

A photograph of a wooden dock extending into a calm body of water at dusk. A person wearing a hat and a light-colored shirt stands on the dock, looking out over the water. A glowing yellow tent is set up on the dock. Two canoes are moored nearby: a dark one on the left and a red one on the right. The sky is a mix of blue and orange, suggesting sunset or sunrise. The overall mood is peaceful and contemplative.

SUMMARY REPORT CCEP-1
**Building Place-Based
Climate Change Education through
the Lens of National Parks and
Wildlife Refuges**

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Cover: Everglades National Park, FL (©Ian Shive/Tandem Photos)



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Table of Contents



I. Executive Summary.....	1
II. Project Objectives and Methods.....	4
III. Review of Scientific Literature	7
IV. Summary of Visitor Surveys.....	9
V. Summary of Project Workshops	12
VI. Summary of Project Outcomes	16
VII. Recommendations for Participating Agencies	18
Acknowledgements	21

I

Executive Summary



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I. Executive Summary



At most parks and refuges, land managers confront mounting evidence that climate change is real and has measurable impacts on the places they protect. But various barriers make it more challenging for staff from federal agencies to discuss climate change with their visitors or raise awareness about its effects—which, in many cases, are already visible.

In the Washington, D.C., area, spring flowering of 100 different species has advanced by 2.4 days from 1970 to 1999. In the Pacific Northwest's Cascade Mountains, decreasing snowpack at mid-elevation stations show a 30-60 percent decline from 1950-2000. And species' ranges are shifting: Over the past 40 years, the range of the Sachem skipper butterfly has expanded 420 miles north. All of these fluctuations are related to climate change.

Yet managers and interpreters at parks and refuges can be apprehensive about discussing such impacts. Prior to 2009, the Department of Interior did not have a formal policy on climate change, and presidential administration discouraged these employees from talking about it. Now, however, both the National Park Service (NPS) and Fish and Wildlife Service (FWS) are developing national strategies, but it takes time for this feeling of support to trickle down

to the field. Some staff members don't realize they can talk about this issue.

Another impediment is staff members' feeling that they lack sufficient knowledge of climate change science and its direct impacts in their park or refuge: Climate change is a complicated, intimidating topic, and staff sometimes lacks the expertise to confidently address it with visitors. Other barriers may include staff's assumption that climate change is too depressing to discuss with visitors on vacation, who may be uncomfortable with the uncertainty inherent in the topic. These workers may also be afraid of how visitors may respond.

As a result, the topic may go unaddressed at some parks and refuges. At Dungeness National Wildlife Refuge in Washington, 79 percent of people surveyed had not received any information on climate change during their visit.

To help parks and refuges discover methods for how to more effectively communicate about climate change, the National Science Foundation funded the Place-based Climate Change Education Partnership (CCEP), a research project involving NPS, FWS, Colorado State University, and the National Parks Conservation Association (NPCA). Research from this partnership spanned five regional Communities

of Practice from Alaska to Florida, and brought together staff from both agencies (as well as representatives from nonprofits, universities, local governments, and other parties involved in climate change) for brainstorming sessions on effective communication strategies aimed specifically at transcending the boundaries of any individual park or refuge. These efforts included surveying agency staff nationwide and surveying visitors at the 16 parks and refuges in the five pilot locations to learn their assumptions, attitudes, and beliefs about climate change.

Some results were surprising, and they may help to break down some of the barriers agency staff have regarding this topic. For example, although many FWS visitors are hunters and anglers who often hold conservative political views, their attitudes toward climate change echoed those expressed by NPS visitors, who tend to be more liberal-leaning.

Surveys revealed that visitors to both parks and refuges are equally concerned about climate change, interested in learning about its impact on the places they cherish, and motivated to make changes that could help protect those places. Opinions differ on the causes of climate change—most visitors suspect that human activity is partly to solely responsible—but the majority are convinced it's happening.

I. Executive Summary (continued)



Furthermore, most visitors are willing to take action and lend their effort toward solutions to climate change threats.

Perhaps most surprisingly as well as empowering, NPS and FWS staff significantly underestimated visitors' concern for climate change. When surveyed, most staff responded that visitors were not concerned (13 percent), slightly concerned (32 percent), or somewhat concerned (39 percent). Yet visitors identified themselves as somewhat concerned (27 percent), very concerned (34 percent), and extremely concerned (22 percent). These findings should embolden agency staff to approach the topic of climate change with visitors, who actually represent a receptive audience.

