural areas they are the only one's doing planning because the local government does not have an in house planner. Therefore, they represent local governments in this study just like the planners that actually work for local governments.
- NC Wildlife Resources Commission is tasked with creating and implementing the SWAP.
- Local Soil and Water Districts were created to coordinate assistance from all available sources – public and private, local state and federal – in an effort to develop locally-driven solutions to natural resource concerns (NACD 2012).
- The NC Cooperative Extension has an office for each county as well, and is an educational partnership of colleges and universities helping people put research-based knowledge to work for economic prosperity, environmental stewardship and an improved quality of life (NSCU 2015).
- Local land trusts are non-profit organizations that protect natural areas of significant ecological, scenic, recreational, agricultural, cultural, or historic value. The NC Coastal Land Trust covers the twenty coastal counties of NC (CTNC 2015).
- NC Sea Grant helps communities and local governments understand and incorporate natural resource protection measures into their development strategies, public services and operations, and management actions (SGNC 2015).
- APNEP's mission is to identify, protect and restore the significant resources of the Albemarle-Pamlico estuarine system using an ecosystem-based management approach (APNEP 2015). Initial conversations with APNEP indicate that there is a strong focus on the partnership aspect. APNEP considers all the current efforts and plans by other groups (including NC SWAP) and works to support these plans and fill in gaps where needed.
- Other supporting agencies were interviewed if someone from the first selection of interviewees reported that they worked with the other supporting agency on habitat conservation.

The interviews contained a mix of open and closed ended questions, with questions related to interviewees job positions, local government ecosystem management and development plans, awareness of the NC SWAP, implementation of the NC SWAP, local government level of support for ecosystem management, type of support provided by state agencies and non-profits,

interagency cooperation, progress toward meeting NC SWAP goals, barriers to implementation of ecosystem management and possible tools or strategies for overcoming barriers.

In particular, in order to answer research question one (*Are local governments aware of NC SWAP, and if so, what steps if any have the local governments taken toward implementing the plan?*), local governments were asked questions about whether they had ever heard of the SWAP or Green Growth Toolbox and what if any actions they had taken towards its implementation (see Appendix C for detailed interview questions).

In order to answer research question two (*Have employees from the NC Wildlife Resources Commission contacted or worked with local governments in the study areas, and if so, in what capacity?*), WRC employees were asked questions about their work with local government in the study area and capacity (see Appendix D for detailed interview questions). Similar questions were also asked of local planners (see Appendix C).

In order to answer research question three (*What are barriers to implementation of NC SWAP in the study area?*), all interviewees were asked a series of questions on the largest barriers to implementation of the NC SWAP and to habitat conservation in general. These questions varied slightly based on the affiliation of the interviewee (e.g. local planner, WRC employee, non-profit advocate) (see Appendices C, D & E for detailed interview questions). This information was then combined with secondary data, relevant literature, and personal observations to make recommendations on overcoming barriers to SWAP implementation and habitat conservation.

The interviews conducted were qualitative in nature. Phillips and Johns (2012: 145) note the following:

“The term qualitative interviewing refers to in-depth, semi-structured, or loosely structured forms of interviewing... Put simply, interviewing is the process of finding, contacting, and meeting with

research participants with the purpose of asking questions about their experiences and knowledge, and then listening - in open and non-judgmental ways – to what they say.”

Interviews were chosen over other formats because of the ability to gain a greater understanding of the process through in depth conversation. This format was ideal for this study, for the reasons outlined by Limb and Dwyer (2001: 44):

“In-depth interviews are used to get participants to provide an account of their experiences, of how they view their own world and the meanings they ascribe to it... The advantage of interviewing is that it can generate a lot of information very quickly; it enables the researcher to cover a wide variety of topics, to clarify issues raised by the participant and to follow up unanticipated themes that arise.”

Specifically, the interviews were semi-structured in nature, meaning there was a list of predetermined questions, but they were asked in a conversational manner giving the interviewee the opportunity to expand on issues they feel are important (Clifford et al. 2010). In semi-structured interviewing the questions are content based (relevant to the research questions) and organized, but also flexible (Hay 2000). The questions that I asked were ordered by category, but if a conversation was started and a question was answered out of order that was acceptable. If an interviewee brought up information that did not answer one of the questions, but it was relevant to the research questions that was also acceptable. However, if the interviewee brought up information not at all related to the research questions, I would guide them back on topic. This distinguishes the interview as semi-structured as opposed to unstructured.

A total of fifty-two people were interviewed including 18 local government planners, five employees of WRC and 29 employees of supporting state government and non-profit agencies. The planners were identified either by their local government websites or by calling the appropriate department and asking for their planner. One WRC employee was referred to me by a colleague and I met another WRC employee at a conference. The initially contacted supporting agencies were identified based on initial conversations with WRC. The interviews were

purposive, key informant interviews, which means they were targeted at people who have the information I need. “Key informants are selected for their knowledge and role in a setting and their willingness and ability to serve as translators, teachers, mentors and/or commentators for the researcher” (DiCicco-Bloom & Crabtree 2006: 315). Therefore, representative sampling was not an issue.

The sampling method was non-probability sampling, meaning the researcher draws samples from a larger population without requiring random selection (Tansey 2007). This is where I selected the initial key informants. Non-probability sampling requires subjective judgment since the researcher decides which interviewees to include (Henry 1990). Because of its subjectivity, non-probability sampling limits the potential to generalize from the findings to the whole population. However, when generalizations are not the goal, and the researcher is trying to obtain information about highly specific events and processes, the non-probability method of sampling is appropriate (Tansey 2007). In addition, Henry (1990) states that non-probability sampling is appropriate when the researcher is trying to determine whether a problem exists or not. In this study, I am trying to understand the processes and events behind implementation of the NC SWAP in the study area and also trying to determine whether barriers to implementation exist. For these reasons, the non-probability sampling method is justified. I also used the snowball method, which means that at the end of each interview I asked the interviewee if they knew anyone else that would be beneficial for me to interview on the subject (in this case those involved in habitat conservation).

The interviews were conducted in person and over the phone. In both types of interviews, a recording device was used to record the interviews (with the interviewees’ permission), and the recorded interviews were transcribed afterwards. There were three separate sets of questions, one

for planners (represent local governments), one for WRC and one for supporting agencies. To protect the interviewee, recordings will be destroyed within six months of completing the research and all answers were saved in a coded format so that the participant cannot be identified by name.

3.5 Data Analysis

Using the 52 interview transcripts as the data source, the data were analyzed using qualitative interpretive techniques. In particular, the responses to each question or grouping of questions were copied and pasted into one document for coding purposes. The data was also summarized by keyword. Based on common patterns identified from grouping answers by question, each transcript was scanned for keywords, such as education, funding or staff. Any responses that included the keyword were grouped on a sheet, no matter which question the answer came from. In each of the organization methods, local governments, WRC employees and supporting agencies were pasted in three different colors of text, so that in addition to identifying overall patterns, patterns within each of these three groups was also identified.

After organizing the data into these usable formats, coding was used to identify patterns in responses and obtain answers to the research questions. “A code in qualitative interviewing is most often a word or short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data” (Saldana 2009: 3). “Coding is the process of examining the raw qualitative data in the form of words, phrases, sentences or paragraphs and assigning codes or labels in order to interpret the data” (Miles & Huberman 1984: 2).

Coding provides a way to categorize the data so that it becomes organized and patterns may be identified. “Coding is... a method that enables you to organize and group similarly coded

data into categories or ‘families’ because they share some characteristic – the beginning of a pattern” (Saldana 2009: 8). During the first round of coding, broad categories were identified. For example, one interviewee may have stated that lack of funding is a barrier to implementation, while another may have said that the need for more staff is a barrier. These were both grouped under the code “capacity”. As another example, one interviewee may have said that the need to educate the general public is a barrier to implementation, while another said that the need to educate elected officials is a barrier. These would both be grouped under the code “education”.

In the second cycle of coding, these broad categories identified were narrowed down into subcategories. “In Second Cycle coding processes, the portions coded can be the exact same units, longer passages of text, and even a reconfiguration of the codes themselves developed thus far” (Saldana, 2009: 3). Using the two examples above, the “capacity” code would be narrowed down into “funding” and “staff” while the “education” code would be narrowed down into “public education” and “elected official education”.

This method of grouping codes into group or categories is referred to as axial coding (Strauss & Corbin 1990). Two common types of axial coding are non-hierarchical and hierarchical. In non-hierarchical coding, there is one set of categories and each category is equal to the others. Non-hierarchical coding is also referred to as flat coding which is comparable to sorting index cards (Miller & Dingwall 1997). In the hierarchical coding method, codes or labels are put in groups of their own, making them sub-codes. A hierarchical arrangement of codes is like a tree, a branching arrangement of sub-codes. In this tree the lowest branches contain the minimum information, with succeeding branches increasing quality and context for interpretation. This study uses a hierarchical axial coding methodology.

Codes from both coding cycles were stored in a document called a “code book”.

According to recommendations from MacQueen et al. (2008: 121) each code book entry contains “the code, a brief definition, a full definition, guidelines for when to use the code, guidelines for when not to use the code, and examples.” The data was coded manually, meaning I went through the responses and assigned codes to them myself, without assistance from a computer software program. Many researchers provide support for this manual method. Saldana (2009: 22) states, “There is something about manipulating qualitative data on paper and writing codes in pencil that give you more control over and ownership over the work.” Bazeley (2007: 92) says, “I recommend that for first-time or small scale studies, code on hard-copy printouts first, not via a computer monitor.” Hahn (2008: 1) states that “qualitative data can be overwhelming unless they are carefully organized and distilled. Only with intelligent analysis can scientific conclusions be drawn from the volumes of data that are usually collected during the course of a qualitative research project.”

After the coding process was finished, the data was used to create tables and charts using Microsoft Excel. These visualizations are part of the data analysis process and help to identify patterns in the responses. Hahn (2008: 1) gives support to this methodology, providing detailed instruction on how qualitative data analysis can be completed using Microsoft Office products such as Word and Excel. La Pelle (2004: 85-86) also provides support to this methodology, stating “For many qualitative research projects... the native functions of full-featured word processing programs can be used, with a little creativity, to perform many of the functions provided by dedicated qualitative data analysis (QDA) software... In fact, I have found that it is often preferable to use Microsoft Word to perform many basic QDA functions.”

Using the information gathered from the data analysis, recommendations were made for improving implementation of the NC SWAP in the study area. One method used to make these recommendations was to look at what the interviewees said they needed. In one of the questions, interviewees were asked about tools or strategies that would help them improve local implementation of habitat conservation, or improve implementation of the SWAP specifically. Some of the answers to these questions actually fell into the barrier category (i.e. “we just need more funding”), but others were actual tools or strategies that would be useful to the interviewee (i.e. “I would like to have a guide that summarizes all the resources available to help my department with conservation planning”). The tools and strategies recommended by the interviewees are valuable suggestions, because they work in the field and know what they need to get the job done in many cases.

Another method used to make recommendations was to look back at the barriers identified by the interviewees and identify possible strategies and tools for overcoming the top barriers identified by the group as a whole, as well as the top barriers identified by each of the sub-groups (local governments, WRC, supporting agencies, etc.). The recommendations for overcoming these top barriers were made based on analysis of the interview data and on information gathered during the literature review process.

These results could be used to help improve implementation of NC SWAP in the study site, and also can be extrapolated to help overcome similar barriers in other ecosystem management projects. This work can be used by county and municipal planners to improve local conservation planning, by employees in WRC to overcome barriers to implementation of the SWAP and by supporting agencies to improve support of habitat conservation in the study area. The study could be distributed to both professional planners, scientists and others in the

conservation field, as well as in academia to journals which bridge the gap between science, planning, and policy.

4 Results and Discussion

4.1 Introduction

This chapter shifts from theory to practice, allowing me to address all four of my research questions. Fifty-two interviews were conducted, including local planners (representatives of local governments), NC Wildlife Resources Commission (WRC) and supporting agencies (state government agencies and non-profit organizations providing support toward implementation of the SWAP and habitat conservation in general). The data gathered from the interview process was coded and analyzed according to the methodology outlined in the previous chapter. In the following, the data is presented first overall, and then broken down into more detail for subgroups (i.e. local governments, supporting agencies, and WRC) or subcategories (i.e. funding may be a subcategory of capacity). To support the text, tables and graphs are included in order to visualize the data. This chapter also examines the meaning behind the results and compares those meanings to the literature review in Chapter 2. This synthesis and analysis allows me to answer my research questions and make recommendations. In the following, the results related to each research question are discussed in individual sections.

4.2 Research Question One Results and Discussion

This section addresses the following research question: *Are local governments aware of the SWAP, and if so, what steps if any have the local governments taken toward implementing the plan?*

All local governments and supporting agencies were asked whether they had heard of the SWAP or the Green Growth Toolbox (GGT). Overall, 61% (11 out of 18) of the local planners (representatives of local governments) were aware of the SWAP or the GGT and 76% (22 out of 29) of the employees of supporting agencies were aware of the SWAP or GGT (Figure 4.1).

When viewed on a by county basis, only one out of three local governments in Beaufort County had heard of the SWAP or GGT, while 60 – 80%+ of the local governments in Carteret and Craven County had heard of the SWAP or GGT (Figure 4.2).

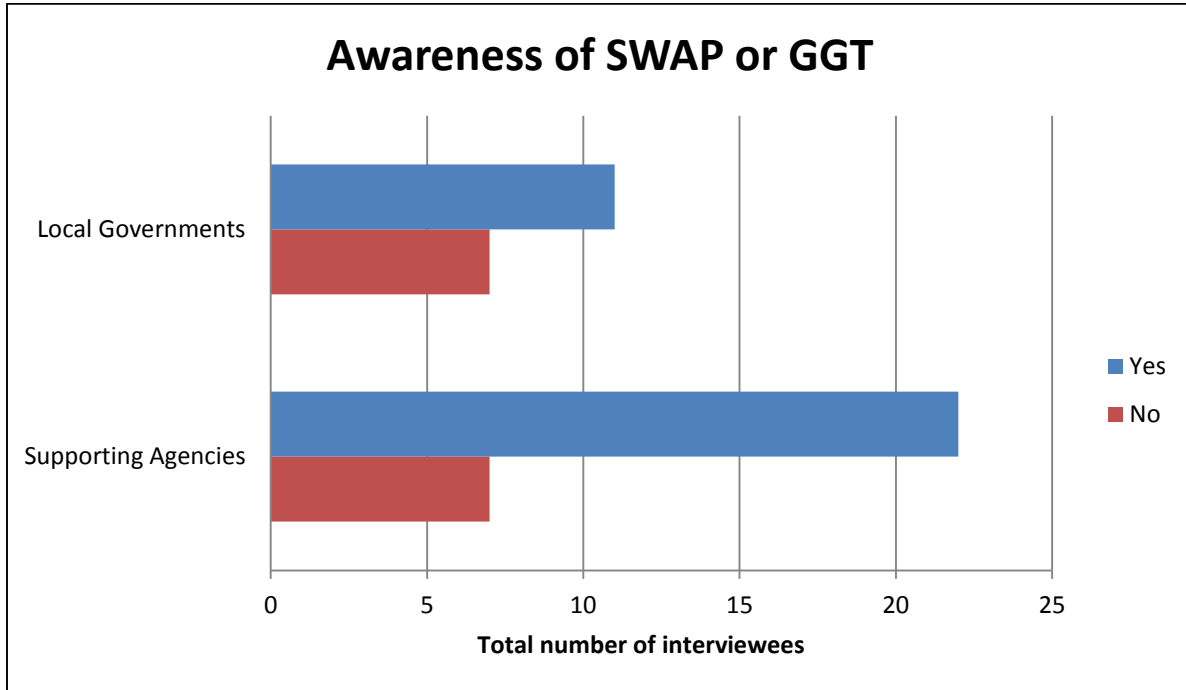


Figure 4.1: Eleven out of 18 local governments were aware of the SWAP or GGT, while 22 out of 29 of the employees of supporting agencies were aware of the SWAP or GGT.

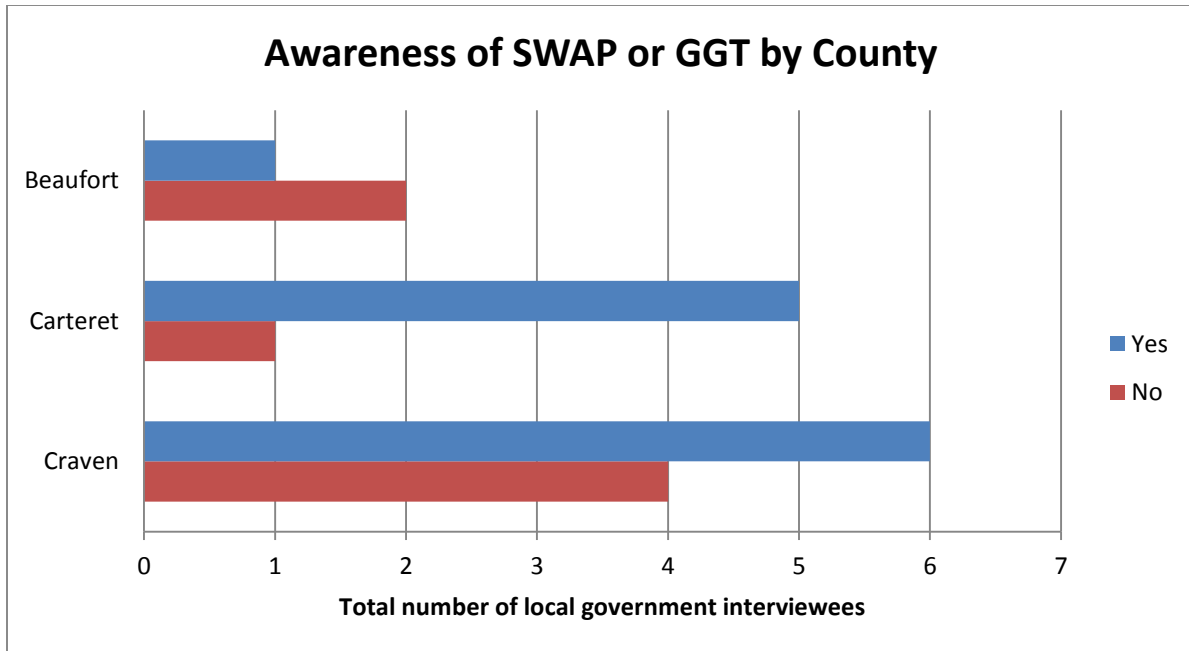


Figure 4.2: One out of 3 of the local governments in Beaufort County were aware of the SWAP or GGT, 6 out of 10 of the local governments in Carteret County were aware of the SWAP or GGT and 5 out of 6 of the local governments in Craven County were aware of the SWAP or GGT.

These results are important because interagency cooperation is one of the ten themes of ecosystem management identified by Grumbine (1994). Interagency cooperation requires cooperation between federal, state, and local management agencies as well as private parties. Interagency cooperation is also needed to accomplish goals three (forming partnerships), four (public education) and five (supporting and improving regulations) of the NC SWAP.

The main actors in implementation of the SWAPs are the state wildlife agencies who created the plans and implement them at the state level and the local governments who implement them through local land use and development decision making. However, there are other agencies that provide support toward implementation, including federal and state government agencies and non-profit organizations having an interest in conservation. Interagency cooperation between all of these groups is important because ecosystem management is complex and each level of government along with private parties and non-profits

have a unique role to play in implementation. Before local governments can cooperate in implementing a plan, they need to be aware of its existence.

The results for Carteret and Craven County are good, most local governments were aware of the SWAP or GGT. In Beaufort County most local governments were not aware of the SWAP or GGT. A question that arises is whether there has been less outreach to Beaufort County, whether there is less support for conservation in Beaufort County than Carteret and Craven, or both.

However, of the total number of local governments who were aware of the SWAP or GGT, only 27% (3 out of 11) had taken steps toward implementation (Figure 4.3). (Again, local implementation involves implementing the plan through land use and development decision making.) In comparison, 55% (12 out of 22) of the employees of supporting agencies who were aware of the SWAP or GGT had taken steps toward implementation (steps taken by supporting agencies may support state or local implementation) (Figure 4.3).

When we look at the results on a by county basis, no implementation actions had been taken in Beaufort County, and only one out of five local governments in Craven County who were aware of the SWAP or GGT had taken action towards implementation. The numbers were better in Carteret County, where 50% of local governments who had heard of the SWAP or GGT had taken action towards implementation (Figure 4.4).

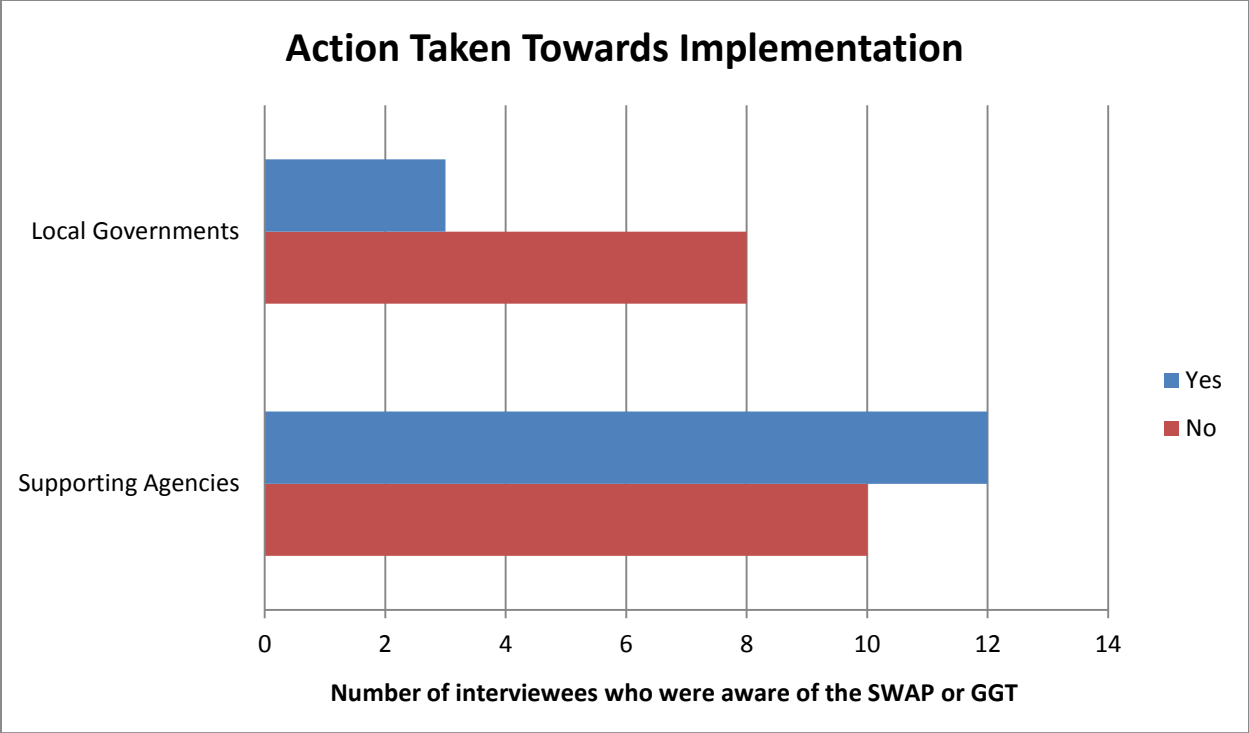


Figure 4.3: Three out of 11 of the local governments who were aware of the SWAP or GGT have taken action towards implementation, while 12 out of 22 of the employees of supporting agencies who were aware of the SWAP or GGT have taken action towards implementation.

