



Community Survey Results for Rappahannock River Valley National Wildlife Refuge: Completion Report

By Natalie R. Sexton, Susan C. Stewart, and Lynne Koontz



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By Natalie R. Sexton, Susan C. Stewart, and Lynne Koontz

I believe that preserving land is of the utmost importance. The Northern Neck and its rivers are a jewel and it is still not too late to protect them from overdevelopment.

Survey Respondent

Introduction

The National Wildlife Refuge System, established in 1903 and managed by the U.S. Fish and Wildlife Service (FWS), is the largest system of lands in the world dedicated to the conservation of wildlife. There are over 547 refuges nationwide, encompassing 96.5 million acres. The mission of the National Wildlife Refuge System is to “administer a national network of lands and waters for the conservation, management and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.” Part of achieving this mission is the goal of fostering “...an understanding and instill appreciation of fish, wildlife, and plants, and their conservation, by providing the public with safe, high-quality, and compatible wildlife-dependent public use.” About 98% of the system is open to the public, attracting nearly 40 million visitors annually. More than 25 million people each year visit refuges to observe and photograph wildlife, 8 million to hunt and fish and more than half a million to participate in educational and interpretation programs (Uniak, 2002).

The National Wildlife Refuge Improvement Act of 1997 (Public Law 105–57, USC668dd) is the guiding legislation for the management of these lands. The law identifies hunting, fishing, wildlife observation and photography, and environmental education and interpretation as uses that should be given priority and provides a process for ensuring that these and other activities do not conflict with the management purpose and goals of the refuge. The act also requires the FWS to develop a comprehensive conservation plan (CCP) for every refuge by the year 2012. A refuge CCP outlines goals, objectives, and management strategies for the refuge for the next 15 years. It provides a vision and describes desired future conditions for the refuge. These goals and objectives have focused largely on habitat and wildlife management. Increasingly, however, refuges are including visitor services goals and objectives in their CCPs to ensure that visitor appreciation and support for fish and wildlife conservation is a part of the refuge’s long-term plan.

Regardless of specific CCP goals and objectives, the National Environmental Policy Act (NEPA; Public Law 91–190:852–859.42, U.S.C. and as amended (P.L. 94–52 and P.L. 94–83) 42 U.S.C. 4321–4347) mandates that the CCP for each refuge must contain an analysis of social and economic conditions (the affected environment) and evaluate social and economic impacts from likely management scenarios. In addition, public review and comment on alternatives for future

management are required. There are many reasons to obtain public input besides legal mandates, however. Public input provides baseline data on public/visitor use, experience, preferences, and expectations. It also can provide managers with a better understanding of public acceptability and concerns of alternatives/future changes that may be proposed in the CCP. This public participation process also facilitates the engagement of a variety of stakeholders in the refuge planning process.

There is some evidence that planning processes that include a broad array of stakeholders produce more comprehensive plans that are more likely to be implemented and accepted by the public (Burby, 2003). The challenge is structuring public involvement in ways that are meaningful and productive for agencies and the broad array of stakeholders.

Studies of public involvement processes in environmental decisionmaking have shown that participants evaluate these processes in terms of both process and outcome. Thus, stakeholders seek qualities such as accessibility and the quality of deliberation (process components) and the extent to which their participation is satisfying (outcome) (Halvorsen, 2003). An accessible process is one that provides a comfortable and convenient setting and is respectful of participants' time. Deliberative processes include open discussion and a forum for respectful exchange of opinions; a deliberative process provides opportunities for learning. Finally, a satisfying process demonstrates that decision makers take public input seriously, and the results of citizen input are reflected in the final decision. It also demonstrates that there is transparency in the decisionmaking process. Other process-focused measures of success in public involvement include the presence of learning opportunities, the development of relationships among group members, and a sense of efficacy (McCool and Guthrie, 2001).

Carr and Halvorsen (2001) drew on criteria proposed by Poisner (1996) to evaluate the effectiveness of public participation in environmental decisionmaking. One interesting finding of their research was that local participants in land-use decisions were not representative of the community. Women, young people, and those with lower income and education levels participated at a lower rate than their distribution in the community. The lesson is that public managers and planners must make special efforts to promote participation by a broad range of stakeholders, including those with traditionally lower rates of participation.

In the CCP process, the public meeting is the forum primarily used to collect citizen input from community members, visitors, and potential visitors. This format can be inadequate for many reasons. Attendance at public meetings is often inconvenient or impossible for occasional visitors to refuges who frequently live long distances from the relevant FWS offices. In addition, those community members who most often attend meetings of this type may represent a vocal minority group that is usually not representative of the full range of community interests regarding the refuge. Also, the type of scientific baseline data that can be collected through this forum is limited. An Issues Workbook is another tool used by FWS for eliciting public response and participation early in the planning process. While the workbook can potentially elicit a broader distribution of input than the public meeting, responses many times represent a nonprobability or convenience sample (for example, the workbook is sent to available mailing lists) which is not selected from the entire population. This type of approach does not yield results that are representative of the entire population, however, due to the sampling approach.

Another tool that can be used to collect baseline information and input is a visitor, community, or stakeholder survey. Conducting a survey is one way that the CCP planning team can reach out to the public and collect baseline data in support of their CCP in a way that can be generalized to an entire population. It is an effective supplement to a public meeting and (or) Issues Workbook when detailed, methodical information on visitor, community resident, or stakeholder populations is needed. Survey research applied to refuge planning can help managers characterize current visitor services and experiences. It can also help managers understand how current and

proposed management activities affect individuals in terms of their preference for services and experiences and identify potential changes in visitation patterns. Finally, high-quality public involvement processes may increase trust in government (Burby, 2003) and provide satisfaction in terms of both process and outcome for management and the public.

Rappahannock River Valley National Wildlife Refuge

Rappahannock River Valley National Wildlife Refuge (Rappahannock NWR or refuge) is located in east-central Virginia along the banks of the Rappahannock River. It is the newest of four refuges that comprise the Eastern Virginia Rivers National Wildlife Refuge Complex. The area between the Rappahannock and Potomac Rivers form the region known as the Northern Neck of Virginia. The Northern Neck region contains the counties of King George, Westmoreland, Lancaster, and Richmond, all which border the Rappahannock River Valley Refuge on the north and east. Caroline, Essex, and Middlesex Counties border the refuge to the south and west and are located in the region known as Virginia's Middle Peninsula, bound by the Rappahannock and York Rivers. The refuge is within a few hours' drive from the urban areas of Washington, D.C., Baltimore, Maryland, and Richmond and Norfolk, Virginia.

Established in 1996, the goal of Rappahannock River Valley NWR is to protect important wetland and upland habitat along the river and its major tributaries. As of May 2005, a total of 7,711 acres have been purchased from willing sellers or donated by refuge partners, including 1,033 acres of conservation easements. The refuge offers wildlife observation, photography, fishing, environmental education, interpretation, and hunting opportunities. The Wilna Unit of the refuge hosts the first public use site—the Wilna Pond Outdoor Classroom—and wildlife observation, fishing, and canoe opportunities.

Study Objectives

This report provides a summary of results for the survey of residents of communities adjacent to Rappahannock River Valley NWR conducted from the spring through the summer in 2006. This research was commissioned by the Northeast Region of the U.S. Fish and Wildlife Service in support of the Rappahannock River Valley NWR CCP and conducted by the Policy Analysis and Science Assistance Branch (PASA) of the U.S. Geological Survey/Fort Collins Science Center.

The purpose of this study was to:

- determine community preferences for wildlife-dependent recreation activities and services that could potentially be provided by the refuge in the future;
- determine community knowledge and understanding of Rappahannock NWR's purpose, the mission of the National Wildlife Refuge System, and land-acquisition issues;
- gain a broader understanding of community recreation use of the Rappahannock River;
- provide insight into community communication and interaction regarding river issues; and
- determine community preferences for land management on the refuge.

Through meetings with planning, visitor services, and refuge staff, PASA developed a survey to collect data from the residents of communities adjacent to the refuge.

Methods

In order to develop a survey that reflected the policy-relevant public use management issues to be addressed in the CCP planning process, we met with refuge staff in May of 2005. Detailed discussions were held with FWS refuge and regional office planning personnel. The purpose of the site visit was to better understand the refuge and the planning process so that we could design a survey that was best suited to obtain the information necessary to inform the CCP process. A second purpose of the site visit was to identify the population to be sampled.

Based on these discussions, we developed preliminary surveys. The surveys were reviewed by FWS personnel, and their comments and suggestions were incorporated. The surveys were then peer reviewed and pretested for readability, clarity, and conciseness before being sent through the Office of Management and Budget for information collection approval (OMB #1028-0083).

Population Sampled

The community sampling area was identified by refuge staff, based on their knowledge of the area. The sampling polygon included census tracts in King George, Essex, Westmoreland, Richmond, Northumberland, Caroline, Lancaster, and Middlesex Counties (fig. 1). A random sample of residents within the sampling polygon was purchased from Marketing Systems Group, a national marketing research firm, and consisted of individuals from a listed household database (households listed in the white pages).

The surveys were mailed to community residents in the spring of 2006 following a step-by-step procedure based on the Total Design Method (Dillman, 2000) which maximizes the quality and quantity of responses for mail and telephone surveys:

- Survey packets included a cover letter explaining the study, the survey, a postage-paid return envelope, and an incentive (Rappahannock River Valley NWR refrigerator magnet).
- One survey packet was sent to each resident in the sample. Over the course of the following 7 weeks, one thank you/reminder postcard and two more survey packages were sent to those who had not responded.
- Finally, a telephone follow up call with a subset of questions from the survey was made to all nonrespondents to address potential nonresponse biases (for example, potential differences between those who responded and those who did not).

Weighting the Data

We took steps to address potential for both nonresponse bias and sampling bias in our data sample. To address potential nonresponse biases, we telephoned all nonrespondents for whom we had telephone numbers ($n = 277$) and asked five key questions from the survey: whether or not they were aware of the refuge, how much they felt they knew about the refuge, number of years they had lived in the area, year they were born, and education level. A total of 56 nonrespondents answered these questions, 49 were deemed ineligible (no longer living at that address, deceased, and so forth), 37 refused, 5 sent in the survey, and 130 were not able to be reached, for a nonrespondent response rate of 27%. Meaningful statistical differences¹ were found between respondents and nonrespondents on the following questions: aware of the refuge, number of years living in the area,

¹Meaningful differences or relationships are defined as follows for this report: While statistical differences at $p < .05$ may exist, in some cases the differences are not practically significant. Practical significance is defined by measures of association that indicate “typical” to “substantial” statistical differences in populations as opposed to “minimal” differences due to sample size. These minimal differences, while statistically significant, have no substantive differences in regard to application to population descriptions and thus are not reported.

and education. Nonrespondents were less likely to be aware of the refuge, had lived in the area a longer amount of time, and had completed fewer years of education. There was no difference between respondents and nonrespondents on age and sex or how much they felt they knew about the refuge. To address potential sampling bias, we compared age and sex distribution of our sample with U.S. Census data. The survey sample in general was older and had a greater representation of males. Data were then weighted accordingly to correct for these nonresponse and sampling biases that were found.

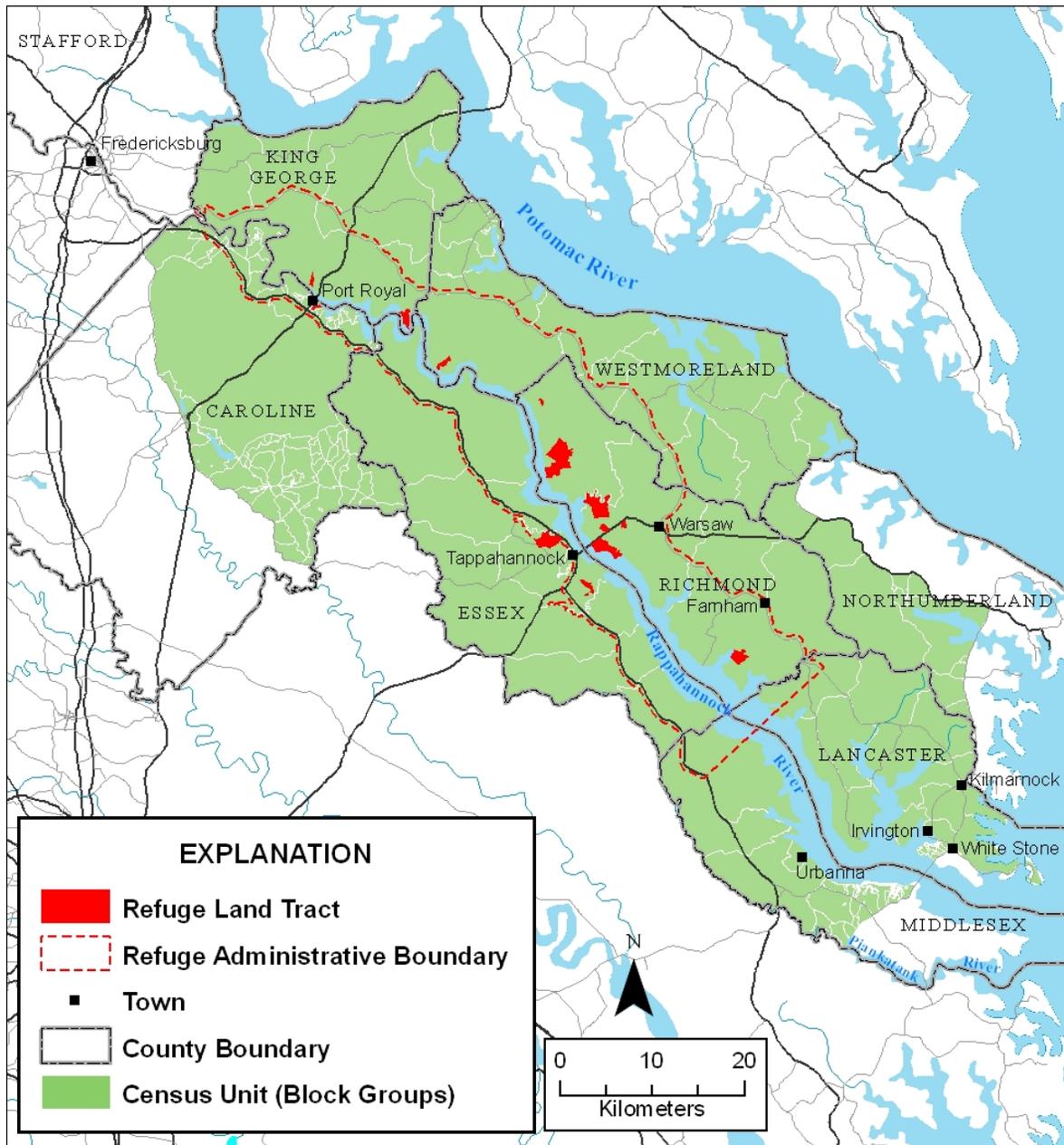


Figure 1. Sampling area for Rappahannock River Valley National Wildlife Refuge community survey.

Data Analysis and Measurement of Concepts

Data were analyzed using SPSS 14.0. The first phase of data analysis involved running frequencies on all questions to gain a basic understanding of the percentages of people who answered in certain ways and the mean levels on key variables. Upon completion of the frequency analyses, the following scales were constructed and additional analyses run.

Consumptive/Nonconsumptive Use Differences

We did not ask detailed questions of respondents regarding visits to the refuge because the population sample for this survey was community residents, and because of the current limited visitor services offered on Rappahannock NWR. As a result, we did not have a way to characterize a resident as a typically consumptive or nonconsumptive use recreationist. However, we wanted to explore, to the extent possible, information about potential visitors in this way. In order to do this we did the following: Respondents were categorized as either hunters or nonhunters, based on their response to the activities they said they participate in along the Rappahannock River (Section 1, Question 1 of the survey). If a respondent said they participate in any one of the hunting activities listed, they were categorized as a hunter; otherwise they were categorized as a nonhunter.

Second, we made two scales from Question 2 of Section 1 on the desirability of future services: desirability of consumptive use services and desirability of nonconsumptive use services. These two scales were developed as follows: A factor analysis on all the services listed identified two factors. Reliability analyses on these two factors indicated strong reliabilities, with consumptive activities having a Cronbach's alpha of .93, and nonconsumptive activities having a Cronbach's alpha of .95. Each scale was then created by averaging the desirability scores of the services in each scale. These two scales (desirability of consumptive use services and desirability of nonconsumptive use services) do not group respondents as consumptive or nonconsumptive users, but rather they are a relative measure of desirability of these types of services.

Willingness to Pay Fees for Services

We made a scale from Question 3 of Section 1 regarding willingness to pay fees for services. The three statements related to fee-paying were tested for reliability and found to have internal consistency that warranted the creation of a scale (Cronbach's alpha² = .82). The average of these three statements was taken to create the scale.

Results

Appendix A includes the summary data for all of the questions in the surveys, in the order that they appear in the survey. Appendix B of this report includes the survey. The body of the report focuses on the meaning of more in-depth analyses of the survey data and comparisons of the different samples. For this reason, frequency information in Appendix A is, for the most part, not repeated in this portion of the report. It will be useful to reference these appendices in conjunction with the report. Throughout this report, statistical differences and relationships are reported for meaningful differences or relationships.

²Cronbach's alpha is a test of the internal consistency of a set of variables. This test is run prior to creating a scale from a set of variables in order to ensure that they correspond sufficiently to make a reliable scale (Nunnally and Bernstein, 1994).

Response Rate

Table 1 outlines the survey distribution and response rate for community residents. The overall response rate for community residents was what was expected, given the hypothesis that most residents are not aware of Rappahannock NWR. Though the response rate was less than the generally accepted 50% (Dillman, 2000), the sample size produced an acceptable margin of error ($\pm 5\%$) and the data were weighted for nonresponse and sampling biases (as described previously). Respondents were from all counties in which the refuge acquisition boundary lies, with the highest percentages coming from King George, Westmoreland, and Lancaster Counties (table 2).

Table 1. Rappahannock River Valley National Wildlife Refuge community survey distribution and response rate.

Statistic	Total
Number of surveys distributed	1,200
Undeliverable addresses	134
Number of returned surveys	368
Response rate	35%
Confidence intervals	5

Table 2. Respondents' county of residence.

County	Respondents(%)
King George	26
Westmoreland	23
Lancaster	17
Richmond	9
Caroline	7
Essex	7
Northumberland	6
Middlesex	5

n = 367

Community Respondent Profile

Profile information for the community residents of the Rappahannock River Valley are based on questions from Section 5 of the survey (table 3).

The average age of respondents was 53, with most having completed high school and one year of college or technical school. This is commensurate with the average education level in the State's population (U.S. Census Bureau, 2006). The average range of income for the study area was between \$35,000 and \$49,999, which is below the average income level for the State (U.S. Census Bureau, 2006).

Respondents have lived in the Northern Neck or Middle Peninsula, on average, between 31 and 32 years. Around half of respondents indicated their families have lived in the area at least two generations. On average, they have lived in the area for 2½ generations, with 10% living in the area 5 or more generations. In many cases, length of residency can have an effect on important variables such as knowledge and management preferences (Sexton and others, 2005).

Only a small percentage of respondents or their immediate family members make a livelihood from industries that may have ties to refuge activity (fig. 2). Twenty-four percent of

respondents indicated that either they or their immediate family members depended on a natural resource-related industry such as farming, timber, fishing, shellfishing, or tourism and recreation for their livelihood (table 4). Many people indicated that they or an immediate family member depend on more than one of the industries listed. The data are broken down into the most common combinations or individual industries. Timber, farming, or a combination of the two comprised the largest number of individuals.

Table 3. Demographics of respondents to community survey.

Demographics	Community
Years lived in Northern Neck or Middle Peninsula	31.7 years
Generations lived in Northern Neck or Middle Peninsula	2.6
Gender	48% male/52% female
Average age	53
Average education level	One year of college or technical school
Average household income	\$50,000-74,999
Race ¹	
White	93%
Black or African American	7%
American Indian	1%
Asian	<1%
Native Hawaiian or other Pacific Islander	<1%
Ethnicity not Hispanic or Latino	100%

¹ Respondents could check more than one race; race percentages are number of responses, not number of respondents.

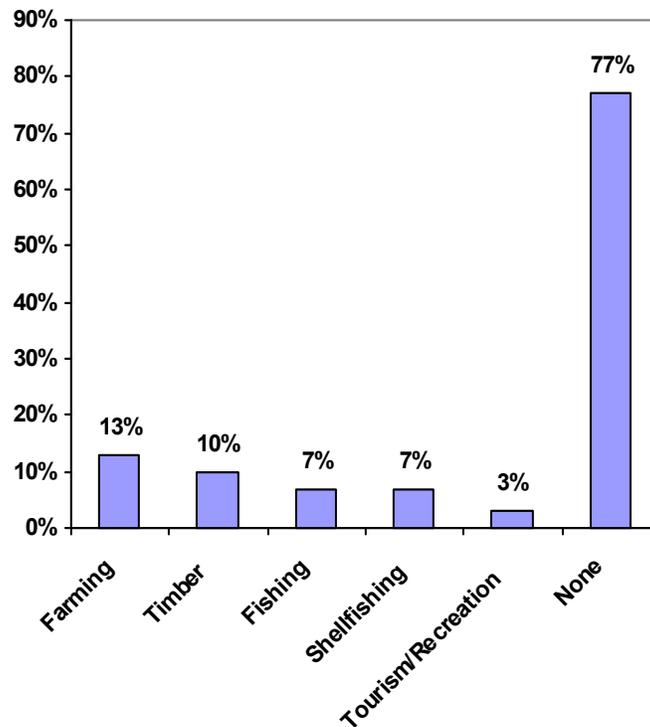


Figure 2. Percentage of Rappahannock River Valley Community respondents (or immediate family members) who depend on industries for their livelihood.

Table 4. Number of respondents who depend (or immediate family members depend) on industries for livelihood.

Industry	n	Industry	n
Timber	30	Farming only	15
Farming	41	Farming and timber	13
Fishing	21	Timber only	10
Shellfish/crabbing	21	Fishing only	5
Tourism/recreation	10	Tourism/recreation only	5
Ranching	1	Fishing and crabbing	5
None of these	240	Crabbing only	5

Community Residents’ Recreation Experience along the Rappahannock River

We asked community residents if they participated in specific recreation activities near their home. We then asked them to identify specifically where along the Rappahannock River they participated in those activities. For this task, respondents were given a map of the river, divided into four areas, consistent with resource concentration areas identified by refuge staff.

Overall, the most frequently reported activities, and those that around half of respondents participate in, were self-guided nature/wildlife viewing, bird watching, boat fishing, and bank fishing (fig. 3).

In terms of where residents participate in these activities, nonconsumptive use activities appear to be most common (fig. 4). In resource area A, the most frequented activities are nature/wildlife photography (60% of respondents who participate in this activity said they participate here), self-guided nature/wildlife viewing (54%), bank fishing (54%), bird watching (50%), and boat fishing (49%).

In resource area B, as in area A, the most frequented activities include self-guided nature/wildlife viewing (50% of those who participate in the activity said they participate here), bird watching (42%), and boat fishing (42%). Additionally, either they or their children attend environmental field trips (58%) in this area and they hike (43%).

In resource area C, as in area A and B, the most frequented activities include boat fishing (54%), self-guided nature/wildlife viewing (31%), and bird watching (30%). Additionally, they bank fish (34%) and photograph nature or wildlife (31%).

In resource area D, as in area A, B, and C, the most frequented activities include boat fishing (52%) and self-guided nature/wildlife viewing (26%). Additionally, they participate in crabbing (40%), photograph nature or wildlife (24%), and bank fish (23%).

While the majority of the possible activities across locations have overall participation of around 50%, environmental field trips, crabbing, and photography each have less than 50% participation (22%, 28%, and 38%, respectively). Other locations near the Rappahannock River where residents participate in these activities can be found in Table 3 in Appendix A.

Community Communication, Civic Engagement, and Trust

In communicating with the public, it is important to understand how individuals participate in natural resource decisionmaking and ways in which they commonly obtain information on these topics. It is also important to understand their familiarity and confidence in the managing

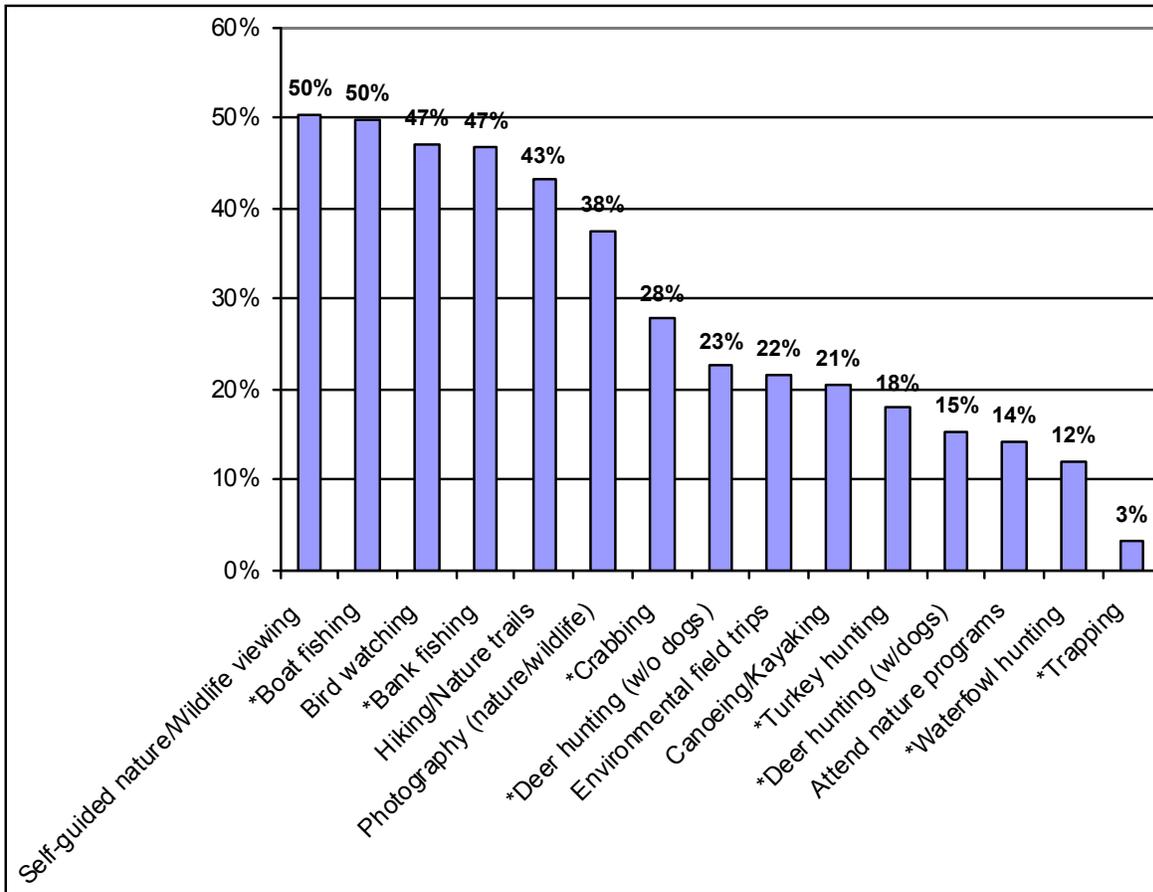


Figure 3. Percentage of community residents of Rappahannock River Valley who participate in specific recreation activities near their home. (Activities with asterisks are considered consumptive use activities and those with no asterisk are considered nonconsumptive use activities.)

organizations. In an effort to better understand these issues, we asked respondents about their engagement in natural resource issues, how much they rely on specific sources for news and information about natural resources along the Rappahannock River, and their familiarity and confidence with organizations that address natural resource issues along the river, including Rappahannock NWR.