Other survey findings confirmed what most agency staff already know: That visitors care deeply about parks and refuges. Climate change threatens the places and activities people love, so by using cherished places as common ground, and by using place-based climate change messages that address impacts on a local level, parks and refuges can spur visitors to confront climate issues.

This research revealed several valuable approaches that could help agencies share messages about climate change with key audiences. It's important to

Table 1: How much are visitors concerned about climate change?

NPS & FWS Staff Anticipated Visitor Response

13	Not Concerned
32	Slightly Concerned
39	Somewhat Concerned

Visitors' Response

27	Somewhat Concerned
34	Very Concerned
22	Extremely Concerned

reach out to younger visitors, since kids and teens can become influential educators in their own right. Agencies should prioritize staff education, so representatives can confidently broach climate change topics with visitors. Parks and refuges must also “walk the talk” by employing sustainable practices and by using those efforts as educational examples for visitors.

Lastly, staff have access to a growing network of climate change resources to collaborate with others and learn from their methods. Agency staff interested in developing climate-change communication

products shouldn't feel alone in their efforts, because the five regional Communities of Practice can serve as models and mentors. Regional collaboration across the two agencies and with their neighbors is changing the conversation about climate change at these places. By borrowing the resources and templates employed by CCEP study sites, and by reaching out to like-minded entities, NPS and FWS staff can benefit from—and add their efforts to—a powerful coalition of partners committed to providing effective climate-change communication on public lands.



Project Objectives and Methods



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II. Project Objectives and Methods



The place-based Climate Change Education Partnership (CCEP) is a National Science Foundation-funded research project involving CSU, NPS, FWS, and NPCA. The purpose of this nationwide, collaborative effort is to assess the communication challenges, opportunities, and needs among park and refuge staff when discussing climate change impacts on America's public lands. This initial effort focused on gathering information and conducting social-science research that could be used to develop an interagency communication strategy to more effectively communicate about climate change across agency boundaries.

The CCEP's goal is to engage staff, managers, volunteers and partners at adjacent public lands in a "landscape-scale" approach to climate-change engagement. To inform such efforts, the partnership collected quantitative and qualitative data regarding the perceptions of visitors to national parks and wildlife refuges as they relate to specific effects of climate change on America's public lands.

Data were collected at five pilot site areas across the country: northern Colorado, Puget Sound in western Washington, southern Florida, the District of Columbia, and Kenai Fjords in Alaska. These regions were selected with oversight from agency leadership at the

Washington office from both NPS and FWS. Agencies chose areas that already had impacts of climate change visible on the landscape, had critical management decisions facing these parks and refuges, and were already known to be communicating about climate change. These areas were highlighted as important places in which to invest resources to build capacity or enhance ongoing efforts to communicate about climate change.

The project was comprised of several activities:

- 1) Site visits that involved park and refuge staff to discuss management priorities, current climate change communication activities, and ideas about enhancing climate change educational efforts in their local area;
- 2) Surveys conducted with agency staff and partners nationwide;
- 3) World Café workshops held at each of the five pilot regions to brainstorm ways of making

the conversation about climate change locally relevant, empowering, and engaging for diverse audiences; and 4) Surveys conducted with park and refuge visitors to collect qualitative and quantitative data on their knowledge, values, and concern about climate change.

Although all four prongs of the CCEP's multi-faceted research effort yielded valuable results, the insights gathered in the visitor surveys provided especially useful information that can help parks and refuges understand who their site-specific visitors are, so they can tailor communication strategies that are appropriate for those audiences. The findings combine visitors' personal anecdotes with quantitative data to form a rich source of information that can aid in the development of effective climate-change messages and educational products.



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II. Project Objectives and Methods (continued)



The CCEP research team developed an on-site visitor survey to assess national park and wildlife refuge visitors' awareness and knowledge of place-specific climate change impacts, as well as their level of concern and willingness to act in response to these impacts. Over a six-month period, the CCEP survey team (consisting of students from Colorado State University) administered this visitor survey at each park and refuge within the five pilot site locations. Each of these national Parks and Refuges is listed in the table to the right.

The surveys were administered in paper form (7 percent) as well as on Apple iPads (93 percent), using an iSurvey electronic template. All of the results were saved, synced, and uploaded to a password-protected data file on the iSurvey website.

