



**Knowledge, Attitudes and Perceptions of
Management Strategies and Regulations of
the Gray's Reef National Marine Sanctuary
by Users and Non-users of the Sanctuary**

U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Ocean Service
Office of National Marine Sanctuaries



March 2012

About the Marine Sanctuaries Conservation Series

The National Oceanic and Atmospheric Administration's National Ocean Service (NOS) administers the Office of National Marine Sanctuaries (ONMS). Its mission is to identify, designate, protect and manage the ecological, recreational, research, educational, historical, and aesthetic resources and qualities of nationally significant coastal and marine areas. The existing marine sanctuaries differ widely in their natural and historical resources and include nearshore and open ocean areas ranging in size from less than one to over 5,000 square miles. Protected habitats include rocky coasts, kelp forests, coral reefs, sea grass beds, estuarine habitats, hard and soft bottom habitats, segments of whale migration routes, and shipwrecks.

Because of considerable differences in settings, resources, and threats, each marine sanctuary has a tailored management plan. Conservation, education, research, monitoring and enforcement programs vary accordingly. The integration of these programs is fundamental to marine protected area management. The Marine Sanctuaries Conservation Series reflects and supports this integration by providing a forum for publication and discussion of the complex issues currently facing the sanctuary system. Topics of published reports vary substantially and may include descriptions of educational programs, discussions on resource management issues, and results of scientific research and monitoring projects. The series facilitates integration of natural sciences, socioeconomic and cultural sciences, education, and policy development to accomplish the diverse needs of NOAA's resource protection mandate.

Knowledge, Attitudes and Perceptions of Management Strategies and Regulations of the Gray's Reef National Marine Sanctuary by Users and Non-users of the Sanctuary

Vernon R. Leeworthy¹

¹ NOAA, National Ocean Service, Office of National Marine Sanctuaries



U.S. Department of Commerce
John Bryson, Secretary

National Oceanic and Atmospheric Administration
Jane Lubchenco Ph.D
Under Secretary of Commerce for Oceans and Atmosphere

National Ocean Service
David M. Kennedy, Assistant Administrator

Office of National Marine Sanctuaries
Daniel J. Basta, Director
Silver Spring, Maryland
March 2012

DISCLAIMER

Report content does not necessarily reflect the views and policies of the Office of National Marine Sanctuaries or the National Oceanic and Atmospheric Administration, nor does the mention of trade names or commercial products constitute endorsement or recommendation for use.

REPORT AVAILABILITY

Electronic copies of this report may be downloaded from the Office of National Marine Sanctuaries web site at www.sanctuaries.nos.noaa.gov. Hard copies may be available from the following address:

National Oceanic and Atmospheric Administration
Office of National Marine Sanctuaries
SSMC4, N/ORM62
1305 East-West Highway
Silver Spring, MD 20910

COVER

Diver, Atlantic spadefish and "live bottom" at Gray's Reef. Photo by Greg McFall.

SUGGESTED CITATION

Leeworthy, V.R. 2012. Knowledge, Attitudes and Perceptions of Management Strategies and Regulations of the Gray's Reef National Marine Sanctuaries by Users and Non Users of the Sanctuary. Marine Sanctuaries Conservation Series NMSP-12-01. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Office of National Marine Sanctuaries, Silver Spring, MD. 48 pp.

CONTACT

Dr. Vernon R. (Bob) Leeworthy
Chief Economist
Office of National Marine Sanctuaries
1305 East West Highway, SSMC4, 11th floor
Silver Spring, MD 20910
Telephone: (301) 713-7261
Fax: (301) 713-0404
E-mail: Bob.Leeworthy@noaa.gov

ABSTRACT

This research is part of the Socioeconomic Research & Monitoring Program for the NOAA Office of National Marine Sanctuaries. In 2010, a baseline study of users and non-users of Gray's Reef National Marine Sanctuary (GRNMS) was initiated. Mail surveys were designed in 2010 and implemented in 2011.

The study provides baseline data on the knowledge, attitudes and perceptions of users and non-users of GRNMS in regard to management strategies and regulations. It also provides information on socioeconomic/demographic profiles, activity participation and use of coastal and ocean waters off the Georgia coast both inside and outside GRNMS. The surveys collected data on sources of public information on GRNMS used and the trust of sources used, familiarity with GRNMS rules and regulations, and attitudes about selected management strategies for coastal and ocean resources both inside and outside GRNMS. For users of GRNMS, perceptions of resource conditions were also addressed.

For users and non-users, two versions of the surveys were designed to address all the issues above. Both versions of the survey were implemented for separate samples of non-users of GRNMS in 2011. For users, Version 1 of the survey was implemented in 2011. Version 2, which obtains information about attitudes on selected management strategies for coastal and ocean resources both inside and outside GRNMS will be implemented in 2012 and follow-up reports will make comparisons with non-users on these topics.

Key findings:

Users of GRNMS

- **Socioeconomic Profiles:** Users were all non-Hispanic white males between the ages of 24 and 75 (average age 52.75, median 53) that were highly educated, with 69% having had "Some College" education or above, and had high annual household incomes with over half exceeding \$100,000. In addition, zero were unemployed during 2010 with 74% being employed full-time and 18% retired. More than 68% of users lived in households without children.
- **Recreation Activity Participation in GRNMS:** Fishing was the primary activity for most users with almost 95% having participated in fishing (about 82% engaged in bottom-fishing and about 90% engaged in trolling or drifting in mid or top water). About 9% participated in SCUBA diving and 27% did some form of nonconsumptive recreation (e.g. whale watching or other wildlife viewing, sailing, or SCUBA diving where they don't take anything). About 61% participated in fishing tournaments.
- **Recreation Activity Participation in Coastal & Ocean Waters off Georgia Coast for Activities that are known to take place in GRNMS:** Again, fishing was the primary activity with 96% having participated. Almost 17% participated in SCUBA diving, while 44% participated in some form of nonconsumptive recreation.
- **Recreation Activity Participation in Selected Activities Outside GRNMS in Georgia:** For selected activities that don't occur in GRNMS, users of GRNMS had the highest participation in beach and shorebird watching activities.
- **Boat Ownership:** More than 97% of users of GRNMS owned a boat with boat length ranging from 17 to 47 feet (average 24.57 feet and median 23.5 feet).
- **Memberships in Groups, Clubs and other Organizations:** Almost 43% of all users were members of fishing groups, clubs or organizations, while 15% were members of environmental organizations.
- **Sources of Information Used for GRNMS:** The top four sources of information used by users were Georgia Department of Natural Resources (71.43%), the Internet (62.34%), GRNMS Web site (58.44%) and Word of Mouth (58.44%).

- **Trust of Sources of Information Used:** For the four most-used sources of information levels of trust (trust very much or completely trust) were 67.35% for the Georgia Department of Natural Resources, 44.45% for the Internet, 74.42% for the GRNMS Web site, and 33.33% for Word of Mouth.
- **How Users of GRNMS would like to Receive Information from GRNMS:** Over half of users of GRNMS would prefer to receive information about GRNMS via either the GRNMS Web site, a Newsletter delivered to their home via the U.S. Postal Service, or by an E-mail List Serve.
- **Attitudes about GRNMS Management Strategies and Regulations:** The overwhelming majority supported (strongly to moderately) all GRNMS management strategies and regulation, except the spear fishing prohibition (43.42% supported, 35.52 did not support, 19.74% were neutral, and 1.32% did not know).
- **Attitudes about GRNMS Processes to Create and Enforce Rules and Regulations:** Less than a majority of all users were supportive of GRNMS processes in creating and enforcing its rules and regulations. There appears to be a perception that GRNMS has not been including the public fairly in its processes or adequately educating the public about its rules and regulations.
- **Familiarity with GRNMS Rules and Regulations:** Despite the negative attitude about GRNMS educating the public adequately about GRNMS rules and regulations, more than 93% of GRNMS users were either very familiar (17.11%) or somewhat familiar (76.32%) with GRNMS rules and regulations.
- **Perceptions of Conditions of Resources in GRNMS:** The majority of users thought most resources in GRNMS were either getting better or staying the same. The highest proportion of users who thought that conditions were getting worse (26.32%) were concerned about invasive species (such as lionfish) followed by “Marine Debris (plastics and other trash)” at 15.79%.

Non-users of GRNMS

- **Socioeconomic Profiles:** Non-user survey respondents had a higher proportion of white males that were more educated and had higher household incomes than the general population in Georgia. Samples were weighted to more closely represent the general population of Georgia. However, there were too few Hispanics responding to the survey to make sample weighting effective, so the Hispanic population is not represented in the results of the study.
- **Recreation Activity Participation in Coastal & Ocean Waters off Georgia Coast for Activities that are known to take place in GRNMS:** Fishing was the activity with the highest participation rate with 33.5% having participated. In aggregate, non-users of GRNMS had higher participation rates in nonconsumptive activities than consumptive activities in the coastal & ocean waters off Georgia.
- **Recreation Activity Participation in Selected Activities Outside GRNMS in Georgia:** For selected activities that don't occur in GRNMS, non-users of GRNMS had the highest participation in beach and shorebird watching activities.
- **Boat Ownership:** 13.68% of non-users of GRNMS owned a boat with boat length ranging from 10 to 46 feet (average 18.4 feet and median 17.5 feet).
- **Memberships in Groups, Clubs and other Organizations:** The proportion of memberships in groups, clubs and organizations was higher in Environmental Groups and Chambers of Commerce than fishing or diving groups, but generally low in all groups.
- **Sources of Information Used for GRNMS:** The top four sources of information used was Television (67.63%), the Internet (65.94%), Newspapers (55.63%) and Word of Mouth (45.66%).
- **Trust of Sources of Information Used:** For the four most-used sources of information levels of trust (trust very much or completely trust) were 55.3%% for Television, 41.71%% for the Internet, 51.37% for Newspapers, and 57.51% for Word of Mouth.

- **How Non Users of GRNMS would like to Receive Information from GRNMS:** Over half of non-users of GRNMS would prefer to receive information about GRNMS via either the GRNMS Web site or a Newsletter delivered to their home via the U.S. Postal Service.
- **Attitudes about GRNMS Management Strategies and Regulations:** The overwhelming majority supported (strongly to moderately) the prohibition on disturbing the sea bed including all mining and oil and gas activities, the prohibition on the damage or removal of bottom formations, the prohibition on the use of explosives, and the prohibition on the discharge of pollutants in GRNMS waters. A plurality (more supporters than non supporters) supported the GRNMS as currently established, the no anchoring regulation, the prohibition on commercial fishing use of wire traps or the use of bottom trawls and the prohibition on spear fishing.
- **Attitudes about GRNMS Processes to Create and Enforce Rules and Regulations:** A majority of all non-users responded that they didn't know about GRNMS processes to create and enforce rules and regulations. For those who did express an opinion, there appears to be a perception that GRNMS has not been including the public fairly in its processes or adequately educating the public about its rules and regulations.
- **Familiarity with GRNMS Rules and Regulations:** Almost 78% of non-users of GRNMS were not at all familiar with GRNMS rules and regulations. Surprisingly, over 21 percent were somewhat familiar with GRNMS rules and regulations, which is close to the same proportion of non-users that thought the GRNMS was doing a good job of educating people about the rules and regulations.
- **Support for Selected Management Strategies for Coastal & Ocean Resources off the Coast of Georgia Inside versus Outside GRNMS:**
 - 1). Use of Marine Zoning: Over three quarters of non-users of GRNMS would support the use of marine zoning in the coastal & ocean waters off the coast of Georgia.
 - 2). Use of Marine Reserves (no-take areas): An overwhelming majority of non- users of GRNMS would support the creation of marine reserves in the coastal & ocean waters off the coast of Georgia both inside and outside of GRNMS with slightly stronger support for marine reserves inside GRNMS.
 - 3). Research Only Areas: An overwhelming majority of non-users of GRNMS support the creation of Research Only Areas in the coastal & ocean waters off the coast of Georgia both inside and outside of GRNMS.
 - 4). Multi-species Fishery Management: Over half of the non-users of GRNMS were neutral on the support for multi-species fishery management with more than 39% in support and a little over 7% against it.
 - 5). Ecosystem-based Approach to Management: An overwhelming majority of non-users of GRNMS would support an Ecosystem-based Management Approach with only about 4.5% opposed to the idea.
- **Concern about the Health of Ocean Areas in and around Georgia outside of GRNMS:** An overwhelming majority of non-users of GRNMS were concerned about the health of ocean & coastal areas for most issues asked, except for marine transportation and mining of minerals, where only a plurality (more concerned than not concerned) were concerned.
- **Concern about the Health of Ocean Areas in GRNMS:** An overwhelming majority of non-users of GRNMS were concerned about the health of ocean & coastal areas for most issues asked, except for marine transportation and mining of minerals, where only a plurality (more concerned than not concerned) were concerned.
- **Support for Protections of Coastal & Ocean Resources off the coast of Georgia inside versus outside of GRNMS:** About 95% of non-users supported protections of coastal & ocean resources off the coast of Georgia outside GRNMS, while almost 89% supported protection efforts in GRNMS.
- **Ways Non-users of GRNMS Value Ocean & Coastal Resources/Marine Environment:** An overwhelming majority of non-users of GRNMS had high to extremely high values for most uses of ocean & coastal resources, except for seafood purchased at non local stores & restaurants and the supply of minerals through mining. The highest

values were given to seafood purchased at local stores and restaurants (86.84%), support for education (83.33%), and protection of resources even though they never intend to visit or directly use them (75.81%).

- **Activities or Actions Non-users of GRNMS Would Do to ensure that ocean and coastal resources are used sustainably and available for future generations to enjoy:** A majority of non-users of GRNMS would recycle (95.72%), use less energy (94.75%), pay user fees like fishing licenses or diving access fees or additional boat registration fees (81.04%), avoid/boycott certain seafood products, pay higher prices for goods and services due to costs to businesses in complying with regulations that protect ocean & coastal resources or require restoration of areas damaged (64.53%), or volunteer time (55.40%). A majority of non-users of GRNMS would not do or do very little in “paying higher taxes for resource protection and restoration” (54.88%), or donate to groups representing fishing (53.36%) or diving (57.64%) interests.

Users versus Non-users of GRNMS – Statistically Significant Differences

- **Socioeconomic Profiles:** Users are all white males, while non-users mirror the general Georgia population. While users had a zero rate of unemployment non-users had a high unemployment rate (15.5%). Users were significantly more concentrated in households characterized as single adult or two adults with no children than non-users.
- **Recreation Activity Participation in Coastal & Ocean Waters off Georgia Coast for Activities that are known to take place in GRNMS:** Users had higher rates of participation in Georgia’s coastal & ocean waters for consumptive activities, especially fishing, than non-users. Non-users had significantly higher participation rate in nonconsumptive recreation (e.g. whale watching or other wildlife viewing, sailing, or SCUBA diving where they don’t take anything) than users, 63.19% versus 44.16%.
- **Recreation Activity Participation in Selected Activities Outside GRNMS in Georgia:** For selected activities that don’t occur in GRNMS, the only statistically significant difference between users and non-users were for participation in beach activities with users having a higher participation rate (76.32% versus 58.45%).
- **Boat Ownership:** Users had a higher rate of boat ownership and, on average, larger boats. Participation rates were 97.37% versus 13.68% and average boat length 24.57 feet versus 18.84 feet.
- **Memberships in Groups, Clubs and other Organizations:** Users had significantly higher rates of membership than non-users in all the groups included in the survey except Diving groups.
- **Sources of Information Used for GRNMS:** Of the 22 sources of information asked in the survey, there were statistically significant different rates of usage between users and non-users in 15 of the sources. Non-users tended to use more general sources of information such as Television, the Internet, and Newspapers than users.
- **Trust of Sources of Information Used:** For the nine sources of information that had sufficient numbers of users of the information source, and therefore a rating on the trust of the source, there was only one statistically significant difference between users and non-users. Non-users had a higher level of trust for information from NOAA’s National Marine Fisheries Service than users.
- **How those surveyed would like to Receive Information from GRNMS:** The only significant difference between users and non-users on how they preferred to receive information about GRNMS was for E-mail Listserv. A significantly higher proportion of users than non-users preferred receiving information by E-mail Listserv (49.33% versus 30.58%).
- **Attitudes about GRNMS Management Strategies and Regulations:** Of the nine GRNMS regulations included in the survey, there were significant differences between users and non-users on the distribution of their scores, mostly accounted for by the higher proportions of “Don’t Know” responses by non-users. Once “Don’t know” responses were removed and mean scores estimated, there were statistically different mean scores for six of the nine regulations with users having scores indicating more support for the regulations than non-users.

- ***Attitudes about GRNMS Processes to Create and Enforce Rules and Regulations:*** On the eight questions addressing GRNMS processes in creating and enforcing its rules and regulations, there were statistically significant differences between users and non-users on the distributions of their scores on all eight questions, mostly accounted for by the higher proportion of “Don’t Know” responses by non-users. Once “Don’t Know” responses were removed and mean scores estimated, there was only one statistically significant difference. Non-users had higher agreement scores with the statement that “the process the GRNMS used to develop its rules and regulations was open and fair to all groups”.
- ***Familiarity with GRNMS Rules and Regulations:*** As would be expected, users of GRNMS were much more familiar with the rules and regulations of GRNMS than non-users. However, it is surprising that over 21 percent of non-users were somewhat familiar with GRNMS’s rules and regulations.

KEY WORDS

Socioeconomic monitoring, knowledge, attitudes, perceptions, management strategies, regulations, users, non-users, activity participation, resource conditions, and socioeconomic/demographic profiles.

ACKNOWLEDGMENTS

I would first like to acknowledge the special assistance of interns Lindsay Williamson and Hope Carter of Georgia Southern University. Under the guidance of Dr. John Peden, Assistant Professor, Recreation & Tourism Management, Lindsay and Hope conducted the mail surveys of users and non-users of Gray's Reef and entered the returned questionnaires in databases with all the meta data to document the survey data. I would also like to thank Gail Oberg of the Skidaway Island Institute for her support throughout the long process to get the surveys going.

A special thank you to Gail Krueger and Becky Shortland for helping design the questionnaires to ensure we were addressing all the issues of Gray's Reef correctly. An extra special thank you goes to Becky for weighing in to complete the data entry and data documentation when the student interns had to get back to school. I know this took her out of her comfort zone, but she was a quick study and did a great job.

Superintendent of Gray's Reef, George Sedberry, did a great job of reviewing and editing the report. In addition, his Foreword to the report lays out the motivation for this study. I would also like to thank Greg McCall for the nice photo of Gray's Reef on the cover. I would also like to thank Manoj Shivlani and Christy Loper for their peer review comments and suggestions. And, finally I would like to thank Auralea Kreiger at AK Graphic Artist for the great page layout and graphics work for the report. Of course any errors in substance or content of the report are solely the responsibility of the author.

FOREWORD

As part of the 2006 management plan for Gray's Reef National Marine Sanctuary, NOAA committed to increasing the public knowledge of the Sanctuary environment to further develop an informed constituency, with the goal to increase awareness, understanding and stewardship of the sanctuary. A challenge noted in the 2006 plan was that of increasing broad public awareness of Gray's Reef as a national treasure and a local natural resource. It was noted such public awareness programs should be developed and implemented with an assessment component to gauge their effectiveness. To address this, the sanctuary proposed a survey of public perceptions among private boaters be conducted to develop a baseline indicator of their knowledge of the sanctuary, its programs, and related coastal ocean issues. The 2006 management plan also proposed a survey be conducted among a broader segment of the general public. Results of the first surveys implemented as a result of the 2006 management plan are reported herein, and can now be used to develop and improve our communications strategy, and to evaluate the effectiveness of our public education and outreach programs. The survey and results described in this report address those needs outlined in 2006, and provide a background for going forward as we revise the 2006 plan for future management of the sanctuary.

George Sedberry
Superintendent
Gray's Reef National Marine Sanctuary

Table of Contents

Introduction	1
Surveys.....	1
Sampling Frames.....	1
Response Rates	1
Non-response Bias/Sample Weighting	2
Statistical Tests	2
Background/Other Literature.....	2
Chapter 1: Users of GRNMS	
User Profiles.....	3
Demographics.....	3
Organizational Membership and Boat Ownership.....	3
Activity Participation and Use	6
Participation in Activities that take place in GRNMS	6
Participation in Activities that don't take place in GRNMS	6
Person-days of Use by Activity.....	6
Participation in Fishing Tournaments	7
Factors Influencing the Choice of going to GRNMS for Activities	7
Knowledge	7
Sources of Information Used	8
Level of Trust of Information Sources Used.....	8
How Users would like to receive information from GRNMS.....	9
Familiarity with GRNMS Regulations.....	9
Attitudes	9
Regulations	9
Processes	10
Performance	10
Perceptions	12
Chapter 2: Non-users of GRNMS	13
User Profiles.....	13
Demographics.....	13
Organizational Membership and Boat Ownership.....	16
Activity Participation and Use	16
Participation in Activities that take place in GRNMS	16
Participation in Activities that don't take place in GRNMS	17
Person-days of Use by Activity.....	17
Knowledge	18

Sources of Information Used	18
Level of Trust of Information Sources Used	18
How Non-users would like to receive information about GRNMS.....	18
Familiarity with GRNMS Regulations	18
Attitudes	18
Regulations	18
Processes	18
Performance	20
Concern about the Health of Coastal and Ocean Areas	20
In and Around Georgia Outside GRNMS	20
In GRNMS.....	21
Support for Protection of Coastal and Ocean Resources	21
Ways Non-users of GRNMS Value Coastal and Ocean Resources/Marine Environment	21
Actions Non-users of GRNMS would take to ensure sustainability of Coastal and Ocean Resources	24
Support for Selected Policy/Management Strategies for Coastal and Ocean Resources	26
Marine Zoning	27
Marine Reserves	27
Research Only Areas	27
Multi-species Fishery Management	28
Ecosystem-based Approach to Management of Coastal and Ocean Resources	29

Chapter 3: User and Non-user Comparisons

User Profiles.....	31
Demographics	31
Organizational Membership and Boat Ownership.....	31
Activity Participation and Use	35
All Users and Non-users	35
Participants Only	37
Knowledge	37
Sources of Information Used	37
Level of Trust of Information Sources Used	39
How Prefer to Receive Information from GRNMS.....	39
Familiarity with GRNMS Regulations	40
Attitudes	40
Regulations	40
Processes	44
Performance	45

