



National Wildlife Refuge Visitor Survey 2010/2011: Individual Refuge Results for Big Muddy National Fish and Wildlife Refuge

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The refuge provides a unique opportunity to see how the reclaimed land will return to a wild state. The big river bottoms are a special place and need protection.—Survey comment from visitor to Big Muddy National Fish and Wildlife Refuge.



Big Muddy National Fish and Wildlife Refuge.
Photo credit: U.S. Fish and Wildlife Service.

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Introduction

The National Wildlife Refuge System (Refuge System), established in 1903 and managed by the U.S. Fish and Wildlife Service (Service), is the leading network of protected lands and waters in the world dedicated to the conservation of fish, wildlife and their habitats. There are 556 national wildlife refuges (NWRs) and 38 wetland management districts nationwide, including possessions and territories in the Pacific and Caribbean, encompassing more than 150 million acres. The mission of the 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 “to foster 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” (Clark, 2001). The Refuge System attracts more than 45 million visitors annually, including 25 million people per year to observe and photograph wildlife, over 9 million to hunt and fish, and more than 10 million to participate in educational and interpretation programs (Uniack, 1999; U.S. Fish and Wildlife Service, 2007). Understanding visitors and characterizing their experiences on national wildlife refuges are critical elements of managing these lands and meeting the goals of the Refuge System.

The Service contracted with the U.S. Geological Survey (USGS) to conduct a national survey of visitors regarding their experiences on national wildlife refuges. The survey was conducted to better understand visitor needs and experiences and to design programs and facilities that respond to those needs. The survey results will inform Service performance planning, budget, and communications goals. Results will also inform Comprehensive Conservation Plan (CCPs), Visitor Services, and Transportation Planning processes.

Organization of Results

These results are for Big Muddy NFWR (this refuge) and are part of USGS Data Series 643 (Sexton and others, 2011). All refuges participating in the 2010/2011 surveying effort will receive individual refuge results specific to the visitors to that refuge. Each set of results is organized by the following categories:

- **Introduction:** An overview of the Refuge System and the goals of the national surveying effort.
- **Methods:** The procedures for the national surveying effort, including selecting refuges, developing the survey instrument, contacting visitors, and guidance for interpreting the results.
- **Refuge Description:** A brief description of the refuge location, acreage, purpose, recreational activities, and visitation statistics, including a map (where available) and refuge website link.
- **Sampling at This Refuge:** The sampling periods, locations, and response rate for this refuge.
- **Selected Survey Results:** Key findings for this refuge, including:
 - Visitor and Trip Characteristics
 - Visitor Spending in the Local Communities
 - Visitors Opinions about This Refuge
 - Visitor Opinions about National Wildlife Refuge System Topics
- **Conclusion**
- **References**
- **Survey Frequencies (Appendix A):** The survey instrument with the frequency results for this refuge.
- **Visitor Comments (Appendix B):** The verbatim responses to the open-ended survey questions for this refuge.

Methods

Selecting Participating Refuges

The national visitor survey was conducted from July 2010 – November 2011 on 53 refuges across the Refuge System (table 1). Based on the Refuge System’s 2008 Refuge Annual Performance Plan (RAPP; U.S. Fish and Wildlife Service, 2011, written comm.), 192 refuges with a minimum visitation of 25,000 were considered. This criterion was the median visitation across the Refuge System and the minimum visitation necessary to ensure that the surveying would be logistically feasible onsite. Visitors were sampled on 35 randomly selected refuges and 18 other refuges that were selected by Service Regional Offices to respond to priority refuge planning processes.

Developing the Survey Instrument

USGS researchers developed the survey in consultation with the Service Headquarters Office, managers, planners, and visitor services professionals. The survey was peer-reviewed by academic and government researchers and was further pre-tested with eight Refuge System Friends Group representatives from each region to ensure readability and overall clarity. The survey and associated methodology were approved by the Office of Management and Budget (OMB control #: 1018-0145; expiration date: 6/30/2013).

Contacting Visitors

Refuge staff identified two separate 15-day sampling periods and one or more locations that best reflected the diversity of use and specific visitation patterns of each participating refuge. Sampling periods and locations were identified by refuge staff and submitted to USGS via an internal website that included a customized mapping tool. A standardized sampling schedule was created for all refuges that included eight randomly selected sampling shifts during each of the two sampling periods. Sampling shifts were three- to five-hour randomly selected time bands that were stratified across AM and PM, as well as weekend and weekdays. Any necessary customizations were made, in coordination with refuge staff, to the standardized schedule to accommodate the identified sampling locations and to address specific spatial and temporal patterns of visitation.

Twenty visitors (18 years or older) per sampling shift were systematically selected, for a total of 320 willing participants per refuge—160 per sampling period—to ensure an adequate sample of completed surveys. When necessary, shifts were moved, added, or extended to alleviate logistical limitations (for example, weather or low visitation at a particular site) in an effort to reach target numbers.

Table 1. Participating refuges in the 2010/2011 national wildlife refuge visitor survey.

Pacific Region (R1)	
Kilauea Point National Wildlife Refuge (HI)	William L. Finley National Wildlife Refuge (OR)
Deer Flat National Wildlife Refuge (ID)	McNary National Wildlife Refuge (WA)
Cape Meares National Wildlife Refuge (OR)	Turnbull National Wildlife Refuge (WA)
Malheur National Wildlife Refuge (OR)	
Southwest Region (R2)	
Bitter Lake National Wildlife Refuge (NM)	Aransas National Wildlife Refuge (TX)
Bosque del Apache National Wildlife Refuge (NM)	San Bernard/ Brazoria National Wildlife Refuge (TX)
Wichita Mountains Wildlife Refuge (OK)	
Great Lakes-Big Rivers Region (R3)	
DeSoto National Wildlife Refuge (IA)	McGregor District, Upper Mississippi River National Wildlife and Fish Refuge – (IA/WI)
Neal Smith National Wildlife Refuge (IA)	
Muscatatuck National Wildlife Refuge (IN)	Big Muddy National Fish and Wildlife Refuge (MO)
Rice Lake National Wildlife Refuge (MN)	Horicon National Wildlife Refuge (WI)
Tamarac National Wildlife Refuge (MN)	Necedah National Wildlife Refuge (WI)
Southeast Region (R4)	
Wheeler National Wildlife Refuge (AL)	Banks Lake National Wildlife Refuge (GA)
Big Lake National Wildlife Refuge (AR)	Noxubee National Wildlife Refuge (MS)
Pond Creek National Wildlife Refuge (AR)	Cabo Rojo National Wildlife Refuge (Puerto Rico)
Merritt Island National Wildlife Refuge (FL)	Pea Island National Wildlife Refuge (NC)
St. Marks National Wildlife Refuge (FL)	Cape Romain National Wildlife Refuge (SC)
Ten Thousand Islands National Wildlife Refuge (FL)	Reelfoot National Wildlife Refuge (TN)
Northeast Region (R5)	
Stewart B. McKinney National Wildlife Refuge (CT)	Moosehorn National Wildlife Refuge (ME)
Bombay Hook National Wildlife Refuge (DE)	Great Swamp National Wildlife Refuge (NJ)
Monomoy National Wildlife Refuge (MA)	Montezuma National Wildlife Refuge (NY)
Parker River National Wildlife Refuge (MA)	Wertheim National Wildlife Refuge (NY)
Patuxent Research Refuge (MD)	Occoquan Bay/ Elizabeth Hartwell Mason Neck National Wildlife Refuge (VA)
Mountain-Prairie Region (R6)	
Monte Vista National Wildlife Refuge (CO)	Sand Lake National Wildlife Refuge (SD)
Quivira National Wildlife Refuge (KS)	National Elk Refuge (WY)
Charles M. Russell National Wildlife Refuge (MT)	
Alaska Region (R7)	
Alaska Maritime National Wildlife Refuge (AK)	Kenai National Wildlife Refuge (AK)
California and Nevada Region (R8)	
Lower Klamath/Tule Lake National Wildlife Refuge (CA)	Ruby Lake National Wildlife Refuge (NV)
Sonny Bono Salton Sea National Wildlife Refuge (CA)	

Refuge staff and/or volunteers (survey recruiters) contacted visitors on-site following a protocol provided by UGSG to ensure a diverse sample. Instructions included contacting visitors across the entire sampling shift (for example, every n^{th} visitor for dense visitation, as often as possible for sparse visitation), and only one person per group. Visitors were informed of the survey effort, given a token incentive (for example, a small magnet, temporary tattoo), and asked to participate. Willing participants provided their name, mailing address, and preference for language (English or Spanish) and survey mode (mail or online). Survey recruiters also were instructed to record any refusals and then proceed with the sampling protocol.

Visitors were mailed a postcard within 10 days of the initial on-site contact thanking them for agreeing to participate in the survey and inviting them to complete the survey online. Those visitors choosing not to complete the survey online were sent a paper copy a week later. Two additional contacts were made by mail during the next seven weeks following a modified Tailored Design Method (Dillman, 2007): 1) a reminder postcard one week after the first survey, and 2) a second paper survey two weeks after the reminder postcard. Each mailing included instructions for completing the survey online and a postage paid envelope for returning the paper version of the survey. Those visitors indicating a preference for Spanish were sent Spanish versions of all correspondence (including the survey). Finally, a short survey of six questions was sent to nonrespondents four weeks after the second survey mailing to determine any differences between respondents and nonrespondents at the national level. Online survey data were exported and paper survey data were entered using a standardized survey codebook and data entry procedure. All survey data were analyzed by using SPSS v.18 statistical analysis software.

Interpreting the Results

The extent to which these results accurately represent the total population of visitors to this refuge is dependent on 1) an adequate sample size of those visitors and 2) the representativeness of that sample. The adequacy of the sample size for this refuge is quantified as the margin of error. The composition of the sample is dependent on the ability of the standardized sampling protocol for this study to account for the spatial and temporal patterns of visitor use specific to each refuge. Spatially, the geographical layout and public use infrastructure varies widely across refuges. Some refuges only can be accessed through a single entrance, while others have multiple unmonitored access points across large expanses of land and water. As a result, the degree to which sampling locations effectively captured spatial patterns of visitor use will likely vary from refuge to refuge. Temporally, the two 15-day sampling periods may not have effectively captured all of the predominant visitor uses/activities on some refuges during the course of a year. Therefore, certain survey measures such as visitors' self-reported "primary activity during their visit" may reflect a seasonality bias.

Herein, the sample of visitors who responded to the survey are referred to simply as "visitors." However, when interpreting the results for Big Muddy NFWR, any potential spatial and temporal sampling limitations specific to this refuge need to be considered when generalizing the results to the total population of visitors. For example, a refuge that sampled during a special event (for example, birding festival) held during the spring may have contacted a higher percentage of visitors who traveled greater than 50 miles to get to the refuge than the actual number of these people who would have visited throughout the calendar year (that is, oversampling of nonlocals). In contrast, another refuge may not have enough nonlocal visitors in the sample to adequately represent the beliefs and opinions of that group type. If the sample for a specific group type (for example, nonlocals, hunters, those visitors who paid a fee) is too low ($n < 30$), a warning is included. Additionally, the term "*this* visit" is used to reference the visit on which people were contacted to participate in the survey, which may or may not have been their most recent refuge visit.

Refuge Description for Big Muddy National Fish and Wildlife Refuge

Big Muddy NFWR stretches the entire state of Missouri, from Kansas City on the west end, to St. Louis on the east end. The pre-settlement Missouri River was subject to large seasonal variations in flows which coursed through a 1,500-foot to one-mile wide braided channel, providing diverse riverine and flood plain habitat. Following the great flood of 1993, many landowners were interested in selling their Missouri River bottomland. In 1994, the refuge was established to restore portions of the Missouri River flood plain; improve and restore wetland habitat; improve fishery and wildlife resources; and provide public opportunities for outdoor recreation and environmental education.

Prior to the government purchasing land to create the refuge, much of the habitat and species diversity was lost to settlement and development. It was not until the great flood that Emergency Supplemental Appropriations provided the means for the government to acquire the land to restore such habitat and species diversity, while also helping the local communities in a time of hardship. Big Muddy NFWR is part of a major migration corridor for waterfowl and other migratory birds. Habitats now consist of bottomland forests, lakes, sloughs and cropland. The refuge also provides habitat for seven threatened and endangered species.

The refuge currently covers 16,743 acres over 10 units located in 11 counties stretching across the width of the Missouri River. The refuge attracts over 27,500 visitors annually (based on 2008 RAPP database; U.S. Fish and Wildlife Service, 2011, written comm.) across its 10 units. Visitors participate in environmental education and interpretation programs, fishing, hunting, wildlife observation, photography, and seasonal mushroom hunting. Hunting activities include deer, turkey, waterfowl, migratory bird, upland bird and small game. Figure 1 displays a map of the refuge. For more information, please visit <http://www.fws.gov/midwest/bigmuddy/>.



Big Muddy National Fish and Wildlife Refuge

Figure 1. Map of Big Muddy NFWR units, courtesy of U.S. Fish and Wildlife Service.

Sampling at Big Muddy National Fish and Wildlife Refuge

A total of 207 visitors agreed to participate in the survey during the two sampling periods at the identified locations at Big Muddy NFWR (table 2). In all, 129 visitors completed the survey for a 63% response rate and $\pm 7\%$ margin of error at the 95% confidence level.¹

Table 2. Sampling and response rate summary for Big Muddy NFWR.

Sampling period	Dates	Locations	Total contacts	Undeliverable addresses	Completed surveys	Response rate
1	10/30/2010 to 11/20 2010	Overton Bottoms North Unit Overton Bottoms South Unit Jameson Island Unit	72	1	50	70%
2	4/9/2011 to 4/23/2011	Overton Bottoms North Unit Overton Bottoms South Unit	135	1	79	60%
Total			207	2	129	63%

Selected Survey Results

Visitor and Trip Characteristics

A solid understanding of refuge visitors and details about their trips to refuges can inform communication outreach efforts, inform visitor services and transportation planning, forecast use, and gauge demand for services and facilities.

Familiarity with the Refuge System

While we did not ask visitors to identify the mission of the National Wildlife Refuge System or the U.S. Fish and Wildlife Service, visitors to Big Muddy NFWR reported that before participating in the survey, they were aware of the role of the U.S. Fish and Wildlife Service in managing national wildlife refuges (90%) and that the Refuge System has the mission of conserving, managing, and restoring fish, wildlife, plants and their habitat (91%). Positive responses to these questions concerning the management and mission of the Refuge System do not indicate the degree to which these visitors understand the day-to-day management practices of individual refuges, only that visitors feel they have a basic knowledge of who manages refuges and why. Compared to other public lands, many visitors feel that refuges provide a unique

¹ The margin of error (or confidence interval) is the error associated with the results related to the sample and population size. A margin of error of $\pm 5\%$, for example, means if 55% of the sample answered a survey question in a certain way, then 50–60% of the entire population would have answered that way. The margin of error is calculated with an 80/20 response distribution, assuming that for any given dichotomous choice question, approximately 80% of respondents selected one choice and 20% selected the other (Salant and Dillman, 1994).

recreation experience (60%; see Appendix B for visitor comments on “What Makes National Wildlife Refuges Unique?”); however, reasons for why visitors find refuges unique are varied and may not directly correspond to their understanding of the mission of the Refuge System. About half of visitors to Big Muddy NFWR had been to at least one other National Wildlife Refuge in the past year (51%), with an average of 5 visits to other refuges during the past 12 months.