In total, 4,181 quantitative surveys were conducted at the 16 parks and refuges listed above from May 6, 2011 to January 8, 2012. Detailed reports of the quantitative surveys are available for each of the parks and refuges listed above.

The survey team used the following script to recruit participants: "Hello, we are students from Colorado State University conducting visitor surveys at [this

park/refuge]. Would you like to take our survey about landscape changes at this [park/refuge]? The survey takes about ten minutes to complete. Your participation is completely voluntary and you can stop taking the survey at any time."

The survey team answered questions pertaining to the technical operation of the iPads and supplied clarification regarding questions and response options. The survey team offered no opinions or facts pertaining to specific questions while the survey was in progress.

Survey administration locations were unique to each refuge and park, though in general, the team targeted popular trailheads, visitor centers, campsites, and viewpoints. Most surveys were collected during the weekends for greater visitor numbers and convenience; however, efforts were made to have both weekends and weekdays represented at each site.

Table 2: Participating Parks and Refuges in the 2011 Visitor Concerns about Climate Change Survey

Rocky Mountain Region

Rocky Mountain Arsenal National Wildlife Refuge (CO)
Rocky Mountain National Park (CO)

Southern Florida and the Keys

Biscayne National Park (FL)
Everglades National Park (FL)
National Key Deer Refuge (FL)
Ten Thousand Islands National Wildlife Refuge (FL)

Washington D.C. Area

Harpers Ferry National Historic Park (WV)
National Capital Parks-East (DC)
Prince William Forest Park (VA)

Southern Alaska

Kenai Fjords National Park (AK)
Kenai National Wildlife Refuge (AK)

Puget Sound Area

Dungeness National Wildlife Refuge (WA)
Mount Rainier National Park (WA)
Nisqually National Wildlife Refuge (WA)
North Cascades National Park (WA)
Olympic National Park (WA)

III

Review of Scientific Literature



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III. Review of Scientific Literature



Much has been published on climate change communication: Since 2002, more than 1,000 peer-reviewed manuscripts have examined how climate change is framed in public discussion and what strategies can be used to help people understand this complex topic.

One recent survey analyzed this body of literature for NPS. Dr. Jessica Thompson and other researchers from Colorado State University examined 975 empirical research articles to assess public perceptions of climate change and the influences steering those perceptions. The resulting report, *Public Understanding of Climate Change: A Review of Recent Social Science Research*, provides insight that can be useful when developing climate-change communication strategies.

The report investigated several challenges to the public's understanding of climate change. A 2009 Pew Research Poll indicates that 84 percent of scientists believe that human actions are causing climate change, compared to only 49 percent of the American public. Those figures suggest that communication about climate change doesn't always bridge the knowledge gap between scientific information and public understanding and concern.

But, the report concludes, information alone doesn't necessarily serve as that bridge. Many other factors also influence people's concern for climate change and their willingness to take action. For example, one study of metropolitan residents found that although mass media does perpetuate some popular misconceptions about climate change, media messaging and interpersonal communication appears to make a positive contribution to public understanding and knowledge.

Quite a few studies (spanning such fields as psychology, sociology, political science, and communication studies) have examined why Americans are relatively reluctant to accept the scientific consensus that human actions are increasing global temperatures. Political affiliation and ideology is one significant factor shaping Americans' stance towards climate change. But other influencing factors include people's mistrust of experts, their religious beliefs, their denial of responsibility, and a perceived lack of risk. Deciding to do something to help mitigate climate change can fundamentally challenge people's ideological and political views, as well as their beliefs about humans' relationship with the natural world.