References	47
-------------------------	-----------

List of Tables

Table	Page
1.1	Sample Sizes and Response Rates for the Surveys of Users and Non-users of GRNMS 1
1.1	Sex, Race/Ethnicity and Age of GRNMS Users: Survey Respondents 2011 3
1.2	Household Size: Users of GRNMS 3
1.3	Boat Ownership, Length of Boat, and Number of People Aboard: Users of GRNMS 5
1.4	Person-days of Activity Participation in GA and GRNMS: Users of GRNMS 7
1.5	Factors Influencing Choice of going to GRNMS for Activities 8
1.6	Sources of Information Used about GRNMS: Users of GRNMS 8
1.7	Level of Trust of Information Sources Used: Users of GRNMS 9
1.8	Attitudes about GRNMS Management Strategies and Regulations: Users of GRNMS 11
1.9	Perceptions of Conditions of Resources in GRNMS: Users of GRNMS 12
2.1	Sex, Race, and Age of GRNMS Non-users: Survey Respondents 2011 13
2.2	Household Size: Non-users of GRNMS 13
2.3	Boat Ownership and Length of Boat: Non-users of GRNMS 16
2.4	Person-days of Activity Participation in GA: Non-users of GRNMS 17
2.5	Sources of Information Used about GRNMS: Non-users of GRNMS 20
2.6	Level of Trust of Information Sources Used: Non-users of GRNMS 21
2.7	Attitudes about GRNMS Management Strategies and Regulations: Non-users of GRNMS 22
2.8	Concern about the Health of Coastal & Ocean Areas in and around Georgia Outside of GRNMS: Non-users of GRNMS 23
2.9	Concern about the Health of Ocean Areas in GRNMS: Non-users of GRNMS 23
2.10	Support for Protection of Coastal & Ocean Resources in and around Georgia Outside of GRNMS versus Inside GRNMS: Non-users of GRNMS 24
2.11	Ways Non-users of GRNMS Value Coastal & Ocean Resources/Marine Marine Environment 25
2.12	Activities or Actions Non-users of GRNMS Would Do to ensure that coastal and ocean resources are used sustainably and available for future generations to enjoy 25
3.1	Age of Users versus Non-users of GRNMS 32
3.2	Household Size, Users versus Non-users of GRNMS 34
3.3	Boat Length, Users versus Non-users of GRNMS 35
3.4	Days of Participation in Selected Activities in GA, Users versus Non-users of GRNMS 37
3.5	Sources of Information Used for GRNMS: Users versus Non-users of GRNMS 38
3.6	Level of Trust of Selected Information Sources Used: Users versus Non-users of GRNMS 41
3.7	Attitudes about Current Management Strategies and Regulations of the GRNMS and How GRNMS Management has Performed: Users versus Non-users of GRNMS 42

List of Figures

Figure	Page
1.1 Educational Attainment of Users: Survey Respondents 2011	3
1.2 Employment Status of Users: Survey Respondents 2011.....	4
1.3 Household Income before Taxes of Users: Survey Respondents 2011	4
1.4 Type of Household of Users: Survey Respondents 2011.....	4
1.5 Household Size of Users: Survey Respondents 2011.....	5
1.6 User’s Memberships in Groups, Clubs and Organizations: Survey Respondents 2011	5
1.7 User’s of GRNMS Activity Participation in GA	6
1.8 User’s Activity Participation in GA for Selected Activities	7
1.9 User’s Participation in Fishing Tournaments	10
1.10 How Users would like to receive information about GRNMS.....	10
1.11 User’s of GRNMS Familiarity with GRNMS Rules and Regulations	10
2.1 Educational Attainment of Non-users of GRNMS: Survey Respondents 2011	14
2.2 Employment Status of Non-users: Survey Respondents 2011	14
2.3 Household Income before Taxes of Non-users of GRNMS: Survey Respondents 2011.....	15
2.4 Type of Household of Non-users of GRNMS: Survey Respondents 2011	15
2.5 Household Size of Non-users of GRNMS: Survey Respondents 2011	16
2.6 Memberships in Groups, Clubs and Organizations, Non-users of GRNMS: Survey Respondents 2011	16
2.7 Non-user’s of GRNMS Activity Participation in GA	17
2.8 Non-user’s of GRNMS Activity Participation in GA for Selected Activities.....	19
2.9 How Non-users of GRNMS would like to receive information about GRNMS	19
2.10 Non-users of GRNMS Familiarity with GRNMS Rules and Regulations.....	19
2.11 Non-users of GRNMS Support for Marine Zoning off the Coast of Georgia	26
2.12 Non-users of GRNMS Support for Marine Reserves off the Coast of Georgia Inside and Outside GRNMS	26
2.13 Maximum Acceptable Level of Impact on Different Uses of GRNMS if Displaced By Marine Reserves.....	27
2.14 Non-users of GRNMS Support for Research Only Areas off the Coast of Georgia Inside and Outside GRNMS.....	28
2.15 Maximum Acceptable Level of Impact on different Uses of GRNMS if Displaced By Research Only Areas in GRNMS.....	28
2.16 Non-users of GRNMS Support for the Multi-species Approach to Fishery Management.....	29
2.17 Non-users of GRNMS Support for the Ecosystem-based Approach to Management.....	29
3.1 Sex: Users versus Non-users of GRNMS.....	31
3.2 Race: Users versus Non-users of GRNMS.....	31
3.3 Age: Users versus Non-users of GRNMS.....	32
3.4 Educational Attainment: Users versus Non-users of GRNMS.....	32
3.5 Household Income: Users versus Non-users of GRNMS	33
3.6 Employment Status: Users versus Non-users of GRNMS	33

Figure	Page
3.7 <i>Household Type: Users versus Non-users of GRNMS</i>	34
3.8 <i>Household Size: Users versus Non-users of GRNMS</i>	34
3.9 <i>Memberships: Users versus Non-users of GRNMS</i>	35
3.10 <i>Boat Ownership: Users versus Non-users of GRNMS</i>	35
3.11 <i>Activity Participation in Coastal & Ocean Activities in GA that are Done in GRNMS: Users versus Non-users of GRNMS</i>	36
3.12 <i>Activity Participation in Other Coastal & Ocean Activities in GA: Users versus Non-users of GRNMS</i>	36
3.13 <i>Ways People Prefer to Receive Information about GRNMS: Users versus Non-users of GRNMS</i>	40
3.14 <i>Familiarity with GRNMS Rules and Regulations: Users versus Non-users of GRNMS</i>	40

Introduction

In 2010, a baseline study of users and non-users of Gray’s Reef National Marine Sanctuary (GRNMS) was initiated. Mail surveys were designed in 2010 and implemented in 2011.

The study provides baseline data on the knowledge, attitudes and perceptions of users and non-users of GRNMS in regard to management strategies and regulations. It also provides information on socioeconomic/demographic profiles, activity participation and use of coastal and ocean waters off the Georgia coast both inside and outside GRNMS.

Surveys

Separate surveys of users and non-users of GRNMS were conducted. Non-users were limited to the people living in households of the State of Georgia. The surveys collected data on sources of public information on GRNMS used and the trust of sources used, familiarity with GRNMS rules and regulations, and attitudes about selected management strategies for coastal and ocean resources both inside and outside GRNMS. For users of GRNMS, perceptions of resource conditions were also addressed.

For users and non-users, two versions of the surveys were designed to address all the issues above. Both versions of the survey were implemented for separate samples of non-users of GRNMS in 2011. For users, Version 1 of the survey was implemented in 2011. Version 2, which obtains information about attitudes on selected management strategies

for coastal and ocean resources both inside and outside GRNMS will be implemented in 2012 and follow-up reports will make comparisons with non-users on these topics.

Sampling Frames. For users, the sampling frame was from a list of users observed in the GRNMS by the Georgia Department of Natural Resources (GADNR). GADNR randomly either boards boats or writes down the boat registration number of the boats observed in the GRNMS. The random boarding is not related to enforcement actions. For boats boarded, name and address of the boat owner/operator is obtained. GRNMS staff received a list containing 249 names and addresses and/or boat registration numbers. Boat registration files were used to obtain names and addresses for the boat registration numbers.

For non-users, two samples of households were purchased from INFO USA, Inc., which maintains databases of households for survey research. Each sample consisted of the names and addresses for 500 households

and was stratified by coastal and non-coastal counties. Unlike most states, Georgia has very few households living in coastal counties because of the terrain, so we over-sampled coastal counties.

Response Rates. For both users and non-users the Dillman Method (Dillman 1978) of mail surveys was used. A full survey was sent out, and if not returned within two weeks, a post card reminder was sent. If a completed survey was not received after an additional two weeks, a full survey package was sent. For users, there were 249 names and addresses of which 94 were undeliverable resulting in 155 net eligible respondents. Of these respondents 79 or 50.97% responded (Table I.1).

For non-users Version 1, 500 surveys were mailed out with 44 undeliverable addresses resulting in 456 net eligible respondents. Of these respondents, 83 or 18.2% responded. For non-users Version 2, 500 surveys were mailed out with 54 undeliverable addresses resulting in 446 net eligible respondents. Of these respondents 60 or 13.45% responded (Table I.1).

Table I.1 Sample Sizes and Response Rates for the Surveys of Users and Non-users of GRNMS

	Users Version 1	Non-users Version 1	Non-users Version 2
Original Mailing List	249	500	500
Undeliverable Addresses	94	44	54
Net Eligible Respondents	155	456	446
Responded	79	83	60
Net Response Rate	50.97%	18.20%	13.45%

Non-response Bias/Sample

Weighting. Given the low response rates for non-users, non-response bias analysis was conducted and sample weights created to adjust for non-response bias (For details see Technical Appendix, Leeworthy 2012). People of Hispanic ethnicity had very low response rates, too low for sample weighting to be effective, so Hispanic people are not represented in the non-user surveys. Both version samples respondents were significantly different from the general Georgia population for demographic factors, sex, age, race/ethnicity, educational attainment and household income. However, for non-response bias to exist requires that these factors are also related to the answers to the survey questions. There were only a few questions for which there were any statistically significant different responses by these demographic factors, so there is some non-response bias, but it is small and was adjusted for by sample weighting. Again for details of the non-response bias analysis and the sample weighting see the Technical Appendix (Leeworthy 2012).

Statistical Tests

When the terms “significant difference” or “statistically significant difference” are used, it means that formal statistical tests were conducted. For categorical variable distributions, Chi-Square tests were conducted. For scores using 5-point Likert scales or continuous variables such as person-days or age of respondents, tests of sample means were conducted using t-tests. Level of significance for all tests was at the .05 level of significance or the 95 percent confidence level.

Background/Other Literature

Several other studies have been done in other National Marine Sanctuaries using the Knowledge, Attitudes and Perceptions framework used here. For the Florida Keys National Marine Sanctuary see Milan et al. (1997), Shivilani et al (2008), Suman et al (1999) and Thomas Murray & Associates (2005), and for the Channel Islands National Marine Sanctuary see LaFranchi and Pendleton (2008) and Loper (2008).

Chapter 1

Users of GRNMS

This chapter includes user profiles, which include the demographic profiles of users, activity participation and use, and the factors that influence the choice of GRNMS for their activity. The profiles are followed by user's knowledge, attitudes of GRNMS management strategies and regulations and user's perceptions of GRNMS resource conditions.

User Profiles

Demographics. The survey questionnaire included demographic information on the survey respondent's sex, age, race/ethnicity, educational attainment, employment status, household income, household type, and household size. Users were all white non-Hispanic males with ages ranging from 24 to 75 years (mean 52.57 and median 53) (Table 1.1).

Users had generally high levels of educational attainment with almost 69 percent with "Some College" or above (Figure 1.1). None of the users were unemployed during the 2011 survey period with more than 74% employed full-time and more than 18% retired (Figure 1.2). Users also had relatively high household incomes with over half of household incomes over \$100,000 (Figure 1.3). Over 68% of users lived in households without children (Figure 1.4). About 46% lived in households with two people (Figure 1.5) with an average household size of 2.54 (Table 1.2).

Table 1.1 Sex, Race/Ethnicity, and Age of GRNMS Users: Survey Respondents 2011

Sex	100% male
Race/Ethnicity	100% Non Hispanic White
Age	
Mean	52.75
Median	53
Minimum	24
Maximum	75

Figure 1.1 Educational Attainment of Users of GRNMS: Survey Respondents 2011

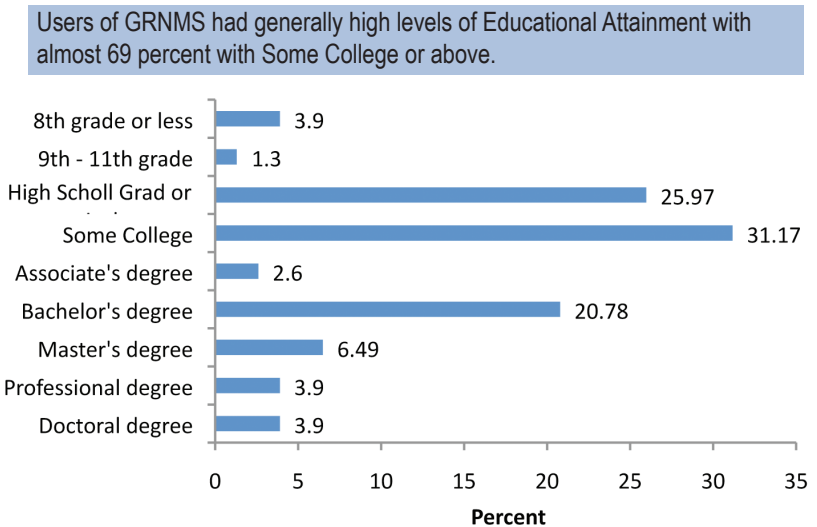


Table 1.2 Household Size: Users of GRNMS

	Mean	Median	Minimum	Maximum
Total Household Size	2.54	2	1	6
Number age 18 or older	2.04	2	1	4
Number under age 18	0.51	0	0	4

Organizational Membership and Boat Ownership. Almost 43% of all users were members of fishing groups, clubs or organizations, while over 15% were members of environmental groups. Also, more than 11% were members of chambers of commerce (Figure 1.6).

More than 97% of users owned a boat ranging from 17 to 47 feet in length (mean 24.57 feet). On average, about three people were aboard the boats when in GRNMS (Table 1.3).

Figure 1.2 *Employment Status of Users of GRNMS: Survey Respondents 2011*

More than 74 percent of GRNMS Users were employed full-time with zero unemployed and more than 18 percent retired.

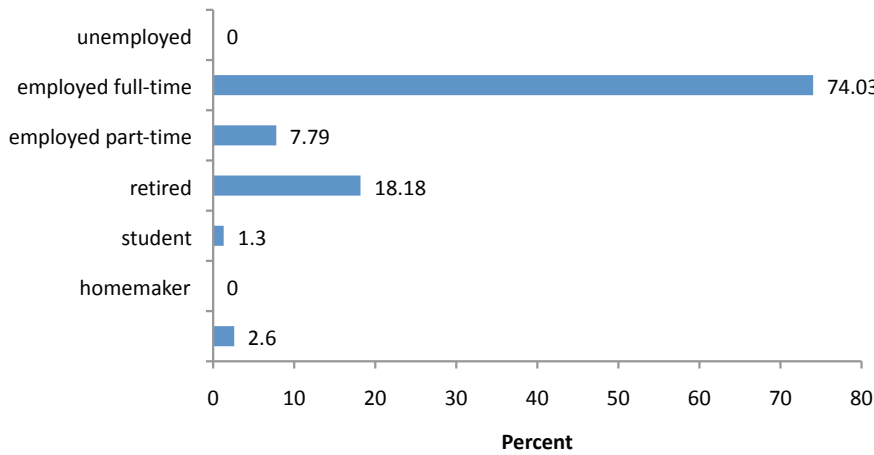


Figure 1.3 *Household Income before taxes of Users of GRNMS: Survey Respondents 2011*

Users of GRNMS had relatively high household incomes with over half of household with income over \$100,000.

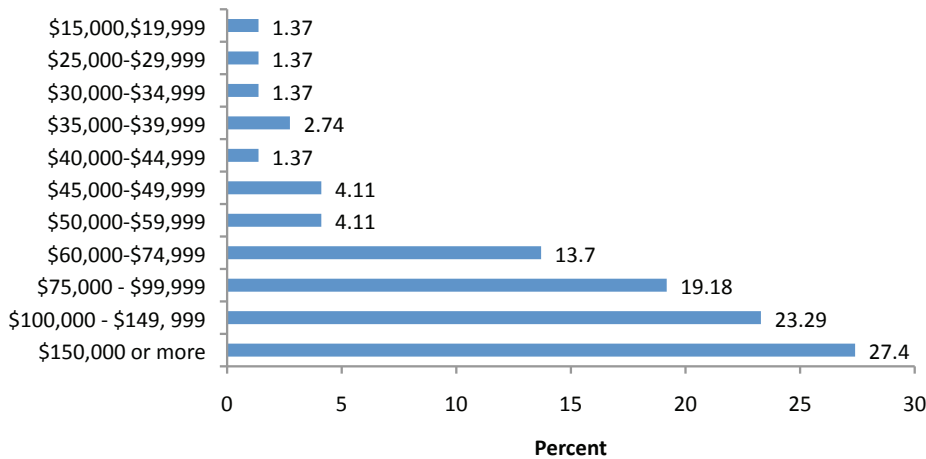


Figure 1.4 *Type of Household of Users of GRNMS: Survey Respondents 2011*

Over 68 percent of Users of GRNMS lived in households without children

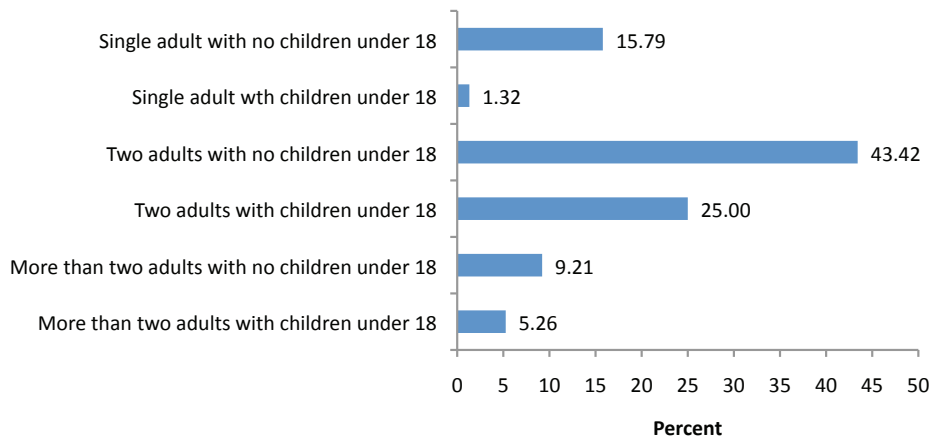


Figure 1.5 Household Size of Users of GRNMS: Survey Respondents 2011

Users of GRNMS had household sizes ranging from 1 to 6 persons with almost 62 percent in households with two or less persons

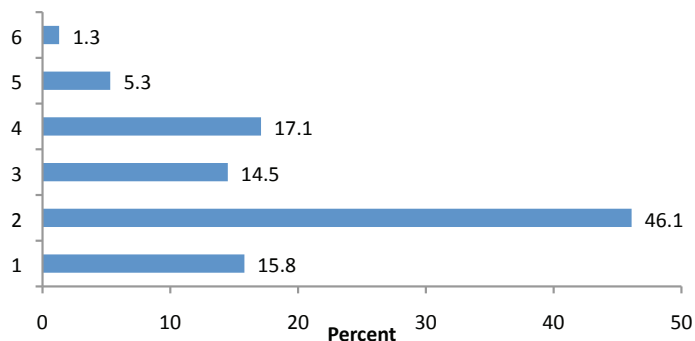


Figure 1.6 Memberships in Groups, Clubs and Organizations, Users of GRNMS: Survey Respondents 2011

Almost 43 percent of all Users of GRNMS were members of fishing groups, clubs or organizations, while over 15 percent were members of environmental groups.

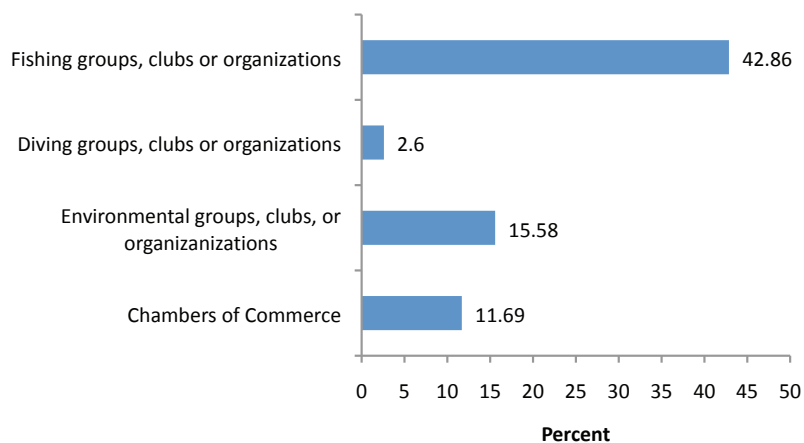


Table 1.3 Boat Ownership, Length of Boat, and Number of People Aboard: Users of GRNMS

Do you own a boat? (percent yes)	97.4
Length of Boat Owned (feet)	
Mean	24.57
Median	23.5
Minimum	17
Maximum	47
Number of People Aboard	
Mean	3.1
Median	3
Minimum	1
Maximum	5

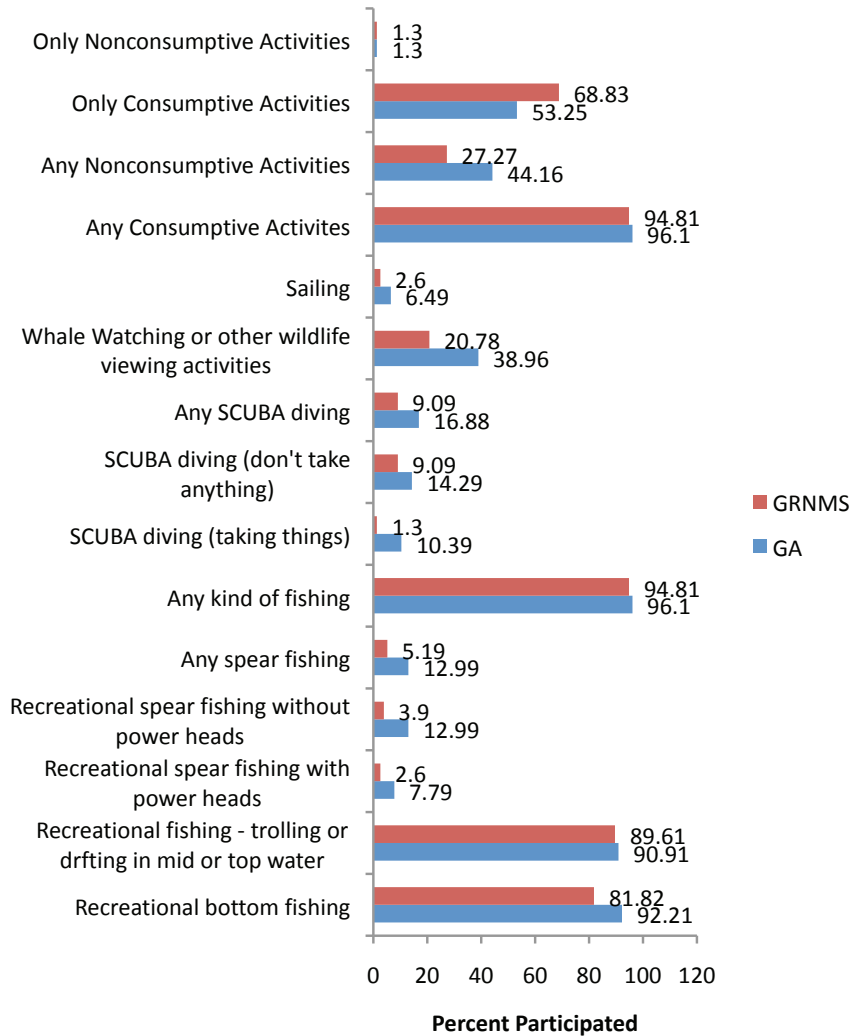
Activity Participation and Use.

The survey gathered information on recreation activities that users participated in GRNMS and in coastal and ocean areas of Georgia outside GRNMS. Activities were classified as those that take place in GRNMS and those that do not take place in GRNMS, but do take place in coastal and ocean areas of Georgia outside GRNMS.