Communication

Respondents were asked how much they rely on specific sources that fell into two categories of news and information about river resources: those sources that involve one-way communication (where information is transferred in one preassigned direction) and those that involve two-way communication (where there is an exchange of information which includes conveying and receiving of ideas).



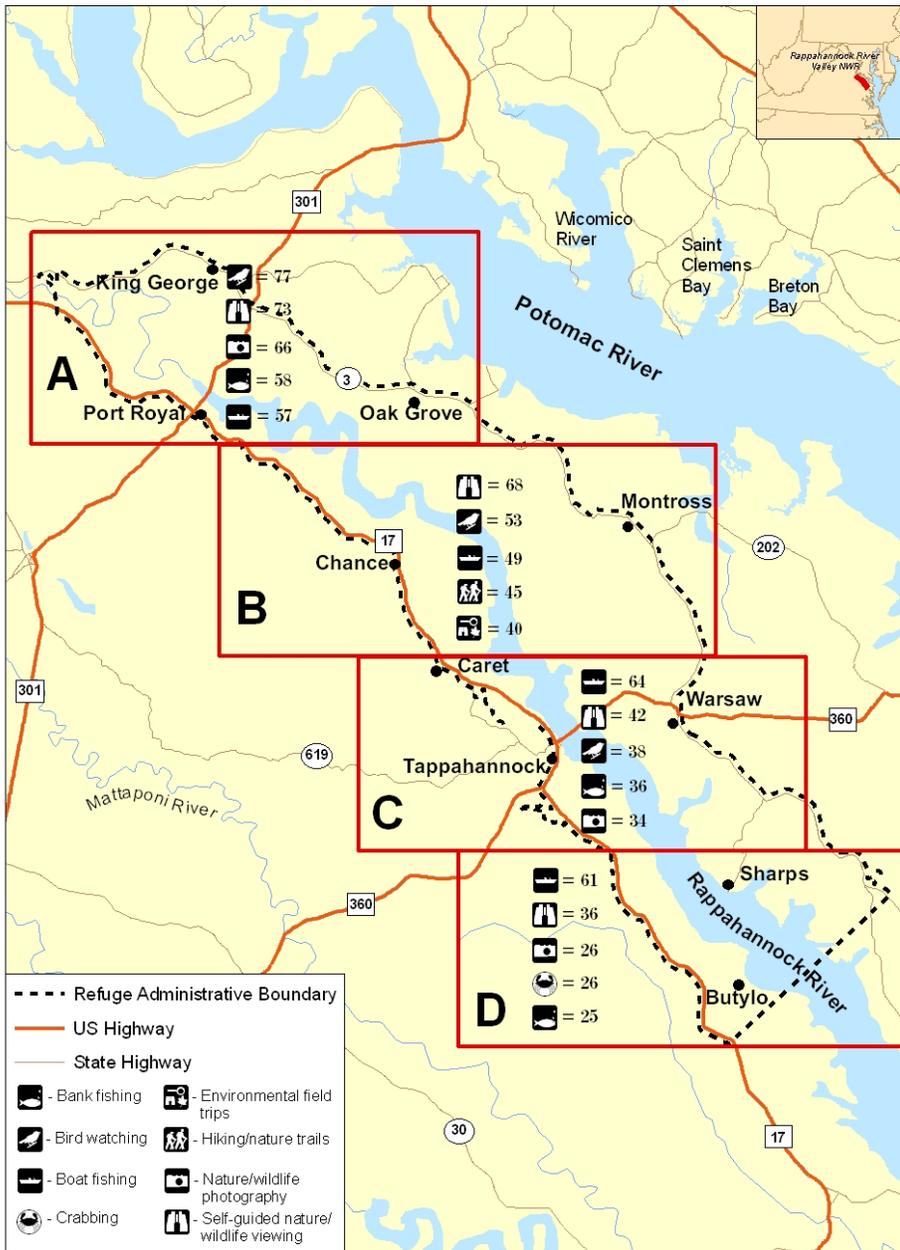
Rappahannock River Valley National Wildlife Refuge

Caroline, Essex, King George, Lancaster, Middlesex, Richmond, and Westmoreland Counties, Virginia

From Rappahannock River Valley National Wildlife Community Survey conducted in 2005

by U.S. Geological Survey/Fort Collins Science Center.

Community participation in recreation activities along the Rappahannock River. Numbers are number of people who participate within each area along the river. Only the top 5 activities are listed.



Produced in the Division of Realty, Hadley, Massachusetts
 Land Status Current to: 06/09/2005
 Base map: USGS 1:250,000 topographic map
 Refuge boundaries: compiled from USFWS sources
 Datum & Projection: NAD_1983_UTM_Zone_18N
 Map Print Date: 9/1/2005



This map is designed for refuge management.
 It is not intended for use as a land survey or
 as a representation of land for convenience or tax purposes.
 For more information visit the USFWS Northeast Region GIS
 website at <http://northeast.fws.gov/gis/>

Figure 4. Community participation in recreation activities along the Rappahannock River. Numbers are number of people who participate within each area along the river. Only the top five activities are listed.

While the majority of Rappahannock River Valley residents do rely on many common forms of one-way communication (for example, newspapers, magazines, printed information from government, TV, radio; fig. 5), mean scores suggest they do not rely on these sources individually a great deal (fig. 6). The exception to this is newspapers, which residents rely on some, particularly the *Freelance Star* (27% of those who use newspapers indicated they read this paper) and the *Rappahannock Record* (26%).

Interestingly, residents' reliance on two-way communication is even less than one-way sources, with interactions with relatives, friends, or neighbors being the only noteworthy source (51% of residents rely on this source, mean = 2.4; fig. 6).

When comparing hunters with nonhunters, hunters tend to rely more heavily on printed materials from government entities ($F = 16.45, p < .001, \eta = .222$)³ and natural resource professionals ($F = 22.78, p < .001, \eta = .256$). Because hunters interact with game wardens and other staff of the Virginia Department of Game and Inland Fisheries, this should come as no surprise. Similarly, those finding consumptive use services more desirable tend to rely more heavily on these two sources ($r = .24$ and $.26$, respectively). Conversely, those residents finding nonconsumptive use services more desirable tend to rely more on printed materials from private entities ($r = .24$), displays and exhibits ($r = .21$), and interaction with refuge staff ($r = .20$).

³The F-statistic is used in analysis of variance statistics with interval-level data to test for significant differences in means (Nunnally and Bernstein, 1994). Eta (η) is a measure of effect size, or the strength of the association between variables. It tells how much of the dependent variable can be explained by the independent variable (Snyder and Lawson, 1993).

⁴The "r" value is Pearson's correlation, representing the degree to which two variables are related (Nunnally and Bernstein, 1994).

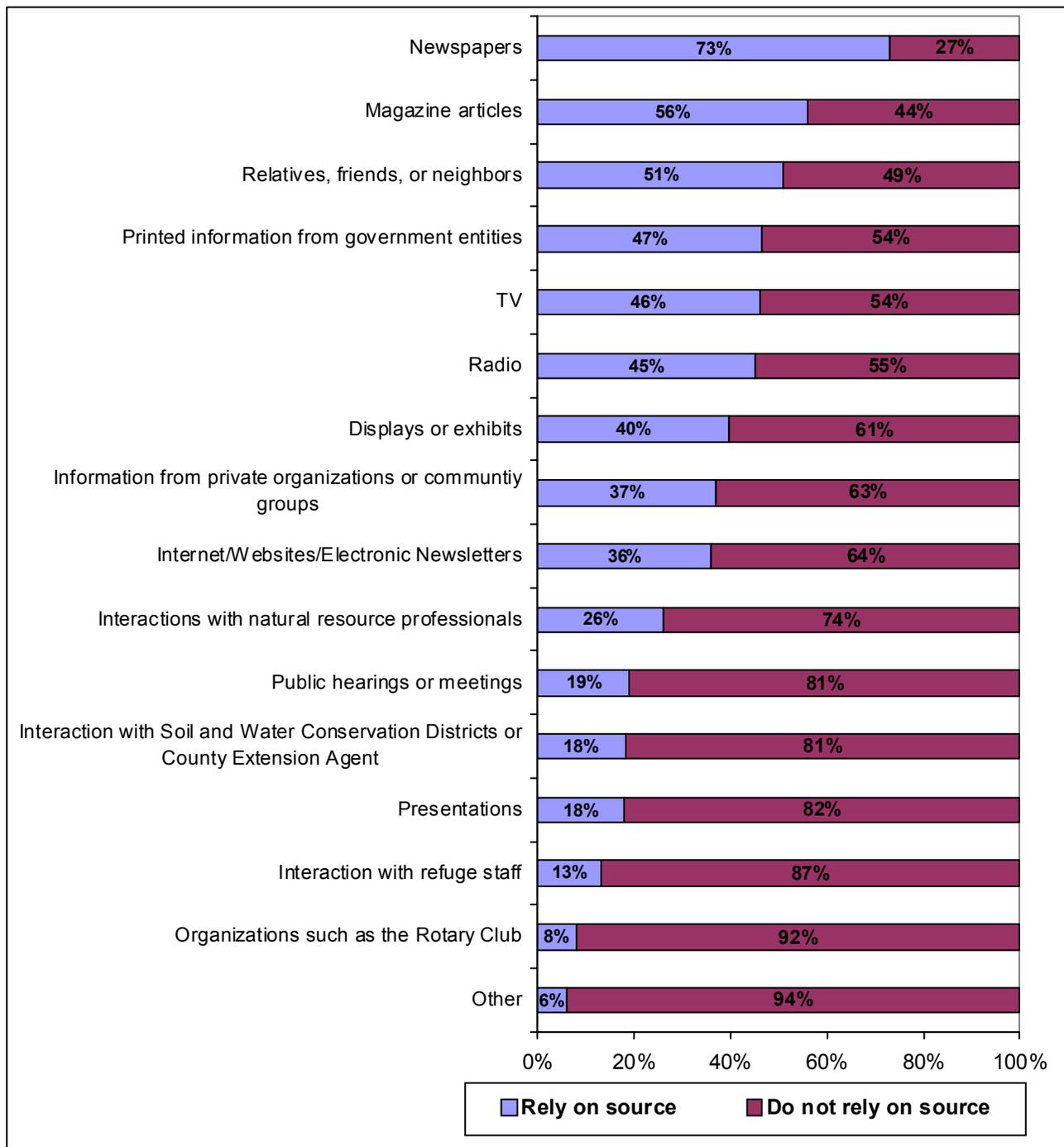


Figure 5. Degree to which community residents of Rappahannock River Valley rely on sources for news and information about natural resources along the Rappahannock River. (Responses were collapsed from original 4-point scale, where 1 = source not used at all and 2 = not much represent were coded as “Do not rely on source,” and 3 = some and 4 = a great deal represent were coded as “Rely on source.”)

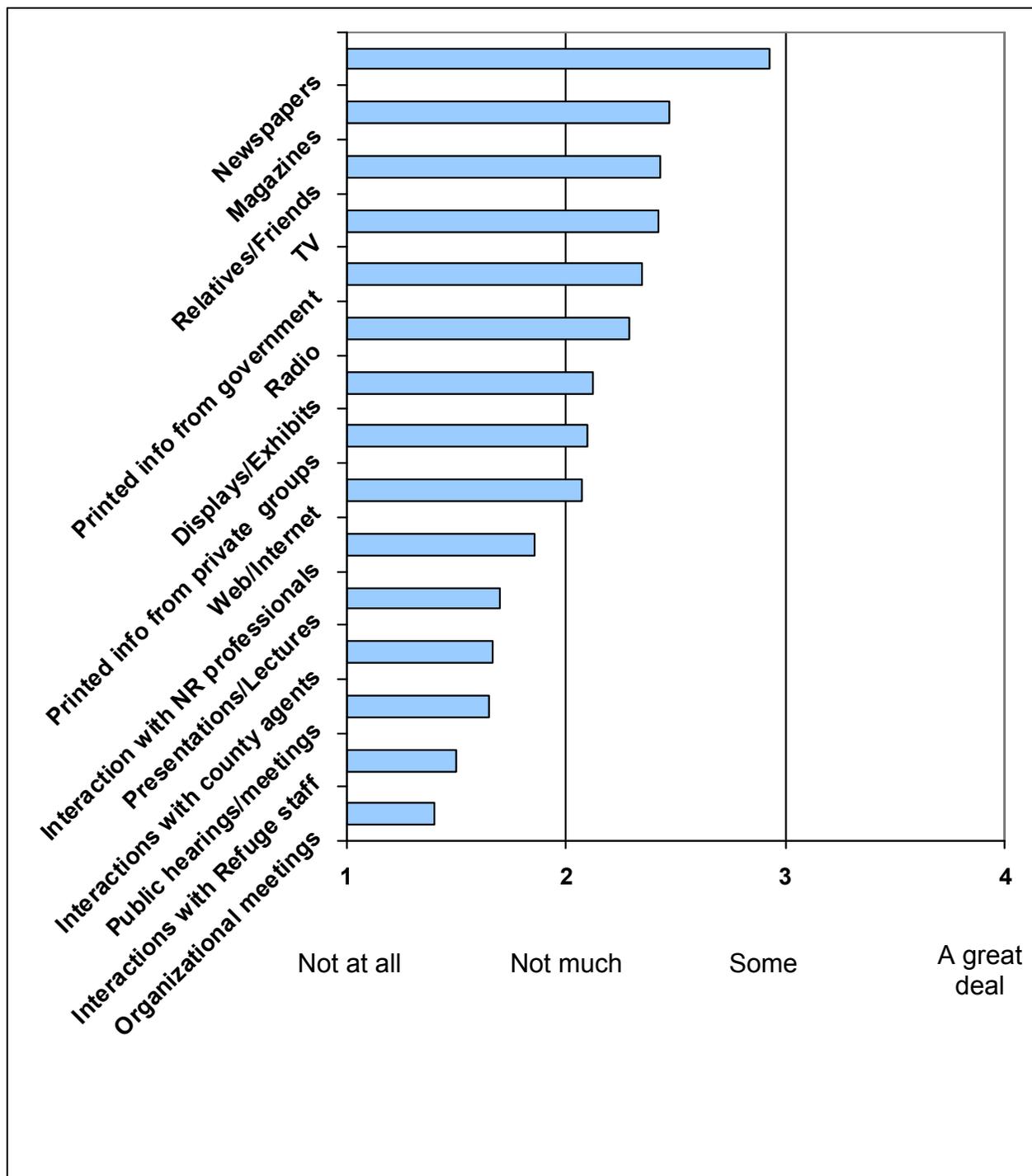


Figure 6. Rappahannock River Valley residents' mean reliance on sources of information about natural resources along the Rappahannock River.

Civic Engagement in Natural Resource Decisionmaking

Community residents have had limited involvement in natural resource issues over the past 5 years (fig. 7), with only 50% of residents engaging in at least one of the activities listed. Of those, the mean number of activities was 1.5. There appear to be no differences in level of civic engagement between hunters and nonhunters, nor are there relationships between desirability of either consumptive or nonconsumptive use services and civic engagement.

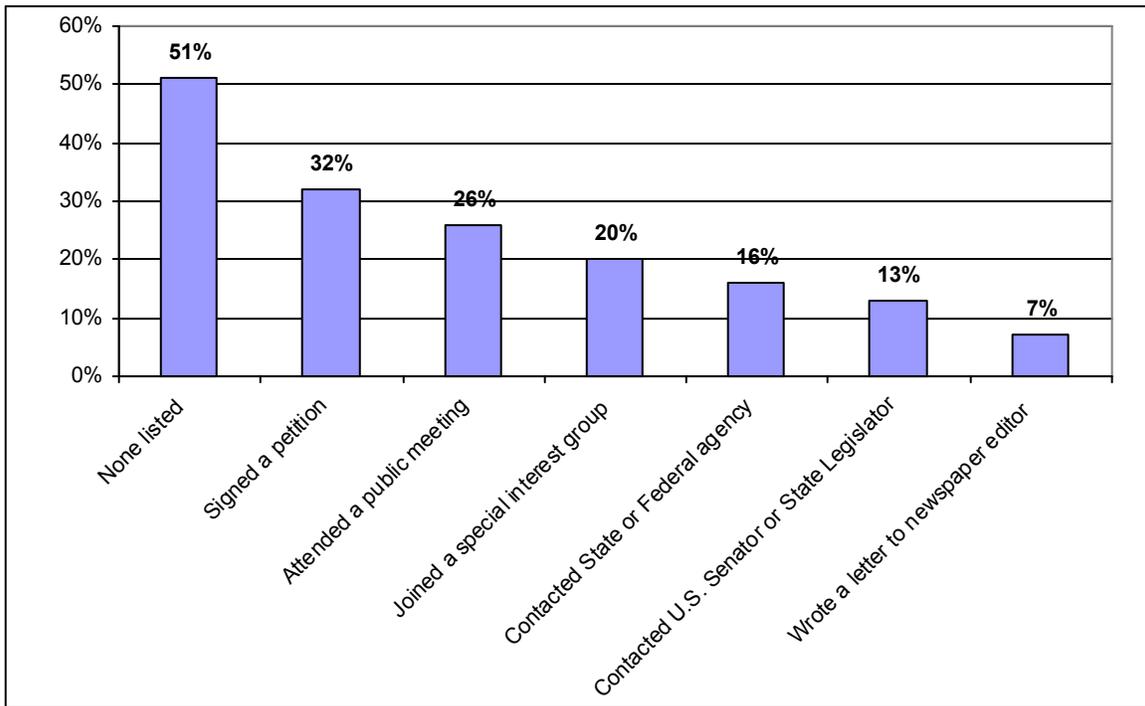


Figure 7. Rappahannock River Valley residents' engagement in natural resource decisionmaking.

Familiarity with and Confidence in Natural Resource Organizations

Community residents have low familiarity with all key organizations involved in natural resource issues along the Rappahannock River (fig. 8). Interestingly, the organization they are the most familiar with received the lowest confidence rating (county government). All other organizations fell in the negative familiarity/positive confidence quadrant of the familiarity/confidence graph. While the lack of familiarity with these organizations may be disheartening to managing agencies such as U.S. Fish and Wildlife Service, it appears opportunities do exist for positive public relations, as confidence is above the neutral mark. However, because there is limited understanding of the role, purpose, or mission with these groups, they may risk losing the “luke-warm” confidence that they have. These groups can work to improve public understanding of the organizational role, while at the same time building on the existing organizational confidence that exists (as opposed to having to simultaneously “mend fences”).

Those respondents who found consumptive use services more desirable tend to be more familiar with State agencies ($r = .21$), though they did not have any more confidence in them. Those respondents who found nonconsumptive use services more desirable tend to have more confidence in land trusts ($r = .24$) and Rappahannock NWR ($r = .24$), though not more familiarity. There were no meaningful differences between hunters and nonhunters on either familiarity or confidence.

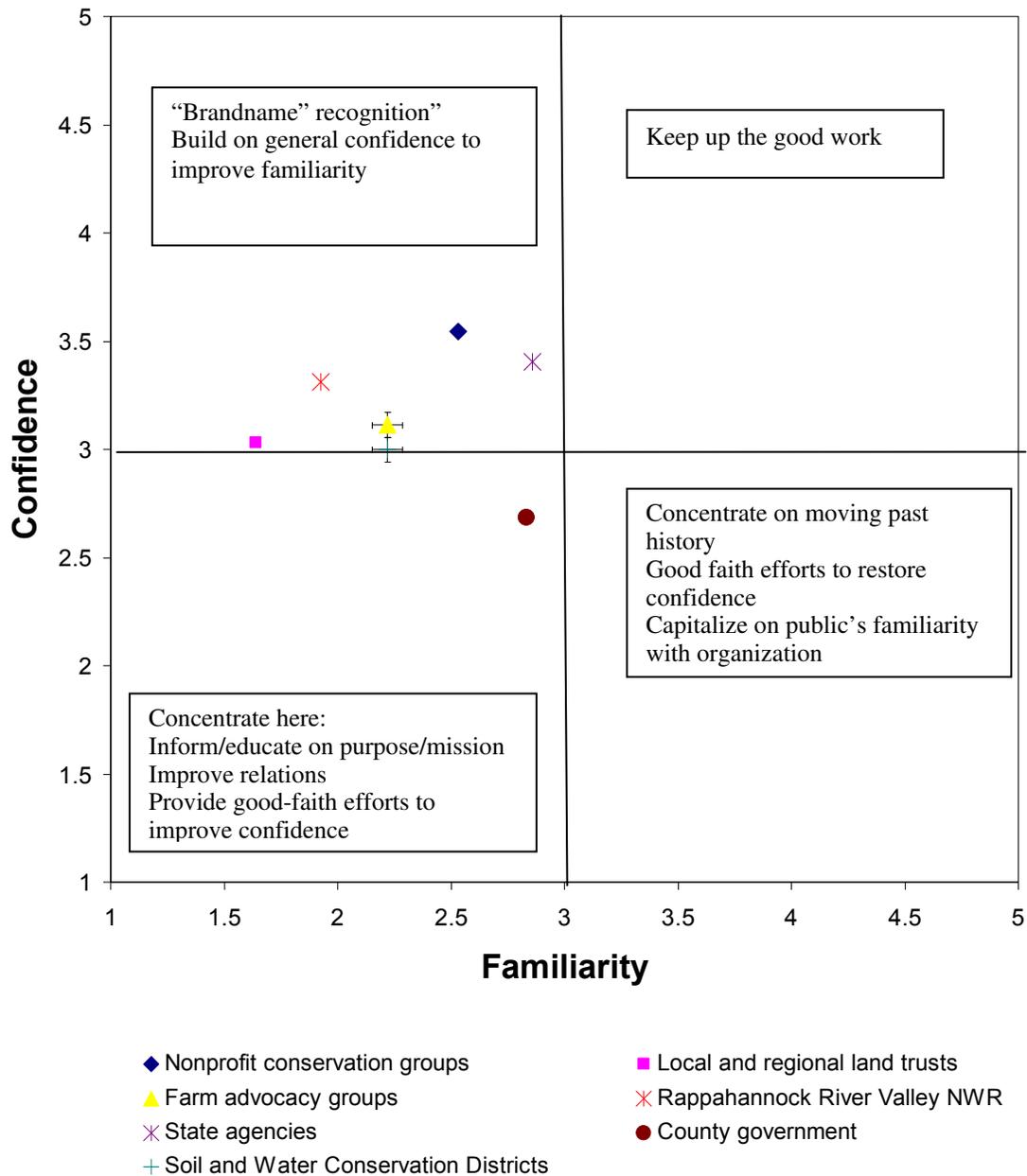


Figure 8. Rappahannock River Valley residents' familiarity and confidence of key organizations and agencies who address natural resource issues along the Rappahannock River. (Familiarity was measured using 4-point scale, where 1=not familiar and 4 = very familiar; this scale converted to 5-point scale for analysis. Confidence was measured using 5-point scale, where 1 = no confidence and 5 = great deal of confidence.)

Community Understanding of the Refuge

An important component of this survey was to better understand community resident knowledge of refuge issues. Because of the newness of the refuge and its only having been open to the public since 2004, there was a perception by the refuge and planning staff that most residents were not aware of the refuge and did not clearly understand the refuge's purpose and the mission of the refuge system. In addition, because the refuge is actively pursuing the acquirement of new lands within its acquisition boundary, either through conservation easements or full title purchase, staff wanted to know the level of knowledge residents had regarding issues surrounding land acquisition.

Awareness

About half of Rappahannock River Valley residents sampled were aware of Rappahannock NWR. Though not a meaningful statistical difference, hunters are more familiar than nonhunters (57% vs. 44%). Factors measured in the survey that contribute to awareness of the refuge include civic engagement in natural resource issues and participation in certain activities along the river.

The more civic engagement activities residents had participated in over the past 5 years, the more aware they were of the refuge ($F = 26.48$, $p < .001$, $\eta = .27$). In particular, if residents had participated in the following activities, they were more likely to be aware of the refuge: contacted a State or Federal agency (73% vs. 45%; $\chi^2 = 13.41^5$, Cramer's $V = .21^6$), attended a public meeting (70% vs. 42%; $\chi^2 = 18.82$, Cramer's $V = .24$), and signed a petition (66% vs. 41%; $\chi^2 = 18.04$, Cramer's $V = .24$).

Residents participating in the following activities along the Rappahannock River tend to be more aware of the refuge: waterfowl hunting (78% vs. 44%; $\chi^2 = 12.56$, Cramer's $V = .21$, bank fishing (58% vs. 38%; $\chi^2 = 12.23$, Cramer's $V = .20$), self-guided wildlife viewing (65% vs. 32%; $\chi^2 = 33.98$, Cramer's $V = .34$), and birdwatching (58% vs. 38%; $\chi^2 = 12.58$, Cramer's $V = .20$). Though a less meaningful relationship, it is worth noting that those participating in hunting with dogs are more aware of the refuge (67% vs. 42%; $\chi^2 = 9.48$, Cramer's $V = .18$).

