

**Maryland Waterways and Public Recreation**  
**Crafting an Effective Survey to Inform Future Policy and Programming**  
**for the Maryland Department of Natural Resources**

Hannah Chan, Ela Dhankhar, Danielle Rockman

School of Public Policy, University of Maryland-College Park  
PLCY400: Senior Capstone

Under the supervision of  
Professor Shanna Pearson  
May 2023



**Partnership for  
Action Learning  
in Sustainability**



PALS - Partnership for Action Learning in Sustainability  
An initiative of the National Center for Smart Growth

Gerrit Knaap, NCSG Executive Director  
Kimberly Fisher, PALS Director

## **Abstract**

This study investigates the most effective way for Maryland's Department of Natural Resources (DNR) to survey for data on park visitors' perceptions of climate change and its impacts on their park experiences. The DNR lacks information on Marylanders' perceptions of climate change, particularly how in relation to their park experiences. The DNR also wants to gather information about general usage and experience at Maryland parks. This study seeks to identify the best way to collect that data. The information is gathered with consideration of the DNR's efforts to expand and adapt park programs and to improve outdoor recreation spaces with additions such as safety signage. The report's findings, survey questions and recommendations are based in a literature review on crafting effective surveys, informational interviews with three park managers, consultation with a survey expert, and a field-tested a questionnaire.

## **Contents**

Executive Summary	3
Background	4
Methodology	6
Data and Observation Analysis	8
Survey Implementation Recommendations	10
Conclusion	12
References	14
Appendix	16

## **Executive Summary**

### **Problem Statement**

Currently, Maryland's Department of Natural Resources (DNR) lacks information on how to gather insight into Maryland parkgoers' knowledge and perceptions of climate change. This information deficit prevents the DNR from confidently expanding programs and creating policies that the public would approve and accept. This study seeks to identify how to craft an effective survey and how to best administer it, for the DNR to implement it on a large scale to collect a representative sample.

### **Proposed Solution**

The following recommendations are designed to encourage a high response rate and increase the survey's understandability:

- Create copies of the questionnaire in multiple languages.  
Translating the questionnaire into multiple languages will allow a wider range of park patrons to participate in the study, providing a more inclusive sample population.
- Administer the questionnaire with consideration for the setting and activities at each park.  
Considering the setting and activities at each location will allow surveyors to factor in obstacles that may prevent a higher response rate.
- Revise certain parts of the questionnaire.  
Revisions will increase its understandability for all participants.
- Use a sign and a verbal survey pitch relevant to the questionnaire.  
Briefly describing the survey topic will inform patrons of the study's purpose and nature and help them decide whether to participate.
- Provide an incentive for patrons to fill out the questionnaire.  
Monetary or non-monetary incentives will encourage patrons to participate.
- Train surveyors in canvassing techniques before they go into the field.  
Training will prepare them to handle a variety of scenarios professionally.
- Conduct further research on how to collect a sample that accurately reflects the Maryland park patron population.  
Further research into sampling techniques and representative sampling will help the DNR gather the most accurate data.

Applying these recommendations will produce a higher response rate and a more representative sample population at Maryland parks.

## **Background**

Maryland's Department of Natural Resources is seeking to expand current outdoor recreation programs and policies across the state to respond to the potential impacts of climate change on parks and patrons. However, as of 2023, the DNR doesn't have data on Maryland park visitors' knowledge and perceptions of climate change or the parks. The following research is meant to guide the DNR in its efforts to gather this data via surveys.

The team crafted a concise survey to assess Maryland park visitors' perceptions. A literature review gave insights into the state's parks and waterways, as well as effective survey design. The literature review greatly influenced the methodology and best practices used in designing the questionnaire.

Maryland DNR oversees a range of outdoor recreation areas, parks, and waterways. The demographics of park visitors are equally wide-ranging as are the DNR's programs. They include education and safety-related programs for adults such as angler programs and boating safety classes, K-12 classroom programming, and youth programs like the Maryland Conservation Corps and the Junior Ranger program.

Every few years, the DNR develops land preservation, parks, and recreation plans for outdoor recreation spaces, parks, and waterways throughout Maryland. As the effects of climate change become more pressing throughout the state, the DNR seeks to know how park patrons perceive the issue to better develop future park plans.

In addition, our client contact spearheaded a project with DNR and NOAA's Coastal Management Fellowship to create "A Guide to Planning for Climate Change on Maryland's Public Lands," a website that serves as a climate change adaptation and resilience planning guide for state and local land managers. We utilized several tools from this website, such as the park equity mapper and the state climate summary for background knowledge on climate hazards and vulnerabilities, and how these hazards differ across parks and recreation areas. Climate risks present differently in each park, waterway, and outdoor recreation area, so we used this background to determine at which parks to administer pilot surveys.

This report compares and contextualizes field notes from pilot tests to knowledge of survey design from. By comparing our survey knowledge to our field experiences and using new-found data, we offer a list of best practices and recommendations uniquely tailored guide the DNR.

### **Pilot Locations**

There is a wide variety of parks throughout Maryland. The DNR's Maryland Park Service maintains 54 State Parks, 25 Natural Resources Management Areas, 7 Natural Environment Areas, 3 Rail Trails, and 2 State Battlefields (*Maryland At-a-Glance*). In the past, the DNR has gathered survey data from state parks but never from county parks (not under the DNR's oversight).

We selected three county parks for our pilot locations serving park visitors not under the DNR's jurisdiction. To expand the variety of results and establish relationships between the DNR and local park systems, we chose to canvas the following three county parks based on their locations in Maryland, the types of climate impacts present, and their accessibility to UMD's College Park campus. In addition, each park had to be in a different Maryland county and have some form of water recreation activity.

