

iSWOOP Implementation in National Parks: Visitors' Perspectives

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Millions of visitors across the country who seek out national parks each year. The national parks are thus uniquely poised to foster public engagement with and interest in science. Interpreters and Scientists Working on our Parks (iSWOOP) is a project that brings together educators, scientists and National Park Service (NPS) interpreters to incorporate park-based science into formal and informal interactions with the public. iSWOOP is led by principal investigators Martha Merson from TERC, and Nicholas Hristov and Louise Allen from Winston Salem State University.

To assess the visitor receptivity and impact of iSWOOP, members of the Char Associates evaluation team and iSWOOP project team reached out to participating parks' interpretive staff, administrators, scientists, and visitors. A variety of methods were used to gather information on visitor engagement in iSWOOP-influenced offerings. Information on visitors was gathered via surveys, interviews, observations, program reflection forms and comment cards.

Evaluation results indicate that iSWOOP-trained interpreters increased visitors' engagement with park-based research. In interpreters' program reflection forms on iSWOOP-related programs they conducted in their parks over a 14-month period (n = 144 program entries, July 2017 - August 2018), interpreters indicated a number of park-based research features incorporated into their programs. The most common iSWOOP feature was talking about the questions driving park-based scientific research, reported as occurring in 85% of programs. Two other features frequently incorporated into programs were discussing the technology scientists are using to answer questions (77%) and engaging visitors to make observations and predictions (69%).

iSWOOP Feature	Percentage of Programs
Talked about the questions driving park-based scientific research	85.4%
Talked about the technology scientists are using to answer questions	77.1%
Invited visitors to make observations or predictions	68.8%
Had a 2-way conversation about the relevance of park-based research	61.8%
Talked about how scientists know what they know	58.3%
Talked about scientists' stories, obstacles and break-throughs	55.6%
Looked at scientists' data or other visualizations to answer their questions	51.4%
Learned something from visitors related to research at parks	20.1%

(n = 144 program entries, submitted by 37 interpreters across five parks)

In over half the programs, visitors also looked at scientists' data and other visualizations, learned about scientists' stories and how scientists knew what they knew, and discussed the relevance of park-based research.

In 2018, the evaluation team created an interview intercept protocol to deepen understanding of visitors' reactions to iSWOOP programs. The protocol was used at two park sites (Indiana Dunes and Acadia) after advertised programs in Summer 2018. The programs varied in duration, topic and program format, such as ranger-led hikes, stops on a self-guided walk, and a junior ranger

activity station. During their interactions with a ranger, visitors heard about a focus of scientific study, e.g., the formation and movement of the famous Mt Baldy dune, amphibian life in the wetlands of Indiana Dunes, and landscape change as informed by Acadia’s pollen record. Rangers illustrated their stories and informative comments with visualizations, sounds, or props to increase understanding of the phenomenon or as a jumping off point for discussion, such as for relevance or methods. After the programs, a member of the evaluation team 1) invited visitors to talk with them; 2) handed out a version of paper surveys to anyone who would take them, or 3) approached visitors who were lingering in the area. Fifty-two visitors answered versions of five questions orally or in a simplified written version of the interview. Visitor responses were analyzed according to a priori codes, based on previous analysis of entries of visitor reactions collected from interpreters during iSWOOP’s pilot phase at Carlsbad Caverns National Park in 2014.

When asked what was most interesting or what struck them about their interactions with interpreters, visitors most frequently expressed their situational interest in terms of the natural history and landscape of the park, topics that had been addressed during the ranger-led programs.

From your interactions with the park ranger today, what struck you/what did you find most interesting?

	Ranger competence	Facilitating others' learning	Natural history or landscape connections	Science process	Place-based connections	Technology	Other
Total visitors	16 (33.3%)	7 (14.5%)	35 (72.9%)	6 (12.5%)	3 (6.25%)	1 (2.1%)	11 (22.9%)

(n = 48, 2 parks)

Close to three-quarters of the visitors (35 out of 48, or 73%) mentioned being struck by something they had heard about the park’s natural history, such as amphibian songs, dune formation and movement, fungal chimneys in the sand created by decomposing oak trees, or the use of pollen cores to tell about a landscape’s history.

The sounds, audio [of the frogs].

The soil comparison, movement of the dune, the chimney, story of boy getting "swallowed up."

The entire talk was interesting. Learned a lot about glaciers and pollen.

[What I found interesting was the] Pollen - I usually think about [pollen in terms of] dust, and allergies. I didn't know you could find it from so long ago. The coring is so cool.

I'm fascinated by core drilling through the layers.

A third of the visitors (16 out of 48, or 33%) commented on the competence, skills and commitment of the rangers leading the programs. A number spoke about the skill and care with which interpreters worked with their children at the Junior Ranger station, as well as the deep interest and passion interpreters had for their work, and for the research conducted at the park.

We were struck by how the rangers seem to genuinely care about teaching the kids, not only at the Junior Ranger Station but throughout the whole park. I have a very inquisitive five year old and all rangers have taken the time to try to answer his questions regardless of how wild they may be.

I'd say many of the Junior Ranger Programs we've attended, both in the park and outside of it, have contained information that my wife and I didn't know. If you spend the time to help your kids out with the activities instead of just standing back, you find there's a lot to learn. I already knew a bit about topography and the cardinal directions, but it's nice learning about the rangers as well and why they do what they do.

[I was struck by] How knowledgeable our park rangers are. I am excited that [our ranger] is so invested in her job and finds it so fulfilling, while taking care of our beautiful lands.

[I was struck by] His take on the value of science in parks. And to evaluate data and use it to predict for future evolving environmental trends - those that may be valuable for future generations.