Those aware of the refuge are also more familiar with all agencies involved in natural resource issues along the river ($F = 14.70 - 165.33$, $p < .001$, $\eta = .21-.58$) and have greater confidence in the refuge ($F = 13.23$, $p < .001$, $\eta = .22$).

Knowledge

On average, residents indicated they knew "very little" about Rappahannock NWR and its management before receiving the survey (on a 5-point scale, where 1 = not at all and 5 = a great deal), with 78% indicating they knew nothing or very little. Hunters reported knowing more than nonhunters, but their self-reported knowledge is still "very little," on average.

Residents objective, or actual, knowledge about the refuge purpose and National Refuge System mission is 72% (with 3.6 answers out of 5 correct, on average); this is in the "C" range if evaluating scores like one would for an academic test (table 5 and fig. 9). However, well over three-quarters of residents know the establishing purpose of the refuge and the primary mission of the National Wildlife Refuge System, and over half know more specific details about refuge mission and management. Though a "C" average indicates knowledge about refuge purpose and mission may be lacking, the broader information appears to be well understood.

⁵The Chi-square statistic (χ^2) is a measure of differences between two nominal categorical variables (Nunnally and Bernstein, 1994).

⁶Cramer's V is a measure of the degree of association between two nominal categorical variables, in this case, yes/no (Nunnally and Bernstein, 1994).

Table 5. Rappahannock River Valley residents’ knowledge regarding Rappahannock National Wildlife Refuge, National Wildlife Refuge System mission, and land acquisition. (Respondents answered a series of True/False and multiple choice questions.)

Question	Correct (%)
Refuge Purpose and Mission	
When looking to obtain land for the Refuge, wetland habitat is a high priority. (True)	91
Rappahannock River NWR was originally established to <i>protect migratory birds, wetlands, and endangered species</i> .	87
The primary mission of the National Wildlife Refuge System is <i>to protect and improve fish and wildlife and their habitats</i> .	84
The Refuge has been in existence for 10 years. (True)	65
The Rappahannock River NWR is managed by <i>the U.S. Fish and Wildlife Service</i> . ^a	60
The Refuge is supposed to provide for wildlife conservation and public recreation equally. (False)	55
Land Acquisition and Ownership	
Conservation easements acquired by the Refuge allow most current land uses like farming and hunting to continue, but may restrict development. (True)	88
The number of acres planted in grain (corn, winter wheat, and soybeans has decreased significantly in the counties where the Refuge has purchased land). (False)	70
The National Wildlife Refuge System policy for obtaining land includes all methods except <i>taking land from unwilling sellers through condemnation</i> . ^b	68
Public review is not required for the Refuge to purchase acreage from willing sellers beyond the originally approved acreage. (False)	54
The percentage of Refuge lands currently in conservation easements is <i>about 15%</i> . ^c	46
When the Refuge was established, it was approved to protect up to 20,000 acres. ^d	44
The percentage of the Refuge lands acquired through full ownership title purchase were previously agricultural lands is <i>about 25%</i> . ^e	41
The approximate acreage of cropland adjacent to the Rappahannock River in Caroline, Essex, King George, Richmond, and Westmoreland counties is <i>155,000 acres</i> . ^f	31
The total current acreage of the Refuge, including conservation easements, is approximately <i>7,500 acres</i> . ^g	29

^aThe second most often chosen answer was Virginia Department of Game and Inland Fisheries. (21%)

^bThe second most often chosen answers were purchasing full ownership title from willing sellers. (14%)

^cThe second most often chosen answer was about 30%. (31%)

^dThe second most often chosen answer was 7,500. (27%)

^eThe second most often chosen answer was less than 5%. (27%)

^fThe second most often chosen answer was 300,000. (36%)

^gThe second most often chosen answer was 13,000 acres (28%) and 20,000 acres. (28%)

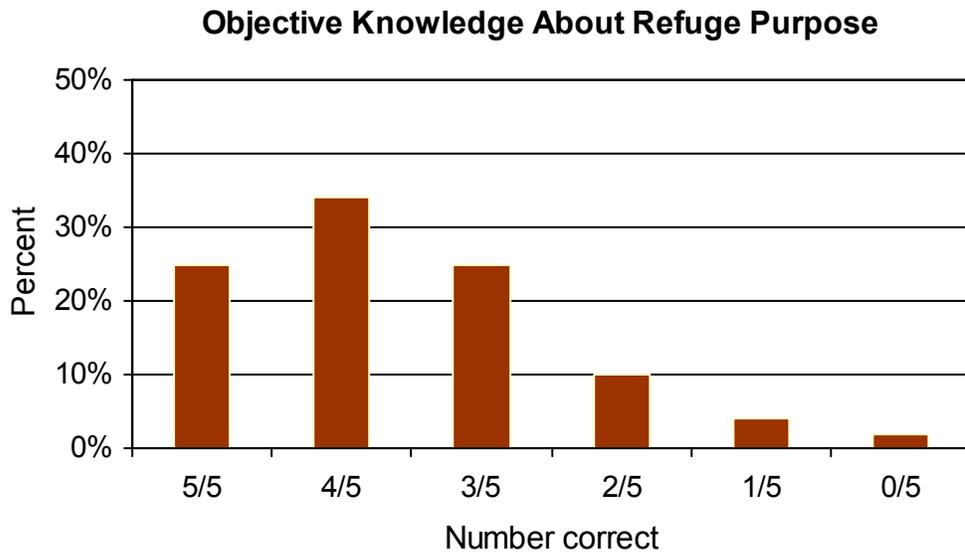


Figure 9. Rappahannock River Valley residents’ actual knowledge of Rappahannock National Wildlife Refuge purpose and National Refuge System mission.

Residents’ knowledge about land-acquisition issues was lower, with residents getting 4.2 answers out of 9 correct, on average (a failing score of 47%; table 5 and fig. 10). Looking at the more general questions, however, nearly 90% of residents correctly stated that most existing land uses can continue to occur on conservation easements. Around two-thirds correctly stated that condemnation is not a policy for obtaining lands, though one out of seven residents does not recognize that purchasing land through full title *is* an employed method by the National Wildlife Refuge System. Residents are much less certain about whether public review is required for land purchase.

There is much uncertainty regarding agricultural lands. About half believe the acreage of cropland adjacent to the river is greater than the actual 155,000 acres. About one-third of residents have the misperception that the percentage of agricultural lands acquired through full ownership title purchase is greater than the actual 25% (about one-fourth think it is less). However, a little over two-thirds of residents correctly answered that the number of acres planted in grain in counties where the refuge has purchased land has not decreased. This would indicate while most do not believe the grain acreage has decreased, there is a misperception that available cropland is greater than it actually is. There is mixed perception on how much of that land the refuge has acquired (40% answering correctly (that it is 25%), 27% believing it is less, and 32% believing it is more).

There is also much uncertainty about the refuge boundary and refuge land ownership. A little over half of residents think that the original acquisition boundary was less than the actual 20,000 acres, though the same percentage believes the current acreage of the refuge is greater than the actual 7,500 acres. About half of residents correctly answered the percentage of refuge lands in easement (46% knew it was 15%), though about one-third think more land is in easement (30%).

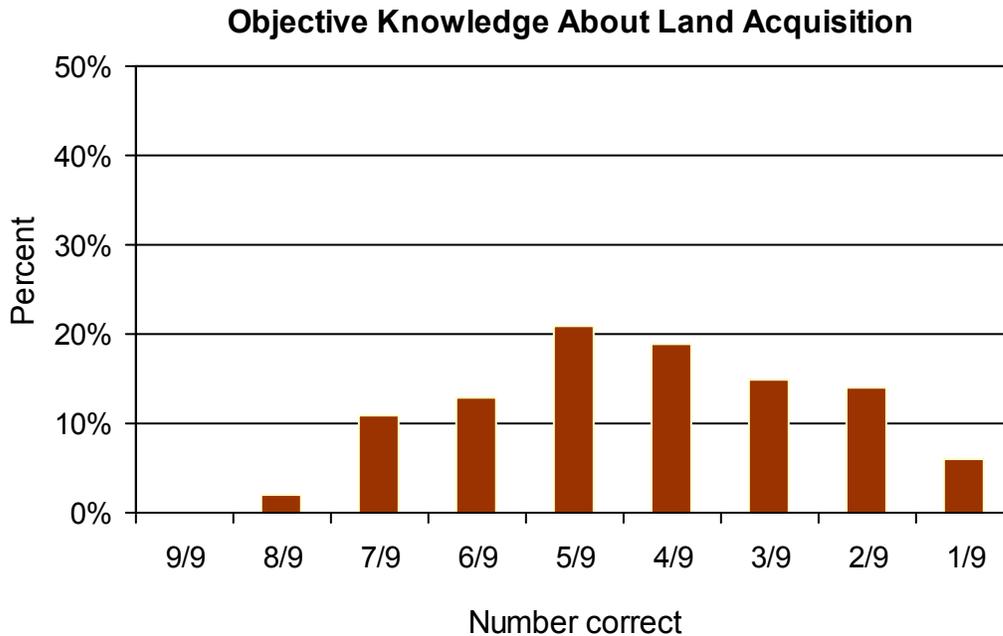


Figure 10. Rappahannock River Valley residents’ actual knowledge of land acquisition and land ownership.

Residents do not appear to know whether most activities are permitted or not permitted on the refuge (fig. 11). Nearly all residents, however, did correctly indicate that photography is permitted and about two-thirds know fishing is permitted. About two-thirds also know dogs off leash are not allowed on the refuge. Less than half know that collecting items such as artifacts, plants, or insects is not permitted and about one-third are not sure. Interestingly, only about one-third realize hunting is permitted on the refuge, with an equal number unsure if this activity is permitted or not. Residents seem the most ill-informed about beach use, horseback riding, and camping or picnicking, with only one-fourth or less realizing these activities are not permitted, a large percentage being unsure about beach use and horseback riding, and the majority believing camping and picnicking are allowed on the refuge.

More nonhunters than hunters know that dogs are not permitted on the refuge without a leash, with about half of hunters (47%) believing they are allowed as compared to only 11% of nonhunters ($\chi^2= 15.92$, $p \leq .001$, Cramer’s $V = .23$; fig. 12). Very few hunters were unsure about this rule, whereas about one-fourth (23%) of nonhunters were unsure. Conversely, more nonhunters incorrectly believe camping and picnicking are allowed (61% for nonhunters vs. 38% for hunters; $\chi^2= 13.47$, $p = .001$, Cramer’s $V = .21$).

Additionally, those who were aware of the refuge before receiving the survey are more knowledgeable about the refuge ($F=11.03$, $p = .001$, $\eta = .18$). Those with more knowledge about refuge purpose and land acquisition tend to have higher confidence in the refuge ($r = .28$).

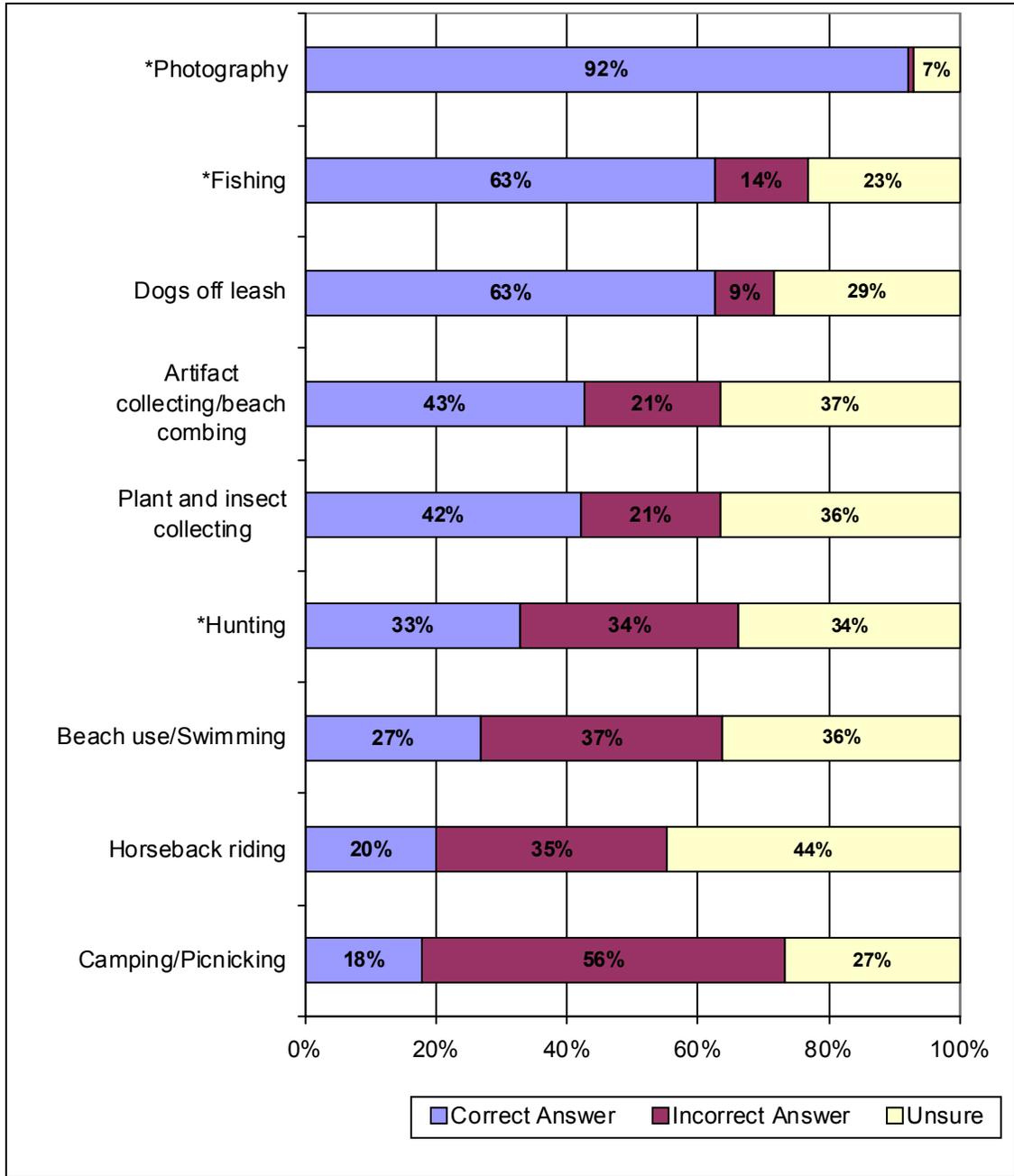


Figure 11. Rappahannock River Valley respondents' knowledge of permitted activities on the Rappahannock National Wildlife Refuge. Asterisk indicates activities that are allowed on the refuge.

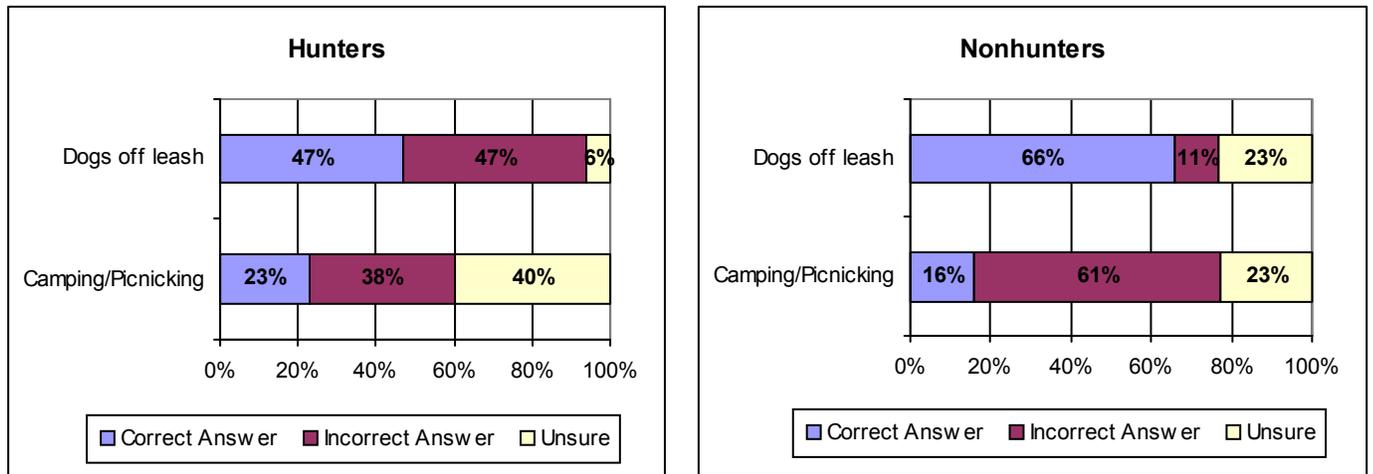


Figure 12. Comparing hunters' understanding of activities that are allowed or not allowed on Rappahannock National Wildlife Refuge to that of nonhunters.

Community Preferences for Future Services

We asked respondents to rate their desire (on a scale from 1 to 4, with 1 being not at all desirable and 4 being very desirable) for specific priority public use activities and services as identified by the Refuge Improvement Act and other compatible services that may be considered in the future (fig. 13). We then asked residents the general location they would prefer seeing each service offered (referring to a map divided into four areas, consistent with resource concentration areas identified by refuge staff).

Educational information on historic sites had the highest mean desirability, followed by fishing opportunities, access for people with disabilities, viewing areas with information about wildlife habitats, restrooms, and a website with information about the refuge and its activities.

The first two were uniformly desirable across all the areas listed on the accompanying map (fig. 14), while the latter three of the top five desirable services varied from location to location. The Rappahannock River Valley National Wildlife Refuge Visitor Services Review (2005) mentioned many of these activities under current conditions and recommendations. Two exceptions were educational information on historic sites and a website with information about the refuge and its activities. Findings suggest that in addition to environmental education, information on the historical nature of refuge sites would be well accepted by the community. The mean desirability of other services listed and prevalence of individuals who indicated high desirability for these indicate that the recommendations of the Visitor Services Review and Alternatives Matrix could be well received.

The position of hunting opportunities in ranking of mean desirability should be noted. The four hunting activities that were suggested were not as highly desirable on average as other services mentioned, but this should not be interpreted as a low interest in hunting. Upon comparison of mean desirability scores, significant differences were found between hunters and nonhunters (fig. 15).

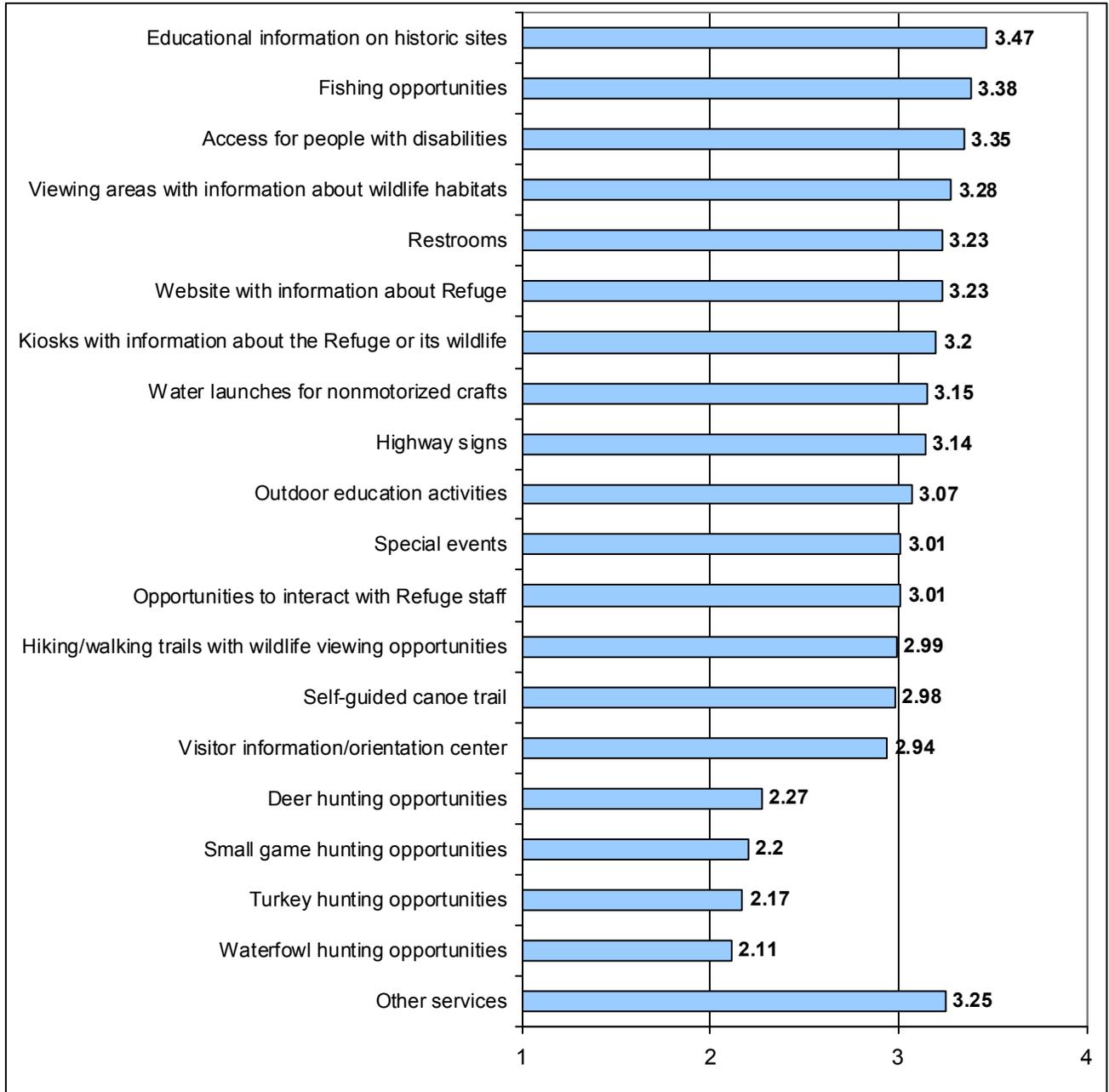


Figure 13. Rappahannock River Valley residents' mean desirability to see services offered by Rappahannock River Valley National Wildlife Refuge. Responses were coded from 1 (not at all desirable) to 4 (very desirable).



Rappahannock River Valley National Wildlife Refuge

Caroline, Essex, King George, Lancaster, Middlesex, Richmond, and Westmoreland Counties, Virginia

From Rappahannock River Valley National Wildlife Community Survey conducted in 2005

by U.S. Geological Survey/Fort Collins Science Center.

Community desirability for offering of recreation services on the Rappahannock River Valley National Wildlife Refuge. Numbers are number of people desiring the service within each area along the river. Only the top 5 services are listed.



Figure 14. Community desirability for recreation services along the Rappahannock River. Numbers are number of people who desire each service within each area along the river. Only the top five activities are listed.

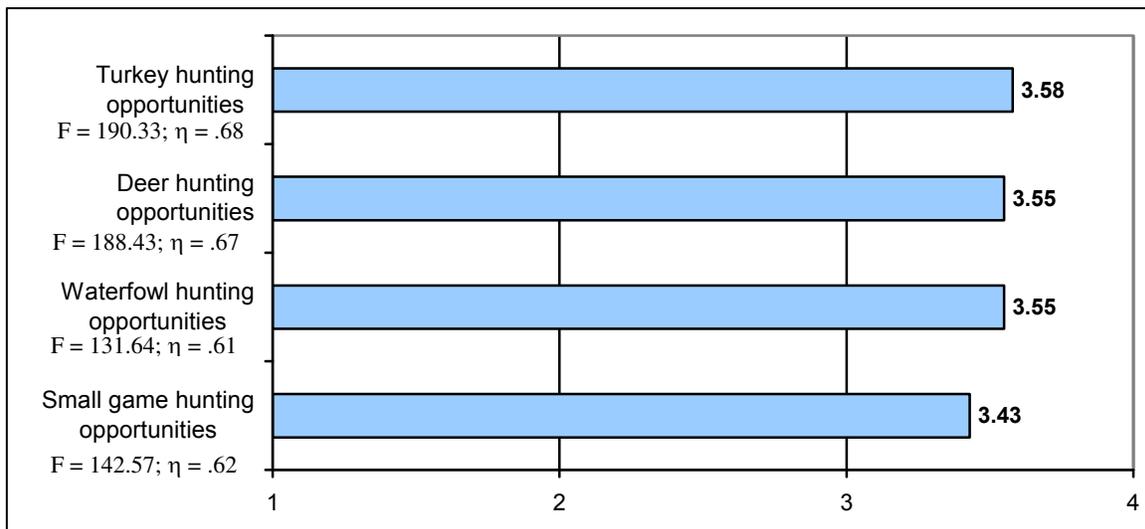


Figure 15. Hunters’ mean desirability to see hunting activities offered by Rappahannock River Valley National Wildlife Refuge. Responses were coded from 1 (not at all desirable) to 4 (very desirable).

Willingness to Pay Fees for Services

Related to residents’ desirability for future services, we asked their willingness to pay for services. Though in principle, many (42%) believe they should not have to pay a fee to visit a National Wildlife Refuge and 35% are not sure, the majority are willing to pay fees for educational programs, special events, and maintenance of facilities they use (fig. 16). Only around 40% of residents would be willing to pay for hunting, fishing, or crabbing activities.

There were interesting relationships between desirability of future services and willingness to pay fees (table 6). As desirability for nonconsumptive use services increased, willingness to pay fees for all services asked about, including consumptive use services (programs, maintenance of facilities and hunting/fishing/crabbing) increased. Conversely, as desirability for consumptive use services increased, willingness to pay fees increased for the consumptive use services of hunting, fishing, and crabbing activities.

Overall willingness to pay fees for services (fee scale; see Data Analysis and Measurement of Concepts) was correlated with many of the nonconsumptive use services residents were asked about in the survey, yet none of the consumptive use services listed (table 7). It can be inferred from tables 6 and 7 that those desiring nonconsumptive use services are generally willing to pay fees for these services.

In addition to the relationship between desirability of services and willingness to pay fees, knowledge about the refuge also appears to be related. For all three fee questions, as total knowledge increases, willingness to pay for services increases. A negative relationship was found between total knowledge and the statement “I should not have to pay to visit this refuge or any other national wildlife refuge,” ($r = -.13$) indicating those with less overall knowledge about the refuge are more likely to agree with the sentiment that they should not have to pay to visit a refuge.

