

ABACO WATER QUALITY MONITORING PROGRAM



Water: Systems, Science and Society

RESEARCH PRACTICUM

TUFTS UNIVERSITY

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Abstract

Protecting coastal water quality is an environmental issue of importance to the community of Elbow Cay, an island in the Abacos in the Bahamas. This project is designed to raise awareness about coastal water quality by integrating components of a comprehensive watershed management program: gathering and analyzing scientific data, developing a citizen-directed monitoring program, and doing community outreach work in a location that has limited regulatory resources to provide environmental protection.

Coastal water quality testing results indicate very low levels of fecal coliform bacteria in testing locations; however, long-term monitoring should be performed to capture bacteria trends throughout the year. To promote ongoing monitoring efforts, a volunteer-based monitoring program has been implemented. The results of qualitative interviews to assess levels of awareness and willingness to preserve coastal water quality show that there is widespread willingness to pay for specific projects and outcomes to improve local water quality, but not for broad user fees or general taxes. There was also widespread willingness to make personal investments to protect the environment and eagerness to help educate all community stakeholders.

The community engagement and outreach component of the project included meeting government and community leaders, presentations to schoolchildren, and presenting the 2009 testing results to the community at a town meeting.

Executive Summary

Coastal water quality has been identified as an environmental issue of importance to the community of Elbow Cay, a small island off the coast of Great Abaco in the Bahamas archipelago. Friends of the Environment, a non-profit environmental organization based in Marsh Harbor, Abaco, and Tufts University graduate students (who were enrolled in the Research Practicum component of the Water: Systems, Science and Society (“WSSS”) Certificate program) collaborated to develop a citizen-directed water quality testing initiative on Elbow Cay. This included field research on the four-mile-long island from March 19-27, 2010.

The initiative is designed to raise awareness of water quality issues in the Abaco Islands by gathering and analyzing scientific data, and gauging resident awareness of and interest in issues that relate to coastal water quality.

This report is intended as a framework for developing a citizen-based water quality monitoring program on Elbow Cay. The report is provided to Friends of the Environment (FRIENDS) to support its efforts to increase awareness of coastal water quality in Elbow Cay and to protect local environmental quality.



The WSSS Research Practicum offers graduate students the opportunity to perform field research in a small group setting on case studies focusing on the integrated assessment of water resources problems. Its goal is to expose students to the techniques and thought processes of integrated water resources assessment and thereby advance their training as researchers and professionals. Consisting of the ten Tufts students and two faculty members, the Practicum team fulfills its academic objectives while working with FRIENDS in a relationship intended to parallel and draw upon the consultant-client model.

A. Project Components

The WSSS Research Practicum on Elbow Cay consisted of the following four components, each of which is summarized in this report.

A.1 Water Quality Testing

The Tufts Practicum team tested coastal water samples for sewage indicator bacteria. This testing builds on similar work performed by WSSS students in March, 2009. To increase awareness of the potential impacts of human activity on local water quality, FRIENDS will make all testing results available to the Abaco community on their website.

A.2 Abaco Water Quality Monitoring Program (AWM)

The Practicum team developed a volunteer water quality monitoring program suited to the capabilities of FRIENDS and the Abaco community. This will make year-round water quality monitoring possible at points on or near Abaco. The monitoring program will train volunteers in monitoring techniques and data reporting protocols, and thereby help to raise awareness of water quality issues on the islands.

A.3 Citizen Awareness, Education and Outreach

The Tufts team enhanced community awareness of the importance of water quality monitoring and past testing results by presenting at a community meeting at the Hope Town Sailing Club and an assembly at the Hope Town elementary school during its field research in March. The team also conducted qualitative stakeholder interviews to help FRIENDS better understand the social setting of water quality on Elbow Cay. Based on information from this research, the Practicum team will create a detailed survey instrument to assist FRIENDS in better targeting its outreach and awareness campaign on Elbow Cay.

A.4 Social Surveying

A subset of the team conducted surveys of several key categories of island residents and visitors, specifically boaters, homeowners and business operators. These groups are further classified as Bahamian citizens, year-round residents and second-homeowners. Questions focused on respondents' knowledge of environmental issues on the island, particularly water quality, and their willingness to address these issues by implementing new policy measures.