Visiting This Refuge

Some surveyed visitors (23%) had only been to Big Muddy NFWR once in the past 12 months, while most had been multiple times (77%). These repeat visitors went to the refuge an average of 11 times during that same 12-month period. Visitors used the refuge during only one season (51%), during multiple seasons (32%), and year-round (17%).

Most visitors first learned about the refuge from friends/relatives (50%), people in the local community (24%), or signs on the highway (20%; fig. 2). Key information sources used by visitors to find their way to this refuge include previous knowledge (57%), signs on highways (30%), or directions from friends/family (18%; fig. 3).

Most visitors (86%) lived in the local area (within 50 miles of the refuge), whereas 14% were nonlocal visitors. For most local visitors, Big Muddy NFWR was the primary purpose or sole destination of their trip (83%; table 3). For most nonlocal visitors, the refuge was also the primary purpose or sole destination of their trip (67%). Local visitors (n = 110) reported that they traveled an average of 19 miles to get to the refuge, while nonlocal visitors (n = 18) traveled an average of 236 miles. ***It is important to note that summary statistics based on a small sample size (n < 30) may not provide a reliable representation of the population.*** Figure 4 shows the residence of visitors travelling to the refuge. Nearly all visitors travelling to Big Muddy NFWR were from Missouri.

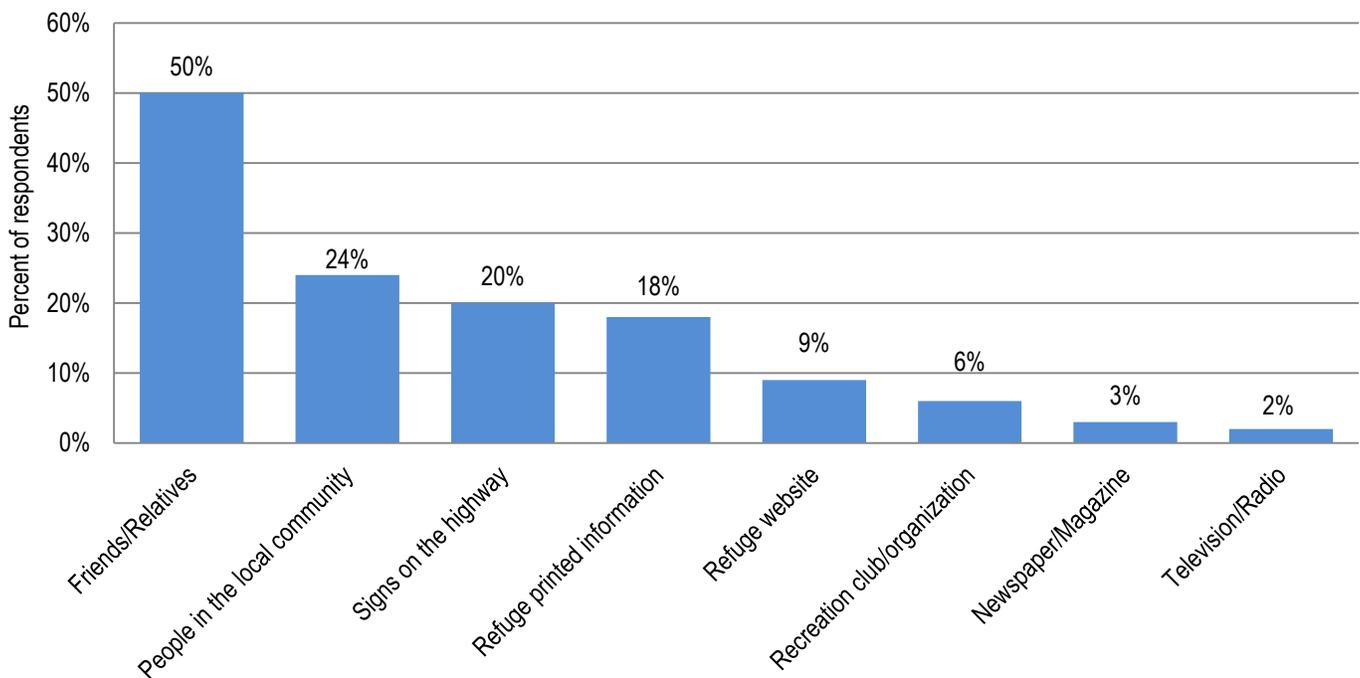


Figure 2. How visitors first learned or heard about Big Muddy NFWR (n = 123).

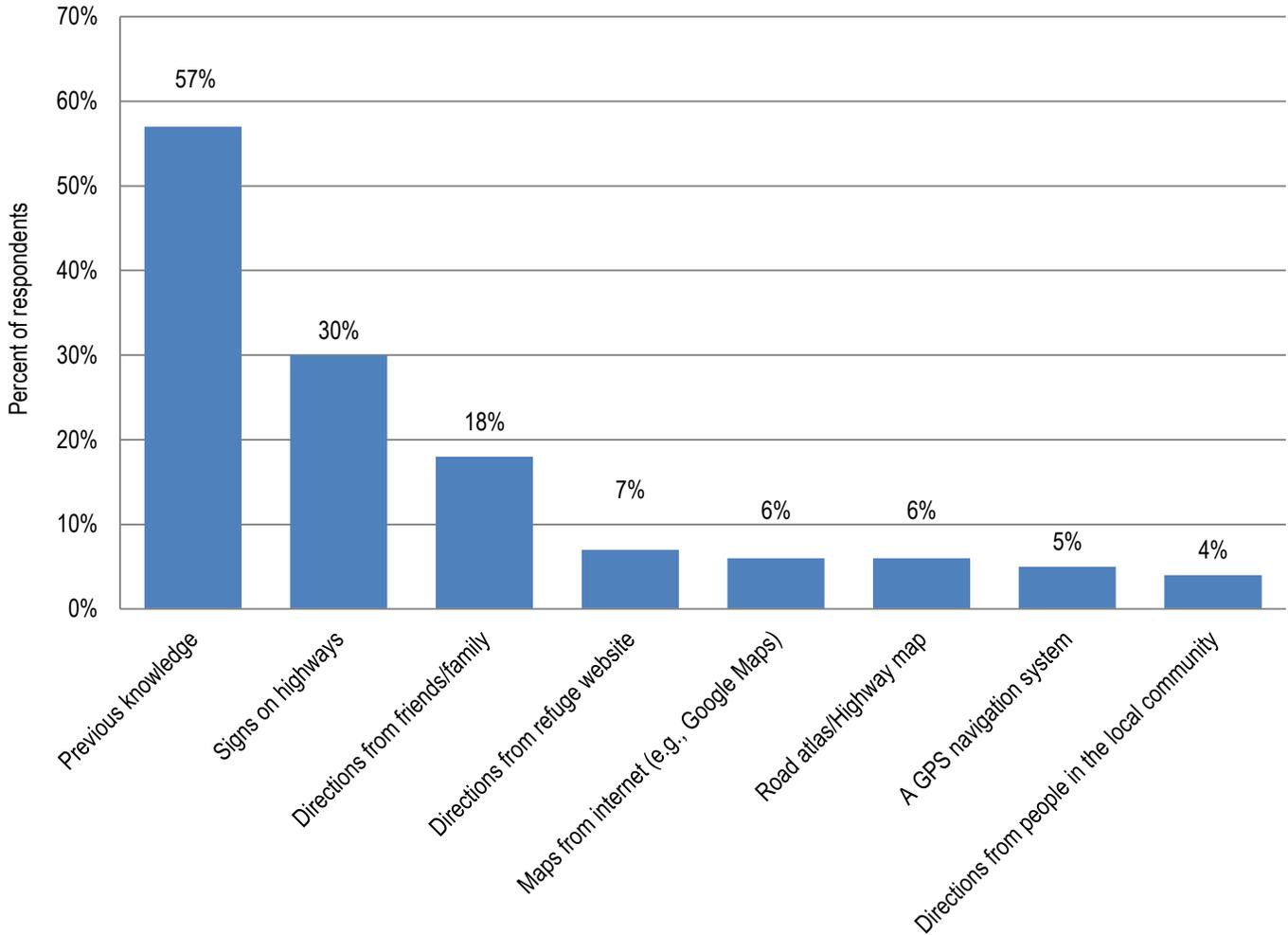


Figure 3. Resources used by visitors to find their way to Big Muddy NFWR during *this* visit (n = 126).

Table 3. Influence of Big Muddy NFWR on visitors' decision to take *this* trip.

Visitors	Visiting this refuge was...		
	the primary reason for trip	one of many equally important reasons for trip	an incidental stop
Nonlocal	67%	5%	28%
Local	83%	8%	9%
Total	80%	8%	12%

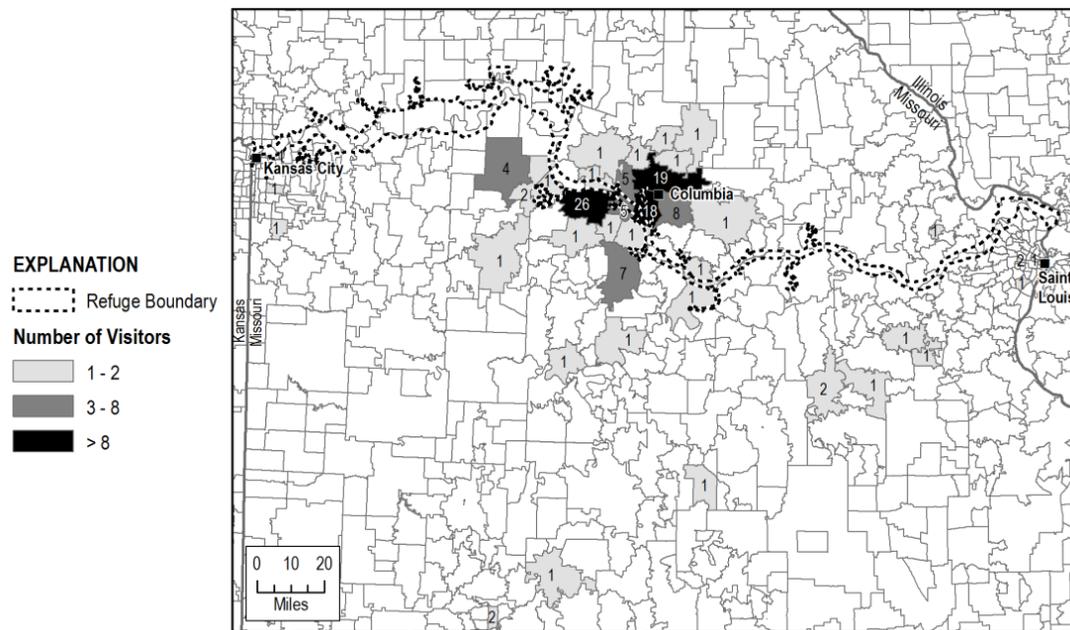


Figure 4. Number of visitors travelling to Big Muddy NFWR by residence. Top map shows residence by state and bottom map shows residence by zip codes near the refuge (n = 129).

Surveyed visitors reported that they spent an average of 4 hours at Big Muddy NFWR during one day there (a day visit is assumed to be 8 hours). However, the most frequently reported length of visit during one day was actually 2 or 4 hours (both 20%). The key modes of transportation used by visitors to travel around the refuge were private vehicle (84%), walking/hiking (27%), and private vehicle with trailer (15%; fig. 5). Most visitors indicated they were part of a group on their visit to this refuge (59%), travelling primarily with family and friends (table 4).

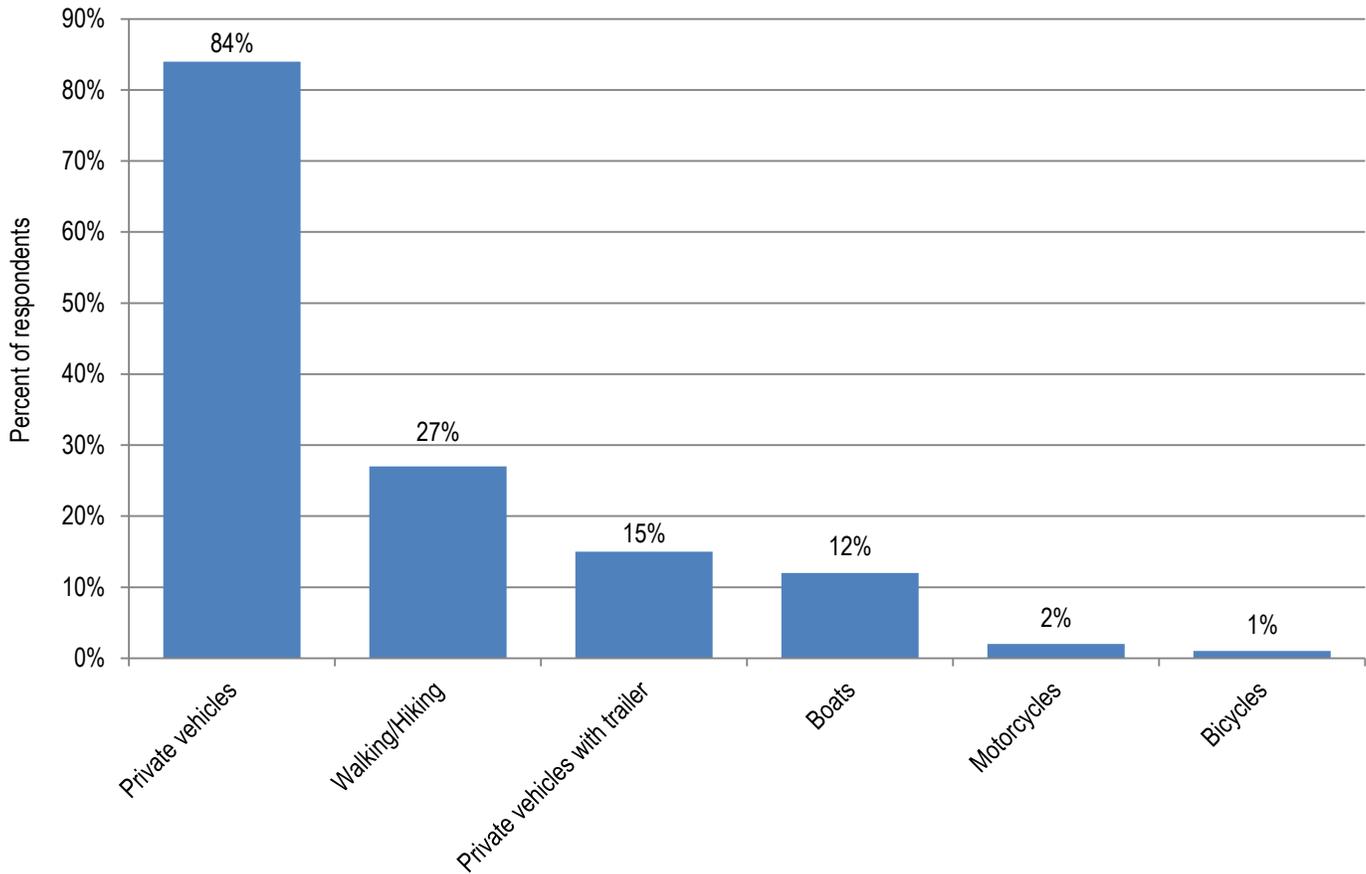


Figure 5. Modes of transportation used by visitors to Big Muddy NFWR during *this* visit (n = 128).