1. **Lake Artemesia** is a 38-acre lake in Berwyn Heights, in Prince George's County. Originally owned by the Artemesia family as a goldfish farm, the Maryland-National Capital Park and Planning Commission (M-NCPPC) acquired the land and small ponds in 1972 and turned it into a large man-made lake. Popular recreational activities include birding, fishing, exercising, walking, and biking. In recent years, the biggest impact of climate change is a shift in plant bloom cycles, as plants flower earlier and longer. As a result, there is a concern that invasive species may also increase. Climate change hasn't impacted the number of park patrons because of the park's highly accessible location among nearby neighborhoods. A diverse population in terms of race, socioeconomic status, and age frequent the park.
2. **Wheaton Regional Park** is a 536-acre public park comprising various recreational facilities and activity areas in Montgomery County. M-NCPPC created the park in 1960. It offers recreational activities including ice skating, horseback riding, ball fields, skateparks, and hiking. The Commission has put a lot of effort into mitigating climate change at Wheaton Regional Park, such as planting native grasses to reduce erosion and runoff and reducing the amount of salt used on roads to decrease the pH in waterways. The effects of climate change have increased the number of park patrons because the weather has gotten warmer faster. Within a two-mile radius, there is a diverse population of park patrons. Most people living around the park are people of color with a mix of cultures and socioeconomic backgrounds.
3. **Carroll Creek Linear Park** is a manmade stream running through downtown Frederick. Purposely designed as a mitigation effort to prevent flooding, the creek flows into Culler

Lake. Activities at Carroll Creek include fishing, walking, and shopping. Climate change has caused a higher rate of algae blooms and significant flooding. Because the park is in an urban area with paved roads and sidewalks, the ground is less permeable, leading to more runoff and less absorption of rainwater. The park is implementing mitigation efforts to combat increased flooding, but it is a battle due to constant urban development. As with the other pilot locations, Carroll Creek park patrons are ethnically and socioeconomically diverse.

## **Methodology**

This study seeks to identify recommendations and best practices to help DNR conduct an effective survey study on park visitors' perceptions of climate change. An extensive literature review gave background on Maryland parks, outdoor recreation areas, and waterways, along with their demographic makeup, available amenities and activities, and various climate impacts. We also interviewed the park managers at pilot survey test locations, gaining invaluable background on these county parks.

The literature review also directed writing an effective survey, including the best ways to word, order, and format the survey questions to avoid bias and maximize understandability. National public opinion surveys on climate change already administered, provided some of the questions in this survey, which allows the DNR to compare state-wide data from the climate questions on this survey to national data.

Based on this background understanding, the survey was drafted underwent several iterations. Questions and their order were reviewed by survey experts, and it was field-tested with classmates and peers for feedback that would help create the final version. The final questionnaire is in this report's appendix.

### **Best Practices for Survey Design**

- Base the survey on a clearly defined research question. All survey questions must relate to the research question and help answer the problem (Draugalis).
- Pretest to help identify unclear questions or confusing instructions (Gonzalez).
- Don't ask double-barreled questions, that is, multiple questions in one (PLCY306 lecture).
- Use simple and neutral language (PLCY306 lecture).
- Avoid leading questions that may sway respondents (PLCY306 lecture).
- Avoid loaded or assumptive questions that contain assumptions about respondents (PLCY306 lecture).
- Use the rule of four in multiple-choice questions to prevent respondents from selecting the middle option as the default (anonymous pilot survey respondent).

- Be intentional about the question order. It's usually best to place less sensitive questions at the beginning of the survey, and more controversial questions toward the end (survey training with Shanna Pearson).
- Consider the delivery method and presentation of the questionnaire (Edwards).
- Consider using monetary incentives such as gift cards or non-monetary incentives such as food to increase response rates (Edwards).
- Always be polite when out in the field (survey training with Shanna Pearson).

We tested the survey in April 2023, administering it to groups of two or three students at the pilot park locations. Lake Artemesia in Prince George's County is close to campus and emphasizes water recreation at a manmade lake, which met our water recreation criteria. Wheaton Regional Park in Montgomery County offers diverse recreational activities. The park fulfilled the water requirement at its Pine Lake. Carroll Creek Linear Park in Frederick County is unique as a constructed urban park in downtown Frederick. Each park is distinctive based on its recreational activities, demographics, climate impacts, and geographic placement.

We wrote a survey based on our research question and on instructions from the DNR. Questions focused on how close respondents lived to the parks, their user experience, and their perception of climate change. The survey began with questions about the respondent's travel to the park. Next, it asked about the activities they came to the park for. The survey then moved to questions about how climate impacts their park experiences. The fourth section focused on climate change perception. The last questions were demographic related. The survey asked less than 20 questions, as studies show that people are more inclined to take shorter surveys. We used snacks as incentives to get a larger sample.

We used the following survey protocol:

- We went during peak times to ensure that there would be many people who might respond to the survey.
- At each park, we stationed ourselves near a well-frequented area and canvassed for two hours.
- We asked passing visitors if they were willing to complete a quick anonymous survey.
- Each respondent was given instructions, a clipboard, and a paper copy of the survey, and were left to complete it.
- All surveys were self-administered unless respondents requested otherwise.
- Participants were allowed to omit questions or talk among themselves.
- After they finished, participants returned the survey and clipboard to the table.
- To eliminate selection bias, we attempted to ask every single person who passed by the table.



## **Data and Observation Analysis**

### **Canvassing and Sample Size**

Canvassing at the parks revealed several interesting considerations. We collected 57 responses across the three parks: 15 from Lake Artemesia, 14 from Wheaton Regional Park, and 28 from Carroll Creek Linear Park. While surveying, we aimed to eliminate as much survey bias as possible. To do so, the survey protocol called for asking every single park visitor that walked past our table. However, it was impossible to ask every person. Many people were running, cycling, or working out while wearing headphones. Attempts to ask runners failed because they were too focused on their workout and couldn't hear us, so we focused on patrons who weren't doing such activities.

Our second observation was how the park's setting and activities impacted sample size. The survey protocol, called for setting up in highly populated and frequented areas. At Lake Artemesia, we positioned ourselves near the park's entrance. At Wheaton Regional Park, we set up across from the playground, along a walkway to bathrooms and the parking lot. At Carroll Creek Linear Park, we located alongside a walkway within 100 feet of a populated bridge and its shops. However, a highly populated area didn't guarantee a steady stream of willing participants.