Relationships were found between willingness to pay a fee to support facility maintenance and familiarity with the refuge ($r = .24$) and confidence in the refuge to address natural resource issues along the Rappahannock River ($r = .32$). There was also a substantial correlation between willingness to pay for programs and confidence in the refuge ($r = .33$). Those with more confidence in the refuge are more willing to pay fees for facilities and programs.

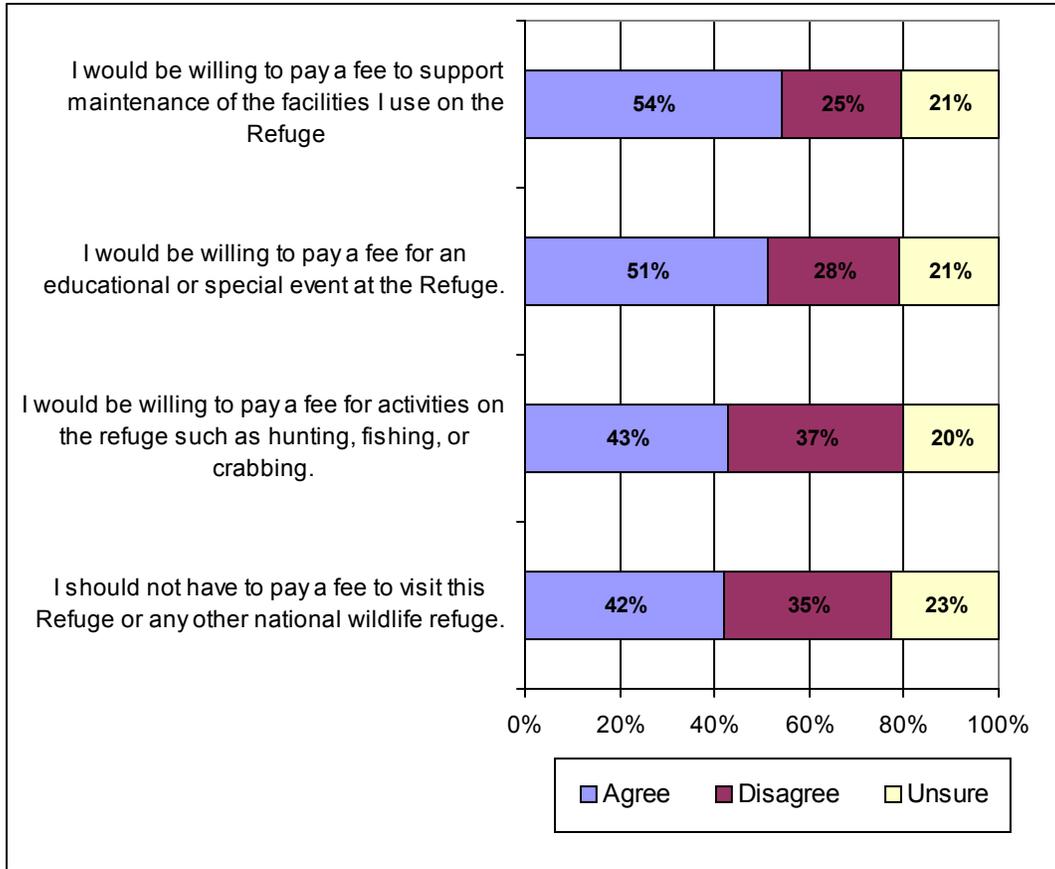


Figure 16. Level of agreement with willingness to pay for future services, where responses are collapsed into “agree,” disagree,” and “unsure.”

Table 6. Correlation between Rappahannock River Valley residents’ willingness to pay a fee for services offered at Rappahannock River Valley National Wildlife Refuge and desirability of future consumptive and nonconsumptive use services.

Fee paying	r	
	Nonconsumptive	Consumptive
Willing to pay a fee for activities on the Refuge such as hunting, fishing, or crabbing	.29	.31
Willing to pay a fee for an educational program or special event at the Refuge	.38	
Willing to a pay a fee to support maintenance of facilities I use on the Refuge	.37	

Table 7. Correlation between Rappahannock River Valley residents’ desire for specific future recreation services at Rappahannock River Valley National Wildlife Refuge and overall willingness to pay a fee for services (fee scale).

Service	r^a
Water launches for nonmotorized crafts	.42
Self-guided canoe trail	.42
Special events	.36
Hiking/walking trails for wildlife viewing opportunities	.35
Visitor information/orientation center	.33
Opportunity to interact with Refuge staff	.32
Website with information about the Refuge and its activities	.31
Outdoor education activities	.30
Viewing areas with information about different wildlife habitats	.30
Educational information on historic sites	.30

^aDesirability was coded from 1 “not at all desirable” to 4 “very desirable”.

Community Preferences for Management of Refuge Lands

Rappahannock River Valley NWR staff was interested in investigating community preferences for the acquisition and management of refuge lands. Because the management of lands inherently includes tradeoffs, the following tradeoff factors were identified as important community considerations for land acquisition and management:

- access for hunting and fishing opportunities,
- access for wildlife observation opportunities,
- opportunities for development along rivers and creeks,
- plantings in fields or crops under the control of the refuge,
- the look of the overall refuge landscape, and
- the options for acquisition of available land (within the refuge acquisition boundary).

For each of these factors, different options were identified representing the possible range for that factor (table 8). For example, when looking at table 8 at the tradeoff for access for wildlife viewing opportunities, there are two options that might occur: access would increase, or access would remain the same.

To present the potential options for land management in a way that would allow respondents to make decisions with those tradeoff factors in mind, hypothetical scenarios were constructed. First, all possible combinations of factors and options were entered into an orthogonal design process in SPSS 14.0 in order to obtain the combination of factors that would maximize the information obtained from respondents without needing to use all possible combinations. This design methodically chooses factors, but in some cases, the combinations chosen cannot exist in reality (for example, fields planted in trees and grasses for many different wildlife throughout the year and the landscape is orderly and cultivated). The unrealistic scenarios were removed from the

Table 8. Factors and associated options comprising hypothetical future scenarios for land acquisition and management.

Factors		Options	
Access for hunting and fishing opportunities:	increases	remains the same	
Access for wildlife observation opportunities:	increases	remains the same	
Development opportunities along rivers and creeks:	increase	decrease	
Fields are planted with:	crops that may be used by Canada geese and Mallards in winter	trees and grasses for many different wildlife throughout the year	
The landscape is:	orderly and cultivated	wild and uncultivated	
Available land is:	acquired by the Refuge with full ownership rights	acquired by the Refuge with partial ownership rights (conservation easement)	not acquired by the Refuge

pool of potential scenarios, and the final survey included six scenarios (table 9). Respondents were asked to rate (on a 7-point scale) whether they found the scenario acceptable or unacceptable. A series of analyses was conducted to better understand community residents’ acceptability (or unacceptability) of the hypothetical scenarios and to gain insight into the factors having the greatest contribution to acceptability.

Acceptability of Hypothetical Management Scenarios

In an attempt to identify meaningful differences in agreement with these different scenarios, the “potential for conflict index” (PCI) was used (Manfredo, Vaske, and Teel, 2003). The PCI shows central tendency, dispersion, and form simultaneously and thus presents a concise indication of potential conflict for the scenario in question. The PCI is the ratio of scoring on either side of a neutral point. This analysis assumes that the greatest conflict would occur when responses are distributed between two extreme values on a scale (in this case, 50% strongly disagreeing and 50% strongly agreeing). This scenario would produce a PCI value of 1. If all responses were on one side of the neutral point (for example 100% agreeing), a PCI value of 0 would result. Graphically, a larger bubble represents a higher potential for conflict. In addition, the graph shows the distribution of the means (that is, where they fall on the agreement scale).

The mean scores for most of the hypothetical scenarios were above the neutral point, indicating general acceptability. The scenario with the highest mean acceptability was Scenario 1, followed by Scenario 4 and Scenario 3 (fig. 17). All of these involved an increase in wildlife observation opportunities, a decrease in development, and the acquisition of available land by the refuge. Scenario 5 had the lowest mean acceptability rating and was the only hypothetical scenario in which development opportunities along rivers and creeks increased. The potential for conflict index scores for all scenarios are low, and there are no scenario bubbles that straddle the neutral line (fig. 17). This indicates a relative agreement among community members about the acceptability of the scenarios. Figure 18 displays the percentage of respondents who rated the scenarios as acceptable or unacceptable, or who were neutral in their opinions.

Table 9. Hypothetical future scenarios presented in Rappahannock River Valley National Wildlife Refuge Community Survey.

Factor	Scenario					
	1	2	3	4	5	6
Hunting and fishing opportunities	Increase	Remain the same	Increase	Remain the same	Increase	Remain the same
Wildlife observation opportunities	Increase	Increase	Increase	Increase	Remain the same	Remain the same
Development opportunities	Decrease	Decrease	Decrease	Decrease	Increase	Decrease
Fields	Corn and wheat used by Canada geese and Mallards in winter	Trees and grasses for many different wildlife throughout the year	Trees and grasses for many different wildlife throughout the year	Trees and grasses for many different wildlife throughout the year	Trees and grasses for many different wildlife throughout the year	Corn and wheat used by Canada geese and Mallards in winter
Landscape	Orderly and cultivated	Wild and uncultivated	Wild and uncultivated	Wild and uncultivated	Wild and uncultivated	Orderly and cultivated
Available land	Acquired by Refuge with full ownership rights	Not acquired by Refuge	Acquired by Refuge with partial ownership rights (conservation easement)	Acquired by Refuge with partial ownership rights (conservation easement)	Not acquired by Refuge	Acquired by Refuge with partial ownership rights (conservation easement)

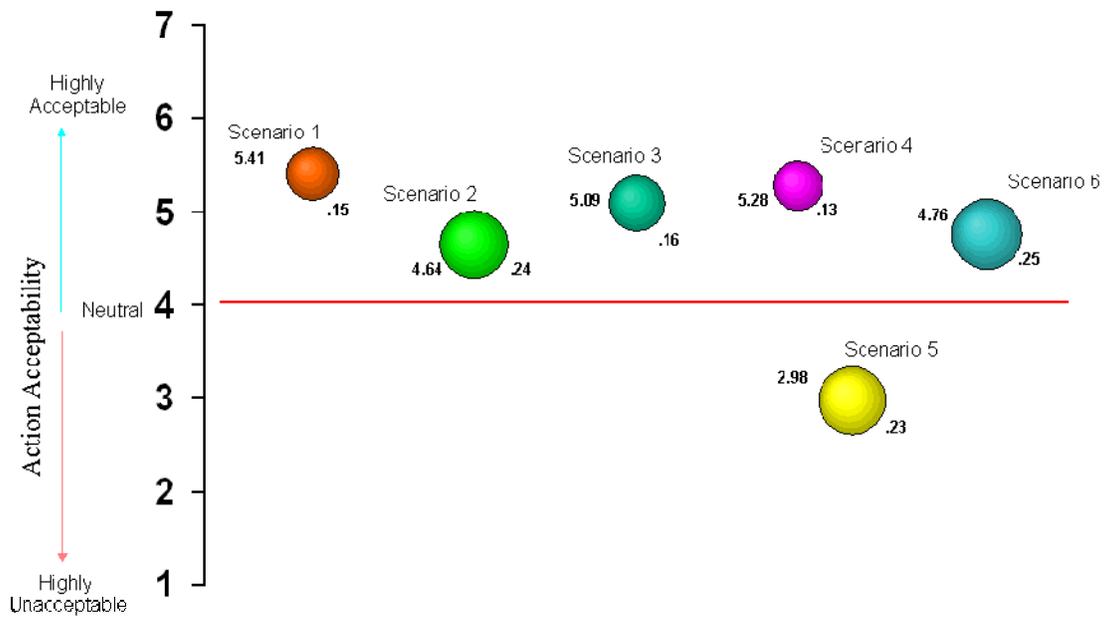


Figure 17. Potential for conflict index for hypothetical future scenarios.

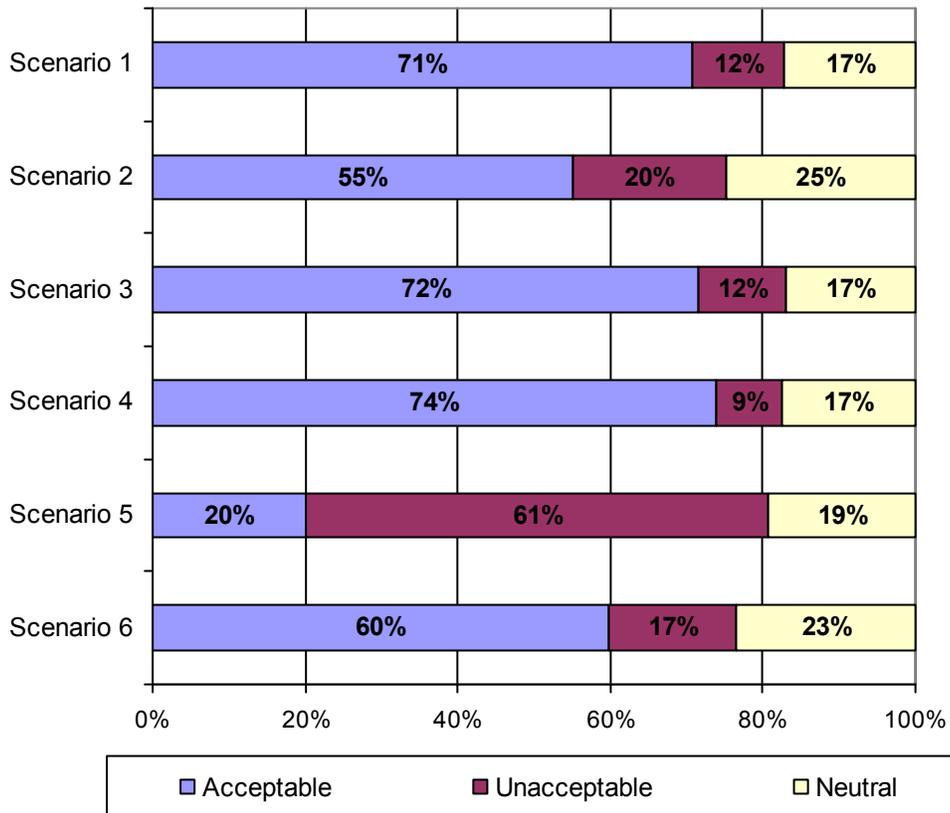


Figure 18. Rappahannock River Valley community members' acceptability of hypothetical future scenarios.

Influence of Specific Factors on Scenario Acceptability

Although the options within particular factors common among similarly acceptable scenarios might suggest certain factors that are influencing the scenarios' acceptability, there was interest in investigating the driving factors more empirically. The data were manipulated to make each factor in a scenario become an individual dichotomous variable. Land acquisition was converted into three separate dichotomous variables, each representing an acquisition option. For example, "access for hunting and fishing opportunities" became an individual dichotomous variable in which "remains the same" was coded as 0 and "increases" was coded as 1. These conversions allowed the factors to be analyzed independently as separate variables.

First, each factor was correlated with overall scenario acceptability (across all scenarios) in order to determine the relationship between each factor and acceptability and the direction of that relationship. All of the factors were significantly correlated with scenario acceptability, but some of the smaller correlations could be contributed to sample size (table 10). Development opportunities, the refuge not acquiring land, and wildlife observation opportunities were the most highly correlated with acceptability. The direction of the correlations, based on variable coding, indicate that acceptability increases as development opportunities decrease; the refuge acquires land; and wildlife observation opportunities increase.

These three variables were then put into a regression analysis to determine the relative effect of each one on acceptability. The regression model was significant ($F = 148.65$, $p < .001$) with 19% of the variance in acceptability explained by these variables. The standardized regression coefficients showed that the most influential variable was development opportunities, followed by the refuge not acquiring land, and wildlife observation opportunities (table 10).

Table 10. Correlations and regression model with overall scenario acceptability.

Scenario Attribute	r^a	Standardized beta ^a	r^2
			.19
Development opportunities ^b	.42	.27	
The refuge does not acquire available land ^c	-.32	-.13	
Wildlife observation opportunities ^d	.31	.10	

^a All correlations and standardized regression coefficients were significant at $p < .001$.

^b Variable was coded as 0 "increase" and 1 "decrease."

^c Variable was coded as 0 "available land is acquired" and 1 "available land is not acquired."

^d Variable was coded as 0 "remains the same" and 1 "increase."

Other Variables Influencing Scenario Acceptability

We hypothesized the following variables (in addition to the scenario factors) would affect scenario acceptability:

- length of time respondent had lived in the Northern Neck or Middle Peninsula,
- knowledge about the refuge,
- civic engagement,
- confidence in Rappahannock River Valley National Wildlife Refuge,

- information obtained from one-way information sources, and
- desirability of consumptive and nonconsumptive use services (scales).

When all of these variables (along with the scenario factors) were put into a regression model to attempt to explain variance in overall scenario acceptability, the explained variance increased to 22% (from 19% in table 10). As previously held true, development opportunities, the refuge not acquiring land, and wildlife observation opportunities had the greatest effect on the model. Community members who had more knowledge about the refuge and found non-consumptive services more desirable also had higher average overall scenario acceptability (table 11).

The hypothesized model was also tested on each scenario (without the scenario factors, as this was statistically impossible). This was done in order to understand the variables that may have been affecting individual scenarios, since these relationships could not be tested previously. The model was significant for Scenarios 1, 3, 4, and 5 (table 12). Nine percent of the variance in acceptability for Scenario 1 was explained with civic engagement, the use of one-way information sources, length of residency in the area, and refuge knowledge figuring significantly in the model. The less civic engagement activities respondents engaged in, the more they used one-way information sources, the less time they had lived in the Northern Neck or Middle Peninsula, and the more knowledge about the refuge they had, the more acceptable they found Scenario 1. Community members' acceptability of Scenario 3 increased as their use of one-way information and knowledge about the refuge increased and their level of civic engagement decreased. Scenario 4 was found to be more acceptable by people who had more confidence in the ability of Rappahannock River Valley NWR to address natural resource issues along the Rappahannock River, had more knowledge of the refuge, and had lived in the area a shorter amount of time. Finally, Scenario 5 was more acceptable to people who participated less in civic engagement, had less confidence in the refuge, and had lived in the area longer. While the amounts of explained variance are small in these models, they give insight into other factors contributing to acceptance of hypothetical management scenarios. These variables may be useful in identifying segments of the community that would be more or less accepting of future management actions.

Table 11. Regression model with overall scenario acceptability.

Scenario attribute/Independent variable	Standardized β	<i>p</i>	r^2
			.22
Development opportunities ^a	.29	< .001	
The refuge does not acquire available land ^b	-.12	< .001	
Wildlife observation opportunities ^c	.11	.001	
Knowledge	.08	.001	
Desirability of non-consumptive services	.06	.01	

^a Variable was coded as 0 “increase” and 1 “decrease.”

^b Variable was coded as 0 “available land is acquired” and 1 “available land is not acquired.”

^c Variable was coded as 0 “remains the same” and 1 “increase.”

Table 12. Regression models explaining variance in scenario acceptability.

Scenario	Significant variables entered	Standardized β	<i>p</i>	r^2
Scenario 1	Civic engagement	-.22	.001	.09
	One-way information	.16	.02	
	Length of time in area	-.14	.03	
	Knowledge	.13	.04	
Scenario 3	One-way information	.20	.002	.08
	Knowledge	.17	.008	
	Civic engagement	-.15	.03	
Scenario 4	Confidence in RRVNWR	.28	< .001	.15
	Length of time in area	-.17	.004	
	Knowledge	.14	.02	
Scenario 5	Civic engagement	-.19	.004	.08
	Length of time in area	.14	.02	
	Confidence in RRVNWR	-.14	.03	

By and large, community members seem to be accepting of any scenario that does not include the increase of development opportunities but does include the increase of wildlife observation opportunities. They want the refuge to acquire land but do not seem to have a preference for whether the acquisition is through full title purchase or conservation easements. Overall, people who know more about the refuge, have confidence in the refuge’s ability to manage the land around the Rappahannock River, have lived in the area less time, and have a greater desire to see non-consumptive services offered are more accepting of scenarios that would match recommendations made in the Visitor Services Review and management alternative matrix. Respondents who were more accepting of Scenario 5, which included the increase of development opportunities and the refuge not acquiring available land had lived in the area longer and were less confident in the refuge’s ability to manage land along the river.

Discussion of Key Findings

Community Resident Profile

Respondents have a long history in the area, having lived in the Northern Neck or Middle Peninsula, on average, between 31 and 32 years. About half of respondents indicated that their families have lived in the area at least two generations, and 10% stated that their families have been in the area five or more generations. The average age of respondents is 53 and most have completed high school and one year of college or technical school. Only 24 percent of respondents or their immediate family members make a livelihood from industries that may have ties to refuge activity. This percentage was representative of 74 respondents who have connections with a variety of combinations of the industries listed. It was hypothesized that knowledge about the refuge and the acceptability of management actions would be, in part, influenced by industry affiliations. There was, however, no effect of industry affiliations on either management actions or refuge knowledge.

Recreation Experience along the Rappahannock River

Around half of the respondents participate in self-guided nature or wildlife viewing, boat fishing, bird watching, and bank fishing along the Rappahannock River. Less than one-fourth of respondents participate in hunting activities. Nonconsumptive activities fell into the top five most frequently reported activities in each of the four resource areas adjacent to the refuge administrative boundary. Boat fishing was the only consumptive use activity that was among the five most popular in all areas. Bank fishing was among the most popular in three out of the four areas, and crabbing was listed in the southern most portion of the Rappahannock River bordered by the refuge. This information can aid refuge personnel in understanding where services can be most useful if offered or expanded in the future.

Communication about Natural Resources along the Rappahannock River

Rappahannock River Valley respondents rely mostly on one-way communication sources for news and information about natural resources along the Rappahannock River: however, they do not rely on these sources much. The exception to this is newspapers, which respondents indicated they use “some” to “not much.” The most frequently used newspapers are the *Freelance Star* and the *Rappahannock Record*. The main source of two-way communication is interactions with relatives, friends, or neighbors.

Hunters tend to rely more heavily on printed materials from government entities and natural resource professionals. This is most likely related to their interactions with game wardens and other staff of the Virginia Department of Game and Inland Fisheries. Similarly, those finding consumptive use services more desirable tend to rely more heavily on these two sources. Conversely, those respondents finding nonconsumptive use services more desirable tend to rely more on printed materials from private entities, displays and exhibits, and interaction with refuge staff. Knowing how residents communicate about natural resources along the river may allow refuge and planning staff to communicate more effectively with residents about key issues. Also, understanding differences in communication patterns between user groups can help to further effectively target communication and outreach efforts with those groups.

Civic Engagement in Natural Resource Decisionmaking

Community residents have had limited involvement in natural resource issues (civic engagement) over the past 5 years, with only 50% of respondents engaging in at least one of the activities listed. Civic engagement was a predictor in explaining support for the most acceptable scenario and least acceptable scenarios. The more civically engaged an individual was (the more activities they had participated in), the more likely they were to support scenarios involving an increase in wildlife viewing opportunities and a decrease in development, while the less civically engaged a person was, the more likely they were to support the scenario involving the increase in development opportunities.

Familiarity with and Confidence in Natural Resource Organizations

Overall, residents have low familiarity with the organizations involved in natural resource management along the Rappahannock River. They are most familiar with county government, but this is also the organization in which they have the least amount of confidence. Although they are not particularly familiar with the refuge (only around half were aware of it), there is indication of a fair amount of confidence in it. Hunters, especially waterfowl hunters, are more aware of the refuge than nonhunters. Among nonhunters, however, people who participate in bank fishing, self-guided

wildlife viewing, and bird watching are more likely to be familiar with the refuge. Those people who are more familiar with the refuge are more familiar with all organizations involved with natural resource issues along the Rappahannock River and have more confidence in the refuge. People who are more civically engaged in natural resource decisionmaking (for example, signed a petition, attended a public meeting, and so forth) were also more aware of the refuge. Similar to the finding with information sources, those people who have a greater desire for consumptive use activities are more familiar with State agencies, though they do not have more confidence in them than those desiring nonconsumptive uses. However, those people who find nonconsumptive uses more desirable do have more confidence in land trusts as well as in the refuge. The more confidence people have in the ability of Rappahannock NWR to manage resources along the river, the more accepting they are of scenarios for hypothetical future management that involve a decrease in development opportunities and the acquisition of available land by the refuge. These survey results show a clear connection between agency familiarity and confidence and acceptability of scenarios, indicating the importance for continued effective communication, education, and relationship-building by the refuge with the community.

Community Understanding of the Refuge

Generally, people feel that they know “very little” about Rappahannock NWR and its management. The average number of correct answers to questions regarding the refuge and its establishing purpose, land-acquisition policies, and its relationship to agricultural lands confirms this claim. Most people do know that the establishing purpose of the refuge was to protect migratory birds, wetlands, and endangered species. Most also know that the primary purpose of the National Wildlife Refuge System is to protect and improve fish and wildlife and their habitats. They are also aware that condemnation is not a policy for obtaining land, but one in seven was not aware that full title purchase of available property from willing sellers is an option. Most people know that photography and fishing are permitted on refuge lands and that dogs off leash are not. Only about one-third know that hunting is permitted on the refuge. There was some confusion as to whether collecting items such as artifacts, plants or insects, beach use, horseback riding, camping, or picnicking are allowed on the refuge, none of which is permitted. These results indicate that the refuge may consider enhancing outreach regarding these subjects, in particular the permissibility of certain activities on the refuge.

Preferences for Future Services and Willingness to Pay Fees

Educational information on historic sites, fishing opportunities, access for people with disabilities, viewing areas with information about wildlife habitats, restrooms, and a website with information about the refuge and its activities were ranked as most desirable by the most respondents. While on average hunting opportunities were not rated desirable, these activities were rated as the most desirable by hunters. Educational information on historic sites was the most desirable activity in each of the four resource areas listed on the map, followed universally by fishing opportunities.

When asked about willingness to pay a fee for services offered by Rappahannock River Valley NWR, 42% indicated that they should not have to pay a fee to visit this or any refuge. However, the majority of respondents are willing to pay a fee for educational programs, special events, and maintenance of the facilities they use. People who know more about the refuge and those who rated nonconsumptive services and activities as desirable tend to be more willing to pay a fee for services.

