A study of inclusive conservation in the Denali Region of Alaska

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ENVISION is a 3-year research project that develops an inclusive approach to the management of protected areas with the aim of improving biodiversity and human well-being. We engage diverse groups of stakeholders of a protected area, such as recreational users, residents, local businesses, landowners, agriculture, researchers or local governments and protected area managers.

ON THE COVER
Left: A group of hikers enjoy a view of Denali from Kantishna. Center-left: Dall sheep (*Orvis dalli*) in the Polychrome mountains of Denali National Park. Center-right: Entry way to a community in McKinley Park. Right: A moose drinking water in a tundra pond near Denali State Park.

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Abstract

Protected area conservation has been positioned as a global solution to a number of pressing social-ecological challenges. Nearly 250 million people currently live in or near protected areas and that number is ever-increasing due to the universal appeal of natural areas. Although public land management agencies have traditionally focused attention within protected areas, engagement with adjacent communities is fundamentally important for developing long-term, sustainable, and transboundary solutions to conservation problems. The diversity of voices and history of relationships can lead to challenges in representation and participation at either local or regional levels. Indeed, frustrations can stem from perceived and actual exclusion of residents in decision-making, in that some groups can be left thinking their perspectives are not correctly represented, or even worse, are being excluded from a seemingly inaccessible decision-making process. Explicit consideration of the array of goals held by local communities and their potential for implementation through management strategies is known as "inclusive conservation." This approach to resource management is needed to be proactive and effectively engage the range of community members around a protected area.

This project was part of a broader collaboration with an international team of scholars from three protected areas in Western Europe, a group of science communication experts, and policy-makers from the International Union for Conservation of Nature (IUCN), referred to as the ENVISION project (Raymond et al. 2022). This larger team examined the various ways in which protected areas engaged multiple viewpoints of community members to enhance inclusive conservation practices for protected area management. Throughout the project described in this report, we have been in communication with our ENVISION colleagues to exchange insights, findings, and policy implications.

Our research was designed to identify and support a process for inclusive conservation in the region surrounding Denali National Park and Preserve and Denali State Park (see Denali project website). We employed mixed methods, including in-depth interviews and focus groups with residents to understand how local places are viewed and characterized. The next phase of research quantified and modeled the relationships that had been previously observed. We then developed online discussion forums with residents to understand how dialogue about the project findings could facilitate information sharing, learning and meaningful exchange. The three objectives that guided this study and provided a basis for structuring this report are as follows:

- Characterize the meanings of places and how they are changing in the region
- Understand the experiences, perspectives, and preferences of residents
- Evaluate 'social learning' about inclusive conservation through deliberation

Executive Summary

- This research project began in 2018 with goal of understanding the values, behavior, and preferences for resource management among communities around Denali National Park and Preserve and Denali State Park. The management agencies of interest spanned federal, state, and local sectors.
- Partnerships were key to the conduct of this research, as illustrated by the formation and engagement of an Executive Committee comprised of 10 members of regional communities and local organizations. Collectively, we aimed to open up a dialogue about residents' aspirations for building a more inclusive approach to conservation and protected area management in the future.
- This technical report is organized in terms of the three objectives that corresponded to three phases of research. These phases were developmental in sequence and allowed the research team to build working relationships with participants and organizations in the Denali region. For more information, see https://doi.org/10.5281/zenodo.4352166.