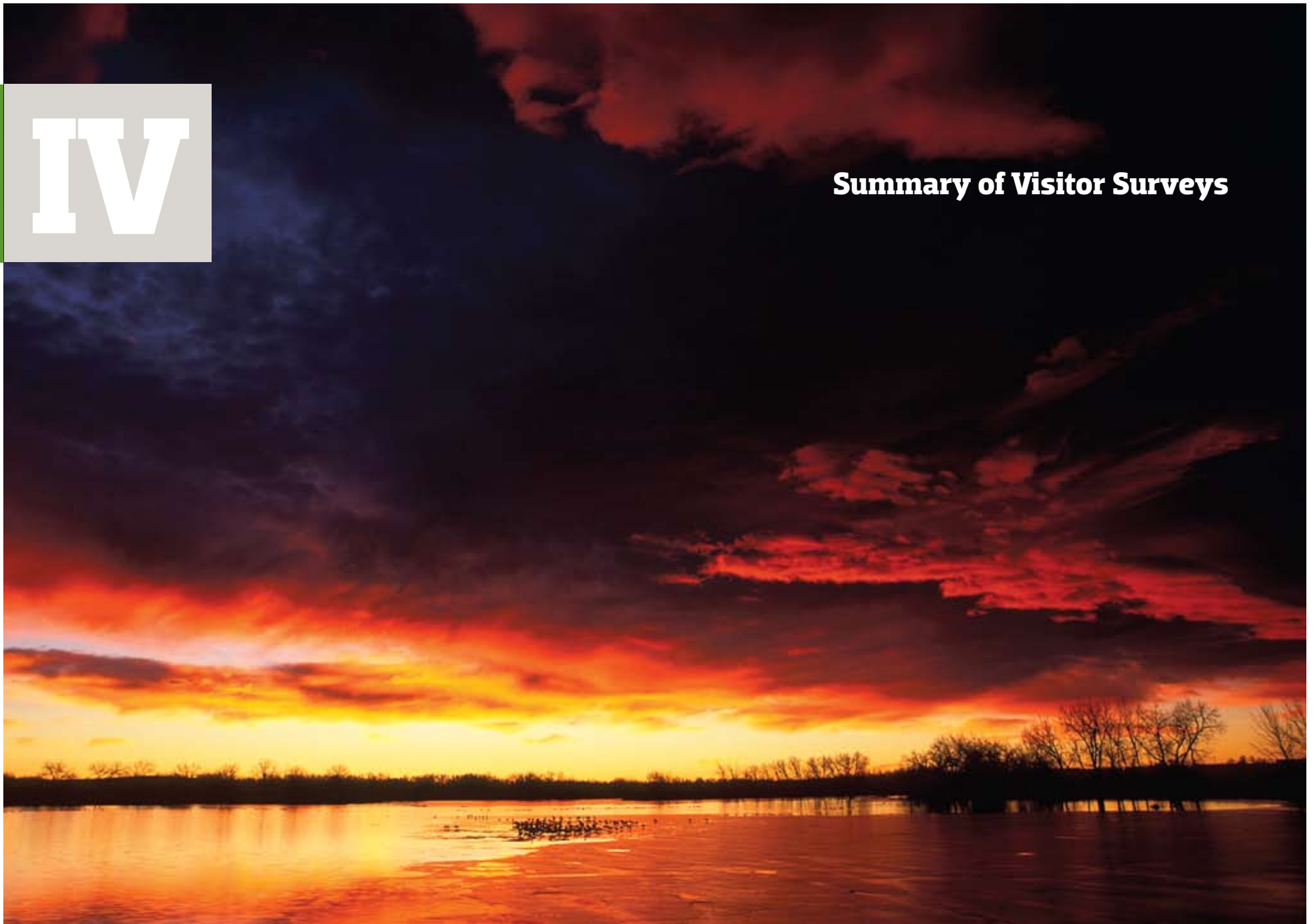
In order for the American public to develop concern for climate change and a willingness to help mitigate its impact, people must become aware of the conse-

quences of this very large-scale problem. They also need to believe that others are committed to the climate-change cause. And they need a way to connect climate change to their deeply held political, cultural, and religious values.

Place-based climate change communication staged in natural areas and on public lands (such as national parks) can increase people's feelings of connectedness to this issue. In fact, the report observed a growing number of studies demonstrating that firsthand observations of the place-specific impacts of climate change can significantly influence the public's perceptions of the topic. That's especially true when the Park Service is the source of climate-change information: Research indicates that 75 percent of the public trusts the Park Service for information about climate change. Findings such as these indicate that climate-change communication could benefit significantly from place-based education in national parks and wildlife refuges.

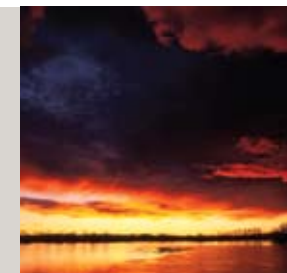
IV

Summary of Visitor Surveys



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IV. Summary of Visitor Surveys



Respondents were evenly split among males (51 percent) and females (49 percent). Many respondents had completed a graduate or professional degree (41 percent). Most visitors surveyed self-identified as white or Caucasian (86 percent) and the largest segment were Democrats (37 percent). On average, visitors surveyed have visited the parks or refuges 14 times. Many visitors indicated that this was their first visit (53 percent).