Preferences for Management of Refuge Lands

Most of the hypothetical future scenarios for management of refuge lands were deemed acceptable. The only scenario rated as unacceptable involved an increase in development opportunities. The most acceptable scenarios involve the refuge acquiring available land, although the distinction between acquisition through full ownership rights or conservation easements did not appear to make a difference in acceptability rating. These scenarios also involve an increase in access for wildlife viewing opportunities and a decrease in development opportunities along rivers and streams.

Overall, community members do not appear to be in favor of increased development along rivers and streams and are supportive of having Rappahannock NWR acquire available land. They also feel positively about wildlife observation, as they are more accepting of situations that involve an increase in access for this opportunity as opposed to having access remain at current levels. This is in keeping with other survey results that indicate that residents find self-guided nature/wildlife viewing and bird watching important and find viewing areas with information about wildlife and habitats desirable. The look of the fields and surrounding landscape seems to be less important to residents than the assurance that development opportunities decrease, the refuge acquire land, and wildlife observation opportunities increase.

Interestingly, those people who find nonconsumptive activities more desirable are more accepting of scenarios overall (and conversely less accepting of the scenario with increased development), as were residents who are more knowledgeable about the refuge.

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Appendix A: Frequency Results for Rappahannock River Valley National Wildlife Refuge Community Survey⁷

This appendix contains the information obtained from frequency counts of the raw data from the Rappahannock River Valley National Wildlife Refuge community survey. The order of the tables follows that of the questions in the survey, section by section. Verbatim end-of-survey comments are categorized at the end of the appendix.⁷

⁷These data were weighted to account for nonresponse bias as well as for potential sampling bias. First, in order to correct for the sampling bias, data was compared to available U.S. Census data and weighted for age and sex. Second, in order to correct for the nonresponse bias, the data were weighted by the following variables: whether or not respondents were aware of the refuge, number of years living in the area, and education.

Section 1: Recreational activities and preference for recreation along the Rappahannock River.

Question 1. Please indicate whether you currently participate in the following activities near your home and then tell us where you participate in each activity.

Table 1. Percentage of respondents who participate in activities near their home. **NOTE:** Percentages are based on number who answered the question (e.g., for turkey hunting – of the 55 who answered, 18 percent said they participated).

Activity	Respondents (%)	<i>n</i>
Self-guided nature/wildlife viewing	50	152
Boat fishing	50	156
Bird watching	47	146
Bank fishing	47	143
Hiking/nature trails	43	129
Photography (nature/wildlife)	38	114
Crabbing	28	85
Deer hunting (without dogs)	23	69
Environmental field trips (attended by you or your children)	22	65
Canoeing/kayaking	21	62
Turkey hunting	18	55
Deer hunting (with dogs)	15	45
Attend nature programs (guided bird walks, lectures, presentations)	14	43
Waterfowl hunting	12	36
Trapping	3	10

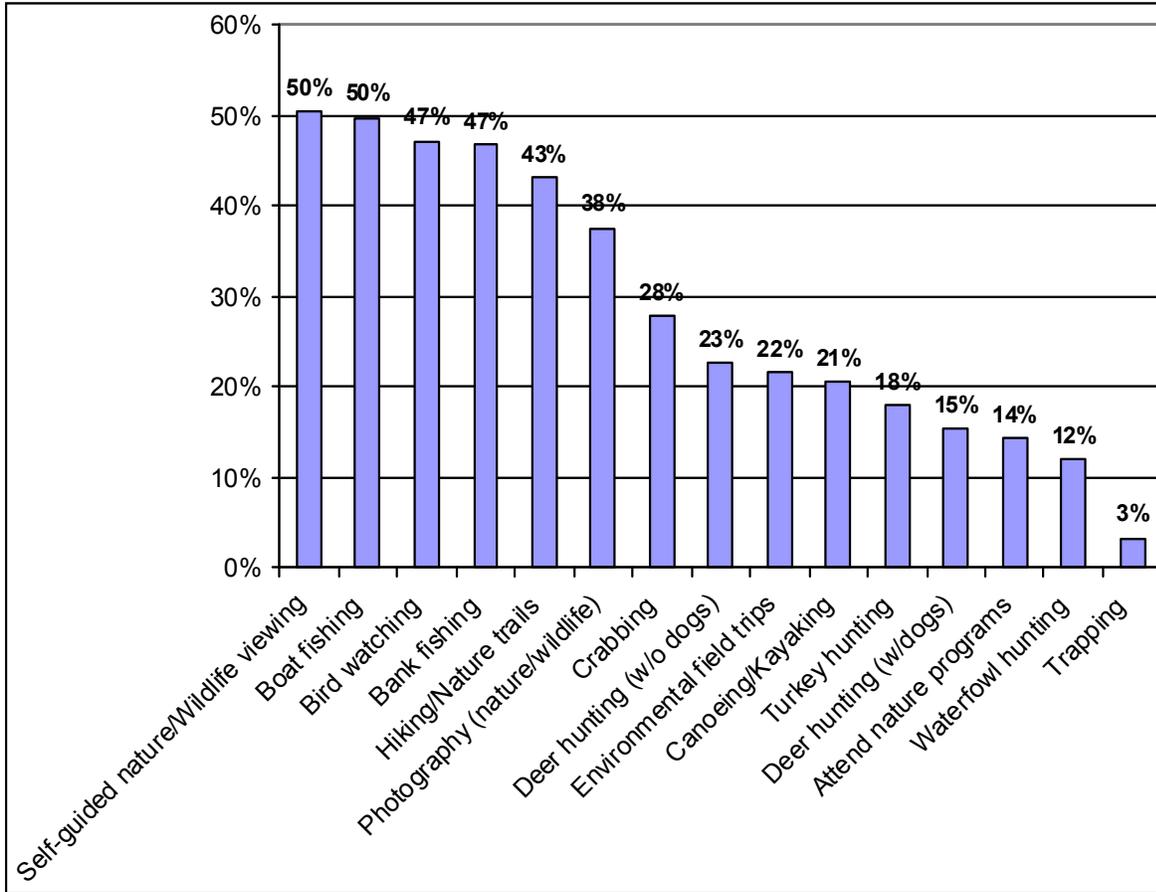
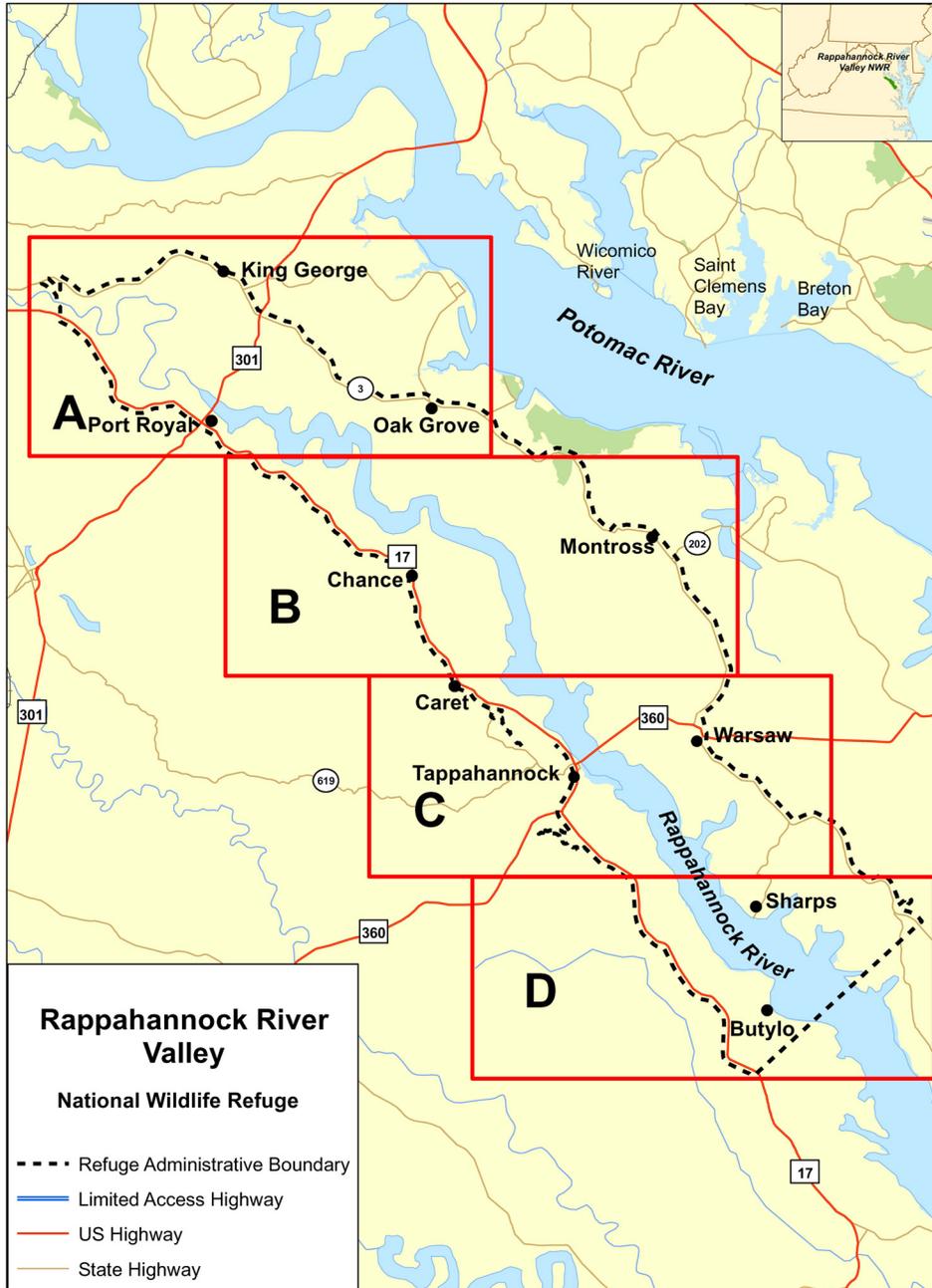


Figure 1. Percentage of respondents who participate in activities near their home.

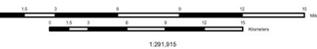


Rappahannock River Valley National Wildlife Refuge

Caroline, Essex, King George, Lancaster, Middlesex, Richmond, and Westmoreland Counties, Virginia



Produced in the Division of Realty, Hadley, Massachusetts
Land Status Current to: 06/06/2005
Basemap: USGS 1:250,000 topographic map
Refuge boundaries: compiled from USFWS sources
Datum & Projection: NAD_1983_UTM_Zone_18N
Map Print Date: 9/1/2005



This map is designed for refuge management.
It is not intended for use as a land survey or
as a representation of land for conveyance or tax purposes.
For more information visit the USFWS Northeast Region GIS
website at <http://northeast.fws.gov/gis/>



Figure 2. Map included in survey for location.

Table 2. Percentage of respondents selecting a specific location for each corresponding activity.
NOTE: Percentages are based on number who answered the question (e.g., for turkey hunting – of the 51 who answered, 35 percent participate at location A, 45 percent at location B, etc.)

Activity	Location				
	(% of respondents choosing each location)				
	A	B	C	D	<i>n</i>
Self-guided nature/wildlife viewing	54	50	31	26	136
Boat fishing	49	42	54	52	118
Bird watching	61	42	30	19	126
Bank fishing	54	29	34	23	107
Hiking/nature trails	49	43	28	21	103
Photography (nature/wildlife)	60	36	31	24	110
Crabbing	36	21	41	40	66
Deer hunting (without dogs)	45	25	35	17	63
Environmental field trips (attended by you or your children)	45	58	38	26	70
Canoeing/kayaking	38	39	24	37	53
Turkey hunting	35	37	39	26	51
Deer hunting (with dogs)	39	29	41	24	45
Attend nature programs (guided bird walks, lectures, presentations)	48	33	30	17	31
Waterfowl hunting	35	45	31	31	43
Trapping	27	40	23	18	18

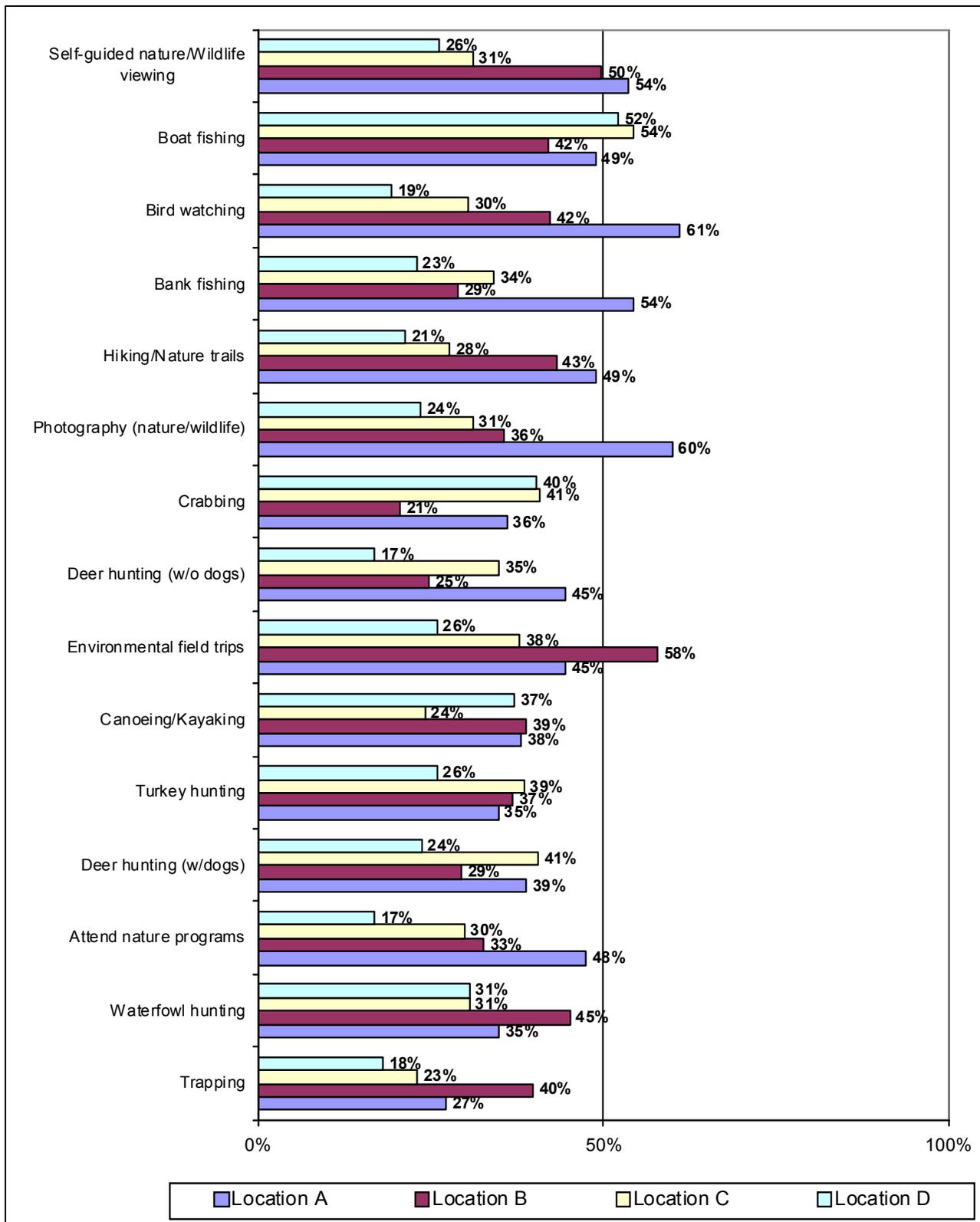


Figure 3. Percentage of respondents selecting a specific location for each corresponding activity.

Table 3. Verbatim responses reported by more than five respondents for “elsewhere nearby” and number of people who wrote in each of the locations (Top 10 locations where at least five people described an “other location”).

	Lancaster County	Potomac	Home/Private property	Caledon State Park	Wicomico River	Carratomam River	Fort AP Hill	Rappahannock/River/basin	Chesapeake Bay	Westmoreland	Other ^a	<i>n</i>
Bird watching	-	3	13	6	5	-	-	-	-	-	46	73
Photography	-	3	8	3	5	-	-	-	-	-	33	52
Hiking	7	-	3	8	-	-	-	-	-	6	36	60
Environmental trips	4	-	-	5	-	-	-	-	-	3	11	23
Bank Fishing	2	9	3	-	2	-	3	-	-	-	35	52
Boat Fishing	3	15	-	-	4	4	2	3	9	-	29	69
Deer Hunting	1	-	1	-	-	-	-	-	-	-	11	13
Deer Hunting w/o Dogs	3	-	6	-	-	-	2	-	-	-	5	25
Turkey Hunting	4	5	-	-	-	-	-	2	-	-	7	18
Waterfowl Hunting	5	-	-	-	-	-	-	-	-	-	3	8
Wildlife Viewing	3	1	5	6	-	1	-	-	-	-	40	56
Canoeing ^a	3	2	-	-	2	4	-	-	1	-	28	40
Nature Program ^a	1	-	-	3	-	-	-	-	-	-	10	14
Crabbing	3	12	3	-	4	5	-	-	-	-	28	55
Trapping ^a	1	1	-	-	-	-	-	-	-	-	3	5

^aOther Locations reported by fewer than 5 respondents: Mattapuni River/York River, Lake Gaston, Lower Norneck-Ottoman, Urbana, Locust Hill, Colonial Beach, Corbin, King and Queen, Maryland, Fredericksburg, Belle Isle State Park, Hewlett/Hughlet Point, Fauquier County, Northumberland County, E&F, Dragon Run, Hull Creek, Shenandoah Park, Kilmarnock, Gloucester Point, Yeocomico River, Tuper Creek, Stafford County, Comorn, Richmond County, Appalachian Trail, Heritage Point, Nomini Bay Area.

Question 2: Tell us your desire to see each of the following services offered by Rappahannock River Valley NWR, then tell us the general location you would prefer seeing each service offered.

Table 4. Desirability of services at Rappahannock NWR.

Service	Desirability (%)					n
	Very desirable	Moderately desirable	Somewhat desirable	Not desirable	No opinion	
Fishing opportunities	56	18	7	8	11	306
Educational information on historic sites	54	25	7	3	12	301
Access for people with disabilities	50	16	9	6	19	305
Restrooms	47	16	10	9	18	306
Viewing areas with information about different wildlife habitats	44	23	13	3	16	301
Kiosks or signs with information about the Refuge or its wildlife	43	22	12	7	17	298
Highway signs directing visitors to the Refuge	43	20	14	9	14	298
Website with information about the refuge and its activities	43	19	8	9	21	272
Hiking/walking trails for wildlife viewing opportunities	39	21	21	9	10	304
Water launches for non-motorized crafts (canoes, kayaks)	38	17	7	10	29	300
Outdoor education activities	36	23	18	6	17	292
Self guided canoe trail	35	14	7	15	29	296
Other services please specify	33	-	3	10	55	111
Opportunities to interact with Refuge staff	29	22	15	7	28	263
Visitor information/orientation center	28	27	19	7	19	288
Special events (guided bird walks, lectures, presentations)	24	17	17	16	26	294
Deer hunting opportunities	23	13	6	38	21	299
Small game hunting opportunities	22	11	5	39	23	297
Turkey hunting opportunities	20	13	3	40	24	297
Waterfowl hunting opportunities	20	8	4	39	29	297

Table 5. Mean desirability score for each service listed.

Service	Mean^a	SD	n
Educational information on historic sites	3.47	.77	266
Fishing opportunities	3.38	.96	274
Access for people with disabilities	3.35	.96	247
Viewing areas with information about different wildlife habitats	3.28	.88	253
Restrooms	3.23	1.05	252
Website with information about the refuge and its activities	3.23	1.03	272
Kiosks or signs with information about the Refuge or its wildlife	3.20	.97	248
Water launches for nonmotorized crafts (canoes, kayaks)	3.15	1.08	214
Highway signs directing visitors to the Refuge	3.14	1.03	256
Outdoor education activities	3.07	.96	242
Special events (guided bird walks, lectures, presentations)	3.01	.99	219
Opportunities to interact with Refuge staff	3.01	.99	189
Hiking/walking trails for wildlife viewing opportunities	2.99	1.04	275
Self guided canoe trail	2.98	1.20	210
Visitor information/orientation center	2.94	.96	234
Deer hunting opportunities	2.27	1.32	236
Small game hunting opportunities	2.20	1.33	229
Turkey hunting opportunities	2.17	1.31	225
Waterfowl hunting opportunities	2.11	1.33	210
Other services ^b	3.25	1.27	50

^aResponses were coded on a scale from 1 (not at all desirable) to 4 (very desirable).

^bATV trails, hike/bike trails, RV and camping sites, guided tours, outings for children/special events, food services, wildlife and nature opportunities, additional hunting opportunities.

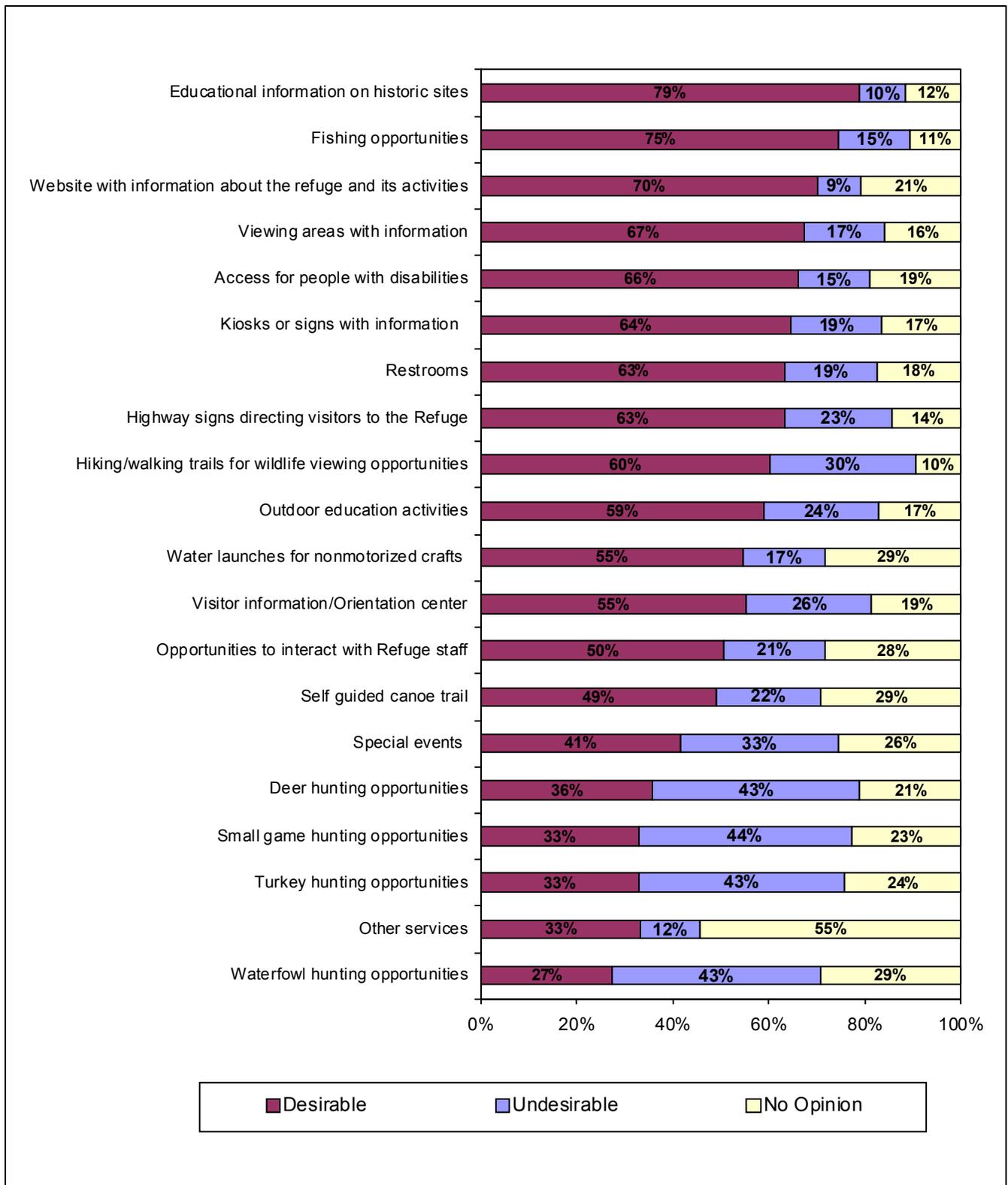


Figure 4. Desirability of visitor services offered at Rappahannock NWR where responses are collapsed into “desirable,” “undesirable,” and “no opinion.”