The report consists of nearly a dozen separate deliverables, including a training video. Each is summarized below. Briefly, they are:

- Summary Report (this report)
- Technical Memorandum Appendix 1
- Quality Assurance Plan (QAP) Appendix 2
- Volunteer Manual Appendix 2A
- Fecal Coliform Testing
 Manufacturer Information Appendix 2B
- Membrane Filter Technique Appendix 2C
- Memorandum of Understanding Appendix 2D
- Community Meeting Flyer Appendix 3A
- Community Meeting Presentation Appendix 3B
- Schools Presentation Appendix 3C
- Social Surveying Findings Appendix 4
- Proposed Follow-Up Survey Appendix 4A

B. Water Quality Testing

The technical memo describes the results of coastal water testing on Elbow Cay on March 20-26, 2010 for the presence of fecal coliform bacteria (see appendix 1). Fecal coliform bacteria are a group of bacteria that live in the intestinal tract of warm-blooded animals. High fecal coliform levels may indicate contamination from human or animal wastes and the presence of disease-causing bacteria. Very high fecal coliform may render waters unsafe for boating, swimming, drinking, or shellfishing. Hope Town Harbour and White Sound, recreational beaches, and several background sites around Elbow Cay were analyzed for fecal coliform bacteria, a general indicator of more harmful bacteria that might be present in sewage. Our results indicate that only one location in the two harbors had a higher level of fecal coliform bacteria than Florida Department of Environmental Protection standards.

In general, Hope Town Harbour and White Sound exhibited much lower fecal coliform levels during the March 2010 monitoring campaign compared to a week-long campaign in March 2009. Continued systematic monitoring by the newly initiated Abaco Water Quality Monitoring (AWM) Program will provide more comprehensive data on seasonal and yearly trends in Abaco's coastal water quality.



C. Abaco Water Quality Monitoring (AWM) Program

C.1 Rationale

The purpose of the Abaco Water Quality Monitoring (AWM) program is to raise awareness of water quality issues in the Abaco islands by involving citizens in the process of gathering and analyzing scientific data. A major environmental issue identified by some residents of Elbow Cay is the problem of discharge of untreated sewage directly to the harbors surrounding the island. Due to limited governmental capacity for environmental regulation, much of the work of maintaining water quality is left to local residents. Through the collaborative work of the Tufts WSSS Program and the FRIENDS advocacy group, AWM was created as a volunteer water quality monitoring initiative that empowers residents to collect high-quality data on sewage indicator bacteria relating to human waste. The AWM initiative is an example of how non-specialists can perform water quality monitoring in locations with limited governmental involvement in water quality.

C.2 Logistics

The Marine Committee of FRIENDS oversees AWM and appoints a program manager. The project manager coordinates volunteer activities and makes strategic decisions regarding sampling locations and testing frequency. Initial sampling sites were identified by FRIENDS and screened by WSSS during weeklong intensive water quality testing in March, 2009 and 2010. These sites, as well as others that will be added as AWM develops, are expected to be sampled as frequently as FRIENDS sees fit – preferably no less than once a month. Volunteers collect water samples at designated sites, place the samples on ice and deliver them to a laboratory on Elbow Cay for analysis. The project manager, assisted as needed by volunteers, performs the analysis and, for each sample, records the number of colony-forming units of fecal coliform.

Due to limited governmental capacity for environmental regulation, citizens must address their own concerns