- Phase 1: Characterize the meanings of places and how they are changing.
  - The initial phase for this study involved holding introductory meetings with residents, interviews, and focus groups across communities. In these discussions, we sought to characterize the landscape and understand why residents developed connections with places. Residents expressed a **strong sense of community** and social cohesion rooted in the remote setting, shared appreciation for local places, and interest in maintaining the character of the community. For more information, see https://doi.org/10.5281/zenodo.4527775.
  - **Tourism** played a central role in shaping the Denali region, with sense of place influencing, and being influenced by, multiple factors, particularly **climate change and large-scale development.**
  - Residents of the Denali region agree that **subsistence practices** are central to the regional identity and lifestyle of Alaskans. The question of how to define subsistence and who should qualify as a subsistence user varies greatly among community members included in our study, particularly between Ahtna, an Alaska Native Athabascan people, and Alaskan settlers. We adopted the legal definition of subsistence use as representing both native and non-native hunting, fishing, and gathering practices. A unilateral approach to subsistence use policy and enforcement is likely to be contentious.
  - The **vast and largely intact wildlands of the Denali region** were universally valued among different groups of community members. While the underlying reasons for appreciating their local wild spaces varied (e.g., recreation activities, resource use, charismatic wildlife, intrinsic values of nature), keeping Alaska's natural environment ecologically intact is common ground for why residents consider the Denali region to be a special place.

- Phase 2: Understand the experiences, perspectives, and preferences of residents
    - A survey of all people living in the region indicated respondents were generally **long-time residents that learned about protected management from a diversity of sources**. They were mostly White, highly educated, equally split between males and females, and approximately 50 years old. Approximately half identified as Native and non-native subsistence users.
    - Engagement in behaviors that benefit the environment were moderately high and could be explained by high **levels of environmental concern, a sense of moral obligation to minimize impacts, widespread beliefs that climate change was occurring, and multiple perceived benefits from the landscape**.
    - Respondents expressed long-term, guiding principles in life that favored unity with nature, benefiting society, and 'living a good life'.
    - Residents' preferences for the future were examined to understand tradeoffs people would be willing to make in the face of climate change, including willingness to pay for a desired future.
        - The probability of choosing a hypothetical future increased with more moose in the regional population, a higher number of acres of forest managed for wildfire suppression, lower off-season tourism growth rates, and fewer donations that residents could opt into making from their Alaska Permanent Fund annual dividend.
        - **Increasing moose populations and forested acres actively managed for fire suppression were most economically valuable** whereas off-season tourism mattered less, and respondents were willing to pay even for less off-season tourism.
        - The probability that a respondent would prefer a future that was different than the status quo varied based on attitudes toward those same features. We observed that respondents were attuned to projected impacts through their reported preferences for conditions that aligned with predominant challenges resulting from climate change.
    - An analysis of protected area governance showed residents desired **more transparency, greater access to decision-making processes, and more information on plans for public engagement.** Organizations within the federal and state government alongside the tourism industry had the greatest influence on Denali governance, as compared to local residents.

- Phase 3: Evaluate 'social learning' about inclusive conservation through deliberation
    - A **four-week online program** was administered to three subgroups of residents that were selected based on their value profiles. The goal of this program was to facilitate interactions among people and evaluate how they changed their understanding of places. We refer to this process as 'social learning' about environmental change.

Participants (n = 35) were paid for participation in an initial focus groups, four week-long facilitated discussions, and a final webinar. See this website for more information: https://denalidiscussion.org/

- **Week 1**: Participants were asked to identify benefits of the landscape. Results suggested wilderness and natural beauty, being able to live a unique "Alaskan" way of life, and a sense of community were most important. Key threats also were discussed. Residents indicated the Denali region was most impacted by development and growth, industrial tourism, and climate change.
- **Week 2**: Management practices that responded to benefits and threats were assessed, during which time residents called for a paradigm shift in public land management that would be more inclusive of multiple resident perspectives.
- **Week 3**: Residents were asked to consider the values that guide their life and how these values influenced their views of public land management. Perceived mismatch in values was raised as a concern and potential point of conflict in the future for future communication between agencies and residents.
- **Week 4**: When asked to reflect on learning that occurred throughout the four-week Denali Discussion Forum, residents signaled that learning occurred. "Relational learning" that encompassed growth around an understanding of others, shared positions, and trust building was most prominent.

o A before-and-after assessment was conducted to identify changes that may have come about as a result of participation in the Denali Discussion Forum. Results showed that i**nteractions with others resulted in shifts in long-term, individual values, whereas learning that occurred from the reflections of each participant caused shifts in social values assigned to the Denali Landscape**. For more information, see https://doi.org/10.5281/zenodo.5706747.