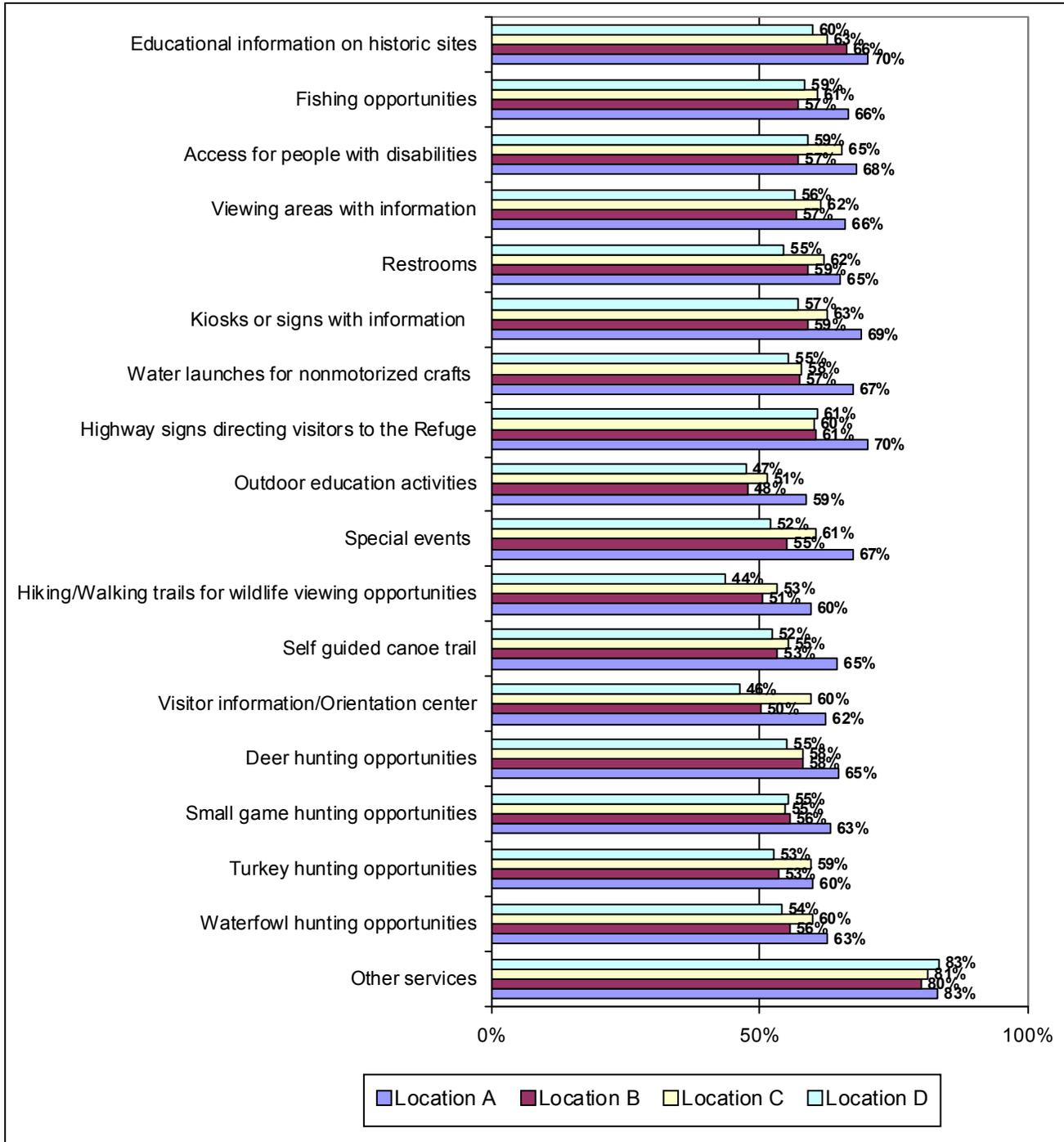


Figure 5. Percentage of respondents indicating desirability of activities at each location.

Question 3: Willingness to pay for potential future services offered by Rappahannock River Valley NWR.

Table 6. Level of agreement with statements about services offered at Rappahannock NWR.

Statement	Strongly agree (%)	Agree (%)	Unsure (%)	Disagree (%)	Strongly disagree (%)	Mean^a	SD
I would be willing to pay a fee for activities on the refuge such as hunting, fishing, or crabbing.	11	32	20	18	19	2.98	1.30
I would be willing to pay a fee for an educational or special events at the Refuge.	9	42	21	13	15	3.17	1.22
I would be willing to pay a fee to support maintenance of the facilities I use on the Refuge (such as canoe/kayak launch, trails, photo blinds, parking, restrooms)	9	46	21	10	15	3.23	1.20
I should not have to pay a fee to visit this Refuge or any other national wildlife refuge.	22	21	23	24	11	3.17	1.32

^aResponses were coded on a scale from 1 (strongly disagree) to 5 (strongly agree).

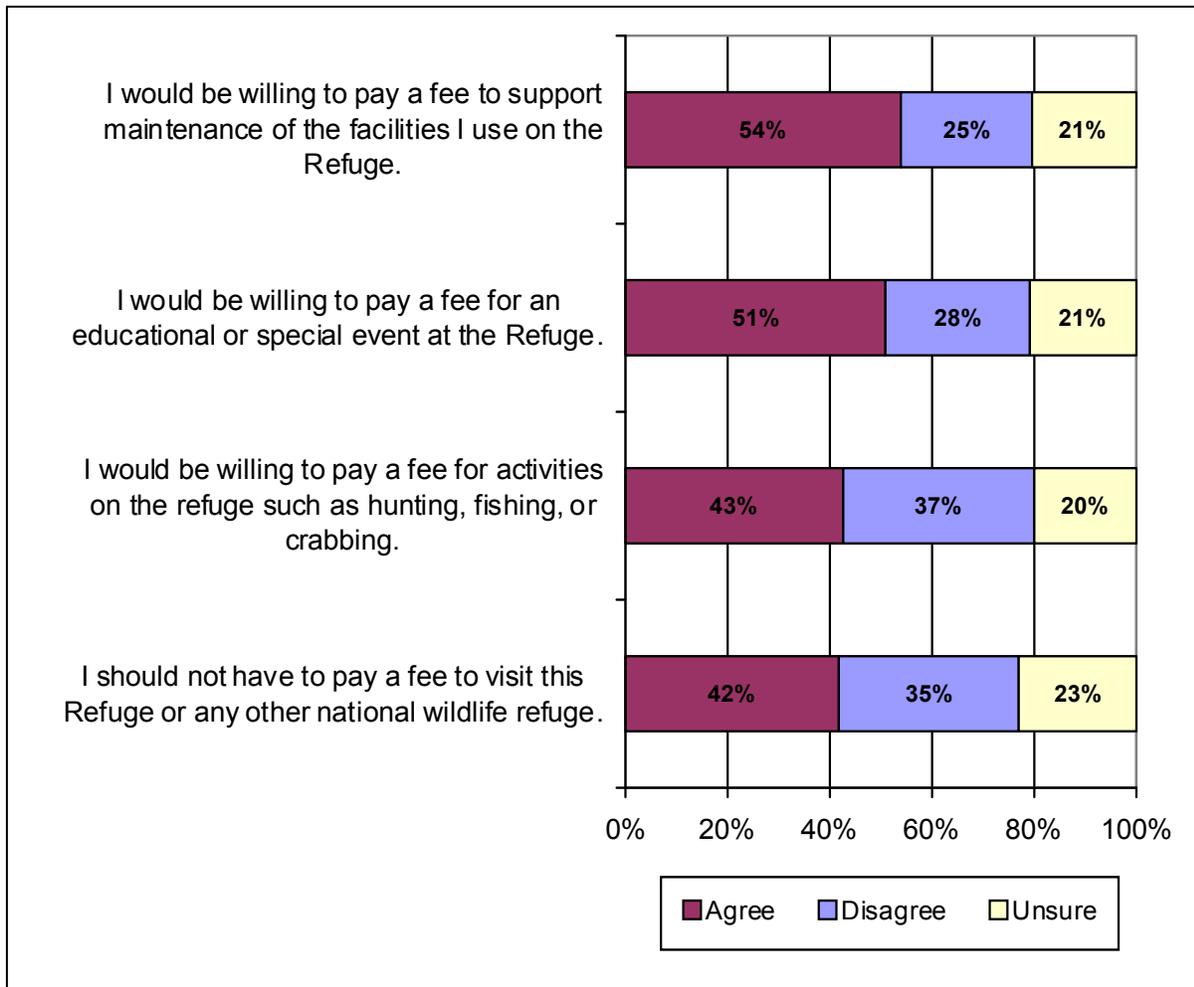


Figure 6. Level of agreement with willingness to pay for future services, where responses are collapsed into “agree,” disagree,” and “unsure.”

Section 2: Knowledge and understanding of Rappahannock River Valley NWR and the Rappahannock River.

Question 1: Before receiving this survey, were you aware of Rappahannock River Valley NWR?

Question 2: In general, how much do you feel you know about Rappahannock River Valley NWR and its management?

Table 7. Respondent awareness of the refuge before receiving the survey and their self-assessed knowledge about the refuge and its management.

	<i>%</i>	<i>n</i>
Aware?		
Yes	48	157
No	52	169
How much do you feel you know?		
Nothing at all	38	38
Very little	40	43
Some	16	14
A fair amount	5	5
A great deal	< 1	1

Question 3 and 4: Knowledge questions.

Table 8. Knowledge questions regarding Rappahannock River Valley NWR and the Rappahannock River. Rappahannock River Valley residents' knowledge regarding Rappahannock NWR, National Wildlife Refuge System mission, and land acquisition. (Respondents answered a series of True/False and multiple choice questions).

Question	Correct (%)
Refuge Purpose and Mission	
When looking to obtain land for the Refuge, wetland habitat is a high priority. (True)	91
Rappahannock River NWR was originally established to protect migratory birds, wetlands, and endangered species.	87
The primary mission of the National Wildlife Refuge System is to protect and improve fish and wildlife and their habitats.	84
The Refuge has been in existence for 10 years. (True)	65
The Rappahannock River NWR is managed by the U.S. Fish and Wildlife Service. ^a	60
The Refuge is supposed to provide for wildlife conservation and public recreation equally. (False)	55
Land Acquisition and Ownership	
Conservation easements acquired by the Refuge allow most current land uses like farming and hunting to continue, but may restrict development. (True)	88
The number of acres planted in grain (corn, winter wheat, and soybeans) has decreased significantly in the counties where the Refuge has purchased land. (False)	70
The National Wildlife Refuge System policy for obtaining land includes all methods except taking land from unwilling sellers through condemnation. ^b	68
Public review is not required for the Refuge to purchase acreage from willing sellers beyond the originally approved acreage. (False)	54
The percentage of Refuge lands currently in conservation easements is about 15%. ^c	46
When the Refuge was established, it was approved to protect up to 20,000 acres. ^d	44
The percentage of the Refuge lands acquired through full ownership title purchase were previously agricultural lands is about 25%. ^e	41
The approximate acreage of cropland adjacent to the Rappahannock River in Caroline, Essex, King George, Richmond, and Westmoreland counties is 155,000 acres. ^f	31
The total current acreage of the Refuge, including conservation easements, is approximately 7,500 acres. ^g	29

^aThe second most often chosen answer was Virginia Department of Game and Inland Fisheries. (21%)

^bThe second most often chosen answer was purchasing full ownership title from willing sellers. (14%)

^cThe second most often chosen answer was about 30%. (31%)

^dThe second most often chosen answer was 7,500. (27%)

^eThe second most often chosen answer was less than 5%. (27%)

^fThe second most often chosen answer was 300,000. (36%)

^gThe second most often chosen answer was 13,000 acres (28%) and 20,000 acres. (28%)

Question 5: Which of the following actives do you think are allowed at Rappahannock River Valley NWR?

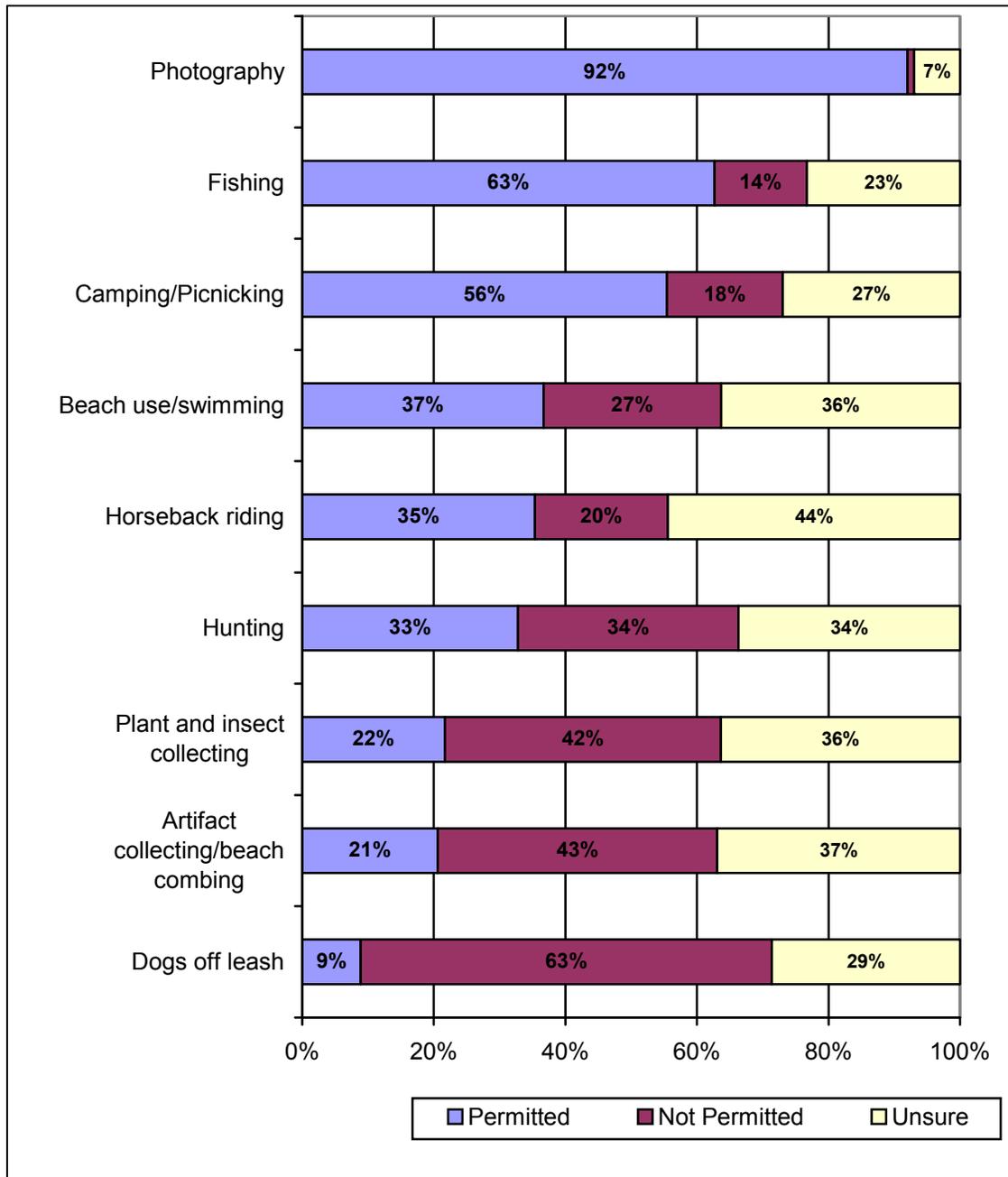


Figure 7. Respondents' beliefs about whether or not activities are permitted on the refuge (*n*'s range from 303 to 315).

Question 6: Familiarity and confidence with groups addressing natural resource issues along the Rappahannock River.

Table 9. Levels of familiarity and confidence for each of the agencies listed.

Organization	Familiarity (%)					Confidence (%)				
	Not familiar	Somewhat familiar	Moderately familiar	Very familiar	<i>n</i>	No confidence at all	Limited confidence	Moderate confidence	A great deal of confidence	<i>n</i>
Nonprofit conservation groups such as The Nature Conservancy and the Chesapeake Bay Foundation	37	34	23	7	318	9	16	48	27	183
Local and regional land trusts such as The Northern Neck Land Conservancy and the Middle Peninsula Land Trust	71	21	7	1	311	18	31	42	9	98
Farm advocacy groups such as the Virginia Farm Bureau Federation	41	28	19	12	312	9	32	45	15	155
Rappahannock River National Wildlife Refuge	47	37	16	1	311	2	20	59	20	139
State agencies such as the Department of Game and Inland Fisheries and the Department of Conservation and Recreation	21	32	32	15	313	2	25	50	24	221
County government such as the Board of Supervisors and the Planning Commission	28	22	23	28	313	25	42	28	5	198
Soil and Water Conservation Districts	45	29	15	11	313	9	40	39	12	148
Other	76	1	4	20	62	17	13	16	54	24

Table 10. Other organizations and agencies listed by respondents in Question 6.

Organizations/Agencies	<i>n</i>
Any & all government	1
Army Corps of Engineers - Wetland Regulatory	1
Audubon Society	1
Ducks Unlimited	1
Friends of Rappahannock	1
Individual landowners	1
Land developers; big builders	1
Local citizens	1
Real estate developers	1
Trout Unlimited; C.C.A.; B.A.S.S.	1

Table 11. Familiarity and confidence with organizations addressing natural resource issues along the Rappahannock River, with responses collapsed.

Organization	Not familiar (%)	Familiar (%)	No confidence in abilities (%)	Confident in abilities (%)
Rappahannock River National Wildlife Refuge	84	16	22	79
Nonprofit conservation groups such as The Nature Conservancy and the Chesapeake Bay Foundation	71	29	25	75
State agencies such as the Department of Game and Inland Fisheries and the Department of Conservation and Recreation	53	47	27	73
Other	77	23	30	70
Farm advocacy groups such as the Virginia Farm Bureau Federation	69	31	41	59
Soil and Water Conservation Districts	74	26	49	51
Local and regional land trusts such as The Northern Neck Land Conservancy and the Middle Peninsula Land Trust	92	8	49	51
County government such as the Board of Supervisors and the Planning Commission	50	50	67	33

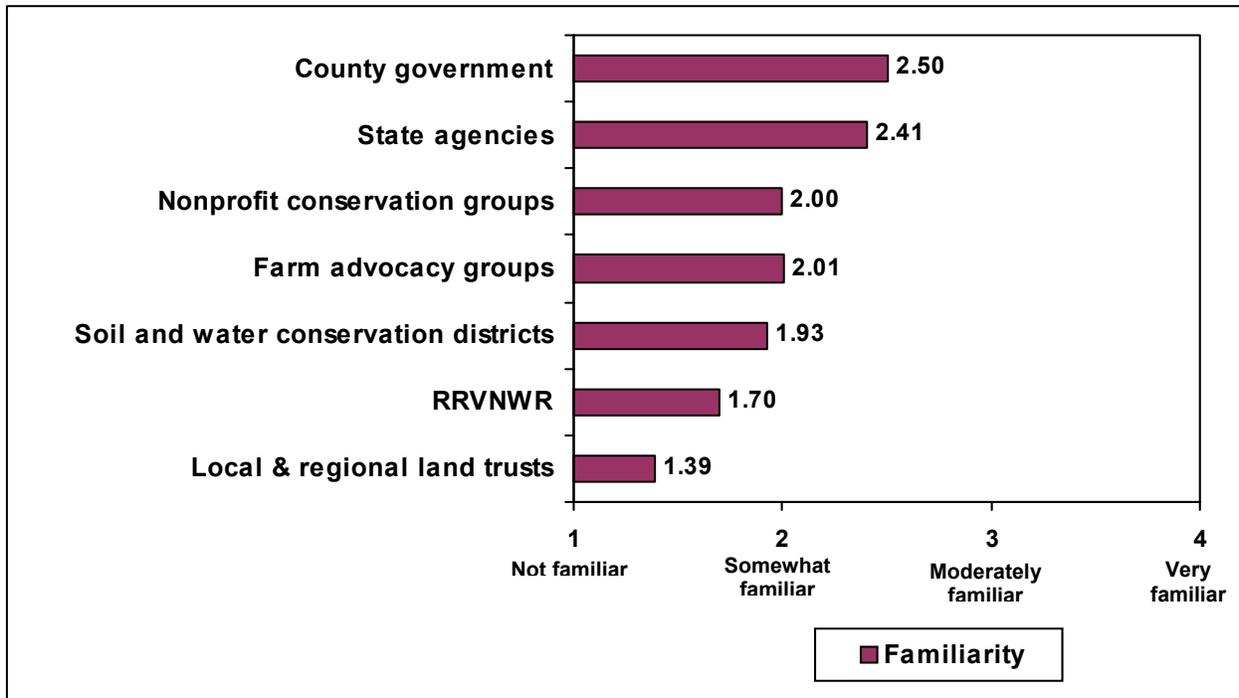


Figure 8. Mean familiarity with organizations addressing natural resource issues along the Rappahannock River. Responses are coded on a 4-point scale from 1 “not familiar” to 4 “very familiar.”

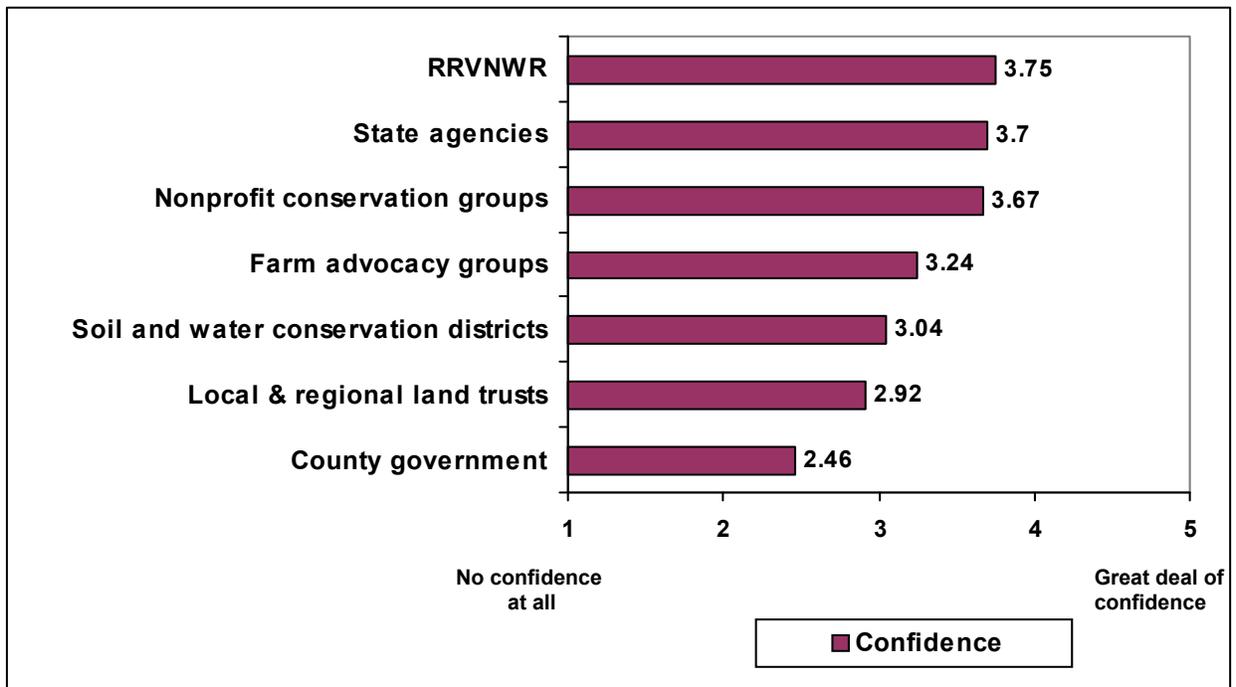


Figure 9. Mean confidence with organizations addressing natural resource issues along the Rappahannock River. Responses are coded on a 5-point scale from 1 “no confidence at all” to 5 “great deal of confidence.”

Section 3: Preferences for land management along the Rappahannock River.

Table 12. Acceptability of land management options along the Rappahannock River.

Land Management Options	Highly unacceptable (%)	Moderately unacceptable (%)	Slightly unacceptable (%)	Neutral (%)	Slightly acceptable (%)	Moderately acceptable (%)	Highly acceptable (%)
Scenario 1 (n = 302) Hunting and fishing opportunities: increase Wildlife observation opportunities: increase Development opportunities: decrease Fields: corn and wheat used by Canada Geese and Mallards in winter Landscape: orderly and cultivated Available land: acquired by Refuge with full ownership	4	3	6	17	12	26	33
Scenario 2 (n = 299) Hunting and fishing opportunities: remain the same Wildlife observation opportunities: increase Development opportunities: decrease Fields: trees and grasses for many different wildlife throughout the year Landscape: wild and uncultivated Available land: not acquired by the Refuge	5	6	9	25	20	27	9
Scenario 3 (n = 292) Hunting and fishing opportunities: increase Wildlife observation opportunities: increase Development opportunities: decrease Fields: trees and grasses for many different wildlife throughout the year Landscape: wild and uncultivated Available land: acquired by Refuge with partial ownership rights (conservation easement)	5	3	4	17	23	32	14
Scenario 4 (n = 303) Hunting and fishing opportunities: remain the same Wildlife observation opportunities: increase Development opportunities: decrease Fields: trees and grasses for many different wildlife throughout the year Landscape: wild and uncultivated Available land: acquired by Refuge with partial ownership rights (conservation easement)	4	3	2	17	20	36	19
Scenario 5 (n = 292) Hunting and fishing opportunities: increase Wildlife observation opportunities: remain the same Development opportunities: increase Fields: trees and grasses for many different wildlife throughout the year Landscape: wild and uncultivated Available land: not acquired by the Refuge	28	21	13	19	8	9	3

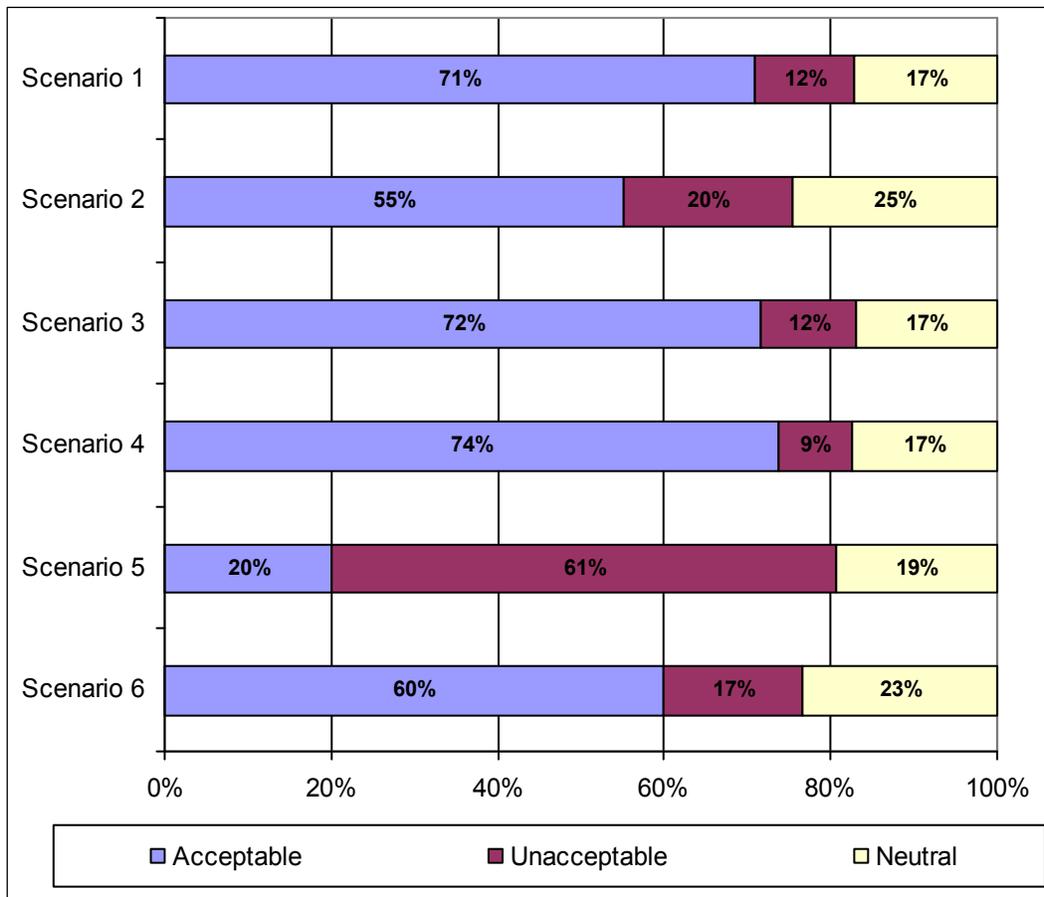


Figure 10. Percentage of respondents rating land management options along the Rappahannock River as acceptable, unacceptable, or neutral.