Participation in Activities that take place in GRNMS. The survey asked about participation in “recreational bottom fishing”, “recreational fishing – trolling or drifting in mid or top water”, “recreational spear fishing – with power heads”, “recreational spear fishing-without power heads”, “SCUBA diving where nothing is taken”, “SCUBA diving where something is taken or harvested”, “whale watching or other wildlife viewing activities” and “sailing”. These activities were then classified into “consumptive” and “non-consumptive” activities. Figure 1.7 summarizes the results. Users of GRNMS had higher participation rates in consumptive activities than in nonconsumptive activities in the coastal and ocean waters off Georgia, including GRNMS. About 95% participated in fishing in GRNMS, while 96% participated in fishing in the coastal and ocean waters of Georgia outside GRNMS. Even though spear fishing is prohibited in GRNMS, more than 5% of survey respondents said they participated in spear fishing in GRNMS, while almost 13% said they did it in coastal and ocean areas of Georgia outside GRNMS. A little more than 9% participated in SCUBA diving in GRNMS, while almost 17% participated in SCUBA diving in the coastal and ocean waters of Georgia outside GRNMS.

Figure 1.7 Users of GRNMS Activity Participation in GA

For activities that are known to occur in GRNMS, Users of GRNMS had higher participation rates in consumptive activities than in nonconsumptive activities in the coastal & ocean waters off Georgia, with 95 to 96 percent participating in fishing in either GRNMS or coastal & ocean waters outside GRNMS off the Georgia coast.



Participation in Activities that don't take place in GRNMS. The survey asked about participation in “beach activities”, “surfing”, “windsurfing or kite boarding”, “personal watercraft use (jet skis, wave runners, etc.)”, and “shorebird watching”. Users of GRNMS had the highest participation in “beach activities” with 76.6% and “shorebird watching” with

33.77% (Figure 1.8). More than 22% participated in ‘personal watercraft use’, while more than 10% participated in surfing and about 6.5% participated in “windsurfing or kite boarding”.

Person-days of Use by Activity. Intensity of use was measured as annual person-days of use where a

person-day is equal to one person doing an activity for a whole day or any part of a day. Survey respondents were asked about their use for the activities that take place in GRNMS and how many person-days were in GRNMS versus how many person-days were in coastal and ocean waters of Georgia outside GRNMS. Results were summarized as the mean number of person-days for “all users”, which includes those that did zero days of an activity, and “participants only”, which includes only those that did at least one day of an activity (Table 1.4).

Inside GRNMS, users had the highest mean person-days of activity in “recreational fishing – trolling or drifting in mid or top water” with 7.19 person-days for 2010, while ‘recreational bottom fishing’ was close behind with 6.64 person-days. The difference, however, is not statistically significant (Table 1.4).

Outside GRNMS, users had the highest mean person-days of activity in “recreational bottom fishing” at 21.92 person-days in 2010, while “recreational fishing-trolling or drifting in mid or top water” was second with 14.08 person-days. This difference was statistically significant (Table 1.4).

Participation in Fishing Tournaments. Survey respondents, who fished, were asked if they participated in fishing tournaments. About 61% participated in fishing tournaments (Figure 1.5).

Factors Influencing the Choice of going to GRNMS for Activities. Survey respondents were

Figure 1.8 Users of GRNMS Activity Participation in GA for Selected Activities

For selected activities that don't occur in GRNMS, Users of GRNMS had the highest participation in Beach and Shorebird Watching activities in the coastal & ocean waters off Georgia outside GRNMS.

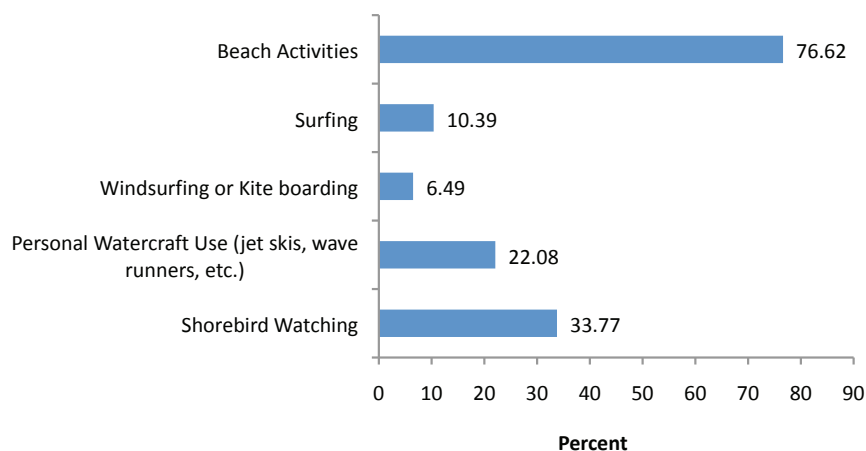


Table 1.4 Person-days of Activity Participation in GA and GRNMS: Users of GRNMS

Activity	All Users ¹		Participants Only
	GA (mean)	GRNMS (mean)	GA (mean)
Recreational bottom fishing	21.92	6.64	23.83
Recreational fishing - trolling or drifting in mid or top water	14.08	7.19	15.62
Recreational spear fishing with power heads	0.28	*	5.25
Recreational spear fishing without power heads	0.42	*	4.43
SCUBA diving (taking things)	0.12	*	3.00
SCUBA diving (don't take things)	0.37	0.27	4.50
Whale watching or other wildlife viewing activities	5.04	0.94	14.32

1. All Users includes people who did not do the activity, so they have zero days of use.

* sample size too small

asked for the factors that influenced their choices when deciding to go to GRNMS for their activities. For each factor they were asked to respond either “Yes”, “Somewhat”, or “Not at All”. “Fish species preference” had the highest proportions of users who said “Yes” with 80.82%. This was followed by “weather” and “sea conditions”

both with about 75% responding “Yes”. Even though about 95% fish in GRNMS, only 52% said “Yes” to “better fishing” (Table 1.5).

Knowledge

The survey addressed four topics on knowledge; 1) sources of information used, 2) level of trust of

information sources used, 3) how users prefer to receive information about GRNMS and 4) familiarity with GRNMS regulations. The “Don’t Know” responses to the attitudes and perceptions questions also provide indirect information about user’s knowledge.

Sources of Information Used.

The survey asked about 22 known possible sources of information and provided for “other” sources responses. The most used sources of information included the “Georgia Department of Natural Resources” (71.43%), “Internet” (62.34%), “GRNMS Web site” (58.44%), “Word of Mouth” (58.44%), and “NOAA’s National Marine Fisheries Service” (50.65%). Only 8% had used “Social Media (Twitter, You tube, Facebook, etc.). The full results are summarized in Table 1.6.

Level of Trust of Information Sources Used.

For sources of information used, respondents were asked for their level of trust of the information scored on a five-point Likert scale where 1=No Trust at All to 5=Completely Trust. For the sources that were used the most, the “GRNMS Web site” had the highest level of trust with 74.42% trusting it very much or completely trusted. The “Georgia Department of Natural Resources” followed with 67.35% trusting it very much or completely trusted and “NOAA’s National Marine Fisheries Service” with 64.7% trusting it very much or completely trusted. Although the “Internet” and “Word of Mouth” were highly used sources of information, only 44.45% trusted very much or completely trusted the “In-

Table 1.5 Factors Influencing Choice of Going to GRNMS for Activities

Factor	Yes (%)	Somewhat (%)	Not at All (%)
Weather	75.34	17.81	6.85
Fish species preference	80.82	13.70	5.48
Time of Day	38.24	27.94	33.82
Seasonal patterns	67.61	25.35	7.04
Word of mouth/radio talk	35.82	32.84	31.34
Boat Captain’s choice	27.27	25.76	46.97
Sea conditions	75.00	18.06	6.94
Distance to GRNMS	61.11	25.00	13.89
Better fishing	52.05	42.47	5.48
Better diving for things to see	9.09	7.79	83.12

Table 1.6 Sources of Information Used about GRNMS: Users of GRNMS

Source Used	(% Yes)
Grays Reef National Marine Sanctuary Sanctuary Advisory Council	16.88
Grays Reef National Marine Sanctuary Staff	14.29
Grays Reef National Marine Sanctuary Web site	58.44
NOAA’s National Marine Fisheries Service	50.65
Atlantic States Marine fisheries Commission	6.49
South Atlantic Fishery Management Council	6.49
Georgia Department of Natural Resources	71.43
Georgia Sea Grant	1.30
Georgia’s Coastal Conservation Association (CCA)	33.77
Recreational Fishing Alliance (RFA)	31.17
American Sportfishing Association (ASA)	16.88
National Coalition for Marine Conservation (NCMC)	1.30
International Game and Fish Association (IGFA)	12.99
Southern Kingfish Association (SKA)	44.16
Fishing Magazines/Newsletters	49.35
SCUBA diving magazines/Newsletters	11.69
Newspapers	41.56
Radio	25.97
Television	36.36
Internet	62.34
Social Media (Twitter, You tube, Facebook, etc.)	8.00
Word of mouth	58.44
Marinas	9.09
Fishing Captains	2.60
Other Anglers	2.60
Other Divers	1.30

Table 1.7 Level of Trust of Information Sources Used: Users of GRNMS

Source	No Trust At All	Very Little Trust	Neutral	Trust Very Much	Completely Trust
Grays Reef National Marine Sanctuary Advisory Council	0.00	18.18	27.27	27.27	27.27
Grays Reef National Marine Sanctuary Staff	0.00	20.00	10.00	30.00	40.00
Grays Reef National Marine Sanctuary Web site	0.00	6.98	18.60	46.51	27.91
NOAA's National Marine Fisheries Service	0.00	8.82	26.47	35.29	29.41
Atlantic States Marine Fisheries Commission	0.00	60.00	40.00	0.00	0.00
South Atlantic Fishery Management Council	25.00	25.00	25.00	25.00	0.00
Georgia Department of Natural Resources	4.08	6.12	22.45	38.78	28.57
Georgia Sea Grant	0.00	0.00	0.00	100.00	0.00
Georgia's Coastal Conservation Association (CCA)	0.00	0.00	12.50	58.33	29.17
Recreational Fishing Alliance (RFA)	0.00	4.17	12.50	50.00	33.33
American Sportfishing Association (ASA)	0.00	8.33	16.67	41.67	33.33
National Coalition for Marine Conservation (NCMC)	0.00	0.00	0.00	0.00	100.00
International Game and Fish Association (IGFA)	0.00	0.00	0.00	62.50	37.50
Southern Kingfish Association (SKA)	0.00	6.45	22.58	35.48	35.48
Fishing Magazines/Newsletters	0.00	2.94	35.29	44.12	17.65
SCUBA diving magazines/Newsletters	0.00	0.00	14.29	71.43	14.29
Newspapers	0.00	3.57	35.71	46.43	14.29
Radio	0.00	0.00	33.33	50.00	16.67
Television	0.00	3.70	40.74	44.44	11.11
Internet	0.00	8.89	46.67	37.78	6.67
Social Media (Twitter, You tube, Facebook, etc.)	0.00	0.00	75.00	25.00	0.00
Word of mouth	2.38	14.29	42.86	26.19	7.14

ternet”, while only 33.33% trusted very much or completely trusted “Word of Mouth” (Table 1.7).

How Users would like to receive information about GRNMS.

Backing up the sources of information used and the level of trust of the sources used, the “GRNMS Web site” was chosen as the most preferred way users would like to receive information about GRNMS at 53.25%. This was followed closely by a “Newsletter delivered by the U.S. Postal Service” (50.65%) and “E-mail list serve” (50.0%). A “telephone call from staff” was the least preferred at 6.58% (Figure 1.10).

Familiarity with GRNMS Regulations. Survey respondents were also asked for a self-evaluation of their familiarity with the regulations of GRNMS. More than three-quarters (76.32%) of users said they were “somewhat familiar” with the regulations and 17.11% said they were “very familiar” with the regulations. Only 6.58% said they were not at all familiar with the regulations (Figure 1.11).

Attitudes

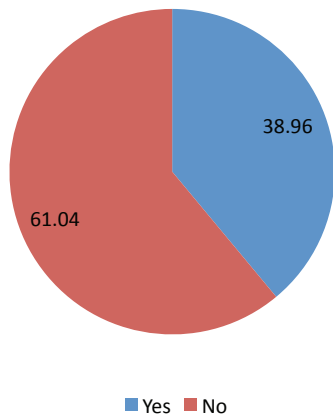
Survey respondents were asked about their attitudes on GRNMS management strategies and regulations using 17 items (Table 1.8). The first nine items addressed cur-

rent GRNMS regulations. Items 10 – 13 addressed the processes GRNMS has used in developing its regulations. And, items 14 – 17 addressed GRNMS performance in implementation and enforcement of its regulations. Attitudes were measured on a five-point Likert scale using an agreement scale with each statement with 1=strongly agree to 5=strongly disagree. A “don’t know” response was also allowed.

Regulations. All the statements about GRNMS regulations were stated in terms of support for the regulations. An overwhelming majority of users moderately to strongly agree with all the regula-

Figure 1.9 Users of GRNMS Participation in Fishing Tournaments

About 61 percent of Users of GRNMS participated in fishing tournaments



tions in GRNMS, except the spear fishing prohibition. Only 43.42% of users moderately to strongly agree with the spear fishing regulation. There were a relatively low proportion of “Don’t Know” responses to the statement about regulations (Table 1.8).

Processes. Three of the four items (11, 12, and 13) about GRNMS processes to develop its regulations were stated in a way such that the responses of agreement are a negative response, while for item 10 agreement was a positive response. All of these statements received a high proportion of “Don’t Know” or “Neutral” responses, which indicates a lack of knowledge of the processes. There was an almost equal amount of agreement and disagreement for item 10 (The process that GRNMS used to develop its rules and regulations was open and fair to all groups) with 25.98% moderately to strongly in agreement and 28.57% moderately to strongly in disagreement.

Figure 1.10 How Users of GRNMS would like to receive information about GRNMS

Over half of Users of GRNMS would prefer to receive information about GRNMS via either the GRNMS Web site, Newsletter delivered to their home via the U.S. Postal Service, or E-mail List serve.

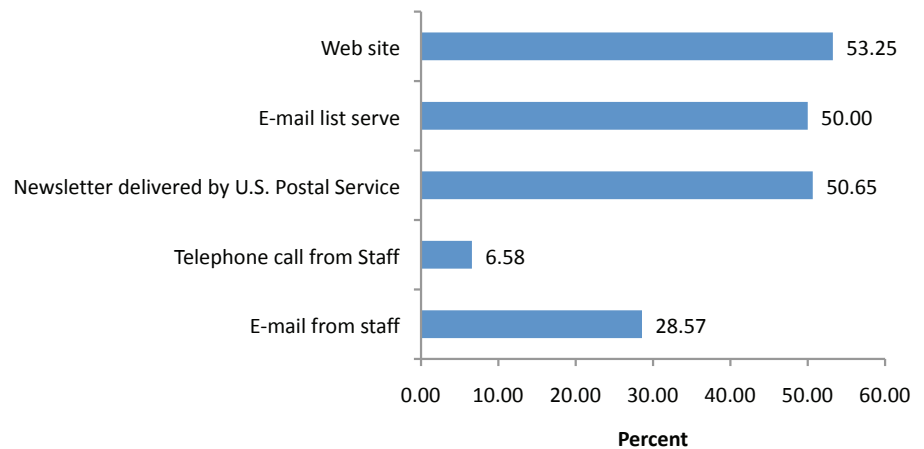
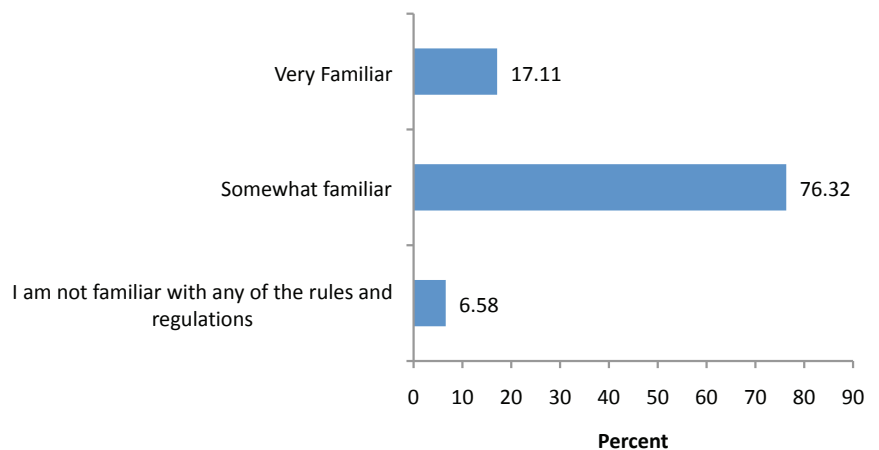


Figure 1.11 Users of GRNMS Familiarity with GRNMS Rules and Regulations

Over 93 percent of GRNMS Users were familiar with GRNMS rules and regulations.



For items 11 – 13, a higher proportion was in agreement, which means a negative attitude about the processes (Table 1.8).

Performance. The last four statements on attitudes addressed the performance of GRNMS in implementing and enforcing its regulations. All four of these statements

were worded in such a way that agreement with the statement is a positive attitude. For all but one of the items in this section (17. GRNMS does a good job of educating the public about its rules and regulations), there was a high proportion of “Don’t Know” or “Neutral” responses indicating a lack of knowledge. A plurality was

Table 1.8 *Attitudes about GRNMS Management Strategies and Regulations: Users of GRNMS*

Statement	SA	MA	N	MD	SD	DK
1. I support the GRNMS as it is currently established	30.67	32.00	8.00	5.33	10.67	13.33
2. I support the no anchoring regulation	62.34	16.88	3.90	7.79	7.79	1.30
3. I support the prohibition on disturbing the sea bed including all mining and oil & gas activities	71.05	9.21	6.58	3.95	6.58	2.63
4. I support the prohibition of commercial fishing use of wire fishing traps	90.91	2.60	1.30	2.60	1.30	1.30
5. I support the prohibition of commercial fishing using bottom trawls	89.61	3.90	1.30	1.30	2.60	1.30
6. I support the prohibition on the damage or removal of bottom formations	84.42	7.79	2.60	2.60	1.30	1.30
7. I support the prohibition on the use of explosives	94.74	1.32	1.32	0.00	1.32	1.32
8. I support the prohibition on the discharge of pollutants in GRNMS waters	90.67	2.67	2.67	1.33	1.33	1.33
9. I support the prohibition on spear fishing	35.53	7.89	19.74	7.89	27.63	1.32
10. The process that GRNMS used to develop its rules and regulations was open and fair to all groups	14.29	11.69	20.78	10.39	18.18	24.68
11. It has not mattered whether the average person participated in the workshops and meetings of the GRNMS because the average person could not influence the final decisions	22.08	20.78	20.78	10.39	10.39	15.58
12. GRNMS has not addressed the concerns of other federal and state governments in developing its rules and regulations	11.69	7.79	25.97	7.79	6.49	40.26
13. GRNMS has not addressed the concerns of individual citizens in developing its rules and regulations	24.68	11.69	22.08	10.39	6.49	24.68
14. Once that the GRNMS regulations have been in effect, there has been no way that the average person to voice his/her opinion on the usefulness of the regulations	25.97	15.58	16.88	9.09	6.49	25.97
15. The procedures that GRNMS has established to deal with violations of its regulations has been fair and just	9.33	21.33	20.00	2.67	6.67	40.00
16. GRNMS does a good job of enforcings its regulations	12.16	28.38	21.62	6.76	5.41	25.68
17. GRNMS does a good job of educating the public about its rules and regulations	13.33	26.67	17.33	10.67	24.00	8.00

SA=Strongly Agree, MA=Moderately Agree, N=Neutral, MD=Moderately Disagree, SD=Strongly Disagree. and DK=Don't Know

Table 1.9 *Perceptions of Conditions of Resources in GRNMS: Users of GRNMS*

Resource	Getting a Lot Better	Getting Somewhat Better	Same	Getting Somewhat Worse	Getting a Lot Worse	Don't Know
Live bottom habitat	10.67	24.00	26.67	1.33	0.00	37.33
Other bottom habitat	7.89	19.74	34.21	1.32	0.00	36.84
Fish populations (bottom fish)	18.67	22.67	25.33	8.00	0.00	25.33
Fish populations (pelagic)	14.47	18.42	35.53	7.89	2.63	21.05
Fish populations (diversity or number of species)	14.47	19.74	38.16	5.26	0.00	22.37
Other Sea life (abundance)	6.58	26.32	31.58	2.63	0.00	32.89
Other Sea life (diversity or number of species)	6.67	25.33	33.33	1.33	0.00	33.33
Water quality	10.53	18.42	44.74	1.32	0.00	25.00
Invasive species (such as lionfish)	1.32	3.95	21.05	15.79	10.53	47.37
Marine debris (plastics, other trash)	9.21	17.11	32.89	14.47	1.32	25.00
Sea based pollution (discharges from boats)	10.53	14.47	30.26	6.58	2.63	35.53

in agreement with all four of the statements, thus a positive attitude performance score.

Perceptions

The survey asked users for their perceptions of conditions of 11 resources in GRNMS. Ratings of conditions were asked using a five-point Likert scale with 1=getting a lot better, 2=getting somewhat better, 3=same, 4=getting somewhat worse, and 5=getting a lot worse. A “Don’t Know” response was also allowed. A high proportion of users responded that they “Don’t Know” for all 11 resources. For all resources, except “Invasive species” a higher proportion of users thought conditions were getting somewhat to a lot better than those who thought conditions were getting somewhat to a lot worse (Table 1.9).

Chapter 2

Non-users of GRNMS

This chapter includes profiles of non-users of GRNMS, which include the demographic profiles of non-users and activity participation and use of coastal and ocean areas off Georgia outside of GRNMS. The profiles are followed by non-user's knowledge and attitudes of GRNMS management strategies and regulations, concerns about the health of coastal and ocean areas inside and outside GRNMS off the Georgia coast, support for protection of coastal and ocean resources inside and outside GRNMS off the Georgia coast, ways non-users value ocean and coastal resources/marine environment, activities that non-users would do to ensure the sustainability of coastal and ocean resources, and support for selected policy/management strategies for coastal and ocean resources off the Georgia coast.

User Profiles

Demographics. The survey questionnaire included demographic information on the survey respondent's sex, age, race/ethnicity, educational attainment, employment status, household income, household type, and household size. The non-user samples were weighted using multi-variate weighting so as to come as close to the general Georgia population as possible, however due to the nature of multi-variate weighting some of the univariate distributions will differ from the distributions reported in the U.S. Census of population for Georgia. For further details see the technical appendix to this report (Leeworthy 2012).

Table 2.1 Sex, Race, and Age of GRNMS Non-users: Survey Respondents 2011

Sex	
Female	41.60%
Male	58.40%
Race	
White	63.03%
Black or African American	27.98%
Asian	8.14%
Native Hawaiian-Pacific Islander	0.85%
Age	
Mean	46.54
Median	48
Minimum	18
Maximum	96

Table 2.2 Household Size: Non-users of GRNMS

	Mean	Median	Minimum	Maximum
Total Household Size	2.79	3	1	6
Number age 18 or older	2.21	2	1	4
Number under age 18	0.58	0	0	4

Non-users were 58.40% male with 63% white non Hispanic, 27.98% black or African American non Hispanic and 8.14% Asian non Hispanic. As noted in the Introduction, Hispanics did not respond to the survey in large enough numbers to make sample weighting effective so they are not represented in the results. Non-user's ages ranged from 18 to 96 years (mean 46.54 and median 48) (Table 2.1).

