



# Climate Change Segmentation Groups at Kenai Fjords National Park: Insight Into Visitors' Perceptions

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## Introduction

Recently the National Park Service announced initiatives that aim to interpret and communicate global climate change to park visitors (*CCRP 2010*). Interpretative design and delivery, as well as communication initiatives, require a comprehensive understanding of visitors' attitudes, opinions, and values. However, opinions about climate change can be difficult to assess and may vary widely between regions and groups. General U.S. polling data cannot be assumed to be representative of visitors to a specific park or region. An abundance of park research indicates visitors and managers often differ substantially in their opinions about resource conditions and levels of human impacts (*Manning 2011*). As a result, managers may ineffectively distribute resources by inaccurately assuming knowledge of an audience's beliefs and opinions. Park staff engaged in climate change interpretation, communication, or policy decisions may need empirical data to help identify visitors' attitudes towards climate change.

During the summer of 2010, researchers investigated Kenai Fjords National Park (Kenai Fjords) visitors' attitudes about global climate change and climate influenced park resources. The purpose of this project was to gain insight into visitor awareness regarding climate influenced park resources and visitor belief in the occurrence (i.e., if global climate change is happening) and human influence on global climate change (i.e., anthropogenic causation).

**Figure 1. Visitors at Exit Glacier, Kenai Fjords National Park.**

NPS photograph

## Methods

The research occurred in three phases. First, researchers conducted in-depth, one-hour interviews with seven Kenai Fjords interpretative and management staff in June 2010. Based on these interviews, researchers designed a visitor questionnaire. Second, researchers conducted a pilot test, using the draft questionnaire (N = 123) and asked staff to review the questionnaire. During the third phase, researchers administered the revised questionnaire to adult visitors in August 2010. Researchers approached potential respondents at the Exit Glacier Nature Center and the *MV Kenai Star* (a park concessionaire ship that provides marine based tours of Kenai Fjords). Visitors completed the questionnaire prior to their Exit Glacier or boat tour experience.

The questionnaire assessed a wide range of visitor perceptions regarding climate change, park experiences, and resources. Presented here are results that assess visitor beliefs in the occurrence of global climate change and anthropogenic causation. The questionnaire also captured visitors' perceived awareness of four different types of climate related biophysical change at the park: 1) change in the size of glaciers, 2) change in the terminus location of glaciers, 3) increases in vegetation, and 4) decreases in the number of Steller Sea Lions. All responses were measured on a seven-point scale.

After standard data cleaning and ensuring adequate validation of the measurements, researchers calculated descriptive statistics regarding visitor opinions. Researchers then used a statistical procedure to divide visitors based on their beliefs about climate change and their perceived awareness of climate related change at the park.

## Results

Researchers approached 411 visitors; 366 visitors completed the questionnaire (89% response rate). This sample is representative of August visitors to Kenai Fjords. A total of 128 visitors were sampled at the Exit Glacier Nature Center, and 238 visitors were sampled at the *MV Kenai Star*. Researchers compared visitor responses and characteristics (e.g., length of stay in the area, past visit history, demographics) from these two samples. The two visitor groups did not differ statistically. Therefore, the results in the remaining sections are aggregated, combining both the Exit Glacier and *MV Kenai Star* samples.

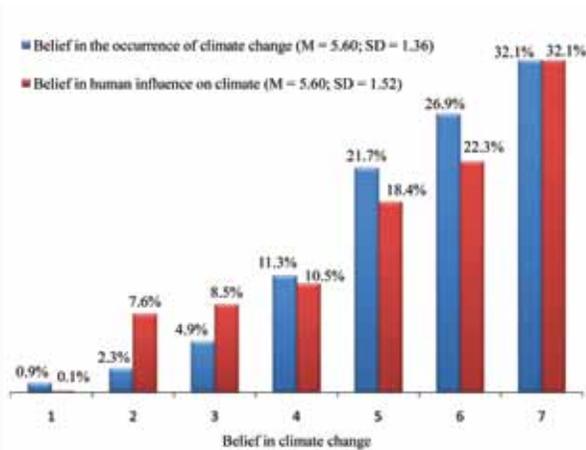
### Description of the sample

The sample was evenly split between males (49.8%) and females (50.2%). The majority of visitors are well educated, with approximately 60% possessing at least a four-year college degree. Limited differences of race exist, with white visitors comprising 88.5% of the sample. However, income is more dispersed, with 50% of the visitors reporting more than \$75,000 in annual household income. Respondents reside in a variety of U.S. states, with 7% of the sample from Alaska, and approximately 80% of the sample split evenly between U.S. Census Regions.