- Deeper shifts in values can come about from facilitated interactions that involve relating to others rather than learning opportunities that involve a one-way flow of information.
- Value differences are important to consider for enhancing communication.

Acknowledgments

View of Denali from Wonder Lake (© DAVE ALEXANDER)

Chapter 1. Introduction

Protected areas are widely accepted as effective solutions for conserving natural and cultural resources in the face of global environmental change (Schleicher et al. 2019). These areas are recognized as important and protect ecological integrity and biodiversity, tell compelling stories of human history, and generate environmental stewardship. Nearly 250 million people are living within or adjacent to protected area boundaries and this estimate could increase to as many as one billion people if the ambitious goals of designating 30% of earth's terrestrial and aquatic land as protected area are achieved. Public land management in these contexts has traditionally affected conditions within the protected area boundaries and less attention has been placed on surrounding communities. As a result, tensions have risen from the perceived and actual exclusion of local community members and residents from decision-making that influences nearby protected areas. Explicit consideration of the pluralistic goals of local communities in protected area management decision-making is known as socially inclusive conservation, which aims to actively understand and engage the diverse perspectives of multiple communities.

1.1. Inclusive conservation in the Denali Region of Alaska

Alaska is an ideal context to study inclusive conservation given the vast expanse of public lands, complex dynamics between residents and decision-makers, and the social-ecological pressures of landscape change. Approximately 80% of land in Alaska is managed by state or federal governments which draw a large influx of tourists to the rural landscape. Denali National Park and Preserve and Denali State Park, in particular, are high-profile tourist destinations in the Denali region that attract more than 600,000 visitors annually during peak tourism season from May-September. Tourism in the region is fundamentally important for supporting the local economy, in part due to employment of over 100 residents year-round and many local businesses. Residents in the region surrounding Denali protected areas, which we refer to as the "Denali Region" (see Figure 1), are directly affected by decisions being made about public lands. Likewise, decisions made by nearby residents and communities influence local ecosystems. Consequently, there is a strong need to understand the interrelationships between people and places in the Denali region and to strengthen connections among local community members, regional decision-makers, and Denali management staff to help ensure broad representation of diverse voices in environmental management and planning processes.
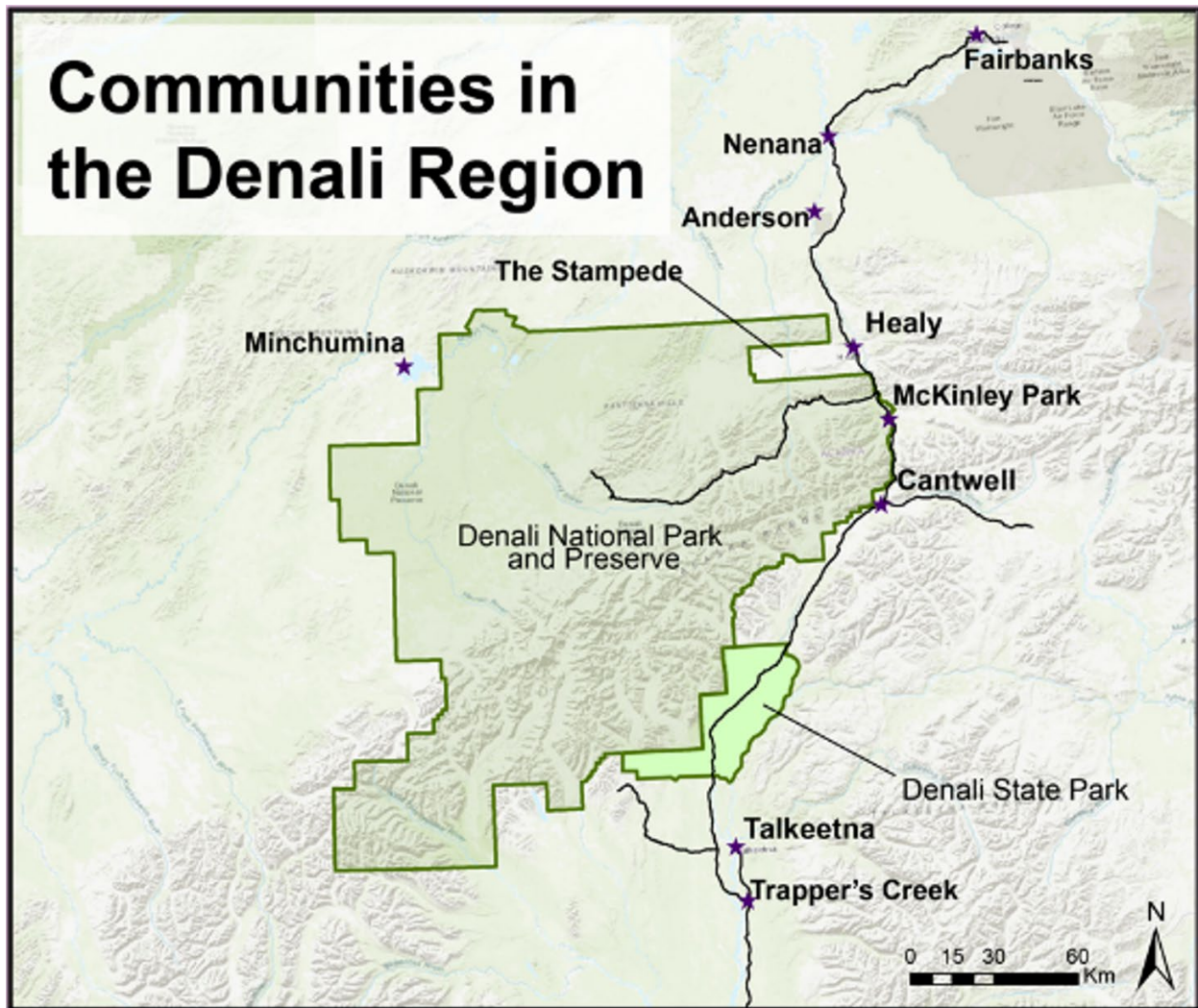
Figure 1. Study area that we define as the Denali Region. Drawn from *Johnson et al. (2022)*.

1.2. Research objectives

We pursued three phases of research to: 1) characterize the meanings of places and how they are changing in the Denali region; 2) assess the experiences, perspectives, and preferences of residents in the Denali region through survey research; and 3) Evaluate learning through an online discussion forum (see Figure 2).

