Visitor Perceptions of Climate Change: A National Park Service and U.S. Fish and Wildlife Service Study, National Elk Refuge

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Between 2011 and 2012, a collaborative survey was conducted across 16 national parks and national wildlife refuges to assess visitor perceptions and attitudes about climate change. This foundational work—led by researchers at Colorado State University in partnership with the National Parks Conservation Association, the National Park Service (NPS), and the U.S. Fish and Wildlife Service—provided valuable insights into public understanding of climate change and its relevance to visitor experiences. Published findings from the 2013 study have since informed climate change communication strategies and justified continued education efforts within parks and refuges.

More than a decade later, we propose to replicate and update this survey to capture current visitor attitudes, measure shifts in public perception over time, and understand how climate change is impacting visitor experiences and expectations. This new effort will inform evidence-based communication tools, educational programming, and strategic investments in interpretation and engagement across public lands. As the nation's largest provider of informal education, the NPS has both a responsibility and an opportunity to lead meaningful dialogue about climate change. Climate change is not a distant threat—it is a present and pervasive force affecting every acre of land managed by the NPS. Melting glaciers, rising seas, altered ecosystems, and cultural site degradation are all visible impacts that underscore the urgency of public understanding and involvement. To that end, parks serve not only as places of recreation and inspiration, but also as powerful venues for climate literacy—helping visitors discover personal relevance, connect with science, and make informed decisions.

This renewed survey initiative aligns with the NPS *Climate Change Response Strategy* and the *National Climate Change Interpretation and Education Strategy*, which emphasize collaborative stewardship and communication. Engaging visitors in climate conversations is critical to fostering a climate-literate public and developing actionable responses to the most pressing environmental challenge of our time. The updated survey will support these goals by capturing how visitors perceive climate change today, how it shapes their park experiences, and how they expect the NPS to respond.

Ultimately, this research will strengthen the NPS's ability to communicate the story of climate change with clarity, authenticity, and purpose—ensuring our public lands remain not only protected landscapes, but also essential platforms for public education and engagement.

Introduction of Study

Methods

Project leads from Northern Michigan University will survey visitors at up to 9 target NPS sites, and 4 FWS sites across varying geographic regions. Target parks will be identified in consultation with the NPS and FWS to reach a robust number of respondents comparable to the 2012 survey.

Figure 1. *Participating Parks and Refuges in the 2025 Visitor Perceptions on Climate Change Study*

Southern Florida and the Keys

Biscayne National Park (FL)

Everglades National Park (FL)

Southwest Region

Joshua Tree National Park (CA)

Lake Mead National Recreation Area (NV)

Northern California

Yosemite National Park (CA)

Golden Gate National Recreation Area (CA)

Don Edwards National Wildlife Refuge (CA)

Western Mountain Region

National Elk Refuge (WY)

Grand Teton National Park (WY)

Rocky Mountain Arsenal National Wildlife Refuge (CO)

Rocky Mountain National Park (CO)

Upper Peninsula Michigan

Pictured Rocks National Lakeshore (MI)

Central Minnesota

Minnesota Valley National Wildlife Refuge (MN)

Survey Development. The survey used in this study was created using the data collection software from ArcGIS Survey123, which is compatible with the Samsung Tab A9+ tablets. The ArcGIS app allows for the electronic survey to be viewed and completed on the Samsung Tab A9+ tablets. The survey team administered the survey on 12 tablets and gathered approximately 400 survey responses in each location during the permitted survey timeframe/period. All surveys were saved, synced, and uploaded to the password-protected ArcGIS platform, where the results were generated and viewable by the survey team.

Procedure. Approximately, 5,000 surveys were administered over the course of 8 months by the Northern Michigan University Climate Change Survey Team. The team used the following script to recruit willing and anonymous respondents:

"Hello, I am a student from Northern Michigan University working with the National Park Service and the U.S Fish and Wildlife Service conducting visitor surveys at this park/refuge. This survey is about visitors' perceptions of climate change at this Park and takes about 5-7 minutes to complete. Your participation is completely voluntary and anonymous. You can stop taking the survey at any time. Would you be willing to help the National Park Service better understand visitors' opinions by taking this survey?"

The survey team was available to answer any technical questions that pertained to the operation or navigation of the survey on the tablet and any necessary clarification respondents may need to complete the survey. However, the survey team was not to offer any opinions or insight regarding specific questions while the survey was being conducted.