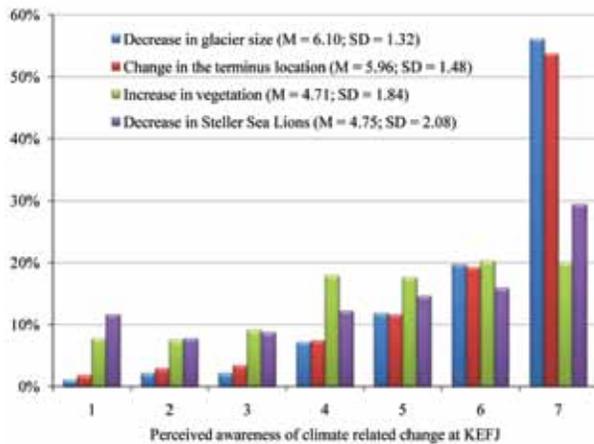
### Visitor opinions about the occurrence and cause of global climate change

Visitors seem to generally believe that global climate change is happening (80% in agreement; *Figure 1*). Approximately 1% of visitors possess an extremely low belief that global climate change is happening. Similar results appear for beliefs in anthropogenic causation, with

approximately 32% of visitors indicating an extremely high belief that global climate change is at least partially caused by human actions (Figure 2). However, the

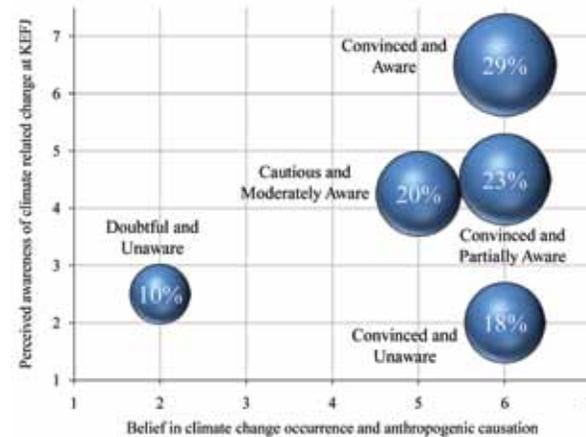


**Figure 2.** Kenai Fjord visitor beliefs in the occurrence and human influence on global climate change (both measured on seven-point scale using multiple response items). 1 = extremely low belief; 7 = extremely high belief.

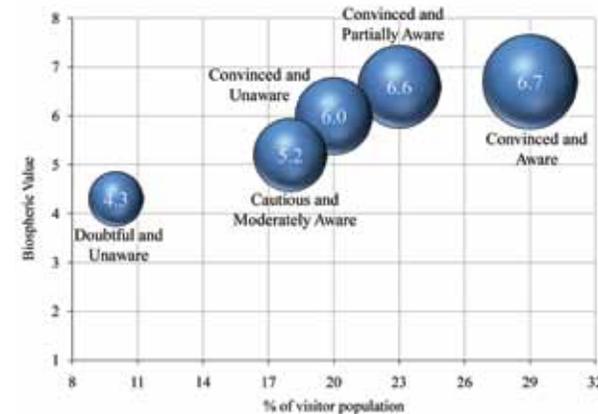


**Figure 3.** Kenai Fjords visitors' perceived awareness of climate related change at Kenai Fjords (measured on a seven point scale). 1 = not aware at all; 7 = highly aware.

standard deviation is higher for human influence ( $SD = 1.52$ ), indicating that more disagreement among visitors may exist in this belief.



**Figure 4.** Results of an analysis to segment Kenai Fjords visitors based on their beliefs in global climate change and their perceived awareness of biophysical climate related change at Kenai Fjords (both measured on a seven-point scale using multiple response items). Awareness: 1 = not aware at all; 7 = highly aware. Belief in climate change: 1 = extremely low belief; 7 = extremely high belief.



**Figure 5.** Kenai Fjords climate change segmentation groups' level of biospheric value (measured on a seven-point scale using multiple response items). 1 = low biospheric value; 7 = high biospheric value. The mean value is noted inside of each bubble.

## Visitors' perceived awareness of biophysical climate related change at Kenai Fjords

Visitor awareness of climate-related change at Kenai Fjords is generally high, but it does vary based on the park resource being impacted (Figure 3). Specifically, most visitors (87.6%) perceive themselves to be aware of the decreased size in many of the park's glaciers and changes in the terminus location of glaciers (84.5%). Conversely, 57.9% of visitors report an awareness of increased vegetation in the park and 59.0% of visitors indicate they are aware of a decrease in the number of Steller Sea Lions.

## Kenai Fjords visitor climate change segmentation groups

To identify different groups of visitors with similar beliefs, the researchers combined all the measures for beliefs in global climate change and perceived awareness of climate related change at Kenai Fjords. Results indicate five distinct groups of visitors exist, who differ statistically ( $p < 0.001$ ) and conceptually regarding their 1) belief in the occurrence of global climate change, 2) belief that humans influence or cause global climate change, and 3) perceived awareness of climate-related change at Kenai Fjords (Figure 4). The largest group of visitors with similar beliefs (29% of visitors) may be described as "Convinced and Aware". These individuals are characterized by a high belief in both occurrence ( $M = 6$ ) and human influence ( $M = 6$ ) on global climate change and a high perceived awareness of park-specific climate-related change ( $M = 6.5$ ).