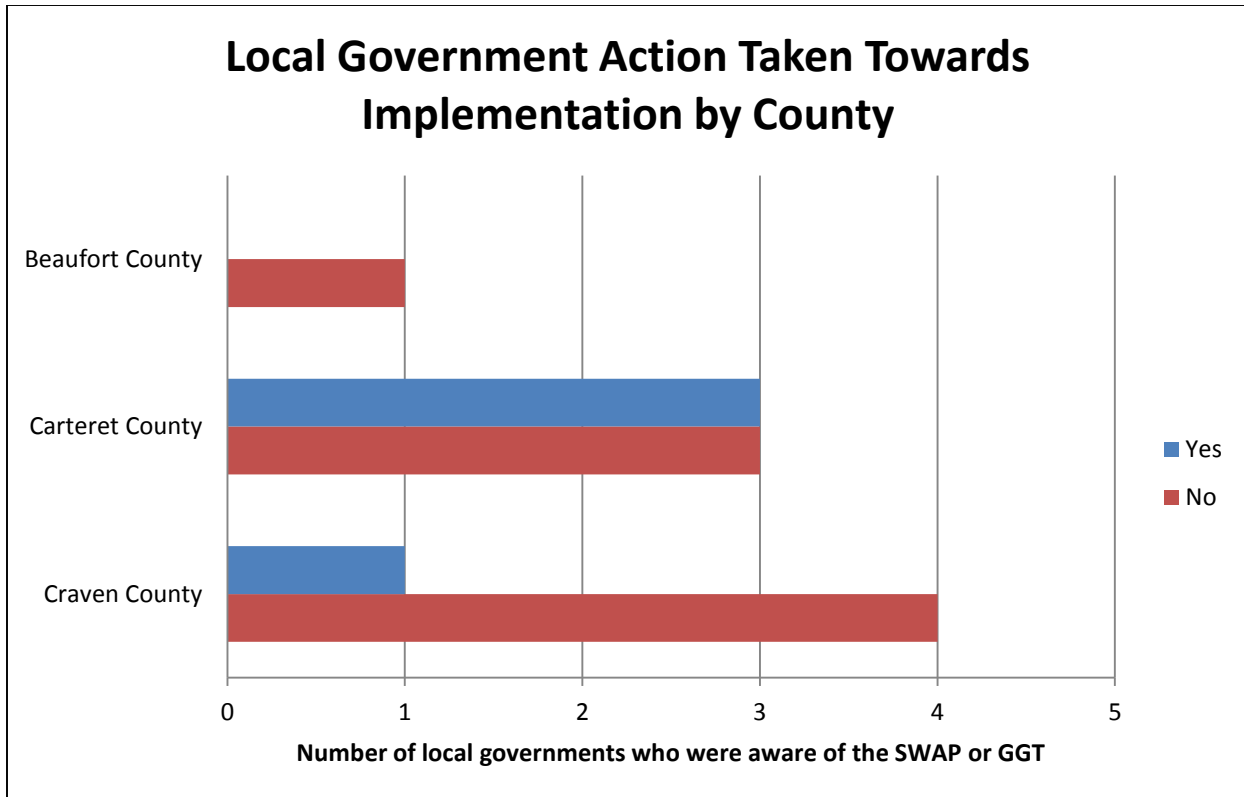


Figure 4.4: The one local government in Beaufort County who had heard of the SWAP or GGT had not taken action towards implementation, 3 out of 6 of the local governments in Carteret County who had heard of the SWAP or GGT had taken action towards implementation and 1 out of 5 of the local governments in Craven County who had heard of the SWAP or GGT had taken action towards implementation.

The local governments who reported taking action toward implementation were Morehead City (Carteret County), the Town of Beaufort (Carteret County) and the Eastern Carolina Council of Governments (COG) (serve Carteret and Craven County). According to these results, implementation has been addressed by a planning consulting company that serves Carteret and Craven County and two municipalities in Carteret County. Implementation has not been addressed at the county level in any county, and it has not been addressed at the municipal level in either Beaufort or Craven County.

These results indicate that the SWAP may not have the level of local implementation that it needs to be successful. Local governments need to be implementing the SWAP because in order for ecosystem management to reduce the impacts of development, conservation and

planning must be integrated (Lerner 2006). Ecosystem management focuses on many scales and requires participation from all levels of government, but implementation must occur at the local level with local land use planning (Brody 2003a). The most serious threat to biodiversity is habitat destruction (Beatley 2000, Brooks et al. 2006) and habitat is destroyed piece by piece with local development decisions that have a cumulative effect. This is why local implementation is so important. Without implementation by local governments, the SWAP or any other ecosystem management plan cannot be successful.

The question arises of why only 27% of local governments who had heard of the SWAP or GGT had taken action toward implementation. In most cases I found that the planners who had heard of the SWAP or GGT but had not taken action were supportive of the SWAP or GGT personally, but they did not have the support they needed from their governing boards to go forward with implementing the plan. As one planner put it:

“All of these policies, regardless of what planning departments might recommend, what gets approved is what the county commissioners decide on... [This] county has historically gone to great lengths to protect the individual property owner versus something they may see as good for society or good for the environment... We work at the pleasure of the board.”

Another planner said:

“It is always going to be a balancing act between conservation and development because you are going to have some commissioners who are pro-business and want to allow them to develop and some are on the extreme side. And you have some on the other extreme side who don't want to see the development; they want to keep things natural... So anytime you deal with politics and commissioners and those types of governmental bodies, you are never going to get a one sided answer. You are always going to have to consider several opinions.”

Specifically, the Town of Beaufort (Carteret County) uses the GIS data from the GGT on a consistent basis for development planning. The Eastern Carolina Council of Government (COG) (serves Carteret and Craven County) uses the GIS data as needed for park planning and transportation planning projects. Morehead City (Carteret County) uses the GGT when

developing local ordinances. If the COG is removed from the results, Carteret County has been the only county where the SWAP or GGT has been implemented and this has occurred at the municipal level (Morehead City and Town of Beaufort), not the county level.

The eight local governments who had heard of the GGT, but do not use it were asked why they are not using the tool. Three had only heard of the tool recently or in vague terms, two did not have time because of capacity issues (need for more staff), two were in communities that are more focused on economic growth, and one didn't have a need for the tool (due to low levels of growth).

In the words of one local planner who cited the need for more staff, "All of us back here are doing multiple jobs and it's really just not a priority." Another planner cited a focus on economic growth as the reason for not using the tool stating, "Back again to the balance between development and habitat protection. The county and municipalities are inviting growth to boost the economy."

The planner who didn't have a need for the tool had the following comment, "We are certainly not opposed to it, but with the economy being what it is and development being what it is we are just not seeing that. Largely what we see here in the county is individual single-family applications. We are not seeing any big scale residential push. So we have just not had those opportunities."

The seven local governments who had not heard of the GGT were asked whether they think their governing board would support the use of the tool. Three said yes they believe their governing board would support use of the GGT, one said no their governing board would not support the use of the GGT, and three said it is a possibility, but they were not sure.

One planner who gave a yes answer stated, “I think they would. I really do. I went in there and looked at it and saw how it may help some of our development plans, and I think the municipality would support the use of this.”

One planner who gave a maybe answer showed interest in the tool, but wasn’t sure about the political will to implement it stating, “I think that the county would be interested in learning more. I can tell you as a planner I am very interested in learning more about those and certainly downloading the GIS layers immediately, that would be something I would like to have access to. And I think if I figure out the right way to approach this with the commissioners, I think it would certainly be worthwhile to make them aware of these things and get some potential language for down the road.”

The planner who gave a no answer had the following comment, “Because we do so many projects and we get it trickled down, the conservation measures and stuff are already being dictated to us. It’s not something I think we would be really too keen on or really proactively want to do to be honest with you.”

In addition to what actions they have taken specifically towards implementation of the SWAP or GGT, local governments were asked about their land use plans, and other plans, policies and programs that guide decision making on habitat related issues. Supporting agencies were also asked what type of support they provide towards local implementation of habitat conservation. These questions are important because certain steps that are taken locally to conserve habitat can help implement the SWAP, even if the actors are not aware of the plan. In order for ecosystem management to reduce the impacts of development, conservation and local planning and development decision making must be integrated (Lerner 2006). These questions about local plans and policies allowed me to determine whether the goals of ecosystem

management in general and the SWAP specifically are addressed within local land use and development planning.

Local governments were asked if conserved land is included in their land use plans. Fifteen out of 17 (88%) said yes, conserved land is included in their land use plan. These local governments were asked what type of land is conserved. Eight conserve some wetland/marsh areas, seven conserve public parks/open spaces, four have federally owned conservation land listed, two conserve forest land, two conserve Natural Heritage Areas designated by the state, one conserves bluff areas and one conserves farmland (Figure 4.5).

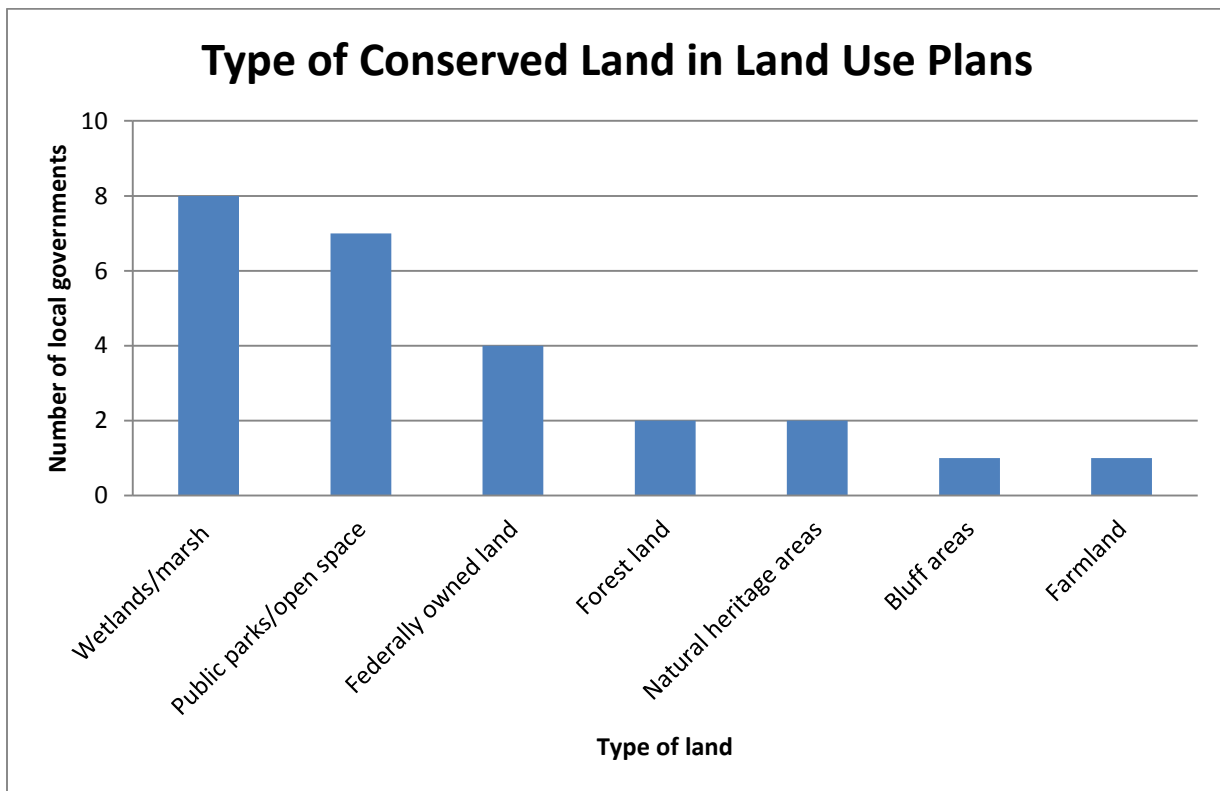


Figure 4.5: Type of land conserved in land use plans as reported by local governments.

Local governments were asked whether they had a habitat protection plan and all said no, they did not have a specific plan for habitat protection or conservation. The local governments were asked whether there are any other plans, policies or programs in effect to protect valuable resource lands and/or wildlife habitat. Six out of 17 (35%) have a local policy or ordinance that

exceeds state requirements and is mandated for all development (i.e. not optional incentives). In total, ten out of 17 local governments (59%) have some type of local policy or program that protects valuable resource lands and/or wildlife habitat, whether they have a mandatory policy or program, and optional policy or program or both (Table 4.1). Sixty-percent of those policies and programs were reported for Carteret County, 30% were reported for Craven County and 10% were reported for Beaufort County. This data reinforces that there may be the most support for conservation in Carteret County, followed by Craven County, and the least amount of support in Beaufort County.

	Down East Conservation Ordinance (increased setback req. for waterfront)	Dunes & Vegetation Ordinance	Floodplain Buyout Incentive	Low Impact Development Incentive	Cluster Housing Incentive	Open Space Ordinance	Smart Growth Incentive	Stormwater Ordinance	Tree Protection Ordinance	Voluntary Ag District Incentive
Atlantic Beach								X		
Cape Carteret				X				X		
Carteret County	X									
Craven County					X					X
Emerald Isle		X								
Havelock				X						
Morehead City					X					
New Bern			X			X				
Pine Knoll Shores									X	
Washington							X			

Table 4.1: Local conservation related policies and programs that exceed state requirements.

While 59% of local governments reporting a policy or program above state requirements is good, none of the policies or programs reported were sufficient to serve as an overall habitat management strategy. All of the policies or programs supported some aspect of conservation, but were not enough to stand alone to protect habitat. For example, some of the reported policies or programs were related to more stringent stormwater requirements. While this does enhance habitat by improving water quality, it is not enough to protect habitat alone. Also, while 59% of local governments did report a policy or program, that leaves 41% who have no policies or programs related to conservation that are above state requirements. Again, this is a barrier to implementation because ecosystem management must be implemented at the local level with local land use decision making (Brody 2003a).

Additionally, 71% (12 out of 17) of local governments indicated that their communities are either totally or partially dependent on the state for conservation planning and regulation. This is an important result because it indicates that if the state (WRC in this case) is not reaching out to local governments, they will not receive the information they need to implement the goals of ecosystem management. Comments made indicating dependence on the state include:

- “They are not keen on telling a landowner that something can’t be developed because the habitat is unique or important. The locals will wait for someone else to do it, either the state or the feds.”
- “We implement CAMA and some of the state programs, so I think that helps protect resource lands. I think that we rely on the state to guide us on that as a local planner.”
- “Through state regulation we have to have those goals and we have to meet those requirements and everything. So that is a part of all development that goes on here. But, do we go above and beyond that, no, I don’t really think so.”
- “We depend on the wildlife community and organizations in order to do that.”
- “I think if it was mandated is really the only time you would see that happen around here. From the state or the federal. Just the same way people started worrying about stormwater and things like that. The same kind of process would probably have to happen.”

These local planners are in some cases openly stating that the only way ecosystem management goals are going to be implemented in their communities is through top down regulation. This presents an issue for implementation in a majority of the study area since the SWAP has no regulatory power.

Local governments were also asked whether they feel that development plans coincide with habitat conservation. Ten out of 17 (50%) said yes they feel that they coincide and four out of 17 (24%) said no, they don't feel like they coincide. Two local governments said that some development plans coincide with habitat conservation while others don't. Of the ten local governments who think that development plans do coincide with habitat conservation, four think they coincide because they have a conservation policy that exceeds state requirements or because they conserve more land than the state requires. Three local governments think they coincide because development plans meet state requirements. Two think development plans coincide with conservation because developer incentives are in place, while one thinks they coincide due to support from commissioners and the public. Three of the four local governments who did not feel that development plans coincide with habitat conservation did not give a reason. However, one of the local planners voiced the need for more regulations and stronger ordinances, stating "Our development related ordinances are limited in their regulatory language to the extent that there is very little effect even on land use, but certainly nothing that would be geared toward any type of environmental regulation at all."

Then local governments were asked whether there are times when they turn down development in favor of conservation. Four out of 17 (24%) said yes, there are times when their county or municipality turns down development in favor of conservation. Ten out of 17 (59%) said no, there are not times when their county or municipality turns down development in favor

of conservation. Three local planners were not sure whether development had been turned down due to a short history in their positions.

These results are important, because they tell us that only half of local governments think their plans are consistent with conservation goals, and some of those think they are consistent simply because they are meeting the minimum requirements set forth by the state. In addition, over half of the local governments have never turned down development in favor of conservation. This further shows the need for state agencies to reach out to local governments and work with them on conservation issues. If not, the majority will not have the information they need to achieve the goals of ecosystem management. Even more concerning is that given the information, the local governments still may not be interested in ecosystem management, indicating that state agencies need to educate local governments on why ecosystem management is important.

Supporting agencies were asked what type of support they provide towards habitat conservation. This question is important to address because supporting agencies can help fill in gaps for local and state implementation. Twenty-three unique supporting agencies were interviewed and the type of support they provide was summarized into ten categories. The most common type of support reported was education and outreach, followed by providing assistance to private landowners, habitat restoration and enhancement projects, technical assistance, providing training, providing grants (for research, restoration, or land acquisition, acquiring land for conservation, legal and political advocacy, providing data and developing policy (Figure 4.6). The specific support provided by each agency is summarized in Appendix F.

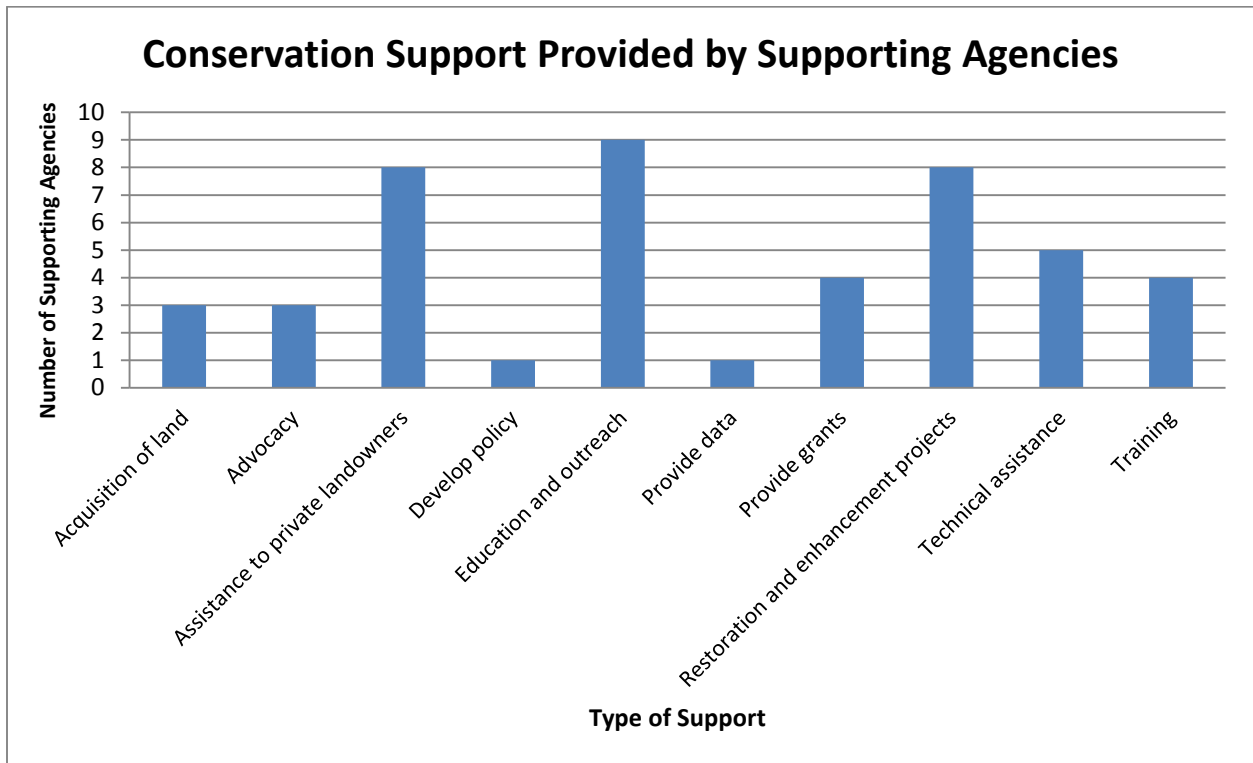


Figure 4.6: Type of conservation support provided by supporting agencies.

4.3 Research Question Two Results and Discussion

This section discusses the results for research question two:

Have employees from the NC Wildlife Resources Commission contacted or worked with local governments in the study areas, and if so, in what capacity?

Looking at implementation of the SWAP by WRC begins to answer research question two by showing us where the focus of state level implementation has been and how much focus has been placed on local government education and outreach. The Wildlife Diversity Program – the division of WRC in charge of implementing the plan – published annual program reports from 2007 – 2011 (WDP 2008, 2009, 2010, 2011). After 2011, the program continued to publish annual program reports for employees, but stopped publishing them for the public. The Wildlife Diversity Program started publishing quarterly updates for the public after 2011, reasoning that

these quarterly updates were more understandable and user-friendly for the general public (WDP 2012a, 2012b, 2012c, 2012d, 2013a, 2013b, 2013c, 2013d, 2014a, 2014b, 2014c, 2014d).

For the purpose of this research, each Wildlife Diversity Program report was searched for actions within the appropriate basins (Pamlico, Neuse and Onslow Bay) and counties (Beaufort, Carteret, Craven) (WDP 2008, 2009, 2010, 2011, 2012a, 2012b, 2012c, 2012d, 2013a, 2013b, 2013c, 2013d, 2014a, 2014b, 2014c, 2014d) (see Appendix A). Figure 4.7 summarizes these findings. This data was also used to make initial observations on progress made towards meeting the goals and key themes of NC SWAP (see Appendix A).

Based on the search terms for the Wildlife Diversity Program reports, sixty-one actions were reported in the study area. These actions were organized into categories. Fifty-two percent of these actions were species inventory and monitoring actions (related to goal one of the SWAP), 11% were priority species management actions (such as sea turtle rescues) (related to goal two of the SWAP), 8% were local government education and outreach actions (training workshops, technical assistance, conservation planning assistance, etc. for local government employees) (related to goal five of the SWAP), 11% were public education and outreach actions (education events for community groups or schools, involving community members in volunteering, etc.) (related to goal four of the SWAP), 3% put new land into conservation (related to goal two of the SWAP), and 13% were actions that restored or enhanced existing conservation land (related to goal two of the SWAP) (ibid.) (Figure 4.7).

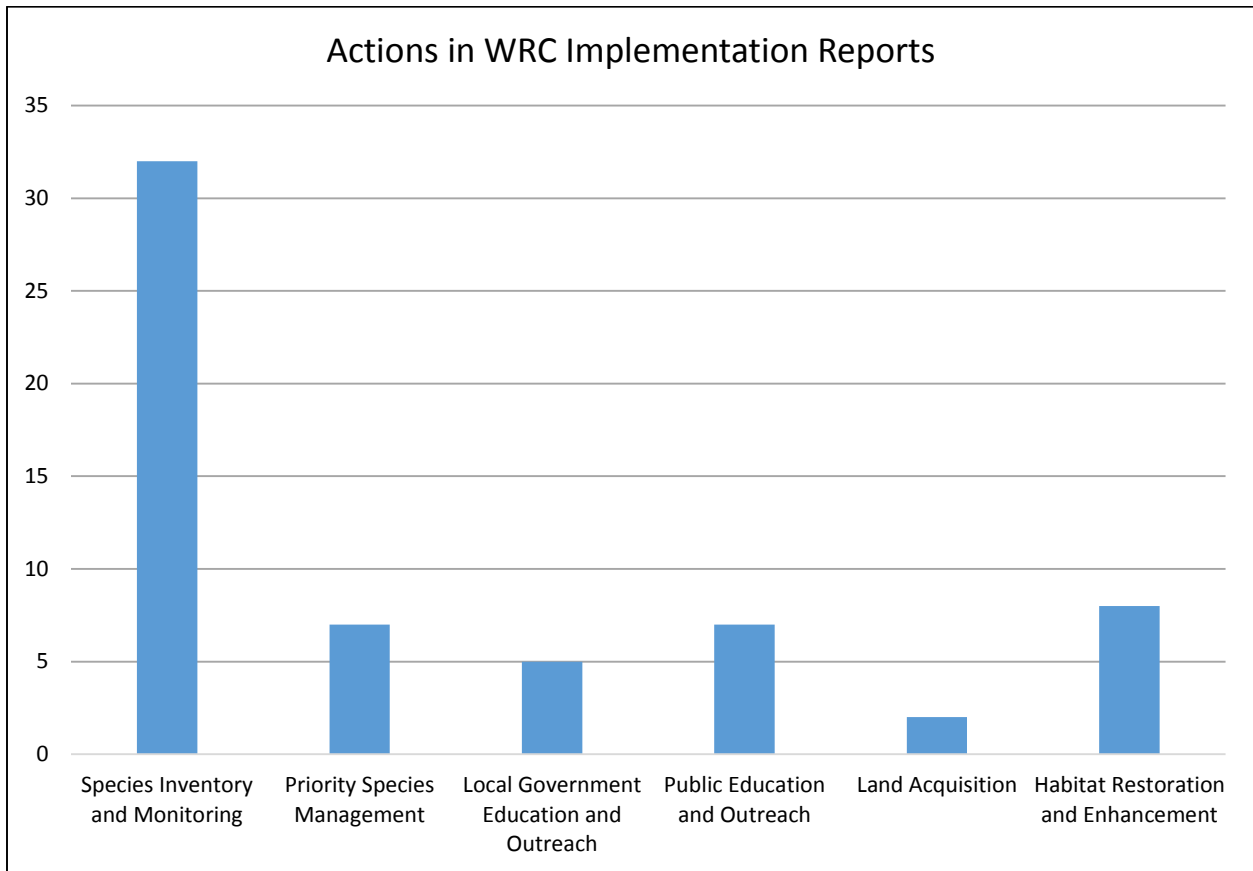


Figure 4.7: Actions in the study area from WRC implementation reports. The main focus has been on species inventory and monitoring actions.

The results from the Wildlife Diversity Program reports indicate that species inventory and monitoring – a key component of adaptive management – has been the main focus of state level implementation. Species inventory and monitoring is a key component of adaptive management because it increases information and knowledge which decreases uncertainty in planning and management decisions. Therefore, it is an important focus. However, it is equally important to focus on local implementation and education and outreach so that the information gathered can be used to actually conserve wildlife habitat.

There were two actions reported that put new land into conservation. One was the purchase of Gull Island in the Pamlico Sound area (WDP 2009). The other was a conservation easement on 76 acres of privately owned land adjacent to the Croatan National Forest in Craven

County (WDP 2011). Both are huge accomplishments in terms of providing additional wildlife habitat.

Five of the actions reported were related to local government education and outreach, which include a presentation of the NC Birding Trail given to the Carteret County Tourism Development Authority (WDP 2008), training workshops on the Green Growth Toolbox (Carteret County, Craven County, and Morehead City attended) (WDP 2011), and working with Beaufort County on an agreement to manage a significant portion of the Voice of America site A (expected to become county property in 2015) (WDP 2014d). So there has been some type of contact or outreach to local governments in each county, which is critical to getting the NC SWAP implemented.