C.3 AWM Guidance Materials

C.3(a) Quality Assurance Plan

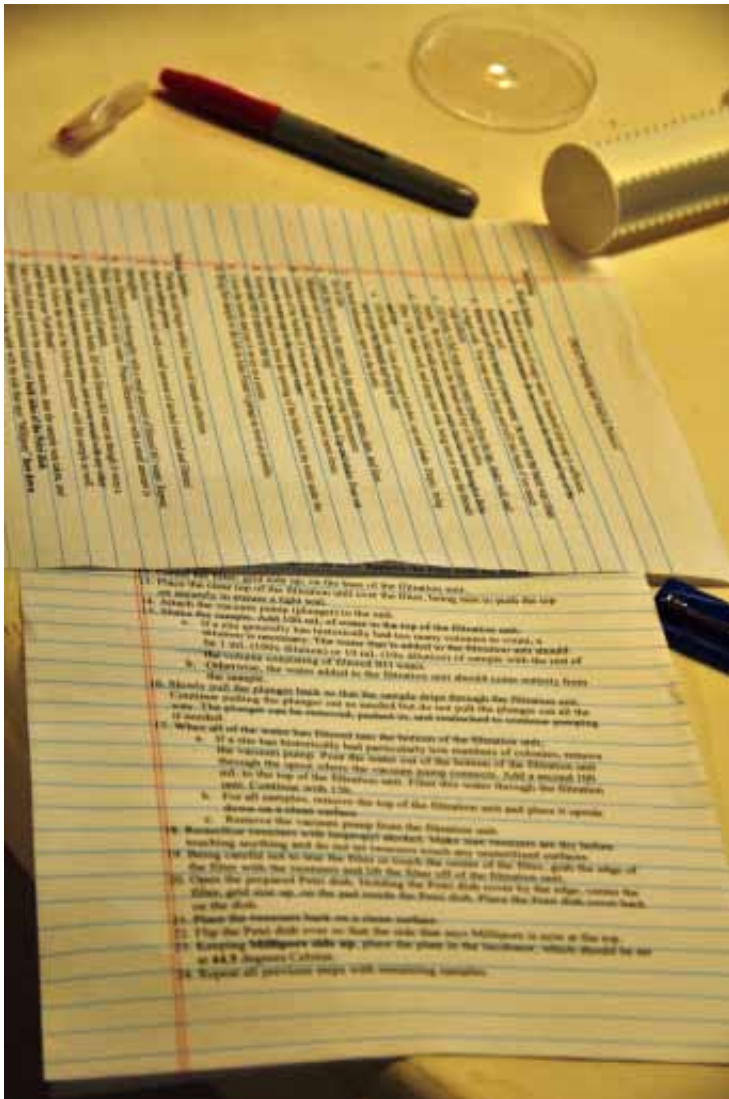
Under the federal Clean Water Act in the United States, water quality monitoring programs must be described by a Quality Assurance Project Plan (QAPP), which defines a monitoring program's objectives, organization and methods. WSSS used the QAPP model to develop the Abaco Water Quality Monitoring Quality Assurance Plan (QAP) to ensure data integrity and testing consistency by describing in detail the objectives, organization and methods of the AWM Program. Like a QAPP, the AWM QAP is designed to ensure data integrity and testing consistency by describing in detail the objectives, organization and methods of the AWM Program. The Quality Assurance Plan – set forth in Appendix 2 – is derived from the QAPP used by the Mystic River Watershed Association (MyRWA), a non-profit watershed advocacy organization based in Arlington, Massachusetts in the US. It details the AWM Program's logistics, the rationale behind required actions, and standard sampling and laboratory procedures.



The first half of the Quality Assurance Plan contains organizational details of AWM, including a comprehensive overview of the program's scope. These sections outline the expectations for individuals who take leadership positions or participate in the program, as well as standards for training

new volunteers. In addition, the Quality Assurance Plan contains criteria to evaluate and approve the quality of the data gathered. Following the procedures set forth in the organizational section of the Quality Assurance Plan ensures that these data are precise, accurate, representative and complete.

The second half of the Quality Assurance Plan contains in-depth descriptions of procedures to follow during sample collection and analysis. It includes sections that address in detail the sampling process design, sample collection and handling by volunteers, and the analytical methods to be performed. The section on quality control includes definitions of laboratory procedures that validate result accuracy, along with step-by-step instructions for understanding the results of the validation tests.



Quality Assurance Plan components include a Volunteer Manual designed for use by those who do not need information as detailed as is provided by the QAP, as well as manufacturer information on materials used for analysis.

*The key sections of the Quality Assurance Plan (QAP)
(Appendix 2) are:*

Part A: Contact List

- Project Organization
- Background
- Project Description
- Data Quality Objectives and Criteria
- Training Requirements

Part B: Sampling Process Design

- Sampling Methods and Handling
- Analytical Methods
- Quality Control
- Instrumentation and Supplies

Part C: Assessment and Oversight

Part D: Data Validation and Usability

Appendix 2A: Abaco Water Quality Monitoring Volunteer Manual

Appendix 2B: Fecal Coliform Testing Manufacturer Information

*Appendix 2C: Standard Method 9222D: Single Membrane Filtration
for Fecal Coliform*

*Appendix 2D: Memorandum of Understanding between Tufts University
WSSS Program and FRIENDS*

C.3(b) Volunteer Manual

The AWM Volunteer Manual, which is set forth appendix 2A, is a resource to help volunteers familiarize themselves with sample collection and analysis procedures. The Quality Assurance Plan requires volunteers to review the manual before each sampling event to ensure the continued collection of accurate data. The AWM Volunteer Manual contains detailed instructions for volunteers to follow while sampling. It is intended to serve as an initial training tool for new volunteers, and, in conjunction with the training video (see below), for volunteers to refresh their memories on the proper procedures for water quality analysis. Most of these procedures are not part of typical daily activities, so before each sampling event it is important to remind volunteers of their responsibilities.