Respondents were asked to select a degree to which they thought climate change is or is not happening (see Table 3). Responses were measured on a seven-point scale ranging from (1) “extremely sure climate change is happening” to (7) “extremely sure climate change is not happening.” Most visitors surveyed (35 percent) were extremely sure that climate change is happening.

Not only are visitors sure climate change is happening, but they also appear to be concerned about it. The largest number of visitors (56 percent) indicated they were either very or extremely worried about climate change, and another 55 percent indicated that climate change was either very or extremely important to them. Respondents were asked to agree or disagree with two statements involving their desire to learn about climate-change impacts and visible effects of

climate change. Most respondents (61 percent) agree or strongly agree that they would like to learn more about climate change at the refuge or park they visited. Many of the visitors surveyed (57 percent) agree or strongly agree that the effects of climate change can already be seen at the park or refuge they visited (see Table 4).

Visitors were asked how willing they are to change their behaviors to help reduce the impacts of climate change. Most respondents (67 percent) answered “very willing” or “extremely willing” to change their behaviors (see Table 5).

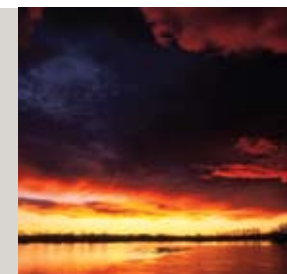
Generally speaking, there were only slight differences in responses between sites: At Colorado’s Rocky Mountain Arsenal National Wildlife Refuge (NWR), for example, 40 percent of visitors surveyed feel “extremely sure” that climate change is happening, as do 38 percent of visitors to Florida’s Key Deer NWR. Geographic location doesn’t seem to have significantly affected visitor responses.

Visitors to Alaska’s Kenai Peninsula, however, did sway slightly from the overall survey trends. At Kenai NWR, 29 percent of visitors were “very sure” climate change is happening, which suggests slightly less conviction than at sites overall. Yet at that same

Table 3: Do you think climate change is happening? (n = 4,174)



IV. Summary of Visitor Surveys (continued)



refuge, 81 percent of visitors said that climate change was important to them personally. The discrepancy may suggest that, even when visitors lack confidence in their own climate change knowledge they still feel concerned about impacts to the places they cherish.

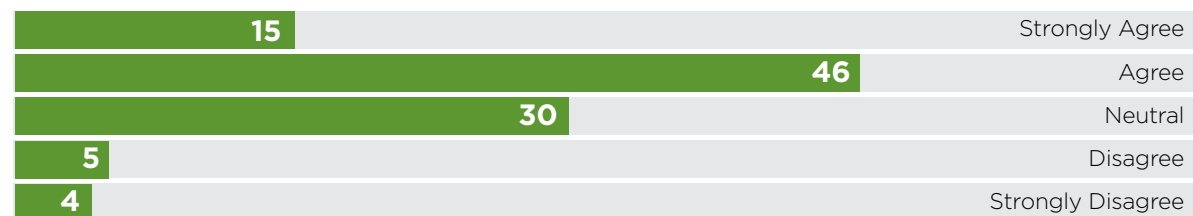
Survey data also confirm that visitors want to learn about climate change at parks and refuges. Their preferred methods include:

- #1 Park or Refuge Website (46%)
- #2 Trailside Exhibits (42%)
- #3 Indoor Exhibits (38%)
- #4 Printed Materials (32%)
- #5 Films, Movies or Videos (31%)

For a full report on survey data, visit climatechangepartnership.org.

Table 4: How much do you agree or disagree with the following statements?

I would like to learn more about climate change impacts in this Park/Refuge (n = 3,988)



I believe that some of the effects of climate change can already be seen at this Park/Refuge (n = 3,965)