Table 4. Type and size of groups visiting Big Muddy NFWR (for those who indicated they were part of a group, n = 75).

Group type	Percent (of those traveling in a group)	Average group size		
		Number of adults	Number of children	Total group size
Family/Friends	95%	3	1	4
Commercial tour group	0%	0	0	0
Organized club/School group	1%	20	0	20
Other group type	4%	4	0	4

Surveyed visitors participated in a variety of refuge activities during the past 12 months (fig. 6); the top three activities reported were hiking (36%), wildlife observation (35%), and freshwater fishing (25%). The primary reasons for their most recent visit included mushroom picking (40%), hunting (21%), and fishing (9%; fig. 7). Although 12% of visitors indicated they went to the visitor center, Big Muddy NFWR does not have a visitor center. It may be that visitors were referencing the visitor center at Arrow Rock State Historic Site adjacent to the Jameson Island Unit when they answered this question.

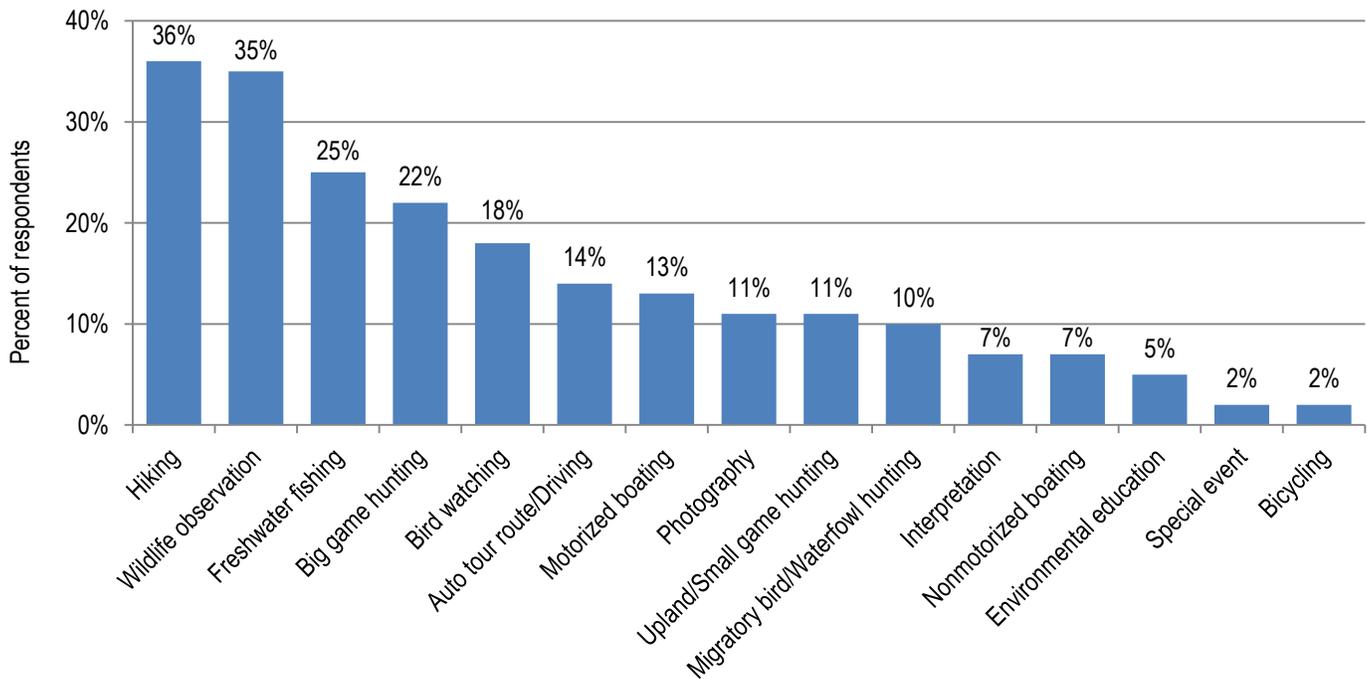


Figure 6. Activities in which visitors participated during the past 12 months at Big Muddy NFWR (n = 129). See Appendix B for a listing of “other” activities.

Visitor Characteristics

Nearly all (99%) surveyed visitors to Big Muddy NFWR indicated that they were citizens or permanent residents of the United States. Only those visitors 18 years or older were sampled. Visitors were a mix of 86% male with an average age of 47 years and 14% female with an average age of 45 years. Visitors, on average, reported they had 14 years of formal education (college or technical school). The median level of income was \$50,000–\$74,999. See Appendix A for more demographic information. In comparison, the 2006 National Survey of Fishing, Hunting and Wildlife-Associated Recreation found that participants in wildlife watching and hunting on public land were 55% male and 45% female with an average age of 46 years, an average level of education of 14 years (associate degree or two years of college), and a median income of \$50,000–\$74,999 (Harris, 2011, personal communication). Compared to the U.S. population, these 2006 survey participants are more likely to be male, older, and have higher education and income levels (U.S. Department of the Interior and U.S. Department of Commerce, 2007).

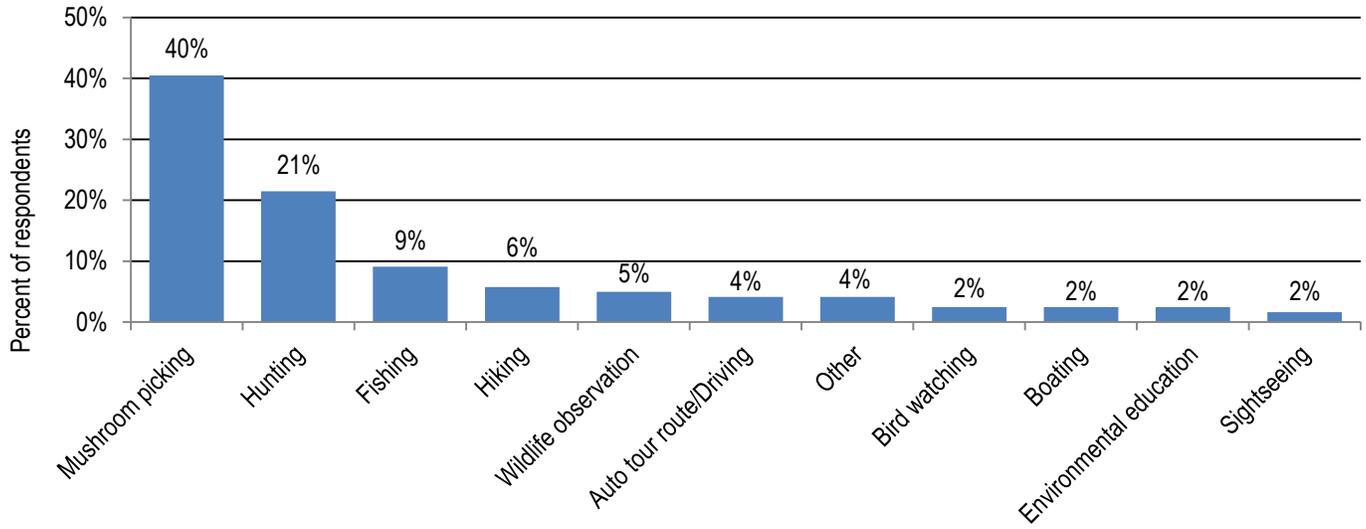


Figure 7. The primary activity in which visitors participated during *this* visit to Big Muddy NFWR (n = 121). See Appendix B for a listing of “other” activities.

Visitor Spending in Local Communities

Tourists usually buy a wide range of goods and services while visiting an area. Major expenditure categories include lodging, food, supplies, and gasoline. Spending associated with refuge visitation can generate considerable economic benefits for the local communities near a refuge. For example, more than 34.8 million visits were made to national wildlife refuges in fiscal year 2006; these visits generated \$1.7 billion in sales, almost 27,000 jobs, and \$542.8 million in employment income in regional economies (Carver and Caudill, 2007). Information on the amount and types of visitor expenditures can illustrate the economic importance of refuge visitor activities to local communities. Visitor expenditure information also can be used to analyze the economic impact of proposed refuge management alternatives.

A region (and its economy) is typically defined as all counties within 50 miles of a travel destination (Stynes, 2008). Visitors that live within the local 50-mile area of a refuge typically have different spending patterns than those that travel from longer distances. During the two sampling periods, 86% of visitors to Big Muddy NFWR indicated that they live within the local area. Nonlocal visitors (14%) stayed in the local area, on average, for 5 days. Table 5 shows summary statistics for local and nonlocal visitor expenditures in the local communities and at the refuge, with expenditures reported on a per person per day basis. ***It is important to note that summary statistics based on a small sample size ($n < 30$) may not provide a reliable representation of that population.*** During the two sampling periods, nonlocal visitors spent an average of \$81 per person per day and local visitors spent an average of \$18 per person per day in the local area. Several factors should be considered when estimating the economic importance of refuge visitor spending in the local communities. These include the amount of time spent at the refuge, influence of refuge on decision to take this trip, and the representativeness of primary activities of the sample of surveyed visitors compared to the general population. Controlling for these factors is beyond the scope of the summary statistics presented in this report. Detailed refuge-level visitor spending profiles which do consider these factors will be developed during the next phase of analysis.

Table 5. Total visitor expenditures in local communities and at Big Muddy NFWR expressed in dollars per person per day.

Visitors	n ¹	Median	Mean	Standard deviation	Minimum	Maximum
Nonlocal	15	\$63	\$81	\$106	\$0	\$425
Local	83	\$12	\$18	\$17	\$0	\$80

¹n = number of visitors who answered both locality *and* expenditure questions.

Note: For each respondent, reported expenditures were divided by the number of persons in their group that shared expenses in order to determine the spending per person per trip. This was then divided by the number of days spent in the local area to determine the spending per person per day for each respondent. For respondents who reported spending less than one full day, trip length was set equal to one day. These visitor spending estimates are appropriate for the sampling periods selected by refuge staff (see table 2 for sampling period dates and figure 7 for the primary visitor activities). They may not be representative of the total population of visitors to this refuge.

Visitor Opinions about This Refuge

National wildlife refuges provide visitors with a variety of services, facilities, and wildlife-dependent recreational opportunities. Understanding visitors' perceptions of their refuge experience is a key component of the Refuge System mission as it pertains to providing high-quality wildlife-dependent recreational opportunities. Having a baseline understanding of visitor experience can inform management decisions to better balance visitors' expectations with the Refuge System mission. Recent studies in outdoor recreation have included an emphasis on declining participation in traditional activities such as hunting and an increasing need to connect the next generation to nature and wildlife. These factors highlight the importance of current refuge visitors as a key constituency in wildlife conservation. A better understanding is increasingly needed to better manage the visitor experience and to address the challenges of the future.

Surveyed visitors' overall satisfaction with the services, facilities, and recreational opportunities provided at Big Muddy NFWR were as follows (fig. 8):

- 88% were satisfied with the recreational activities and opportunities,
- 83% were satisfied with the information and education about the refuge and its resources,
- 74% were satisfied with the services provided by employees or volunteers, and
- 86% were satisfied with the refuge's job of conserving fish, wildlife and their habitats.

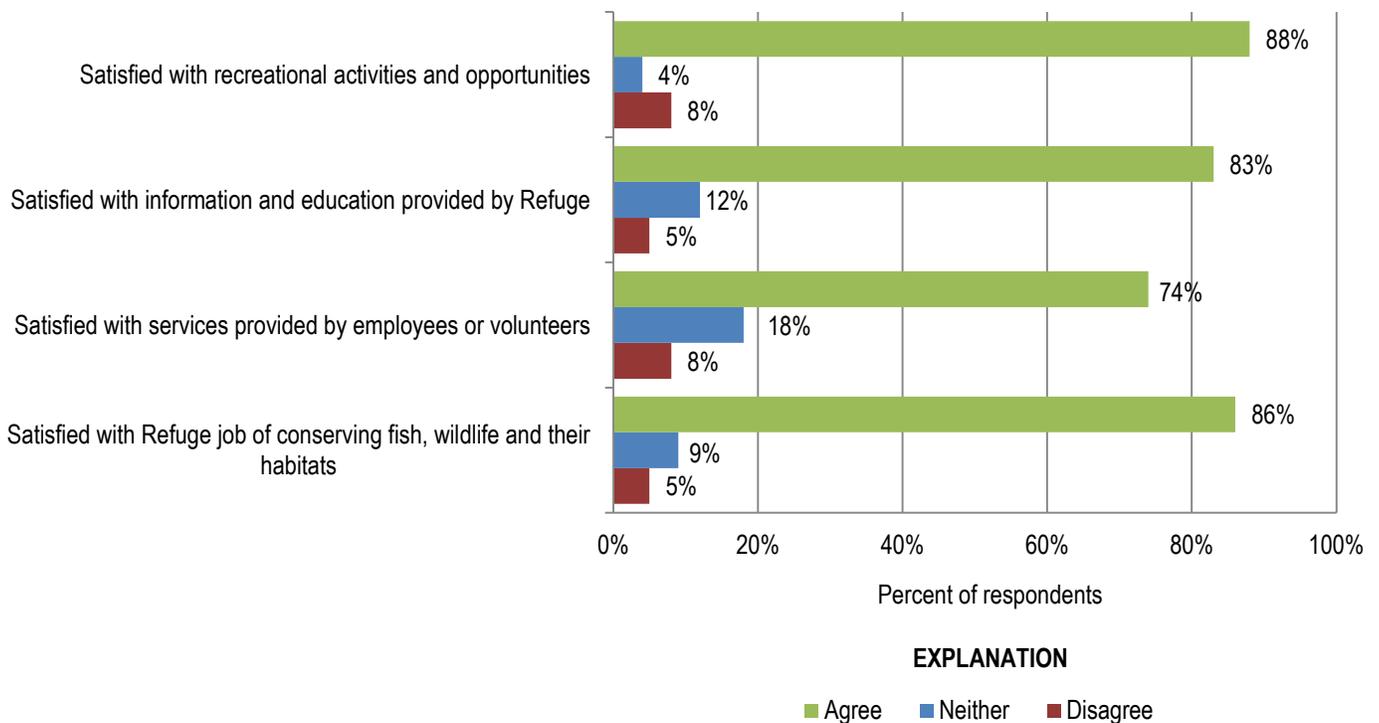


Figure 8. Overall satisfaction with Big Muddy NFWR during *this* visit (n ≥ 101).