The sample weighted distributions for Educational Attainment of non-users were not significantly different from the general population of Georgia with 61.82% with "Some College" or above (Figure 2.1). The sample weighted employment status of non-users was significantly higher than the gen-

eral population of Georgia for the 2011 survey period with more than 15% unemployed. Only 47.32% were employed full-time, 14.68% employed part-time and 20.51% retired. In addition more than 4% were Homemakers (Figure 2.2). Due to the high unemployment rate of the weighted sample, a relatively high proportion of the sample of non-users had household income less than \$5,000, while 17.33% had household income \$100,000 or above (Figure 2.3). More than 61% of non-users lived in households without children (Figure 2.4). About 48.7% lived in households with two people or less (Figure 2.5) with an average household size of 2.79 (Table 2.2).

Figure 2.1 Educational Attainment of Non-users of GRNMS: Survey Respondents 2011

The sample weighted distributions of Educational Attainment for Non-users of GRNMS were not significantly different from the general population of Georgia.

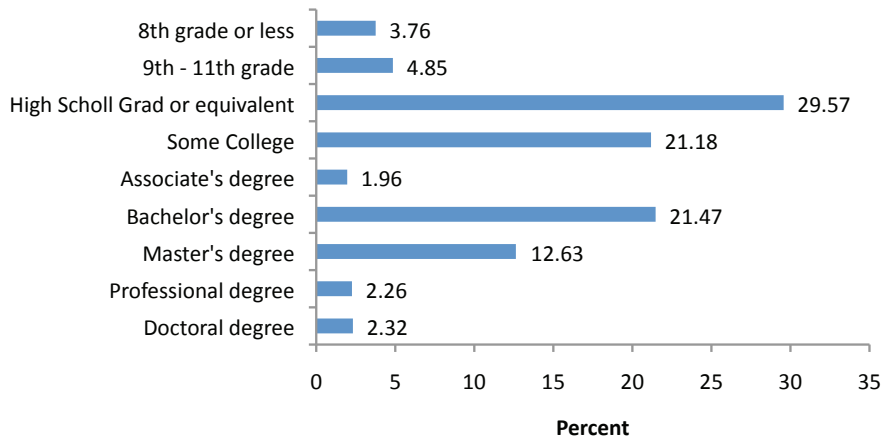


Figure 2.2 Employment Status of Non-users: Survey Respondents 2011

The sample weighted employment status of Non-users of GRNMS contained a higher proportion of those unemployed than the general population of Georgia.

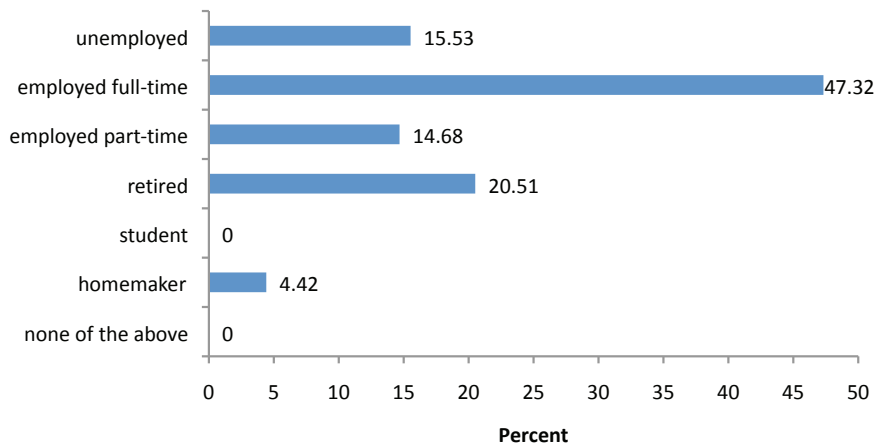


Figure 2.3 Household Income before Taxes of Non-users of GRNMS: Survey Respondents 2011

The sample weighted distribution of Household Income for Non-users of GRNMS had a significantly higher proportion of those with incomes less than \$5,000. This is a function of multivariate sample weighting. The unweighted sample proportion was half that of the 2010 U.S. Census

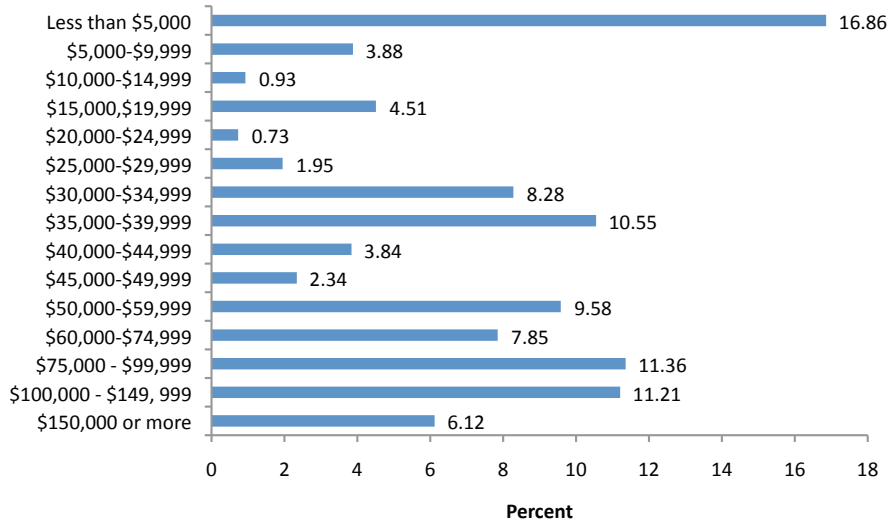
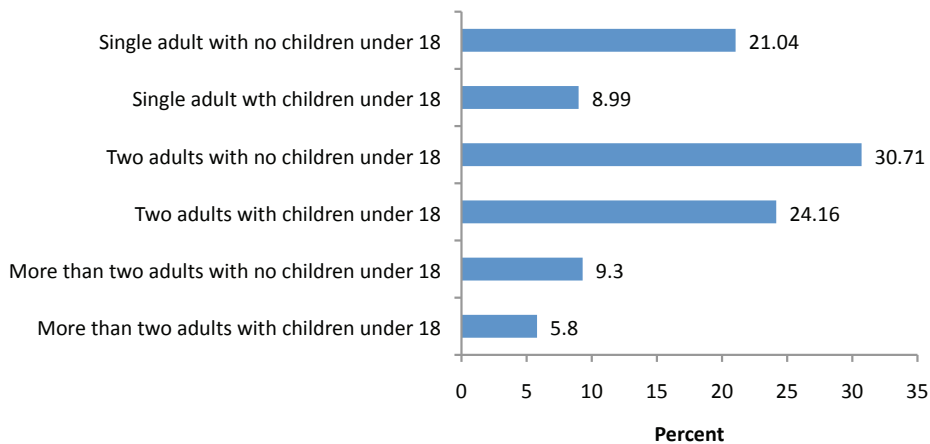


Figure 2.4 Type of Household of Non-users of GRNMS: Survey Respondents 2011

The sample weighted distribution of Household types for Non-users of GRNMS was concentrated in households without children. Only about 39 percent of Non-user households contained children less than 18 years of age.



Organizational Membership and Boat Ownership. The proportion of memberships in groups, clubs and organizations was higher in Environmental Groups and Chambers of Commerce than in fishing or diving groups, but generally low in all groups (Figure 2.6).

More than 13% of non-users owned a boat ranging from 10 to 46 feet in length (mean 18.84 feet) (Table 2.3).

Activity Participation and Use. The survey gathered information on recreation activities that non-users participated in and around coastal and ocean areas of Georgia outside GRNMS. Activities were classified as those that take place in GRNMS and those that do not take place in GRNMS, but do take place in coastal and ocean areas of Georgia outside GRNMS.

Participation in Activities that take place in GRNMS. The survey asked about participation in “recreational bottom fishing”, “recreational fishing – trolling or drifting in mid or top water”, “recreational spear fishing – with power heads”, “recreational spear fishing-without power heads”, “SCUBA diving where nothing is taken”, “SCUBA diving where something is taken or harvested”, “whale watching or other wildlife viewing activities” and “sailing”. These activities were then classified into “consumptive” and “nonconsumptive” activities. Figure 2.7 summarizes the results. Non-users of GRNMS had higher participation rates in nonconsumptive activities than in consumptive activities in the coastal and ocean waters off Georgia. About 25.9% participated in “whale watching or

Figure 2.5 Household Size of Non-users of GRNMS: Survey Respondents 2011

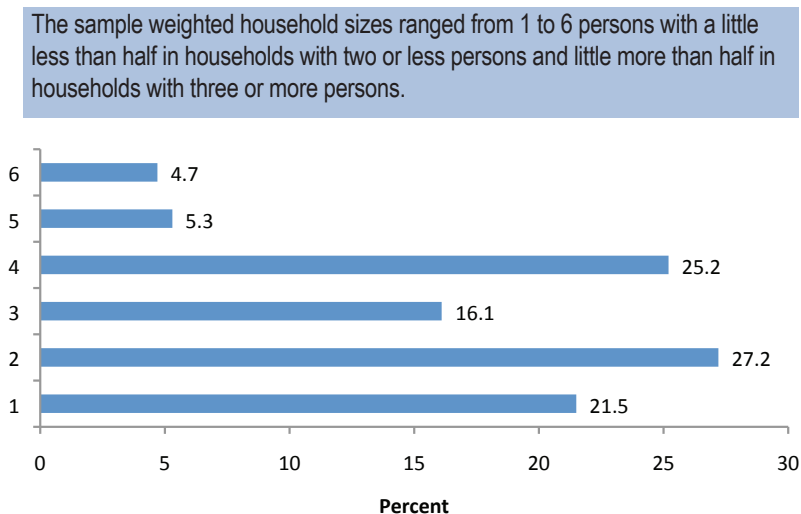


Figure 2.6 Memberships in Groups, Clubs and Organizations, Non-users of GRNMS: Survey Respondents 2011

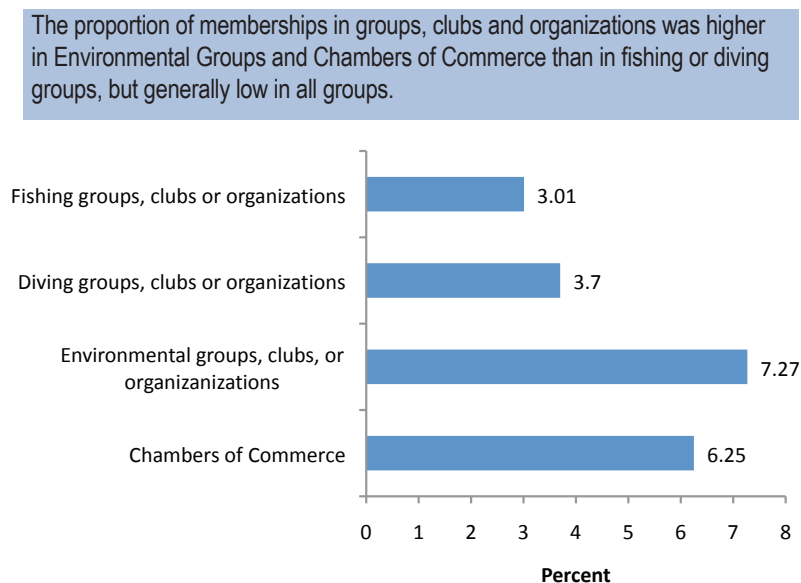


Table 2.3 Boat Ownership and Length of Boat: Non-users of GRNMS

Do you own a boat? (percent yes)	13.68
Length of Boat Owned (feet)	
Mean	18.84
Median	17.5
Minimum	10
Maximum	46

other wildlife viewing activities”, 11.67% participated in ‘sailing’ and 8.37% participated in “SCUBA diving where nothing is taken. More than one-third (33.52%) participated in fishing in the coastal and ocean waters of Georgia outside GRNMS. Two percent participated in spear fishing with only about one-half of one percent using power heads.

Participation in Activities that don't take place in GRNMS. The survey asked about participation in “beach activities”, “surfing”, “windsurfing or kite boarding”, “personal watercraft use (jet skis, wave runners, etc.)”, and “shorebird watching”. Non-users of GRNMS had the highest participation in “beach activities” with 58.45% and “shorebird watching” with 29.12% (Figure 2.8). More than 15% participated in ‘personal watercraft use”, while 6.9% participated in surfing and 2.76% participated in “windsurfing or kite boarding”.

Person-days of Use by Activity. Intensity of use was measured as annual person-days of use where a person-day is equal to one person doing an activity for a whole day or any part of a day. Survey respondents were asked about their use for the activities that are known to take place in GRNMS and how many person-days were done in coastal and ocean waters of Georgia outside GRNMS. Results were summarized as the mean number of person-days for “all users”, which includes those that did zero days of an activity, and “participants only”, which includes only those that did at least one day of an activity (Table 2.4).

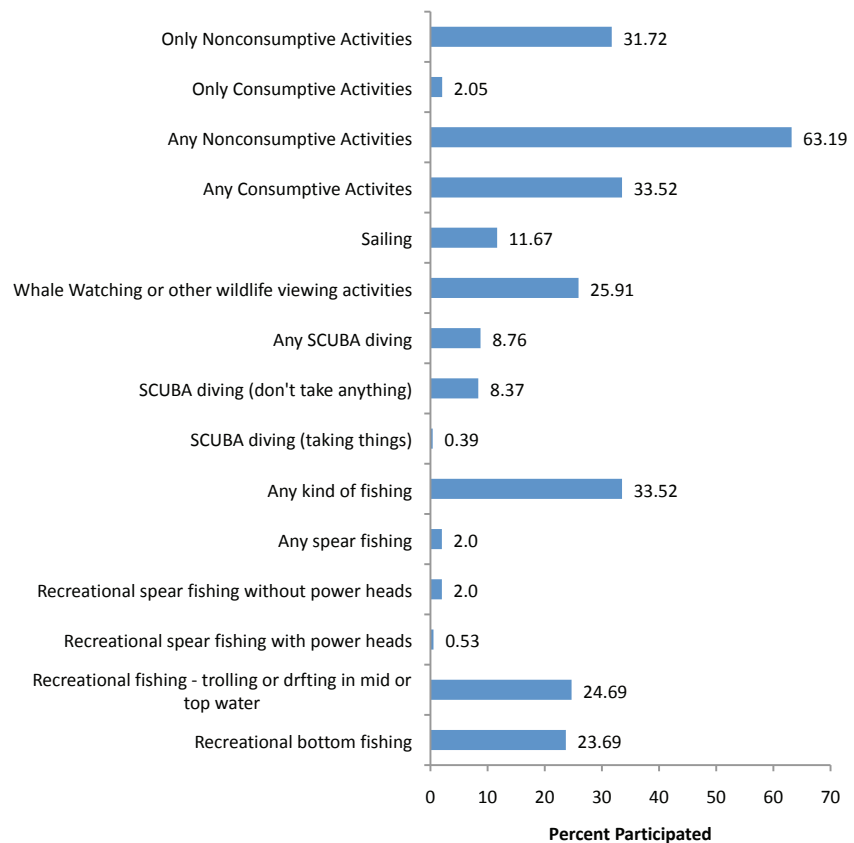
Table 2.4 Person-days of Activity Participation in GA: Non-users of GRNMS

Activity	All Non Users ¹	Participants Only
	GA (mean)	GA (mean)
Recreational bottom fishing	1.02	6.25
Recreational fishing - trolling or drifting in mid or top water	1.85	8.56
Recreational spear fishing with power heads	0.06	*
Recreational spear fishing without power heads	0.13	*
SCUBA diving (taking things)	0.00	N/A
SCUBA diving (don't take things)	0.45	*
Whale watching or other wildlife viewing activities	1.51	5.05

1. All Non Users includes people who did not do the activity, so they have zero days of use. * sample size too small

Figure 2.7 Non-users of GRNMS Activity Participation in GA

For activities that are known to occur in GRNMS, Non-users of GRNMS had higher participation rates in nonconsumptive activities than in consumptive activities in the coastal & ocean waters off Georgia.



For All Non-users, the highest mean person-days of activity was in “recreational fishing-trolling or drifting in mid or top water” at 1.85 person-days in 2010, while for “recreational fishing-bottom fishing all non-users did 1.02 person-days. This difference was not statistically significant. All Non-users did 1.51 person-days of “whale watching or other wildlife viewing activities (Table 2.4).

For Participants Only, non-users did 8.56 person-days of “recreational fishing-trolling or drifting in mid or top water” and 6.25 person-days of “recreational bottom fishing”. The difference is not statistically significant. Non-users, Participants Only, did on average 5.05 person-days of ‘whale watching or other wildlife viewing activities.

Knowledge

The survey addressed four topics on knowledge; 1) sources of information used, 2) level of trust of information sources used, 3) how users prefer to receive information about GRNMS and 4) familiarity with GRNMS regulations. The “Don’t Know” responses to the attitudes questions also provide indirect information about non-user’s knowledge.

Sources of Information Used.

The survey asked about 22 known possible sources of information and provided for “other” sources responses. The most used sources of information included the mass media. Television was the source with the highest use at 67.63% followed by the “Internet” at 65.9%,

“Newspapers” at 55.63% and “Radio” at 51.16%. Almost a third of non-users used “Social Media (Twitter, You tube, Facebook, etc.). The full results are summarized in Table 2.5.

Level of Trust of Information Sources Used.

For sources of information used, respondents were asked for their level of trust of the information scored on a five-point Likert scale where 1=No Trust at All to 5=Completely Trust. For the sources that were used the most, “Radio” had the highest level of trust with 59% trusting it very much or completely trusted. “Television” followed with 55.3% trusting it very much or completely trusted and “Newspapers” with 51.37% trusting it very much or completely trusted. Although the “Internet” was a highly used source of information, only 41.71% trusted very much or completely trusted the “Internet” (Table 2.6).

How Non-users would like to receive information about GRNMS.

The GRNMS Web site was the most preferred way non-users would like to receive information about GRNMS at 52.57%. This was followed closely by a “Newsletter delivered by the U.S. Postal Service” (50.74%). E-mail from staff was preferred by more than one-third of non-users closely followed by “E-mail list serve” (30.58%). A “telephone call from staff” was the least preferred at 4.09% (Figure 2.9).

Familiarity with GRNMS Regulations.

Survey respondents were also asked for a self-evaluation of their familiarity with the regulations of GRNMS. More than three-quarter

(77.83%) of non-users said they were “not at all familiar with any of the rules and regulations”. It was surprising that 21.46% of non-users say they were “somewhat familiar” with the regulations (Figure 2.10).

Attitudes

Survey respondents were asked about their attitudes on GRNMS management strategies and regulations using 17 items (Table 2.7). The first nine items addressed current GRNMS regulations. Items 10 – 13 addressed the processes GRNMS has used in developing its regulations. And, items 14 – 17 addressed GRNMS performance in implementation and enforcement of its regulations. Attitudes were measured on a five-point Likert scale using an agreement scale with each statement with 1=strongly agree to 5=strongly disagree. A “don’t know” response was also allowed.

Regulations. All the statements about GRNMS regulations were stated in terms of support for the regulations. There were a high proportion of “Don’t Know” responses for items 1 and 2. A majority or plurality of non-users moderately to strongly agree with all the regulations in GRNMS, except the spear fishing prohibition. Only 32.01% of non-users moderately to strongly agree with the spear fishing regulation with a plurality (39.22%) remaining neutral (Table 1.8).

Processes. Three of the four items (11, 12, and 13) about GRNMS processes to develop its regulations were stated in a way

Figure 2.8 *Non-users of GRNMS Activity Participation in GA for Selected Activities*

For selected activities that don't occur in GRNMS, Non-users had the highest participation in Beach and Shorebird Watching activities in the coastal & ocean waters off Georgia.

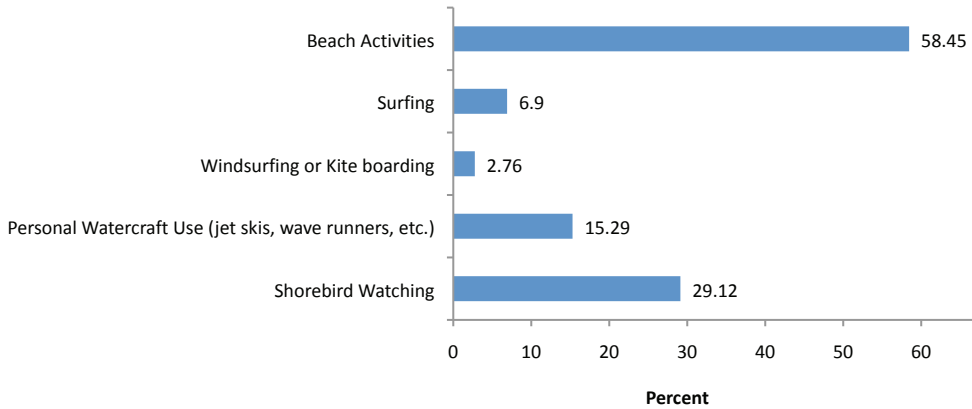


Figure 2.9 *How Non-users of GRNMS would like to receive information about GRNMS*

Over half of Non-users of GRNMS would prefer to receive information about GRNMS via either the GRNMS Web site or a Newsletter delivered to their home via the U.S. Postal Service.

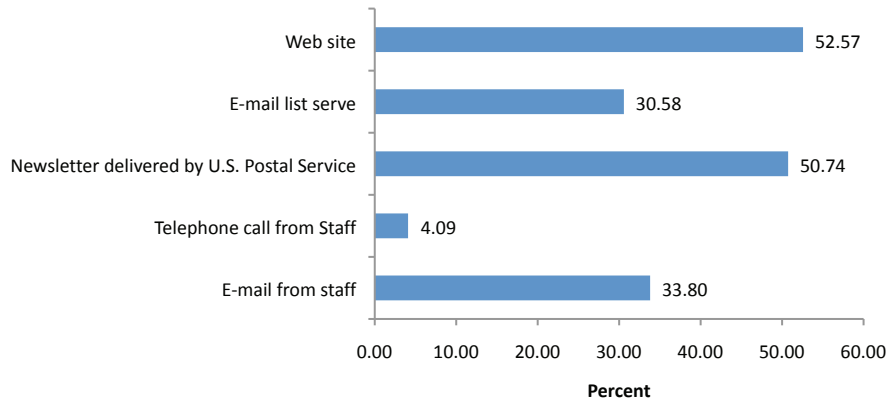
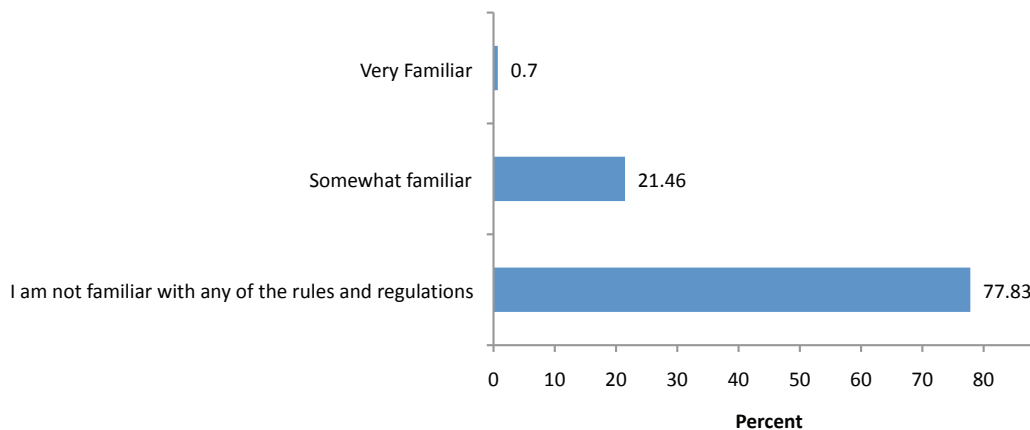


Figure 2.10 *Non-users of GRNMS Familiarity with GRNMS Rules and Regulations*

As would be expected, almost 78 percent of Non-users of GRNMS were not familiar with the rules and regulations of GRNMS. It is surprising that more than 21 percent were somewhat familiar with the rules and regulations.



such that the responses of agreement are a negative response, while for item 10 agreement was a positive response. All of these statements received a high proportion of “Don’t Know” or “Neutral” responses, which indicates a lack of knowledge of the processes. A plurality either moderately or strongly agreed with the statement for item 10 (The process that GRNMS used to develop its rules and regulations was open and fair to all groups) with 21.93%. For items 11 – 13, a higher proportion was in agreement, which means a negative attitude about the processes (Table 2.7).