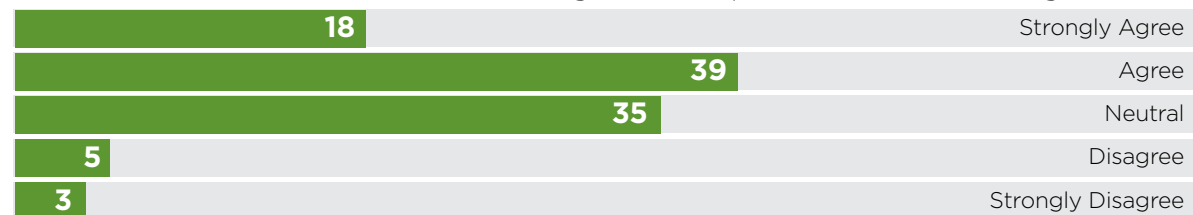
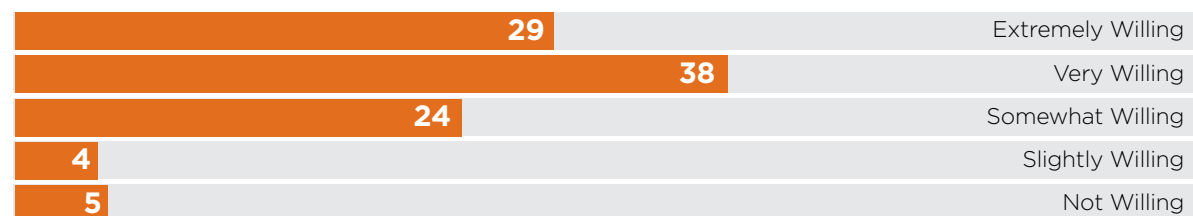


Table 5: How willing are you to change your behaviors in this Park/Refuge to help reduce the impact of climate change? (n = 4175)



V

Summary of Project Workshops



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V. Summary of Project Workshops

Surveying visitors at sites managed by the Park Service and Fish and Wildlife Service was one component of the Place-based Climate Change Education Partnership. The project also included a series of “Climate Change Cafes” that took place in each of the project’s five target regions: South Florida, the Pacific Northwest’s Puget Sound, Alaska’s Kenai Peninsula, the District of Columbia, and northern Colorado. These one-day workshops brought together representatives from the NPS and FWS as well as local educators, scientists, and NGOs with an interest in understanding and educating the public about climate change in their particular geographic area.

Each workshop opened with presentations by NPS and FWS spokespersons who summarized their current climate-change communication strategies and discussed the project’s relevance to their agencies. At the D.C. gathering, for example, Dr. Bert Frost (NPS Associate Director of Natural Resource Stewardship and Science) described how, as one of the largest informal education organizations in the world, the Park Service is well-positioned to utilize the power of place to share a message on climate change. He explained that parks provide tangible examples of climate change happening now on the landscape, and as such they’re living laboratories where citizens can engage in participatory science learning.

Fish and Wildlife Service representatives such as Mike Carlo, of the Office of Visitor Services, reminded workshop participants that the conservation of fish, wildlife, plants, and their habitat for the benefit of the American people is the driving force behind his



agency’s response to climate change. At the Kenai workshop, Carlo explained how its interaction with the public at more than 550 national wildlife refuges position the Fish and Wildlife Service to communicate with the public on climate change. Carlo emphasized that messengers and delivery systems must be diverse to effectively reach varied audiences, and he discussed the benefit of integrating the results from the Place-Based Climate Change Education Partnership into broader Fish and Wildlife Service programs, such as current inventory and monitoring programs that use present refuge greenhouse gas emissions and energy reduction efforts as educational examples for the public.

Some workshops also invited local researchers to present their evidence on regional climate-change trends. For example, Dr. Lara Whitely Binder (a researcher with the Climate Impacts Group at the University of Washington) presented observed and predicted impacts associated with climate change in the Pacific Northwest at the Puget Sound workshop. Representatives from Colorado State University presented a brief overview of the visitor survey data they’d amassed for the workshop’s target region. Additionally, based upon her research of climate-change communication theory, Dr. Jes Thompson outlined the do’s and don’ts of developing climate change messages.



V. Summary of Project Workshops (continued)



According to Dr. Thompson, ineffective climate change communication tactics include:

- Fear appeals and doomsday prophecies
- Arbitrarily balanced positions in media reports
- Technical and scientific language, explanations coded in jargon
- Predictions couched in uncertainty and ambiguity
- References to people and animals far away

Dr. Thompson also offered ten strategies for effective climate change messaging:

- Know your audience.
- Know what type of claim you are asserting.
- Connect the message to cultural values and beliefs.
- Make the message meaningful.
- Lead with your strongest argument.
- Make the message empowering.
- Link global patterns to local action.
- Partner with other organizations.
- Start from the inside and inspire action within your organization/agency.
- Communicate about actions you/your agency is already taking to mitigate and adapt to climate change.