Survey Sites. The on-site survey locations were predetermined and permitted by our partners at the NPS and USFWS. The permitted locations varied at each park or refuge; however, many of the targeted areas included popular trailheads, visitor centers, and campgrounds. Upon arrival at each location, the survey team consulted with park rangers and location managers to determine the most appropriate sites to survey

at that specific park or refuge. Most surveys were collected during the weekends due to the increased visitation and convenience at that time; however, weekdays are also represented at each location.

Response Rates. The survey response team collected a total of 408 surveys at National Elk Refuge.

Visitor Survey Results

Visitor Demographics

The majority of participants were U.S. residents (89%), with the most common age group being 55-64 years old (18%). Most respondents were highly educated, with (68%) holding a bachelor's degree or higher, and the racial demographic was predominantly White (79%), with limited representation from other racial groups. Additionally, (78%) of participants were visiting the park or refuge for the first time, suggesting a large proportion of newcomers in the sample.

Table 1

Demographic Characteristics of Participants

Characteristics	n	%
Are you a resident of the United States? (n=403)		
Yes	359	89
No	34	8
Do not wish to answer	10	2
Age (n=405)		
18-24 years old	57	14
25-34 years old	67	17
35-44 years old	66	16
45-54 years old	68	17
55-64 years old	72	18
65-74 years old	64	16
75 years or older	11	3
Highest level of education completed? (n=394)		
Less than high school/Some high school	7	2
High school graduate	32	8
Vocation/trade school certificate	7	2
Some college	41	10
Associates degree	33	8

Bachelor's degree (BA, AB, BS, etc.)	132	34
Master's degree (MA, MS, Med, MSW, MBA, etc.)	90	23
Professional degree (MD, DDS, DVM, LLB, JD, etc.)	24	6
Doctorate degree (PhD. EdD. etc.)	19	5
Do not wish to answer	9	2
Are you Hispanic or Latino? (n=395)		
Yes	28	7
No	354	90
Do not wish to answer	13	3
Which of these categories best indicates your race? Please select one or more. (n=392)		
American Indian or Alaska Native	10	3
Asian	49	13
Black or African American	5	1
Native Hawaiian	1	0
White	309	79
Other race or ethnicity	13	3
Do not wish to answer	21	5
Is this your first visit to this Park/Refuge? (n=408)		
Yes	318	78
No	90	22
Including this visit, approximately how many times have you visited this park in the last 12 months? **The average number of visits over a 12 month period was 6 visits.**		

Visitor Concerns about Impact of Climate Change

Respondents were asked to rate their level of concern on the impact of climate change, both in a general sense and in the Park/Refuge, respectively.
Percentages may not add up to 100% due to rounding for readability.

Table 2

Please choose the issue you are most concerned about regarding this Park/Refuge (n=401)

Categories	Response Percentage (%)
Air Pollution	5
Water Pollution	7
Climate Change	36
Light Pollution	4
Noise Pollution	6
Invasive Species	13
Overcrowding	29

Climate change is the most pressing concern among respondents, with (36%) identifying it as their top issue related to the Park/Refuge. Overcrowding (29%) was also of concern to respondents. Air, light, water and noise pollution are less of a concern to visitors.

Table 3

How worried are you about climate change? (n=397)

Categories	Response Percentage (%)
Very Worried	40
Somewhat Worried	30
Not Very Worried	20
Not at all Worried	10

Under half of respondents (40%) reported being very worried about climate change, while an additional (30%) were somewhat worried, indicating that just under three-quarters express some level of concern. Approximately (30%) of participants reported being not very worried or not at all worried.

Table 4

How important is the issue of climate change to you personally? (n=396)

Categories	Response Percentage (%)
Extremely Important	29
Very Important	24
Somewhat Important	24

Not too Important	14
Not at all Important	9

A majority of respondents (53%) consider climate change to be either extremely or very important to them personally. Meanwhile, a smaller portion, about (23%), view the issue as either not too important or not at all important.

Table 5

How much do you think climate change will harm the following?

	Response Percentage (%)				
Statement	A Great Deal	A Moderate Amount	Only a Little	Not at All	Don't Know
You personally (n=345)	20	34	28	15	3
Future Generations of People (n=336)	57	20	11	8	3
This Park/Refuge (n=334)	50	25	12	7	5

The data indicates that concern about climate change is highest when considering its impact on future generations, with (57%) of respondents believing it will harm them "a great deal." Concern is also higher for the park or refuge itself, with half of respondents (50%) selecting "a great deal." In contrast, fewer respondents perceive personal harm, with only (20%) indicating that climate change will affect them "a great deal," suggesting a greater perceived threat to others and the environment than to themselves personally.

Table 6

How much do you agree with the following statement?