WRC employees were also asked to summarize what actions have been taken to implement the SWAP in the coastal region of the state. Figure 4.8 summarizes the responses by category.

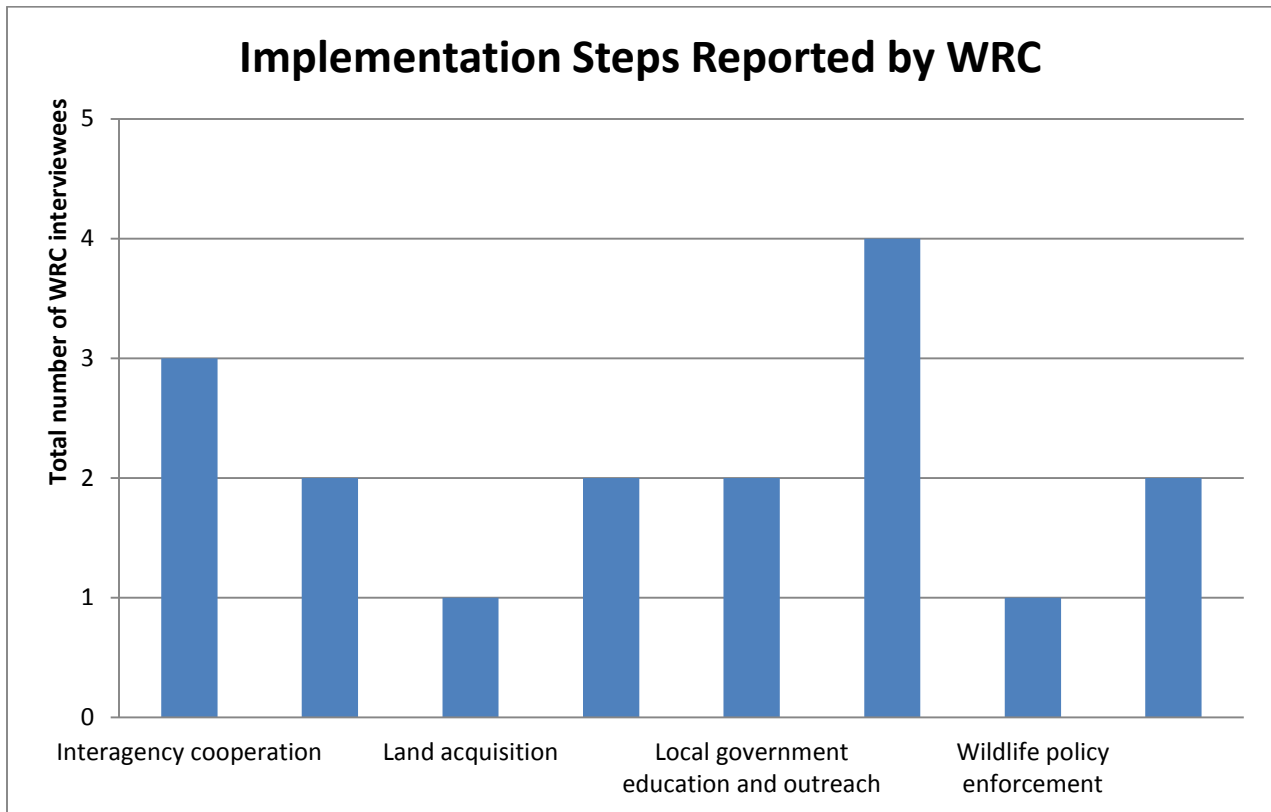


Figure 4.8: Percentage of WRC employees reporting implementation steps in each category.

While the results from the interviews of WRC employees added a few additional categories for state implementation, the important result here is that both the implementation reports and the interviews indicate that species inventory and monitoring actions have been the main focus of state level implementation. While species inventory and monitoring is important, if there is a lack of a focus on other goals such as education and outreach to local governments and the public, the plan will never be implemented. The benefit of adaptive management is that action can be taken before all the needed information is gathered. Although there is the possibility that mistakes will be made, if we wait until we know everything, there is danger that it will be too late to protect ecosystems and the species within them, because they will already have been destroyed by unregulated development. Adaptive management says that just because there is uncertainty doesn't mean you shouldn't manage.

Most WRC employees are biologists, so it is natural that they may be more comfortable studying species than dealing with the politics involved in getting local governments and the public educated on the plan and involved in implementation. However, Brody (2003a) showed that local governments must be involved in implementing ecosystem management and Broberg (2003) showed that biologists and other scientists need to be involved in local development decision-making processes if ecosystem management is to be successful.

Local governing bodies are more likely to be involved implementation if they have the support of the public. This means it is very important for state level implementation to involve education and outreach to local elected officials, staff, and the public. Supporting agencies interviewed that reported providing support towards education and outreach include the Division of Marine Fisheries, the Pamlico-Albemarle Wildlife Conservationists, NC Sea Grant, the Pamlico-Tar River Foundation, the Division of Water Resources, the NC Coastal Land Trust, the Beaufort County Cooperative Extension, the Craven County Cooperative Extension, and the Neuse River Foundation.

To directly address research question two, WRC employees were asked whether they had contacted or worked with planners in any of the counties or municipalities. None of the employees of WRC who were interviewed had contact with or had worked with planners in Beaufort County. WRC reported that no planners from Beaufort County attended their GGT training, and no planners in Beaufort County reported attending the GGT training either. The Mid-East Commission did report having contact with WRC through their RPO and they heard of the GGT there.

Although Beaufort County has not participated in the GGT training workshops and neither has any municipality in the county, when asked if they have future plans to work with

Beaufort County or any municipalities in the county, the two WRC employees who reported working with planners on a weekly basis showed interest in the partnership. One stated, “If they are interested, yes we definitely would. Because they have a lot of priority habitat, so yes.”

None of the employees of WRC who were interviewed had contact with or had worked with planners in Carteret County. According to the best memory of the WRC employee in charge of GGT training, no planners from Carteret County had attended (again this was based on memory, not checking state-wide records).

The Town of Beaufort and Morehead City both reported attending the GGT training workshop. The Town of Beaufort commented that WRC still checks up on them and is always willing to come out and speak to a group. The Eastern Carolina COG reported having contact with WRC through their TPO. Carteret County reported having contact years back in an effort to incorporate habitat protection plans into beach nourishment projects.

According to SWAP implementation reports (Appendix A), Morehead City and Carteret County attended a GGT training workshop. Carteret County did not report attending and WRC did not report them attending. In the past, the NC Coastal Land Trust hosted GGT workshops in the coastal region for WRC. They reported that a planner from Carteret County attended one of their workshops, but that planner has since left the position.

WRC expressed interest in partnerships in Carteret County, but they have been stretched thin on the amount of outreach they are able to do. One employee stated:

“We have only held one workshop in the northeast part of the state, just because the development rate is lower there. So we are focusing on the southeast right now because we have limited staff and they have a higher rate of development. We would definitely be interested to work with them and once we have the resources we can reach out to them.”

WRC reported having contact with a GIS person and possibly a planner from Craven County who attended their GGT workshop. WRC reported that the GIS person was very active in

using the data. WRC plans to continue the partnership with Craven County by touching base every once in a while to see if they need anything and provide any technical assistance needed.

The SWAP implementation reports (Appendix A) also reported attendance by Craven County. However, Craven County planners did not report contact with WRC and reported that they were not aware of the GGT. This is most likely due to a turnover in positions, similar to what happened in Carteret County. If that is not the case, there may be a lack of communication between the planners and the GIS department. Havelock reported having contact with WRC through a planning conference and reported that they followed up by receiving technical assistance from WRC on enhancement of a park site.

Local governments were also asked whether WRC had contacted them for technical services or assistance with habitat protection planning or conservation planning. Thirty-three percent (6 out of 18) of local planners reported that they had been contacted by WRC for this purpose. The Mid-East Commission reported having contact with WRC through their Regional Planning Organization (RPO). Havelock reported having contact through a planning conference and followed up by receiving technical assistance from WRC on habitat enhancement on a park site. The Town of Beaufort and Morehead City reported having contact by attending the GGT training workshop. The Town of Beaufort said that WRC still checks up on them and provides new information and updates. They also commented that WRC is always willing to come in and talk to a group about the GGT. The Eastern Carolina Council of Governments reported having contact through their Transportation Planning Organization (TPO). Carteret County reported having contact years ago in an effort to incorporate habitat protection plans into beach nourishment projects (which was abandoned due to cumbersome requirements and lack of capacity to implement).

Interestingly, the one local government that a WRC employee recalled working with was Craven County. And this was in regards to the GGT. However, Craven County did not report having contact with or working with WRC. At the time of our interview, Craven County planners were not even aware of the GGT. This is most likely due to a turnover in positions. The county may no longer be using the GGT. If that is not the case, there may be a lack of communication between GIS staff and planners in the county.

There is definitely a need for more outreach in each county, especially in Beaufort County where no planner in the county has attended at GGT workshop. A situation is presented here where two municipal level planners from Carteret County attended GGT training workshops, but WRC did not recall them attending. WRC recalled a GIS person and possibly a planner from Craven County attending a GGT workshop, but Craven County planners had not heard of the GGT.

While local government outreach is occurring in the study area to some extent, it would be more successful if the outreach was more frequent and more personal. The staff person at WRC who handles GGT training workshops for this area should know the planners in the area by name and know within a couple months if a position turns over. Which brings us to this point; the staff is stretched too thin to provide this level of personal support.

WRC has two staff members who handle GGT training workshops, one for the Piedmont area and one statewide. So the person in charge of GGT for the coast is also in charge of the rest of the state. That person is doing an outstanding job based on the fact that they have 100 counties to cover. But, in order to provide the level of outreach to local governments that is needed, more WRC staff need to be assigned to the task. Ideally there would be plenty of staff to do this and WRC would have twenty people for the state handling local government outreach and GGT

training, which would be one person for each five county region. Or maybe you have someone in a three county region where growth is high and someone in a seven county region where growth is lower. Then WRC would be able to provide frequent, personal support for outreach to local governments.

Realistically, having twenty people assigned to this task is not going to happen any time soon when there are only two people doing it now. However, I would highly recommend having six WRC employees assigned to local government education and outreach, two in the coastal region, two in the piedmont, and two in the mountain region. This would require hiring four more employees (not possible due to staff cap right now, more discussion in the barriers section), shifting the responsibilities of four current employees, or developing a partnership with one or more supporting agencies to provide this outreach and conduct workshops. At the very minimum, I would recommend having three WRC employees assigned to local government outreach, which would be one for the Mountains, one for the Piedmont and one for the Coast.

While it is good that 61% of local governments in the study area are aware of the SWAP or GGT, that still leaves 39% who didn't have a chance to help implement the plan because they didn't even know about it. If there were more employees assigned to this task, more local governments probably would have been aware. With more frequent and personal follow up, it is also possible that more than 27% of the local governments who had heard of the plan would have taken action towards implementation.

With the current staff resources, WRC has been focusing on outreach to local governments in areas where there are currently high levels of development pressure threatening valuable habitat areas. When you have limited resources, you focus where they are needed. However, WRC is always available to help local governments who request their assistance.

WRC employees were asked, if they were contacted by a local government planner who wanted free technical assistance or assistance with preparing local ecosystem management plans, would they have staff available to assist the local government. Every WRC employee said yes. As one WRC employee put it, “Emphatic, yes. We would make staff available for that.” But, a local planner who does not know about the plan and doesn’t know that WRC is available for conservation planning assistance can’t ask.

Since biologists and other scientists have more education and training regarding ecosystems than others, they need to play an active role in shaping local land use decisions to meet the goals of ecosystem management (Broberg 2003). This means that local staff, planning boards, and governing bodies need to be in close communication with scientists, and it would be beneficial if scientists were members of the local planning board (Broberg 2003). In order to provide this level of outreach and interagency cooperation with local governments, more employees will have to be assigned to the task.

The challenge faced by WRC is the same challenge outlined by Stoms et al. (2010). The researchers interviewed state wildlife agencies in 50 states and found three main challenges to implementation of the SWAPs. They found that coordinators in 60% of the states felt challenged by engaging private landowners and local governments in implementation efforts. Coordinators reported that in part this was due to the limited ability of the agencies to interact with hundreds of local governments given current budgets. This is the exact issue occurring with WRC.

Also related to question two is interagency cooperation between supporting agencies, WRC and local governments. This interagency cooperation with supporting agencies is also important to address as they are helping to implement the SWAP and habitat conservation

measures in general, and are available to help fill in gaps for state and local implementation actions.

When asked how often they work with planners and/or planning boards, ten percent (3 out of 29) employees of supporting agencies reported working with planners frequently (daily to weekly), 21% (6 out of 29) reported working with planners often (monthly to bi-monthly), 24% (7 out of 29) reported working with planners occasionally (one to three times per year), 31% (9 out of 29) reported working with planners rarely (less than once per year) and 14% (4 out of 29) reported that they never work with planners (Figure 4.9).

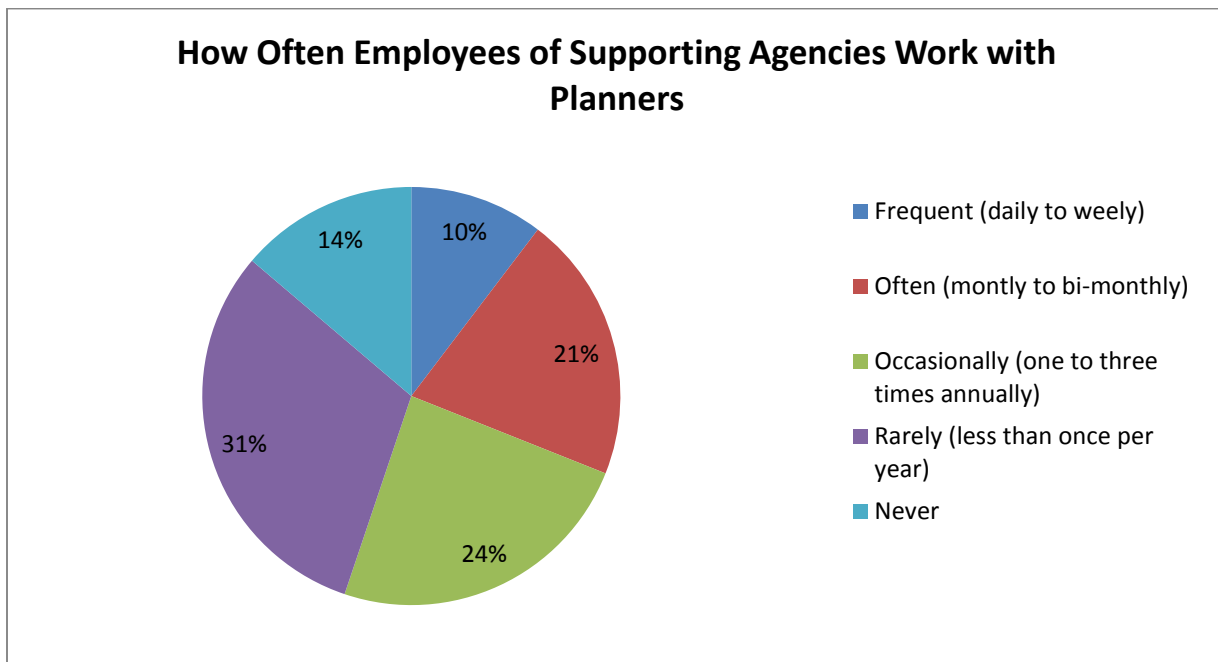


Figure 4.9: Pie chart showing how often employees of supporting agencies work with planners and/or planning boards.

Supporting agency employees were asked whether they had contacted or worked with Beaufort County Planning Department or any municipal Planning Department in Beaufort County (except for seven employees who were specific to Carteret or Craven County). Nine out of 22 (41%) employees of supporting agencies reported that their agency has had contact with or worked with Beaufort County Planning Department or one of the municipal Planning

Departments in the county. The unique agencies were the Beaufort County Soil and Water Conservation District, the Pamlico-Albemarle Wildlife Conservationists, the Pamlico-Tar River Foundation, the Division of Water Resources, the Division of Coastal Management, the Beaufort County Cooperative Extension and the Beaufort County Natural Resources Conservation Service, Division of Marine Fisheries, and the NC Forest Service.

As for specific projects and contacts reported, the Beaufort County Soil and Water Conservation District provides their input to the Beaufort County Planning Department on plats when new development proposals come in. The Pamlico-Albemarle Wildlife Conservationists have worked with Beaufort County Planning on providing wildlife habitat in a park site. The Pamlico-Tar River Foundation worked with Beaufort County Planning on their water trail project. The Division of Water Resources reported working with Beaufort County on their stormwater program and reviewing their Coastal Land Use Plan before it was approved. The Division of Coastal Management reported working with Beaufort County Planning on their Land Use Plan. The Division of Coastal Management is working with Beaufort County, the city of Washington, and the town of Bath on public access grants.

The Beaufort County Cooperative Extension reported working with the Beaufort County Planning Department on the Voluntary Agricultural District and with the city of Washington Planning Department on the community garden. The Natural Resources Conservation Service for Beaufort County reported working with Beaufort County Planning on water management, areas that flood and questions about soils and they also worked with Beaufort County on their new park site. The Division of Marine Fisheries reported working with Beaufort County Planning when they submit grant applications and working with them on stormwater in the past, until that

was transferred to the Division of Water Resources. The NC Forest Service reported providing data to Beaufort County Planning Department on wildfires in the county.

Employees of supporting agencies were also asked whether they had contacted or worked with the Carteret County Planning Department or any municipal planning department in Carteret County (except for eight who were specific to Beaufort or Craven County). Eleven out of 21 (52%) employees of supporting agencies report that their agency has had contact with or worked with the Carteret County Planning Department or a municipal Planning Department in the county. The unique agencies were the Division of Marine Fisheries, the Division of Water Resources, APNEP, NC Coastal Federation, NC Forest Service, Division of Coastal Management, Carteret County Soil and Water Conservation District, NC Sea Grant, NC Coastal Land Trust, and the NC Coastal Federation.

As for specific projects and contacts reported, the Division of Marine Fisheries reported working with Carteret County Planning when they submit grant applications and working with them on stormwater in the past, until that was transferred to the Division of Water Resources. The Division of Water Resources reported working with Beaufort County on their stormwater program and reviewing their Coastal Land Use Plan before it was approved. APNEP reported working with the Planning Department in Carteret County on a project they were doing through a Clean Water Management Trust Fund grant. The NC Coastal Federation reported that they work with Carteret County Planning on their Low Impact Development program. They have also worked with the town of Beaufort Planning Department on a Watershed Restoration Plan. Other Planning Departments NC Coastal Federation have worked with include Cedar Point, Cape Carteret, Pine Knoll Shores, and Atlantic Beach. Projects include a groundwater study, stormwater issues, land acquisition, manuals, and ordinances, among others.

The NC Forest Service reported providing data to Carteret County Planning Department on wildfires in the county. The Division of Coastal Management reported working with Carteret County Planning on their Land Use Plan. The Division of Coastal Management reported frequently working with Carteret County and the municipalities in the county on public access grants. The Carteret County Soil and Water Conservation District works with the Carteret County Planning Department mainly on drainage issues related to development. NC Sea Grant reported that the Morehead City Planning Department attended one of their workshops. The NC Coastal Land Trust reported working with the Planning Department when surveying conservation land. They also hosted a GGT workshop that Carteret County Planning had attended in the past, but that planner has since moved on to another position.

Employees of supporting agencies were also asked whether they had contacted or worked with the Craven County Planning Department or any municipal planning department in Craven County (except for eight who were specific to Beaufort or Carteret County). Ten out of 21 (48%) employees of supporting agencies reported that their agency has had contact with or worked with Craven County Planning Department or one of the municipal Planning Departments in the county. The unique agencies were the Division of Marine Fisheries, the Division of Water Resources, The NC Coastal Land Trust, the NC Forest Service, the Division of Coastal Management, the Craven County Soil and Water Conservation District, the Craven County Cooperative Extension and the Neuse River Foundation.

As for specific projects and contacts reported, the Division of Marine Fisheries reported working with Craven County Planning when they submit grant applications and working with them on stormwater in the past, until that was transferred to the Division of Water Resources. The Division of Water Resources reported working with Craven County on their stormwater

program and reviewing their Coastal Land Use Plan before it was approved. The NC Coastal Land Trust reported donating parkland to Craven County and working with New Bern on a park project. The NC Forest Service reported providing data to Craven County Planning Department on wildfires in the county. The Division of Coastal Management reported working with Craven County Planning on their Land Use Plan. The Division of Coastal Management also reported working with Craven County and the municipalities in the county on public access grants. Craven County has also attended a workshop hosted by the Division of Coastal Management.

The Craven County Soil and Water Conservation District reported working with Craven County Planning on drainage issues related to development, flooding issues, erosion control, coastal area management issues, CAMA requirements, subdivision reviews, and technical support related to surveying, grade shots, and elevations. Craven County Cooperative Extension reported working with the County Planning Department on local foods and planning for farmland preservation. The Neuse River Foundation reported contacting the Craven County Planning Department for information on their development approval process. The NC Coastal Federation reported working with the Craven County on a stormwater project and a shoreline project and with New Bern on a Low Impact Development project.

Employees of supporting agencies were also asked, if a local government planner contacted you wanting free technical assistance or assistance with conservation planning, would you have staff available to assist the county or municipality. Twelve out of 29 (41%) gave a yes answer. Fourteen out of 29 (48%) said possibly, but it would depend on what type or how much assistance they needed. Three gave a no answer. The supporting agencies giving a yes answer include Beaufort County Soil and Water Conservation District, NC Forest Service, Pamlico-Tar River Foundation, the Carteret County Natural Resources Conservation Service, the NC Coastal

Federation, the Division of Coastal Management, the Craven County Soil and Water Conservation District, the Natural Heritage Program, the Carteret County Soil and Water Conservation District, the Craven County Cooperative Extension and the Neuse River Foundation.

Those giving a no answer to providing that assistance with conservation planning include the Division of Water Resources, NC Forest Service and the Office of Land and Water Stewardship. The Division of Water Resources said they would be unlikely to have enough staff, and the Office of Land and Water Stewardship said they only focus on conservation funding and could assist with a grant application. It is interesting that NC Forest Service responded yes and no. The employee who said no explained that they cannot do a Forest Stewardship Plan for another state agency (a local government falls in that category) and that they mainly work with private landowners. The employees were probably considering support for conservation planning in different terms. Support for wild fire management (including data) could be considered to be under the conservation planning umbrella for some and not for others.

Supporting agencies were also asked whether they had contact with WRC. Twenty-two out of 29 (76%) of the employees of supporting agencies reported being in contact with or working with WRC. Six of the contacts or projects were related to SWAP or GGT, six were for information/data sharing, three were for assistance to private landowners, two were for conservation planning, two were for habitat restoration projects, two were for land acquisition projects, one was for public education, one was for technical assistance, and one was for a public access project (see Figure 4.10). These results are encouraging as they show that most supporting agencies do have a relationship with WRC.

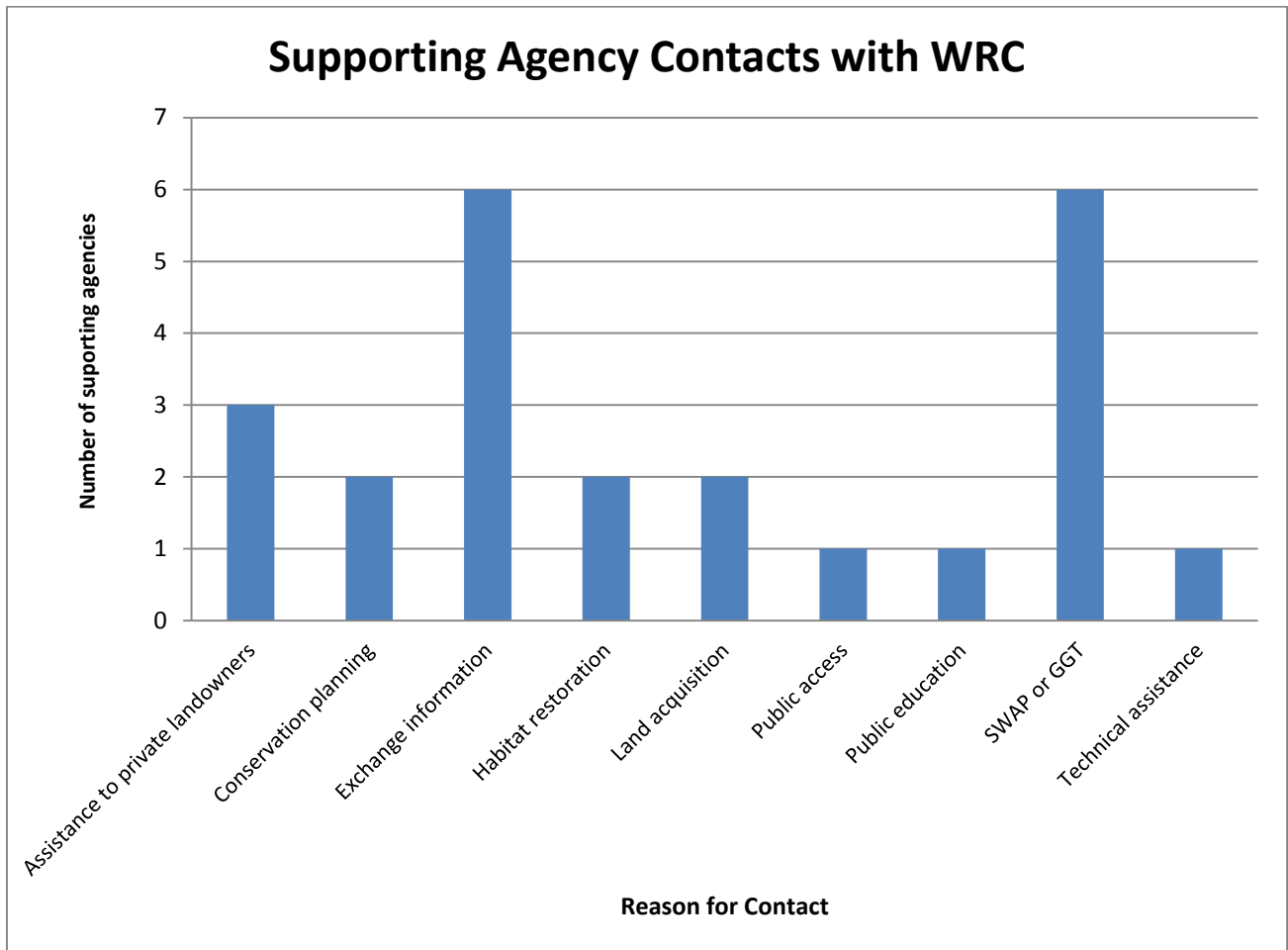


Figure 4.10: Type of contacts supporting agencies have had with WRC.