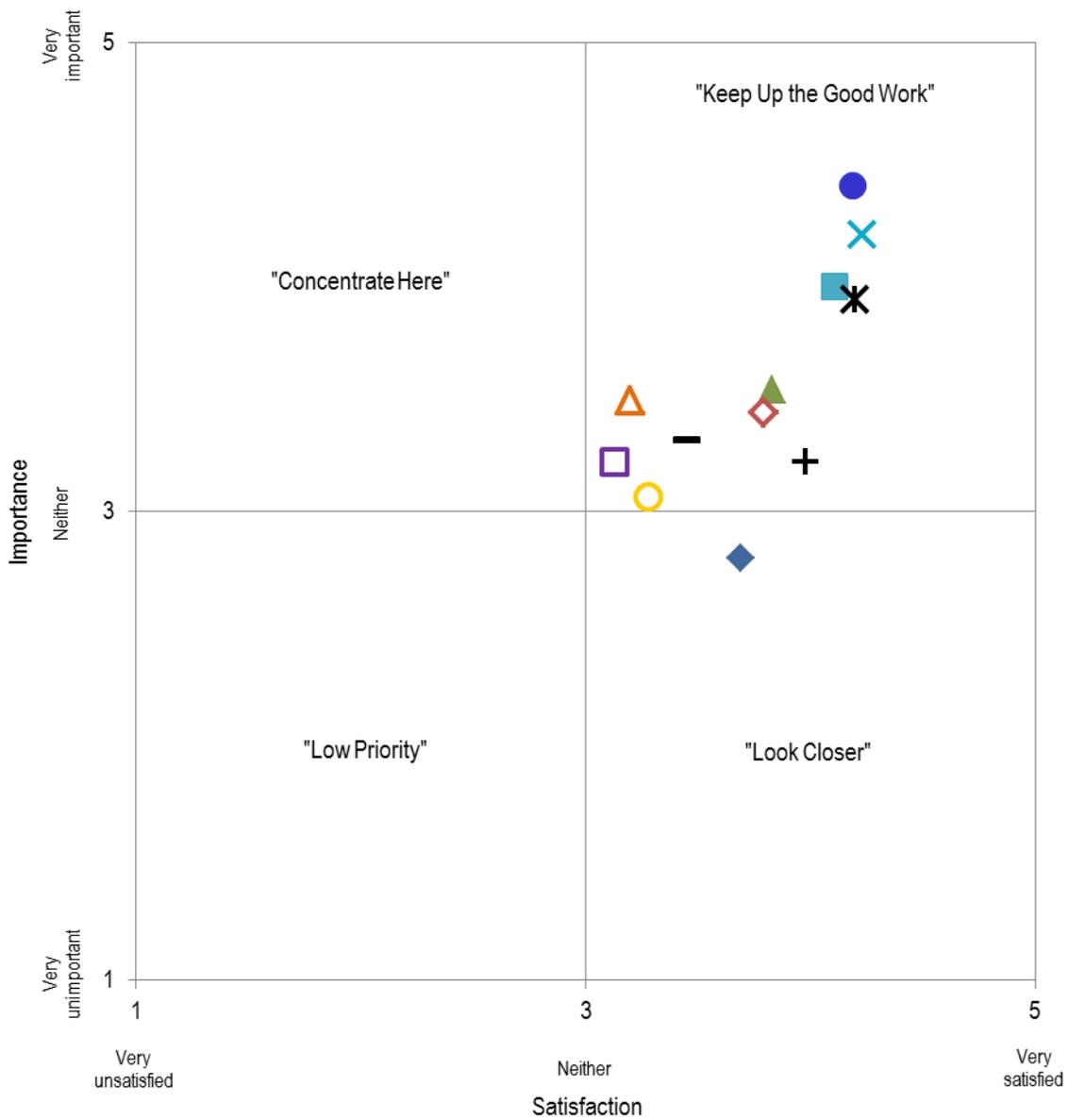
Importance/Satisfaction Ratings

Comparing the importance and satisfaction ratings for visitor services provided by refuges can help to identify how well the services are meeting visitor expectations. The importance-performance framework presented in this section is a tool that includes the importance of an attribute to visitors in relation to their satisfaction with that attribute. Drawn from marketing research, this tool has been applied to outdoor recreation and visitation settings (Martilla and James, 1977; Tarrant and Smith, 2002). Results for the attributes of interest are segmented into one of four quadrants (modified for this national study):

- Keep Up the Good Work = high importance/high satisfaction;
- Concentrate Here = high importance/low satisfaction;
- Low Priority = low importance/low satisfaction; and
- Look Closer = low importance/high satisfaction.

Graphically plotting visitors' importance and satisfaction ratings for different services, facilities, and recreational opportunities provides a simple and intuitive visualization of these survey measures. However, this tool is not without its drawbacks. One is the potential for variation among visitors regarding their expectations and levels of importance (Vaske et al., 1996; Bruyere et al., 2002; Wade and Eagles, 2003), and certain services or recreational opportunities may be more or less important for different segments of the visitor population. For example, hunters may place more importance on hunting opportunities and amenities such as blinds, while school group leaders may place more importance on educational/informational displays than would other visitors. This potential for highly varied importance ratings needs to be considered when viewing the average results of this analysis of visitors to Big Muddy National Fish and Wildlife Refuge. This consideration is especially important when reviewing the attributes that fall into the "Look Closer" quadrant. In some cases, these attributes may represent specialized recreational activities in which a small subset of visitors participate (for example, hunting, kayaking) or facilities and services that only some visitors experience (for example, exhibits about the refuge). For these visitors, the average importance of (and potentially the satisfaction with) the attribute may be much higher than it would be for the overall population of visitors.

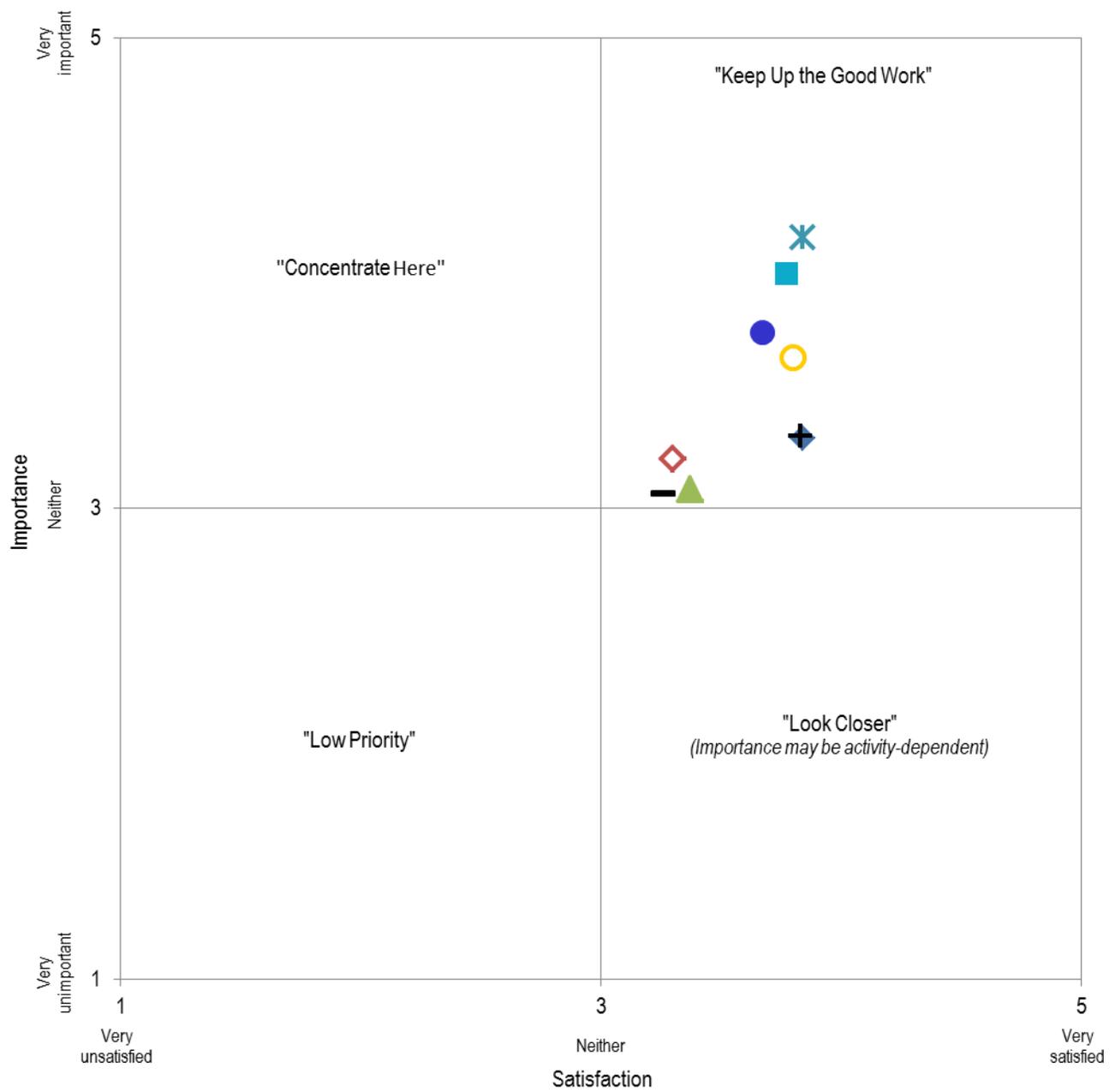
Figures 9-11 depict surveyed visitors' importance-satisfaction results for refuge services and facilities, recreational opportunities, and transportation-related features at Big Muddy NFWR, respectively. Nearly all refuge services and facilities fell in the "Keep Up the Good Work" quadrant except availability of employees/volunteers, which fell into the "Look Closer" quadrant (fig. 9). All refuge recreational opportunities fell in the "Keep Up the Good Work" quadrant (fig. 10). All transportation-related features fell in the "Keep Up the Good Work" quadrant (fig. 11).



EXPLANATION

- ◆ Availability of employees/volunteers
- ▲ Knowledgeable employees/volunteers
- Signs with rules/regulations
- Environmental education programs/activities
- Convenient hours/days of operation
- ▲ Well-maintained restrooms
- + Courteous/welcoming employees/volunteers
- × Printed information about this Refuge
- ◇ Exhibits about this Refuge
- Visitor Center
- ✕ Informational kiosks/displays about this Refuge
- Wildlife observation structures

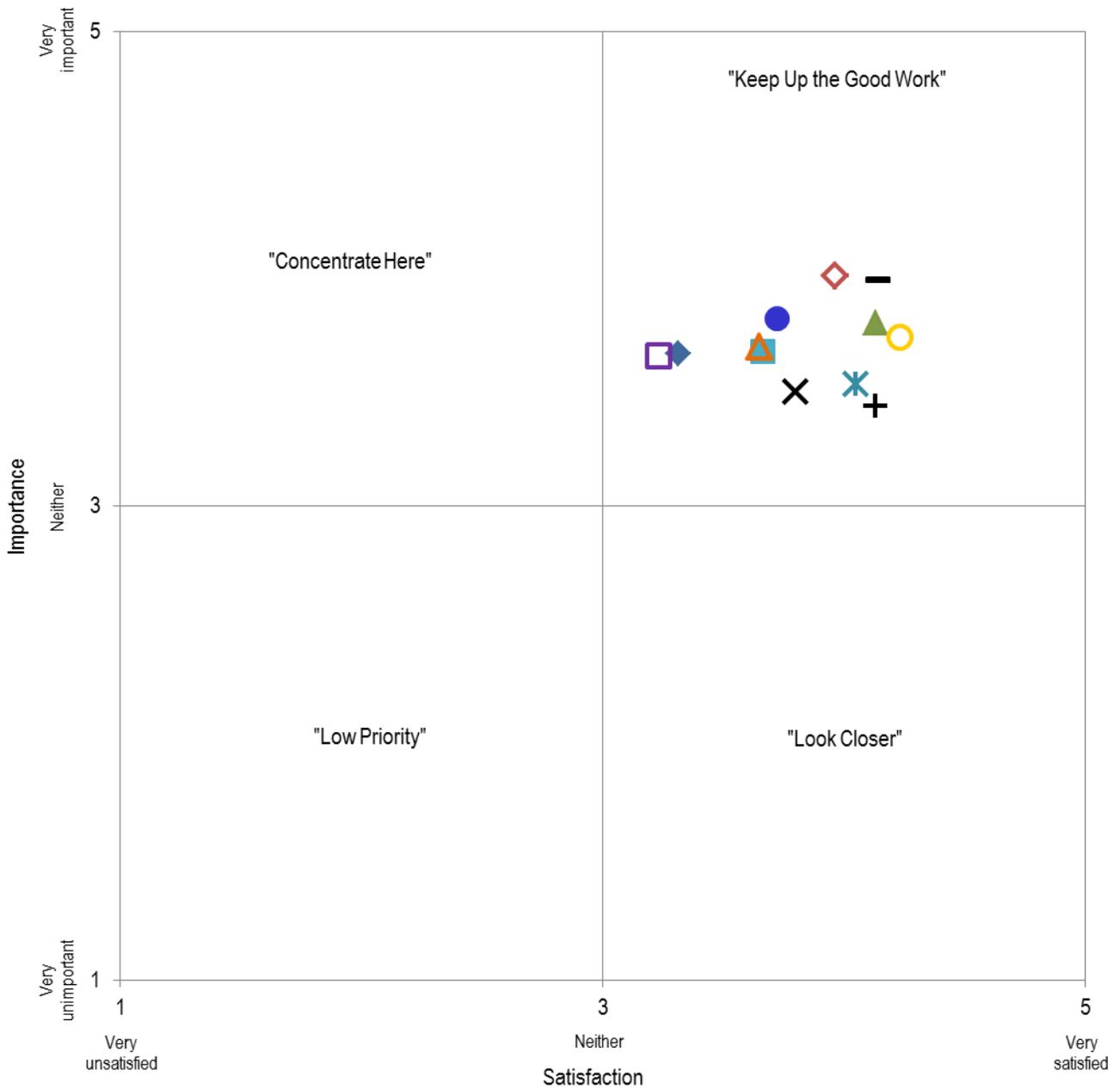
Figure 9. Importance-satisfaction ratings of services and facilities provided at Big Muddy NFWR.