The AWM Volunteer Manual is divided into four main sections. The first section describes the purpose of the manual, which includes an emphasis on following the protocol to maintain a high level of data quality. It also lists the current sampling locations. The second section outlines the risks of sampling, notes that the safety of volunteers is paramount, and includes emergency contact information. The third section reinforces the importance of careful note taking and data entry verification by detailing recordkeeping procedures, including the labeling of samples, the maintenance of water quality data sheets and use of the field notebook. The AWM Volunteer Manual's final section takes volunteers through the water sampling and analysis procedures. The sampling procedures include pre-sampling preparations, step-by-step procedures for taking a sample, and instructions on transporting samples back to the laboratory. To facilitate the training of additional volunteers, the standard laboratory analysis procedures are also included in the volunteer manual.



C.3(c) Training Video

The training video provides a visual representation of the training manual. The purpose of the video is two-fold. First, it serves as an initial training tool for new volunteers. It provides practical, hands-on instruction in conjunction with the training manual. Second, it will serve as a refresher for volunteers, particularly when someone cannot remember exactly how to perform a key function or what to do next. It is designed to be used in conjunction with the training manual, which the volunteers can take into the field or lab.

The video is designed to offer streamlined, step-by-step visual instruction in how to collect, filter, plate and analyze samples. Instruction on how to maintain a sterile procedure is included throughout, particularly at points where mistakes are likely to be made. Also included are reminders about how to deal with common problems.

C.3(c)(i) Organization of the Video

The video is broken into four segments. The first is an overview of coastal water quality issues, the importance of having a testing program and a definition of fecal coliform. The second part is an overview of the process of water testing from sampling through data entry so that every volunteer understands the broader context. The next two sections walk step by step through the processes of sample collection and analysis.



In summary, the four parts are:

1. Introduction to water quality and water testing
2. Overview of the water testing process
3. Step-by-step instructions for collecting samples
4. Step-by-step instructions for analyzing samples

C.3(c)(ii) Formatting

The video will be delivered in a high-quality format on a DVD. This DVD will be divided into four chapters, one for each section described above. FRIENDS will keep the DVD to use as needed for training sessions. To increase access to the video for water quality testing volunteers, a lower-quality version will be provided that can be shared on the Internet. FRIENDS will post this version on its website for access by the public.

C.3(c)(iii) Production Process

About two and a half hours of rough footage were taken in and around the temporary testing lab on Elbow Cay, using a Panasonic PV-GS80 camcorder. Editing was done using iMovie HD. The goal of maximizing continuity of actions and actors was not fully realized due to limited time on Elbow Cay. Still, the footage collected should be sufficient to avoid distracting discontinuities. Equipment costs were negligible, as no new equipment needed to be purchased.

D. Community Awareness, Education and Outreach

D.1 Introduction

The overall goal of the Community Awareness, Education and Outreach component of the Research Practicum was to establish a dialogue with the island community about coastal water quality on Elbow Cay in order to develop a context for introducing a volunteer water quality monitoring program. Water management depends on science and technology, but it is also a social process, making it vital for scientists to understand the social fabric of the environment in which they work (Rhoads et al., 1999). The education and outreach conducted on Elbow Cay established a two-way exchange of information between the community and the researchers, which is essential for creating successful interventions. Discussion and education can lead to local action and ownership of the issues. Citizen awareness of and participation in monitoring may enable residents and organizations to take action in environmental decision-making (Gouviea, 2004). The three methods employed to raise awareness were dissemination of a flyer, a community meeting and educational presentations at two local schools.

D.2 Project Goals

The purpose of the flyer was to encourage attendance at the community meeting by generating interest in and raising awareness of the project before the Practicum team arrived. The intent was to include enough information in the flyer to spark interest in and conversation about the results of the water quality testing completed in March, 2009 by the Practicum team. The flyer was designed to reach all segments of the public on the island. Although it is a difficult goal to achieve, all segments of the population should be represented in public participation concerning water management (Duram & Brown, 1999).