Planners were asked about what outside agencies they work with on issues of habitat conservation. Six local planners mentioned the Division of Coastal Management, four mentioned the NC Coastal Land Trust, two mentioned WRC, two mentioned the Division of Water Resources, two mentioned the Office of Land and Water Stewardship, two mentioned the Carteret County Soil and Water Conservation District, two mentioned NC Sea Grant, one mentioned NC DENR in general, one mentioned the Craven County Cooperative Extension, one mentioned the Pamlico-Tar River Foundation, one mentioned the Division of Marine Fisheries, one mentioned the Craven County Soil and Water Conservation District, one mentioned the NC Coastal Federation, one mentioned the Carteret County Cooperative Extension, and one

mentioned the Beaufort County Soil and Water Conservation District. These partnerships reported by local governments represent 63% (15 out of 24) of the unique agencies interviewed (including WRC).

4.4 Research Question Three Discussion

This section discusses the results for research question three: *What are barriers to implementation of NC SWAP in the study area?*

WRC employees were asked to rate how much progress has been made towards meeting each goal outlined in the SWAP. They were asked to rate progress on a scale of 1-10 with 1 being absolutely no progress on meeting the goal and 10 being the goal has been completely achieved. This questions provides important background information and begins to address research question three (*What are barriers to implementation of NC SWAP in the study area?*) by determining where WRC sees weaknesses in implementation, if any. The responses were averaged for each goal and are summarized in Table 4.2.

Table 4.2: WRC employees’ average rating for progress made towards each SWAP goal and variance in responses.

Goal	Average Progress Rating	Variance
1. To improve understanding of the species diversity in North Carolina and enhance our ability to make conservation or management decisions for all species.	6	2.8
2. To conserve and enhance habitats and the communities they support.	6	4.8
3. To foster partnerships and cooperative efforts among natural resource agencies, organizations, academia and private industry.	9	0.5
4. To support educational efforts to improve understanding of wildlife resources among the general public and conservation stakeholders.	7	3.8
5. To support and improve existing regulations and programs aimed at conserving habitats and communities.	6	2.7

Goal three (interagency cooperation) was given the highest average progress rate, indicating that WRC employees have developed strong partnerships. While the Wildlife Diversity Program implementation reports (see Appendix A) indicated that the majority of the actions taken in the study area have been towards goal one (species inventory & monitoring), this goal was only given an average rating of 6 on the progress scale, indicating that WRC employees feel that progress has been made, but there is still a lot of work to be done in this area. The other goals (conserving & enhancing habitats, education, and supporting and improving regulations and programs) were given similar average ratings of 6 and 7, although these goals received little attention in the Wildlife Diversity Program implementation reports.

The variance is the average distance each data point is from the mean (the average progress rating in this case). Goal three (interagency cooperation) had a very low variance, indicating that the WRC employees all agree that this goal has almost been achieved. The variances for goal one (species inventory & monitoring) and goal five (supporting and improving regulations and programs) were average, while the variances for goal two (conserving & enhancing habitats) and goal four (education) were high. The high variance in goals two and four occurred because one interviewee gave a 10 rating for every goal, and low ratings from other interviewees for goals two and four compared to the 10 rating gave a high variance. This indicates that some WRC employees feel that goal two and goal four need more attention. These results indicate that implementation of the NC SWAP needs to focus more on conserving and enhancing habitats and communities (often held up by lack of funding) and on educational efforts to improve understanding of wildlife resources among the general public and conservation stakeholders (can be done at a reasonable cost but requires dedicated staff time).

WRC employees were also asked to rate how often the “key themes” or strategies outlines in NC SWAP are being used to achieve the above goals. They were asked to rate the key themes or strategies on a scale of 1-10, with 1 being absolutely no use of this key theme and 10 being consistent, regular use of this key theme. The responses were averaged for each key theme and are summarized in Table 4.3.

Table 4.3: WRC employees average rating for use of key themes and variance in responses.

Key Theme	Average Use Rating	Variance
1.The need to strengthen partnerships among natural resource agencies, organizations, academics and individuals in order to meet shared goals and visions.	10	0.8
2.The need to impact the landscape in a large-scale fashion and to consider all components of a sustainable community of plants and animals.	9	1.7
3.The need to gather additional information and fill knowledge gaps in order to advance our understanding of species and their habitats.	9	0.8
4.The need to work cooperatively with private landowners to influence the conservation of natural resources across the majority of the state.	9	2.7
5.The need to educate and engage local governments, planning commissions, and urban publics about the importance of fish and wildlife conservation as a key component of successful land use planning.	7	9.5

Key themes one, two, three and four received very high average use ratings with a low to average variance in responses. Key theme five (need to educate and engage local governments, planning commissions and urban publics) received a 7 for the average use rating, and had an extremely high variance in responses. The high variance is because one interviewee rated the use of every key theme as a 10 (and a second interviewee rated key theme five with a 10) and

comparing with low ratings from other respondents caused a high variance. This indicates that some WRC employees feel that key theme five needs more attention. These results indicate that NC SWAP implementation may need to focus more on educating and engaging local governments, planning commissions, and urban publics.

Local governments and supporting agencies were also asked about their level of support for the goals of the SWAP. This refers to support from the local governing body for local governments and from the agency for supporting agencies. These questions also begin to address research question three, because goals with low levels of support likely have barriers associated with their implementation.

Overall, local governments rated the average level of support for the goals of the SWAP between a 6-7 on the 1-10 support scale, with high levels of variance in responses, even within counties (Table 4.4). These findings support Burby and May's (1998) findings that local commitment varies drastically across NC and that a lack of commitment by local governments to tackle environmental issues can be a barrier to ecosystem management. The data indicates that Burby and May's hypothesis is accurate in the study site, as the level of commitment varies even within counties.

Table 4.4: Local government and supporting agency average rating for how much support their governing board or agency has for the goals of the SWAP and variance in responses.

Goal	Local Government Overall Average Rating / Variance	Beaufort County Average Rating / Variance	Carteret County Average Rating / Variance	Craven County Average Rating / Variance	Supporting Agency Overall Average Rating / Variance
1. To improve understanding of the species diversity in North Carolina and enhance our ability to make conservation or management decisions for all species.	6 / 4.3	4 / 1.3	6 / 5.0	7 / 5.1	8 / 5.1
2. To conserve and enhance habitats and the communities they support.	7 / 4.0	6 / 6.3	7 / 4.3	7 / 3.0	8 / 4.1
3. To foster partnerships and cooperative efforts among natural resource agencies, organizations, academia and private industry.	7 / 4.8	6 / 4.3	8 / 5.2	7 / 5.6	9 / 1.8
4. To support educational efforts to improve understanding of wildlife resources among the general public and conservation stakeholders.	7 / 4.9	6 / 4.3	7 / 6.2	6 / 6.7	8 / 4.7
5. To support and improve existing regulations and programs aimed at conserving habitats and communities.	7 / 4.7	5 / 5.3	7 / 4.3	7 / 8.5	7 / 6.5

When asked about their level of support for the goals of the SWAP, Beaufort County local governments' answers consistently averaged lower than Carteret and Craven County local governments' answers, indicating that at least part of the reason that only one out of three local governments in Beaufort County have heard of the SWAP or GGT and none have taken action toward implementation may be that there is less support for conservation in Beaufort County than in Carteret and Craven County.

There are possible reasons that the level of commitment to tackle environmental issues varies from county to county, and even within counties. Burby and May (1998) found there are three major factors that explain variation in commitment. These factors include the quality of the

plan, presence of environmental issues (i.e. high development pressure), and constituency attention to environmental issues.

The first major factor identified by Burby and May (1998) was quality of the plan. There are less people working in public administration in Beaufort County than Carteret and Craven, so there are less people available to plan for ecosystem management (US Census 2010). Craven County has the highest percentage of its population in public administration positions, indicating that they have the most staff capacity to implement ecosystem management. Carteret County is also well above the state average in the percentage of its population employed in public administration. While having more people in public administration doesn't necessarily mean ecosystem management is being planned for, it means there is the staff capacity to do so. Although all counties are subject to the Coastal Area Management Act (CAMA) which requires them to have a land use plan, Burby and May (1998) found that a general planning mandate is not likely to solve the commitment issue.

The second factor identified by Burby and May (1998) was the presence of environmental issues related to the goal in question. In this study we are looking at ecosystem management and conservation, so a previous issue with high levels of development pressure leading to loss of valuable resource land would be a factor that would cause higher levels of commitment by local governments. Carteret County has the highest level of population growth out of the three counties, although it is still slightly below the state average. In our study area, Carteret County is most likely to be concerned about development pressure and therefore more likely to be committed to ecosystem management. Beaufort County is actually losing population and Craven County had less than 1% growth, indicating that development pressure is not presenting much of an issue in these counties.

Conversations with WRC indicate that development pressure in the northeast coastal region is low compared to the southeast coastal region which is experiencing high levels of development pressure from the Wilmington area. However, that situation could change and planning now would be proactive and give the needed time to get the job done right. Where development pressure is not an issue, conservation planning is not generally a priority, even though it would be proactive and beneficial to plan while there is still valuable resource land to protect.

The third factor identified by Burby and May (1998) was constituency attention to environmental issues. Local governments are more likely to be committed to ecosystem management when citizens demand it. The results from the Census data show that Carteret and Craven County are better off economically than Beaufort County. They have higher levels of median household and per capita incomes and lower poverty levels (US Census 2010). There is more commitment where there is more capacity to implement the objectives of ecosystem management. Areas that are struggling economically generally have low levels of commitment for tackling environmental issues. The citizens of Beaufort County are more likely to put pressure on elected officials for job creation than environmental protection. Education is also a consideration. With a higher percentage of its population having Bachelor's degrees or higher (US Census 2010), the pressure from citizens for local governments to implement ecosystem management is most likely to occur in Carteret County. A well-educated constituency is more likely to be concerned about environmental issues both because they are more likely to be knowledgeable about the issues.

Supporting agencies consistently averaged one to two points above local governments on the support rating, except with goal five (supporting and improving regulations), which both local

governments and supporting agencies averaged out to a 7 on the support scale. The highest average rating for the overall local government response was a 7 on the support scale. This indicates that local governments feel their governing boards somewhat support the goals of the SWAP, but that more support could be provided. This is a possible barrier to implementation, because if the goals do not have high levels of support in the counties and municipalities, it will be more difficult for local governments to implement the SWAP.

Local governments were also asked to rate the level of community support for habitat conservation in their county or municipality on a scale of 1-10, with 1 being no support and 10 being fully supports. The level of community support refers to the level of support from the public. This question is important to address because the local governing board is more likely to support implementation if they have support and pressure from voters. The average overall score was a 7 on the 1-10 support scale. Beaufort County local governments rated the level of community support as an average of 7 on the support scale, Carteret County local governments rated the level of support as an average of 8 on the support scale and Craven County rated the level of support as an average of 6 on the support scale.

To directly address research question three, all interviewees (local governments, WRC and supporting agencies) were asked their opinion on what are the largest barriers to habitat conservation (largest barriers to implementation of SWAP for WRC employees). Their responses were organized into seven categories including “capacity” (funding or staff), “education and outreach” (public or elected official), “population and development pressure”, “need stronger regulations”, “need more monitoring and enforcement”, “focus on economy” and “other”. The other category includes sub-categories that only had one response. The five responses under the

other category were climate change/sea level rise, the need for more woodland diversity, permitting obstacles for restoration projects, invasive species and excessive regulation.

Overall, 69% (36 out of 52) of interviewees viewed the need for education and outreach (public or elected officials and government staff) as a top barrier, 50% (26 out of 52) said capacity issues (funding or staff) were a top barrier, 33% (17 out of 52) said population and development pressure was a top barrier, 19% (10 out of 52) said the need for stronger regulations was a top barrier, 17% (9 out of 52) said a focus on the economy was a top barrier, 8% (4 out of 52) said the need for more monitoring and enforcement was a top barrier and five had responses which fell in the other category (Figure 4.11).

For local governments, the top barrier cited was education and outreach (11 planners), followed by population and development pressure (five planners), followed by the need for stronger regulations (four planners), followed by capacity issues (three planners), followed by a focus on the economy (two planners), followed by needing more monitoring and enforcement (one planner), followed by excessive regulations (categorized as other, one planner) (Figure 4.11).

For WRC, the top barriers cited were education and outreach (four WRC employees) and capacity issues (four WRC employees), followed by population and development pressure (one WRC employee), the need for stronger regulations (one WRC employee) and a focus on the economy (one WRC employee) (Figure 4.11).

For supporting agencies, the top barrier cited was education and outreach (22 supporting agency employees), capacity issues (19 supporting agency employees), population and development pressure (ten supporting agency employees), a focus on the economy (six supporting agency employees), the need for stronger regulations (five supporting agency

employees), the need for more monitoring and enforcement (three supporting agency employees), and four other (climate change/sea level rise, need more woodland diversity, permitting obstacles for restoration projects, invasive species, one supporting agency employee each) (Figure 4.11).

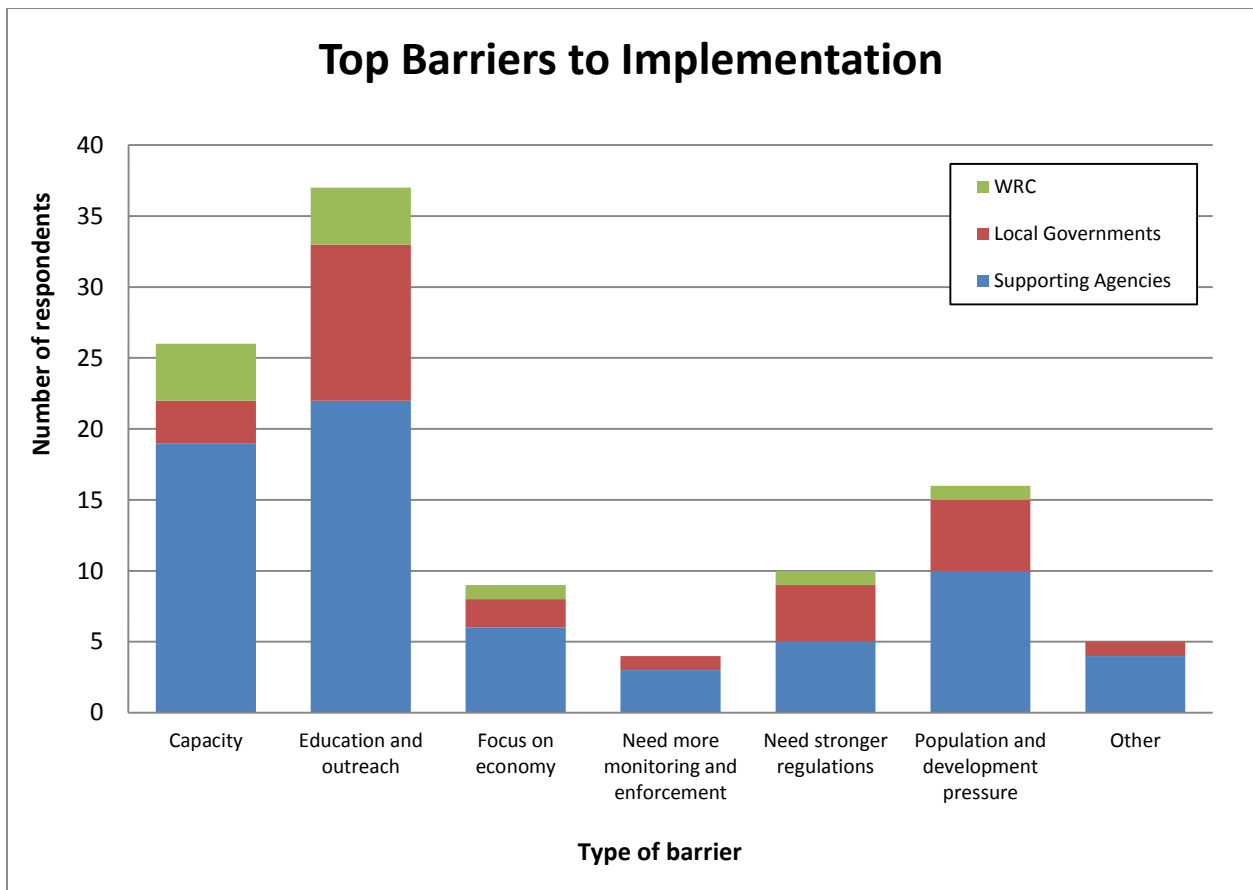


Figure 4.11: Top barriers to implementation of habitat conservation identified by WRC, local governments and supporting agencies.

The capacity and education and outreach categories were broken down into subcategories. The category “education and outreach” included the barriers of the need to educate the public and the need to educate elected officials and government staff. Each interviewee was counted once if they mentioned education and outreach issues, whether they mentioned both the need to educate the public and elected officials and government staff, or just

one or the other. Overall, 69% (36 out of 52) interviewees cited the need for education and outreach as a top barrier. Thirty-six percent (13 out of 36) of those citing the need for education and outreach included both the need to educate the public and the need to educate elected officials and government staff, 14% (5 out of 36) only included elected officials and government staff and 50% (18 out of 36) only included the public.

When broken down by group, 41% (9 out of 22) of supporting agency employees citing education and outreach as a top barrier included both elected officials and government staff and the public, 23% (5 out of 22) included only elected officials and government staff and 36% (8 out of 22) included only the public. Twenty-five percent (1 out of 4) of WRC employees citing education and outreach as a top barrier included both elected officials and government staff, while 75% (3 out of 4) included only the public. Thirty percent (3 out of 10) of local governments included both elected officials and government staff, while 70% (7 out of 10) of local governments included only the public (Figure 4.12).

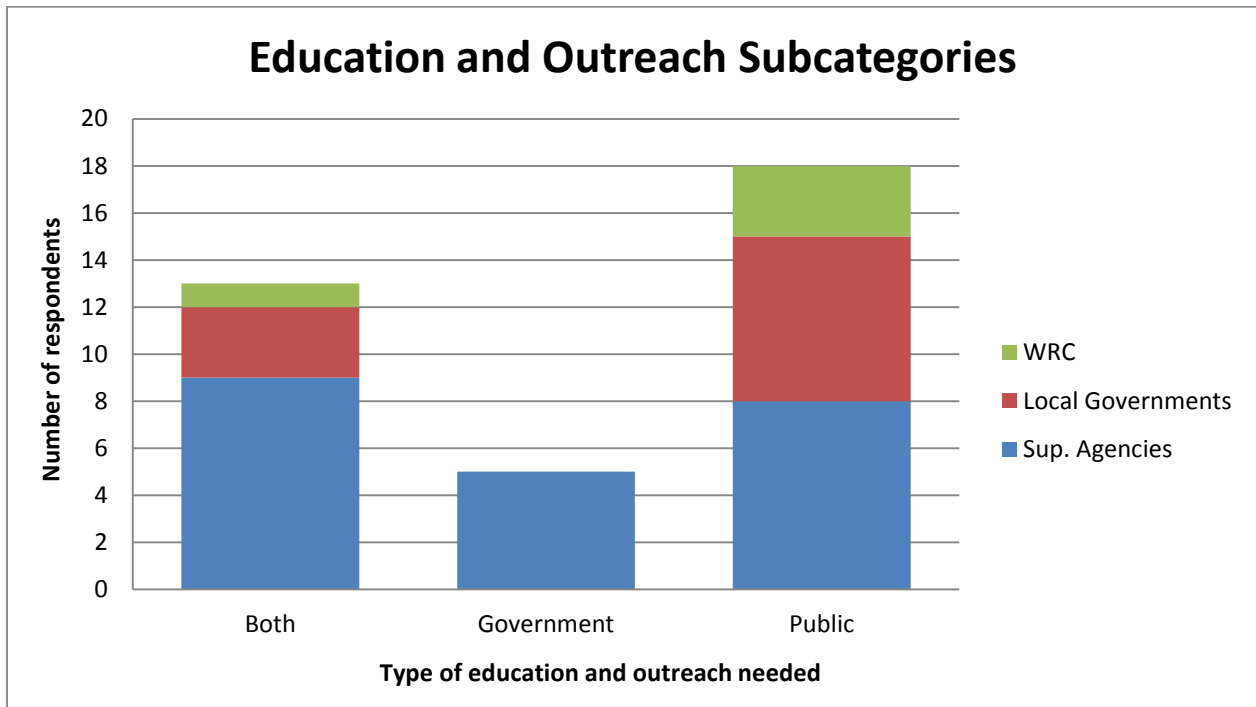


Figure 4.12: Subcategories for the “Education and Outreach” Category include both the need for elected official and government staff and public education, only the need for elected official and government staff education and only the need for public education.

The category “capacity” included the barriers of the need for more staff and the need for more funding. Each interviewee was counted once if they mentioned capacity issues, whether they mentioned both the need for funding and staff, or just one or the other. Overall, 50% (27 out of 52) of interviewees cited capacity issues a top barrier. Thirty-seven percent (10 out of 27) included both staff and funding, 44% (12 out of 27) included only funding, and 19% (5 out of 27) included only staff.

When broken down by group, 33% (6 out of 19) of supporting agency employees citing capacity issues included both staff and funding, 42% (8 out of 19) of supporting agency employees included only funding, and 21% included only staff (4 out of 19). One-hundred percent (4 out of 4) of WRC employees citing capacity issues included both staff and funding. One-hundred percent (4 out of 4) of local governments citing capacity issues included only funding (Figure 4.13).

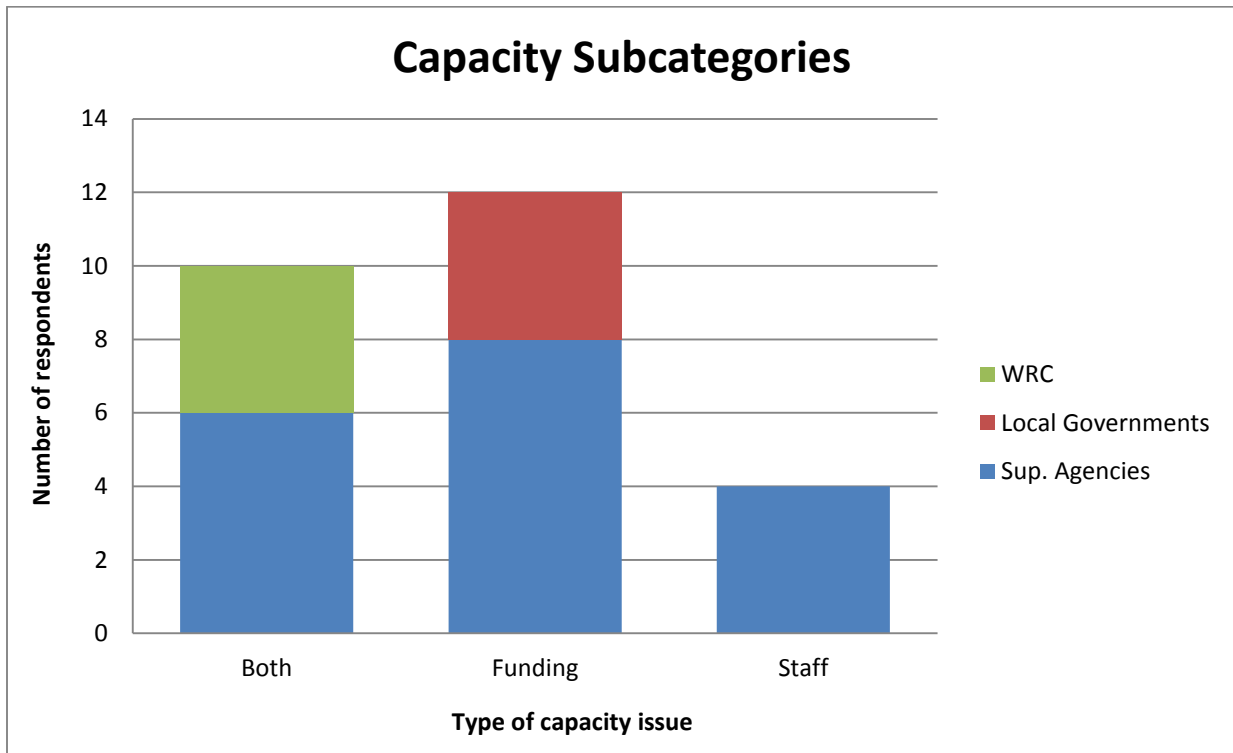


Figure 4.13: Subcategories for the “Capacity” category include both the need for more funding and staff, only the need for more funding and only the need for more staff.