EXPLANATION

- ◆ Bird watching opportunities
- Wildlife viewing opportunities
- + Photography opportunities
- Hunting opportunities
- × Fishing opportunities
- Hiking opportunities
- ◇ Kayak/Canoe opportunities
- Bicycling opportunities
- ▲ Volunteer opportunities

Figure 10. Importance-satisfaction ratings of recreational opportunities provided at Big Muddy NFWR.



EXPLANATION

- | | | | |
|---------------------------------|-------------------------------|--------------------------------|----------------------------------|
| ◆ Condition of roads | + Condition of parking areas | ▲ Condition of bridges | ✕ Condition of trails/boardwalks |
| ✕ Number of parking places | ● Number of pullovers | ◇ Safety of driving conditions | — Safety of Refuge entrances |
| ○ Directional signs on highways | ■ Directional signs on Refuge | △ Directional signs on trails | □ Disabled access |

Figure 11. Importance-satisfaction ratings of transportation-related features at Big Muddy NFWR.

Visitor Opinions about National Wildlife Refuge System Topics

One goal of this national visitor survey was to identify visitor trends across the Refuge System to more effectively manage refuges and provide visitor services. Two important issues to the Refuge System are transportation on refuges and communicating with visitors about climate change. The results to these questions will be most meaningful when they are evaluated in aggregate (data from all participating refuges together). However, basic results for Big Muddy National Fish and Wildlife Refuge are reported here.

Alternative Transportation and the National Wildlife Refuge System

Visitors use a variety of transportation means to access and enjoy national wildlife refuges. While many visitors arrive at the refuge in a private vehicle, alternatives such as buses, trams, watercraft, and bicycles are increasingly becoming a part of the visitor experience. Previous research has identified a growing need for transportation alternatives within the Refuge System (Krechmer et al., 2001); however, less is known about how visitors perceive and use these new transportation options. An understanding of visitors' likelihood of using certain alternative transportation options can help in future planning efforts. Visitors were asked their likelihood of using alternative transportation options at national wildlife refuges in the future.

Of the six Refuge System-wide alternative transportation options listed on the survey, the majority of Big Muddy NFWR visitors who were surveyed were likely to use the following options at national wildlife refuges in the future (fig. 12):

- an offsite parking lot that provides trail access; and
- a boat that goes to different points on Refuge waterways.

The majority of visitors were *not* likely to use:

- a bus/tram that takes passengers to different points,
- a bus/tram that provides a guided tour,
- a bike share program, or
- a bus/tram that runs during a special event on national wildlife refuges in the future (fig. 12).

When asked about using alternative transportation at Big Muddy NFWR specifically, 32% of visitors indicated they were unsure whether it would enhance their experience; however, some visitors thought alternative transportation would enhance their experience (15%) and others thought it would not (54%).

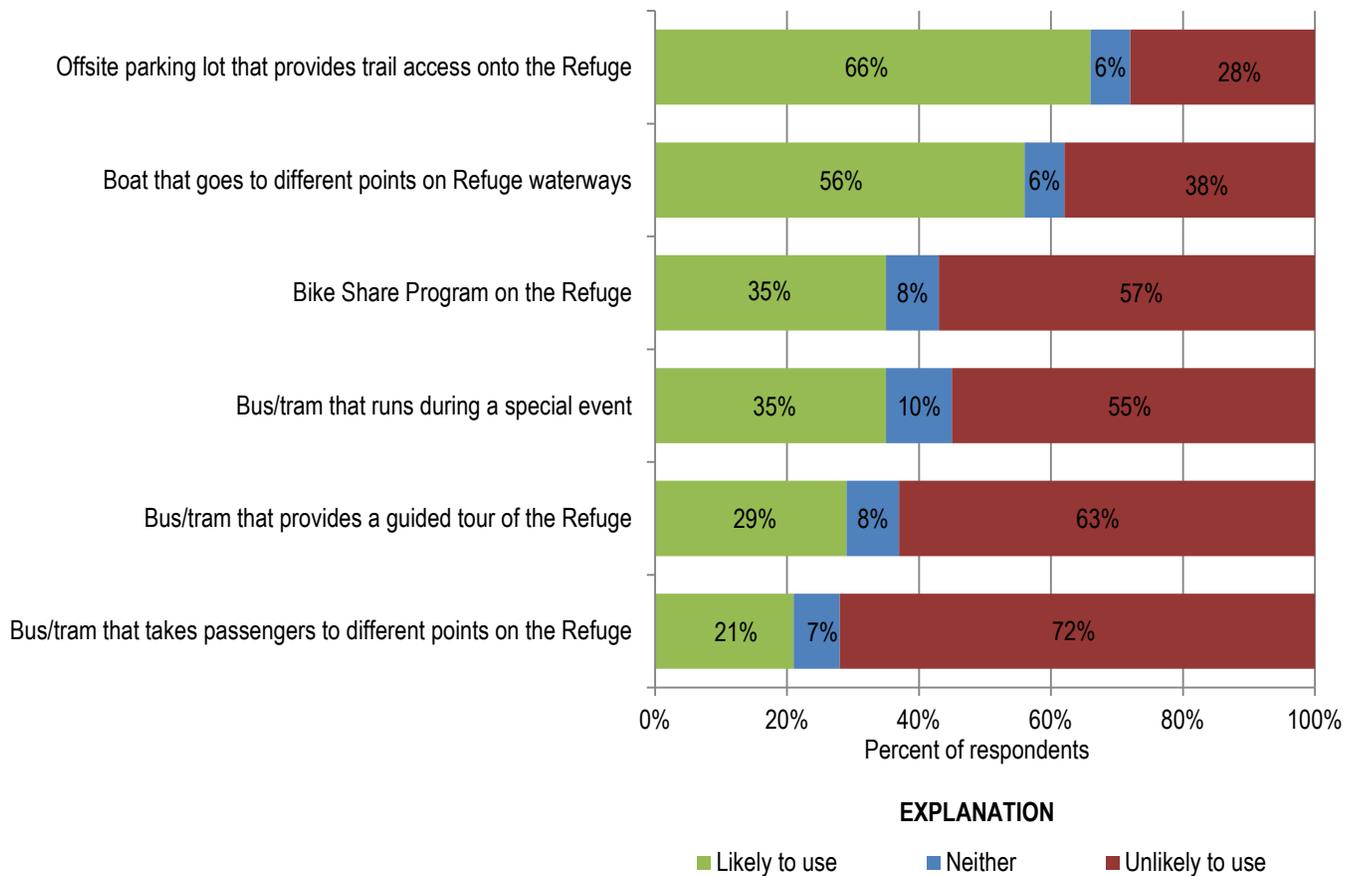


Figure 12. Visitors' likelihood of using alternative transportation options at national wildlife refuges in the future (n ≥ 122).

Climate Change and the National Wildlife Refuge System

Climate change represents a growing concern for the management of national wildlife refuges. The Service's climate change strategy, titled "Rising to the Urgent Challenge," establishes a basic framework for the agency to work within a larger conservation community to help ensure wildlife, plant, and habitat sustainability (U.S. Fish and Wildlife Service, 2010). To support the guiding principles of the strategy, refuges will be exploring options for more effective engagement with visitors on this topic. The national visitor survey collected information about visitors' level of personal involvement in climate change related to fish, wildlife and their habitats and visitors' beliefs regarding this topic. Items draw from the "Six Americas" framework for understanding public sentiment toward climate change (Leiserowitz, Maibach, and Roser-Renouf, 2008) and from literature on climate change message frames (for example, Nisbet, 2009). Such information provides a baseline for understanding visitor perceptions of climate change in the context of fish and wildlife conservation that can further inform related communication and outreach strategies.

Factors that influence how individuals think about climate change include their basic beliefs, levels of involvement, policy preferences, and behaviors related to this topic. Results presented below provide baseline information on visitors' levels of involvement with the topic of climate change related to fish,

wildlife and their habitats. The majority of surveyed visitors to Big Muddy NFWR agreed with the following statements (fig. 13):

- “I am personally concerned about the effects of climate change on fish, wildlife and habitats.”

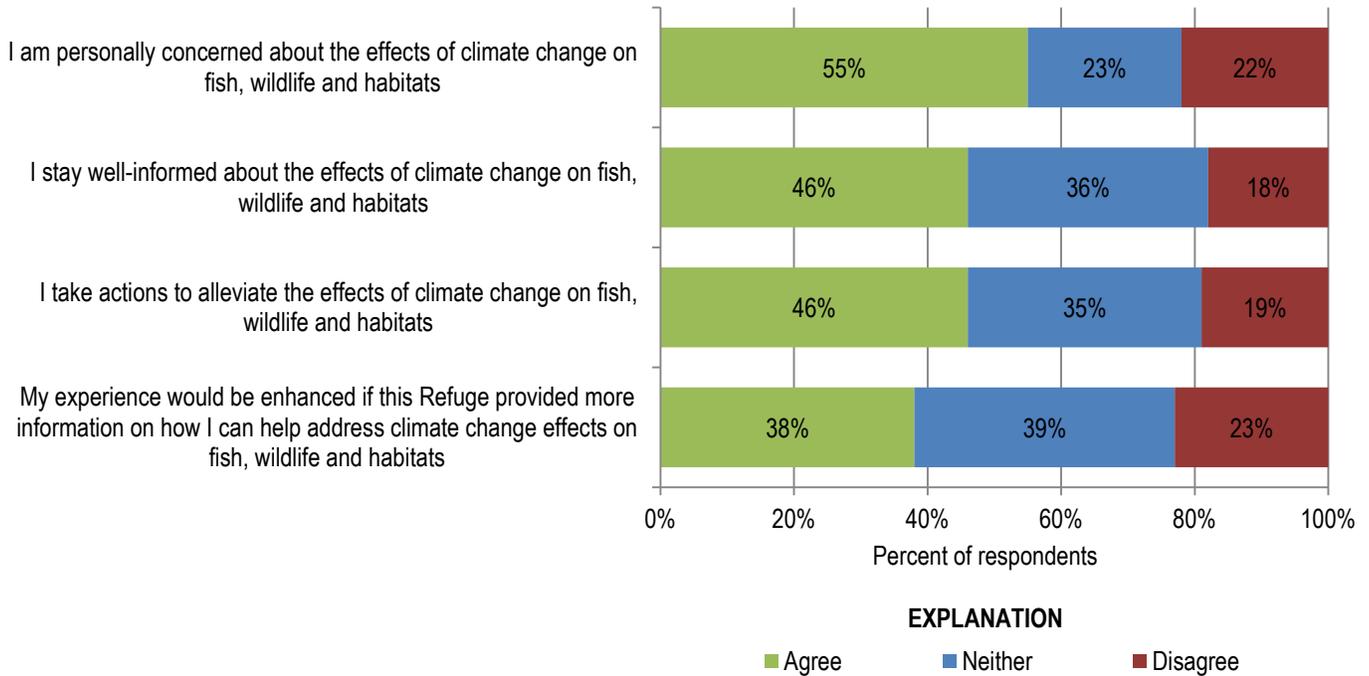


Figure 13. Visitors’ personal involvement with climate change related to fish, wildlife and their habitats (n ≥ 120).

These results are most useful when coupled with responses to belief statements about the effects of climate change on fish, wildlife and their habitats, because such beliefs may be used to develop message frames (or ways to communicate) about climate change with a broad coalition of visitors. Framing science-based findings will not alter the overall message, but rather place the issue in a context in which different audience groupings can relate. The need to mitigate impacts of climate change on Refuges could be framed as a quality-of-life issue (for example, preserving the ability to enjoy fish, wildlife, plants, and their habitat) or an economic issue (for example, maintaining tourist revenues, supporting economic growth through new jobs/technology).

For Big Muddy NFWR, the majority of visitors believed the following regarding climate change related to fish, wildlife and their habitats (fig. 14):

- “It is important to consider the economic costs and benefits to local communities when addressing climate change effects;”
- “Future generations will benefit if we address climate change effects;”
- “We can improve our quality of life if we address the effects of climate change;” and
- “There is too much scientific uncertainty to adequately understand climate change effects.”

Such information suggests that certain beliefs resonate with a greater number of visitors than other beliefs do. This information is important to note because some visitors (38%) indicated that their experience would be enhanced if Big Muddy NFWR provided information about how they could help address the effects of climate change on fish, wildlife, and their habitats (fig. 13), and framing the information in a way that resonates most with visitors may result in a more engaged public who support strategies aimed at alleviating climate change pressures. Data will be analyzed further at the aggregate, or national level, to inform the development of a comprehensive communication strategy about climate change.

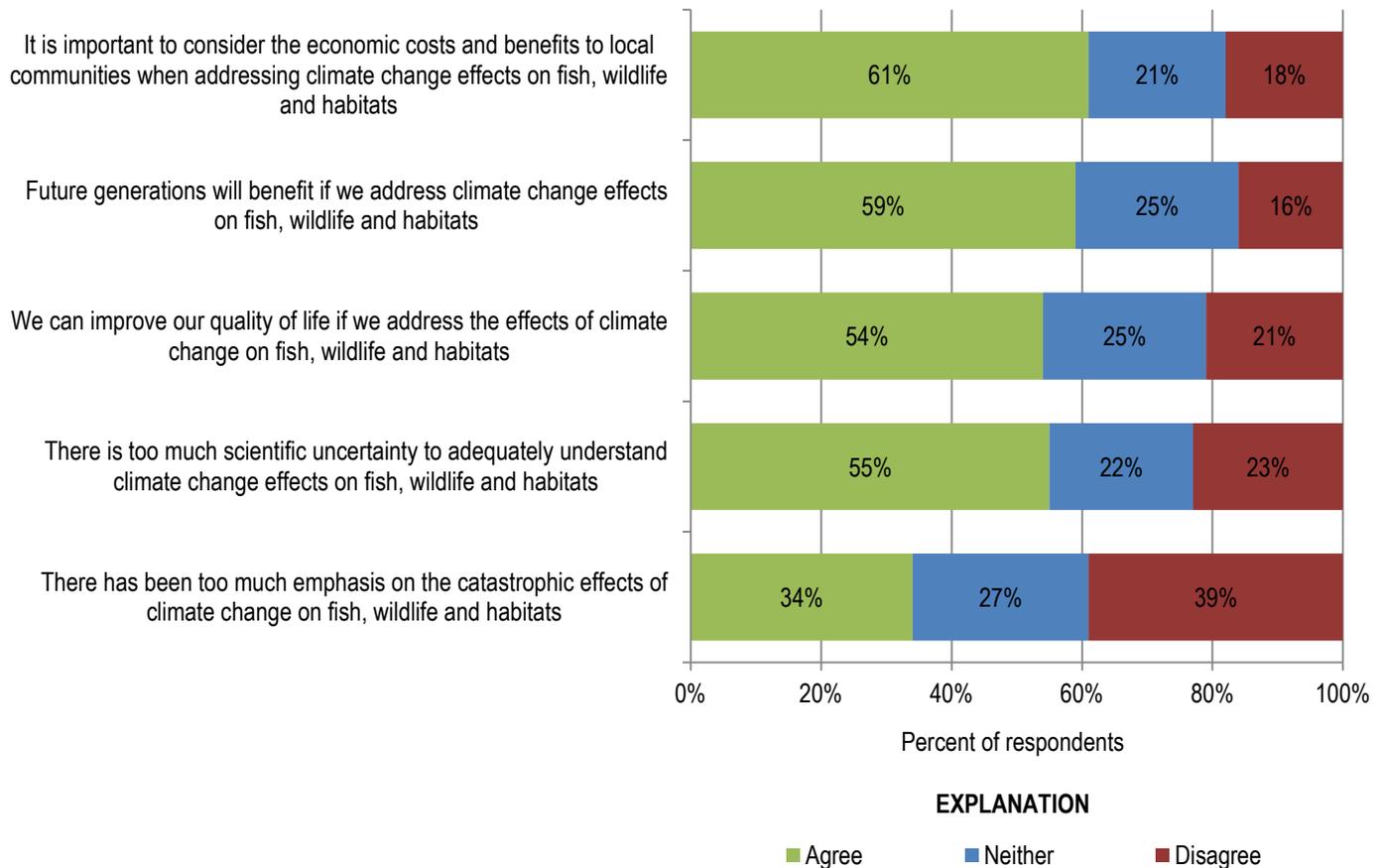


Figure 14. Visitors' beliefs about the effects of climate change on fish, wildlife and their habitats (n ≥ 117).