Performance. The last four statements on attitudes addressed the performance of GRNMS in implementing and enforcing its regulations. All four of these statements were worded in such a way that agreement with the statement is a positive attitude. For all of the items in this section there was a high proportion of “Don’t Know” or “Neutral” responses indicating a lack of knowledge. A plurality was in agreement with three of the four (items 14, 15 and 16) statements, thus positive attitude performance scores. For item 17 “GRNMS does a good job of educating the public about its rules and regulations”, a plurality moderately to strongly disagreed thus a negative performance score.

Concern about the Health of Coastal and Ocean Areas

The survey asked respondents about their level of concern on 14 issues regarding the health of

Table 2.5 Sources of Information Used about GRNMS: Non-users of GRNMS

Source	Used (% Yes)
Grays Reef National Marine Sanctuary Sanctuary Advisory Council	7.07
Grays Reef National Marine Sanctuary Staff	6.00
Grays Reef National Marine Sanctuary Web site	30.15
NOAA’s National Marine Fisheries Service	13.52
Atlantic States Marine Fisheries Commission	3.04
South Atlantic Fishery Management Council	3.02
Georgia Department of Natural Resources	40.14
Georgia Sea Grant	6.06
Georgia’s Coastal Conservation Association (CCA)	4.77
Recreational Fishing Alliance (RFA)	3.82
American Sportfishing Association (ASA)	9.56
National Coalition for Marine Conservation (NCMC)	3.89
International Game and Fish Association (IGFA)	4.50
Southern Kingfish Association (SKA)	3.24
Fishing Magazines/Newsletters	22.13
SCUBA diving magazines/Newsletters	11.21
Newspapers	55.63
Radio	51.16
Television	67.63
Internet	65.94
Social Media (Twitter, You tube, Facebook, etc.)	32.13
Word of mouth	45.66
Marinas	0.25
Fishing Captains	0.25
Other Anglers	0.25
Other Divers	0.25
Commercial Fishermens Associations	0.25
Kayaking Clubs	0.25
Local events)booths at fairs & festivals)	0.25
U.S. Army Corps of Engineers - Savannah (TV Announcements)	0.25

ocean and coastal areas. Respondents were first asked about their level of concern for these 14 issues in the coastal and ocean waters in and around Georgia outside GRNMS, then about them inside GRNMS. A five-point Likert scale for level of concern was used with 1=Not concerned at all, 2=Not very concerned, 3=Neutral, 4=Somewhat concerned, and 5=Extremely concerned.

In and Around Georgia Outside GRNMS. An overwhelming majority of non-users were somewhat to extremely concerned about all the issues except “shipping (marine transportation)” and “mining of minerals (including sand)”. For “shipping (marine transportation)” a plurality was somewhat to extremely concerned at 49.83%. For “mining of minerals (including sand), a majority were neutral at 52.28%, with a higher proportion

Table 2.6 Level of Trust of Information Sources Used: Non-users of GRNMS

Source	No Trust At All	Very Little Trust	Trust Very Neutral	Much	Completely Trust
Grays Reef National Marine Sanctuary Advisory Council	0.00	15.75	0.00	29.33	54.93
Grays Reef National Marine Sanctuary Staff	0.00	0.00	0.00	27.19	72.81
Grays Reef National Marine Sanctuary Web site	0.00	9.31	11.62	36.82	42.25
NOOA's National Marine Fisheries Service	2.14	0.00	8.91	32.85	56.09
Atlantic States Marine Fisheries Commission	0.00	0.00	8.51	17.30	74.19
South Atlantic Fishery Management Council	0.00	0.00	0.00	39.72	60.28
Georgia Department of Natural Resources	0.00	16.18	17.09	35.74	30.99
Georgia Sea Grant	0.00	0.00	51.97	9.44	38.59
Georgia's Coastal Conservation Association (CCA)	0.00	5.37	0.00	43.01	51.62
Recreational Fishing Alliance (RFA)	0.00	0.00	9.97	20.98	69.06
American Sportfishing Association (ASA)	0.00	0.00	46.49	15.93	37.57
National Coalition for Marine Conservation (NCMC)	0.00	0.00	6.58	22.89	70.53
International Game and Fish Association (IGFA)	0.00	0.00	0.00	79.64	20.36
Southern Kingfish Association (SKA)	0.00	23.48	0.00	64.99	11.54
Fishing Magazines/Newsletters	0.00	5.19	22.09	57.13	15.59
SCUBA diving magazines/Newsletters	0.00	11.37	23.23	52.48	12.93
Newspapers	1.22	12.61	34.80	40.68	10.69
Radio	0.85	9.90	30.23	46.65	12.36
Television	0.96	12.09	31.65	46.07	9.23
Internet	0.00	11.83	46.46	37.11	4.60
Social Media (Twitter, You tube, Facebook, etc.)	0.00	20.28	19.06	53.51	7.15
Word of mouth	5.43	8.60	28.46	50.52	6.99

somewhat to extremely concerned (35.98%) than were not all to not very concerned (11.74%). The full results are summarized in Table 2.8.

In GRNMS. An overwhelming majority of non-users were somewhat to extremely concerned about all the issues except “mining of minerals (including sand)”. For “mining of minerals (including sand)”, a majority were neutral at 51.13%, with a higher proportion somewhat to extremely concerned (41.31%) than were not all to not very con-

cerned (7.57%). The full results are summarized in Table 2.9.

Support for Protection of Coastal and Ocean Resources

The survey asked respondents about their level of support for protection of resources outside and inside GRNMS. A five-point Likert scale for support was used with 1=No support at all, 2=Somewhat against, 3=Neutral, 4=Somewhat support and 5=Strongly sup-

port. About 95% somewhat to strongly supported the protection of coastal and ocean resources outside GRNMS, while about 90% supported protection of ocean resources inside GRNMS.

Ways Non-users of GRNMS Value Coastal and Ocean Resources/Marine Environment

The survey asked respondents for their level of value for 10 uses of coastal and ocean resources. The

Table 2.7 Attitudes about GRNMS Management Strategies and Regulations: Non-users of GRNMS

Statement	SA	MA	N	MD	SD	DK
1. I support the GRNMS as it is currently established	13.99	14.59	12.88	2.47	0.00	56.07
2. I support the no anchoring regulation	27.21	10.86	8.09	6.56	0.88	46.40
3. I support the prohibition on disturbing the sea bed including all mining and oil & gas activities	38.15	22.05	16.31	5.68	8.47	9.34
4. I support the prohibition of commercial fishing use of wire fishing traps	28.05	14.81	27.04	10.07	3.07	16.95
5. I support the prohibition of commercial fishing using bottom trawls	30.79	11.59	30.21	7.55	2.67	17.19
6. I support the prohibition on the damage or removal of bottom formations	35.40	26.33	17.13	1.84	1.36	17.94
7. I support the prohibition on the use of explosives	53.49	26.36	1.26	1.75	2.06	15.08
8. I support the prohibition on the discharge of pollutants in GRNMS waters	53.15	28.04	1.96	1.08	1.36	14.43
9. I support the prohibition on spear fishing	18.55	13.46	39.22	8.09	4.98	15.71
10. The process that GRNMS used to develop its rules and regulations was open and fair to all groups	10.36	11.57	17.87	2.95	0.00	57.24
11. It has not mattered whether the average person participated in the workshops and meetings of the GRNMS because the average person could not influence the final decisions	13.20	9.77	12.84	9.34	4.11	50.74
12. GRNMS has not addressed the concerns of other federal and state governments in developing its rules and regulations	1.82	6.86	22.51	0.82	3.46	64.54
13. GRNMS has not addressed the concerns of individual citizens in developing its rules and regulations	4.48	14.30	10.68	3.61	5.21	61.73
14. Once that the GRNMS regulations have been in effect, there has been no way that the average person to voice his/her opinion on the usefulness of the regulations	6.61	11.53	10.99	4.05	3.43	63.38
15. The procedures that GRNMS has established to deal with violations of its regulations has been fair and just	8.25	10.00	11.25	5.30	0.00	65.20
16. GRNMS does a good job of enforcing its regulations	7.80	16.20	13.72	0.00	0.00	62.28
17. GRNMS does a good job of educating the public about its rules and regulations	6.29	15.72	9.32	9.95	7.49	41.22

SA=Strongly Agree, MA=Moderately Agree, N=Neutral, MD=Moderately Disagree, SD=Strongly Disagree and DK=Don't Know

Table 2.8 *Concern about the Health of Coastal & Ocean Areas in and around Georgia
Outside of GRNMS: Non-users of GRNMS*

Issue	Not Concerned at all	Not Very Concerned	Neutral	Somewhat Concerned	Extremely Concerned
a. Ocean acidification	2.97	19.75	11.30	31.54	34.43
b. Climate change	7.51	5.60	18.90	13.85	54.13
c. Sea level rise	5.88	7.89	18.50	13.79	53.94
d. Over fishing (catching more than can be replaced)	3.61	14.86	5.68	28.67	47.19
e. Coral reef health or other live bottom habitat	4.04	4.16	1.08	40.35	50.38
f. Marine animal's health	1.77	2.27	4.40	36.68	54.88
g. Shipping (marine transportation)	2.20	5.17	42.79	40.24	9.59
h. Dredging/Offshore dredge disposal	3.31	6.73	15.12	28.74	46.10
i. Beach renourishment	1.89	5.47	20.49	46.79	25.35
j. Energy production (oil & gas)	4.93	2.68	5.91	24.90	61.58
k. Alternative energy production (wind, tidal, and wave)	5.57	4.31	22.71	20.38	47.03
l. Mining of minerals (including sand)	4.48	7.26	52.28	19.98	16.00
m. Habitat loss from coastal development	0.69	1.09	7.71	48.49	42.01
n. Pollution (contaminants such as mercury, PCBs, sewage, pesticides)	0.69	1.08	1.08	22.36	74.79

Table 2.9 *Concern about the Health of Ocean Areas in GRNMS: Non-users of GRNMS*

Issue	Not Concerned at all	Not Very Concerned	Neutral	Somewhat Concerned	Extremely Concerned
a. Ocean acidification	4.13	19.27	5.93	30.19	40.48
b. Climate change	7.25	5.70	18.03	11.53	57.48
c. Sea level rise	6.44	8.04	22.03	7.04	56.45
d. Over fishing (catching more than can be replaced)	1.77	3.64	6.85	39.78	47.96
e. Coral reef health or other live bottom habitat	3.28	3.64	16.90	16.60	59.59
f. Marine animal's health	1.77	4.39	17.66	21.30	54.88
g. Shipping (marine transportation)	1.45	4.09	36.71	43.88	13.88
h. Dredging/Offshore dredge disposal	2.96	5.17	12.22	33.30	46.36
i. Beach renourishment	1.89	4.84	13.95	50.25	29.06
j. Energy production (oil & gas)	4.18	0.76	6.35	25.56	63.15
k. Alternative energy production (wind, tidal, and wave)	3.72	5.32	8.53	31.50	50.94
l. Mining of minerals (including sand)	2.66	4.91	51.13	20.26	21.05
m. Habitat loss from coastal development	0.69	1.08	20.26	25.90	52.07
n. Pollution (contaminants such as mercury, PCBs, sewage, pesticides)	0.69	1.08	3.35	14.17	80.71

Table 2.10 Support for Protection of Coastal & Ocean Resources in and around Georgia Outside of GRNMS versus Inside GRNMS: Non-users of GRNMS

	No Support at All	Somewhat Against	Neutral	Somewhat Support	Strongly Support
a. Protection Outside GRNMS	0.69	1.08	3.21	60.35	34.66
b. Protection Inside GRNMS	0.69	1.08	9.42	26.68	62.13

Table 2.11 Ways Non-users of GRNMS Value Coastal & Ocean Resources/Marine Environment

Good or Service	No Value	Low Value	Medium Value	High Value	Extremely High Value
a. Support for recreation activities	2.99	1.92	33.27	41.66	20.16
b. Seafood purchased at local stores and restaurants	3.75	1.08	8.33	40.28	46.56
c. Seafood purchased at non local stores & restaurants	4.58	16.40	35.64	32.73	10.65
d. Support for Scientific Research	1.45	15.93	17.05	25.92	39.65
e. Support for education	1.45	2.92	12.30	17.90	65.43
f. Supply of mineral resources through mining	2.50	29.71	26.63	2.81	8.34
g. Supply of oil & gas	5.87	9.44	16.27	20.62	47.79
h. Supply of alternative energy (wind, wave, tidal)	2.53	18.72	12.64	22.56	43.54
i. Supply of pharmaceutical products through mining or harvest of resources	1.45	22.66	15.07	42.97	17.85
j. Protection of resources even though I never intend to visit or directly use them	1.45	14.10	8.65	22.54	53.27

level of value used was a five-point Likert scale where 1=No value, 2=Low value, 3=Medium value, 4=High value, and 5=Extremely high value. A majority of non-users of GRNMS had high to extremely high values for all uses except “seafood purchased at non local stores & restaurants” (43.38%) and the “supply of mineral resources through mining” (41.15%). The top three valued uses were “seafood purchased at local stores and restaurants” (86.84% with high to extremely high values), “support for education” (83.33% with high to extremely high values), and “protection of resources even though I never intend to visit or di-

rectly use them” (75.81% with high to extremely high values). These latter scores indicate that there is high non-use value or what economists call “passive economic use value” or the willingness-to-pay for protecting resources even though they will never use the resources (Bishop et al 2011). The full results are summarized in Table 2.11.

Actions Non-users of GRNMS would take to ensure sustainability of Coastal and Ocean Resources

The survey asked respondents about the activities or actions they would take to ensure that coastal and ocean resources are used sustainably and available for future generations. Nine activities or actions were presented and a five-point Likert scale was used to score to what extent respondents would undertake each activity or action, where 1=Would not do, 2=Would do very little, 3=Would do some,

Table 2.11 *Ways Non-users of GRNMS Value Coastal & Ocean Resources/Marine Environment*

Good or Service	No Value	Low Value	Medium Value	High Value	Extremely High Value
a. Support for recreation activities	2.99	1.92	33.27	41.66	20.16
b. Seafood purchased at local stores and restaurants	3.75	1.08	8.33	40.28	46.56
c. Seafood purchased at non local stores & restaurants	4.58	16.40	35.64	32.73	10.65
d. Support for Scientific Research	1.45	15.93	17.05	25.92	39.65
e. Support for education	1.45	2.92	12.30	17.90	65.43
f. Supply of mineral resources through mining	2.50	29.71	26.63	32.81	8.34
g. Supply of oil & gas	5.87	9.44	16.27	20.62	47.79
h. Supply of alternative energy (wind, wave, tidal)	2.53	18.72	12.64	22.56	43.54
i. Supply of pharmaceutical products through mining or harvest of resources	1.45	22.66	15.07	42.97	17.85
j. Protection of resources even though I never intend to visit or directly use them	1.45	14.10	8.65	22.54	53.27

Table 2.12 *Activities or Actions Non-users of GRNMS Would Do to ensure that coastal and ocean resources are used sustainably and available for future generations to enjoy*

Activity or Action	Would Not Do	Would do Very Little	Would Do Some	Would Do a Lot	Would do the Maximum
a. Volunteer time	10.50	34.10	45.41	4.42	5.57
b. Pay higher taxes for resource protection and restoration	23.12	31.76	36.30	7.23	1.58
c. Pay higher prices for goods and services due to costs to businesses in complying with regulations that protect ocean & coastal resources or require restoration of areas damaged	13.46	22.01	48.44	16.09	0.00
d. Pay user fees like fishing licenses or diving access fees or additional boat registration fees	3.76	15.20	58.65	14.80	7.59
e. Donate to groups representing recreational fishing interests	21.39	31.97	42.92	2.96	0.76
f. Donate to groups representing diving interests	45.81	11.83	38.64	2.96	0.76
g. Recycle	1.89	2.38	20.78	21.06	53.88
h. Use less energy	1.89	3.36	29.91	21.13	43.71
i. Avoid/boycott certain seafood products	21.37	6.68	39.02	9.34	23.59

Figure 2.11 *Non-users of GRNMS Support for Marine Zoning off the Coast of Georgia*

Over three quarters of Non-users of GRNMS would support the use of marine zoning in the coastal & ocean waters off the coast of Georgia

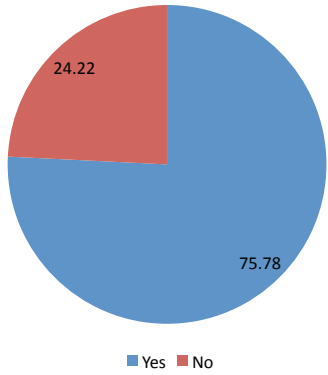
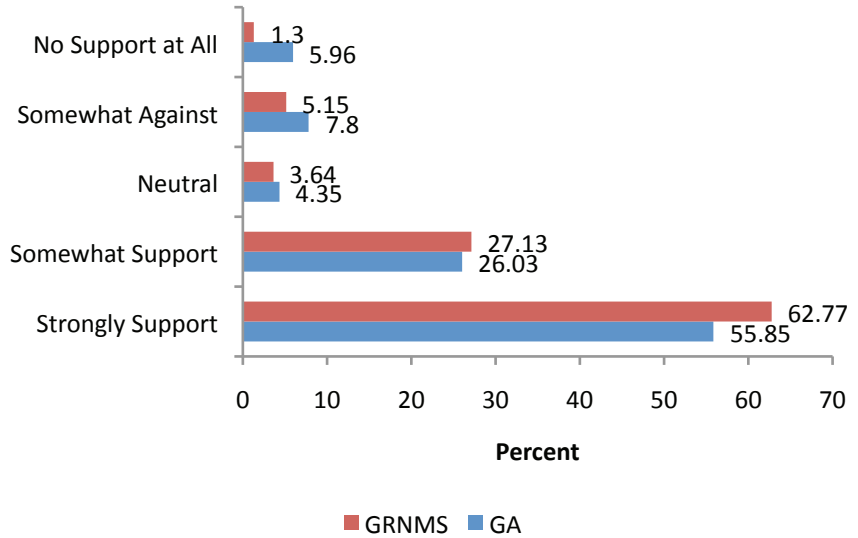


Figure 2.12 *Non-users of GRNMS Support for Marine Reserves off the Coast of Georgia Inside and Outside GRNMS*

An overwhelming majority of Non-users of GRNMS would support the creation of marine reserves in the coastal & ocean waters off the coast of Georgia both inside and outside GRNMS with slightly stronger support for the marine reserves within the GRNMS.



4=Would do a lot, and 5=Would do the maximum. A majority would do some to the maximum for six of the nine activity/actions. The three activities/actions that a majority would do very little or not at all was “pay higher taxes for resource protection and restoration”, “donate to groups representing recreational fishing interests” and “donate to groups representing diving interests”. The latter two of these make sense in that a majority of non-users of GRNMS don’t participate in recreational fishing or diving. The first is more complicated.

The literature on user fees supports the notion that people are willing to pay user fees for the activities that they participate in (Aukerman 1987, Brown 1992, Fedler and Miles 1989,

Kyle et al 2002, Leeworthy 1993, and Winter et al 1999). They do not want to subsidize the activities of others. If general taxes are used to pay to support recreational or other activities or goods and services they don’t consume, they generally do not support them. This is what is being picked up by the response to “pay higher taxes for resource protection and restoration”. One can see this more clearly by looking at the response to “pay higher prices for goods and services due to costs to businesses in complying with regulations that protect ocean & coastal resources or require restoration of areas damaged”. In this case, people are paying only for the goods and services they consume through the prices that are passed onto them by suppliers. The major-

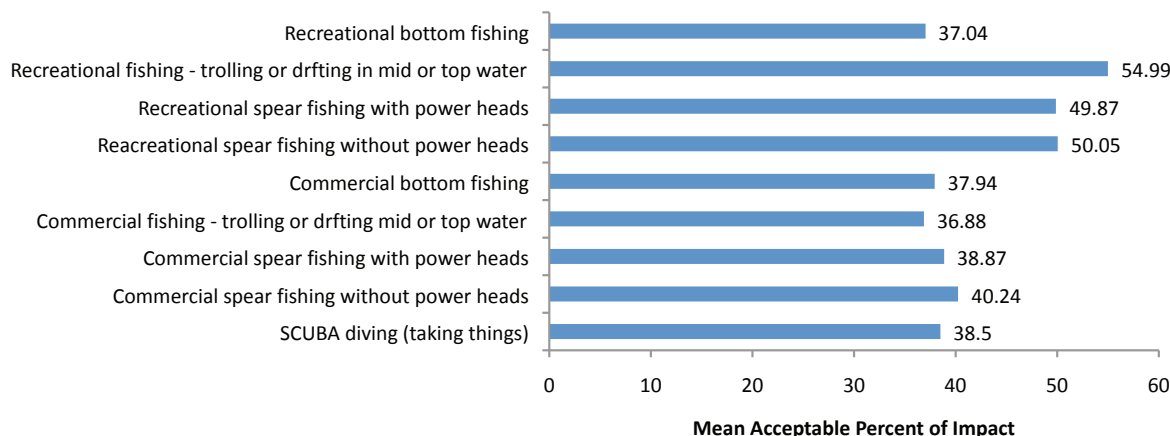
ity of non-users of GRNMS would do some to doing the maximum (64.53%). The full results are summarized in Table 2.12.

Support for Selected Policy/Management Strategies for Coastal and Ocean Resources

The survey addressed three general kinds of controversial policy/management strategies that have been implemented in various places or that are being considered in managing coastal and ocean resources: marine zoning where certain activities are prohibited or restricted, multi-species fishery management where fishery managers must take into account the

Figure 2.13 *Maximum Acceptable Level of Impact on Different Uses of GRNMS if Displaced By Marine Reserves*

Non-users of GRNMS would support the creation of marine reserves in GRNMS even if it resulted in displacement of a range of 37 percent to about 55 percent of selected activities.



inter-relationships among species, and ecosystem-based management where all uses and all resources are given consideration in management. For marine zoning, two special forms of zones are addressed: marine reserves or “no take” areas where only nonconsumptive activities are allowed and “research only areas” where only scientific and educational activities are allowed. For these two types of zones, opinions of respondents were also obtained as to what extent of displacement of activities was acceptable.