At Lake Artemesia, a stream of patrons passed our table due to the trail-like nature of the park and the streamlined nature of the entrance, but it was impossible to ask everyone. At Carroll Creek Linear Park we garnered the largest sample size due to the high-density population of the area, but we received the most rejections as well. At this well-traveled pedestrian area, along the creek's linear walkway it was easy to ask patrons, and as a result, we garnered the most respondents.

It was most difficult to recruit participants at Wheaton Regional Park. We set up directly across from the playground, on a pathway near public bathrooms. In theory, this location would generate a significant stream of participants, but because the area was so open, people easily walked around us. It was very different from the streamlined trail area at Lake Artemesia.

### **Demographics**

Along with setting and location, we observed the impact of park visitor demographics. At Wheaton Regional Park, visitors were mostly families; parents were preoccupied with watching their children and keeping them safe. We avoided distracting parents and focused on asking individuals who weren't preoccupied. As a result, most of our survey population were teenagers. At all parks, we observed diversity in the race and ethnicity of park visitors. There were a few instances where participants couldn't take the survey in English or had their child translate the survey.

The incentive of pre-packaged snacks (chips, trail mix, nuts, and Oreos) appealed more to some demographics—younger audiences—than others. There was also a difference in how popular the snack incentives were, based on the location. Carroll Creek Linear Park is a shopping and restaurant district, and fewer people chose an incentive because they'd already had lunch or would soon eat at a nearby restaurant. Patrons at Lake Artemesia and Wheaton Regional Park seemed to be more incentivized by the snacks than those at Carroll Creek.

### **Survey Responses**

Participants generally completed the questionnaire without any questions. Of those participants who asked clarifying questions, the most asked question was whether respondents could select multiple options that applied to their situation. Originally, the only questions that had a “choose all that apply” option were the activity question (Q3) and race question (Q20). But patrons asked about selecting multiple options for the method of transportation question (Q1), the park emotion question (Q4), the outdoor recreation information question (Q5), and the climate change emotion question (Q13).

One piece of constructive feedback we received was about the “Rule of Four.” Some survey questions provided five options on a Likert scale. The respondent suggested we decrease to four answer options to prevent participants from choosing the middle option as default. Based on our data, it doesn't appear that most participants chose the middle option as default. However, DNR might consider this for future use.

Overall, we received support, encouragement, and general feedback about the survey and project. Some participants talked to us after completing their survey, asking us what school we were from and/or complimenting us on our project. Some park visitors didn't fill out the survey but encouraged us as they passed by. Others were excited to see young people taking action to help the environment and voiced their worry about the lack of climate change action by the government. We only had one conversational encounter with a patron who didn't believe in human impacts on climate change, but the interaction was pleasant. The patron also still expressed interest in volunteer events and clean-ups. We spoke about the generational differences in climate change beliefs and our shared experiences with the environment. A handful of patrons verbally expressed concern for the environment and the need for climate change mitigation policy.

We also observed park patrons' concern for the environment in our pilot survey responses. According to the data, at all three parks, most respondents said they thought climate change was a very serious problem. At Lake Artemesia, 73 percent of respondents marked “very serious” in response to Q10, “In your opinion, how much of a problem is climate change?” At Wheaton Regional Park, 57 percent of respondents marked “very serious”, and at Carroll Creek, that percentage was 61 percent (see Appendix B). Regarding interest in current and future programs,

nearly all respondents checked off “yes” to at least one of the program options provided (see Appendix C).

## **Survey Implementation Recommendations**

### **Create the survey in multiple languages**

We recommend that DNR produce the survey in multiple languages, especially Spanish. At Wheaton and Lake Artemesia, numerous families were primarily Spanish speakers. The language barrier prevented us from asking many families who passed by. Foreign-speaking families who took the survey seemed to do so because their children were drawn to the snacks. Multiple parents relied on their children to understand what we were doing at the parks and to take the survey. Based on interviews with park managers, the most frequent foreign languages at parks are Spanish, Mandarin, French, Ethiopian, and Korean. Producing the questionnaire in these languages would allow a wider range of park patrons to participate and help the DNR understand all their patrons.

The survey pitch script should also be translated into multiple languages on printed signs. Multilingual scenes and pitches increase accessibility to the survey for more Maryland residents.

### **Administer the questionnaire with consideration for the setting and activities at each park**

We found it was easier to remain stationary on a walking or hiking trail because there was a steady stream of patrons walking past. At Lake Artemesia and Carroll Creek, we were set up directly on the trail or walking area and there were no routes for patrons to avoid us. However, it was harder to ask patrons in open areas such as a playground or field. Patrons had to be inclined to come up to the table.

In open settings, it would be beneficial for surveyors to be mobile, walking around with clipboards and directly approaching patrons. Additionally, being mobile allows surveyors to ask a wider range of patrons. At the playground, most patrons were parents watching their children and we didn’t want to distract them. If a surveyor directly approached them instead, they may be more willing to take the questionnaire.

### **Revise certain parts of the survey**

Q16 presented a list of park-related programs and activities and asked participants which ones they’d be interested in participating in. This question should be revised to include a disclaimer that answering the question does not bind patrons to participate in the events. We observed that some patrons skipped Q16, possibly out of fear they’d have to follow through on their answers.

Some pilot participants forgot to turn the survey over and complete the second side. Accordingly, we recommend adding a footer at the bottom of the first page asking the participant to turn the page over and continue.

Q5 was a list of information-sharing outlets asked patrons how they get information about Maryland recreation. Another outlet option should be added, “word of mouth.” Some patrons said they learned about activities or parks from friends and family. Providing a word-of-mouth option would add another category for patrons to choose from.

Finally, we recommend adding instructions on Q1, Q4, Q5, and Q13 to notify participants they can select multiple options. Another edit to indicate this would be to change the response boxes on these questions to squares instead of circles. This alternative is less direct, but it is another way to let participants know they can select multiple options.