The need for more education and outreach was the top barrier identified by every group. This agreement between groups shows that there is a high need for more education and outreach to local governments and the public. Local government education and public education are closely related, because many planners who had heard of the SWAP or GGT, but had not taken steps toward implementation supported the plan or toolbox personally, but did not have the support of their local governing body to implement the plan. The governing body answers to the local citizens because they are an elected body. If there is more support from the public, there will be more support from the governing bodies, which will give local planners the support they need to implement the SWAP.

The need for more education and outreach is related to one of the ten themes of ecosystem management identified by Grumbine (1994). The value theme says that regardless of

the role of scientific knowledge, human values play a dominant role in ecosystem management goals. Keough and Blahna (2006) point out that for ecosystem-based management to be successful, there needs to be an integrated balance between social, economic and ecological goals. The need for more education and outreach indicates that there needs to be more of a focus on social goals.

Further supporting the need for more education and outreach is the Wildlife Diversity Program implementation reports (see Appendix A). These reports, searched from 2007 – 2014, showed five implementation actions related to local government education and outreach and seven implementation actions related to public education and outreach, for a total of 12 actions related to education and outreach in a seven year period. Compare this to 32 reported actions related to species inventory and monitoring, which no group of interviewees (including WRC) identified as a top barrier.

Similarly, when WRC employees were asked to summarize what actions have been taken to implement the SWAP in the coastal region of the state, 40% mentioned actions related to local government education and outreach, none mentioned actions related to public education and outreach, and 80% mentioned actions related to species inventory and monitoring.

In addition, the SWAP goal for education was rated as an average of a 7 on the 1-10 progress scale by WRC employees, with a high level of variance in responses. The high level of variance occurred because some employees felt that this goal warranted a low score on the progress scale.

While WRC employees are citing the need for more education and outreach as a top barrier to implementation, the focus is not there. The focus is on species inventory and monitoring. As a key aspect of adaptive management, this is certainly a valid and important goal.

However, if the information being gathered is not being shared with the public and local governments, the objectives of ecosystem management will not be achieved and unregulated development will continue to destroy valuable habitats.

Capacity issues were tied as the top barrier to implementation by WRC employees. According to information gathered during interviews, WRC receives funding through state appropriations, federally through the State Wildlife Grants Program, through the Pitman Roberson Act (excise tax on guns and bullets), the Dingle Johnson Act (excise tax on fishing equipment) and from licenses for fishing, hunting and boat registrations. There has recently been a decline in state appropriations and federal funding through the State Wildlife Grants Program. This decline in funding has caused a moratorium on hiring for WRC. While WRC is not laying off employees, they are not allowed to hire any new permanent staff.

This moratorium on hiring new employees in WRC is a significant barrier to implementation because more staff is needed to focus on education and outreach. The only other options for providing the needed support for education and outreach is to shift the responsibilities of some current employees, or to partner with supporting agencies on this objective. However, capacity issues were cited as the second top barrier to implementation by supporting agencies, which puts a limit on the amount of help they are able to provide. For example, two WRC employees reported that they partner with the Natural Heritage Program for data collection and local government education and outreach, but the Natural Heritage Program has been updating their data less frequently than they used to and they are not able to provide as much support towards local government education and outreach as they used to due to budget cuts to the program from their parent agency, the North Carolina Department of Environment and Natural Resources (DENR). In addition, the NC Coastal Land Trust used to host GGT workshops in the

coastal region, but was unable to continue due to capacity issues. They were willing to continue if WRC paid them a fee, but since WRC was experiencing their own capacity issues, this was not possible.

Population and development pressure was the third most cited barrier overall. It was the second barrier cited by local governments, was tied as the second barrier for WRC and was the third most common barrier cited by supporting agencies. The population and development pressure barrier simply reinforces the fact that ecosystem management must occur at the local level with local land use decision making (Brody 2003a), because local governments are in charge of most development decisions.

The need for stronger regulations was the third most common barrier identified by local governments and was tied as the second most common barrier identified by WRC. Also supporting the need for stronger regulations is the lack of comprehensive habitat conservation policies at the local level, combined with the fact that 67% of local governments indicated that they depend on the state either partially or totally for conservation planning and regulation. Stronger regulations from the state level would address the lack of commitment by local governments.

4.5 Research Question Four Results and Discussion

This section discusses the results of research question four: *What are possible tools or strategies that can be used to overcome these barriers and increase implementation of the NC SWAP in the study area?*

In the last section we saw that WRC, local governments, and supporting agencies cited the need for education and outreach (both local government and public) as the top barrier to implementation. The various groups agreeing on a top barrier shows that there is a very high

need. The first recommendation I have is for WRC to be granted more funding to hire full time staff to focus on education and outreach for the SWAP or GGT. This would be the best way to address the need for more education and outreach because it would not require shifting employees away from other important tasks.

If it is not a possibility to hire new staff to fill the need for education and outreach, I recommend shifting the responsibility of some other WRC employees to this task, developing more partnerships with supporting agencies, or preferably both. I recommend shifting the responsibilities of at least four WRC employees who are currently focused on species inventory and monitoring to education and outreach related job duties. This would provide two employees for the Coastal Plain, Piedmont and Mountain regions. Then these two employees can enlist supporting agencies to help with education and outreach, without asking them to carry the whole burden. Supporting agencies express a desire to help with implementation, but also cited their own capacity issues, which limits how much assistance they are able to provide.

This is not to undermine the importance of species inventory and monitoring actions. This information gathering is a key aspect of adaptive management and provides the data needed to guide management decisions. However, there are already many WRC employees dedicated to this task and very few dedicated to education and outreach, with only two employees dedicated to local government outreach for the whole state. With all groups of interviewees, including WRC, citing the need for education and outreach as a top barrier, it is vital that this barrier be addressed.

The good news is that education and outreach is relatively inexpensive, but it does require dedicated staff time. Gaining support from the public is the only way to put pressure on elected officials to fund conservation, because they respond to the public. It is vital to get the

support of the local communities where the SWAP is to be implemented if the root of capacity issues is to be addressed.

The other good thing is that supporting agencies are available to assist. On average, supporting agencies showed high levels of support for the goals of the NC SWAP. Supporting agencies are available to provide assistance towards education and outreach as well as acquisition of land, advocacy, providing assistance to private landowners, developing policy, providing data, providing grants for restoration and enhancement projects, technical assistance and training (for specific types of support available from each agency see Appendix F). Thirty-nine percent of the supporting agencies interviewed provide support toward education and outreach. These agencies include the Division of Marine Fisheries, Pamlico-Albemarle Wildlife Conservationists, NC Sea Grant, the Pamlico-Tar River Foundation, the Division of Water Resources, the NC Coastal Land Trust, the Beaufort County Cooperative Extension, the Craven County Cooperative Extension and the Neuse River Foundation. These agencies represent opportunities for partnership in addressing education and outreach needs of the SWAP. Some of these contacts are already happening, which is great. All groups reported a high level of support for partnerships.

However, some supporting agencies expressed interest in helping with education and outreach for the SWAP, but weren't aware of the plan. Three employees of supporting agencies expressed interest in helping implement the SWAP or GGT, but said they need training workshops for their staff. Another employee of a supporting agency said they would like to help, but need information on how they can support the SWAP or GGT. That employee stated,

“The biggest thing for us is, what are the priorities that need some action? What are the low hanging fruits, the easy things to pick off where they might be able to use some community support to do that. Because I didn't even know the SWAP existed. So outreach to other non-profit groups like ours, because we can play a role to sort of help be a liaison to community members.

And we work there, so we are local, and can help with local grassroots and sort of build support from the bottom up.”

Most supporting agencies are open to partnerships and I recommend that WRC employees and local governments reach out to supporting agencies in their area for assistance in addressing the need for education and outreach and other issues related to implementation of the SWAP and ecosystem management in general.

Burby and May’s (1998) findings support the recommendation of putting more focus on education and outreach. The researchers had two recommendations for improving local government commitment, including improving the quality of local plans and building constituency interest in, and demands for, the objectives of ecosystem management. There is more commitment by local governments where citizens demand attention towards environmental issues.

I also recommend that the SWAP be used to develop state level policy to guide local implementation of habitat conservation. Local governments and WRC identified the need for stronger regulations as one of their top three barriers to implementation. No local governments reported local policies that comprehensively addressed habitat conservation issues. Sixty-seven percent of local governments interviewed indicated that they depended on the state either partially or totally for conservation planning and regulation. Some said outright that the goals of the SWAP would not be implemented in their communities unless it was forced by the state or federal government.

The recommendation of a state mandate based on the goals of the SWAP falls under Burby and May’s (1998) recommendation of improving the quality of local plans. They found that a general planning mandate is not likely to solve the commitment issue when it comes to environmental goals. The state mandate should require involving all stakeholders in the planning

process and be flexible enough to be adapted to local conditions. “Supportive constituencies can be created through programs that enhance public awareness of environmental problems and also through provisions of environmental mandates that require local governments to undertake collaborative planning processes with affected stakeholders” (Burby and May 1998, p. 95).

The creation and enforcement of state mandates requires an extraordinary amount of political will, which is currently absent in North Carolina. However, research has shown that state mandates can be successful. Berke and French (1994) examined the influence of state mandates on the content and quality of comprehensive plans in five states (including NC) and found that state mandates have a clearly measureable effect in enhancing local plan quality. Although the design of the state mandate itself can be important in determining local plan quality, the researchers found that state mandates have forced local governments to pay greater attention to comprehensive plans and have put additional responsibility on local governments for implementing the adopted plans. Imperial (1999) noted that a variety of institutional structures can work to implement ecosystem management depending on the objectives to be achieved and the political climate at hand. Many local planners in the study area are saying that top-down regulation is the only way to get the objectives of the SWAP accomplished. This presents an issue when the SWAP is a non-regulatory document, which is why I am recommending that the plan be used to develop state level policy to guide development decision-making.

As with capacity issues, we find that the need for education and outreach is at the root of the need for stronger regulations. Elected officials are more likely to pass strong regulations from the state level with voter support. Again, gaining the support of the public is a vital step, which is why addressing the need for education and outreach to both local governments and the public by

shifting staff responsibilities at WRC and developing more partnerships with supporting agencies is the most important recommendation that this research makes.

The last recommendations for tools and strategies to overcome barriers came from the interviewees. Each interviewee was asked about possible tools or strategies that would help their agency implement habitat conservation or improve habitat conservation (implement SWAP or improve SWAP implementation for WRC employees). The tools and strategies identified by local governments include visual materials for education and outreach purposes, data on critical habitat that is not unbuildable, a more detailed land use plan, GIS data that is frequently updated, more information to private landowners on partnering with land trusts for conservation easements, sample ordinances, parcel level data on what land is valuable for conservation and marketing habitat conservation as ecotourism. These recommendations are important because some can help local planners gain consensus from elected officials and the public, and some can help them successfully implement the SWAP.

The tools and strategies identified by WRC employees include better access to information technology (online meeting facilities and university libraries), more in state conferences, and financial incentives for private landowners such as a Transfer of Development Rights program. These recommendations are important because they can help WRC access more data and improve interagency cooperation, as well as reach out to private landowners.

The tools and strategies identified by supporting agencies include cost share programs for living shorelines, certification programs for private forest land, cost share programs for habitat enhancement for private landowners, workshops to train their staff (three identified this strategy), more GIS tools, a factsheet summarizing all the existing conservation plans, information on what they can do to support any given conservation plan, more technical assistance for prescribed

burning (two identified this tool), a summary sheet of the conservation assistance that is available (three identified this tool), workshops for private landowners on days they can attend, and more financial incentives for private landowners in general. These recommendations are important because they can help improve specific habitats such as forests and shorelines, they can help with outreach to private landowners, and they can help supporting agencies understand how to take action on the SWAP and other conservation plans.

Some of these recommendations are easier to address than others. Some require a lot of funding and staff time, such as providing more outreach and incentive programs for private landowners. Some require a lot of staff time, such as providing parcel level data on what land is valuable for conservation. However, some require only a little funding or only a little staff time, relatively speaking. For example, developing visual materials for education and outreach purposes, creating a factsheet summarizing all the existing conservation plans, and sending information to supporting agencies on how they can support SWAP implementation are all low cost activities that can be completed by one or two employees in a few days of time. Providing WRC employees with better information technology such as online meeting facilities and access to university libraries is relatively low cost and requires little to no employee time to get implemented. I would recommend addressing these easy recommendations first, and then moving on to the more difficult recommendations on the list. For example, three interviewees said they would like a summary sheet of the conservation assistance that is available, and I already created that summary sheet for the supporting agencies interviewed (see Appendix F).

Some of the interviewees' recommendations can be incorporated through the GGT. While the GGT handbook contains an educational component about development pressure, the needs of wildlife in the state and how green growth can help, these can easily be developed into

visual materials for education and outreach purposes. There can be materials for elected officials and materials for the public. WRC likely already has materials for presentations to elected officials because they offer this service to local governments who have attended a GGT workshop. However, if these materials were made available as part of the GGT, planners could make these presentations themselves. Marketing habitat conservation as ecotourism is mentioned in the workbook, but it could also be included as part of the elected official education and outreach materials. Information for private landowners on partnering with land trusts for conservation easements could be included as a subset of the public education and outreach materials.

The GGT does contain data on critical habitat and gives details on incorporating conservation into land use plans, so those recommendations have already been achieved by WRC. It is important that the GIS data is updated frequently, and WRC needs to consider how to keep the GGT conservation data up to date since the Natural Heritage Program (which provides the majority of the data) is not updating as frequently due to budget cuts. Providing parcel level GIS data could prove to be an expensive and staff consuming task, but there is a possibility of partnering with universities to achieve this objective. While the GGT does contain a few sample conservation ordinances, zoning ordinances addressing conservation, and examples of developer incentive programs, the toolbox could benefit from more examples.

The tools identified as a need by interviewees are important recommendations to put in place, because being involved in the field of planning and/or conservation on a daily basis, they know where tools are lacking and what they need to get the job done. A popular theme with all groups was the need for more incentives and more outreach to private landowners. There were comments such as, “If we had some money in a fund to offer to local governments that they

could provide as a cost share to waterfront property owners, we could get more of these put in instead of bulkheads.” And “I think a lot of folks do not know what opportunities there are if they want to partner with a group like a Land Trust to have their property in conservation.”

Three supporting agency employees identified the need for a summary sheet of the conservation assistance that is available. One stated, “so the resources are there, it is a matter of knowing about them. Identification of other resources, whether they are monetary resources or technical service providers could help make that work. It is more just about knowing where it is to me, knowing where those resources are.” I have created a summary sheet of the conservation assistance available from the supporting agencies that were interviewed (Appendix F).

Three employees of supporting agencies expressed interest in helping implement the SWAP or GGT, but said they need training workshops for their staff. Another employee of a supporting agency said they would like to help, but need information on how they can support the SWAP or GGT. That employee stated,

“The biggest thing for us is, what are the priorities that need some action? What are the low hanging fruits, the easy things to pick off where they might be able to use some community support to do that. Because I didn’t even know the SWAP existed. So outreach to other non-profit groups like ours, because we can play a role to sort of help be a liaison to community members. And we work there, so we are local, and can help with local grassroots and sort of build support from the bottom up.”

5 Conclusion

5.1 Problem Statement and Findings

This thesis has argued that preserving biodiversity is essential to ecosystem health and productivity. Ecosystem management is currently the generally agreed upon technique to prevent biodiversity loss and restore ecosystem health (Grumbine 1994). Each state has created an ecosystem-based State Wildlife Action Plan (SWAP) in order to continue receiving funding under the State Wildlife Grants Program (Lerner 2006). The plans are intended to present a coordinated action agenda at the state-level for preventing wildlife from becoming endangered.

Although ecosystem management occurs at broad scales and requires support from all levels of government, it must be implemented through local land use decision making in order to be successful (Brody 2003a). There can be barriers associated with implementation of a state plan at the local level, such as a lack of commitment by the local government to tackle environmental issues (Burby & May 1998), lack of biological information (Slocombe 1993), competing interests (Brody 2003b), a focus on economic growth (Slocombe 1993), and a focus on private property rights. It is vital to identify barriers to implementation of the SWAPs at the local level, because without being incorporated into local development decision making processes the plans will not be successful.

This research is a case study focusing on local implementation of the NC SWAP in the three coastal counties of Beaufort, Carteret and Craven. The methodology used was qualitative interviewing. Fifty-two interviews were conducted in total, including 18 local planners (representatives of local governments), five employees of the NC Wildlife Resources Commission (created the NC SWAP) and 29 employees of supporting agencies. The findings presented herein provide insight into how the NC SWAP is being implemented in the study area

and identify barriers to implementation of the NC SWAP. I then used the findings to make recommendations for overcoming barriers and increasing implementation of the plan in the study area.

In general, I found that the NC SWAP does not have the level of local implementation that it needs to be successful in the study area. Most local governments have heard of the NC SWAP, but most have not taken steps towards implementation. However, I found that most local governments personally support the plan, but do not have the support of their governing bodies to take steps toward implementation. Since governing bodies tend to respond to voters, this indicates a lack of support for the goals of ecosystem management from the public.

This lack of implementation and focus on private property rights is the most pronounced in Beaufort County, and least so in Carteret County, where about half of the local governments have taken some step towards implementation, despite limited outreach from the NC Wildlife Resources Commission (WRC) in the area. The reason for Beaufort County showing the least amount of support for the goals of the SWAP may be related to the lower median household and per capita incomes and higher poverty rates in the county, compared to the two other counties in the study area and the state as a whole (US Census 2010). Where the economy is poor, there is generally a lack of commitment for conservation planning (Keough and Blahna 2006, Burby and May 1998). WRC cited a need for more staff as the reason for limited outreach in the study area, as funding cuts from both the state and federal level have caused a staff cap to be initiated within the entire agency. This means that no new permanent full time staff members can be hired.

Specifically, my first research question asked whether local governments were aware of the SWAP and if so what steps the local governments have taken towards implementing the plans. Overall 61% of local governments had heard of the NC SWAP or its Green Growth

Toolbox (online tool to help local governments implement the NC SWAP). One-third of the local governments in Beaufort County had heard of the SWAP or Green Growth Toolbox (GGT) while 60-80% of the local governments in Carteret and Craven County had heard of the SWAP or GGT.

However, only 27% of the total number of local governments who had heard of the SWAP or GGT had taken some step toward implementation. These steps included using the GIS data in the GGT (Town of Beaufort in Carteret County), using the GGT to develop ordinance changes (Morehead City in Carteret County), and using the GGT for transportation planning (Eastern Carolina Council of Governments which is a planning consulting firm serving Carteret and Craven County). By county, no action was taken in Beaufort County, 20% of the local governments who had heard of the SWAP or GGT took action in Craven County, and 50% of the local governments who had heard of the SWAP or GGT took action in Carteret County. These actions occurred at the municipal level and by one planning consulting firm providing services to local governments. No actions were reported at the county level.

Again, the reason cited by most local governments for lack of implementation was lack of support from their governing bodies. This confirms Burby and May's (1998) findings that a lack of commitment by local governments to tackle environmental issues can be a barrier to local implementation of ecosystem management. It also confirms their findings that local commitment varies drastically across NC, as local commitment varied drastically in just this three county study area.

Additionally, 67% of the total number of local governments indicated that their community is totally or partially dependent on the state for conservation planning and regulation. Many said that the NC SWAP would not be implemented in their communities without a

mandate from the state or federal government. These findings are significant to implementation of the NC SWAP, because the plan has no regulatory power. Without the support of local governments the plan will not be implemented through local development decision-making and may therefore not be successful in the study area. These findings indicate that gaining the support of local governments is vital to getting the plan implemented, and this may include gaining the support of the public, because elected officials tend to respond to voters.

My second research question asked whether employees from NC WRC have contacted or worked with local governments in the study area and if so in what capacity. WRC reported Craven County attending a GGT workshop, but couldn't recall others. This was based on memory, not searching statewide records. WRC reported holding one GGT workshop in the northeast coastal region. The NC Coastal Land Trust also reported hosting a GGT workshop in this region in the past, although they do not provide that support to WRC any longer due to capacity issues. Morehead City and the Town of Beaufort reported attending a GGT workshop. Wildlife Diversity Program (the division of WRC in charge of implementation) reports show Carteret County attending a GGT workshop. The NC Coastal Land Trust reported that a Carteret County planner did attend their GGT workshop, but that planner has since left the position. Two other planners had heard of the GGT at other meetings or conferences. (A few other contacts were reported by planners, but none directly related to the SWAP or GGT.)

While local government outreach is occurring in the study area to some extent, it would be more successful if the outreach was more frequent and more personal. The WRC staff member in charge of local government outreach in the study area should know the planners there and reach out to new planners when positions turn over. Broberg (2003) found that biologists and other scientists need to play an active role in shaping local land use decisions to meet the goals of

ecosystem management, and that this must be accomplished by being in close communication with local staff, planning boards and governing bodies. However, the WRC staff is stretched too thin to provide this level of personal support. WRC has two staff members who handle GGT training workshops, one for the Piedmont area and one statewide. So the person in charge of local government outreach for the coastal region is also in charge of the rest of the state. Because of development pressure in the southeast coastal region WRC been focusing their limited resources towards local government outreach on the coast in that high priority area. While WRC expressed interest in the partnerships in the study area and emphasized that they are always available to assist local governments who request it, they expressed difficulty in providing the level of local government outreach they would like to due to capacity issues.

My third research question asks what are barrier to implementation of the NC SWAP in the study area. The need for more education and outreach (local government and public) was the most frequently cited barrier for all three groups. The fact that the local governments, WRC employees and supporting agency employees all see the need for education and outreach as the top barrier to implementation is significant. This finding indicates a need to focus resources towards this objective, but results indicate that very few of WRC's resources are being focused on education and outreach. The Wildlife Diversity Program implementation reports and interviews with WRC employees indicate that the main focus of state implementation efforts has been species inventory and monitoring, which is an important component of adaptive management, but was not a top barrier to implementation cited by any group of interviewees, including WRC. This indicates that state level implementation may not be focusing on the most vital barriers to getting the goals of the SWAP accomplished.

The second top barrier identified overall was capacity issues (lack of funding and staff). Capacity issues were tied as the first top barrier for WRC and were the second top barrier for supporting agencies. These findings indicate that capacity issues are challenging WRC to provide the needed level of education and outreach and these issues are also challenging supporting agencies to fill in the gaps. This confirms Stoms et. al.'s (2010) findings that most state wildlife agencies feel challenged by engaging private landowners and local governments in implementation efforts, and that this is partially due to limited budgets.

The third most commonly identified barrier identified overall was population and development pressure. This was the second most common barrier cited by local governments, it was tied for second by WRC and it was the third most common barrier for supporting agencies. NC currently has 52 federally threatened or endangered species, whose status is a direct or indirect result of rapid development (FWS 2014). Every state in the US has species that are threatened or endangered, and the most serious threat to these species' survival is habitat destruction (Beatley 2000, Brooke et. al 2006). These findings provide further support that implementation must occur at the local level with local development decision making.

For local governments, the third most common barrier was the need for stronger regulations. This was tied for second by WRC. Again, this finding indicates an issue for implementation since the NC SWAP is a non-regulatory document.

5.2 Recommendations

My fourth research question asks about possible tools or strategies that can be used to overcome barriers and increase implementation of the NC SWAP in the study area. I used the findings gathered from the interviews with the support of the literature review to make these recommendations.

One of the most important results of this research is that the need for more education and outreach is possibly the top barrier to implementation of the SWAP and other conservation plans. The first recommendation I have is for WRC's staff cap to be lifted and for the agency to be granted more funding to hire full time staff to focus on education and outreach for the SWAP or GGT. This would be the best way to address the need for more education and outreach because it would not require shifting employees away from other important tasks. It would also provide the opportunity to hire employees who have a background in education if this is a possibility.

If it is not a possibility to hire new staff to fill the need for education and outreach, I recommend shifting the responsibilities of at least four WRC employees who are currently focused on species inventory and monitoring to education and outreach related job duties. This is not to undermine the importance of species inventory and monitoring actions. This information gathering is a key aspect of adaptive management and provides the data needed to guide management decisions. However, there are already many WRC employees dedicated to this task and very few dedicated to education and outreach, with only two employees dedicated to local government outreach for the whole state. With all groups of interviewees, including WRC, citing the need for education and outreach as a top barrier, it is vital that this barrier be addressed.