Marine Zoning. Survey respondents were first asked if they supported the use of marine zoning in coastal and ocean areas. More than three-quarters of non-users of GRNMS supported the use of marine zoning (Figure 2.11).

Marine Reserves. Survey respondents were asked for their level of support for marine reserves or “no take” areas in the coastal and ocean waters off Georgia outside

GRNMS and inside GRNMS. Level of support was measured using a five-point Likert scale where 1=No support at all, 2=Somewhat against, 3=Neutral, 4=Somewhat support and 5=Strongly support. A majority strongly supported marine reserves in coastal and ocean waters off Georgia outside GRNMS (55.85%) and inside GRNMS (62.77%), with higher support for marine reserves in GRNMS. When we combine somewhat support and strongly support, marine reserves are supported outside GRNMS by 81.88% of non-users of GRNMS and by 89.9% of non-users for marine reserves inside GRNMS.

As a follow-up to the question of support for marine reserves inside GRNMS, survey respondents were asked what percent of each activity that would be displaced by marine reserves they thought would be acceptable. Nine separate uses/activities were presented that would be displaced by marine reserves in GRNMS. Non-users of GRNMS

would support the creation of marine reserves in GRNMS even if it resulted in displacement of a range of 37% to 55% of selected activities (Figure 2.13).

Research Only Areas. Survey respondents were asked for their level of support for research only areas in the coastal and ocean waters off Georgia outside GRNMS and inside GRNMS. The same five-point support scale that was used for marine reserves was used. An overwhelming majority of non-users of GRNMS would somewhat to strongly support the creation of research only areas in coastal and ocean waters both inside (80.74%) and outside GRNMS (80.38%). A majority (53.63%) strongly supports research only areas inside GRNMS (Figure 2.14).

As a follow-up to the question of support for research only areas inside GRNMS, survey respondents were asked what percent of each activity that would be displaced by research only areas they thought

Figure 2.14 *Non-users of GRNMS Support for Research Only Areas off the Coast of Georgia Inside and Outside GRNMS*

Non-users of GRNMS would overwhelmingly support the creation of Research Only Areas in the coastal & ocean waters off Georgia both inside and outside for GRNMS.

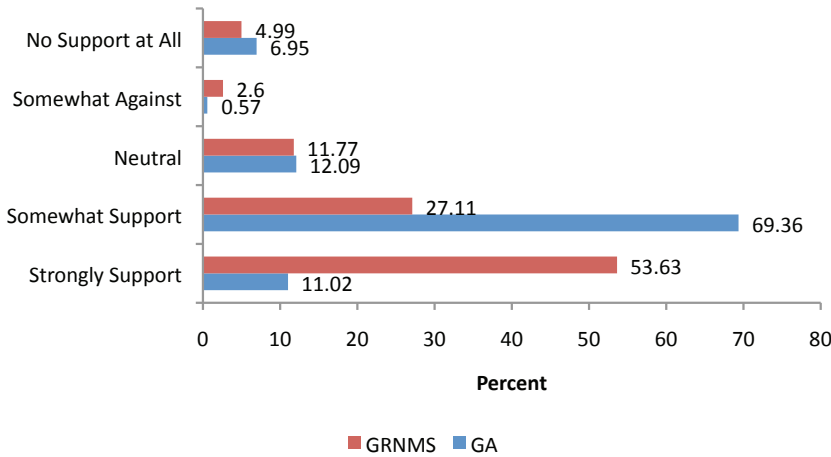
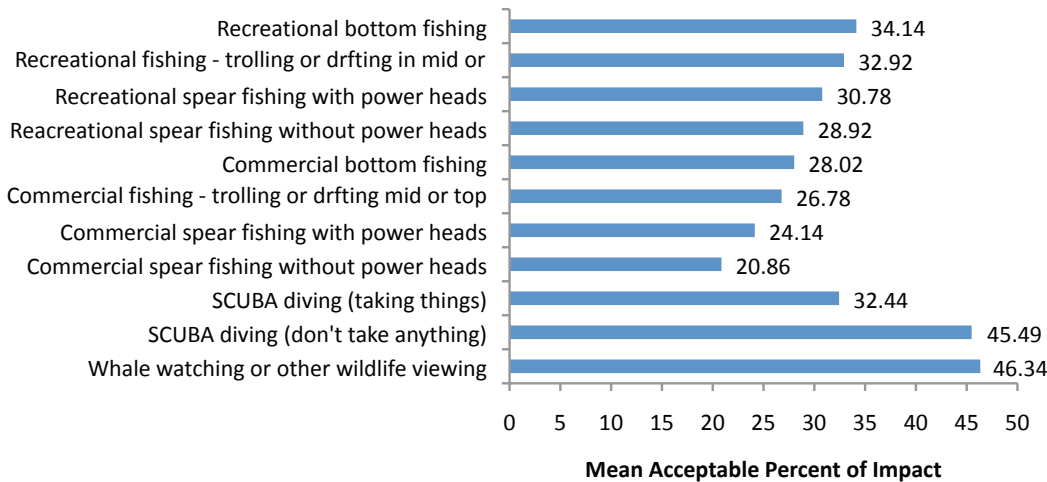


Figure 2.15 *Maximum Acceptable Level of Impact on different Uses of GRNMS if Displaced By Research Only Areas in GRNMS*

Non-users of GRNMS would support the creation of Research Only Areas in GRNMS even if it resulted in displacement of a range of about 21 percent to 46 percent of selected activities. An unexpected result was the less consumptive an activity the higher the accepted level of impact.



would be acceptable. Eleven separate uses/activities were presented that would be displaced by marine reserves in GRNMS. Non-users of GRNMS would support the creation of research only areas in GRNMS even if it resulted in

displacement of a range of about 21% to 46% of selected activities. An unexpected result was that the less consumptive an activity, the higher the accepted level of impact (Figure 2.15).

Multi-species Fishery Management. Survey respondents were told that, historically, fishery managers or managers of marine mammals have managed on a species by species basis and recent trends are to expand this species-specific

approach to what is being called multi-species management. They were further told that in fisheries management, the approach involves looking at various inter-relationships between species such as predator-prey relationships (big fish eat little fish). Respondents were then asked for their level of support for the multi-species approach using the five-point Likert support scale. Over half of non-users of GRNMS were neutral on the support for the multi-species approach to fishery management with more than 39% in support and a little over 7% against it (Figure 2.16).

Ecosystem-based Approach to Management of Coastal and Ocean Resources. Survey respondents were told that there was a more comprehensive approach that goes beyond fishery management. They were also told that in a full ecosystem-based management approach, all human uses and values are recognized and that management attempts to achieve a balance across many different uses and values. Respondents were then asked for their level of support for the ecosystem-based management approach using the five-point Likert scale. An overwhelming majority of non-users of GRNMS would support an ecosystem-based approach with more than 69% either somewhat or strongly supporting the approach (Figure 2.17).

Figure 2.16 *Non-users of GRNMS Support for the Multi-species Approach to Fishery Management*

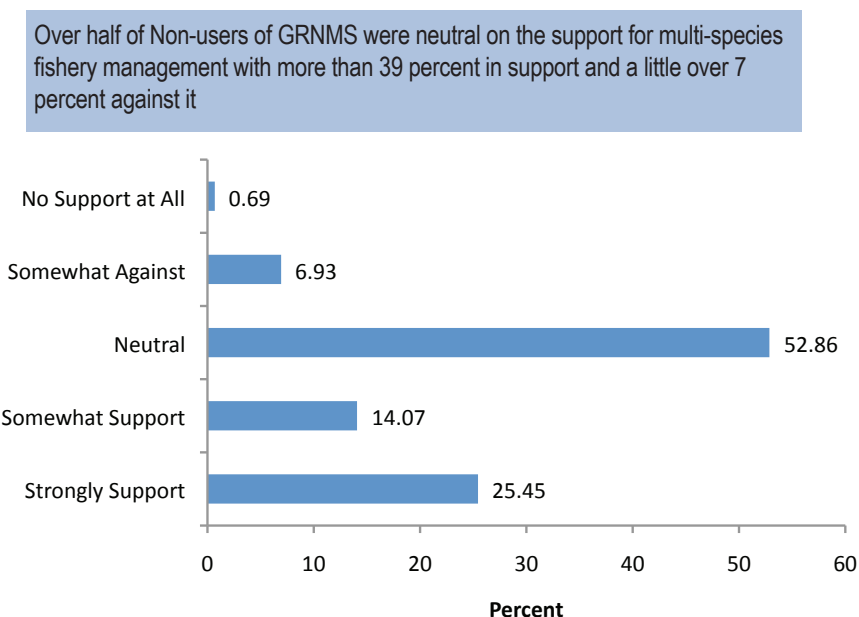
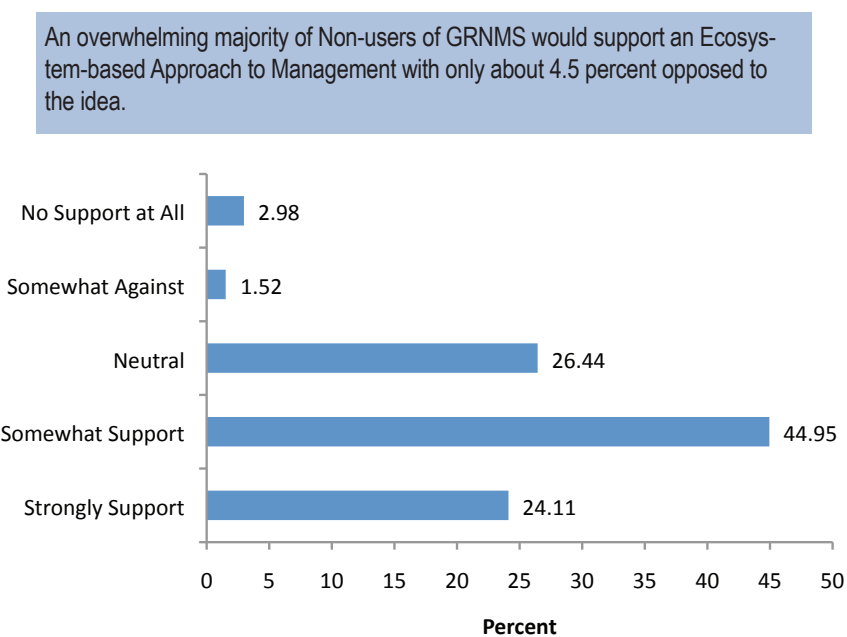


Figure 2.17 *Non-users of GRNMS Support for the Ecosystem-based Approach to Management*



Chapter 3

User and Non-user Comparisons

In this chapter, users and non-users of GRNMS are compared and statistically significant differences are highlighted.

User Profiles

Demographics. Users were significantly different from non-users for every demographic factor except educational attainment and average household size. Users were all male, while for non-users the proportion of males was closer to the general population of Georgia (Figure 3.1). Users were all white, while the distribution by race for non-users was closer to the general population of Georgia (Figure 3.2). Users were, on average, significantly older than non-users, and users were more concentrated in the age range of 35 to 64 than non-users (Table 3.1 and Figure 3.3). Although there appear to be some differences in educational attainment between users and non-users, the differences are not statistically significant (Figure 3.4). Users had significantly higher household incomes than non-users. No user had a household income less than \$25,000, while 28.86% of non-users did. And, 51.39% of users had household incomes \$100,000 or above, while only 17.33% of non-users did (Figure 3.5). None of the users were unemployed, while 15.53% of non-users were. Further, 75% of users were employed full-time, while only 47.32% of non-users were employed full-time. And, 14.68% of non-users were employed part-time compared to only 7.89% of users (Figure 3.6).

Figure 3.1 Sex: Users versus Non-users of GRNMS

Users of GRNMS were all males, while the distribution by sex for non-users was closer to the general population of GA.

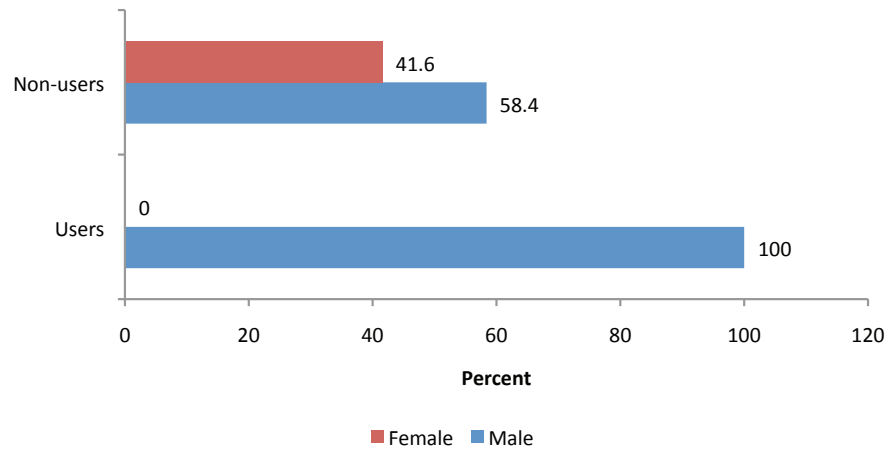
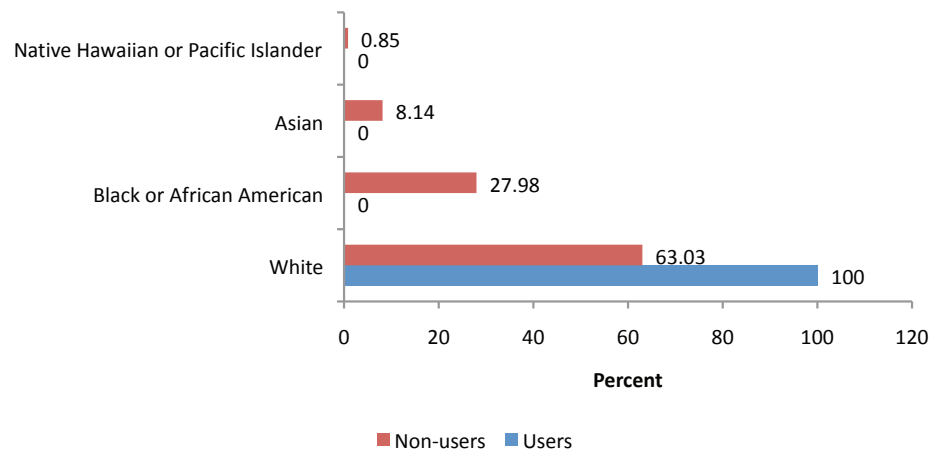


Figure 3.2 Race: Users versus Non-users of GRNMS

Users of GRNMS were all white, while the distribution by race for non-users was closer to the general population of GA



Although non-users had higher average household size than users, the difference was not statistically significant (Table 3.2). Users were significantly more concentrated in households with two people and had a significantly lower proportion in single-person households than non-users (Figures 3.7 and 3.8).

Organizational Membership and Boat Ownership. Users had significantly higher rates of organizational membership than non-users in all groups included in the survey except Diving groups (Figure 3.9). Users had significantly higher rates of boat ownership than non-users, 97.37% for users and 13.68% for

Table 3.1 Age of Users versus Non-users of GRNMS

	Mean	Median	Minimum	Maximum	Statistically Significant Difference ¹
Users	52.55	53	24	75	Yes
Non-users	46.54	48	18	96	

1. Statistical test is a t-test at .05 level of significance.

Figure 3.3 Age: Users versus Non-users of GRNMS

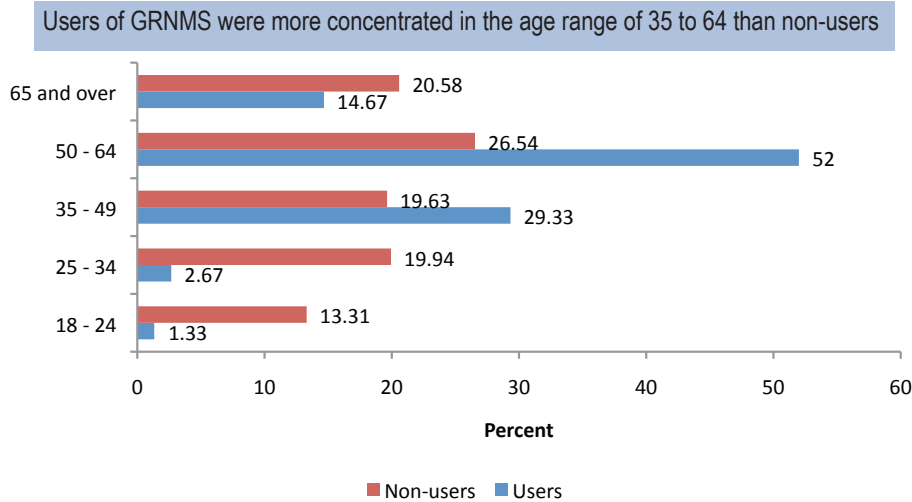


Figure 3.4 Educational Attainment: Users versus Non-users of GRNMS

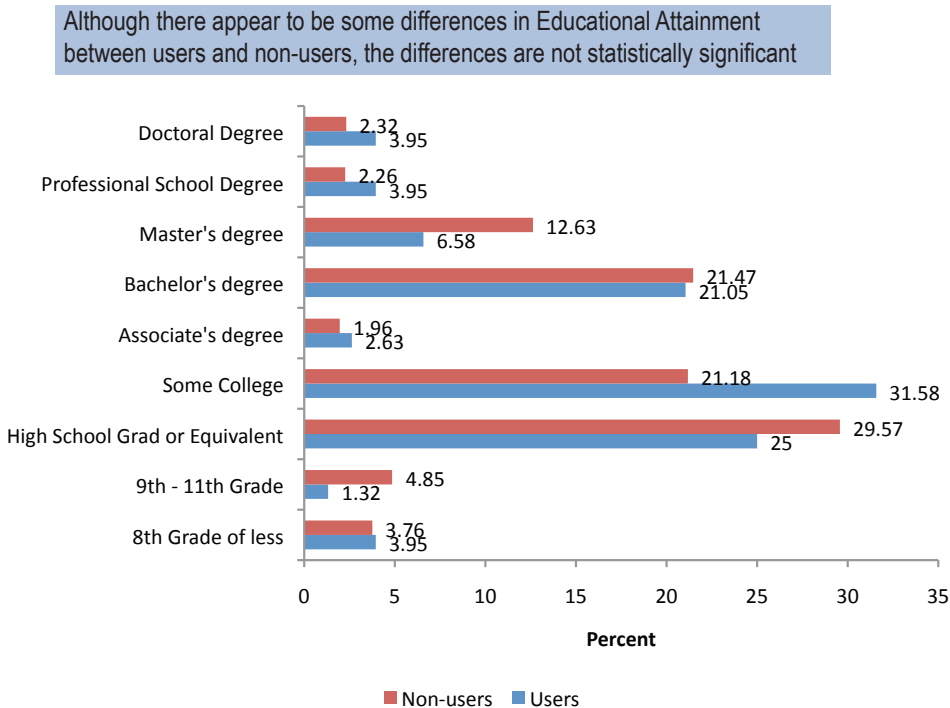


Figure 3.5 Household Income: Users versus Non-users of GRNMS

Users had significantly higher household incomes than non-users

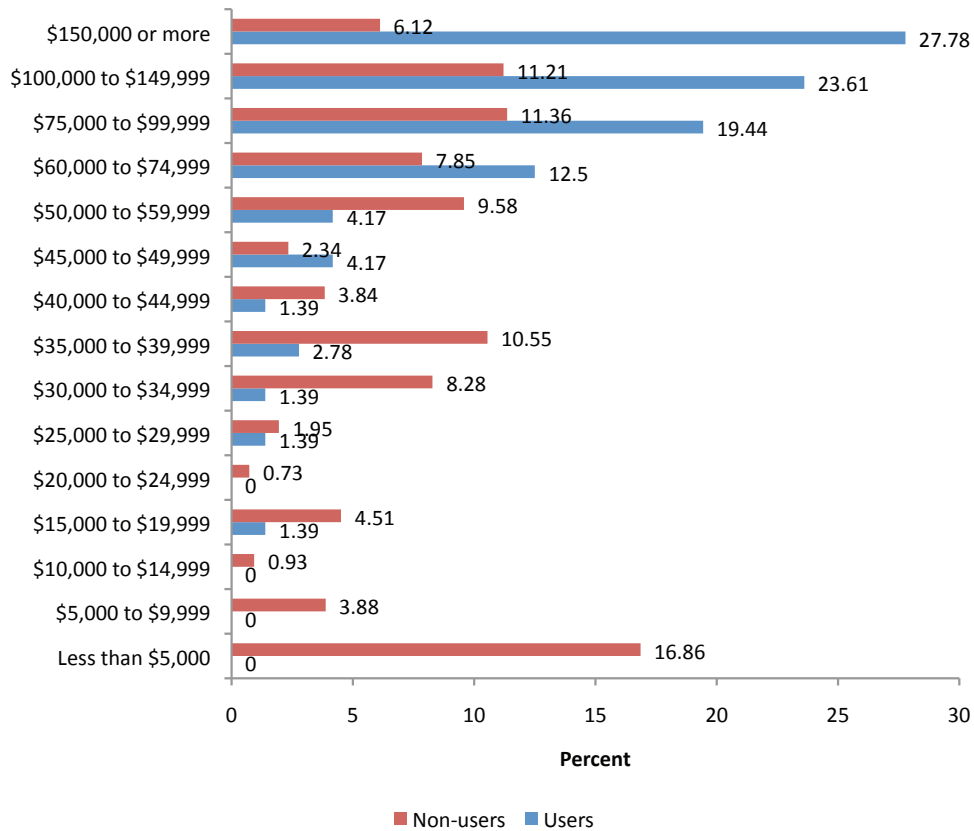


Figure 3.6 Employment Status: Users versus Non-users of GRNMS

Users had significantly higher rates of full-time employment and significantly lower rates of unemployment than non-users

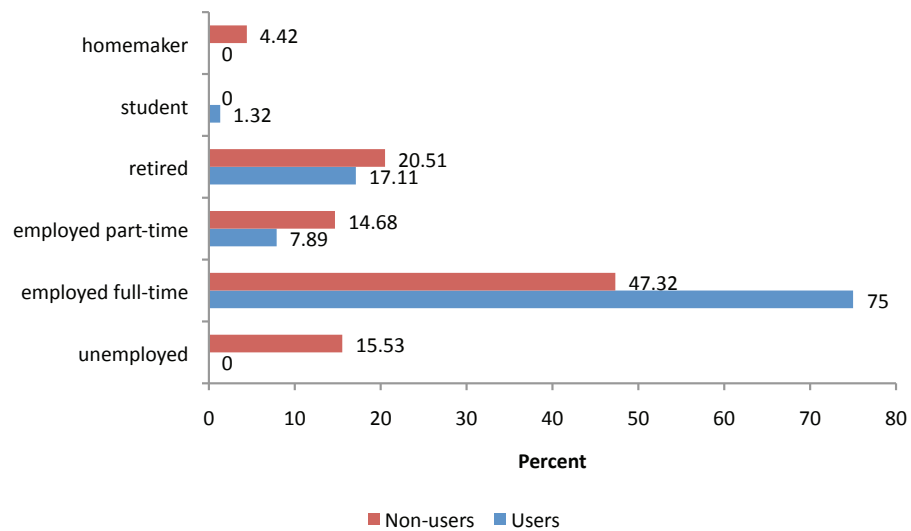


Table 3.2 Household Size, Users versus Non-users of GRNMS

	Mean	Median	Minimum	Maximum	Statistically Significant Difference ¹
Users	2.54	2	1	6	No
Non-users	2.8	3	1	6	