### **Use a sign and a verbal survey pitch that is relevant to the survey**

At the first two parks, we used a sign that said, “PALS Community Survey.” While the sign generally described our questionnaire, it didn’t indicate what the survey topic or client. Also, park patrons didn’t know what PALS was, so they tended to ignore it. At the third park, we used a sign that read “Environmental Survey for the University of Maryland and Department of Natural Resources.” More patrons looked at the sign and were intrigued by the survey. When patrons stopped to read the sign, we asked them to participate, which generated a higher response rate.

There was a similar uptick in response rate from the verbal survey pitch when we used keywords like “survey about environmental impact” or “survey for the Department of Natural Resources,” as opposed to pitching in a nonspecific way such as “do you have a few minutes to take a survey?” As people passed, we had their attention only for enough time to deliver a few words. The verbal delivery of the survey pitch is important to generate participants.

### **Evaluate the effectiveness of incentives for park patrons**

We recommend that the DNR evaluate which incentives are most effective. We used pre-packaged snacks displayed on the survey table, which helped to increase survey participants. However, we observed that snacks attracted a younger audience; older patrons were more interested in monetary rewards. Additionally, the incentives were more effective at Lake Artemesia and Wheaton Regional rather than Carroll Creek because of the location and activities at each park. DNR should consider age and location when exploring the types of incentives most likely to incentivize a diverse range of participants, including non-monetary and monetary items.

**Train surveyors in canvassing techniques before they go into the field**

DNR should have mandatory canvas training for all surveyors before they begin. Training should include how to speak to patrons, how to decrease surveyor bias, and how to handle different situations. Scenarios and scene play are good preparation. We did encounter situations we'd trained and were well-prepared to handle them. DNR must train their surveyors to conduct themselves professionally and address a diverse range of situations.

**Conduct further research on how to collect a representative sample that accurately describes Maryland park patrons**

To implement the survey on a large scale and collect a representative sample of Maryland park patrons, DNR should further research how to gather a representative sample size. This report's preliminary research is not representative data. But for the DNR to fully understand park patrons' needs and perceptions, the agency needs an accurate and representative sample size. Options include a simple random sample, cluster sample, or stratified sample to prevent bias.

The DNR will need to consult census data and park-visitation data to determine the different park populations. DNR will also need to consider whether to under-sample or over-sample with special consideration for race, age, or socioeconomic status in the representative sample. While our research depended on voluntary responses, it was riddled with response bias because participants chose to participate. Our data may be skewed toward one side of the spectrum. DNR will need to determine how to limit response bias when they expand the survey.

**Conclusion**

This preliminary study was designed to determine the most effective way to craft and administer a climate perception survey at parks for the DNR to implement at a full scale in the future.

Based on research and field observations, this survey would be feasible for large-scale implementation. The DNR would greatly benefit from implementing the questionnaire in state and county parks across Maryland.

The tested survey doesn't entirely focus on climate change. It also asks about users' experiences and feelings about parks. Gaining an accurate representation and understanding of park patrons' perceptions of climate change and use of Maryland parks will influence both the DNR's program development and the user experience. The DNR can use survey findings to create new climate change or environmental programs, develop educational programs for adults and kids, introduce policies to mitigate climate change impacts in parks, and create signage to improve the user experience. The survey's findings will give the DNR much-needed data on patrons' experiences

at the parks, their perceptions of climate impact, and their interests regarding future programs and policies.

Additionally, park patrons have expressed openness to and support for this research. At our pilot locations, we received positive feedback and encouragement from park patrons. Some patrons talked to us after completing the survey and complimented us for our work. Other patrons encouraged us as they walked by our table. Thus, these experiences indicate a willingness from Marylanders to be involved in the policy and program creation process of the Maryland DNR through tools such as surveys.

As mentioned in our observations, most pilot survey respondents also expressed their concern for climate change and environmental impact. In addition, several respondents voiced interest in DNR-ran programs and activities related to the environment and climate change. Our study reveals a need for this survey to be implemented on a representative scale of all Maryland parkgoers so that the DNR has the appropriate data to expand its policies and programs to adapt to climate change.

The DNR's mission is to secure a sustainable future for the environment, people, and economy, through protection, restoration, and enhancement work. Based on this survey testing, it seems many Marylanders are interested in the agency's work and aware of climate change. The Maryland Department of Natural Resources can and should use surveys to gain an enhanced understanding of park visitors' thoughts and needs and then implement programs and policies aligned with Marylanders' growing interests in climate change.

The type of survey tested is feasible for the DNR to implement after further research on acquiring a representative sampling across the state. Overall, the DNR can effectively assess Marylander's growing interest in its parks and climate change with surveys.

## References

- (2022). (rep.). *Montgomery County Parks, Recreation, and Open Space (PROs) Plan*. Retrieved from <https://dnr.maryland.gov/land/Documents/Stewardship/Montgomery-2022-LPPRP-Draft.pdf>.
- Bell, J. (2021, September 14). *In Response to Climate Change, Citizens in Advanced Economies are Willing to Alter How They Live and Work*. Pew Research Center's Global Attitudes Project. <https://www.pewresearch.org/global/2021/09/14/in-response-to-climate-change-citizens-in-advanced-economies-are-willing-to-alter-how-they-live-and-work/>
- Derrington, M. L. (2009). A Three-Step Guide to Developing Effective Surveys. *Principal*, 88(4), 46–47.
- Draugalis, J. R., Coons, S. J., & Plaza, C. M. (2008). Best practices for survey research reports: A synopsis for authors and reviewers. *American Journal of Pharmaceutical Education*, 72(1), 11. <https://doi.org/10.5688/aj720111>
- Edwards, P. J., Roberts, I., Clarke, M. J., DiGuseppi, C., Wentz, R., Kwan, I., Cooper, R., Felix, L. M., & Pratap, S. (2009). Methods to increase response to postal and electronic questionnaires. *Cochrane Database of Systematic Reviews*, 2010(1). <https://doi.org/10.1002/14651858.mr000008.pub4>
- Gonzalez, G. L. (2001). Conducting Effective Surveys on a Limited Budget. *Recreational Sports Journal*, 25(1), 16–24. <https://doi.org/10.1123/nirsa.25.1.16>
- Maryland at a Glance*. Maryland State Parks, by County. (n.d.). <https://msa.maryland.gov/msa/mdmanual/01glance/html/parks.html>.
- Maryland Department of Natural Resources, & Maryland Department of Commerce. (2019, December). *Maryland Outdoor Recreation Economic Commission Final Report*. [https://dnr.maryland.gov/Documents/more/MORE\\_FinalReport.pdf](https://dnr.maryland.gov/Documents/more/MORE_FinalReport.pdf).
- Maryland Department of Natural Resources. (n.d.). *Home*. A Guide to Planning for Climate Change on Maryland's Public Lands. Retrieved April 30, 2023, from <https://sites.google.com/umich.edu/marylandclimatechange/home>
- Maryland Department of Natural Resources. (2021). (rep.). *Maryland Department of Natural Resources Annual Report 2021*.