	Response Percentage (%)				
Statement	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
The effects of climate change can already be seen at this Park/Refuge (n=400)	12	31	43	8	6
I would like to learn more about climate change topics in this Park/Refuge (n=395)	14	39	31	9	7

Relative to other topics, sharing climate change information should be a high priority at this Park/Refuge (n=390)	24	38	24	8	5

The data shows that under half of respondents (43%) agree or strongly agree that the effects of climate change are already visible at the park or refuge, the same portion of respondents (43%) remain neutral, suggesting uncertainty or a lack of awareness. Interest in learning more about climate change is relatively strong, with (53%) expressing agreement, indicating a receptive audience for educational initiatives. Furthermore, (62%) believe that sharing climate change information should be a high priority, highlighting a clear public interest in climate communication at this site.

Visitor Interest in Climate Change Education/Adaptation

Table 7

Have you received any climate change information about this Park/Refuge? (n=395)

Statement	Response Percentage (%)
No	91
Yes	9

A majority of respondents (91%) reported not receiving any climate change information about the park/refuge, while only (9%) said they had. This suggests a significant communication gap regarding climate change at this site.

Table 8

From what sources have you received information about climate change at this park/refuge? (n=35)

Categories	Response Percentage (%)
Exhibits (indoor, roadside, trailside)	71
Ranger and staff-guided walks/talks/tours	31
Informal conversations with rangers and park staff	37
In-park videos, films, movies	26
Printed materials (brochures, books, maps, etc.)	37
Cell phone or audio tours	9
Park/Refuge website	9
Social media (Facebook, X, Instagram, etc.)	9
Online videos, films, movies, podcasts	17
Other	9

It is important to note that approximately (9%) of the total number of respondents answered this question. Among the small group who answered this question, exhibits (71%) were the most common sources.

Other sources, such as printed materials and informal conversation with rangers and park staff (37%) and ranger and staff-guided walks/talks/tours (31%) were cited.

Table 9

During your visit, how interested are you in learning about climate change topics at this Park/Refuge through the following sources?

Statement	Response Percentage (%)				
	Very Interested	Interest	Neutral	Not Very Interested	Not at all Interested
Exhibits (indoor, roadside, trailside) (n=400)	20	43	22	9	7
Ranger and staff-guided walks/talks/tours (n=397)	20	35	27	10	7
Informal conversations with rangers and park staff (n=394)	21	40	23	10	7
In-park videos, films, movies (n=397)	14	42	24	12	9
Printed materials (brochures, books, maps, etc.) (n=397)	13	39	26	13	9
Cell phone or audio tours (n=386)	11	25	35	19	10
Park/Refuge website (n=382)	15	39	26	12	8
Social media (Facebook, X, Instagram, etc.) (n=384)	14	32	28	15	12
Online videos, films, movies, podcasts (n=379)	16	36	26	13	8

Visitors are most interested in learning about climate change through exhibits and talking with park staff. Ranger-led programs and the park website are also popular sources of interest. Respondents are also interested in learning about climate change using printed materials, and the park website. In contrast, there is less interest in using cell phone or audio tours and social media for climate information. Overall, people prefer in-person and on-site experiences over digital or self-guided options.

Table 10

Please indicate your level of interest in learning how climate change is affecting...

Categories	Response Percentage (%)				
	Very Interested	Interested	Neutral	Not Very Interested	Not at all Interested
Wildlife in this Park/Refuge (n=399)	37	37	15	6	5
Plants And Natural Features (forest, lakes, rivers, etc.) in this Park/Refuge (n=399)	32	42	16	6	5
Cultural And Historical Features (historical Indigenous sites, historical buildings, archaeology, etc.) in this Park/Refuge (n=395)	25	37	25	7	6
People (visitor safety, staff safety, human health, visitor experience, etc.) in this Park/Refuge (n=396)	19	35	29	10	7
Facilities (park buildings, roads, etc.) in this Park/Refuge (n=392)	16	33	32	11	7
Neighboring Communities (Indigenous people, local communities) (n=371)	19	40	27	8	5

Visitors showed the highest interest in learning how climate change affects wildlife (74%) interested or very interested and plants and natural features (74%). Cultural and historical features also attracted moderate attention, with about (62%) expressing interest, while interest was notably lower for topics like facilities (49%) and people in the park/refuge (54%). Overall, the natural environment draws the most concern, whereas impacts on people, infrastructure, and surrounding communities generate comparatively less interest.

Table 11

Please indicate your level of interest in learning about...