Park visitors considered scientific research conducted at the park highly important. Three fourths of the visitors (32 out of 42 visitors, or 76%) rated park-based science as "extremely important."

How important is it to you that scientific research is happening in the park? (1 = not important at all; 5 = extremely important)

1 = Not important	2	3	4	5 = Very important
0	0	2 (4.8%)	8 (19%)	32 (76.2%)

(n = 42, 2 parks)

As one visitor who considered park-based science extremely important expressed, "How else would you successfully preserve the park? You need to know what's going on around you, even at the scientific level." Another visitor commented, "I'm glad research is happening. I love national and state parks."

37 of the 48 visitors (77%) indicated that they had heard about park-based research during their visit. Visitors were asked what their reactions were to the park-based research they had heard about. Responses were coded as to whether their reactions were emotional, focused on factual information, or focused on the purposeful nature of research, such as for managing public lands.

Reactions to hearing about the scientific research that takes place in this park

	Emotional	Factual	Purposeful	Other
Total visitors	31 (83.7%)	7 (18.9%)	8 (21.6%)	4 (1.3%)

(n = 37, 2 parks)

Rather than regarding the scientific research as overly serious or dry, the vast majority had an emotional reaction. Over three-fourths of visitors (31 out of 37, or 83.7%) expressed an emotional reaction to the research, using such terms as "amazing," "cool," "excited," "surprised" and "fascinating."

Amazing that there are holes in the dunes.

It blew my mind [the dune is] so much different since 1956.

I was shocked about the little boy [who fell in the hole.]

I loved the story from her [the interpreter's] childhood. All real nature lovers have a story to connect to, not just facts. I genuinely appreciate that.

I was surprised by the amount of research taking place, considering all you hear about government funding cuts. I was surprised to see that there is still stuff going on in national parks...I read some of the cards over there to my five year old; it sounds like there's a large variety of research taking place here.

A little over a fifth (8 out of 37, or 21.6%) noted the research's purposeful nature, and the importance of the research to inform conservation efforts.

I was intrigued by what the ranger said about collecting weather data ever since the park opened. A great way to prepare for the future is to look to the past. I'm sure having somebody analyze that data allows park officials to have some foresight into how climate change will affect this part of Maine.

[The research is] Worthwhile. It helps to understand our world - the change that occurs naturally and that which we accelerate.

[I'm struck by] how important it is and how it impacts our surroundings.

Knowledge will help [us] understand & preserve this area!

Roughly a fifth (7 out of 37, or 18.9%) recounted factual information they had learned.

I was told a bit about some work taking place with native flora, as well as efforts in both the past and present to get accurate migration routes of different species. The ranger also mentioned a fire that took place during the last 100 years which helped to define the species we see here today.

[I learned about] About the geologist doing research into the structure below.

iSWOOP experiences also appeared to foster visitors' continued interest in science. After experiencing an interaction featuring park-based research, park visitors reported having curiosity questions (Renninger, 2010) and ideas of how they might later re-engage in content addressed in the iSWOOP park program. Visitors were asked to consider, "From this interaction with the ranger today, is there anything you want to come back to - either this place or the topics? Something you might read up on or look into more, do or talk about with others?"

Close to half the visitors (46%, 23 out of 50) indicated that there were particular topics they were interested in learning more about. More specifically, 30% (15 out of 50) expressed interest in learning more about the biological, ecological and/or geological aspects and history of the park and land, topics covered in their interactions with park rangers, while 24% (12 out of 50) reported being curious to learn more about the impact that humans have on the environment.

I'm sure my kids will revisit the information on plants and geology. I may look a bit more into how the island was formed. Its beauty is a real wonder.

[I'm interested to] read a bit more into the geological history, and interested in core sampling.

I found the bat research to be interesting, I want to look more into why they are having difficulty surviving. I also want to look more into areas with high light pollution. Since [my son] seems to have taken an interest in the air pollution bucket [activity at the Junior Ranger station], maybe that's something we'll do together.

Rather than describing a topic they wished to know more about, roughly a fourth (24%, or 12 out of 50) offered more place-based plans, grounded in their intentions to return to national parks. Some visitors primarily stated their plans for additional hikes or places they wished to visit in the park, while others expressed a desire for active park experiences that involved thinking about aspects of the natural world.

Now that I know this is here, I'll likely come out and make this hike again on my own. Maybe next time I'll take a detour on my way down and go over to the Beehive.

I'd love to hike Cadillac [Mountain] and think about different rocks that are there.

I would certainly love to come back to the park generally, more specifically to the trails. This park has a different feel, the people who visit and the staff really do care about the preservation of this land. There's no trash left hanging around and people leave things as they are naturally. I'm sure my kids will also want to do Junior Ranger Stations some more; they love talking to the rangers and doing the hands-on activities.

I have a natural interest in the area's state/national & local forest preserves and learn best by hiking and attending these events.

In summary, our evaluation of visitor engagement in iSWOOP-related offerings indicate that interpreters incorporated a number of park-based research features into their programs, such as talking about the questions driving park-based research, featuring scientists' visualizations and stories, and discussing the relevance of park-based research. Visitors were struck by what they learned about the natural history and landscape of the park, and also by the skill and commitment of the rangers leading the programs. Visitors regarded the conduct of scientific research at parks as extremely important and expressed gratitude for the research being done, and reacted with enthusiasm and wonder at the research. iSWOOP experiences also appeared to foster visitors' continued interest in science, with visitors interested in learning more about the natural history of the park and land and the impact that humans have on the environment, with some expressing their intentions to return to national parks for future visits.

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