Smardon, R. C. (1988). Water recreation in North America. *Landscape and Urban Planning*, 16(1–2), 127–143. [https://doi.org/10.1016/0169-2046\(88\)90039-4](https://doi.org/10.1016/0169-2046(88)90039-4).

Stinchcomb, C., & Dickinson, B. (n.d.). *Maryland and the District of Columbia*. State Climate Summaries. Retrieved February 27, 2023, from <https://statesummaries.ncics.org/chapter/md/>.

Taherdoost, Hamed, *How to Design and Create an Effective Survey/Questionnaire; A Step by Step Guide* (2018, August 1). *International Journal of Academic Research in Management (IJARM)*, Vol. 5, No. 4, 2016, Page: 37-41.

Thompson, J. E. (2017). Survey data reflecting popular opinions of the causes and mitigation of climate change. *Science Direct*, 14, 412-249. ELSEVIER. Retrieved 2023, from <https://doi.org/10.1016/j.dib.2017.07.060>.

Weber, E. U. (2010). What Shapes Perceptions of Climate Change? *Wiley Interdisciplinary Reviews: Climate Change*, 1(3), 332–342.  
<https://doi.org/10.1002/wcc.41>

Yale Climate Opinion Maps 2021 - Yale Program on Climate Change Communication. (2022, February 23). Yale Program on Climate Change Communication. Retrieved February 27, 2023, from <https://climatecommunication.yale.edu/visualizations-data/ycom-us/>.



## Appendix A

### The field-tested survey



Hello! We are a group of undergraduate public policy students at the University of Maryland. We are working with the Maryland Department of Natural Resources to collect data about park recreation and climate change. All information collected from this survey is confidential and anonymous. Your participation in this survey is voluntary. You may elect to stop your participation at any time. This survey will take around 5 minutes. Please complete the questions to the best of your ability. When you are done, put the survey in the basket on the table. Thank you for your time and input!

**Q1) How did you get to the park today?**

- Walk                       A bike, scooter, or skateboard                       A car                       Public transportation (such as a bus or train)

**Q2) How long did it take you to get to the park today?**

- Under 15 minutes                       16 to 30 minutes                       31 to 45 minutes  
 46 to 59 minutes                       1 hour to 2 hours                       More than 2 hours

**Q3) Which of the following activities do you plan to do while you are here today? (please choose all that apply)**

- Hiking or walking                       Working out                       Fishing                       I came without a plan  
 Riding bikes, scooters, or skateboards                       Boating, canoeing, or kayaking                       Picnicking                       Other (*Specify here*):  
 Playing ball or frisbee                       Swimming                       Using a playground

**Q4) When you come to this park, how does it make you feel?**

- Excited                       Happy                       Empowered                       Proud  
 Frustrated                       Helpless                       Sad                       Other (*Specify here*):

**Q5) Where do you get information about outdoor recreation in Maryland?**

- Recreational website                       Social media                       Other (*Specify here*):  
 Government website                       I have never looked up information about outdoor recreation

**Q6) Do you plan your park visits around the weather, like the temperature or rain?**

- Yes                       No

**Q7) Have severe weather events, like extreme heat, flooding, or major storms impacted your trips to Maryland parks?**

- Frequently                       Sometimes                       Rarely                       Never                       I'm not sure

**Q8) In your experience, have you noticed this park being affected by any of the following?**

	Yes	No	Not sure
Warming temperatures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flooding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Earlier plant bloom cycles	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q9) How much would you say you know about climate change?**

- A lot                       A fair amount                       A little bit                       Not much at all                       No opinion

**Q10) In your opinion, how much of a problem is climate change?**

- Not at all     
  Not too serious     
  Somewhat serious     
  Very serious     
  Don't know / not sure

**Q11) How much do you think human activity, such as the burning of fossil fuels, contributes to climate change?**

- Not at all     
  Not too much     
  Some     
  A great deal     
  Don't know/not sure

**Q12) Do you think climate change will pose a serious threat to the community in your lifetime?**

- Yes     
  No

**Q13) When you hear about climate change, how does it generally make you feel?**

- Curious     
  Anxious     
  Powerless     
  No feeling/  
 Optimistic     
  Empowered     
  Angry     
 indifferent

**Q14) How confident are you in the Maryland State government's ability to combat climate change?**

- Completely confident     
  Very confident     
  Quite confident     
  A little confident     
  Not at all confident

**Q15) Are you interested in learning more about climate change?**

- Yes     
  No

**Q16) Would you be interested in participating in any of the following activities in the parks?**

	Yes	No
Environmental educational programs	<input type="radio"/>	<input type="radio"/>
Climate change educational programs	<input type="radio"/>	<input type="radio"/>
Clean ups	<input type="radio"/>	<input type="radio"/>
Volunteer opportunities	<input type="radio"/>	<input type="radio"/>
Environment-related social events	<input type="radio"/>	<input type="radio"/>

**Q17) How old are you?**

- Under 18     
  18-24     
  24-34     
  35-44  
 45-54     
  55-64     
  65 or over     
  Prefer not to answer