Conclusion

These individual refuge results provide a summary of trip characteristics and experiences of a sample of visitors to Big Muddy NFWR during 2010–2011. These data can be used to inform decision-making efforts related to the refuge, such as Comprehensive Conservation Plan implementation, visitor services management, and transportation planning and management. For example, when modifying (either minimizing or enhancing) visitor facilities, services, or recreational opportunities, a solid understanding of visitors' trip and activity characteristics, their satisfaction with existing offerings, and opinions regarding refuge fees is helpful. This information can help to gauge demand for refuge opportunities and inform both implementation and communication strategies. Similarly, an awareness of visitors' satisfaction ratings with refuge offerings can help determine if any potential areas of concern need to be investigated further. As another example of the utility of these results, community relations may be improved or bolstered through an understanding of the value of the refuge to visitors, whether that value is attributed to an appreciation of the refuge's uniqueness, enjoyment of its recreational opportunities, or spending contributions of nonlocal visitors to the local economy. Such data about visitors and their experiences, in conjunction with an understanding of biophysical data on the refuge, can ensure that management decisions are consistent with the Refuge System mission while fostering a continued public interest in these special places.

Individual refuge results are available for downloading at <http://pubs.usgs.gov/ds/643/> as part of USGS Data Series 643 (Sexton and others, 2011). For additional information about this project, contact the USGS researchers at national_visitor_survey@usgs.gov or 970.226.9205.

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National Wildlife Refuge Visitor Survey



PLEASE READ THIS FIRST:

Thank you for visiting a National Wildlife Refuge and for agreeing to participate in this study! We hope that you had an enjoyable experience. The U.S. Fish and Wildlife Service and the U.S. Geological Survey would like to learn more about National Wildlife Refuge visitors in order to improve the management of the area and enhance visitor opportunities.

If you have recently visited more than one National Wildlife Refuge or made more than one visit to the same Refuge, please respond regarding only the Refuge and the visit when you were asked to participate in this survey. Any question that uses the phrase “this Refuge” refers to the Refuge and visit when you were contacted.

SECTION 1. Your visit to this Refuge

1. Including your most recent visit, which activities have you participated in during the past 12 months at this Refuge?
(Please mark **all that apply.**)

- | | | |
|---|--|--|
| <input type="checkbox"/> 22% Big game hunting | <input type="checkbox"/> 36% Hiking | <input type="checkbox"/> 5% Environmental education (for example, classrooms or labs, tours) |
| <input type="checkbox"/> 11% Upland/Small-game hunting | <input type="checkbox"/> 2% Bicycling | |
| <input type="checkbox"/> 10% Migratory bird/Waterfowl hunting | <input type="checkbox"/> 14% Auto tour route/Driving | <input type="checkbox"/> 2% Special event (<i>please specify</i>)
<u>See Appendix B</u> |
| <input type="checkbox"/> 35% Wildlife observation | <input type="checkbox"/> 13% Motorized boating | |
| <input type="checkbox"/> 18% Bird watching | <input type="checkbox"/> 7% Nonmotorized boating (including canoes/kayaks) | <input type="checkbox"/> 47% Other (<i>please specify</i>)
<u>See Appendix B</u> |
| <input type="checkbox"/> 25% Freshwater fishing | | |
| <input type="checkbox"/> 0% Saltwater fishing | <input type="checkbox"/> 7% Interpretation (for example, exhibits, kiosks, videos) | <input type="checkbox"/> 2% Other (<i>please specify</i>)
<u>See Appendix B</u> |
| <input type="checkbox"/> 11% Photography | | |

2. Which of the activities above was the ***primary*** purpose of your visit to this Refuge?
(Please write **only one activity** on the line.) See report for categorized results; see Appendix B for miscellaneous responses

3. Did you go to a Visitor Center at this Refuge?

- 88% No
- 12% Yes → If yes, what did you do there? (Please mark **all that apply.**)
- | | |
|---|---|
| <input type="checkbox"/> 7% Visit the gift shop or bookstore | <input type="checkbox"/> 0% Watch a nature talk/video/presentation |
| <input type="checkbox"/> 27% View the exhibits | <input type="checkbox"/> 20% Stopped to use the facilities (for example, get water, use restroom) |
| <input type="checkbox"/> 7% Ask information of staff/volunteers | <input type="checkbox"/> 53% Other (<i>please specify</i>) <u>See Appendix B</u> |

4. Which of the following best describes your visit to this Refuge? (*Please mark **only one.***)

Nonlocal	Local	Total	
67%	83%	81%	It was the primary purpose or sole destination of my trip.
6%	8%	8%	It was one of many equally important reasons or destinations for my trip.
28%	9%	12%	It was just an incidental or spur-of-the-moment stop on a trip taken for other purposes or to other destinations.

5. Approximately how many **miles** did you travel to get to this Refuge?

Nonlocal 236 number of miles

Local 19 number of miles

6. How much time did you spend at this Refuge on your visit?

See Report for Results

7. Were you part of a group on your visit to this Refuge?

41% No (*skip to question #9*)

59% Yes → What **type of group** were you with on your visit? (*Please mark **only one.***)

95% Family and/or friends

1% Organized club or school group

0% Commercial tour group

4% Other (*please specify*) See Appendix B

8. How many people were in your group, including yourself? (*Please answer each category.*)

3 number 18 years and over

1 number 17 years and under

9. How did you **first learn or hear about** this Refuge? (*Please mark **all that apply.***)

50% Friends or relatives

9% Refuge website

20% Signs on highway

2% Other website (*please specify*) See Appendix B

6% Recreation club or organization

2% Television or radio

24% People in the local community

3% Newspaper or magazine

18% Refuge printed information (brochure, map)

7% Other (*please specify*) See Appendix B

10. During which seasons have you visited this Refuge in the last 12 months? (*Please mark **all that apply.***)

77% Spring
(March-May)

34% Summer
(June-August)

58% Fall
(September-November)

25% Winter
(December-February)

11. How many times have you visited...

...this Refuge (including this visit) in the last 12 months? 9 number of visits

...other National Wildlife Refuges in the last 12 months? 3 number of visits

SECTION 2. Transportation and access at this Refuge

1. What **forms of transportation** did you use on your visit to this Refuge? (*Please mark **all that apply.***)

- | | | | | | |
|------------------------------|---|------------------------------|----------------------------------|------------------------------|---------------------------------------|
| <input type="checkbox"/> 84% | Private vehicle without a trailer | <input type="checkbox"/> 0% | Refuge shuttle bus or tram | <input type="checkbox"/> 1% | Bicycle |
| <input type="checkbox"/> 15% | Private vehicle with a trailer
(for boat, camper or other) | <input type="checkbox"/> 2% | Motorcycle | <input type="checkbox"/> 27% | Walk/Hike |
| <input type="checkbox"/> 0% | Commercial tour bus | <input type="checkbox"/> 0% | ATV or off-road vehicle | <input type="checkbox"/> 2% | Other (<i>please specify below</i>) |
| <input type="checkbox"/> 0% | Recreational vehicle (RV) | <input type="checkbox"/> 12% | Boat | <u>See Appendix B</u> | |
| | | <input type="checkbox"/> 0% | Wheelchair or other mobility aid | | |

2. Which of the following did you use to find your way to this Refuge? (*Please mark **all that apply.***)

- | | | | |
|------------------------------|--|------------------------------|---|
| <input type="checkbox"/> 30% | Signs on highways | <input type="checkbox"/> 7% | Directions from Refuge website |
| <input type="checkbox"/> 5% | A GPS navigation system | <input type="checkbox"/> 4% | Directions from people in community near this Refuge |
| <input type="checkbox"/> 6% | A road atlas or highway map | <input type="checkbox"/> 18% | Directions from friends or family |
| <input type="checkbox"/> 6% | Maps from the Internet (for example,
MapQuest or Google Maps) | <input type="checkbox"/> 57% | Previous knowledge/I have been to this Refuge before |
| | | <input type="checkbox"/> 2% | Other (<i>please specify</i>) <u>See Appendix B</u> |

3. Below are different alternative transportation options that could be offered at some National Wildlife Refuges in the future. Considering the different Refuges you may have visited, please tell us **how likely you would be to use each transportation option.** (*Please circle one number for each statement.*)

How likely would you be to use...	Very Unlikely	Somewhat Unlikely	Neither	Somewhat Likely	Very Likely
...a bus or tram that takes passengers to different points on the Refuge (such as the Visitor Center)?	<input type="checkbox"/> 56%	<input type="checkbox"/> 16%	<input type="checkbox"/> 6%	<input type="checkbox"/> 14%	<input type="checkbox"/> 7%
...a bike that was offered through a Bike Share Program for use while on the Refuge?	<input type="checkbox"/> 48%	<input type="checkbox"/> 10%	<input type="checkbox"/> 8%	<input type="checkbox"/> 22%	<input type="checkbox"/> 13%
...a bus or tram that provides a guided tour of the Refuge with information about the Refuge and its resources?	<input type="checkbox"/> 50%	<input type="checkbox"/> 14%	<input type="checkbox"/> 8%	<input type="checkbox"/> 22%	<input type="checkbox"/> 6%
...a boat that goes to different points on Refuge waterways?	<input type="checkbox"/> 31%	<input type="checkbox"/> 7%	<input type="checkbox"/> 7%	<input type="checkbox"/> 29%	<input type="checkbox"/> 27%
...a bus or tram that runs during a special event (such as an evening tour of wildlife or weekend festival)?	<input type="checkbox"/> 48%	<input type="checkbox"/> 7%	<input type="checkbox"/> 10%	<input type="checkbox"/> 23%	<input type="checkbox"/> 12%
...an offsite parking lot that provides trail access for walking/hiking onto the Refuge?	<input type="checkbox"/> 18%	<input type="checkbox"/> 10%	<input type="checkbox"/> 6%	<input type="checkbox"/> 31%	<input type="checkbox"/> 35%
...some other alternative transportation option? (<i>please specify</i>) <u>See Appendix B</u>	<input type="checkbox"/> 21%	<input type="checkbox"/> 0%	<input type="checkbox"/> 0%	<input type="checkbox"/> 43%	<input type="checkbox"/> 36%

4. If alternative transportation were offered at *this* Refuge, would it enhance your experience?

- 15% Yes 54% No 32% Not Sure

5. For each of the following transportation-related features, first, **rate how important** each feature is to you when visiting this Refuge; then **rate how satisfied** you are with the way this Refuge is managing each feature. *If this Refuge does not offer a specific transportation-related feature, please rate how important it is to you and then circle NA "Not Applicable" under the Satisfaction column.*

Importance						Satisfaction					
Circle one for each item.						Circle one for each item.					
Very Unimportant	Somewhat Unimportant	Neither	Somewhat Important	Very Important		Very Unsatisfied	Somewhat Unsatisfied	Neither	Somewhat Satisfied	Very Satisfied	Not Applicable
10%	11%	7%	46%	25%	Surface conditions of roads	13%	21%	9%	36%	20%	NA
11%	15%	11%	46%	16%	Surface conditions of parking areas	4%	6%	7%	38%	44%	NA
10%	3%	25%	27%	36%	Condition of bridges	2%	2%	27%	21%	48%	NA
13%	9%	17%	39%	22%	Condition of trails and boardwalks	2%	8%	25%	36%	29%	NA
10%	15%	12%	41%	23%	Number of places for parking	5%	5%	15%	30%	45%	NA
6%	9%	12%	46%	26%	Number of places to pull over along Refuge roads	5%	12%	15%	42%	26%	NA
6%	8%	11%	34%	41%	Safety of driving conditions on Refuge roads	4%	10%	14%	29%	43%	NA
5%	8%	11%	38%	38%	Safety of Refuge road entrances/exits	1%	4%	18%	35%	42%	NA
7%	9%	19%	34%	31%	Signs on highways directing you to the Refuge	2%	3%	18%	25%	52%	NA
6%	9%	23%	39%	23%	Signs directing you around the Refuge roads	4%	10%	29%	32%	26%	NA
9%	5%	23%	37%	26%	Signs directing you on trails	2%	9%	34%	29%	25%	NA
9%	9%	25%	27%	31%	Access for people with physical disabilities or who have difficulty walking	13%	10%	37%	21%	20%	NA

6. If you have any comments about transportation-related items at this Refuge, please write them on the lines below.

See Appendix B

SECTION 3. Your expenses related to your Refuge visit

1. Do you live in the local area (within approximately 50 miles of this Refuge)?

86% Yes

14% No → How much time did you spend **in local communities** on this trip?