Table 13. Mean acceptability scores for scenarios for land management along the Rappahannock River.

Scenario	Mean ^a	Standard Deviation
Scenario 1	5.41	1.63
Scenario 2	4.64	1.56
Scenario 3	5.09	1.51
Scenario 4	5.28	1.46
Scenario 5	2.98	1.76
Scenario 6	4.76	1.66

^aResponses were recoded from original scale so that 1 = highly unacceptable and 7 = highly acceptable.

Section 4: Civic engagement and communication about natural resource issues.

Question 1: Please indicate which activities you have participated in within the last 5 years related to natural resource issues.

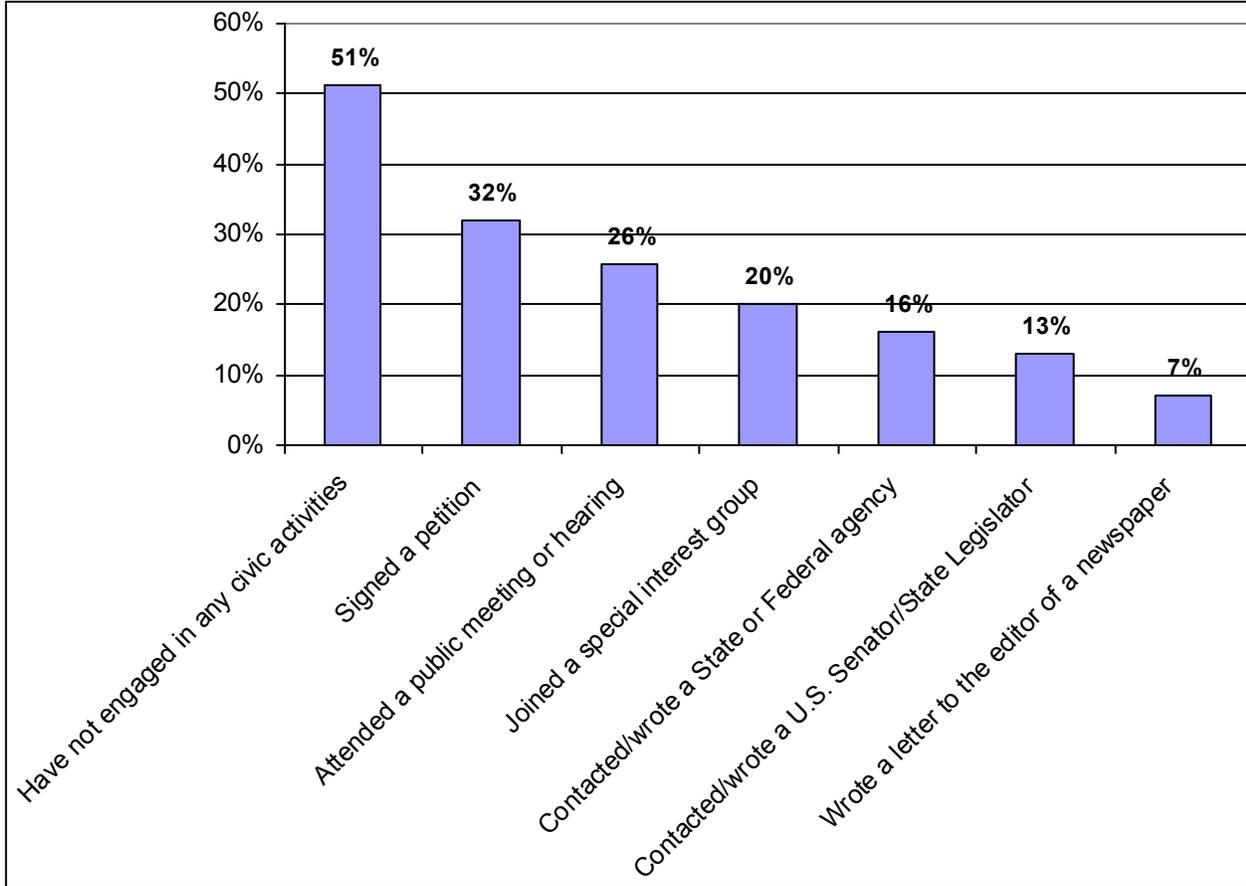


Figure 11. Participation in natural resource decisionmaking.

Table 14. Participation in natural resource decisionmaking.

Activity	Participation (%)
Attended a public hearing or meeting.	26
Signed a petition.	32
Joined a special interest group.	20
Contacted or wrote a U.S. Senator or State Legislator.	13
Contacted or wrote a State or Federal agency.	16
Wrote a letter to the editor of a newspaper.	7
Have not engaged in any civic activities.	51

n = 317

Table 15. Special interest groups respondents have joined.

Group or organization	<i>n</i>
Hunting and Fishing Organizations	26
B.A.S.S. (1)	North American Hunting Club (1)
Bass Master (1)	National Rifle Association (8)
Delta Waterfowl (2)	Pheasants Forever (2)
Ducks Unlimited (5)	Trout Unlimited (2)
Federation of Fly Fishers (2)	Virginia Deer Hunter Assoc. (2)
National Wild Turkey Federation (1)	
National Environmental/Conservation Organizations	27
Audubon Society (4)	National Wildlife Federation (4)
Defenders of Wildlife (1)	Natural Resources Defense Council (1)
Environmental (general) (2)	Nature Conservancy (8)
Environmental Defense Fund (1)	Sierra Club (4)
National Arbor Day Foundation (1)	
National Parks Conservation Assoc. (1)	
Local and Regional Environmental Organizations	25
Chesapeake Bay Foundation (11)	Save the Bay (2)
Friends of Lancaster County (1)	Scenic Virginia (1)
Mattspurin River Group (1)	Virginia Native Plant Society (1)
Northern Neck Land Conservancy (5)	Westmoreland Bird Club (1)
Rappahannock River Valley NWR (1)	Wildlife land Trust (1)
Animal Protection Organizations	13
Animal Welfare League (1)	Izaak Walton League (2)
ASPCA (2)	PETA (3)
Humane Society (3)	SPCA (1)
International Fund For Animal Welfare (1)	
Miscellaneous	8
American Ratbone Rescues-Protectors of Peace & Tranquility for the Emmerton Area (1)	Farm Bureau (1)
Boy Scouts of America (1)	Reedville Fisherman's Museum (1)
Committee to Keep and Bear Arms (1)	RHA (1)
Concerned Citizens of Northumberland County (1)	The Colwell-Miller Faction (1)
Outdoor Clubs and organizations	4
Appalachian Trail Club (1)	Virginia Twin Rivers Watermen's Association (1)
Boat US (1)	
Fishing Bay Yacht Club (1)	
Civic Organizations	3
Coles Point Community Organization (1)	Ruritans (1)
Lions Club (1)	

Question 2: How much do you rely on the following sources for news and information about natural resources along the Rappahannock River?

Table 16. Information sources respondents use for news and information about natural resources along the Rappahannock River.

Sources	A great deal (%)	Some (%)	Not much (%)	Not at all (%)	<i>n</i>
Newspapers	36	36	11	16	305
TV	17	29	33	21	309
Relatives, friends, or neighbors	15	36	27	22	311
Printed information from government entities	14	33	29	25	310
Magazine articles	13	43	23	21	308
Radio	13	32	26	29	306
Internet/websites/electronic newsletters	11	25	24	40	301
Printed information from private organizations or community groups	8	29	29	34	304
Public hearings or meetings	6	13	22	59	306
Displays or exhibits	5	35	28	33	309
Interactions with Soil and Water Conservation Districts or County Extension Agent	5	13	27	55	309
Other	5	1	13	81	284
Interactions with natural resource professionals (game wardens, foresters)	4	22	30	44	314
Presentations or lectures	3	15	31	51	298
Interactions with Refuge staff	3	10	21	66	305
Organizations such as the Rotary Club, Ruritans, or Lions Club	3	4	21	71	308

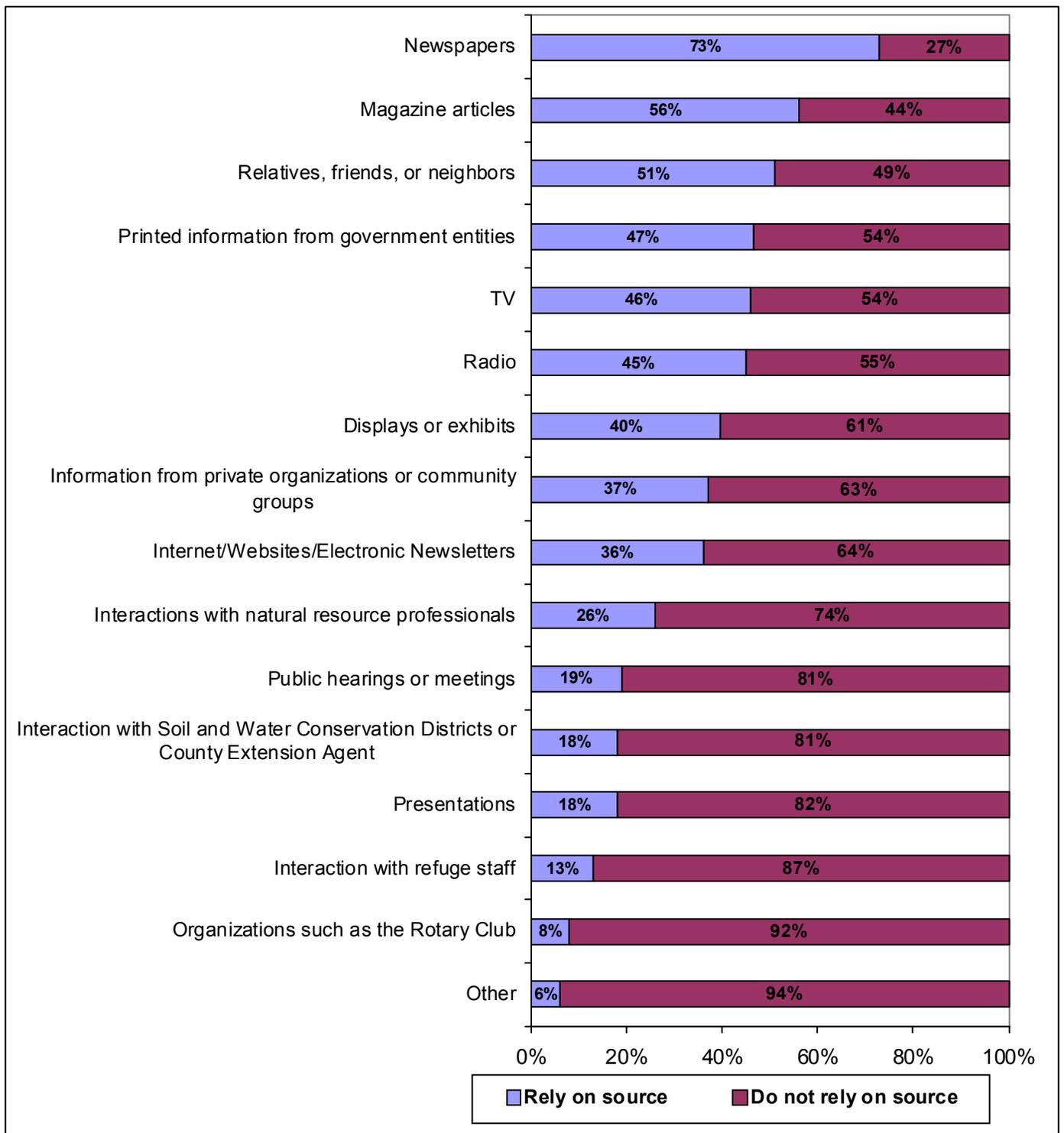


Figure 12. Information sources respondents use for news and information about natural resources along the Rappahannock River, with responses collapsed into “Rely on source,” and “Do not rely on source.”

Table 17. Specific newspapers listed by respondents that they rely upon for news and information about natural resources along the Rappahannock River.

Most frequently cited newspaper source used by respondents	<i>n</i>
Freelance Star	61
Rappahannock Record	60
Richmond Times Dispatch	35
Northern Neck News	21
King George Journal	12
Westmoreland News	11
Southside Sentinel	8
Washington Post	6
Other	6
Caroline Progress	3
Fredericksburg Paper	2
The Daily Press	2
Total	227

Section 5: Demographics

Question 1: How long have you lived in the Northern Neck or Middle Peninsula?

Question 2: How many generations has your family lived in the Northern Neck or Middle Peninsula?

Table 18. Amount of time respondents and family have lived in the Northern Neck or the Middle Peninsula.

Years lived in the Northern Neck or the Middle Peninsula ^a	<i>n</i>	Generations family lived in the Northern Neck or the Middle Peninsula ^b	<i>n</i>
0–9	70	0	59
10–24	65	1	58
Over 25	190	2	29
		3	45
		4	41
		5	27
		> 5	26

^aMean = 31.68, SD 23.84

^bMean 2.60, SD 2.24

Question 3: Gender

Table 19. Gender of respondents.

Gender	Respondents (%)
Male	48
Female	52

n = 326

Question 4: In what year were you born?

Table 20. Percentage of respondents by age category.

Age category	Respondents (%)	<i>n</i>
18–21	< 1	1
22–29	5	18
30–39	8	29
40–49	19	66
50–64	39	136
> 65	28	96

n = 346

Mean = 53.41, SD = 17.59

Question 5: Do you or any of your immediate family members depend on the following industries for your/their economic livelihood?

Table 21. Percentage of respondents (or immediate family members) who depend on industries for livelihood.

Industry	Respondents (%)
Timber	10
Farming	13
Fishing	7
Shellfish/crabbing	7
Tourism/recreation	3
Ranching	< 1
None of these	77

n = 315

Question 6 and 7: Race and ethnicity

Table 22. Race and ethnicity of respondents.

Ethnicity^a	Respondents (%)
Hispanic or Latino	-
Not Hispanic or Latino	100
Race^b	
White	93
American Indian or Alaska Native	1
Black or African American	7
Asian	< 1
Native Hawaiian or other Pacific Islander	< 1

^a *n* = 319

^b *n* = 324

Question 8: What is your highest year of formal schooling?

Table 23. Level of education of respondents.

Level of education	Respondents (%)
Less than high school	8
High school	51
College	32
Advanced degree	10

n = 326

Question 9: What was your approximate total household income from all sources (before taxes) last year?

Table 24. Household income of respondents.

Income	Respondents (%)
Less than \$10,000	5
\$10,000 to \$14,999	5
\$15,000 to \$24,999	8
\$25,000 to \$34,999	9
\$35,000 to \$49,999	17
\$50,000 to \$74,999	22
\$75,000 to \$99,999	12
\$100,000 to \$149,999	18
Over \$150,000	4
Median income	\$50,000 to \$74,999

Question 10: Would you like to receive information on any of the following?

Table 25. Respondents' desire for information regarding the refuge.

Information on:	Yes (%)
Refuge Friends Group	22
Refuge volunteer opportunities	21
Information about future refuge planning activities	37
Information about refuge programs and events	70
Results from this study	83

n = 255

Verbatim Responses at End of Survey

(Categories were created after review of comments. Many comments are repeated under more than one category.)

Visitation and Recreation Use

- I generally favor increased **hunting opportunities**, less development, and a more natural look for the vegetation.
- Create a large refuge for **hunting, fishing and tourism**.
- **Bank fishing** is limited in the Essex area. Years ago there was a pier by the Downing Bridge where many people including myself went to **fish and crab**. I also remember hunting as a youngster and maybe walking the woods for 2 or 3 days before I would even see a deer. Now with increased building, farming, and tree farming, it is nothing to see deer right at my back door or anywhere along the road. Their habitat is dwindling greatly every day. Development is going to happen but it's a shame it is at the cost of wildlife.
- We are heavy public **boat ramp users** and keep a large boat in the water on the Rappahannock. Any facilities that would help boaters would be nice; also duck blinds on a rental or lottery basis would be nice. Our **primary boat use is fishing, fresh and saltwater**.
- I am an animal lover. I do not like to see any animal hurt or killed even for hunting but I understand that hunting is necessary especially when you think about the deer population. It would be nice to have a place to go in your own home town where you can safely **walk or ride a trail**, go **horseback riding**, do some fishing and just take in nature as it was intended for. I would be willing to pay a fee for that and I think a lot of other people would also. You'd be surprised as to the number of people that do not have or get the opportunity to experience these things. When I was little I would spend a lot of time outdoors doing just that and I loved it and still do. Just being outside and watching nature at its best is satisfying enough for me. I don't have to be doing anything, besides it would be good for the children as well, put them more in touch with nature, learning about nature, then maybe some of the children would not be so afraid of animals and so forth. My answer may not be right but I know what a lot of people like and they like the outdoors as well.
- A **mountain bike trail** (i.e. gravel-not paved) would be great. It would attract bikers from far away!
- I have joined the R.R.V.N.W.R. within the last month. Since I'm retired I have time to **volunteer**. Greg, at the refuge, says a canoe dock in Rappahannock is in the works. I plan to be available. I'd like to see an **A.T.V. trail** open to the public sometime, with a reasonable user fee, of course.

- **ATV and dirt bike opportunities** should be increased-once wildlife become accustomed to them they simply move out of the way and continue with their daily business (I've seen this numerous times sitting in a deer stand and watched deer move to a better vantage point to watch the bikes then go right back to their daily business once the bikes passed).
- I prefer to visit refuges instead of national parks because they are wild and uncultivated. **Photography** is my hobby.
- I checked **hunting & fishing** as I have children who live in Rocky Mount, VA, who might like to hunt or fish in your refuge.
- A number of years ago my husband & I had a 20 ft **boat with an outboard motor**, and we went as far up the Rappahannock River as we cared to go to Fredericksburg. It was a beautiful trip, the trees were beautiful and the eagles were a joy to watch. Sincerely hope plans will be wonderful for everyone to enjoy. The beautiful parts of nature are its Rappahannock River that can only be enjoyed in Virginia.
- I live in Northern Northumberland County and have little reason to visit or use the Refuge-given the **limited access and facilities** there. This region **lacks any serious hiking/nature trails**, although there are thousands of natural areas. Hiking is a minimally invasive activity, but apparently not important to the Management.
- I would like to see all the **hunting & fishing opportunities** possible.
- I actually have only walked the Cat Point Creek trail from Menokeie; went on a **bird walk** at Hull Spring Farm with Sandy Spenser; and on the **Nature Walk** at George Washington's birthplace. Also attended Northern Neck Audubon when presentation was given on Rappahannock River Valley National Wildlife Refuge.
- I enjoy **bird watching, photography, biking, canoeing**, and other activities listed, but I have no idea what is currently available; hence, no idea as to what might be needed.
- **Hunting opportunities** should be closely monitored & controlled, perhaps only when overpopulation becomes a problem.
- **Stop deer hunting with dogs.** I have never seen a group of people so disrespectful of landowners' rights and so full of a feeling of entitlement to damage property, litter, and be a general nuisance on the roadways of the Northern Neck. It makes me ashamed at times to call myself a sportsman knowing that I am grouped with these truly common/ignorant people.

- Why **can't we keep sharks teeth we find and driftwood!!** On our beaches in Wakefield Park and surrounding areas.
- Just a note regarding combining **hunting & fishing**-I have no interest in hunting whatsoever.
- I have **fished and crabbed** the Potomac River and Potomac Creek. This was what my father and his father did and my son is doing now. Unlike my father and grandfather it was only part time for me as my son its part time. So I know more about the Potomac. Lived on a place that had 4 miles of shoreline for 26 years. Family still own Belle Plains on the creek.

Development/Preservation

- **Development-I wish we could stop it & turn things back.** Animals have no place to go anymore, very little food sources remain, more to fear now, and they-animals-are better to be surrounded by all the development & what it has brought. Our beauty trees, flowers, greenery, fields, farms, etc)are no longer around us. We outsource everything. Even human food sources are no longer available. Farmers didn't look for new opportunities to continue their farming in these changing times. Instead they feared & shut down/sold out. Any opportunity to have someone interested in **preservation & cleaning up** for future generations needs to be taken seriously.
- I generally favor increased hunting opportunities, **less development**, and a more **natural look for the vegetation**.
- Zero population growth for humans in Northern Neck and Mid Pen. Buffer zones from river. **Stop development** on the water. Increase tourism. No industry.
- Bank fishing is limited in the Essex area. Years ago there was a pier by the Downing Bridge where many people including myself went to fish and crab. I also remember hunting as a youngster and maybe walking the woods for 2 or 3 days before I would even see a deer. Now with **increased building**, farming, and tree farming, it is nothing to see deer right at my back door or anywhere along the road. Their **habitat is dwindling** greatly every day. **Development** is going to happen but it's a shame it is **at the cost of wildlife**.
- **Leave it alone.** Too many people screwing up the Bay. "It's not nice to mess with Mother Nature." A waste of tax dollars.
- I lived on a farm most of my life so I take a great deal on keeping land as **natural as possible**. I love to be outdoors and do activities but not at the expense of the land.

- I feel that the land owner has the **least control and say on what is done with the land**. Groups-special interest-and such as yours-have too much control and say as to what is done with land. I have a small stream running through the back of my land. I could not cut timber off X on both sides of the stream. It ended up being a sizeable area and only I continue to pay taxes on this area. That screams, "Wrong," to me.
- Bikes make great walking trails for everyone to use and although they may do some **destruction** in places like creek crossings and hill climbs after the springs of non-use nature will take the trail back over and no-one will ever know it was there. Thank you
- I have visited refuges all over the east coast, I prefer to visit refuges instead of national parks because they are **wild and uncultivated**.
- I believe that **preserving land** is of the utmost importance. The Northern Neck and its rivers are a jewel and it is still not too late to protect them from overdevelopment. I also think that locking up the land by purchasing it is the most fail-safe method of **preservation**. But short of this **conservation easements** and agreements will have to do.
- The Wildlife Refuge is the only way to control humans from **destroying** all nature's environment.
- I think it is very important that we keep our natural resources **protected**. The earth depends on us to do this. **Animals are very important** to me.
- The problem, as I see it, with the **protection** of our **dwindling** natural resources lies within the lack of public awareness.
- I am very supportive of **conservation** and very interested in environmental issues.
- I would like to see the Rappahannock River Valley National Wildlife Refuge **add more land** to encompass both sides of the Rappahannock River from start all the way to the bay to **protect** our precious wildlife so generations to come can enjoy it.
- The Rappahannock and my small portion of it **mean more to me than anywhere else on earth**. ...I would like to take this opportunity to call your attention to a small piece of this area which is so remote that few even know of it. On old maps it appears as Perch Creek, but it would now be known as Perch Lagoon since the neck of land separating it from Manrito Creek washed out a few years ago. This area badly needs to be **protected** from power boats, especially these new small jet boats. Not only is this a sensitive area, there are snags just below the surface (locust or cedar mostly) which are like bayonets.

- When this refuge was proposed, we supported their statement that this would be a waterfowl refuge-when the **plans were changed** to emphasize other wildlife beyond the resident-abandon agriculture for grass fields and trees- forcing higher concentrations of Canada Geese on local farmer's wheat fields- the F&WLS lost local support of many local landowners-particularly the agricultural community.
- I am in favor of any ways that will help **preserve** our beloved Northern Neck.
- I would like to **conserve** any and all refuges, but some of your questions were unknown to me or my wife. I am interested in learning more about it and what it has to offer the community in terms of both conservation and recreation. Limited knowledge
- The United States government already owns 671,759,297.7 acres of our land. That is a total of 29.6% of all U.S. land. I think that's enough, only 2.4 percent are used for military purposes. We already have state parks with hiking trails, and ample areas of forest for bird watching. Most of our rivers and streams are open to the public, with free ramps, giving everyone free access. I am concerned that our government may become too Communistic, wanting to own all U.S. land. The truth is U.S. citizens cannot compete with the United States government, when it comes to bidding on property that's for sale. The government that governs least, governs best, in a free society.

Services/Facilities

- I generally favor **increased hunting opportunities**, less development, and a more natural look for the vegetation. ... I have not heard much about the programs you offer nor have I seen many signs that depict the boundaries of the refuge or where the access points are.
- **Create** a large refuge for hunting, fishing and tourism.
- **Bank fishing is limited** in the Essex area. Years ago there was a pier by the Downing Bridge where many people including myself went to fish and crab. I also remember hunting as a youngster and maybe walking the woods for 2 or 3 days before I would even see a deer. Now with increased building, farming, and tree farming, it is nothing to see deer right at my back door or anywhere along the road. Their habitat is dwindling greatly every day. Development is going to happen but it's a shame it is at the cost of wildlife.
- I would be **interested in events for children**.