**Q18) What is your sex?**

- Male     
  Female     
  Non-Binary     
  Prefer not to answer

**Q19) Do you consider yourself Hispanic or Latino?**

- Yes     
  No     
  Prefer not to answer

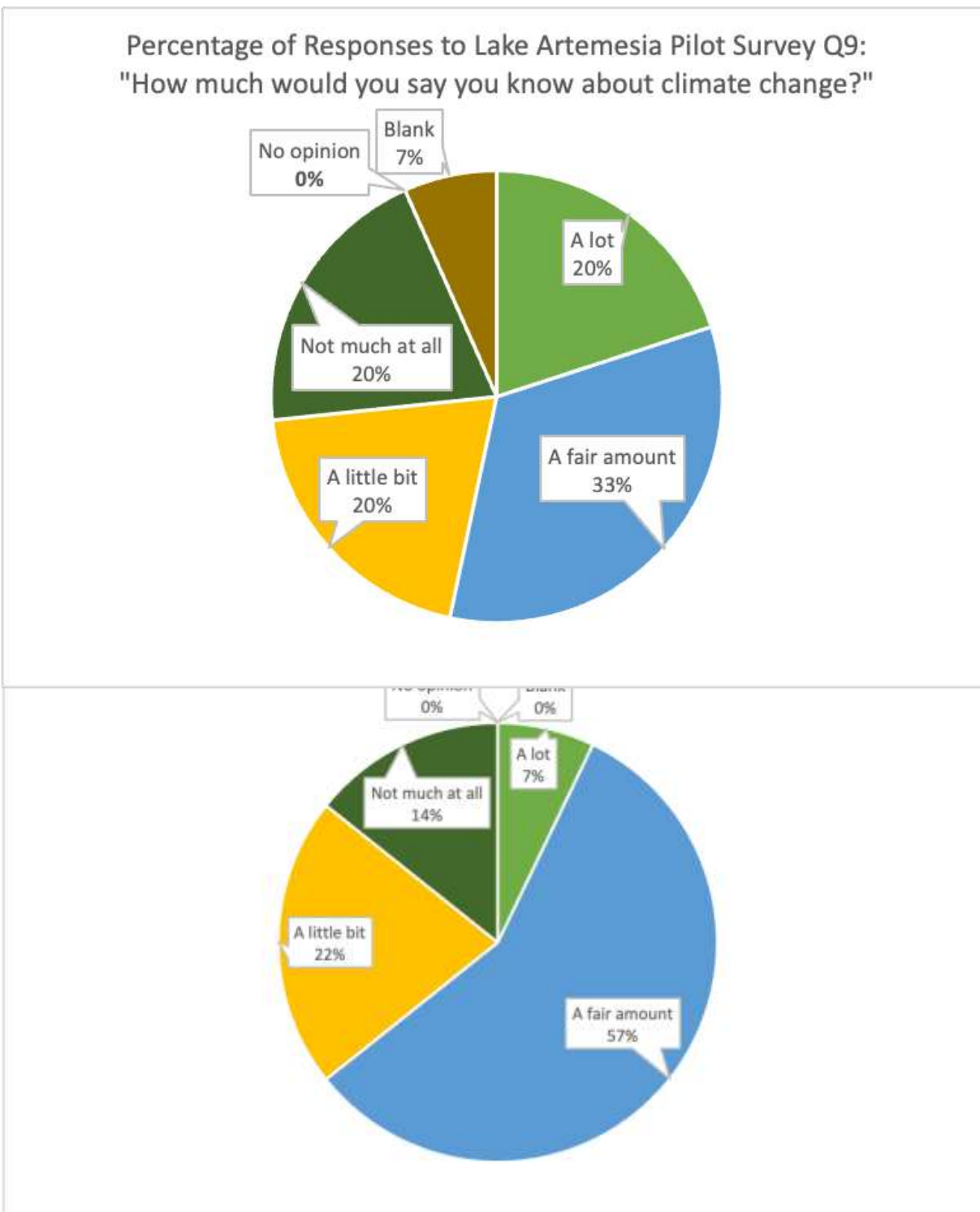
**Q20) Which racial group best describes you? (choose all that apply)**