Discussion
and
education can
lead to local
action

In addition to formally introducing the Practicum team to the community, the objectives of the community meeting were threefold: to provide a brief overview of waste discharge and the its implications for coastal water quality; to report the results of the water testing conducted in March, 2009 by the WSSS Practicum; and to relay information about the proposed volunteer water quality monitoring (AWM) program. In the United States, public meetings and information sessions have been found to be very useful methods to increase participation in watershed initiatives (Duram & Brown, 1999).

The goal of the school presentations was to engage children in the community with coastal water quality issues through education. Environmental education as a general subject often seeks to empower students to transform society (Gough & Robottem, 1993). These educational presentations shared this goal of student empowerment. School programs have the potential to mobilize community interest in an issue (Gough & Robottem, 1993). Furthermore, community participation and integration in curriculum enhances learning, and creates a mutually beneficial partnership. (Bouillion & Gomez, 2001). The conceived relationship of presenters to the students was as members of the same global community.



...to engage children in the community with education about water quality

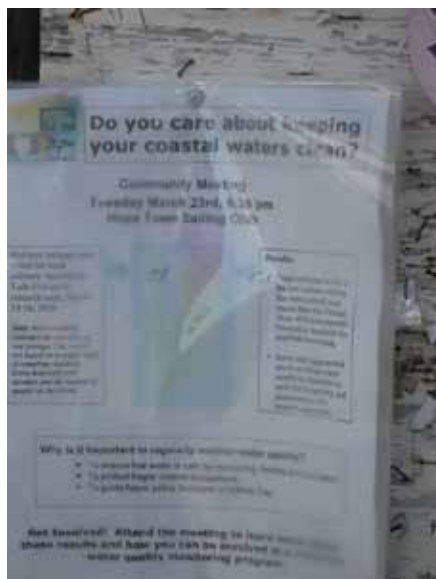
D.3 Planning Process

D.3(a) Flyer

A variety of flyer designs were researched and the opinions of faculty members and Friends of the Environment were incorporated into the final product (see Appendix 3A). Information in the flyer was extracted from the 2009 WSSS Practicum results as well as from plans for the current project. The flyer was intended to be sent to the client prior to the arrival of the practicum team in Elbow Cay to ensure advance notice of the community meeting. The flyer was a one-way method of communication which advertised a more thorough two-way method of communication (Duram & Brown 1999).

D.3(b) School Presentation

A variety of education materials were examined and several experiments and demonstrations were considered, before a sub-group of the Practicum team decided to create a PowerPoint presentation (see appendix 3C) using information gathered from several science curriculum websites. A demonstration was invented to show dilution and the possibility of microscopic pollution. The presentation sought to build a connection between the science taught in the classroom and real world problems. It is hypothesized that without such connections students disengage from classroom learning (Bouillion & Gomez 2001). The very real potential problem of coastal water pollution in



Elbow Cay was used to build this connection. To demonstrate the global nature of water issues, several photos of different landscapes were shown and various water issues in those landscapes were discussed. It was very important to keep the presentation positive and so the last slide was a discussion of the possible solutions to water quality problems.

D.3(c) Community Presentation

FRIENDS had requested a presentation describing the previous year's water testing results in addition to information about the new initiatives planned by FRIENDS and the WSSS Practicum for 2010. If the scientific community is not open with the public, trust in the work being conducted falls (Till, 1999; Duram & Brown, 1999). Information was gathered from both the full report and technical memorandum produced by the 2009 WSSS Practicum team, as well as through personal communications among faculty and students involved with the testing last year. The main points of the presentation were the 2009 results, along with a brief overview of consequences of fecal coliform in coastal water, information about the Practicum team's activities for the week, and an introduction to the volunteer water monitoring program. Door-to-door contact and information meeting are judged to be the most effective methods to stimulate public participation (Duram & Brown 1999). An overhead presentation accompanied the community meeting; it is



included here as Appendix 3B.

D.3(d) Volunteer Training

The volunteer training program was jointly designed by FRIENDS and the WSSS Practicum team. The objective of this process was to ensure the successful deployment of the Abaco Water Monitoring Program. Other important components in the planning process included: identifying a program leader and ensuring broad participation from the Abaco community. The training took place two days after the community meeting, so the meeting could be used as a forum to promote the water monitoring program. The training was planned for one morning in which the trainees learned about all components of the monitoring program: the purpose, how to collect, analyze, and report results.