This brings up the question of why WRC has focused on species inventory and monitoring actions (related to goal one of the SWAP) when there is a greater need for local government and public education and outreach (related to goals four and five of the SWAP). In fact, not one interviewee, including WRC, identified the need for more species inventory and monitoring as a top barrier to implementation. So why has species inventory and monitoring been the main focus? Most WRC employees are biologists by training. Generally biologists are more familiar and comfortable with monitoring wildlife than getting involved in the politics of

local government and public education and outreach. It is possible that they are simply implementing the part of the plan that they have the most expertise in.

However, if we study species and their needs without affecting land use, as the years pass these studies will show fewer and fewer number of these species as more continue to be added to the endangered species list because their habitats have been destroyed by unregulated development. Adaptive management proponents say that just because you don't have all the information doesn't mean you shouldn't manage (Fontaine 2011). Managers adapt their plans and actions as new information comes in, but in the meantime action can still be taken to protect habitat, which conserves biodiversity. The fact is, no matter how much we study we will never have all the information because biological and ecological information is not static, it changes over time.

Land use must be affected if the SWAP is to be successful. Every group of interviewees cited the need for education and outreach as the top barrier because they are aware of this need. The support of the public and local governments must be gained. Supporting agencies can help provide the needed education and outreach. While some supporting agencies are limited by capacity issues, some expressed interest in helping with education and outreach for the SWAP, but weren't even aware of the plan. Most supporting agencies are open to partnerships and I recommend that WRC employees and local governments reach out to supporting agencies in their area for assistance in addressing the need for education and outreach and other issues related to implementation of the SWAP and ecosystem management in general. Supporting agencies and the type of support they provide are listed in Appendix F.

I also recommend that the SWAP be used to develop state level policy to guide local implementation of habitat conservation in development decision making. Local governments and

WRC identified the need for stronger regulations as one of the top three barriers to implementation. No local governments reported local policies that comprehensively addressed habitat conservation issues. Sixty-seven percent of local governments interviewed indicated that they depended on the state either partially or totally for conservation planning and regulation. Some said outright that the goals of the SWAP would not be implemented in their communities unless it was mandated by the state or federal government. These results show that a state mandate may be necessary if the goals of the SWAP are to be achieved.

Research has shown that state mandates can be successful. Berke and French (1994) found that state mandates have a strong impact on environmental goals, as the comprehensive plans they studied which were subject to state mandates had a significantly higher score in this area than plans which were not subject to state mandates. However, they also found that the design of the state mandate is important. They found that the mandate feature that has the highest correlation with achievement of goals is local commitment building (Berke and French 1994). The second most important feature was clarity of the state's goals.

Although the counties in the study area are currently mandated to plan under the Coastal Area Management Act (CAMA), Burby and May (1998) found that when a local government is not committed to tackling environmental issues, a general planning mandate is not likely to solve the issue. They found that the best way to address local commitment issues was to have state mandates that improve the quality of local plans and build constituency interest in, and demands for, attention to the objectives sought by the planning mandates. "State mandates should insist that local governments both involve citizens in the planning process that is mandated and provide information to create awareness of the problems addressed in the plan" (Burby and May 1998,

105). Burby and May's (1998) findings as well as Berke and French's (1994) finding reinforce the importance of a focus on education and outreach.

Imperial (1999) found that in some cases decentralized (bottom-up) approaches to ecosystem management work, but in some cases a centralized (top-down) approach is necessary depending on the local political climate. In either case, he found that coordination should result in standardized information requirements, review procedures, permit stipulations, and required skills of those involved in the process. Many local governments in the study area are saying that top-down regulation is the only way to get the objectives of the SWAP accomplished. Local governments tend to be very knowledgeable about the local political climate within their jurisdictions. This presents an issue when the SWAP is a non-regulatory document, which is why I am recommending that the SWAP be used to develop state level policy to guide development decision making.

However, the state mandate does need to be designed in a way that it is both effective, but not deemed to be overly restrictive or coercive. In addition, where counties are struggling economically the mandate should be funded at full cost instead of as a cost-share grant. Local governments have expressed concern over the failure of higher-level governments to fund the costs of implementation, the lack of flexibility in requirements, and a shift to them of political blame for infringement of property rights (Burby and May 1998). As a consequence, lower-level governments can be reluctant to participate in ecosystem management. If a state mandate is interpreted by local governments as being overly prescriptive or coercive, they may participate half-heartedly, only meeting minimum requirements, or there may be political backlash (Burby and May 1998).

For these reasons it is important that the state mandate be balanced so that it is effective, but gives flexibility to adapt to local conditions. Most importantly, involving the public in the process should be required and there should be guidelines for doing so. There should be standardized reporting requirements that are to be met by each locality, but these reports should be able to accommodate the variety of conditions that exist locally. Also of great importance is that counties which are already struggling economically be funded at full cost to meet the state mandate, and other counties be funded at half cost. If the cost of implementing the mandate is exorbitant, it is going to be difficult for some local governments to comply, which will likely cause animosity and lack of cooperation. However, the mandate still needs to be strict enough to protect the most valuable habitats and corridors, which is why it must be balanced so that it is effective yet flexible. The mandate should also be clear on its goals so that local governments know what to expect. It should also take some of the pressure off of local governments when they are restricting private property rights. Local planners have to look the public in the eye and tell them if they can't do something with their land. Many planners are saying this would be much easier to do if they had a state or federal mandate they can cite as a requirement so that the burden doesn't fall completely on them as a representative of the local government.

The last recommendations for tools and strategies to overcome barriers came from the interviewees. Each interviewee was asked about possible tools and/or strategies that would help their agency implement habitat conservation or improve habitat conservation (implement SWAP or improve SWAP implementation for WRC employees). Based on the results of that question, I also recommend developing visual materials for education and outreach purposes, frequently updating GIS data, providing more outreach and incentive programs to private landowners, providing more sample ordinances, providing parcel level data on what land is valuable for

conservation, marketing habitat conservation as ecotourism where there is more of a focus on the economy than conservation, better access to information technology such as online meeting facilities and access to university libraries for WRC employees, more in state conferences related to conservation, providing workshops to train the staff of supporting agencies on how they can support SWAP implementation, create a factsheet summarizing all the existing conservation plans, providing supporting agencies with information on how they can support implementation of the SWAP, and providing more technical assistance for prescribed burning.

5.3 Limitations and Further Research

This research provides insight into how the NC SWAP is being implemented in Beaufort, Carteret and Craven County. By finding out if and how the plan is being implemented at the local level and identifying barriers to local implementation, I was able to provide valuable recommendations on overcoming barriers and increasing implementation of the NC SWAP in the study area. However, care should be taken when applying these results to other geographic regions, whether to other states or nearby counties. I found that there was much variation in the level of local commitment, even within the study area. The local political environment and therefore the answers to the interview questions will likely differ depending on the region. Further, the use of the non-probability sampling method and the sample size of the study make the results unable to be tested for statistical significance.

However, the research did shed light on the holes in state level implementation of the NC SWAP. There has been a focus on species inventory and monitoring, but a lack of focus on education and outreach, even though education and outreach was cited as the top barrier to implementation by all groups and the need for more information on species was not cited as a top barrier by any group, including WRC. The main focus of state level implementation has not been

where the need exists. While species inventory and monitoring is an important part of adaptive management, education and outreach are equally important.

Without support from local governments and the public, land use will not be affected and the studies being conducted will show dwindling populations of wildlife species. This rings true not only for effectiveness of the SWAP, but for other habitat conservation or ecosystem management plans as well. My conclusion is that WRC has put this focus on species inventory and monitoring because the majority of their staff are biologists by training and are therefore more comfortable with studying wildlife than the politics of local government and public education and outreach. Further research on the subject could study state level implementation of SWAPs in other states to determine if there is a similar focus. However, limitations to be noted include low study numbers, a lack of quantitative data, and that no measurement of species performance occurred.

While local commitment varied even within the study area, the results showed that where there is a low level of commitment, the issue does not usually stem from the planners, who understand the importance of conservation due to their training, but from the local elected officials. Generally, local elected officials will become interested if the voting public becomes interested. This is why education and outreach to the public and elected officials is so important, and why it was identified as the top barrier to implementation by all groups of interviewees. There needs to be consensus that environmental problems are important to tackle and that ecosystem management is the best way to do so. It is possible that a state mandate which requires local governments to plan for conservation and protect the most valuable wildlife habitat, while also being flexible enough to adapt to local conditions and requiring involving the public in the process may be the best balance between top-down and bottom-up approaches in areas where

local commitment is an issue. Berke and French (1994) and Burby and May (1998) have already shown the effectiveness of this type of mandate, although further studies on the topic could prove useful. In addition, as education and outreach to the public and local elected officials is carried out, there should be research tracking the effectiveness of the various initiatives.

The interview questions designed for this study can be used to study implementation of the NC SWAP in other counties and to study local implementation of SWAPs in other states. This study provides guidance for further research on SWAP implementation in other geographic regions. With the second update of the SWAPs due to be released this year, the time is right for research studying local implementation of the plans. This study would be useful to professional planners, state wildlife agencies implementing SWAPs, natural resource managers and biologists, non-profits and others involved in the field of habitat conservation and/or ecosystem management.

References

- Albemarle-Pamlico National Estuary Partnership (APNEP). "About APNEP." (2015). Web. Accessed 15 Feb. 2015.
http://portal.ncdenr.org/web/apnep/about?p_p_id=15&p_p_lifecycle=1&p_p_state=normal
- American Bar Association. "Overview of the Endangered Species Act and Highlights of Recent Legislation." (2004). Web. Accessed 23 May 2015.
<http://apps.americanbar.org/environ/committees/endangered/OverviewoftheESA.pdf>
- American Planning Association. "What is Planning?" (2015). Web. Accessed 28 June 2015.
<https://www.planning.org/aboutplanning/whatisplanning.htm>
- Bazeley, Pat. *Qualitative Data Analysis with NVivo*. London: Sage Publications, 2007. Print.
- Beatley, Timothy. "Preserving Biodiversity." *Journal of the American Planning Association* 66.1 (2000). Web. Accessed 08 December 2013.
<http://search.proquest.com.jproxy.lib.ecu.edu/docview/229726041/fulltextPDF?accountid=10639>
- Beatley, Timothy. "Protecting Biodiversity in Coastal Environments: Introduction and Overview." *Coastal Management* 19.1 (1991). Web. Accessed 18 February 2014.
<http://www.tandfonline.com.jproxy.lib.ecu.edu/doi/pdf/10.1080/08920759109362128>
- Berke, Philip R. and French, Steven P. "The Influence of State Planning Mandates on Local Plan Quality." *Journal of Planning Education and Research* 13 (1994). Web. Accessed 26 April 2015. <http://jpe.sagepub.com.jproxy.lib.ecu.edu/content/13/4/237.full.pdf+html>
- Broberg, Len. "Conserving Ecosystems Locally: A Role for Ecologists in Land Use Planning." *Professional Biologist* 53.7 (2003). Web. Accessed 11 February 2014.
<http://bioscience.oxfordjournals.org.jproxy.lib.ecu.edu/content/53/7/670.full.pdf+html>
- Brody, Samuel D. "Implementing the Principles of Ecosystem Management through Local Land Use Planning." *Population and Environment* 24.6 (2003a). Web. Accessed 08 December 2013.
<http://search.proquest.com.jproxy.lib.ecu.edu/docview/208855267/fulltextPDF?accountid=10639>
- Brody, Samuel D. "Measuring the Effects of Stakeholder Participation on the Quality of Local Plans Based on the Principles of Collaborative Ecosystem Management." *Journal of Planning Education and Research* 22.4 (2003b). Web. Accessed 11 February 2014.
<http://jpe.sagepub.com.jproxy.lib.ecu.edu/content/22/4/407.full.pdf+html>
- Brooks T.M., Mittermeier R.A., da Fonseca G.A.B., Gerlach J., Hoffman M., Lamoreux J.F., Mittermeier, C.G., Pilgrim J.D., and Rodrigues A.S.L. "Global Biodiversity Conservation Priorities." *Science* 313.58 (2006). Web. Accessed 11 February 2014.
<http://www.sciencemag.org.jproxy.lib.ecu.edu/content/313/5783/58.full.pdf>

- Burby, Raymond J. and May, Peter J. "Addressing the Commitment Conundrum." *Journal of Environmental Planning and Management* 41.1 (1998). Web. Accessed 19 April 2014. <http://www.tandfonline.com.jproxy.lib.ecu.edu/doi/pdf/10.1080/09640569811812>
- Clifford, Nicholas, French Shaun and Valentine, Gill. *Key Methods in Geography*. Thousand Oaks, CA: Sage Publications Inc., 2010. Print.
- Christensen, Norman L., Bartuska, Ann M., Brown, James H., Carpenter, Stephen, D'Antonio, Carla, Francis, Rober, Franklin, Jerry F., MacMahon, James A., Noss, Reed F., Parsons, David J., Peterson, Charles H., Turner, Monica G., and Woodmansee, Robert G. "The Report of the Ecological Society of America Committee on the Scientific Basis for Ecosystem Management." *Ecological Applications* 6.3 (1996). Web. Accessed 19 April 2014. <http://www.esajournals.org.jproxy.lib.ecu.edu/doi/abs/10.2307/2269460>
- Conservation Trust for North Carolina (CTNC). "North Carolina's Land Trusts." (2015). Web. Accessed 15 Feb. 2015. <http://www.ctnc.org/north-carolina-local-land-trusts/find-local-land-trust/>
- Cortner, Hanna J., Wallace, Mary G., Burke, Sabrina, Moote, Margaret A. "Institutions Matter: The Need to Address the Institutional Challenges of Ecosystem Management." *Landscape and Urban Planning* 40.1 (1998). Web. Accessed 08 December 2013. http://ac.els-cdn.com/S0169204697001084/1-s2.0-S0169204697001084-main.pdf?_tid=bdce4098-a08d-11e3-962e-00000aab0f6b&acdnat=1393601818_79cc1444766d495551cd504bdaede984
- Cortner, Hanna J. and Moote, Margaret A. *The Politics of Ecosystem Management*. Washington, DC: Island Press, 1999. Print.
- DiCicco-Bloom, Barbara and Crabtree, Benjamin F. "The Qualitative Research Interview." *Medical Education* 40.4 (2006). Web. Accessed 2 May 2015. <http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2929.2006.02418.x/epdf>
- Fontaine, Joseph J. "Improving our legacy: Incorporation of Adaptive Management into State Wildlife Action Plans." *Journal of Environmental Management* 92.5 (2011). Web. Accessed 08 December 2013. http://ac.els-cdn.com/S0301479710003440/1-s2.0-S0301479710003440-main.pdf?_tid=4e2437ca-c4f0-11e3-a8ae-00000aacb362&acdnat=1397602393_0c9e784e47805309f3ecc40ac59ea7fd
- Franklin, Jerry F. *Ecosystem Management: An Overview*. Stevens Point, WI: Yale University Press, 1997. Print.
- Gaydos, Joseph K., Dierauf, Leslie, Kirby, Grant, Brosnan, Deborah, Gilardi, Kirsten, Davis, Gary E. "Top 10 Principles for Designing Healthy Ecosystems Like the Salish Sea." *EcoHealth* 5 (2008). Web. Accessed 17 June 2015. <http://download.springer.com/static/pdf/254/art%253A10.1007%252Fs10393-009-0209-1.pdf?originUrl=http%3A%2F%2Flink.springer.com%2Farticle%2F10.1007%2Fs10393-009->

[0209-1&token2=exp=1434548720~acl=%2Fstatic%2Fpdf%2F254%2Fart%25253A10.1007%252Fs10393-009-0209-1.pdf%3ForiginUrl%3Dhttp%253A%252F%252Flink.springer.com%252Farticle%252F10.1007%252Fs10393-009-0209-1*~hmac=c538c38b44a42edf379cd84053968d73557b1d6542ebbd4c34db816df18849d8](http://www.springer.com/252F10.1007/252Fs10393-009-0209-1)

Grumbine, Edward R. "What is Ecosystem Management?" *Conservation Biology* 8.1 (1994). Web. Accessed 08 December 2013.
<http://www.jstor.org.jproxy.lib.ecu.edu/stable/pdfplus/2386718.pdf?acceptTC=true&acceptTC=true&jpdConfirm=true>

Hahn, Chris. *Doing Qualitative Research Using Your Computer: A Practical Guide*. Thousand Oaks, CA: Sage Publications, 2008. Print.

Hause, Eric. "Coastal Carolina Wildlife." (2011). *Coastal Guide*. Web. Accessed 30 March 2014.
<http://www.coastalguide.com/packet/nc-wildlife.shtml>

Hay, Ian. *Qualitative Research Methods in Human Geography*. South Melbourne, Victoria, Australia: Oxford University Press, 2000. Print.

Henry, Gary T. *Practical Sampling*. Newbury Park, CA: Sage Publications, 1990. Print.

Imperial, Mark T. "Institutional Analysis and Ecosystem-Based Management: The Institutional Analysis and Development Framework." *Environmental Management* 24.4 (1999). Web. Accessed 26 April 2015.
http://download.springer.com/static/pdf/322/art%253A10.1007%252Fs002679900246.pdf?originUrl=http%3A%2F%2Flink.springer.com%2Farticle%2F10.1007%2Fs002679900246&token2=exp=1436716602~acl=%2Fstatic%2Fpdf%2F322%2Fart%25253A10.1007%252Fs002679900246.pdf%3ForiginUrl%3Dhttp%253A%252F%252Flink.springer.com%252Farticle%252F10.1007%252Fs002679900246*~hmac=20336a5f52dfcb71c19b91684797a2a2275f0acb2237799ff23be12426d8b4e1

Keough, Heather L. & Blahna, Dale J. "Achieving Integrative, Collaborative Ecosystem Management." *Conservation Biology* 20.5 (2006). Web. Accessed 27 February 2014.
<http://onlinelibrary.wiley.com.jproxy.lib.ecu.edu/doi/10.1111/j.1523-1739.2006.00445.x/pdf>

La Pelle, Nancy. "Simplifying Qualitative Data Analysis Using General Purpose Software Tools." *Field Methods* 16.1. (2004). Web. Accessed 3 May 2015.
<http://fm.sagepub.com.jproxy.lib.ecu.edu/content/16/1/85.full.pdf+html>

Lackey, Robert T. "Seven Pillars of Ecosystem Management." *Landscape and Urban Planning* 40 (1998). Web. Accessed 11 February 2014. http://ac.els-cdn.com/S0169204697000959/1-s2.0-S0169204697000959-main.pdf?_tid=44d4e370-935b-11e3-b2bc-00000aacb361&acdnat=1392150775_d96c7bbc35f393c9ab82e541628f627c

- Lerner, Jeff, Cochran, Bobby and Michalak, Julia. "Conservation Across the Landscape: A Review of the State Wildlife Action Plans." *Defenders of Wildlife* (2006). Web. Accessed 11 February 2014. http://www.defenders.org/publications/conservation_across_the_landscape_handout.pdf
- Limb, Melanie and Dwyer, Claire. *Qualitative Methodologies for Geographers*. New York, NY: Oxford University Press Inc., 2001. Print.
- Lubell, Mark, Feiock, Richard C., and Ramirez, Edgar. (2005) "Political Institutions and Conservation by Local Governments." *Urban Affairs Review* 40.6. Web. Accessed 11 February 2015. <http://uar.sagepub.com.jproxy.lib.ecu.edu/content/40/6/706.full.pdf+html>
- Luczkovich, Joseph J. "Environments and Ecosystems of North Carolina." East Carolina University Institute for Coastal and Marine Resources and Department of Biology. (2001). Web. Accessed 15 February 2015. <http://core.ecu.edu/BIOL/luczkovichj/NCecol/NCnathis.htm>
- MacQueen, Kathleen M. et al. *Handbook for Team-Based Qualitative Research*. Plymouth, United Kingdom: AltaMira Press, 2008. Print.
- Michalak, Julia and Lerner, Jeff. "Linking Conservation and Land Use Planning: Using the State Wildlife Action Plans to Protect Wildlife from Urbanization." (2008). *Transportation Land Use, Planning, and Air Quality Congress 2007*. Web. Accessed 11 February 2014. <http://ascelibrary.org.jproxy.lib.ecu.edu/doi/pdf/10.1061/40960%28320%294>
- Miles, Matthew B. and Huberman, A.M. *Qualitative Data Analysis: A Sourcebook of New Methods*. Thousand Oaks, CA: Sage Publications, 1984. Print.
- Miller, Gale and Dingwall, Robert. *Context and Method in Qualitative Research*. Thousand Oaks, CA: Sage Publications, 1997. Print.
- National Association of Conservation Districts (NACD). "About Conservation Districts." (2012). Web. Accessed 15 Feb. 2015. <http://www.nacdnet.org/about/districts>
- National Oceanic and Atmospheric Association (NOAA). "National Ocean Service Education Discovery Kits: Estuaries." (2005). Web. Accessed 15 April 2014. http://oceanservice.noaa.gov/education/tutorial_estuaries/lessons/estuaries_tutorial.pdf
- National Oceanic and Atmospheric Association (NOAA). "NOAA Confirms Caribbean Monk Seals Extinction." (2008). Web. Accessed 23 May 2015. http://www.noaaneews.noaa.gov/stories2008/20080606_monkseal.html
- National Oceanic and Atmospheric Association (NOAA). "National Coastal Population Report: Population Trends from 1970 to 2020." (2013). Web. Accessed 19 April 2014. <http://stateofthecoast.noaa.gov/features/coastal-population-report.pdf>

- National Wildlife Federation (NWF). "What is Biodiversity?" (2012). Web. Accessed 19 April 2014.
<http://www.nwf.org/Wildlife/Wildlife-Conservation/Biodiversity.aspx>
- Nature Conservancy. Southeast Coastal Plain. (2014). Web. Accessed 30 March 2014.
<http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/northcarolina/placesweprotect/coastal-plain.xml>
- NC State University (NCSU) Cooperative Extension. "Departments and Partners." (2015). Web. Accessed 15 Feb. 2015. <http://www.ces.ncsu.edu/departments-partners/>
- NC Wildlife Resources Commission (WRC). "NC State Wildlife Action Plan." (2005). Web. Accessed 08 December 2013.
http://www.ncwildlife.org/Portals/0/Conserving/documents/ActionPlan/WAP_complete.pdf
- NC Wildlife Resources Commission (WRC). "About the Green Growth Toolbox." (2015). Web. Accessed 30 May 2015.
<http://www.ncwildlife.org/Conserving/Programs/GreenGrowthToolbox/AboutGGT.aspx>
- Phillips, Richard and Johns, Jennifer. *Fieldwork for Human Geography*. Thousand Oaks, CA: Sage Publications, 2012. Print.
- Poiani, Karen A., Richter, Brian D., Anderson, Mark D., and Richter Holly E. "Biodiversity Conservation at Multiple Scales: Functional Sites, Landscapes, and Networks." *BioScience* 50.2 (2000). Web. Accessed 18 February 2014.
<http://bioscience.oxfordjournals.org/content/50/2/133.full.pdf+html>
- Riggs, Stanley, Ames, Dorthea V., Culver, Stephen J., and Mallinson, David J. *The Battle for North Carolina's Coast*. Chapel Hill, NC: The University of North Carolina Press, 2011. Print.
- Saldana, Johnny. *The Coding Manual for Qualitative Researchers*. Thousand Oaks, CA: Sage Publications, 2009. Print.
- Shah, Anup. "Why Is Biodiversity Important? Who Cares?." *Global Issues*. 19 (2014). Web. Accessed 22 May. 2015. <http://www.globalissues.org/article/170/why-is-biodiversity-important-who-cares>
- Sea Grant North Carolina (SGNC). "Our Team." (2015). Web. Accessed 15 Feb. 2015.
<http://ncseagrant.ncsu.edu/about-us/our-team>
- Slocombe, Scott D. "Implementing Ecosystem-Based Management: Development of Theory, Practice, and Research for Planning and Managing a Region." *BioScience* 43.9 (1993). Web. Accessed 08 December 2013.
<http://www.jstor.org.jproxy.lib.ecu.edu/stable/pdfplus/1312148.pdf?&acceptTC=true&jpdConfirm=true>

Society of American Foresters. "The Dictionary of Forestry." (2008). Web. Accessed 19 April 2014.
http://dictionaryofforestry.org/dict/term/ecosystem_management

Steel, Brent S. and Weber, Edward. "Ecosystem Management, Decentralization and Public Opinion." *Global Environmental Change* 11 (2001). Web. Accessed 26 April 2015. http://ac.els-cdn.com/S0959378000000625/1-s2.0-S0959378000000625-main.pdf?_tid=e9abd3ce-ec59-11e4-ab40-00000aab0f02&acdnat=1430083344_9fbc92aaa88b3e3fb3e01a95e106f9a8

Stoms, David, Davis, Frank and Scott, Michael J. "Implementation of State Wildlife Action Plans: Conservation Impacts, Challenges and Enabling Mechanisms." *U.S. Geological Survey Gap Analysis Bulletin* 17 (2010). Web. Accessed 11 February 2014.
<http://www.gap.uidaho.eduwww.gap.uidaho.edu/bulletins/17/Stoms.pdf>

Strauss, Anselm and Corbin, Juliet M. *Basics of Qualitative Research: Grounded Theory, Procedures and Techniques*. Thousand Oaks, CA: Sage Publications, 1990. Print.