 2 number of hours OR 9 number of days

2. Please record the amount that **you and other members of your group** with whom you shared expenses (for example, other family members, traveling companions) spent in the local 50-mile area during **your most recent visit** to this Refuge. *(Please enter the amount spent to the nearest dollar in each category below. Enter 0 (zero) if you did not spend any money in a particular category.)*

Categories	<u>Amount Spent in Local Communities & at this Refuge</u> <i>(within 50 miles of this Refuge)</i>
Motel, bed & breakfast, cabin, etc.	
Camping	
Restaurants & bars	
Groceries	
Gasoline and oil	
Local transportation (bus, shuttle, rental car, etc.)	
Refuge entrance fee	
Recreation guide fees (hunting, fishing, wildlife viewing, etc.)	
Equipment rental (canoe, bicycle, kayak, etc.)	
Sporting good purchases	
Souvenirs/clothing and other retail	
Other <i>(please specify)</i> _____	

See Report for Results

3. Including yourself, how many people in your group shared these trip expenses?

 1 number of people sharing expenses

4. As you know, some of the costs of travel such as gasoline, hotels, and airline tickets often increase. If your total trip costs were to increase, what is the maximum extra amount you would pay and still visit this Refuge? *(Please circle the highest dollar amount.)*

\$0	\$10	\$20	\$35	\$50	\$75	\$100	\$125	\$150	\$200	\$250
16%	30%	25%	7%	12%	2%	3%	0%	0%	0%	5%

5. If you or a member of your group paid a fee or used a pass to enter this Refuge, how appropriate was the fee? *(Please mark **only one**.)*

33%	Far too low	0%	Too low	67%	About right	0%	Too high	0%	Far too high	98%	Did not pay a fee <i>(skip to Section 4)</i>
-----	-------------	----	---------	-----	-------------	----	----------	----	--------------	-----	---

6. Please indicate whether you disagree or agree with the following statement. *(Please mark **only one**.)*

The value of the recreation opportunities and services I experienced at this Refuge was at least equal to the fee I paid.

0%	Strongly disagree	0%	Disagree	0%	Neither agree or disagree	33%	Agree	67%	Strongly agree
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SECTION 4. Your experience at this Refuge

1. Considering your visit to this Refuge, please indicate the extent to which you disagree or agree with each statement. *(Please circle one number for each statement.)*

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree	Not Applicable
Overall, I am satisfied with the recreational activities and opportunities provided by this Refuge.	2%	6%	4%	55%	33%	NA
Overall, I am satisfied with the information and education provided by this Refuge about its resources.	1%	4%	12%	57%	25%	NA
Overall, I am satisfied with the services provided by employees or volunteers at this Refuge.	4%	4%	18%	47%	28%	NA
This Refuge does a good job of conserving fish, wildlife and their habitats.	4%	1%	9%	43%	44%	NA

2. For each of the following services, facilities, and activities, first, **rate how important** each item is to you when visiting this Refuge; then, **rate how satisfied** you are with the way this Refuge is managing each item.
If this Refuge does not offer a specific service, facility, or activity, please rate how important it is to you and then circle NA “Not Applicable” under the Satisfaction column.

Importance					Refuge Services, Facilities, and Activities	Satisfaction					
Circle one for each item.						Circle one for each item.					
Very Unimportant	Somewhat Unimportant	Neither	Somewhat Important	Very Important		Very Unsatisfied	Somewhat Unsatisfied	Neither	Somewhat Satisfied	Very Satisfied	Not Applicable
22%	15%	31%	26%	6%	Availability of employees or volunteers	5%	6%	37%	20%	32%	NA
21%	6%	22%	33%	18%	Courteous and welcoming employees or volunteers	6%	0%	30%	16%	48%	NA
16%	6%	20%	24%	33%	Knowledgeable employees or volunteers	6%	3%	31%	20%	39%	NA
4%	4%	6%	44%	43%	Printed information about this Refuge and its resources (for example, maps and brochures)	2%	4%	12%	32%	49%	NA
3%	8%	9%	56%	24%	Informational kiosks/displays about this Refuge and its resources	0%	4%	16%	34%	45%	NA
3%	0%	7%	35%	55%	Signs with rules/regulations for this Refuge	4%	3%	10%	38%	46%	NA
11%	5%	33%	33%	18%	Exhibits about this Refuge and its resources	1%	6%	31%	36%	26%	NA
11%	9%	35%	29%	16%	Environmental education programs or activities	4%	4%	59%	13%	21%	NA
16%	4%	48%	21%	11%	Visitor Center	7%	0%	67%	11%	15%	NA
7%	3%	16%	36%	39%	Convenient hours and days of operation	4%	2%	22%	24%	48%	NA
10%	8%	31%	24%	26%	Well-maintained restrooms	11%	9%	48%	15%	17%	NA
15%	8%	35%	25%	17%	Wildlife observation structures (decks, blinds)	11%	7%	56%	9%	17%	NA
16%	2%	34%	32%	16%	Bird-watching opportunities	2%	2%	34%	31%	30%	NA
9%	7%	16%	45%	22%	Opportunities to observe wildlife other than birds	3%	6%	27%	35%	29%	NA
13%	9%	28%	34%	16%	Opportunities to photograph wildlife and scenery	3%	2%	35%	28%	32%	NA
9%	4%	12%	28%	47%	Hunting opportunities	5%	3%	25%	42%	24%	NA
4%	3%	12%	38%	44%	Fishing opportunities	4%	7%	20%	38%	31%	NA
6%	4%	25%	38%	27%	Trail hiking opportunities	5%	7%	28%	38%	23%	NA
14%	4%	42%	29%	12%	Water trail opportunities for canoeing or kayaking	4%	4%	59%	23%	10%	NA
19%	7%	34%	30%	10%	Bicycling opportunities	9%	0%	58%	20%	12%	NA
13%	6%	50%	23%	8%	Volunteer opportunities	3%	1%	66%	15%	15%	NA

3. If you have any comments about the services, facilities, and activities at this Refuge, please write them on the lines below.

See Appendix B

SECTION 5. Your opinions regarding National Wildlife Refuges and the resources they conserve

1. Before you were contacted to participate in this survey, were you aware that National Wildlife Refuges...

...are managed by the U. S. Fish and Wildlife Service?

90%

Yes

10%

No

...have the primary mission of conserving, managing, and restoring fish, wildlife, plants and their habitat?

91%

Yes

9%

No

2. Compared to other public lands you have visited, do you think Refuges provide a unique recreation experience?

60%

Yes

40%

No

3. If you answered "Yes" to Question 2, please briefly describe what makes Refuges unique. _____

See Appendix B

4. There has been a lot of talk about climate change recently. We would like to know what you think about climate change as it relates to fish, wildlife and their habitats. To what extent do you disagree or agree with each statement below? (Please circle one number for each statement.)

Statements about climate change	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
I am personally concerned about the effects of climate change on fish, wildlife and their habitats.	14%	8%	22%	33%	22%
We can improve our quality of life if we address the effects of climate change on fish, wildlife and their habitats.	14%	7%	25%	33%	21%
There is too much scientific uncertainty to adequately understand how climate change will impact fish, wildlife and their habitats.	11%	11%	22%	39%	16%
I stay well-informed about the effects of climate change on fish, wildlife and their habitats.	4%	13%	37%	33%	13%
It is important to consider the economic costs and benefits to local communities when addressing the effects of climate change on fish, wildlife and their habitats.	7%	11%	21%	42%	19%
I take actions to alleviate the effects of climate change on fish, wildlife and their habitats.	10%	9%	35%	33%	13%
There has been too much emphasis on the catastrophic effects of climate change on fish, wildlife and their habitats.	21%	18%	27%	23%	11%
Future generations will benefit if we address the effects of climate change on fish, wildlife and their habitats.	10%	6%	25%	33%	26%
My experience at this Refuge would be enhanced if this Refuge provided more information about how I can help address the effects of climate change on fish, wildlife and their habitats.	14%	9%	38%	26%	13%

SECTION 6. A Little about You

**** Please tell us a little bit about yourself. Your answers to these questions will help further characterize visitors to National Wildlife Refuges. Answers are not linked to any individual taking this survey. ****

1. Are you a citizen or permanent resident of the United States?

99% Yes 1% No → If not, what is your home country? See Figure 4 in Report

2. Are you? 86% Male 14% Female

3. In what year were you born? 1964 (YYYY)

4. What is your highest year of formal schooling? (Please circle one number.)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20+
(elementary)					(junior high or middle school)			(high school)				(college or technical school)				(graduate or professional school)			
					0%			32%				48%				20%			

5. What ethnicity do you consider yourself? 3% Hispanic or Latino 97% Not Hispanic or Latino

6. From what racial origin(s) do you consider yourself? (Please mark ***all that apply.***)

- 5% American Indian or Alaska Native 0% Black or African American 96% White
 1% Asian 1% Native Hawaiian or Pacific Islander

7. How many members of your household contribute to paying the household expenses? 2 persons

8. Including these members, what was your approximate household income from all sources (before taxes) last year?

- | | | |
|---|--|--|
| <input type="checkbox"/> 1% Less than \$10,000 | <input type="checkbox"/> 23% \$35,000 - \$49,999 | <input type="checkbox"/> 11% \$100,000 - \$149,999 |
| <input type="checkbox"/> 6% \$10,000 - \$24,999 | <input type="checkbox"/> 28% \$50,000 - \$74,999 | <input type="checkbox"/> 3% \$150,000 - \$199,999 |
| <input type="checkbox"/> 9% \$25,000 - \$34,999 | <input type="checkbox"/> 18% \$75,000 - \$99,999 | <input type="checkbox"/> 1% \$200,000 or more |

9. How many outdoor recreation trips did you take in the last 12 months (for activities such as hunting, fishing, wildlife viewing, etc.)?

30 number of trips

Thank you for completing the survey.

There is space on the next page for any additional comments you may have regarding your visit to this Refuge.

See Appendix B for Comments

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Appendix B: Visitor Comments to Open-Ended Survey Questions for Big Muddy National Fish and Wildlife Refuge

Survey Section 1

Question 1: "Including your most recent visit, which activities have you participated in during the past 12 months at this Refuge?"

Special Event	Frequency
Educational field trip - looking at restoration efforts.	1
Natural Areas Conference Field/River Trip	1
Volunteer tree planting	1
Total	3

Other Activity	Frequency
Garlic mustard pull	1
Geocaching	1
Just went to look at all the wasted farm land. Such a waste. Nothing for wildlife to eat. They are all in the hills where the crops are.	1
Landscape painting in oil paints (plein air)	1
Migratory bird research	1
Morel mushroom hunting	4
Mushroom and blackberry picking	1
Mushroom hunting	47
Trail building	1
Went to see the Clydesdale horses	1
Total	59

2 nd Other Activity	Frequency
Pecan harvesting	1
Trash clean up	1
Total	2

Question 2: "Which of the activities above was the primary purpose of your visit to this Refuge?"
Primary activities are categorized in the main report; the table below lists the "other" miscellaneous primary activities listed by survey respondents.

Other Miscellaneous Primary Activities	Frequency
Berry picking	1
Geocaching	1
Invasive species pull (garlic mustard and mushrooms)	1
Just curious	1
Landscape painting	1
Migratory bird research	1
Sightseeing	1
Total	7

Question 3: "Did you go to a Visitor Center at this Refuge?"; If Yes, "What did you do there?"

Other Visitor Center Activity	Frequency
Get maps and regulations of the area.	1
I got maps and obtained information.	1
Just looked at the map since it is just signs and billboards at this refuge.	1
Maps	1

Papers	1
Picked up maps	1
Read information	1
Rules for hunting area	1

Question 7: "Were you part of a group on your visit to this Refuge?; If Yes, "What type of group were you with on your visit?"

Other Group Type	Frequency
Employee	1
Non-profit organization	1
Three guys on a hunting trip	1
Total	3

Question 9: "How did you first learn or hear about this Refuge?"

Other Website	Frequency
Missouri Department of Conservation	1
USA Jobs	1
Total	2

Other Ways Heard about This Refuge	Frequency
Employee of FWS	1
Employer	1
I hauled rock to the site.	1
I learned about it from a taxidermist.	1

I worked there.	1
Other hunters	1
Recommended by the Missouri Conservation Department	1
Volunteer opportunities	1
Total	8

Survey Section 2

Question 1: "What forms of transportation did you use on your visit to this Refuge?"

Other Forms of Transportation	Frequency
Allow ATVs for getting deer out only!!!!!!	1
Kayak	1
Total	2

Question 2: "Which of the following did you use to find your way to this Refuge?"

Other Ways Found This Refuge	Frequency
Drove down a road to see where it went.	1
Geocaching website	1
We came via the river.	1
Total	3

Question 5: "Below are different alternative transportation options that could be offered at some National Wildlife Refuges in the future...please tell us how likely you would be to use each transportation option."

Other Transportation Option Likely to Use	Frequency
4-wheel ATV	1
ATV	3
ATV, horse	1
Auto	1
Bike	1
Boat rental to get around some of the ponds and lakes.	1
Canoe/Kayak	1
Car/Truck	1
Horseback	2
I would really like to see you let people use ATVs for putting up deer stands and getting deer out, or for decoy use only, not for fun or sightseeing.	1
Private vehicle	1
This is such a useless place - why would anyone want to take anything there to see the weeds?	1
Total	15

Question 6: "If you have any comments about transportation-related items at this Refuge, please write them on the lines below."

Comments on Transportation-related Items at This Refuge (n = 26)

Again, ATVs for hunting only would really be helpful, and I mean for hunting only. You could give tickets out for people there mudding or just playing around. Very helpful, as the area is not easy to hunt if you have to pull or drag a deer or decoys a mile.

Big Muddy, in the area I was in, was very mucky; therefore, it would not be too reasonable to provide other forms of transportation from what I saw.

Could use more surface roads to get closer to the mushroom hunting areas near the river.

I go to Big Muddy NWR a lot and this year was horrible because you didn't get the road cleared off after floods, so people without big 4X4 trucks could not get back to the river or ponds to fish. This is something you really need to look into, especially if you care about people

enjoying themselves at this refuge.

I think extra parking along roadways would make the refuge a lot better. I personally love to park on the side of the road at different places and walk in. Also, boat transportation up and down the river would be great, too.

I think offering bus/train transportation would ruin the refuge.

I'm relating this survey to Overton Bottoms of the Big Muddy NFWR. So often times the high water leaves the road and trails muddy and washed out. Many times the road leading into Taylor's Landing is just treacherous, and I've gotten stuck there.

It is a flood prone area, so the roads reflect this and is not being paved. Signage could be better (bigger/more graphic) and some signs on I-70 would help.

It would be nice to have a trail cut along the edge between woods and fields - not plowed, just cut. Plant some crops - there is not much for deer to eat.

It's a small rural refuge; get real. Either you have a good car or truck or you don't get there. If it's wet, the roads are muddy and you can get stuck. This is Missouri for Christ's sake.

Much of the roads were not accessible with my 2WD truck. If I would have met another oncoming vehicle, I would not have been able to pull over without getting stuck.

Need to open up to ATV use with restrictions.

None... the mushroom hunters that swarm over the area make turkey hunting difficult, but it's public land. Thanks.

Roads are almost impassible when wet. More gravel should be used to reinforce this road.

Support for bikes!

The boat ramp for river access has far too swift of a river current for loading/unloading a boat.