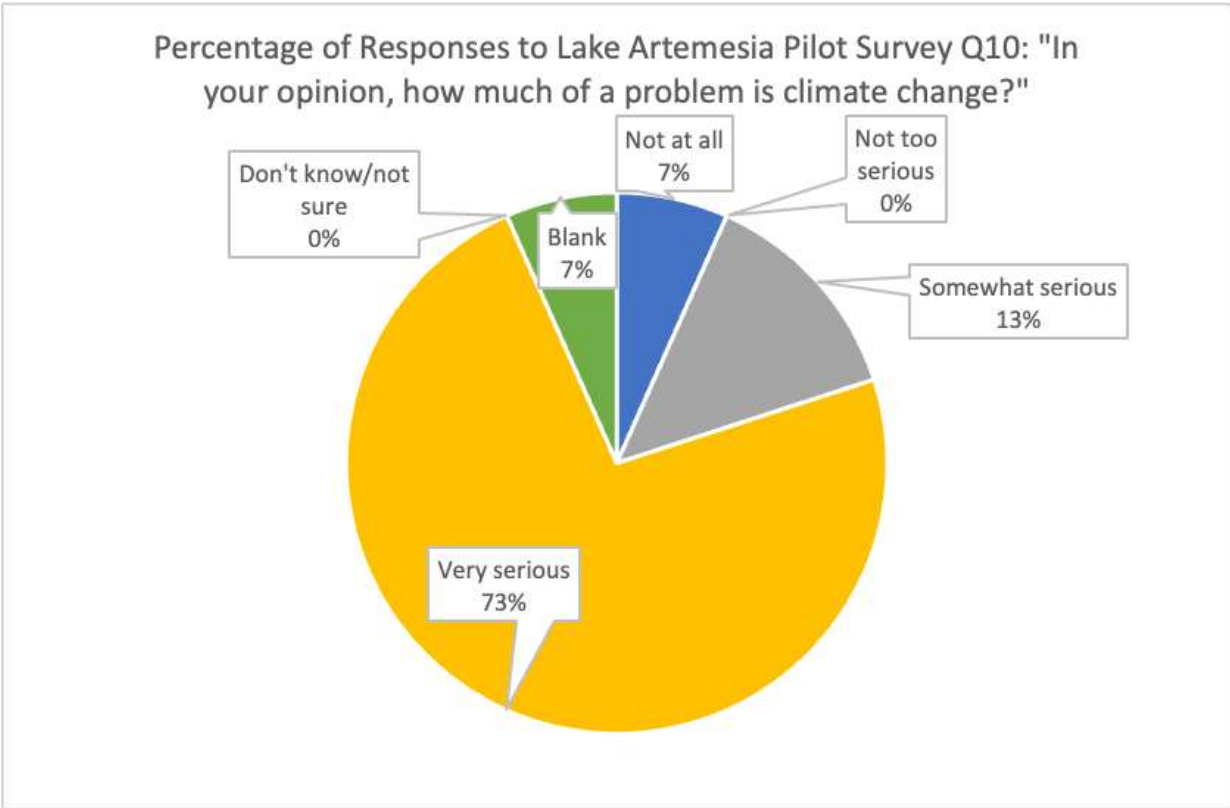
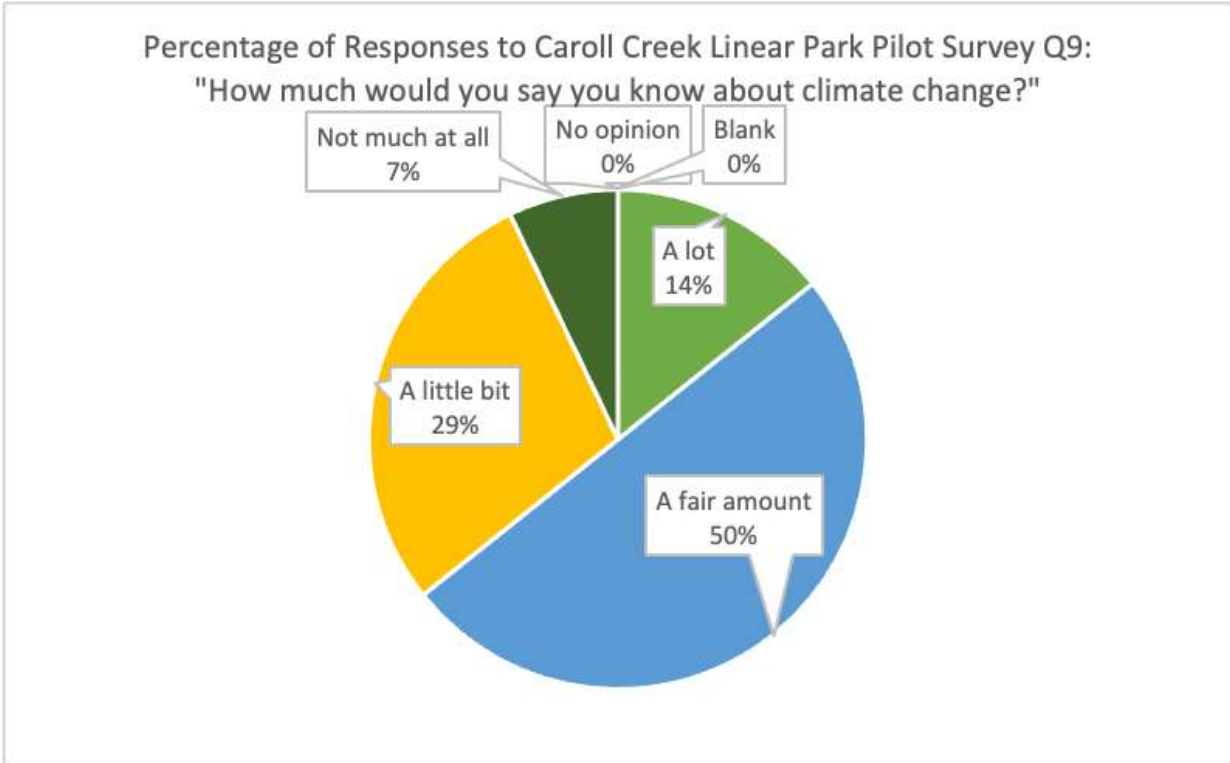
- White     
  Black or African American     
  Asian  
 American Indian or Alaskan Native     
  Middle Eastern or North African     
  Prefer not to answer