This research was conducted at a regional scale that geographically encompassed several communities living on or near the George Parks Highway from Fairbanks to Trapper Creek. These communities included eight primary community groups that spanned interests in education, environmental management, mass tourism, indigenous and non-native subsistence use, energy, local business, local government, and military operations.
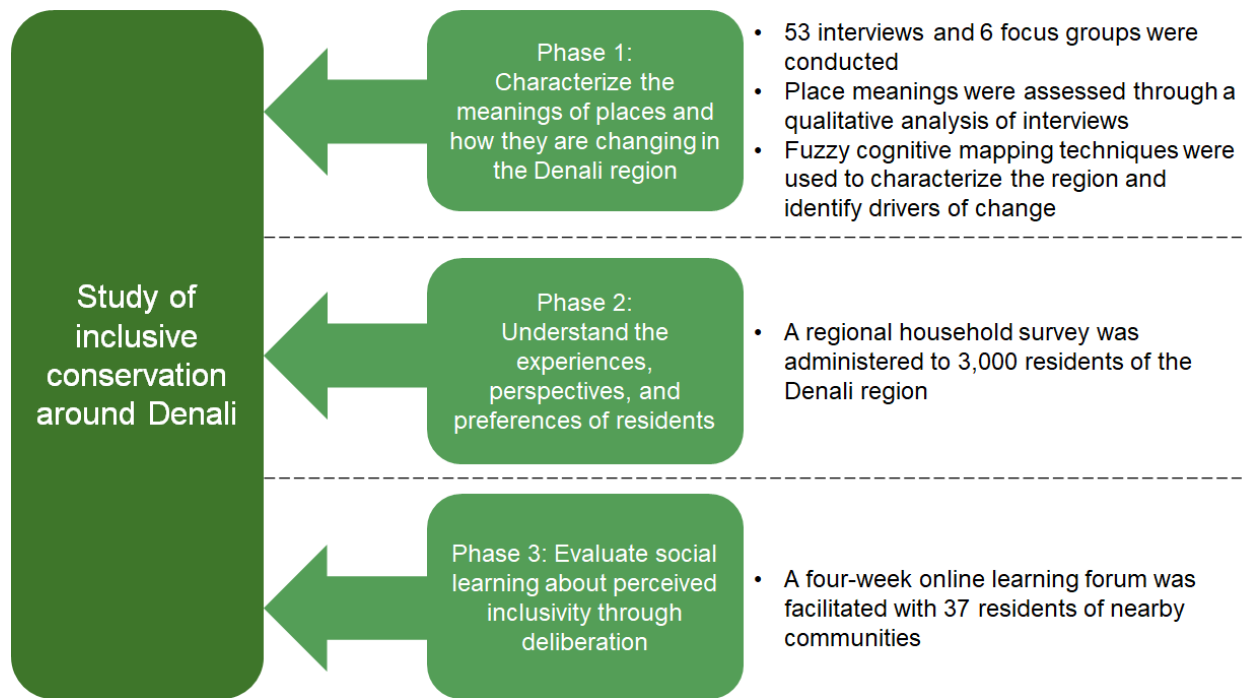
Figure 2. Three phases of research focused on understanding inclusive conservation in the Denali region of Alaska

1.3. Formation of an Executive Committee to guide the research process

An Executive Committee was formed toward the beginning of this project and engaged throughout the research process. This group of community members represented a diversity of perspectives on visions for the future of the region surrounding Denali National Park and Preserve and Denali State Park. The members of this group helped the research team understand different interests that govern the region surrounding Denali and provided feedback for maintaining relevancy of the intended research outcomes. Representation on this Committee spanned local government, education, environmental management, Alaska Native Corporations, industry, local businesses, and state agencies (see Figure 3). Also, this group was engaged to understand the impacts of various policies options and approaches for supporting resource management and human well-being tied to the region. More specifically, members of the Executive Committee were invited to participate in the following processes throughout the project:

1. Provide guidance to the project team throughout the project. Members were asked to come together approximately two times per year in-person and/or through the Zoom platform.
2. Advise on and review research instruments, including a survey questionnaire, policy toolkit, and short film to enhance the relevance and usefulness of these documents and outcomes.
3. Participate in a 'Summit' toward the end of the project where the team would discuss the social and ecological consequences of different community visions for protected area management. The team intended for this event to be held in Denali National Park and

Preserve and attended by the Committee, alongside a consortium of researchers working with other local communities surrounding Kromme Rijn and Utrechtse Heuvelrug regions (The Netherlands), Sierra de Guadarrama National Park (Spain), Västra Harg nature reserve (Sweden) and Denali National Park and Preserve (United States).

4. Help shape and promote the vision of inclusive conservation in the Denali Region and its deliverables throughout their professional networks.