1. Statistical test is a t-test at .05 level of significance.

Figure 3.7 Household Type: Users versus Non-users of GRNMS

Users were significantly more concentrated in households characterized as single adult or two adults with no children than non-users

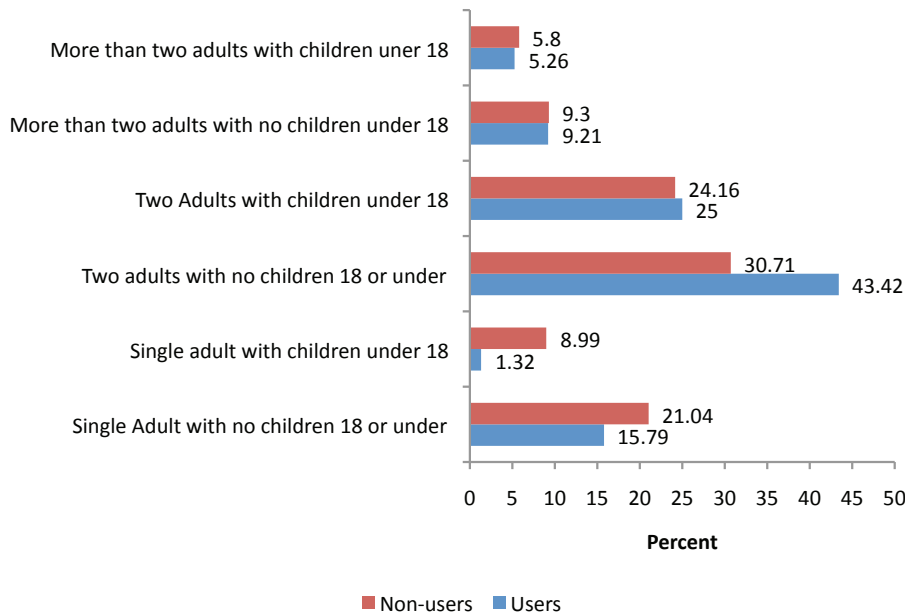


Figure 3.8 Household Size: Users versus Non-users of GRNMS

A significantly higher proportion of users lived in households with two people and had a significantly lower proportion in single person households than non-users

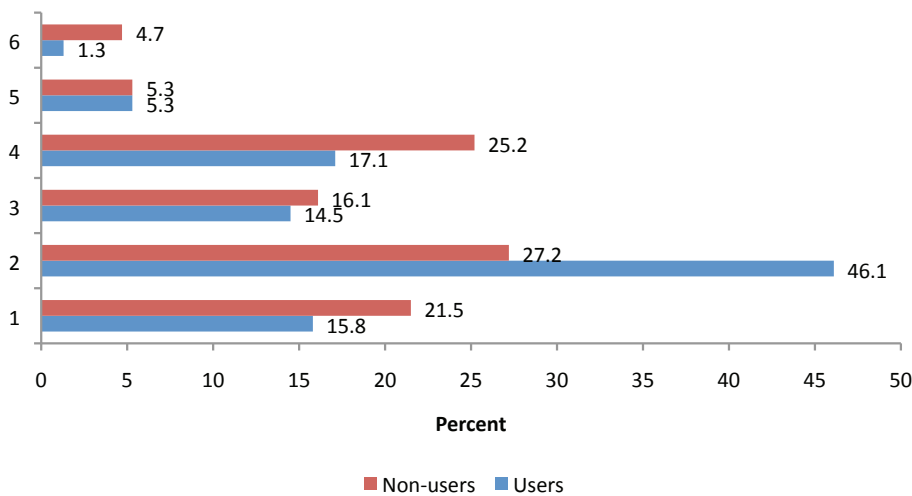


Figure 3.9 Memberships: Users versus Non-users of GRNMS

Users had significantly higher rates of membership than non-users in all the groups included in the survey except Diving groups

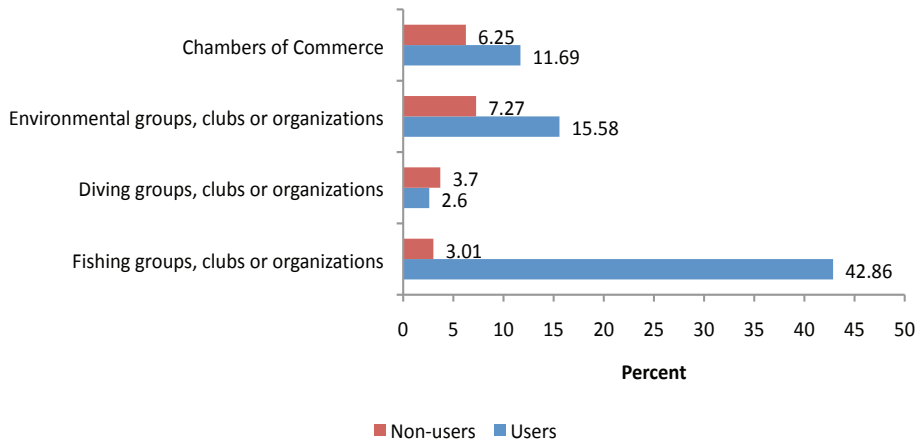


Figure 3.10 Boat Ownership: Users versus Non-users of GRNMS

Users had significantly higher rates of boat ownership than non-users

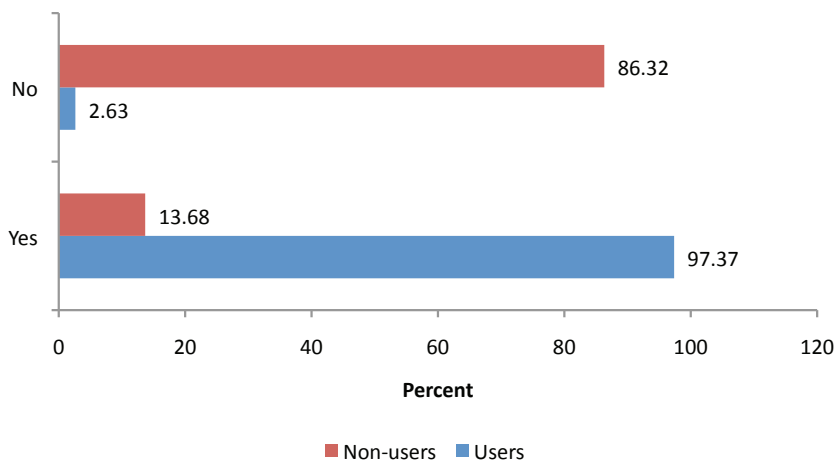


Table 3.3 Boat Length, Users versus Non-users of GRNMS (feet)

	Mean	Median	Minimum	Maximum	Statistically Significant Difference ¹
Users	24.57	23.25	17	47	Yes
Non-users	18.84	17.5	10	46	

1. Statistical test is a t-test at .05 level of significance

non-users (Figure 3.10), and had, on average, bigger boats, 24.57 feet in length for users and 18.84 feet for non-users (Table 3.3).

Activity Participation and Use.

For activities known to occur in GRNMS, users had higher rates of participation in the coastal and ocean waters off the coast of Georgia for consumptive activities, especially fishing, than non-users. Non-users had significantly higher participation rates in nonconsumptive activities (Figure 3.11). For selected activities that would not occur in GRNMS, the only statistically significant difference between users and non-users was for participation in “Beach activities” (Figure 3.12).

Use was measured in person-days where a person-day is equal to one person doing an activity for a whole day or any part of a day. Use was summarized as annual mean number of person-days by activity. Activities included were limited to the activities that are known to occur in GRNMS and are reported in two sets of means: “All Users and Non-users”, which includes those who did zero person-days and “Participants Only”, which includes only those who did at least one person-day of activity. For activities with low participation rates, sample sizes for the “Participants Only” sample were not large enough to support statistical tests for differences. The results are summarized in Table 3.4.

All Users and Non-users. Users had higher average annual number of person-days of use for “recreational bottom fishing” (21.81 person-days for users and 1.02

Figure 3.11 Activity Participation in Coastal & Ocean Activities in GA that are Done in GRNMS: Users versus Non-users of GRNMS

For activities known to occur in GRNMS, users had higher rates of participation in Georgia's coastal & ocean waters for consumptive activities, especially fishing, than non-users. Non-users had significantly higher participation rates in nonconsumptive activities.

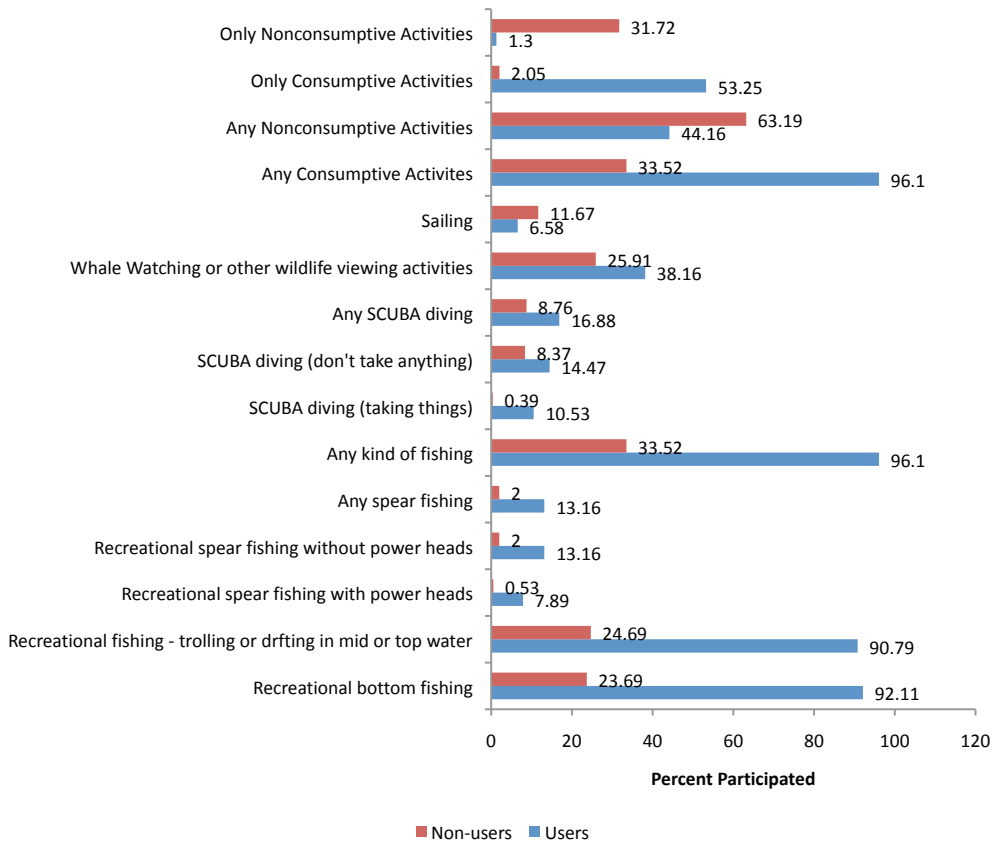


Figure 3.12 Activity Participation in Other Coastal & Ocean Activities in GA: Users versus Non-users of GRNMS

For selected activities that would not occur in GRNMS, the only statistically significant difference between users and non-users was for participation in Beach activities.

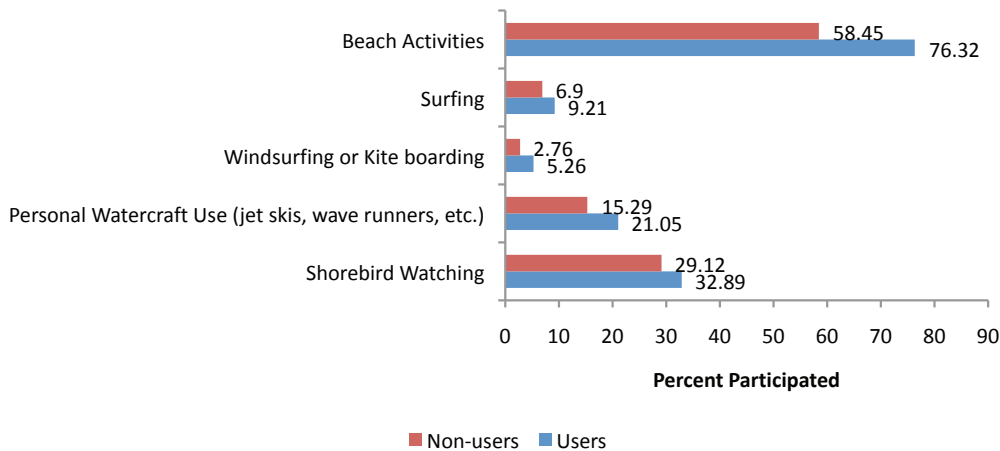


Table 3.4 Days of Participation in Selected Activities in GA, Users versus Non-users of GRNMS

Activity	All Users & Non Users ¹			Participants Only ²		
	Users (Mean)	Non-users (Mean)	Statistically Significant Difference ³	Users (Mean)	Non-users (Mean)	Statistically Significant Difference ³
Recreational bottom fishing	21.81	1.02	Yes	23.73	6.25	Yes
Recreational fishing - trolling or drifting in mid or top water	13.86	1.85	Yes	15.4	8.56	Yes
Recreational spear fishing with power heads	0.28	0.06	No	*	*	*
Recreational spear fishing without power heads	0.42	0.13	No	*	*	*
SCUBA diving (taking things)	0.13	0.00	Yes	*	*	*
SCUBA diving (don't take anything)	0.45	0.38	No	*	*	*
Whale Watching or other wildlife viewing activities	5.60	1.51	Yes	16.33	5.05	Yes

1. Includes those who did zero days of activity.

2. Includes only those that did at least one day of activity.

3. Yes means statistically significant using a t-test at .05 level of significance.

* sample size too small

person-days for non-users), recreational fishing-trolling or drifting in mid or top water (13.86 person-days for users and 1.85 person-days for non-users), “SCUBA diving – taking things (0.13 person-days for users and 0.0 person-days for non-users), and “whale watching or other wildlife viewing activities” (5.60 person-days for users and 1.51 person-days for non-users). This latter finding is interesting since users have lower participation rates in “whale watching and other wildlife viewing activities” than non-users, but on average do more days per year of the activity than non-users.

Participants Only. Sample sizes only supported estimation of means to support statistical tests for three of the seven activities for this subsample of users and non-users. Users had higher average annual person-days of use for “recreational bottom fishing” (23.73 person-

days for users and 6.25 person-days for non-users), “recreational fishing-trolling or drifting in mid or top water” (15.4 person-days for users and 8.56 person-days for non-users), and “whale watching or other wildlife viewing activities” (16.33 person-days for users and 5.05 person-days for non-users).

Knowledge

Sources of Information Used. There were statistically significant differences in 14 of the 22 sources of information sources used between users and non-users of GRNMS (Table 3.5). As would be expected, users had higher rates of use of GRNMS Sanctuary Advisory Council (17.11% versus 7.07%), GRNMS Staff (14.47% versus 6.0%), and GRNMS Web Site (59.21% versus 30.15%). Given the fact that users have significantly higher participation

rates in recreational fishing than non-users, it is not surprising that users generally have higher rates of use of sources that involve the fisheries. What is surprising is that some of the differences here are not statistically significant. Users have significantly higher rates of use of information from NOAA’s National Marine Fisheries Service (50% versus 13.52%), Georgia Department of Natural Resources (71.05% versus 40.14%), Georgia’s Coastal Conservation Association (34.21% versus 4.77%), Recreational Fishing Alliance (31.58% versus 3.82%), International Game and Fish Association (13.16% versus 4.50%), Southern Kingfish Association (44.74% versus 3.24%), and Fishing Magazines/Newsletters (50% versus 22.13%).

If we limit the samples to those users and non-users that participate in the recreational fisheries, the

Table 3.5 Sources of Information Used for GRNMS: Users versus Non-users of GRNMS

Source of Information Used	User Group	Percent Used	Statistically Significant Difference ¹
1. GRNMS Sanctuary Advisory Council	User	17.11	Yes
	Non-user	7.07	
2. GRNMS Staff	User	14.47	Yes
	Non-user	6.00	
3. GRNMS Web Site	User	59.21	Yes
	Non-user	30.15	
4. NOAA's National Marine Fisheries Service	User	50.00	Yes
	Non-user	13.52	
5. Atlantic States Marine Fisheries Commission	User	6.58	No
	Non-user	3.04	
6. Atlantic Fishery Management Council	User	6.58	No
	Non-user	3.02	
7. Georgia Department of Natural Resources	User	71.05	Yes
	Non-user	40.14	
8. Georgia Sea Grant	User	1.32	No
	Non-user	6.06	
9. Georgia's Coastal Conservation Association (CCA)	User	34.21	Yes
	Non-user	4.77	
10. Recreational Fishing Alliance (RFA)	User	31.58	Yes
	Non-user	3.82	
11. American Sports Fishing Association (ASA)	User	17.11	No
	Non-user	9.56	
12. National Coalition for Marine Conservation	User	1.32	No
	Non-user	3.89	
13. International Game and Fish Association (IGFA)	User	13.16	Yes
	Non-user	4.50	
14. Southern Kingfish Association (SKA)	User	44.74	Yes
	Non-user	3.24	

1. Yes means statistically significant using a Chi-square and Jonckheere-Terpstra tests at the 0.05 level of significance.

Table 3.5 Sources of Information Used for GRNMS: Users versus Non-users of GRNMS (continued)

Source of Information Used	User Group	Percent Used	Statistically Significant Difference ¹
15. Fishing Magazines/Newsletters	User	50.00	Yes
	Non-user	22.13	
16. SCUBA diving Magazines/Newsletters	User	11.84	No
	Non-user	11.21	
17. Newspapers	User	42.11	Yes
	Non-user	55.63	
18. Radio	User	26.32	Yes
	Non-user	51.16	
19. Television	User	36.84	Yes
	Non-user	67.63	
20. Internet	User	61.84	No
	Non-user	65.94	
21. Social Media (Twitter, You Tube, Facebook, etc.)	User	8.11	Yes
	Non-user	32.13	
22. Word of Mouth	User	59.21	Yes
	Non-user	45.66	

1. Yes means statistically significant using a Chi-square and Jonckheere-Terpstra tests at the 0.05 level of significance.

story changes for some sources of information. Users have significantly higher rates of use of information than non-users from NOAA's National Marine Fisheries Service (50.68% versus 27.04%), Georgia's Coastal Conservation Association (35.62% versus 6.99%), Recreational Fishing Alliance (31.51% versus 7.90%), and the Southern Kingfish Association (43.84% versus 5.44%).

Non-users had significantly higher rates of use for all mass media sources of information, except the "Internet". Non-users had significantly higher rates of use for "Newspapers" (55.63% versus 42.11%), "Radio" (51.16% versus 26.32%), "Television" (67.63% versus 36.84%) and "Social Media-Twitter, You Tube, Facebook, etc." (32.13% versus 8.11%).

Users had significantly higher rates of use of "Word of Mouth" than non-users (59.21% versus 45.66%).

Level of Trust of Information Sources Used.

The tests for statistical differences of the levels of trust for information sources used were limited by sample sizes since many sources had low rates of uses. Statistical tests for differences were performed on nine of the sources of information used, which had at least 25 observations per user group (i.e. user or non-user). Two tests were conducted: one for the differences in the distribution of the ratings using a Chi-square test and a test of the differences in the mean scores using a t-test. For the nine sources of information used that were tested, the only significant difference was

for the NOAA's National Marine Fisheries Service. Non-users had significantly higher mean scores (4.41 versus 3.85) than users. And, 88.94% of non-users either trusted very much or completely the information from NOAA's National Marine Fisheries Service versus 64.70% for users.

How Prefer to Receive Information from GRNMS.

The only significant difference between users and non-users on how they prefer to receive information about GRNMS was for "E-mail Listserve". A significantly higher proportion of users than non-users prefer receiving information by "E-mail Listserve" with 49.33% of users preferring this method versus 30.58% for non-users (Figure 3.13).

Familiarity with GRNMS Regulations. As would be expected, users of GRNMS were much more familiar with the rules and regulations of GRNMS than non-users. However, it was surprising that more than 21% of non-users were somewhat familiar with GRNMS's rules and regulations (Figure 3.14).

Attitudes

Two general types of statistical tests were performed on each attitude statement. The first tests were for differences in the distribution of agreement scores using the Chi-square and Jonckheere-Terpstra (JT) tests in SAS (Statistical Analysis System Version 9). A "Yes/No" result in Table 3.7 for these tests means the differences were statistically significant using the standard Chi-square test, but not significant using the JT test. The second test was for the differences in the mean scores with the "Don't Know" responses removed so scores ranged from 1 to 5. A mean score less than three (3.0) means that respondents agreed with the statement. Scores four (4.0) or above mean respondents were not in agreement with the statement. A mean score of 3.0 means respondents were neutral on the statement (neither agreed nor disagreed).