- We are heavy public boat ramp users and keep a large boat in the water on the Rappahannock. **Any facilities** that would help boaters would be nice, also duck blinds on a rental or lottery basis would be nice. Our primary boat use is fishing, fresh and saltwater.
- It would be nice to have **a place to go** in your own home town where you can safely walk or ride a trail, go horseback riding, do some fishing and just take in nature as it was intended for. I would be **willing to pay a fee** for that and I think a lot of other people would also.
- There should be **consistency with services** offered-do not agree spending dollars on public landings for small H2O craft-many small marinas & public access throughout region.
- **A mountain bike trail** (i.e. gravel-not paved) would be great. It would attract bikers from far away!
- While I understand this is not one of your goals, I'd like to have **public A.T.V. trails** opened, with **user fee**, of course, because now, there are none.
- **ATV and dirt bike opportunities** should be increased-once wildlife become accustomed to them they simply move out of the way and continue with their daily business (I've seen this numerous times sitting in a deer stand and watched deer move to a better vantage point to watch the bikes then go right back to their daily business once the bikes passed).
- I am looking for **conservation projects** suitable for Boy Scout & Eagle projects or for Boy Scout and Cub Scout community service.
- **Need more boat launches.**

Expansion/Acquisition

- I favor **expansion** of the refuge, especially on lands adjacent to the river. I have not heard much about the programs you offer nor have I seen many signs that depict the boundaries of the refuge or where the access points are.
- Need to **expand** refuge as much as possible as fast as possible as a filter for Chesapeake Bay and water improvement.
- I feel that the land owner has the least control and say on what is done with the land. Groups-special interest-and such as yours-have too much control and say as to what is done with land. I have a small stream running through the back of my land. I could not cut timber off X on both sides of the stream. It ended up being a sizeable area and I and only I continue to pay taxes on this area. That screams, "wrong" to me. This is what frightens me. I don't trust that your group

has the power to cause change that land owners can't control. I pay taxes on land on both sides of a stream that goes through my land and I have no control or say over this land. NOT RICH!

- The Northern Neck and its rivers is a jewel and it is still not too late to protect them from overdevelopment. I also think that **locking up the land by purchasing** it is the most fail-safe method of preservation. But short of this **conservation easements** and agreements will have to do.
- I would like to see the Rappahannock River Valley National Wildlife Refuge **add more land** to encompass both sides of the Rappahannock River from start all the way to the bay to protect our precious wildlife so generations to come can enjoy it.
- **The United States government already owns 671,759,297.7 acres of our land.** That is a total of 29.6% of all U.S. land. I think that's enough, only 2.4 percent are used for military purposes. We already have state parks with hiking trails, and ample areas of forest for bird watching. Most of our rivers and streams are open to the public, with free ramps, giving everyone free access. I am concerned that our government may become too Communistic, wanting to own all U.S. land. The truth is U.S. citizens cannot compete with the United States government, when it comes to bidding on property that's for sale. The government that governs least, governs best, in a free society.

Refuge Staff/Management in general

- U.S. Congress must fund the programs-more money. (2) Actually, this refuge is for posterity-the future-one of the best investments by our government. (3) Management should not be either totally cultivated fields or left wild-a mixed approach is best. Thank you. Sec. 3, Scenario 6. **What about a hybrid management - some cultivated and some wild?**
- All of the people that I have met that are associated with the refuge have been very **good listeners** to my knowledge and my opinions of the Rappahannock River, its fish, birds, wildlife, phragmites, etc. and I appreciate that. I feel that the intentions of the Refuge are good as well as necessary.
- Since I'm retired I have time to **volunteer**. Greg, at the refuge, says a canoe dock in Rappahannock is in the works. I plan to be available. I'd like to see an A.T.V. trail open to the public sometime, with a reasonable user fee, of course. I'm looking forward to being of service. On behalf of Cub Scout Pack 255, Oak Grove, Virginia, **thanks** for the kids fishing day, 3 June '06. Great experience for kids.

- At any rate, I believe you are providing a **service** to me, wildlife, and future generations. **Good boy!** Don't stop before the miracle happens. Thank you kindly!
- Are you aware of the **newly formed authority** in the Northern Neck charged with securing public access sites? FYI.
- Much of this questionnaire sounds as if USFWS wants to become a recreation agency in competition with Parks & state/US Forests.
- Our household had never heard of the RRV until receiving this questionnaire. This week was also our first experience staying in a National Park. If you folks can do as **wonderful a job** as these folks do--with the limited financial resources they have-you'll have **tremendous success**.

Wildlife/Habitat Management

- **Management** should not be either totally cultivated fields or left wild-a mixed approach is best. Thank you. Sec. 3, Scenario 6. **What about a hybrid management - some cultivated and some wild?**
- **Animals have no place to go anymore**, very little food sources remain, more to fear now, and they-animals-are better to be surrounded by all the development & what it has brought.
- **Leave it alone.** Too many people screwing up the Bay. "It's not nice to mess with Mother Nature."
- I lived on a farm most of my life so I take a great deal on **keeping land as natural as possible**. I love to be outdoors and do activities but not at the expense of the land.
- A number of years ago my husband & I had a 20 ft boat with an outboard motor, and we went as far up the Rappahannock River as we cared to go to Fredericksburg. It was a beautiful trip, the trees were beautiful and the eagles were a joy to watch. Sincerely **hope plans will be wonderful** for everyone to enjoy. The beautiful parts of nature are its Rappahannock River that can only be enjoyed in Virginia.
- I would like to take this opportunity to call your attention to a small piece of this area which is so remote that few even know of it. On **old maps** it appears as Perch Creek, but it would now be known as Perch Lagoon since the neck of land separating it from Manrito Creek washed out a few years ago. This area badly needs to be protected from power boats, especially these new small jet

boats. Not only is this a **sensitive area**, there are snags just below the surface (locust or cedar mostly) which are like bayonets.

- I'm also curious about the "**grass fields**;" I don't recall the early explorers of this area reporting any extensive **upland grassed areas**-only marsh & further south Cone Breaks- e.g. the "Green Sea" on the NC/VA line in Chesapeake & the Dismal Swamp area-any references?
- Why can't we keep sharks teeth we find and driftwood!! On our beaches in Wakefield Park and surrounding areas.
- Just a note regarding **combining hunting & fishing**-I have no interest in hunting whatsoever.

Limited Knowledge about the Refuge

- We know of and would like to visit the Refuge. **We can never find an entrance.** Is there?
- I would like to conserve any and all refuges, but some of your questions were unknown to me or my wife. I am **interested in learning more** about it and what it has to offer the community in terms of both conservation and recreation.
- **Our household had never heard of the RRV** until receiving this questionnaire. This week was also our first experience staying in a National Park. If you folks can do as wonderful a job as these folks do--with the limited financial resources they have-you'll have tremendous success. Move to services and facilities or limited knowledge.
- I am glad for the opportunity to participate in this survey because until now I had **very little knowledge of the refuge**. I am interested in learning more about it and what it has to offer the community in terms of both conservation and recreation.
- I am glad to learn of this refuge and look forward to **learning more** about this refuge.
- I **have not heard much** about the programs you offer nor have I seen many signs that depict the boundaries of the refuge or where the access points are.
- I **know nothing** about the Rappahannock River Valley National Wildlife Refuge nor have I seen information or public education regarding it. If you increase public awareness, I'm sure there would be increased interest.

Appendix B: Rappahannock River Valley National Wildlife Refuge Community Survey

Rappahannock River Valley National Wildlife Refuge Community Survey



Cat Point Creek: Photo courtesy of Sandy Spencer, USFWS.

Please Read This First

This survey is an effort to gather information from local community members for Rappahannock River Valley National Wildlife Refuge. The Refuge is developing a long-term plan for the lands it manages and needs your input! This plan will define the refuge management goals and objectives for the next 15 years. The study will specifically outline such programs as wildlife habitat management, public use and access, and land protection. By better understanding the community's opinions and understanding of Refuge issues, the Refuge can do a better job. *Even if you have not heard of the Refuge or feel you are not that familiar with it, the Refuge would still like to hear from you.*

Section 1—Please tell us about your recreational activity and your preferences for recreation along the Rappahannock River.

Enclosed with this survey is a map of the Rappahannock River Valley. On the map are 4 locations identified as A, B, C, and D. Please refer to this map to answer both questions 1 and 2.

1. Please indicate whether you currently participate in the following activities near your home by **first** circling “yes” or “no” on the left. **Then**, tell us specifically where you participate in each activity by circling all letters on the right that apply. If you participate in the activity elsewhere nearby, circle “Elsewhere nearby” and write the location where you participate in the activity in the space provided.

Participate			Location (<i>See map insert; please circle all that apply</i>)				
Yes	No	Bird watching	A	B	C	D	Elsewhere nearby (<i>please specify below</i>) _____
Yes	No	Photography (nature/wildlife)	A	B	C	D	Elsewhere nearby (<i>please specify below</i>) _____
Yes	No	Hiking/Nature trails	A	B	C	D	Elsewhere nearby (<i>please specify below</i>) _____
Yes	No	Environmental field trips (attended by you or your children)	A	B	C	D	Elsewhere nearby (<i>please specify below</i>) _____
Yes	No	Bank fishing	A	B	C	D	Elsewhere nearby (<i>please specify below</i>) _____
Yes	No	Boat fishing	A	B	C	D	Elsewhere nearby (<i>please specify below</i>) _____
Yes	No	Deer hunting (with dogs)	A	B	C	D	Elsewhere nearby (<i>please specify below</i>) _____
Yes	No	Deer hunting (without dogs)	A	B	C	D	Elsewhere nearby (<i>please specify below</i>) _____
Yes	No	Turkey hunting	A	B	C	D	Elsewhere nearby (<i>please specify below</i>) _____
Yes	No	Waterfowl hunting	A	B	C	D	Elsewhere nearby (<i>please specify below</i>) _____
Yes	No	Self-guided nature/Wildlife viewing	A	B	C	D	Elsewhere nearby (<i>please specify below</i>) _____
Yes	No	Canoeing/Kayaking	A	B	C	D	Elsewhere nearby (<i>please specify below</i>) _____
Yes	No	Attend nature programs (guided bird walks, lectures, presentations)	A	B	C	D	Elsewhere nearby (<i>please specify below</i>) _____
Yes	No	Crabbing	A	B	C	D	Elsewhere nearby (<i>please specify below</i>) _____
Yes	No	Trapping	A	B	C	D	Elsewhere nearby (<i>please specify below</i>) _____

2. This question has two parts. **First**, tell us your desire to see each of the following services offered by Rappahannock River Valley National Wildlife Refuge by circling the number on the left that corresponds with your answer. **Then**, tell us **the general location** you would prefer seeing each service offered by circling the letter on the right that corresponds with your answer.

Desirability (Please circle only one.)						Location (See map insert; please circle all that apply.)			
Not at all Desirable	Somewhat Desirable	Moderately Desirable	Very Desirable	No Opinion		A	B	C	D
1	2	3	4	5	Hiking/Walking trails for wildlife viewing opportunities	A	B	C	D
1	2	3	4	5	Restrooms	A	B	C	D
1	2	3	4	5	Outdoor education activities	A	B	C	D
1	2	3	4	5	Access for people with disabilities	A	B	C	D
1	2	3	4	5	Visitor information/Orientation center	A	B	C	D
1	2	3	4	5	Deer hunting opportunities	A	B	C	D
1	2	3	4	5	Small game hunting opportunities	A	B	C	D
1	2	3	4	5	Turkey hunting opportunities	A	B	C	D
1	2	3	4	5	Waterfowl hunting opportunities	A	B	C	D
1	2	3	4	5	Fishing opportunities	A	B	C	D
1	2	3	4	5	Kiosks or signs with information about the Refuge or its wildlife	A	B	C	D
1	2	3	4	5	Viewing areas with information about different wildlife habitats	A	B	C	D
1	2	3	4	5	Highway signs directing visitors to the Refuge	A	B	C	D
1	2	3	4	5	Water launches for nonmotorized crafts (canoes, kayaks)	A	B	C	D
1	2	3	4	5	Self-guided canoe trail	A	B	C	D
1	2	3	4	5	Educational information on historical sites	A	B	C	D
1	2	3	4	5	Special events (guided bird walks, lectures, presentations)	A	B	C	D
1	2	3	4	5	Website with information about the Refuge and its activities	----Not applicable----			
1	2	3	4	5	Opportunity to interact with Refuge staff	----Not applicable----			
1	2	3	4	5	Other services (Please specify) _____	A	B	C	D

3. In thinking about services that may be offered in the future by Rappahannock River Valley National Wildlife Refuge, please read each statement below and circle the number that corresponds to your level of agreement.

Statement	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
I would be willing to pay a fee for activities on the Refuge such as hunting, fishing, or crabbing.	1	2	3	4	5
I would be willing to pay a fee for an educational program or special event at the Refuge.	1	2	3	4	5
I would be willing to pay a fee to support maintenance of the facilities I use on the Refuge (such as canoe/kayak launch, trails, photo blind, parking, restrooms).	1	2	3	4	5
I should not have to pay a fee to visit this Refuge or any other national wildlife refuge.	1	2	3	4	5

Section 2 – Please tell us about your understanding of Rappahannock River Valley National Wildlife Refuge and the Rappahannock River.

In order to communicate effectively with local community members, it is important that we understand what is commonly known about the Refuge and the Rappahannock River Valley and how people interact in their community on river-related issues.

1. Before receiving this survey, were you aware of Rappahannock River Valley National Wildlife Refuge?
 - Yes No

2. In general, how much do you feel you know about Rappahannock River Valley National Wildlife Refuge and its management? *Please check one.*
 - Nothing at all Very little Some A fair amount A great deal

3. For each question or statement below, please check the **one box** that you feel most accurately represents the correct answer.

<p>a. The Rappahannock River Valley National Wildlife Refuge was originally established to:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Protect migratory birds, wetlands, and endangered species <input type="checkbox"/> Protect water quality <input type="checkbox"/> Provide camping and picnicking opportunities <input type="checkbox"/> Protect wildlife with no public use permitted 	<p>c. The Rappahannock River Valley National Wildlife Refuge is managed by:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Virginia Department of Game and Inland Fisheries <input type="checkbox"/> The National Park Service <input type="checkbox"/> The U.S. Fish and Wildlife Service <input type="checkbox"/> They are self-managing
<p>b. The primary mission of the National Wildlife Refuge System is:</p> <ul style="list-style-type: none"> <input type="checkbox"/> To provide recreation opportunities for the public <input type="checkbox"/> To protect and improve fish and wildlife and their habitats <input type="checkbox"/> To manage the nation’s water resources <input type="checkbox"/> To preserve cultural resources 	<p>d. The National Wildlife Refuge System policy for obtaining land includes all methods <i>except</i>:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Purchasing full ownership title to a property from willing sellers <input type="checkbox"/> Purchasing partial ownership rights to a property (conservation easement) <input type="checkbox"/> Acquiring land through exchanges and donations <input type="checkbox"/> Taking land from unwilling sellers through condemnation

e. The total current acreage of the Refuge, including conservation easements, is approximately:

- 1,000 acres
- 7,500 acres
- 13,000 acres
- 20,000 acres

f. When the Refuge was established, it was approved to protect up to _____ acres?

- 20,000 acres
- 13,000 acres
- 7,500 acres
- 1,000 acres

g. What percentage of the Refuge lands acquired through full ownership title purchase were previously agricultural lands?

- Less than 5%
- About 25%
- About 50%
- About 75%

h. What percentage of Refuge lands are currently in conservation easements?

- Less than 1%
- About 15%
- About 30%
- About 60%

i. What is the approximate acreage of cropland adjacent to the Rappahannock River in Caroline, Essex, King George, Richmond, and Westmoreland counties?

- 475,000 acres
- 300,000 acres
- 155,000 acres
- 50,000 acres

4. Please indicate whether you think each of the following statements about Rappahannock River Valley National Wildlife Refuge is true or false by checking the appropriate box.

	True	False
The Refuge is supposed to provide for wildlife conservation and public recreation equally.	<input type="checkbox"/>	<input type="checkbox"/>
The Refuge has been in existence for 10 years.	<input type="checkbox"/>	<input type="checkbox"/>
Public review is not required for the Refuge to purchase acreage from willing sellers beyond the originally approved total acreage.	<input type="checkbox"/>	<input type="checkbox"/>
When looking to obtain additional land for the Refuge, wetland habitat is a high priority.	<input type="checkbox"/>	<input type="checkbox"/>
Conservation easements acquired by the Refuge allow most current land uses like farming and hunting to continue, but may restrict development.	<input type="checkbox"/>	<input type="checkbox"/>
The number of acres planted in grain (corn, winter wheat, and soybeans) has decreased significantly in the counties where the Refuge has purchased land.	<input type="checkbox"/>	<input type="checkbox"/>

5. Which of the following activities do you think are allowed at Rappahannock River Valley National Wildlife Refuge? *Please check the box that matches your answer.*

Activity	Permitted on the Refuge	Not permitted on the Refuge	Unsure
Photography	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hunting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fishing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Horseback riding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Camping/Picnicking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Beach use/Swimming	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dogs off leash	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Plant and insect collecting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Artifact collecting/Beach combing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. Many organizations and agencies address natural resource issues along the Rappahannock River. We would like to know your **level of familiarity** with the groups listed below and your **confidence in their ability** to address these issues. *Please circle the numbers on the right and the left that correspond with your answer.*

Familiarity					Confidence				
Not Familiar	Somewhat Familiar	Moderately Familiar	Very Familiar		No Confidence at All	Limited Confidence	No Opinion	Moderate Confidence	Great Deal of Confidence
1	2	3	4	Nonprofit conservation groups such as The Nature Conservancy and the Chesapeake Bay Foundation	1	2	3	4	5
1	2	3	4	Local and regional land trusts such as The Northern Neck Land Conservancy and the Middle Peninsula Land Trust	1	2	3	4	5
1	2	3	4	Farm advocacy groups such as the Virginia Farm Bureau Federation	1	2	3	4	5
1	2	3	4	Rappahannock River Valley National Wildlife Refuge	1	2	3	4	5
1	2	3	4	State agencies such as the Department of Game and Inland Fisheries and the Department of Conservation and Recreation	1	2	3	4	5
1	2	3	4	County government such as the Board of Supervisors and the Planning Commission	1	2	3	4	5
1	2	3	4	Soil and Water Conservation Districts	1	2	3	4	5
1	2	3	4	Other (<i>please specify</i>) _____	1	2	3	4	5

Section 3 – Please tell us your preferences for land management along the Rappahannock River.

There are many ways that lands within the Refuge boundary (see map) can be managed. Below are 6 hypothetical scenarios that describe potential effects of Refuge management. These effects include:

- Access for hunting and fishing opportunities **increases** or **remains the same**
- Access for wildlife observation opportunities **increases** or **remains the same**
- Opportunities for development along rivers and creeks **increase** or **decrease**
- Fields are planted with **crops that may be used by Canada geese and Mallards in winter** or with **trees and grasses for many different wildlife throughout the year**
- The landscape is **orderly and cultivated** or **wild and uncultivated**
- Available land is acquired by the Refuge with **full ownership rights, partial ownership rights (conservation easement)**, or available land is **not acquired by the Refuge**

Please read each scenario and rate how acceptable you find it by circling a number on the scale below it. Although the scenarios may seem very similar, each is different and should be rated independently.

Scenario 1

- Hunting and fishing opportunities: **increase**
- Wildlife observation opportunities: **increase**
- Development opportunities: **decrease**
- Fields: **corn and wheat used by Canada Geese and Mallards in winter**
- Landscape: **orderly and cultivated**
- Available land: **acquired by Refuge with full ownership rights**

Highly Acceptable	Moderately Acceptable	Slightly Acceptable	Neutral	Slightly Unacceptable	Moderately Unacceptable	Highly Unacceptable
1	2	3	4	5	6	7

Scenario 2

- Hunting and fishing opportunities: **remain the same**
- Wildlife observation opportunities: **increase**
- Development opportunities: **decrease**
- Fields: **trees and grasses for many different wildlife throughout the year**
- Landscape: **wild and uncultivated**
- Available land: **not acquired by the Refuge**

Highly Acceptable	Moderately Acceptable	Slightly Acceptable	Neutral	Slightly Unacceptable	Moderately Unacceptable	Highly Unacceptable
1	2	3	4	5	6	7

Scenario 3

- Hunting and fishing opportunities: **increase**
- Wildlife observation opportunities: **increase**
- Development opportunities: **decrease**
- Fields: **trees and grasses for many different wildlife throughout the year**
- Landscape: **wild and uncultivated**
- Available land: **acquired by Refuge with partial ownership rights (conservation easement)**

Highly Acceptable	Moderately Acceptable	Slightly Acceptable	Neutral	Slightly Unacceptable	Moderately Unacceptable	Highly Unacceptable
1	2	3	4	5	6	7

Scenario 4

- Hunting and fishing opportunities: **remain the same**
- Wildlife observation opportunities: **increase**
- Development opportunities: **decrease**
- Fields: **trees and grasses for many different wildlife throughout the year**
- Landscape: **wild and uncultivated**
- Available land: **acquired by Refuge with partial ownership rights (conservation easement)**

Highly Acceptable	Moderately Acceptable	Slightly Acceptable	Neutral	Slightly Unacceptable	Moderately Unacceptable	Highly Unacceptable
1	2	3	4	5	6	7

Scenario 5

- Hunting and fishing opportunities: **increase**
- Wildlife observation opportunities: **remain the same**
- Development opportunities: **increase**
- Fields: **trees and grasses for many different wildlife throughout the year**
- Landscape: **wild and uncultivated**
- Available land: **not acquired by the Refuge**

Highly Acceptable	Moderately Acceptable	Slightly Acceptable	Neutral	Slightly Unacceptable	Moderately Unacceptable	Highly Unacceptable
1	2	3	4	5	6	7

Scenario 6

- Hunting and fishing opportunities: **remain the same**
- Wildlife observation opportunities: **remain the same**
- Development opportunities: **decrease**
- Fields: **corn and wheat used by Canada Geese and Mallards in winter**
- Landscape: **orderly and cultivated**
- Available land: **acquired by Refuge with partial ownership rights (conservation easement)**

Highly Acceptable	Moderately Acceptable	Slightly Acceptable	Neutral	Slightly Unacceptable	Moderately Unacceptable	Highly Unacceptable
1	2	3	4	5	6	7

Section 4 – Please tell us how you participate in and communicate about natural resource issues.

1. We would like to understand how community members participate in local or regional natural resource or environmental issues. Please indicate which of the activities you have participated in within the last 5 years related to environmental or natural resource issues. *Please check all that apply.*

- Attended a public hearing or meeting
- Contacted or wrote a state/federal agency
- Contacted or wrote a U.S. Senator, member of Congress, or State Legislator
- Wrote a letter to the editor of a newspaper
- Signed a petition

- Joined a special interest group (such as an environmental, sportsman's, animal rights, or agricultural organization)

If you joined any special interest group, please list the organization(s) below

└─ _____

- I have not engaged in any of the activities listed above.

2. How much do you rely on the following sources for news and information about natural resources along the Rappahannock River? *For each source, circle the number that best corresponds with your use.*

Sources	Not At All	Not Much	Some	A Great Deal
Magazine articles	1	2	3	4
Newspapers (<i>specify which one</i>) _____	1	2	3	4
Printed information from government entities such as the USDA Farm Service Agency, County Extension Office, Virginia Department of Game and Inland Fisheries, or U.S. Fish and Wildlife Service	1	2	3	4
Printed information from private organizations or community groups such as the Chesapeake Bay Foundation or Corn Growers Association	1	2	3	4
Internet/Websites/Electronic newsletters	1	2	3	4
Radio	1	2	3	4
TV	1	2	3	4
Displays or exhibits	1	2	3	4
Presentations or lectures	1	2	3	4
Relatives, friends, or neighbors	1	2	3	4
Interactions with Refuge staff	1	2	3	4
Interactions with natural resource professionals (game wardens, foresters)	1	2	3	4
Interactions with Soil and Water Conservation Districts or County Extension Agent	1	2	3	4
Organization meetings such as Rotary Club, Ruritans, Lions Club	1	2	3	4
Public hearings or meetings	1	2	3	4
Other (<i>please specify</i>) _____	1	2	3	4

Section 5 – Please tell us something about yourself.

These last few questions will help us make sure the information provided represents local community members. These questions are necessary to ensure the results are statistically valid. Know that your answers will not be associated with you individually in any way.

- How long have you lived in the Northern Neck or Middle Peninsula? _____ years
- How many generations has your family lived in the Northern Neck or Middle Peninsula? _____ generations
- Are you? Male Female
- In what year were you born? _____ (YYYY)
- Do you or any of your immediate family members depend on the following industries for your/their economic livelihood? *Please check all that apply.*
 - Timber Ranching Shellfishing/Crabbing None of these
 - Farming Fishing Tourism/Recreation

6. What ethnicity do you consider yourself? *Please select one.*

- Hispanic or Latino Not Hispanic or Latino

7. Please choose the racial category or categories with which you most closely identify?

- American Indian or Alaska Native Asian
 White Native Hawaiian or Other Pacific Islander
 Black or African American

8. What is your highest year of formal schooling? *Please circle only one.*

- | | | | | | | | | | | | | | | | | | | | |
|--------------|---|---|---|---|---|----------------------|---|---|---------------|----|----|-------------------------------|----|----|----|-----------------------------------|----|----|-----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20+ |
| (elementary) | | | | | | (jr. high or middle) | | | (high school) | | | (college or technical school) | | | | (graduate or professional school) | | | |

9. What was your approximate total household income from all sources (before taxes) last year?
Please check one.

- | | | |
|---|--|--|
| <input type="checkbox"/> less than \$10,000 | <input type="checkbox"/> \$25,000-\$34,999 | <input type="checkbox"/> \$75,000-\$99,999 |
| <input type="checkbox"/> \$10,000-\$14,999 | <input type="checkbox"/> \$35,000-\$49,999 | <input type="checkbox"/> \$100,000-\$149,999 |
| <input type="checkbox"/> \$15,000-\$24,999 | <input type="checkbox"/> \$50,000-\$74,999 | <input type="checkbox"/> \$150,000 and above |

10. Would you like to receive information on any of the following? *Please check all that apply.*

- | | |
|--|--|
| <input type="checkbox"/> Refugee Friends Group | <input type="checkbox"/> Information about Refugee programs and events |
| <input type="checkbox"/> Refugee Volunteer opportunities | <input type="checkbox"/> Results from this study |
| <input type="checkbox"/> Information about Refugee planning activities | |

Thank you for completing the survey. There is space for any additional comments you may have on the next page.

Comments?

Please write any additional comments about the Rappahannock River Valley or Rappahannock River Valley National Wildlife Refuge in the space below.

PAPERWORK REDUCTION ACT STATEMENT: A Federal agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. Public burden for the collection of this information is estimated to average 25 minutes per response. Comments regarding this collection of information should be directed to: Desk Officer for the Interior Department, Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503; and the Bureau Clearance Officer, U.S. Geological Survey, 12201 Sunrise Valley Drive, MS160, Reston, Virginia 20192.

OMB Control Number: 1028-0083, Expiration Date: 04/30/2009