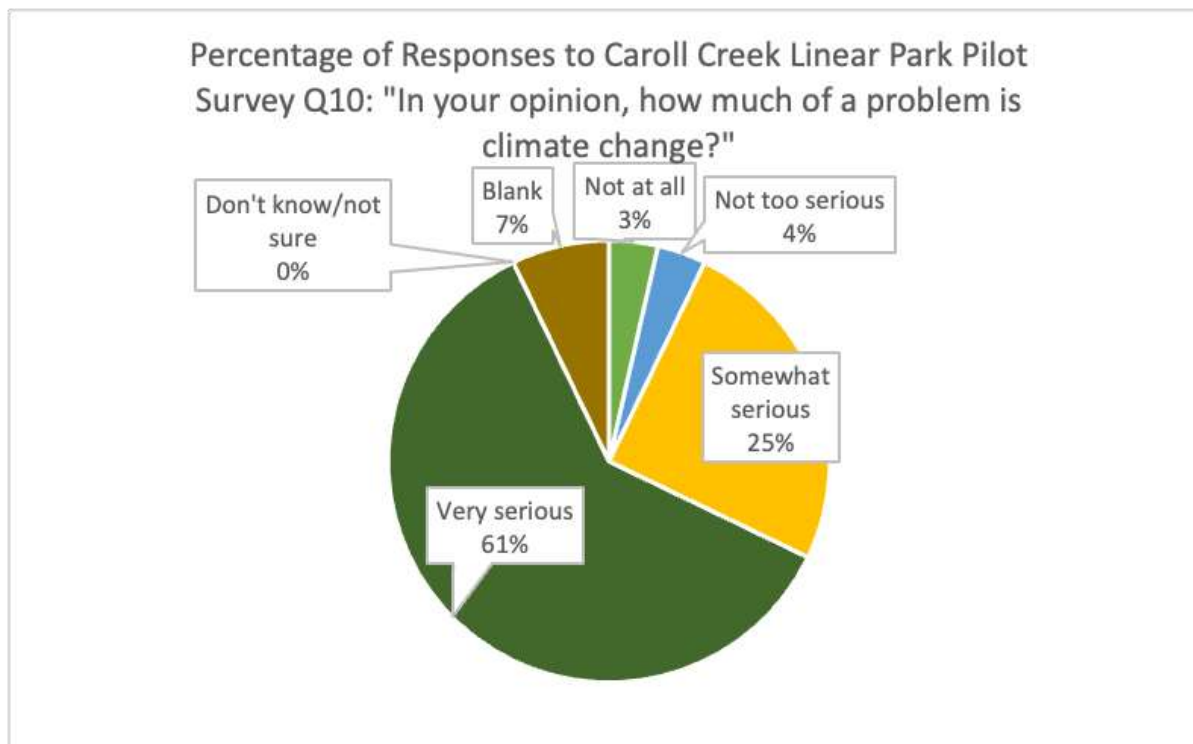
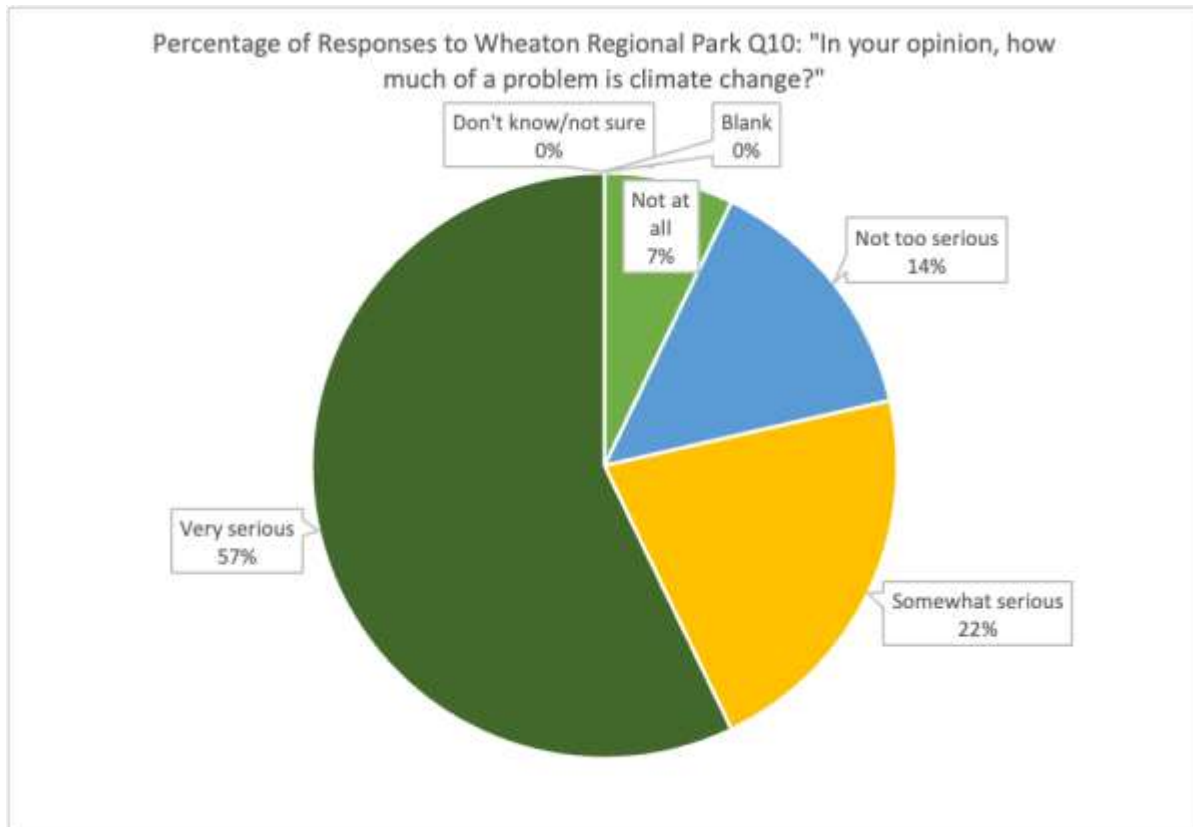
## Appendix B

Breakdown of response data from completed pilot survey—Q9 and Q10

\*Lake Artemesia sample size: 15; Wheaton Regional Park sample size: 14; Carroll Creek Linear Park sample size: 28







## Appendix C

Percentage breakdown of pilot survey responses—Q16 (Would you be interested in participating in any of the following activities in the parks ...)

	Carroll Creek Linear Park			Wheaton Regional Park			Lake Artemesia		
	Yes	No	Blank	Yes	No	Blank	Yes	No	Blank
Environmental Educational Programs	<b>50%</b>	<b>35.71%</b>	14.29 %	<b>42.68%</b>	<b>57.14 %</b>	n/a	<b>53.33%</b>	<b>40%</b>	7%
Climate Change Education Programs	<b>42.86%</b>	<b>39.29%</b>	17.86 %	<b>21.42%</b>	<b>78.57 %</b>	n/a	<b>33.33%</b>	<b>53.33%</b>	13.33 %
Clean-ups	<b>71.43%</b>	<b>17.86%</b>	10.71 %	<b>35.71%</b>	<b>57.14 %</b>	7.14%	<b>73.33%</b>	<b>13.33%</b>	13.33 %
Volunteer opportunities	<b>57.14%</b>	<b>25%</b>	17.86 %	<b>35.71%</b>	<b>50%</b>	14.29 %	<b>73.33%</b>	<b>13.33%</b>	13.33 %
Environment-related social events	<b>53.57%</b>	<b>31.14%</b>	14.29 %	<b>50%</b>	<b>42.86 %</b>	7.14%	<b>66.66%</b>	<b>20%</b>	13.33 %