Dr. Thompson emphasized the importance of place-based communication about climate change. Place-based communication is meaningful dialogue situated in a specific location, where audiences interact with each other and the landscape to develop a deeper understanding about ecological and social interrelationships. It is based on the premises that 1) people are connected to places, 2) they have unique bonds with landscapes such as national parks and wildlife refuges, 3) people learn most effectively through meaningful hands-on activities in that cherished landscape, and 4) people remember lessons and adopt behaviors when they feel a sense of responsibility and have knowledge of consequences.

Workshop speakers provided participants with food for thought and provoked new ideas and collaboration during the events' small-group brainstorming sessions. Using a facilitated World Café process (see www.worldcafefoundation.org for details), participants discussed three questions pertaining to climate change in their locality. These questions served as catalysts for ongoing conversation during the workshop sessions, networking breaks, and meals.

- 1a) Who are the priority National Park Service and national wildlife refuge audiences in your area?
- 1b) What do you want audiences to do about climate change?
- 2) What climate change stories are most important to tell at the national parks and national wildlife refuges in your area?
- 3) What innovative ways can agency staff in your region engage their audiences and enhance their education efforts about climate change?

Despite significant differences in participants' geographic location, several common themes emerged from discussions held during the five Climate Change Cafes. Common themes included:

- **Keep messages place-based.** From Colorado to Florida, participants reported that stakeholders express greater interest and engagement when climate-change communications focus on specific impacts at the park or refuge they visited. As Puget Sound workshopers concluded, "We want our audiences to have a connection to place and understand local examples of change and science, and understand how we know what we know about changes to the local ecosystem."

V. Summary of Project Workshops (continued)



- **Tailor messages to diverse audiences, while also developing some universal messages that can be used across agencies and partners.** In particular, youth and web audiences struck workshop attendees as the most critical factions to reach with climate change messages. At Kenai, for example, where participants voted for the audience they believe is most important to reach, 37 percent voted for web audiences, 31 percent for youth, 17 percent for local communities, and 14 percent for politicians.
- **Educate agency staff.** “There are still some employees who may not be convinced that climate change is human caused or that it needs a human-powered solution,” concluded participants.
- **Spur all audiences to action.** “We want audiences to know that their actions can make a difference,” concluded the Puget Sound group. Actions could include participating in citizen science, “greening” one’s home, and reducing one’s carbon footprint through alternative means of transportation.

- **Exploit connections.** Participants repeatedly emphasized the value of linkages: Connecting local climate-change impacts to global science; sharing climate-change messages among agency educators and teachers in gateway communities; creating an online resource center available to all partners—these connections can strengthen and improve climate-change communication.

Workshop participants also identified and discussed barriers to effective climate-change communication. In various regions, participants agreed that the topic’s politicization made discussion difficult. In Florida, attendees explained, “Tourism and real estate industries of the Florida Keys do not want to advertise the potential inundation caused by sea level rise.” And in Alaska, participants observed, “Our state government has done much to degrade confidence in who scientists are and what they have to say.”

But by scrutinizing their region’s socio-political scene, participants also identified opportunities for effective climate-change communication. “Most people on the Kenai are outdoor-oriented either for fun or for their livelihood,” said one Alaskan attendee, “so they are open to learning about climate change to know what to expect and to prepare and/or adapt to it.”

At the conclusion of each Climate Change Café, participants reported that the opportunity for collective brainstorming and networking among multi-agency and interdisciplinary partners was of tremendous benefit. In fact, participants at most workshops felt that future events should include an even greater diversity of attendees, such as the energy industry, agriculture, residential citizens, politicians, and so on.

Participants also suggested creating a partnership website to serve as an online clearinghouse of information. For more information detailing the outcomes from each of the regional workshops, visit climatechangepartnership.org.

VI

Summary of Project Outcomes

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VI. Summary of Project Outcomes



In the National Park Service, interpreters have a unique methodology for developing educational programming that includes gathering information of both knowledge of the resource (or, in this case, climate change science and impacts) as well as knowledge of the audience. It is rare to have as much site-specific audience knowledge about a single topic as we do now for climate change.

Visitor responses also guide park and refuge managers about the ways climate-change communication might be most effective: online education, indoor and trailside exhibits, printed materials, and videos all ranked highly.

CCEP research also underscores the importance of staff training. Agency staff may want to talk about climate change, but staff is hesitant to do so without a solid understanding of the topic. Effective climate change communication begins with internal efforts to prepare staff for such discussions.