Szaro, Robert C., Sexton, William T., and Malone, Charles R. "The Emergence of Ecosystem Management as a Tool for Meeting People's Needs and Sustaining Ecosystems." *Landscape and Urban Planning* 40.1 (1998). Web. Accessed 08 December 2013. http://ac.els-cdn.com/S0169204697000935/1-s2.0-S0169204697000935-main.pdf?_tid=a5e1376c-60ee-11e3-94f8-00000aab0f6b&acdnat=1386606565_dc5ce9f07d1ae4c92c97d30aaf12fa7d

Tansey, Oisín. "Process Tracing and Elite Interviewing: A Case for Non-Probability Sampling." *Political Science and Politics* 4 (2007). Web. Accessed 2 May 2015.
http://journals.cambridge.org.jproxy.lib.ecu.edu/download.php?file=%2FPSC%2FPSC40_04%2FS1049096507071211a.pdf&code=d9615835ad8960cdbe3d4e84592ebdd3

Thomas, Jack Ward. "Forest Service Perspective on Ecosystem Management." *Ecological Applications* 6.3 (1996). Web. Accessed 22 May 2015.
<http://www.jstor.org.jproxy.lib.ecu.edu/stable/pdfplus/2269465.pdf?acceptTC=true&jpdConfirm=true>

United Nations Environment Program. "Convention on Biological Diversity." (2014). Web. Accessed 22 May 2015.
<https://www.cbd.int/marine/important.shtml>

US Census Bureau. "State and County Quick Facts." (2010). Web. Accessed 30 March 2014.
<http://quickfacts.census.gov/qfd/states/37/37013.html>
<http://quickfacts.census.gov/qfd/states/37/37031.html>
<http://quickfacts.census.gov/qfd/states/37/37049.html>

US Census Bureau. "State and County Quick Facts." (2013a). Web. Accessed 28 June 2015.
<http://quickfacts.census.gov/qfd/states/37/37013.html>
<http://quickfacts.census.gov/qfd/states/37/37031.html>
<http://quickfacts.census.gov/qfd/states/37/37049.html>

- US Census Bureau. "Selected Economic Characteristics. American Community Survey 5-Year Estimates." (2013b). Web. Accessed 28 June 2015.
<http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml>
- US Department of Agriculture, Soil Conservation Service. "Soil Survey of Craven County, North Carolina." (1989). Web. Accessed 30 May 2015.
http://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/north_carolina/NC049/0/craven.pdf
- US Dept. of the Interior. "National Estuary Study." (1970). Web. Accessed 29 June 2015.
<http://babel.hathitrust.org/cgi/pt?id=umn.31951p00622614g;view=1up;seq=10>
- US Fish and Wildlife Service (FWS). "Endangered and Threatened Species and Species of Concern by County for North Carolina." (2014). Web. Accessed 30 March 2014.
http://www.fws.gov/raleigh/species/cntylist/nc_counties.html
http://www.fws.gov/raleigh/es_tes.html
- US Fish and Wildlife Service (FWS). "Listed Animals." (2015a). Web. Accessed 23 May 2015.
http://ecos.fws.gov/tess_public/reports/ad-hoc-species-report?kingdom=V&kingdom=I&status=E&status=T&status=EmE&status=EmT&status=EXPE&status=EXPN&status=SAE&status=SAT&mapstatus=3&fcrithab=on&fstatus=on&fspecrule=on&finvpop=on&fgroup=on&header>Listed+Animals
- US Fish and Wildlife Service (FWS). "Environmental Conservation Online Report: Delisting Report." (2015b). Web. Accessed 23 May 2015. https://ecos.fws.gov/tess_public/reports/delisting-report
- US Fish and Wildlife Service (FWS). "State Wildlife Grant Program – Overview." (2013a). Web. 16 April 2014. <http://wsfrprograms.fws.gov/Subpages/GrantPrograms/SWG/SWG.htm>
- US Fish and Wildlife Service (FWS). "ESA Basics: 40 Years of Conserving Endangered Species." (2013b). Web. Accessed 23 May 2015. http://www.fws.gov/endangered/esa-library/pdf/ESA_basics.pdf
- US Fish and Wildlife Service (FWS). "Wildlife Conservation and Restoration Grant Fund." (2011). Web. Accessed 16 April 2014.
<https://www.cfda.gov/index?s=program&mode=form&tab=core&id=177a95100048215c01b0b69f793acd2d>
- Walker, Brian & Salt, David. *Resilience Thinking: Sustaining Ecosystems and People in a Changing World*. Washington, DC: Island Press, 2006. Print.
- Walters, Carl. "Challenges in Adaptive Management of Riparian and Coastal Ecosystems." *Conservation Ecology* 1.2 (1997). Web. Accessed 23 May 2015.
http://water.epa.gov/lawsregs/guidance/wetlands/upload/2004_11_17_wetlands_MitigationActionPlan_performance_Walters1997.pdf

- Wildlife Diversity Program (WDP), NC Wildlife Resources Commission. "Annual Program Report 2007-2008." (2008). Web. Accessed 11 February 2014.
http://www.ncwildlife.org/Portals/0/Conserving/documents/WildlifeDiversity/AnnualProgramReport_WD_07-08.pdf
- Wildlife Diversity Program (WDP), NC Wildlife Resources Commission. "Annual Program Report 2008-2009." (2009). Web. Accessed 11 February 2014.
http://www.ncwildlife.org/Portals/0/Conserving/documents/WildlifeDiversity/AnnualProgramReport_WD_08-09.pdf
- Wildlife Diversity Program (WDP), NC Wildlife Resources Commission. "Annual Program Report 2009-2010." (2010). Web. Accessed 11 February 2014.
http://www.ncwildlife.org/Portals/0/Conserving/documents/2009-10_WD_AnnualProgram%20Report.pdf
- Wildlife Diversity Program (WDP), NC Wildlife Resources Commission. "Annual Program Report 2010-2011." (2011). Web. Accessed 11 February 2014.
http://www.ncwildlife.org/Portals/0/Conserving/documents/2010-11_WD_AnnualProgramReport.pdf
- Wildlife Diversity Program (WDP), NC Wildlife Resources Commission. "Wildlife Diversity Quarterly Update Jan. - Mar. 2012." (2012a). Web. Accessed 11 February 2014.
http://www.ncwildlife.org/Portals/0/Conserving/documents/WildlifeDiversity/2012_WDP_First_Qtr_Report.pdf
- Wildlife Diversity Program (WDP), NC Wildlife Resources Commission. "Wildlife Diversity Quarterly Update Apr. - June 2012." (2012b). Web. Accessed 11 February 2014.
http://www.ncwildlife.org/Portals/0/Conserving/documents/WildlifeDiversity/2012_WDP_2nd_Qtr_Report.pdf
- Wildlife Diversity Program (WDP), NC Wildlife Resources Commission. "Wildlife Diversity Quarterly Update July - Sept. 2012." (2012c). Web. Accessed 11 February 2014.
http://www.ncwildlife.org/Portals/0/Conserving/documents/WildlifeDiversity/2012_WDP_Third_Qtr_Report.pdf
- Wildlife Diversity Program (WDP), NC Wildlife Resources Commission. "Wildlife Diversity Quarterly Update Oct. - Dec. 2012." (2012d). Web. Accessed 11 February 2014.
http://www.ncwildlife.org/Portals/0/Conserving/documents/WildlifeDiversity/2012_WDP_Fourth_Qtr_Report.pdf
- Wildlife Diversity Program (WDP), NC Wildlife Resources Commission. "Wildlife Diversity Quarterly Update Jan. - Mar. 2013." (2013a). Web. Accessed 11 February 2014.
http://www.ncwildlife.org/Portals/0/Conserving/documents/WildlifeDiversity/2013_WDP_First_Qtr_Report.pdf

- Wildlife Diversity Program (WDP), NC Wildlife Resources Commission. "Wildlife Diversity Quarterly Update Apr. - June 2013." (2013b). Web. Accessed 11 February 2014.
http://www.ncwildlife.org/Portals/0/Conserving/documents/WildlifeDiversity/2013_WDP_2nd_Qtr_Report.pdf
- Wildlife Diversity Program (WDP), NC Wildlife Resources Commission. "Wildlife Diversity Quarterly Update July - Sept. 2013." (2013c). Web. Accessed 11 February 2014.
http://www.ncwildlife.org/Portals/0/Conserving/documents/WildlifeDiversity/2013_WDP_3rd_Qtr_Report.pdf
- Wildlife Diversity Program (WDP), NC Wildlife Resources Commission. "Wildlife Diversity Quarterly Update Oct. - Dec. 2013." (2013d). Web. Accessed 11 February 2014.
http://www.ncwildlife.org/Portals/0/Conserving/documents/WildlifeDiversity/2013_WDP_4th_Qtr_Report.pdf
- Wildlife Diversity Program (WDP), NC Wildlife Resources Commission. "Wildlife Diversity Quarterly Update Jan. - Mar. 2014." (2014a). Web. Accessed 11 February 2014.
<http://www.ncwildlife.org/Portals/0/Conserving/documents/WildlifeDiversity/2014-WDP-1st-Qtr-Report.pdf>
- Wildlife Diversity Program (WDP), NC Wildlife Resources Commission. "Wildlife Diversity Quarterly Update Apr. - June 2014." (2014b). Web. Accessed 11 February 2014.
<http://www.ncwildlife.org/Portals/0/Conserving/documents/WildlifeDiversity/2014-WDP-2nd-Qtr-Report.pdf>
- Wildlife Diversity Program (WDP), NC Wildlife Resources Commission. "Wildlife Diversity Quarterly Update July - Sept. 2014." (2014c). Web. Accessed 11 February 2014.
<http://www.ncwildlife.org/Portals/0/Conserving/documents/WildlifeDiversity/2014-WDP-Third-Qtr-Report.pdf>
- Wildlife Diversity Program (WDP), NC Wildlife Resources Commission. "Wildlife Diversity Quarterly Update Oct. - Dec. 2014." (2014d). Web. Accessed 11 February 2014.
<http://www.ncwildlife.org/Portals/0/Conserving/documents/WildlifeDiversity/2014-WDP-Fourth-Qtr-Report.pdf>
- Williams, Ted. "The Battle Over a North Carolina Beach Continues." *Audubon Magazine* (2012). Web. Accessed 23 May 2015. <http://www.audubon.org/magazine/september-october-2012/the-battle-over-north-carolina-beach>
- Yaffee, Steven L. "Three Faces of Ecosystem Management." *Conservation Biology* 13.4 (1999). Web. Accessed 19 April 2014. <http://onlinelibrary.wiley.com.jproxy.lib.ecu.edu/doi/10.1046/j.1523-1739.1999.98127.x/pdf>

Yaffee, Steven L., Phillips, Ali F., Frentz, Irene C., Hardy, Paul W., Maleki, Sussanne M., and Thorpe, Barbara E. *Ecosystem Management in the United States*. Washington, DC: Island Press, 1996. Print.

Yin, Robert K. *Case Study Research Design and Methods*. Thousand Oaks, CA: Sage Inc., 2009. Print.

Appendices

Appendix A: NC SWAP Implementation Reports

The Wildlife Diversity Program, the division of the NC Wildlife Resources Commission in charge of implementing the SWAP, published annual program reports from 2007 - 2011 before they started providing quarterly program updates in 2012 (WDP 2008, 2009, 2010, 2011, 2012a, 2012b, 2012c, 2012d, 2013a, 2013b, 2013c, 2013d, 2014a, 2014b, 2014c, 2014d). Each program report was searched for actions in the Pamlico basin, the Neuse basin and each county specifically. This data was also used to make initial observations on how much progress has been made towards meeting the goals and key themes of NC SWAP.

2007 - 2008 Annual Report (WDP 2008):

- The Pamlico estuary was determined to be one of the four most important habitats in the “Breeding Shorebird Survey”, for birds such as the American Oyster Catcher and Wilson’s plovers. The majority of American oystercatchers and Wilson’s plovers were found from Carteret County south and were concentrated near inlets where many of the state’s dredge islands are located as well as high quality habitat on many of the state’s barrier island spits.
- Stumpy Point Bay along the western shore of the Pamlico Sound is one of 21 state owned estuarine islands that are now being protected from development and managed to protect nesting colonial waterbirds and shorebirds from human disturbance.
- The bald eagle monitoring program identified the Tar-Pamlico River as having the most known nesting territories in the state (15). Beaufort County has the most nesting sites of any county in the state (11), while Craven County has the second highest number of nesting sites (9). The bald eagle monitoring program identified a new nesting territory in Beaufort County and along the Neuse in Pamlico County. The Neuse River now has five known nesting sites.
- In the coast wide colonial waterbird survey the majority of nesting colonial waterbirds were found in Pamlico Sound, Core Sound, and the lower Cape Fear River. The coast wide colonial waterbird survey also identified losses and changes in habitat on several natural islands. Rawls Island (privately owned) located along the western shoreline of the Pamlico Sound is said to be disappearing.
- Several programs and workshops were given on colonial waterbirds and shorebirds including presentations to the Lower Neuse Birds Club.
- Surveyed important bird areas within the Bogue Inlet Complex (Carteret County) as part of the “Bogue Inlet Waterbird Monitoring and Management” plan.

- Protected nesting habitat, protected high quality foraging and roosting habitat, and prevented human and animal disturbance to waterbirds within the Bogue Inlet Complex as part of the “Bogue Inlet Waterbird Monitoring and Management” plan.
- Brochures were distributed to visitors of Bogue Inlet and an article was featured in *Dropping Anchor* magazine for the public education aspect of the “Bogue Inlet Waterbird Monitoring and Management” plan.
- The Sea Turtle Monitoring Program monitored sea turtle nesting sites on Bogue Banks in Carteret County for the sixth year in a row.
- Presentation of NC Birding Trail was given to Carteret County Tourism Development Authority.

2008- 2009 Annual Report (WDP 2009):

- Prime eagle habitat was surveyed and one alternate nest location was located in both Beaufort and Washington counties. For this period Craven County added three new nesting territories, giving it the highest number of eagle nesting territories of any county in the state (12). Beaufort County had the second highest number of eagle nesting territories (11).
- The STSSN located and released stranded sea turtles on Carteret county beaches (64 found live in Carteret and Dare Counties).
- Gull Island located in the Pamlico Sound near Salvo was purchased by the commission for coastal region waterbird management.
- Inland heronry surveys were conducted in portions of the Neuse River basin. 17 new colonies were located along the Neuse.
- Worked with the Emerald Isle Summer Camp and Outdoor Service Club at West Carteret High School.
- Created a new public brochure titled “Sharing the Shore with North Carolina’s Beach-Nesting Birds”.
- Surveyed important bird areas within the Bogue Inlet Complex (Carteret County) as part of the “Bogue Inlet Waterbird Monitoring and Management” plan.
- Protected nesting habitat, protected high quality foraging and roosting habitat, and prevented human and animal disturbance to waterbirds within the Bogue Inlet Complex as part of the “Bogue Inlet Waterbird Monitoring and Management” plan.
- Brochures were distributed to visitors of Bogue Inlet and an article was featured in *Dropping Anchor* magazine for the public education aspect of the “Bogue Inlet Waterbird Monitoring and Management” plan.

2009- 2010 Annual Report (WDP 2010):

- Beaufort County was identified to be in the conservation range for the gopher frog.
- The Breeding Bird Survey (BBS) is a long term, large scale, international avian monitoring program initiated to track the status and trends of North American bird populations. Two BBS routes were completed in both Beaufort and Craven County in May and June 2010.

- The STSSN located and released 55 stranded sea turtles in Carteret and Dare County beaches.
- Before the 2010 nesting season began, Wildlife Diversity personnel and volunteers posted the perimeter of nesting sites on state owned islands in or near the Pamlico Sound.
- 132 American Oyster Catcher pairs were found in Carteret County during the 2010 breeding season.
- Restoration and enhancement activities occurred on 2 sites in the Croatan National Forest (Carteret County).

2010 - 2011 Annual Report (WDP 2011):

- The coastal region landbird investigation program showed that the Henslow's Sparrow occupies an extremely restricted breeding range in NC with only two known breeding populations, both of which occur at Voice of America (VOA) broadcasting sites A and B in Beaufort and Pitt Counties. This is because open, herbaceous land cover is extremely scarce in NC. Thirty-three Henslow's Sparrows were identified at the site in Beaufort County.
- Two BBS routes were completed in both Craven and Beaufort County in May and June 2011.
- The waterbirds investigations and management program also identified 15 Common Tern nesting colonies in 2011; most were on islands in the Back, Core, and Pamlico Sounds.
- Before the 2010 nesting season began, Wildlife Diversity personnel and volunteers posted the perimeter of nesting sites on state owned islands in or near the Pamlico Sound.
- The Wildlife Diversity staff provided technical guidance to long-term studies of the Pamlico-Albemarle Sounds.
- The STSSN identified a concentrated cold-stunning event in the estuarine waters of Core and Pamlico Sounds in December 2010. 175 sea turtles were found, but only 74 survived. The surviving turtles were placed in rehabilitation centers or aquariums for treatment.
- Neuse River Waterdog surveys and monitoring occurred. Of the 361 sites samples, Waterdogs were captured at 116 sites.
- A heronry survey occurred in the lower Neuse River basin. 39 heronries were detected in the lower Neuse and Tar River basin. Heronries were composed of Great Blue Herons and Great Egrets.
- Gopher frog surveys were conducted in the Croatan National Forest (Carteret County). Gopher Frogs were detected at only two sites on the lower Coastal Plain during the 2010-2011 survey, with one of those sites being one km from a historically known breeding pond in the Croatan National Forest.
- Survey of Piping Plovers was conducted for the International Piping Plover Winter Census in Carteret County.
- Morehead City received Green Growth Toolbox training.
- Carteret County received Green Growth Toolbox training.
- Craven County received Green Growth Toolbox training.
- American Oystercatchers were surveyed and monitored in Carteret County. Two surveys were conducted in the late breeding season (July 2011). Thirty Oystercatchers were found

during the first survey and 70 were found during the second survey. Five surveys were conducted during the fall migration season (August-October 2011) and the average number of Oystercatchers detected was 106. Two surveys were conducted during the winter season (November-December 2011) during which 119 and 194 Oystercatchers were found.

- 76 acres of privately owned land in Craven County near the Croatan National Forest was enrolled in the Safe Harbor Program to protect habitat for the Red Cockaded Woodpecker.

Jan. - March 2012 Quarterly Update (WDP 2012a):

- The STSSN recovered 17 live cold-stunned sea turtles (39 total including dead turtles) from Carteret, Hyde, and Dare Counties from Jan.-Feb. 2012. The surviving sea turtles were placed in rehabilitation centers for treatment.
- A Neuse River Waterdog survey occurred on 47 sites. Waterdogs were detected at 10 of the 47 sites.

April - June 2012 Quarterly Update (WDP 2012b):

- The NC Sea Turtle Nest Protection Project surveyed and monitored sea turtle eggs in Carteret County.

July - Sept. 2012 Quarterly Update (WDP 2012c):

- Conducted a workshop on snakes at Cool Springs Environmental Education Center in Newbern (Carteret County). The workshop had 20 participants.

Oct. - Dec. 2012 Quarterly Update (WDP 2012d):

- Surveying and monitoring of sea turtle nests occurred in Carteret County.

Jan. - March 2013 Quarterly Update (WDP 2013a):

- STSSN recovered 139 live cold stunned sea turtles from Pamlico Sound and Cape Lookout Bight. The turtles were taken to a rehabilitation center.
- The NC Partners in Amphibian and Reptile Conservation did an amphibian and reptile survey at many sites along the Neuse River and Tar River.
- A Neuse River Waterdog survey occurred at many sites in the Tar and Neuse River basins.
- A survey of Carolina Gopher Frogs occurred in the Croatan National Forest (Craven County).
- An upland snake survey occurred in the Croatan National Forest (Craven County).

April - June 2013 Quarterly Update (WDP 2013b):

- A coast-wide survey for American oystercatcher nesting territories was begun. The results were not reported yet.
- The commission is studying how well mitigated wetlands function in comparison to other types of isolated wetlands and open-canopy wetlands. They are restoring 14 isolated wetlands to open-canopy wetlands to increase biodiversity. One of the wetland sites is in Beaufort County near the Pamlico County line.
- Surveying and monitoring of sea turtle nests occurred in Carteret County.

July - Sept. 2013 Quarterly Update (WDP 2013c):

- Wildlife Diversity Program staff helped the NC Museum of Natural Sciences with reptile and amphibian surveys on the Albemarle-Pamlico Peninsula.

Oct. 2013 – Dec. 2013 Quarterly Update (WDP 2013d)

- STSSN recovered 97 live cold stunned sea turtles, primarily along the eastern shoreline of Core and Pamlico Sounds. The turtles were taken to a rehabilitation center.
- Neuse River Waterdog surveying and monitoring occurred.

Jan. 2014 – March 2014 Quarterly Update (WDP 2014a)

- No actions reported in study area.

April 2014 – June 2014 Quarterly Update (WDP 2014b)

- A colonial nesting waterbird survey was conducted in the Pamlico Sound area.

July 2014 – September 2014 Quarterly Update (WDP 2014c)

- In partnership with the NC Coastal Land Trust, two red-cockaded woodpecker artificial cavities were inserted on a conservation easement in Carteret County.
- Surveying and monitoring of sea turtles nests was conducted in Carteret County. Loggerhead Sea Turtle nests were down about 30% from the annual average of 775 nests, which is based on the previous 19 seasons.

October 2014 – December 2014 Quarterly Update (WDP 2014d)

- The Wildlife Resources Commission is working with Beaufort County officials to draft an agreement to manage a significant portion of the Voice of America Site A, which is expected to become property of the county in 2015.
- Neuse River Waterdog surveys and monitoring occurred, mainly in the upper Tar and Neuse River basin.

The following section looks back at the goals and themes of the NC SWAP to develop an

initial observation of how well they are being implemented in the study area based on the annual reports and quarterly updates that were reviewed.

The five goals (NC Wildlife Resources Commission 2005):

1. To improve understanding of the species diversity in North Carolina and enhance our ability to make conservation or management decisions for all species.

Implementation reports indicate that this goal has been a main focus. There were 32 reports of species inventory and monitoring actions in the study area, which account for 52% of the total actions reported in the study area. The only species types that have not been included are plant and insects.

2. To conserve and enhance habitats and the communities they support.

Two of the actions reported added new land in conservation, while eight protected or enhanced habitat on existing government owned land (or land with existing easements), which combined account for 16% of the total actions reported in the study area. Therefore, this goal has been a focus, although based on the importance it would be beneficial for this goal to be an even higher priority. Two actions in the seven year period added new land in conservation, which is great, but the number would preferably be higher. However, funding for land acquisition is likely a hindrance to achieving this goal. A possibility to increase new land in conservation is to focus on educating private landowners about conservation easements when funding for fee simple purchase is not available.

3. To foster partnerships and cooperative efforts among natural resource agencies, organizations, academia and private industry.

Four of the seven community education and outreach actions reported fall under this goal and two other actions types also involve this type of partnership, accounting for 10% of the total actions reported in the study area. One of these actions was a workshop given to the Lower Neuse Birds Club, one was a presentation to a summer camp in Carteret County, one was a snake workshop given at the Cool Springs Environmental Education Center in New Bern, one involved providing technical guidance to long term studies of the Albemarle-Pamlico Sounds, one was a partnership with the NC Coastal Land Trust for enhancement and training and one was assisting the NC Museum of Natural Sciences with species monitoring. There are also many partnerships with other natural resource agencies that are mentioned in the SWAP, but not included in the implementation reports. Therefore, it seems that partnerships and cooperative efforts among natural resource agencies, organizations and academia has been a focus. However, there were no reports of partnerships with private industry, indicating that this portion of the goal has not been a focus in the study area.

4. To support educational efforts to improve understanding of wildlife resources among the general public and conservation stakeholders.

Seven actions reported involve community education and outreach, accounting for 11% of the total actions reported in the study area. One of these actions was a workshop given to the Lower Neuse Birds Club, one was a presentation to a summer camp in Carteret County, one was a snake workshop given at the Cool Springs Environmental Education Center in New Bern, one involved providing technical guidance to long term studies of the Albemarle-Pamlico Sounds, and three involved distributing brochures to the public. Therefore, it seems that this goal has been

somewhat of a focus, although the number of actions would preferably be higher. Seven actions reported in the study area is an average of one action per year. Since three of these actions are simply distribution of brochures, it seems that more workshops and community education events would be beneficial.

5. To support and improve existing regulations and programs aimed at conserving habitats and communities.

Four actions reported in the study area relate to this goal, accounting for 7% of the total actions in the study area. The commission is studying how well mitigated wetlands function in comparison to other types of isolated wetlands and open-canopy wetlands. This study could provide valuable data which has the potential to improve existing wetland mitigation regulations. The other three actions include Green Growth Toolbox workshops (attended by Carteret County, Craven County and Morehead City). These Green Growth Toolbox workshops have the potential to help local governments improve local regulations and programs aimed at conservation. It is excellent that two of the three counties and one municipality have received this training. Preferably Beaufort County and more municipalities would be involved with the Green Growth Toolbox, and if they are not showing up to the workshops a personal phone call or visit to invite them might prove successful. In addition, it would be a good idea to track when planners leave their positions and new employees take their places. The Green Growth Toolbox workshop may need to be attended by the new employee, who may or may not have received this information from the previous planner.