Categories	Response Percentage (%)				
	Very Interested	Interested	Neutral	Not Very Interested	Not at all Interested
Scientific Research on climate change in this Park/Refuge (n=380)	26	41	21	8	4

A majority of respondents (67%) expressed interest or strong interest in learning about scientific research on climate change at the park/refuge, while (12%) indicated little or no interest. This suggests that visitors are generally eager to engage with science-based information about climate change impacts in the park.

Table 12

How much do you agree or disagree with the following possible actions to adapt to climate change in ANY park/refuge?

Statement	Response Percentage (%)					
	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	Don't Know
Wrap iconic trees in fire-resistant materials as wildfire approaches. (n=398)	15	36	24	13	6	8
Allow grasses and bushes to replace forests after wildfires rather than replanting trees. (n=399)	9	32	29	16	8	7
Relocate plants and animals to new areas to protect them from hotter conditions. (n=395)	9	26	35	18	7	6
Build seawalls around staff housing to protect against sea level rise. (n=396)	8	29	35	12	9	7
Move historic lighthouses inland to protect against sea level rise. (n=393)	7	25	38	15	9	6
Invest in structures for visitor use that can be moved if a hurricane is approaching. (n=393)	12	35	31	8	7	6

Abandon maintenance of roads and trails at repeated risk from flooding. (n=394)	9	28	31	15	11	7
Document (but don't remove) archeological artifacts at imminent risk from flooding. (n=388)	13	31	32	10	8	6
Remove archeological artifacts at imminent risk from flooding to store in museums. (n=359)	17	41	26	7	5	5

Overall, respondents tend to support proactive measures to protect natural and cultural resources from climate change, particularly those involving documentation or physical protection. Actions like wrapping trees, relocating artifacts, or building movable structures received relatively more support. In contrast, proposals that involve more permanent ecological changes—such as allowing natural vegetation shifts or abandoning infrastructure—elicited more uncertainty or disagreement. Many responses also show a significant portion of participants who are undecided, suggesting a need for further public engagement or education on these complex adaptation strategies.

Table 13

Have you noticed any efforts to reduce greenhouse gas emissions (renewable energy, hybrid or electric vehicles, mass transit, LEED-certified buildings, etc.) at this Park/Refuge? (n=394)

Statement	Response Percentage (%)
Yes	38
No	62

The majority of respondents (62%) have not noticed any efforts to reduce greenhouse gas emissions at the park/refuge, while a smaller portion (38%) reported noticing such efforts.

Table 14

How much do you agree or disagree with efforts to reduce greenhouse gas emissions at this Park/Refuge? (n=398)

	Response Percentage (%)				
Statement	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
	29	31	31	5	4

A combined (60%) of respondents agree or strongly agree with the efforts to reduce greenhouse gas emissions at the park/refuge, indicating overall support for these initiatives. However, (31%) remains neutral, and a small percentage (9%) disagree with or strongly disagree with these efforts, suggesting room for improvement in either the effectiveness or communication of such efforts.

Visitor Behavior

Table 15

Please indicate whether you have ever done any of the following in ANY Park/Refuge:

	Response Percentage (%)	
Statement	Yes	No
Visited a park/refuge to see iconic features or species that may disappear because of climate change (such as glaciers, Joshua trees, or puffins) (n=396)	63	37
Avoided places that have been impacted by climate change (such as places with lots of dead trees from fires or pests like pine beetles) (n=396)	27	73
Visited a park/refuge to experience extreme weather conditions (like extreme heat in Death Valley) (n=381)	36	64

A significant portion of respondents (63%) have visited a park/refuge specifically to see iconic features or species that may be impacted by climate change, showing a strong interest in the environmental changes occurring in these areas. On the other hand, fewer respondents have avoided climate-impacted locations (27%) or sought out extreme weather experiences (36%), suggesting that most visitors still prioritize the experience of nature despite climate-related changes. OBJ

Table 16

Because of extreme weather conditions (like wildfire/smoke, extreme heat, flooding, hurricanes, etc.) I have…

	Response Percentage (%)	
Statement	Yes	No
Canceled a trip to a park/refuge (n=395)	29	71
Visited a park/refuge less often (n=393)	28	72
Changed the timing of a visit (to a different day or season) (n=390)	47	53

Changed what I did while visiting a park/refuge (like not hiking on a very hot day, or not camping because of flooding) (n=390)	50	50

A notable portion of respondents have adjusted their park/refuge visits due to extreme weather conditions, with (50%) changing their activities (e.g., avoiding hiking in extreme heat) and (47%) altering their visit timing to avoid extreme weather. Additionally, (29%) have canceled trips altogether due to conditions like wildfire smoke or flooding, while (28%) report visiting parks less frequently because of such challenges, indicating that extreme weather is significantly impacting people's park experiences.

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