When communicating about climate change, DON'T...

- use fear-based messages. Fear promotes apathy by convincing audiences that there's nothing they can do.
 - use intimidating technical or scientific jargon
 - make uncertain or ambiguous predictions
 - refer to people or animals far away
-

VII

Recommendations for Participating Agencies



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VII. Recommendations for Participating Agencies



The research completed by the CCEP project can serve as a valuable resource for participating agencies, despite their differences. Whereas the National Park Service has a small army of interpreters, the Fish and Wildlife Service does not—so communication strategies that are appropriate for a park may not work as well at a refuge. Neither agency has an unlimited budget for education and interpretation, so when planning climate change communication, it's helpful to know where those dollars will make the biggest impact.

Visitor survey data suggest that most visitors to parks and refuges understand that climate change is underway, so educators don't need to over-emphasize that point. "Many of our visitors are already there," explains Angie Richman, communication specialist for the NPS Climate Change Response Program. Instead of trying to convince people that climate change is real, messages should suggest ways that visitors can take action. "Explaining how people can be part of the solution is the best place to direct our message," says Richman.

As Dr. Patrick Gonzalez told World Café participants, messages of hope and action convey that because billions of daily acts caused climate change, billions of people's positive actions can reduce emission and

help avert the most drastic impacts of climate change. Survey data suggest that people want to make a difference. Stories of positive change—on the park or refuge, or in neighboring communities—can inspire visitors to become part of the solution.

Indeed, agencies should lead by example and use their own internal actions as teaching examples for visitors. Demonstrating what sites are doing to mitigate and adapt to climate change is an opportunity to inspire visitors to better understand climate change issues and impacts. "We've been using the Climate Leadership in Refuges (CLIR) tool to measure our footprint, but we didn't know if visitors would be interested in knowing about that, or if talking about it would seem too preachy," explains Mike Carlo of FWS. But the survey data convinced him otherwise. Says Carlo, "Now we know it's worthwhile to put effort into showing internal efforts."

Audiences are diverse, and require a variety of messages. Some stories can reach adults, while other messages should target kids. Agencies can also make climate change relevant to various audiences by linking it to forces most of us care about like the economy and recreation opportunities. For example, skeptics may not be moved by statistics on rising temperatures, but they can be engaged by a focus on local industries.

Colorado interpreters might appeal to diverse audiences by demonstrating how tourism (one of the state's top industries) will suffer from climate change. Effective climate-change communication emphasizes that changing our actions now will give us a better world: Positive actions that address climate change can also save money, foster energy independence, create political stability, save plant and animal species, and provide better recreational opportunities.

Messages should emphasize local impacts. Place-based messaging helps avoid personal and political conflicts by keeping the focus on what managers and visitors both agree on: That these places are important and worth caring for. Instead of focusing on the causes of climate change or whether it's happening, communicate instead about the effects on the park or refuge and its implication for its health. "[Our research confirms] that we need national guidelines for messages, but without a place-based approach, [climate change] is a tough sell," says Carlo.

Wildlife can be used as a focal point. As one Colorado partner observed, "People won't come to a climate change walk, but they'll come to a program on pikas that links their behaviors to climate change." But in addition to discussing park and refuge wildlife, it's also important to link climate-change communication

VII. Recommendations for Participating Agencies (continued)



to people's everyday lives and familiar urban species. "Pikas may be cute," one Coloradoan observed, "But they don't live near your average neighborhood." Whenever possible, discuss urban examples (such as backyard robins) as well as lesser-seen wildlife on the park or refuge.

Stage programming outside whenever possible. The natural spaces at parks and refuges can make excellent venues for educational efforts, since reinforcing the value of these places and what they protect is easier when visitors are immersed in them.

Finally, agencies need to invest in their own staff. When asked what they most needed to effectively communicate climate change, participants at the Florida Climate Change Café named "training in climate science and impacts" (22.8 percent) and "help developing communication strategies (45.6 percent) as being most vital. Only when staff members feel knowledgeable and confident about the subject can they successfully communicate with visitors about climate change.

Effective Ways to Share the Message

- Involve visitors in citizen science.
- Utilize technology and social media to reach different audiences.
- Highlight the economic benefits of adopting sustainable behaviors.
- Collaborate with local educators. One teacher + 40 students x 35 years = IMPACT!



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