The road is very rough and almost not accessible to a vehicle. There are no trails - it is a wasteland. There are not food plots for birds or animals; NO place for a bird or animal. Just overgrown weeds. It is a horrible waste of land. No development for people to enjoy.

The road to this portion of the refuge flooded for over a month last year. This was inconvenient, but understandable. I would prefer that the area is maintained for wildlife more than the public. We bought waders and just dealt with it.

The road was under water and impassable on the day of visit due to rain. Areas off road were under water.

The road was very bad. Water covered most of the roads.

There is flooding on roads.

There should be alternative means of transportation for handicap and people with disabilities.

This refuge has only one parking lot and I think bicycles are not allowed, yet certain people have keys to the gate and ride ATVs back to their private property regularly using the same trails that bicycles are not allowed on. There should be more trails and bicycles allowed on these trails.

This refuge has very limited hunting access for people who have disabilities. You must walk so far to get to any hunting areas for deer that people cannot drag the animals out by themselves. Maybe make it to where disabled hunters could use four wheelers or electric buggies on

some of the trails.

This refuge is flooded by the Missouri River and the roads have been in terrible shape for the past year. I know that the area's roads are the responsibility of both federal and state, so there are divisions of labor, but the areas are intimately interrelated and coordination to take care of the road could be better there. Also there is a deep dangerous river channel cutting through the area that prevents hiking access to the area between that channel and the Missouri River. A pedestrian hiking bridge should be provided somewhere over that channel to provide access to what is a beautiful section of woodlands and a very special shoreline area along the Missouri River there. Thank you.

We don't use public transportation. We go in a private vehicle so we can go at our own pace.

Survey Section 4

Question 6: "If you have any comments about services, facilities, and activities at this Refuge, please write them on the lines below."

Comments on Services, Facilities, and Activities at This Refuge (n = 26)

After rain (not when flooded), it takes a four wheel drive vehicle to access boat ramp. Not a huge deal, but the mud does get everywhere on the truck and boat.

Again, it's a rural refuge; it doesn't need any more things than it already has. You can hunt, fish, watch birds, etc. (hunt mushrooms) and there isn't a lot of facilities and there doesn't need to be. Put them someplace else.

Big Muddy NFWR does an amazing job with limited personnel resources. They help our organization with our educational and volunteer missions. They are VERY helpful. Services and facilities are limited, but are slowly and smartly growing. The refuge exists in a floodplain, so maintaining and developing facilities and trails is difficult. I'm very impressed with what is done with the limited resources they have. I'd love to see funds designated for a Visitor Center dedicated to the Missouri River as a whole.

Due to the constant flooding of the refuge because of levies being breeched, the area has become void of wildlife. During the time the Missouri Department of Conservation managed the refuge, wildlife was very abundant but since it has been managed by FWS, it has turned into a weed infested mosquito breeding ground.

I did not see nor do anything while there because of wet, muddy conditions.

I only drove in to read information.

I would like it managed to support waterfowl, specifically duck, and goose hunting.

I would like to see a boat rental and bathroom facility placed at the Big Muddy.

I would like to see more access to trails that are bicycle friendly. I also believe it would be very beneficial to section off some areas for archery only, as the number of hunters grows every year and so does the amount of people walking these areas with high powered rifles.

I would love to see more hiking and bicycling trails in the area.

I'm pleased to have Big Muddy so close at hand. I fear some hunters are not aware of non-toxic shot regulations, especially since the refuge is open to statewide regulations generally. Same for dog training for purposes of hunting.

Increase access to fishing holes by installing ramps or allow vehicles to get closer to water. Increase maintenance to facilitate rabbit/bird hunting (mow paths). Create paths in woods.

It has no bathrooms.

It is not handicap accessible at parking lots.

It needs some crops or food for deer. It also needs better access to far areas of about a 2 mile walk.

It would be great to someday have a Visitor Center to help tie all the refuge sites into the Big Muddy Refuge.

It would be nice to have a couple of bathrooms in this area.

Needs to be a better boat ramp into the river (not so swift).

Overall - very nice.

Refuge staff are doing an excellent job working with the local community and establishing a friends group for the refuge.

The refuge does not have a Visitor Center. It is a highly visible and easily accessed refuge that would benefit tremendously from a Visitor Center located on the refuge.

The road that leads to the boat ramp is in poor condition after winter. It's hard to get in and out with a boat. The ramp was flooded and unable to be used at the time.

There are no animals. The only birds you would see are the cranes eating the fish after a flood. They too are gone now. We saw no birds, no animals. There is nothing there for them. Plant some food plots; then maybe you would have some.

This area provides me with, along with a lot of other wildlife access, a good opportunity to get down to the shore of the Missouri River. I would vote for a hiking bridge built over the bypass channel on the area. When the water is very low, it is possible sometimes to cross that channel to get to the land between it and the river. The river access on that side is interesting and beautiful. A bridge would provide year round access and seems like an excellent plan for improvement at this refuge. Thank you.

USFWS agent was not knowledgeable about state regulations concerning licenses and permits needed to hunt game.

Would like to see you set it up a little more for duck and geese hunting, and put some food plots in areas where it is less likely to flood.

Survey Section 5

Question 3: "If you answered "Yes" to Question 2, please briefly describe what makes Refuges unique."

Comments on What Makes Refuges Unique? (n = 60)

A lot of land to roam.

All of the wildlife makes it unique.

Beautiful open space with tall grassy fields Great refuge for birds and wildlife.

Beautiful place to paint.

Because of the extra level of federal concern for natural habitats leading to the preservation of nature and wildlife. Missouri does a good job with their conservation and DNR areas, but I feel that a partnership between the state and the federal government would lead to greater protection and improvement.

Good cover for hunting deer, duck, and geese; not much for turkey, but really needs some food plots like corn, clover, or millet for ducks around the ponds.

Green undeveloped spaces for wildlife and development of plants are always needed.

I can find an abundance of morel mushrooms in the spring. I can spend time with my family and see wildlife.

I don't know very much about the refuge. I have only been there one time, but I plan on returning.

I like that the primary mission focuses on fish, wildlife, and plants - not human experience. I like that there are fewer amenities than on other public lands.

I like the hunting and fishing opportunities that it affords people.

I love to fish and watch wildlife. I can do this when I please. Thank you very much.

I think refuges are unique because people have an opportunity to see firsthand a well maintained, flourishing ecosystem, which could inspire them to make personal changes elsewhere in the world.

In my visiting of public lands, I think that refuge lands stick to their mission through the management. I feel they are less about recreation in terms of camping, partying, etc. and more about the animals, their habitats, and those who enjoy the elements of nature.

It holds good deer populations for the working man.

It is a better habitat for the wildlife.

It is a good place to observe wildlife in their natural habitat.

It is a large spatial area with ample recreation opportunities.

It is a unique habitat that everyone should enjoy visiting at least once in their lives. It is amazing how well the animals adapt to the flooding that occurs there, and how quickly they return.

It is a unique opportunity to see how the reclaimed land will return to a wild state. The big river bottoms are a special place and need protection.

It is always open.

It is amazing how much the refuge has reverted to its natural state in 8 years.

It is an undisturbed and unaltered environment for plants and animals.

It is left natural, so you can take off walking anywhere.

It is undeveloped.

It is very different looking in regards to other lands I have been to. Being right along the Missouri River makes the habitat very eye opening.

It is wilder and thicker - less people. There are no elevation changes - flat.

It's post flood farm area; interesting how, and how fast, nature is reclaiming the area.

More publicly accessible/well known.

More mushroom hunting.

Natural setting.

Outdoor experience.

Possibility to live.

Provides, but it is not unique.

Refuges are a way for us not only to restore wildlife habitat, but they also allow us to coexist with them in a way we had all but forgotten. I think Lewis and Clark would be proud of our National Wildlife Refuges.

Refuges are natural areas that make outdoor activities challenging and rewarding. It allows for the true outdoorsman to participate in outdoor activities without the interference of people who want outdoor activities to be convenient.

Return to nature's natural state.

The access to the river and other kinds of habitat in the area makes it unique.

The amount of information available to the public about the land and its history makes it unique.

The blow holes are very unique. Sandy river bottoms are different from most areas I visit.

The fact that they are primarily dedicated to providing good habitat over other uses like hunting or tourism means that they are a more rugged experience (in my experience, at least). I like this. On the other hand, other refuges I've been to such as DeSoto Bend in Iowa have great Visitor Centers and education.

The fishing makes it unique.

The good deer hunting makes it unique.

The gravel trails were nice and I enjoyed the benches to rest.

The large size and the location make this reserve very unique. It is very large and extremely accessible being right off of I-70.

The management of the refuge is designed to conserve wildlife, plants, etc., but is still able to offer recreational opportunities.

The Missouri River makes it unique.

The natural surroundings make it unique.

The preservation of habitat makes it unique.

The refuge is for wildlife - fish and animals.

The wildlife and duck access makes it unique.

These are big tracks of land that don't have a road every few hundred yards and plenty of hunting opportunities. It's just not real disabled ready.

They are just an additional resource for the public to visit special places that exist throughout the U.S. and are within most people's budget while conserving important resources, land, wildlife, etc.

They are less developed and less crowded and are usually the best option when I want to actually see wildlife.

They are not commercialized and a person can be one with nature.

They have minimal facilities and should stay that way.

They usually cover large tracts of land with dense cover allowing elbow room for the hunter and opportunities for large game to mature.

They're not just unique, but necessary, due to growing urban/suburban areas. Wildlife need some place to go that remains largely free of human presence. Also, refuges allow people like me, who don't have access to private land, an opportunity to participate in hunting and other recreational activities.

Unique in the way that it is not maintained and is a waste of our money.

You are able to see the area without disturbance.

Additional Comments (n = 27)

Deer and duck numbers seem to be down, possibly due to all the rain fall over the last couple years. It would be nice to see more food plots like they used to plant. Those scouts are doing a nice job on their projects. It is great to see the younger ones in the outdoors getting to participate in something other than a video game.

Great visit, great area. On the day I was surveyed, I caught a statewide limit of beautiful crappies which were in the midst of spring spawn.

Grow corn and soybeans and manage Overton Bottoms for wade-in duck and goose hunting.

I cannot stress the disappointment that myself and my husband feel in the use of this land. My husband is a farmer and I am a business owner in Columbia, MO, so we travel by it every day. To see the land go to waste is horrible. There used to be deer there, but now there is nothing there for them. They used to stand on the levee to eat, but they are just weeds, too. So nothing. I do see many fishermen there. The road is horrible getting there. The whole river bottom is a waste.

I conduct biological research at the refuge and have for 3 previous summers. My primary use is not recreation, so my answers may not be typical. I am however extremely happy that Overton South is not a refuge. It is a fabulous place and I am happy to see it maintained for wildlife. I saw a site go from a corn field to river otter habitat in 3 years. In the face of so much loss and destruction of habitat, that was very nice to see.

I like the idea that there are places to go within the refuge that a lot of people do not like to go into.

I truly enjoy my trips to the bottoms (Refuge). I've been going there for almost twenty years to enjoy fishing and hunting there. There have been issues with the roads (flood damage) and lack of trails, but all in all I enjoy the diversity and the ever changing landscape. I really hope that there are no plans of having parking or entrance fees. It's just nice to spend a few free hours and explore. Thank you.

I was doing a job in Woodridge which took about 1 week and I stayed in my camping trailer. I saw the signs and liked to look around at the wildlife refuge. I like the ones with camping access.

I would like to see additional land areas incorporated into use in the wildlife areas and management holdings.

I would like to see more of the brush and trees cleared off the banks of the Big Muddy so that there could be more room for bank fishing. Thank you and have a great day. (Signed)

Importance on food plots, ATV use, and duck blinds.

In the past, MDC used to maintain different areas of this Refuge for doves and I would like to see this happen again.

It was fine. I don't really expect much when I am wandering around in the woods. Bathrooms are nice to have (especially for the girls), but there is usually some a**hole that messes them up.

My family is always outdoors. We are always hunting, fishing, or training coon dogs for composition hunts on the weekends. We live off the land as much as possible. The only thing I see wrong with the Big Muddy NFWR is that there are huge grass fields that don't flood and you all just leave them untouched. Use part of each field and put in some food plots for the animals for later in the winter after the crops come out. The animals were all traveling away from the area because there was not enough food for them. Just take part of each grass field and plant corn, beans, milo, sunflowers, sorghum, wheat, oats, turnips, chufa, alfalfa, or clover. Also, I think it is beneficial for the animals to have mineral blocks out there as well.

Need to focus on hunting more. Manage for wildlife. Food plots, control burns, brush-hogging, etc.

Stop worrying about freaking "climate change." It's BS and every rational scientist knows it. Just manage the resource on the least amount of money you can. Don't spend it for foolish things like this survey. You aren't going to have the budget you have now in the future.

Thank you for allowing the opportunity to be a part of the effort to conserve nature!

The Big Muddy National Fish and Wildlife Refuge is a gem! I would like to see regulations altered to allow canoeists and boaters on the Missouri River to camp along the river on their journeys.

The breaching of the levees to mitigate flooding along the Missouri River is an effort in futility, with such a small percentage of the levees along the river, removed the portions of the refuge that floods in no way reduces the effect of flooding downstream. This year the refuge flooded nine separate times, with that being said, what do you think the prospects of the wildlife on this refuge is? When the Missouri Department of Conservation managed the area they planted many food plants and maintained the levies, now the refuge is only suitable for growing weeds and mosquitoes. I am very disappointed in how the refuge has deteriorated since FWS has taken over.

The climate on earth has always been changing, sometimes for the better, other times for the worse. Ask the dinosaurs. I'm offended by the obvious political slant of this section.

The development of the floodplains of the Missouri to allow the river to have a floodplain is long overdue. More areas such as this should be made.

The USGS representative at the refuge was very nice! It would be great to see workers in the area more often. Peace and Love, (Signed)

There are comments regarding the previous set of question. During the earth's life, temperature has increased and decreased many times, but

what makes me nervous is pollution. In the USA, there are many things allowed when compared to the European Union, e.g. using old cars (in total, no public transportation), old A/C units (during summer they are still on), etc. I can only walk everyday and still I have the feeling that I am stealing the Earth's purity from people in developing countries.

There is a lot of work to do at this refuge to eradicate noxious plants (e.g. Johnson grass). I understand that these efforts are underway. I am interested in such volunteer activities at this refuge, if there are any. This area is a wonderful opportunity for someone like me to get down to the Missouri River in a reasonably wild area. Thanks.

There needs to be better flood control on the refuge, such as diversion canals, and levees. Controlling the river to only certain areas to flood on the refuge. The area needs more biodiversity to attract more species of plant and wildlife on the refuge.

There needs to be some controlled burns done, in my opinion, to bring in some new growth, perhaps. Limited logging as well, and some emphasis on getting rid of inedible vegetation.

We will visit again.