Regulations. The first nine statements addressed support for GRNMS regulations, including the establishment of the GRNMS boundaries. The distributions of scores were significantly different for all nine of the regulations, but this was due to a certain extent

Figure 3.13 Ways People Prefer to Receive Information about GRNMS: Users versus Non-users of GRNMS

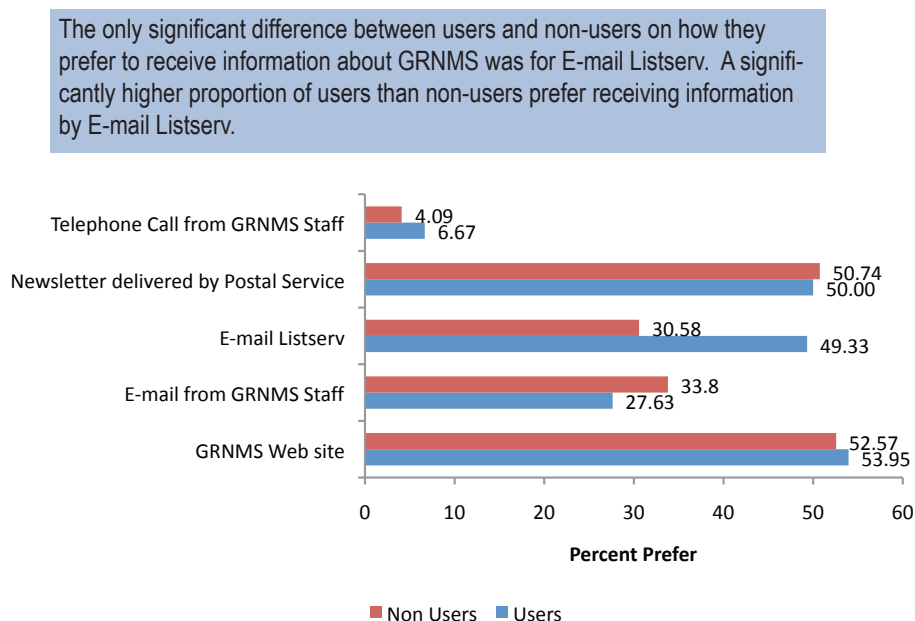


Figure 3.14 Familiarity with GRNMS Rules and Regulations: Users versus Non-users of GRNMS

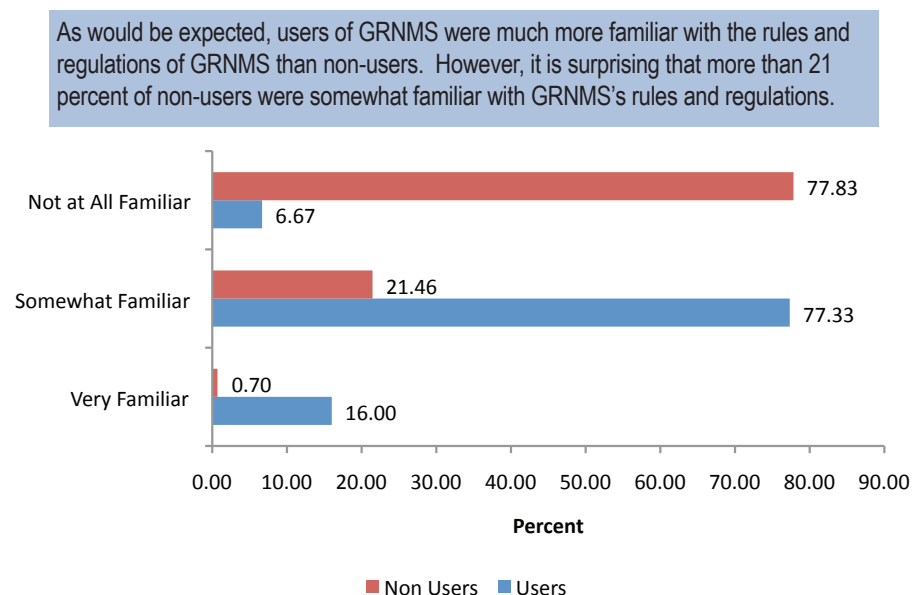


Table 3.6 *Level of Trust of Selected Information Sources Used: Users versus Non-users of GRNMS¹*

Source	User Group	No Trust At All	Very Little Trust	Neutral	Trust Very Much	Completely Trust	Mean	Statistically Significant Difference ²
Grays Reef National Marine Sanctuary Web site	User	0.00	6.98	18.60	46.51	27.91	3.95	No
	Non-user	0.00	9.31	11.62	36.82	42.25	4.12	No
NOAA's National Marine Fisheries Service	User	0.00	8.82	26.47	35.29	29.41	3.85	Yes
	Non-user	2.14	0.00	8.91	32.85	56.09	4.41	Yes
Georgia Department of Natural Resources	User	4.17	6.25	20.83	39.58	29.17	3.83	No
	Non-user	0.00	16.18	17.09	35.74	30.99	3.81	No
Fishing Magazines/Newsletters	User	0.00	2.94	35.29	44.12	17.65	3.76	No
	Non-user	0.00	5.19	22.09	57.13	15.59	3.83	No
Newspapers	User	0.00	3.57	35.71	46.43	14.29	3.71	No
	Non-user	1.22	12.61	34.80	40.68	10.69	3.47	No
Radio	User	0.00	0.00	33.33	50.00	16.67	3.83	No
	Non-user	0.85	9.90	30.23	46.65	12.36	3.60	No
Television	User	0.00	3.70	40.74	44.44	11.11	3.63	No
	Non-user	0.96	12.09	31.65	46.07	9.23	3.50	No
Internet	User	0.00	9.09	47.73	36.36	6.82	3.41	No
	Non-user	0.00	11.83	46.46	37.11	4.60	3.34	No
Word of mouth	User	2.56	15.38	46.15	28.21	7.69	3.23	No
	Non-user	5.43	8.60	28.46	50.52	6.99	3.45	No

1. Selected Sources are those with at least 25 observations per user group to support statistical tests between user groups.

2.. Top Yes/No is the test of the difference in distributions of scores using the Chi-square and Jonckheere-Terpstra (JT) tests at the 0.05 level of significance. A Yes/No means the Chi-square test was significant but the JT test was not. The lower Yes/No is the test of the mean scores using a t-test at 0.05 level of significance.

by including the “Don’t Know” responses in the distributions. As one might expect, non-users have lower rates of familiarity (knowledge) with GRNMS regulations and thus have a higher proportion of “Don’t Know” scores. If we look at the relative proportions of agreement scores (moderately to strongly agree), we can compare distributions on support for the GRNMS regulations.

For item 1 (I support the GRNMS as it is currently established), 62.67% of users were in support, while 28.58% of non-users were in support. More than 56% of non-

users responded that they “Don’t Know” and an additional 12.88% were neutral. Only 2.47% of non-users moderately disagreed and 0.0% strongly disagreed with the statement meaning they did not support the GRNMS as currently established.

For item 2 (I support the no anchoring regulation), 79.22% of users were in support, while 38.07% of non-users were in support. More than 46% of non-users responded that they “Don’t Know” and an additional 8% were neutral. Only 7.44% of non-users moderately to strongly disagreed with the state-

ment (did not support the regulation).

For item 3 (I support the prohibition on disturbing the sea bed including all mining and oil & gas activities), 80.26% of users were in support, while 60.2% of non-users were in support. Thus for this regulation a majority of both users and non-users supported the regulation. Only 9.34% of non-users responded that they “Don’t Know” and an additional 16.88% were neutral. Only 14.15% of non-users moderately to strongly disagreed with the statement (did not support the regulation).

Table 3.7 Attitudes about Current Management Strategies and Regulations of the GRNMS and How GRNMS Management has Performed: Users versus Non-users

Statement	User Group	Strongly Agree	Moderately Agree	Neutral	Moderately Disagree	Strongly Disagree	Don't Know	Mean	Statistically Significant Difference ¹
1. I support the GRNMS as it is currently established	User	30.67	32.00	8.00	5.33	10.67	13.33	2.23	Yes
	Non-user	13.99	14.59	12.88	2.47	0.00	56.07	2.09	No
2. I support the no anchoring regulation	User	62.34	16.88	3.90	7.79	7.79	1.30	1.80	Yes
	Non-user	27.21	10.86	8.09	6.56	0.88	46.40	1.94	No
3. I support the prohibition on disturbing the sea bed including all mining and oil & gas activities	User	71.05	9.21	6.58	3.95	6.58	2.63	1.62	Yes
	Non-user	38.15	22.05	16.31	5.68	8.47	9.34	2.16	Yes
4. I support the prohibition of commercial fishing using wire fishing traps	User	90.91	2.60	1.30	2.60	1.30	1.30	1.18	Yes
	Non-user	28.05	14.81	27.04	10.07	3.07	16.95	2.34	Yes
5. I support the prohibition of commercial fishing using bottom trawls	User	89.61	3.90	1.30	1.30	2.60	1.30	1.21	Yes
	Non-user	30.79	11.59	30.21	7.55	2.67	17.19	2.27	Yes
6. I support the prohibition on the damage or removal of bottom formations	User	84.42	7.79	2.60	2.60	1.30	1.30	1.26	Yes
	Non-user	35.40	26.33	17.13	1.84	1.36	17.94	1.87	Yes
7. I support the prohibition on the use of explosives	User	94.74	1.32	1.32	0.00	1.32	1.32	1.09	Yes
	Non-user	53.49	26.36	1.26	1.75	2.06	15.08	1.50	Yes
8. I support the prohibition on the discharge of pollutants in GRNMS waters	User	90.67	2.67	2.67	1.33	1.33	1.33	1.18	Yes
	Non-user	53.15	28.04	1.96	1.08	1.36	14.43	1.47	Yes
9. I support the prohibition on spear fishing	User	35.53	7.89	19.74	7.89	27.63	1.32	2.84	Yes/No
	Non-user	18.55	13.46	39.22	8.09	4.98	15.71	2.61	No
10. The process that GRNMS used to develop its rules and regulations was open and fair to all groups	User	14.29	11.69	20.78	10.39	18.18	24.68	3.09	Yes
	Non-user	10.36	11.57	17.87	2.95	0.00	57.24	2.31	Yes

1. Top Yes/No is the test of the difference in distributions of scores using the Chi-square and Jonckheere-Terpstra (JT) tests at the 0.05 level of significance. A Yes/No means the Chi-square test was significant but the JT test was not. The lower Yes/No is the test of the mean scores using a t-test at 0.05 level of significance.

For item 4 (I support the prohibition of commercial fishing using wire fishing traps), 93.51% of users were in support, while 42.86% of non-users were in support. For non-users this represents a plurality of support. Only 16.95% of non-users responded that they “Don’t Know” and an additional 27.04% were neutral. Only 13.14% of non-users moderately to strongly dis-

agreed with the statement (did not support the regulation).

For item 5 (I support the prohibition of commercial fishing using bottom trawls), 93.51% of users were in support, while 42.38% of non-users were in support. For non-users this represents a plurality of support. Only 10.22% of non-users responded that they “Don’t Know”

and an additional 30.21% were neutral. Only 10.22% of non-users moderately to strongly disagreed with the statement (did not support the regulation).

For item 6 (I support the prohibition on the damage or removal of bottom formations), 92.31% of users were in support, while 61.73% of non-users were in support. Thus

Table 3.7. Attitudes about Current Management Strategies and Regulations of the GRNMS and How GRNMS Management has Performed: Users versus Non-users (continued)

Statement	User Group	Strongly Agree	Moderately Agree	Neutral	Moderately Disagree	Strongly Disagree	Don't Know	Mean	Statistically Significant Difference ¹
11. It has not mattered whether the average person participated in the workshops and meetings of the GRNMS because the average person could not influence the final decision	User	22.08	20.78	20.78	10.39	10.39	15.58	2.60	Yes
	Non-user	13.20	9.77	12.84	9.34	4.11	50.74	2.62	No
12. GRNMS has not addressed other federal and state governments in developing its rules and regulations	User	11.69	7.79	25.97	7.79	6.49	40.26	2.83	Yes
	Non-user	1.82	6.86	22.51	0.82	3.46	64.54	2.92	No
13. GRNMS has not addressed the concerns of individual citizens in developing rules and regulations	User	24.68	11.69	22.08	10.39	6.49	24.68	2.50	Yes
	Non-user	4.48	14.30	10.68	3.61	5.21	61.73	2.76	No
14. Once that the GRNMS regulations have been in effect, there has been no way that the average person could voice his/her opinion on the usefulness of the regulations	User	25.97	15.58	16.88	9.09	6.49	25.97	2.39	Yes
	Non-user	6.61	11.53	10.99	4.05	3.43	63.38	2.62	No
15. The procedures that GRNMS has established to deal with violations of its regulations has been fair and just	User	9.46	21.62	20.27	2.70	5.41	40.54	2.54	Yes
	Non-user	8.25	10.00	11.25	5.30	0.00	65.20	2.39	No
16. GRNMS does a good job of enforcing its regulations	User	12.33	27.40	21.92	6.85	5.48	26.03	2.54	Yes
	Non-user	7.80	16.20	13.72	0.00	0.00	62.28	2.16	No
17. GRNMS does a good job of educating the public about its rules and regulations	User	13.51	25.68	17.57	10.81	24.32	8.11	3.07	Yes
	Non-user	6.29	15.72	9.32	19.95	7.49	41.22	3.11	No

1. Top Yes/No is the test of the difference in distributions of scores using the Chi-square and Jonckheere-Terpstra (JT) tests at the 0.05 level of significance. A Yes/No means the Chi-square test was significant but the JT test was not. The lower Yes/No is the test of the mean scores using a t-test at 0.05 level of significance.

for this regulation a majority of users and non-users were in support of the regulation. Only 17.94% of non-users responded that they "Don't Know" and an additional 17.13% were neutral. Only 3.2% of non-users moderately to strongly disagreed with the statement (did not support the regulation).

For item 7 (I support the prohibition on the use of explosives), 96.06% of users were in support, while 79.85% of non-users were in support. Thus an overwhelming majority of users and non-users were in support of this regulation. Only 15.08% of non-users responded that they "Don't Know" with an additional 1.26% neutral. Only 3.81%

of non-users moderately to strongly disagreed with this statement (did not support the regulation).

For item 8 (I support the prohibition on the discharge of pollutants in GRNMS waters), 93.34% of users were in support, while 81.19% of non-users were in support. Thus an overwhelming majority of users

ers and non-users were in support of this regulation. Only 14.43% of non-users responded that they “Don’t Know” with an additional 1.96% neutral. Only 2.44% of non-users moderately to strongly disagreed with this statement (did not support the regulation).

For item 9 (I support the prohibition on spear fishing), 43.42% of users were in support, while 32.01% of non-users were in support. Thus only a plurality of users and non-users were in support of this regulation. It had the lowest level of support of all regulations. Only 15.71% of non-users responded that they “Don’t Know” with an additional 39.22% neutral. Only 13.07% of non-users moderately to strongly disagreed with this statement (did not support the regulation).

Mean scores eliminate the “Don’t Know” scores and so scores range from 1 to 5. A mean score below 3.0 means respondents are in support of a GRNMS regulation, while a mean score above 3.0 means respondents do not support a GRNMS regulation. Users and non-users had mean scores for all nine (9) regulations that indicate support for GRNMS regulations. However, there were significant differences between users and non-users for only six (6) of the nine (9) regulations. Users had lower mean scores (more support) than non-users for all six of the regulations for which there was a statistically significant difference (items 3, 4, 5, 6, 7 and 8).

Processes. Items 10-14 in Table 3.7 addressed the processes GRNMS used in developing its rules and

regulations. For item 10 (The process that GRNMS used to develop its rules and regulations was open and fair to all groups), the wording is stated in a way that scores of agreement are positive scores. So the higher the proportion of respondents with scores of moderately to strongly agree and lower mean scores indicate positive attitudes. For items 11-13, the statement were worded in a way that agreement represents a negative attitude and lower mean scores than 3.0 indicate a negative attitude.

For all four process questions, the distributions of scores were significantly different. There were relatively high proportions of “Don’t Know” responses for users and non-users to these statements, but non-users had a majority of respondents that responded “Don’t Know”. So the distributions of the scores require more careful evaluation and must be addressed item by item.

For item 10 (The process that GRNMS used to develop its rules and regulations was open and fair to all groups), 25.98% of users were moderately to strongly in agreement with this statement, while 21.93% of non-users were moderately to strongly in agreement with this statement. However, 28.57% of users were moderately to strongly in disagreement with this statement, while only 2.95% of non-users were moderately in disagreement and none were strongly in disagreement. Thus users had a more negative attitude than non-users.

For item 11 (It has not mattered whether the average person participated in the workshops and

meetings of the GRNMS because the average person could not influence the final decision), 42.86% of users were moderately to strongly in agreement with this statement (a negative attitude), while 22.97% of non-users were moderately to strongly in agreement with this statement. In contrast, 20.78% of users were moderately to strongly in disagreement with this statement (a positive attitude), while 13.45% of non-users were moderately to strongly in disagreement with this statement. Thus both users and non-users had negative attitudes and users were more negative than non-users for this process.

For item 12 (GRNMS has not addressed the concerns of other federal and state governments in developing its rules and regulations), 19.48% of users were moderately to strongly in agreement with this statement (a negative attitude), while 8.68% of non-users were moderately to strongly in agreement with this statement. In contrast, 14.28% of users were moderately to strongly in disagreement with this statement (a positive attitude), while 4.28% of non-users were moderately to strongly in disagreement with this statement. Thus both users and non-users had negative attitudes and users were more negative than non-users for this process.

For item 13 (GRNMS has not addressed the concerns of individual citizens in developing rules and regulations), 36.37% of users were moderately to strongly in agreement with this statement (a negative attitude), while 18.78% of non-users were moderately to strongly in agreement with this statement.

In contrast, 16.88% of users were moderately to strongly in disagreement with this statement (a positive attitude), while 8.82% of non-users were moderately to strongly in disagreement with this statement. Thus both users and non-users had negative attitudes and users were more negative than non-users for this process.

After adjusting for “Don’t Know” responses, there was only one significant difference for mean scores across all four processes. Item 10, regarding the openness and fairness of the process, was the only item where there was a significant difference in mean scores and non-users had a lower mean score meaning a more positive attitude for this process than users. Users actually have a mean score of 3.09 which is a neutral score (Table 3.7).

Performance. Items 14 – 17 in Table 3.7 address the performance of GRNMS regarding its rules and regulations. Item 14 (Once that the GRNMS regulations have been in effect, there has been no way that the average person could voice his/her opinion on the usefulness of the regulations) is stated in a way that agreement with the statement is a negative attitude. Items 15-17 were all stated in a way where agreement is a positive attitude. As with the questions on process, non-users had high proportions of “Don’t Know” responses with a majority providing this response for all items in this section except item 17. Users also had high proportions of “Don’t Know” responses for all items in this section except item 17, but user’s proportions of “Don’t Know” responses were less than that of non-users. Again, be-

cause “Don’t Know” responses can influence the statistical tests for differences in distributions, each item is addressed in more detail below.

For item 14 (Once that the GRNMS regulations have been in effect, there has been no way that the average person could voice his/her opinion on the usefulness of the regulations), 41.55% of users were moderately to strongly in agreement with this statement (a negative attitude), while 18.14% of non-users were moderately to strongly in agreement with this statement. In contrast, 15.58% of users were moderately to strongly in disagreement with this statement (a positive attitude), while 7.48% of non-users were moderately to strongly in disagreement with this statement. For users a plurality had a negative attitude, while for non-users there was a higher proportion of negative than positive scores. Users did have more negative attitudes than non-users for this performance item.

For item 15 (The procedures that GRNMS has established to deal with violations of its regulations has been fair and just), 31.08% of users were moderately to strongly in agreement with this statement (a positive attitude), while 18.25% of non-users were moderately to strongly in agreement with this statement. In contrast, 12.33% of users were moderately to strongly in disagreement with this statement (a negative attitude), while 5.30% of non-users were moderately to strongly in disagreement with this statement. So users had a more positive attitude than non-users for this performance item.

For item 16 (GRNMS does a good job of enforcing its regulations), 39.73% of users were moderately to strongly in agreement with this statement (a positive attitude), while 24% of non-users were moderately to strongly in agreement with this statement. In contrast, 12.33% of users were moderately to strongly in disagreement with this statement (a negative attitude), while 0% of non-users were in disagreement with this statement. Users had a more positive attitude than non-users for this performance item.

For item 17 (GRNMS does a good job of educating the public about its rules and regulations), 39.19% of users were moderately to strongly in agreement with this statement (a positive attitude), while 22.01% of non-users were moderately to strongly in agreement with this statement. In contrast, 35.13% of users were moderately to strongly in disagreement with this statement (a negative attitude), while 27.44% of non-users were moderately to strongly in disagreement with this statement. Users had a more positive attitude than non-users for this performance item.

Again, once “Don’t Know” responses are eliminated and mean scores calculated, there were no differences in any of the four performance items between users and non-users. For items 14 – 16, users and non-users had mean scores less than 3.0 meaning agreement. For item 14, this represented a negative attitude, while for items 15 and 16 it represented a positive attitude. For item 17, users and non-users had mean scores that were neutral (neither a positive nor negative attitude).

References

- Aukerman, Robert. 1987. *User Pays for Recreation Resources*. Fort Collins, Colorado: Colorado State University, Research Services.
- Bishop, Richard C., David J. Chapman, Barbara J. Kanninen, Jon A. Krosnick, Bob Leeworthy, and Norman F. Meade. 2001. *Total Economic Value for Protecting and Restoring Hawaiian Coral Reef Ecosystems: Final Report*. Silver Spring, MD: NOAA Office of National Marine Sanctuaries, Office of Response and Restoration, and Coral Reef Conservation Program. NOAA Technical Memorandum CRCP 16.406 pp. Available at http://coralreef.noaa.gov/aboutcrcep/news/featuredstories/oct11/hi_value/resources/protecting_restoring_hawaiian_cre.pdf
- Brown, LaTonya L. 1992. *A Legislative History of Outdoor Recreation User Fees*. Congressional Research Service, Library of Congress, Washington, D.C. August 14, 1992, 23pp.
- Dillman, D. A.. 1978. *Mail and Telephone Surveys: The Total Design Method*. Wiley-Interscience, New York, NY.
- Fedler, A. J. & Miles, A. F. (1989). Paying for backcountry recreation: Understanding the acceptability of use fees. *Journal of Park and Recreation Administration*, 7 (2), 35-46.
- INFO USA. *Mail Survey Database for Georgia Households*. 5711 S. Circle, Omaha, NE 68127.
- Kyle, G., Graefe, A. & Absher, J. (2002). Determining appropriate prices for recreation on public lands. *Journal of Park and Recreation Administration*, 20(2), 69-89.
- LaFranchi, Chris and Linwood Pendleton. 2008. *Private Boating and Boater Activities in the Channel Islands: A spatial analysis and assessment*. Final Report prepared for the Resources Legacy Fund Foundation (RLFF) and the National Marine Sanctuary Program (NMSP), March 2008, 79pp. Available at <http://sanctuaries.noaa.gov/science/socioeconomic/channelislands/pdfs/privboat1.pdf>
- Leeworthy Vernon R. 1993. *The Feasibility of User Fees in National Marine Sanctuaries: A Preliminary Characterization*. Silver Spring, MD: National Oceanic and Atmospheric Administration, National Ocean Service, Strategic Environmental Assessments Division, December 1993, 24pp.
- Leeworthy, Vernon R. 2012. *Technical Appendix: Knowledge, Attitudes and Perceptions of Management Strategies and Regulations of the Gray's Reef National Marine Sanctuary by Users and Non-users of the Sanctuary*. Silver Spring, MD: National Oceanic and Atmospheric Administration, Office of National Marine Sanctuaries, February 2012.
- Loper, Christy. 2008. *Valuing Networks of Marine Reserves: An Assessment of Recreational Users' Preferences for Marine Conservation in California's Channel Islands*. PhD dissertation, Newark, DE: University of Delaware, College of Marine Studies, June 24, 2008.
- Milon, J. W., D. O. Suman, M. Shivlani, and K. A. Cochran. 1997. *Commercial fishers' perceptions of marine reserves for the Florida Keys National Marine Sanctuary*. Florida Sea Grant Technical Paper-89.
- Statistical Analysis System (SAS) Version 9.1. The SAS Institute, Inc. Cary, North Carolina.

Shivlani, M., Leeworthy V.R., Murray, T.J., Suman, D.O., and F. Tonioli. 2008. Knowledge, Attitudes and Perceptions of Management Strategies and Regulations of the Florida Keys National Marine Sanctuary by Commercial Fishers, Dive Operators, and Environmental Group Members: A Baseline Characterization and 10-year Comparison. Marine Sanctuaries Conservation Series ONMS-08-06. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Office of National Marine Sanctuaries, Silver Spring, MD. 170 pp. Available at <http://sanctuaries.noaa.gov/science/socioeconomic/floridakeys/pdfs/kap2.pdf>

Suman, D. O., M. P. Shivlani, and J. W. Milon. 1999. Perceptions and Attitudes Regarding Marine Reserves: A Comparison of Stakeholder Groups in the Florida Keys National Marine Sanctuary. *Ocean and Coastal Management* 42: 1019-1040.

Thomas J. Murray & Associates. 2005. Tortugas 2000-A post mortem: Evaluation of actual versus projected socio-economic impacts of the Dry Tortugas Ecological Reserve. MARFIN final report in completion of MARFIN project NA04NMF4330079. Available at <http://sanctuaries.noaa.gov/science/socioeconomic/floridakeys/pdfs/tortugas-marfin.pdf>

Winter, P., Palucki, L., & Burkhardt. R. (1999). Anticipated responses to a fee program: The key is trust. *Journal of Leisure Research*, 31(3), 207-226.