D.4 Outcomes

D.4(a) Flyer

The flyer was posted in several public locations one week prior to the arrival of the Tufts Practicum team. When questioned, many residents of Elbow Cay reported awareness of the community meeting. There were a satisfactory number of people at the meeting, with the venue filled with nearly 50 people.

D.4(b) School Presentation

The importance of water quality issues was emphasized by our presence in the classroom. The broad speaking points of the presentation

The WSSS presentation sought to build a connection between the science in the classroom and real world problems

included a description of how the Tufts students were testing water quality around Elbow Cay, the importance of clean coastal water, the global nature of water quality problems, and possible solutions and positive ideas for individual action. There were two presentations: one at the Hope Town School and one at a neighboring island, Man O' War Cay. The children were very engaged and interactive during the presentations and the feedback from the local teachers was positive.

D.4(c) Community Meeting

The community meeting was held in the Hope Town Sailing Club at 6:30 pm on Tuesday, March 23, 2010. A projector and PA system were provided by FRIENDS to facilitate the PowerPoint presentation. Olivia Patterson, Program Coordinator of FRIENDS, introduced the members of the WSSS Practicum 2010 before the graduate students started their presentation.

The presentation was followed by many questions and comments. These questions ranged from those that the practicum team was qualified to answer to those that were beyond the scope of the project. Concerns about the impact of new developments and soak away systems



on coastal water quality were voiced, and many people expressed interest in learning more about the volunteer program. Public participation is a viable part of water management when dealing with complex problems such as non-point source pollution (Duram & Brown 1999).

D.4(d) Volunteer Training

Before the WSSS team arrived on Elbow Cay in March, FRIENDS worked diligently to ensure community members would be willing to participate in the training. The Tufts team continued the outreach efforts during the week. While on the island, the practicum team decided to conduct one volunteer training session instead of two organized training sessions to accommodate volunteer preferences. Additionally, FRIENDS dedicated staff resources to manage the volunteer monitoring program. The volunteer training resulted in seven trained volunteers that are qualified to participate in the

Abaco Water Quality



D.4(e) Monitoring Program

The volunteers are trained to complete the following sampling procedure, the complete training manual can

be viewed as part of appendix 2A.

D.5 Conclusion

The techniques used for community outreach and engagement of the people in Elbow Cay were largely successful. Awareness of the purpose of the visit was created using the flyer, many local people were actively engaged via the community meeting, and the local children benefitted from the interactive water quality presentations. Further interaction with the community occurred via structured interviews designed to gauge local perceptions about water quality issues in the area. The details and results of these interviews are described in the next section.



E. Social Surveying Process Paper

Just as the direction of the water quality testing and volunteer monitoring programs were informed and developed by input from the staff at Friends of the Environment; the social survey research was guided to deliver specific information to FRIENDS. In conversations with the practicum group, FRIENDS staff mentioned an interest in building citizen awareness and education about water quality issues in Elbow Cay. A series of interview questions, targeted and stratified according to groups within the larger community, were developed and 27 interviews were conducted over the course of the practicum's stay in the Bahamas. Additionally, a brief follow-up survey was developed based on the information and ideas gathered through interviews, per FRIENDS' request, for distribution to the population. These documents and a full report of interviewing results can be viewed in

Appendix 4, and its follow-up survey, at Appendix 4A.

Early in communications with FRIENDS, staff identified that one of their primary strategies is to use education as a way to promote environmental conservation. For FRIENDS to better target educational and social marketing campaigns to the residents of Elbow Cay, it would be helpful to have a better understanding of residents' present level of awareness of environmental problems on the island, including water quality. Also, to more effectively design and implement any social marketing, outreach, or other incentives to change behavior within the community, it would be valuable for FRIENDS to have some indication of resident's ability and willingness to change behaviors, support specific initiatives or otherwise participate in the mission of the organization.