The next largest group, which makes up approximately 23% of the visiting population, may be described as "Convinced and Partially Aware". This group has a high belief in both occurrence ( $M = 6$ ) and anthropogenic causation ( $M = 6$ ), and a partial awareness of climate-related change at Kenai Fjords (e.g.,  $M = 6.5$  for change in glaciers;  $M = 2.5$  for increase in vegetation and decrease in Steller Sea Lions). Next, a "Cautious and Moderately Aware" group is characterized by a moderate belief in both occurrence ( $M = 5$ ) and

human influence ( $M = 4$ ) on global climate change, and a moderate perceived awareness of park-specific climate-related change ( $M = 4$ ). This group represents approximately 20% of the visiting population.

A “Convinced and Unaware” group comprises 18% of visitors who have a high belief in both occurrence ( $M = 6$ ) and human influence ( $M = 6$ ) on global climate change, and a low perceived awareness of climate-related change at Kenai Fjords ( $M = 2$ ). The smallest climate change visitor group may be described as “Doubtful and Unaware” (10% of visitors). This group is generally characterized by a low belief in both occurrence ( $M = 2$ ) and anthropogenic causation ( $M = 2$ ), and a low perceived awareness of park-specific climate-related change ( $M = 2.5$ ).

Interestingly further analysis reveals these five climate change segmentation groups do not differ statistically in past visit history to the park, age, income, residence location, or education ( $p > 0.05$ ). However, the researchers also measured respondents’ values, and these groups differ substantially in how much they value plants, animals, and ecosystems (i.e., biospheric value). Specifically, the “Convinced and Aware” group and the “Convinced and Partially Aware” group report a significantly higher value for plants, animals, and ecosystems than the “Doubtful and Unaware” or the “Convinced and Unaware” group ( $p < 0.05$ ; *Figure 5*). In short, although these groups do not differ by standard demographics, they do differ by their levels of value for the natural world.

These groups of visitors with distinct attitudes towards climate change also maintain another important commonality. The majority of respondents, regardless of their group membership, report that habitat for marine life and glaciers are both extremely important to their visit. This finding indicates one area all respondents have in common even though their beliefs in climate change may differ.

### Discussion and Management Implications

The purpose of this study was to gain insight into

Kenai Fjords visitor awareness regarding climate influenced park resources and their beliefs in the occurrence and human influence on global climate change. Results indicate that visitors generally have high beliefs in the occurrence and human influence on global climate change, which differs from the general U.S. population (e.g., *Leiserowitz et al. 2010*). Three of the five climate change segmentation groups agree or completely agree that global climate change is happening, and that global climate change is at least partially caused by human actions. In contrast, four of the five groups are partially aware or unaware of climate-related change to natural resources at Kenai Fjords.

Communication and interpretation with visitors should perhaps highlight biophysical change at the park to increase visitor awareness of park-specific climate related change. Furthermore, it may be important for educators and interpreters to help visitors connect their already existing global beliefs with park specific indicators of climate change (e.g., increases in vegetation). Creating this connection between abstract global beliefs and more concrete awareness (e.g., changes in the size of glaciers) may assist audiences in understanding global climate change and its influences at a local level.

Since visitors seem to possess relatively high levels of belief in climate change, Kenai Fjords may be ideally positioned to provide advanced climate change education and interpretation. Furthermore, it seems simply introducing the topic of climate change to visitors may not be engaging for an audience that perceives themselves to be convinced of its occurrence and human causation. Therefore, interpretation should perhaps be designed to advance visitor knowledge of the subject beyond the basics. For example, interpretation could help visitors explore and understand more complex topics relating to Kenai Fjords, such as the role of ocean currents in global heat transfer or why climatic changes are more pronounced in and near the polar regions.

In addition, it would be appropriate to identify and evaluate the most effective methods to

educate the 10% of visitors who are “Doubtful and Unaware” of climate change and its impacts. With noticeable impacts to glaciers and other primary park resources, Kenai Fjords provides an unique and potentially impactful stage to reach this group.

The results presented here continue to provide insight for managers into the Kenai Fjords visiting population. As Kenai Fjords and other NPS units strive to interpret and educate about global climate change, studies such as this are becoming increasingly necessary. A strong prerequisite for effective interpretation, communication, and some policy decisions is knowledge of a park’s audience. Without a comprehensive understanding of visitors’ attitudes and opinions, park resources may be ineffectively allocated, or opportunities for visitor resource stewardship may be lost.

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### REFERENCES

- Climate Change Response Program. 2010.** *Climate change response strategy*. U.S. Department of the Interior, National Park Service. Retrieved from [http://www.nature.nps.gov/climatechange/docs/NPS\\_CCRS.pdf](http://www.nature.nps.gov/climatechange/docs/NPS_CCRS.pdf).
- Manning, R.E. 2011.** *Studies in Outdoor Recreation: Search and Research for Satisfaction*. Oregon State University Press. Corvallis, OR.
- Leiserowitz, A., E. Maibach, C. Roser-Renouf, and N. Smith. 2010.** *Global Warming’s Six Americas, June 2010*. Yale project on climate change. Yale University and George Mason University. Yale Project on Climate Change. New Haven, Connecticut.