The key themes identified to help meet the goals (NC Wildlife Resources Commission 2005):

- The need to strengthen partnerships among natural resource agencies, organizations, academics, and individuals in order to meet shared goals and visions.
 - This theme is a combination of goals three and four above. Nine actions were reported, accounting for 15% of the total actions reported in the study area.
- The need to impact the landscape in a large-scale fashion, and to consider all components of a sustainable community of plants and animals.
 - This theme is related to goal two above and focuses on the land conservation aspect (the need to impact the landscape in a large-scale fashion). Two actions were reported for the seven year period, accounting for 3% of the total actions in the study area. While these actions carry a higher weight than other types of actions because they actually add new land into conservation, it would be ideal to see a higher number of actions in this category. As I mentioned previously, lack of funding for acquisition may be a contributing factor here. Perhaps more of a focus on enrolling private land in conservation easements would be helpful to increase the level of action on this goal.
- The need to gather additional information and fill knowledge gaps in order to advance our understanding of species and their habitats.

This theme is related to goal one above. This goal is a main focus. Again, there were 32 actions reported in the study area for the seven year period.
- The need to work cooperatively with private landowners to influence the conservation of natural resources across the majority of the state.

This theme is also related to goal two, but is specific to private landowners. One of the land conservation actions involved securing a conservation easement on privately owned land,

accounting for 2% of the total actions reported in the study area. This indicates that outreach to private landowners has not been a main focus, or that efforts have been largely unsuccessful in producing conservation easements. More of a focus on working with private landowners has the potential of adding additional land in conservation via easements, without needing funding for fee simple acquisition.

- The need to educate and engage local governments, planning commissions, and urban publics about the importance of fish and wildlife conservation as a key component of successful land use planning.

This theme is somewhat related to goal five, but has a specific focus on local governments and land use planning, as opposed to regulations and programs overall. There were five reports of local government education and outreach, including a workshop given to Carteret County Tourism Development Authority on the NC Birding Trail and an agreement to manage a significant portion of the Voice of America Site A for Beaufort County. These two actions are great from an outreach standpoint, but may not have an effect on land use planning. The other three actions include Green Growth Toolbox workshops (attended by Carteret County, Craven County and Morehead City). These Green Growth Toolbox workshops have the potential to help local governments improve local regulations and programs aimed at conservation, including land use planning. These three actions account for 5% of the total actions reported in the study area. It is excellent that two of the three counties and one municipality have received this training.

Preferably Beaufort County and more municipalities would be involved with the Green Growth Toolbox, and if they are not showing up to the workshops a personal phone call or visit to invite them might prove successful. In addition, it would be a good idea to track when planners leave their positions and new employees take their places. The Green Growth Toolbox workshop may need to be attended by the new employee, who may or may not have received this information from the previous planner.

Appendix B: Consent Statement

My name is Jamie Heath and I am a graduate student at East Carolina University. Before I begin I need to tell you about this study and get your consent. After I read this information, you can tell me if you would like to proceed.

I am conducting a study about local implementation of state habitat conservation plans, and in particular the NC SWAP. I would like to find out whether the SWAP and other habitat conservation plans are being implemented, what are barriers to implementation, and potential strategies for overcoming these obstacles.

In this interview, you will be asked up to 41 questions, which will take approximately 45 minutes to complete (depending on answers given). Results from this survey will be included in my research, and will ultimately be published in an academic journal, where the information will be used to help planners and elected officials more effectively plan for habitat conservation.

Your participation is voluntary and you may stop the interview at any time or choose not to answer any question that makes you feel uncomfortable. Your responses will not be linked to your name or specific job title. If you have any questions about this study you may always contact me at 252-814-8609, or my thesis advisor Traci Birch at 252-328-1273. If you have any questions concerning your rights as a research subject or concerns regarding research-related injury you may contact East Carolina University's Office for Human Research Integrity at 252-737-2958.

Anyone who completes the interview may receive a summary of the report in order to see how other communities compare to yours.

Appendix C: Planner Interview Questions

I. Position Data:

- Q1: What is your place of employment?
Q2: What is your current job title?
Q3: What are your typical job duties?
Q4: How long have you been in this position?

II. County/Municipal Plans:

- Q5: Does your department have a habitat protection plan? Yes or No
If yes, answer Q6, if no, answer Q7.
- Q6: Please elaborate on the content of the plan(s) and how the plan(s) was/were created and the primary focus.
- Q7: If not, are there other plans that guide decision making on habitat-related issues?
- Q8: Is conserved land included in your land use plan? Yes or No
If no, skip Q8 & Q9.
- Q9: What type of land is conserved?
- Q10: How did you decide what land to conserve?
- Q11: Do you currently have any policies or programs in effect to protect valuable resource lands and/or wildlife habitat? Yes or No
If no, skip Q12.
- Q12: Please elaborate on the relevant policy/policies and/or program(s), how they were created and their primary focus.
- Q13: Do you feel that development plans coincide with habitat conservation? Yes or No
- Q14: Why or why not?
- Q15: Are there times when the county/municipality turns down development in favor of conservation? Yes or No
- Q16: In your opinion, why or why not?

III. County/Municipality Support for Habitat Conservation Planning:

Please indicate the level of support you think the county/municipality has for each of the following five goals on a scale of 1 – 10 with 1 being absolutely no support and 10 being fully supports.

Q17: To improve understanding of the species diversity in North Carolina and enhance our ability to make conservation or management decisions for all species.

1 2 3 4 5 6 7 8 9 10

Comments?

Q18: To conserve and enhance habitats and the communities they support.

1 2 3 4 5 6 7 8 9 10

Comments?

Q19: To foster partnerships and cooperative efforts among natural resource agencies, organizations, academia and private industry.

1 2 3 4 5 6 7 8 9 10

Comments?

Q20: To support educational efforts to improve understanding of wildlife resources among the general public and conservation stakeholders.

1 2 3 4 5 6 7 8 9 10

Comments?

Q21: To support and improve existing regulations and programs aimed at conserving habitats and communities.

1 2 3 4 5 6 7 8 9 10

Comments?

Q22: In your opinion, what is the level of community support for habitat conservation in your county/municipality? (Please answer with the same scale in mind.)

1 2 3 4 5 6 7 8 9 10

Comments?

IV. NC State Wildlife Action Plan:

The NC SWAP is a comprehensive management tool mandated by the federal government and developed by the N.C. Wildlife Resources Commission to conserve and enhance wildlife species and their habitats.

Q23: Have you heard of the NC State Wildlife Action Plan (NC SWAP)?

If no, skip Q24-28.

Q24: Has the county or municipality attempted to implement any aspects of the NC SWAP?

Q25: If yes, what steps has the county/municipality and/or your department taken to implement the NC SWAP?

Q26: Do you know if there are other agencies/organizations in the county attempting to implement all or part of the NC SWAP?

Q27: Do you know if the county and/or your department have plans to implement any aspect of the NC SWAP in the future?

Q28: If yes, what are the future plans and/or aspects of the NC SWAP that will be implemented?

The Green Growth Toolbox is a free conservation planning tool available from the NC Wildlife Resources commission designed to provide local governments with tools for growth that conserves wildlife and natural resources.

Q29: Have you heard of the Green Growth Toolbox (GGT)?

If yes, answer Q30-32. If no, answer Q33-34.

Q30: If you have heard of the GGT, does your agency use the GGT? Yes or No

Q31: If yes, how often and in what capacity?

Q32: If no, why not?

Q33: If you have not heard of the GGT, do you think the county/municipality would support the use of this tool?

Q34: Why or why not?

V. Networking:

Q35: How often does your department work with outside agencies on issues of habitat and/or species conservation (government or private)?

Q36: Does the county/municipality coordinate land use planning or conservation planning with neighboring communities? Yes or No

If yes, please elaborate.

Q37: To your knowledge, has anyone from the NC Wildlife Resources Commission or its Wildlife Diversity program contacted your department and offered to provide technical services or assist with habitat protection planning or conservation planning? Yes or No

If no, skip Q38.

Q38: If so, in what capacity?

Q39: Has the Soil and Water Conservation District, the Cooperative Extension Service, NC Sea Grant, the Albemarle-Pamlico National Estuary Partnership (APNEP) or NC Coastal Land Trust ever contacted you for this purpose? Yes or No

If no, skip Q40.

Q40: If so, which agency or agencies contacted you and in what capacity?

VII. Closing Questions:

Q41: In your opinion, what are the largest barriers to effective habitat conservation?

Q42: What are some possible tools and/or strategies that would help your department implement habitat conservation planning or improve conservation planning?

Q43: Do you have any other comments on the subject?

Q44: Would you like a copy of this study when it is complete? Yes or No

Q45: Do you know anyone else that would be beneficial for me to interview on the subject?

Appendix D: NC Wildlife Resources Commission Interview Questions

I. Position Data:

- Q1: What is your place of employment?
- Q2: What is your current job title?
- Q3: What are your typical job duties?
- Q4: How long have you been in this position?

II. NC SWAP Implementation/Funding:

- Q5: Can you briefly summarize what actions have been taken to implement the SWAP in the coastal region of the state?
- Q6: Can you briefly summarize what future plans your agency has to implement the SWAP in the coastal region of the state?
- Q7: Has state and federal funding for the NC Wildlife Resources Commission/Wildlife Diversity Program remained steady, declined, or increased?
- Q8: If funding declined or increased, how did this affect the NC Wildlife Resources Commission and/or the Wildlife Diversity Program?
- Q9: Have budget cuts to NC DENR affected the NC Wildlife Resources Commission and/or the Wildlife Diversity Program? Yes or No
If no, skip Q10.
- Q10: If so, in what capacity?

III. NC SWAP Goals/Key Themes:

Please indicate to what extent you think the following five goals of the NC SWAP have been met on a scale of 1 – 10 with 1 being absolutely no progress on meeting the goal, and 10 being the goal has been completely achieved.

Q11: To improve understanding of the species diversity in North Carolina and enhance our ability to make conservation or management decisions for all species.

1 2 3 4 5 6 7 8 9 10

Comments?

Q12: To conserve and enhance habitats and the communities they support.

1 2 3 4 5 6 7 8 9 10

Comments?

Q13: To foster partnerships and cooperative efforts among natural resource agencies, organizations, academia and private industry.

1 2 3 4 5 6 7 8 9 10

Comments?

Q14: To support educational efforts to improve understanding of wildlife resources among the general public and conservation stakeholders.

1 2 3 4 5 6 7 8 9 10

Comments?

Q15: To support and improve existing regulations and programs aimed at conserving habitats and communities.

1 2 3 4 5 6 7 8 9 10

Comments?

Please indicate to what extent you think the following “key themes” or strategies of the NC SWAP are being used to achieve the above goals. Please rate the following five key themes on a scale of 1 to 10, with 1 being absolutely no use of this theme or strategy, and 10 being consistent, regular use of this theme or strategy.

Q16: The need to strengthen partnerships among natural resource agencies, organizations, academics, and individuals in order to meet shared goals and visions.

1 2 3 4 5 6 7 8 9 10

Comments?

Q17: The need to impact the landscape in a large-scale fashion, and to consider all components of a sustainable community of plants and animals.

1 2 3 4 5 6 7 8 9 10

Comments?

Q18: The need to gather additional information and fill knowledge gaps in order to advance our understanding of species and their habitats.

1 2 3 4 5 6 7 8 9 10

Comments?

Q19: The need to work cooperatively with private landowners to influence the conservation of natural resources across the majority of the state.

1 2 3 4 5 6 7 8 9 10

Comments?

Q20: The need to educate and engage local governments, planning commissions, and urban publics about the importance of fish and wildlife conservation as a key component of successful land use planning.

1 2 3 4 5 6 7 8 9 10

Comments?

IV. Networking:

Q21: How often do you interact with people who are not employed by the Wildlife Resources Commission, whether other government agencies, NGOs, businesses, etc.?

Q22: How often do you work with planners and/or planning boards?

Q23: Has your agency ever contacted the Beaufort County Planning Department or any municipal planning department in Beaufort County and offered to provide technical assistance or work with them on ecosystem management free of charge?

Q24: Has your agency ever worked with the Beaufort County Planning Department or any municipal planning Department in Beaufort County?

If no, skip Q25.

Q25: If yes, in what capacity?

Q26: Does your agency have future plans to work with the Beaufort County Planning Department or any municipal planning department in Beaufort County?

If no, skip Q27.

Q27: If yes, in what capacity?

Q28: Has your agency ever contacted the Carteret County Planning Department or any municipal planning department in Carteret County and offered to provide technical assistance or work with them on ecosystem management free of charge?

Q29: Has your agency ever worked with the Carteret County Planning Department or any municipal planning Department in Carteret County?

If no, skip Q30.

Q30: If yes, in what capacity?

Q31: Does your agency have future plans to work with the Carteret County Planning Department or any municipal planning department in Carteret County?

If no, skip Q32.

Q32: If yes, in what capacity?

Q33: Has your agency ever contacted the Craven County Planning Department or any municipal planning department in Craven County and offered to provide technical assistance or work with them on ecosystem management free of charge?

Q34: Has your agency ever worked with the Craven County Planning Department or any municipal planning Department in Craven County?

If no, skip Q35.

Q35: If yes, in what capacity?

Q36: Does your agency have future plans to work with the Craven County Planning Department or any municipal planning department in Craven County?

If no, skip Q37.

Q37: If yes, in what capacity?

Q38: If a county/municipal planner contacted your agency wanting free technical assistance or assistance with preparing local ecosystem management plans, would you have staff available to assist the county/municipality? Yes or No

V. Closing Questions:

Q39: What do you see as major barriers to implementation of the SWAP within your agency?

Q40: What do you see as major barriers to implementation of the SWAP outside your agency?

Q41: What are possible tools/strategies that would help your agency implement the SWAP more effectively?

Q42: Do you have any other comments on the subject?

Q43: Would you like a copy of this study when it is complete? Yes or No

Q44: Do you know anyone else that would be beneficial for me to interview on the subject?

Appendix E: Supporting Agency Interview Questions

I. Position Data:

Q1: What is your place of employment?

Q2: What is your current job title?

Q3: What are your typical job duties?

Q4: How long have you been in this position?

II. Agency Support for Habitat Conservation Planning:

Q5: Does your agency support local implementation of habitat conservation? (This includes any type of support, whether financial, training, technical assistance, etc.) Yes or No

If no, skip Q6.

Q6: If so, in what capacity?

Please indicate the level of support you think your agency has for each of the following five goals on a scale of 1 – 10, with 1 being absolutely no support and 10 being fully supports.

Q7: To improve understanding of the species diversity in North Carolina and enhance our ability to make conservation or management decisions for all species.

1 2 3 4 5 6 7 8 9 10

Comments?

Q8: To conserve and enhance habitats and the communities they support.

1 2 3 4 5 6 7 8 9 10

Comments?

Q9: To foster partnerships and cooperative efforts among natural resource agencies, organizations, academia and private industry.

1 2 3 4 5 6 7 8 9 10

Comments?

Q10: To support educational efforts to improve understanding of wildlife resources among the general public and conservation stakeholders.

1 2 3 4 5 6 7 8 9 10

Comments?

Q11: To support and improve existing regulations and programs aimed at conserving habitats and communities.

1 2 3 4 5 6 7 8 9 10

Comments?

III. NC State Wildlife Action Plan:

The NC SWAP is a comprehensive management tool mandated by the federal government and developed by the N.C. Wildlife Resources Commission to conserve and enhance wildlife species and their habitats.

The Green Growth Toolbox is a free conservation planning tool available from the NC Wildlife Resources commission designed to provide local governments with tools for growth that conserves wildlife and natural resources.

Q12: Have you ever heard of the NC State Wildlife Action Plan (NC SWAP) or it's Green Growth Toolbox (GGT)? Yes or No

If no, skip Q13-17

Q13: Has your agency or any county or municipality you work in attempted to implement any aspects of the NC SWAP/GGT?

Q14: If yes, what steps has the county/municipality and/or your agency taken to implement the NC SWAP/GGT?

Q15: Do you know if there are other agencies/organizations in the counties or municipalities you work in attempting to implement all or part of the NC SWAP/GGT?

Q16: Do you know if your agency, any county or municipality you work in, or any other agencies/organizations have plans to implement any aspect of the NC SWAP/GGT in the future?

Q17: If yes, what are the future plans and/or aspects of the NC SWAP/GGT that will be implemented?

IV. Networking:

Q18: How often do you interact with people who are not employed by your agency?

Q19: How often does your department work with outside agencies on issues of habitat and/or species conservation (government or private)?

Q20: To your knowledge, has anyone from the NC Wildlife Resources Commission or its Wildlife Diversity Program ever contacted your agency?

If no, skip Q21.

Q21: If yes, in what capacity?

Q22: How often do you work with planners and/or planning boards?

The following 18 questions are county specific. Soil and Water Conservation District employees and Cooperative Extension employees will only be asked questions pertaining to their own counties.

Q23: Have you ever contacted the Beaufort County Planning Department or any municipal planning department in Beaufort County?

If no, skip Q 24.

Q24: If so, in what capacity?

Q25: Have you ever worked with the Beaufort County Planning Department or any municipal planning department in Beaufort County?

If no, skip Q26.

Q26: If so, in what capacity?

Q27: Do you plan on working with the Beaufort County Planning Department or any municipal planning department in Beaufort County in the future?

If no, skip Q28.

Q28: If so, in what capacity?

Q29: Have you ever contacted the Carteret County Planning Department or any municipal planning department in Carteret County?

If no, skip Q 30.

Q30: If so, in what capacity?

Q31: Have you ever worked with the Carteret County Planning Department or any municipal planning department in Carteret County?

If no, skip Q32.

Q32: If so, in what capacity?

Q33: Do you plan on working with the Carteret County Planning Department or any municipal planning department in Carteret County in the future?

If no, skip Q34.

Q34: If so, in what capacity?

Q35: Have you ever contacted the Craven County Planning Department or any municipal planning department in Craven County?

If no, skip Q 36.

Q36: If so, in what capacity?

Q37: Have you ever worked with the Craven County Planning Department or any municipal planning department in Craven County?

If no, skip Q38.

Q38: If so, in what capacity?

Q39: Do you plan on working with the Craven County Planning Department or any municipal planning department in Craven County in the future?

If no, skip Q40.

Q40: If so, in what capacity?

Q41: If a county/municipal planner contacted you wanting free technical assistance or assistance with conservation planning, would you have staff available to assist the county/municipality?
Yes or No

V. Closing Questions:

Q42: In your opinion, what are the largest barriers to effective habitat conservation?

Q43: What are some possible tools/strategies that would help your agency support local implementation of habitat conservation?

Q44: Do you have any other comments on the subject?

Q45: Would you like a copy of this study when it is complete? Yes or No

Q46: Do you know anyone else that would be beneficial for me to interview on the subject?

Appendix F: Support Provided for Habitat Conservation by Agency

	Acquisition of land	Advocacy	Assistance to private landowners	Develop policy	Education and Outreach	Provide data	Provide grants	Restoration and Enhancement Projects	Technical Assistance	Training
<i>Natural Heritage Program</i>						Provide data on rare species and important natural communities for the conservation of the state's biodiversity.			Provide technical assistance for using their data and the GGT.	Provide training on using their data and the GGT.
<i>Division of Marine Fisheries</i>					Public education and outreach, primarily to fisherman and aquaculture lease holders.					
<i>Beaufort County Soil and Water District</i>			Assist farmers and other private landowners with environmental issues they may have on their land. Use state programs to help improve water quality on private land. Use federal programs to assist private landowners with habitat							

			enhancement, for example installing buffers around field edges.							
<i>Pamlico-Albemarle Wildlife Conservationists</i>		Political and legal advocacy.			Education and outreach to the general public.			Habitat restoration and enhancement projects. A recent project is using vacant land in the City of Washington for pollinator gardens and small wildlife habitat.		
<i>Carteret County Cooperative Extension Service</i>								Clean-up projects across the county, including beaches and other natural areas.		
<i>NC Forest Service</i>			Provide Comprehensive Stewardship Management Plans to private landowners to help them manage their forest land. A Stewardship Plan involves management of timber, water resources, habitat resources, soil and water, and					Provide technical assistance to other state agencies and private landowners on white noise syndrome in the northern long eared bat.	Provide training to other state agencies on white noise syndrome in the northern long eared bat.	

			recreational opportunities. Assist private landowners with conservation easements for forest land.							
<i>NC Sea Grant</i>					Education and outreach to local elected officials on how their decisions may impact their resources. Larger education efforts to bring resource managers and scientists together to talk about issues.		Provide grants to support research.			
<i>Pamlico-Tar River Foundation</i>		Political and legal advocacy.			Provide support for any conservation plans that are out there by education and outreach to make the public aware of its purpose and getting them to understand why it is important.			River clean-up projects.		

<i>Division of Water Resources</i>					Refer people to the GGT.					
<i>Nature Conservancy</i>	Acquire land for conservation		Work with private landowners to encourage them toward good management of their property.							
<i>Carteret County Natural Resources Conservation District</i>			Provide assistance to private landowners to enhance wildlife habitat. Provide private landowners with conservation plans.							
<i>NC Coastal Land Trust</i>	Acquire land for conservation				Hosted GGT workshops in the past. Still refer people to the GGT.					
<i>Albemarle-Pamlico National Estuary Partnership (APNEP)</i>						Provide grants for restoration and research.	Habitat restoration and enhancement projects such as oyster and living shoreline restoration, hydrologic restoration and tree planting.	Available in a technical support/consulting role to local government		
<i>Craven County Natural</i>			Provide assistance to							

<i>Resources Conservation Service</i>			private landowners to enhance wildlife habitat.							
<i>NC Coastal Federation</i>	Acquire land for conservation		Provide assistance to private landowners on implementing living shorelines.					Habitat restoration and enhancement projects such as living shorelines and marsh plantings.		Provide contractor training on living shorelines. Provide developer training on Low Impact Development
<i>Division of Coastal Management</i>				Develop rules and policies to protect sensitive coastal habitats from development.				Manage ten conservation properties to enhance wildlife habitat and use for research and education purposes.	Provide technical assistance to local governments on coastal habitat issues.	Provide training on coastal habitat conservation through the Estuarine Research Reserve.
<i>Craven County Soil and Water Conservation District</i>			Provide assistance to private landowners on erosion control issues. Provide assistance to private landowners to							

			enhance wildlife habitat. For example, installing buffers or grasses and shrubs that are more beneficial to native wildlife.							
<i>Beaufort County Cooperative Extension</i>					Provide education to general public. For example, on how to use native plants to attract wildlife to your yard.					
<i>Beaufort County Natural Resources Conservation Service</i>			Provide assistance to private landowners to enhance wildlife habitat.				Provide grants for wetland conservation and restoration		Provide technical assistance for wetland restoration.	
<i>Carteret County Soil & Water Conservation District</i>								Restoration and enhancement projects, such as stormwater projects and wetland restoration projects.		
<i>Craven County Cooperative Extension</i>					Provide education to the general public. Have a wide range of educational activities.					

<i>Neuse River Foundation</i>		Political and legal advocacy.			Public education and outreach including working closely with public schools.			River clean-up projects.		
<i>Office of Land and Water Stewardship</i>							Provide grant funding for land acquisition.			

Appendix G: Institutional Review Board (IRB) Approval Letter



EAST CAROLINA UNIVERSITY
University & Medical Center Institutional Review Board Office
4N-70 Brody Medical Sciences Building · Mail Stop 682
600 Moye Boulevard · Greenville, NC 27834
Office **252-744-2914** · Fax **252-744-2284** · www.ecu.edu/irb

Notification of Initial Approval: Expedited

From: Social/Behavioral IRB
To: [Jamie Heath](#)
CC: [Traci Birch](#)
Date: 2/26/2015
Re: [UMCIRB 15-000171](#)
Local Implementation of the State Wildlife Action Plan in Coastal North Carolina

I am pleased to inform you that your Expedited Application was approved. Approval of the study and any consent form(s) is for the period of 2/25/2015 to 2/24/2016. The research study is eligible for review under expedited category # 6,7. The Chairperson (or designee) deemed this study no more than minimal risk.

Changes to this approved research may not be initiated without UMCIRB review except when necessary to eliminate an apparent immediate hazard to the participant. All unanticipated problems involving risks to participants and others must be promptly reported to the UMCIRB. The investigator must submit a continuing review/closure application to the UMCIRB prior to the date of study expiration. The Investigator must adhere to all reporting requirements for this study.

Approved consent documents with the IRB approval date stamped on the document should be used to consent participants (consent documents with the IRB approval date stamp are found under the Documents tab in the study workspace).

The approval includes the following items:

Name	Description
Email and Phone Recruitment Script	Recruitment Documents/Scripts
Local Implementation of the State Wildlife Action Plan	Study Protocol or Grant Application
Planner Consent Statement	Consent Forms
Planner Interview Questions	Interview/Focus Group Scripts/Questions
Supporting Agency Consent Statement	Consent Forms
Supporting Agency Interview Questions	Interview/Focus Group Scripts/Questions
Wildlife Resources Commission Interview Questions	Interview/Focus Group Scripts/Questions
WRC Consent Statement	Consent Forms

The Chairperson (or designee) does not have a potential for conflict of interest on this study.

IRB00000705 East Carolina U IRB #1 (Biomedical) IORG0000418
IRB00003781 East Carolina U IRB #2 (Behavioral/SS) IORG0000418