When asked broadly about resident's perceptions of water quality and other social issues related to water on the island, FRIENDS listed the following as primary concerns:

- The people on the island lack an awareness of the water quality problems. The root of the water quality problem is not well understood. The boaters sometimes blame the land residents and vice versa.
- One-on-one interviews would be the best way (for Tufts) to reach people, as opposed to a town meeting.
- The island is feeling a lot of pressure from developers. Fourteen large-scale projects have recently been approved. There is concern over the high rate of recent development and water supply. What happens to their fresh water source when more people live on or visit the island? What is an appropriate carrying capacity of the island? FRIENDS is working with the Nature Conservancy to write a conservation assessment to try and answer some of these questions.
- Social justice – Second home-owners (i.e., non-citizens of the Bahamas) feel they do not have a voice in the local government. Permanent residents (i.e., citizens of the Bahamas) feel like they have more right over the island than the second home-owners. There is a growing disconnect between the two groups (conference call, 11/9/09).

These concerns were distilled into two primary guiding questions which shaped individual interviews. Specifically the survey research team and FRIENDS staff identified the following as “the most important things to find out” (email, 2/5/10):

- What is most people's perception of the current state of water quality?
- What is their willingness to take action (if they think it's necessary)?

Based on differences in perceived environmental impacts and levels of involvement and commitment to the long-term health of the island, the general population of the island was stratified according to distinct stakeholder groups within the community. Specific questions were developed for three specific groups according to discrete possible sources of water pollution: boaters, homeowners and business owners. Of those respondents who were also residents of Elbow Cay (some “boaters” were not), interviewees were then classified as Bahamian citizens, year-round and second-home owners, in an effort to tease out any differences in the responses of these subsets of the population.

To gauge citizen awareness of environmental issues, including the health of the coastal waters and harbours, interviewees were first asked to identify any environmental concerns currently facing the island, Hope Town Harbour and the coastal waters of Elbow Cay, and also identify any potential threats. Awareness of and familiarity with a variety of environmental concerns facing the island ranged from “no problems” to “too numerous to list” with overdevelopment, poor or poorly used waste treatment and burning of trash as the most common concerns reported.



After soliciting a list of concerns, residents were asked more targeted questions about the specific effect of pollution on their (and their family's) lives. To identify the strength

of people's understanding and connection between their individual actions and the greater health of the island and coastal water, each interviewee was asked to identify the impact of a variety of (potential) pollution sources including boats, businesses and homes; and then was asked about what each group "should or could do to protect the condition of coastal waters." The amount of correlation between listed concerns and proposed solutions was used as a proxy to assess resident's understanding of how their actions impact the island. Questions were developed for each category of (primary) user group according to their greatest area of environmental impact (boater, homeowner, business owner/operator) to specifically gauge that group's impact and awareness about the health of the water in Hopetown Harbor and on Elbow Cay.

Finally, all interviewees were asked a series of valuation questions to identify willingness to take actions, including making a payment, to protect or improve the health of Elbow Cay's waters. These included: participation in community activities that promote awareness of and protect coastal water health, user fees, taxes, investing in household, boat or business improvement costs, or otherwise investing time or resources to protect, restore or maintain the health of near-shore waters (for example, through donation). Answers to these questions formed the basis for a short survey for distribution on the island to guide FRIENDS in their thinking about how to target and engage the community in projects and policies that promote environmental stewardship.

Five of the interviews were conducted following a community meeting organized by FRIENDS and were analyzed as a group to discern the distinct level of awareness and willingness to act among FRIENDS current constituents (as compared with the general population). Five recreational users were specifically targeted, again to investigate whether or not there might be some difference in awareness or willingness to take protective measures among surfers, swimmers and divers.

Interviews were uniformly administered to residents, boaters and recreational users indiscriminately. One resident of Abaco Island who was not boating or on vacation was not interviewed and one resident who was solicited refused the interview. One non-English speaker was not

interviewed. Overall, non-response was low and the only bias that could have been caused from non-respondents might be due to the fact that interviewers did not solicit interviewees from their homes. Therefore, the sample interviewed can only represent the population of Elbow Cay that routinely walk around town, recreate, shop or eat out.

Interviewers were careful to identify themselves as graduate students “interested in learning about residents’ relationship with the water and the environment here on Elbow Cay,” and not as consultants for FRIENDS. This was done to ensure respondents were as honest with us as possible that they weren’t trying to answer questions in the way that an environmental group might want them to. The interviews ended up serving many functions and acting as a thread to tie the practicum’s various projects together over the course of the week on Elbow Cay. Conversations provided the practicum group with information and cultural awareness that informed the other areas of involvement with the community, especially in soliciting people to participate with FRIENDS in ongoing water quality monitoring and citizen outreach efforts.

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