Figure 3. Logos of key organizations engaged through the ENVISION Executive Committee

Chapter 2. Characterize the meanings of places and how they are changing in the region

2.1. Research purpose and methods

2.1.1. Assessment of place meanings at a regional scale

Two years of research were dedicated to developing an in-depth understanding of how residents living in the region surrounding Denali National Park and Preserve, as well as Denali State Park, perceived and characterized their local landscape. This initial, in-depth phase of our research involved individual and group-based discussions across the study communities to explore the connections they developed to regional environments, why they cared about natural resource management in the Denali region, and in general, built an appreciative dialogue about how and why places in the region were considered important (Salcido et al. 2023). To inform this process, a 'stakeholder analysis' was performed to identify eight interest groups that spanned federal, state, and local governments, including education, environmental management, local business, natural resource extraction, military, Indigenous groups, tourism, and the Denali Borough. This broad framework was used to inform the process for identifying initial interviewees included in this study. Specifically, we amassed a database of formal, semi-structured interviews with community members residing in the vicinity of Denali National Park and Preserve, in the communities of Anderson, Cantwell, Healy, McKinley Park, the Stampede, and Talkeetna. During these interviews, we asked questions about participants' 'sense of place' and values for the landscape, perceptions and knowledge of landscape change, affiliations with local organizations, opportunities for learning about the landscape, and environmental governance. The recordings and transcriptions derived from these interviews provided us with a deeper understanding of the variety of perspectives, interests, and place meanings expressed by residents. Our entire database includes informal (n = 102), semi-structured in-person (n = 35) and phone-based interviews (n = 7) that have been conducted with residents in the Denali region from 2018 - 2020. Within this dataset, all semi-structured and phone-based interviews have been transcribed and axially coded. Interrater reliability by way of percentage agreement was established through comparison of codes assigned by two different interview coders across six different transcripts. The collected codes were subsequently synthesized to generate themes reflecting the values held by participants, and meanings that characterized the Denali landscape in the minds of residents. These transcriptions and codes were also used to inform the development of a place meanings scale included in mail-back residential surveys, both statewide and in the Denali region.

2.1.2. Key features that characterize the region and drivers of change

This phase of the project evaluated residents' perceptions of social and ecological dynamics of protected areas in the Denali region using data from fuzzy cognitive mapping exercises that were part of focus groups and interviews across six local communities (Johnson et al. 2022). Our operative question asked, "how do local community members characterize Denali as a social-ecological system?" A snowball sampling approach to identify new participants by asking for names of residents who would think differently than the person being interviewed (Denzin and Lincoln 2005).

Participants were provided with activity sheets that included the initial typology of 27 features and drivers of change alongside step-by-step instructions for the fuzzy cognitive mapping exercise. During the exercise, participants worked independently and were first asked to record significant features of the region on sticky notes. Participants placed sticky notes on a blank 42.01 x 59.41cm sheet of cardstock paper and structurally linked the features using directed arrows that indicated influence and either positive or negative relationships, noted by use of black or red pen, respectively. Finally, participants qualified the degree of influence in these connections by thickening the arrows on the map, indicating a continuum in strengths of relationships from very weak to very strong. All focus group discussions were tape recorded and transcribed verbatim to generate qualitative data that complemented the information derived from the final fuzzy cognitive maps. This resulted in 9.40 hours (546 minutes) of focus group recordings and 14.70 hours (887 minutes) of interview recordings. All individual maps were digitized and aggregated to represent one regional fuzzy cognitive map. This regional map was analyzed to extrapolate the features considered most central to the map (i.e., those features that had the most connections to other features in the map) and potential drivers of change. To do this, a value for each feature's outdegree centrality (i.e., its cumulative effects on other feature) and indegree centrality (i.e., cumulative dependence from other features) was calculated. Drivers of change were features with the highest outdegree, relative to indegree centrality given the potential for these features to influence future sustainable states.

2.2. Research results

2.2.1. Results from an assessment of place meanings at a regional scale

A total of seven themes were identified through a thematic analysis of text that was transcribed from discussions with Denali community members (see Figure 4 that depicts these themes). First, Denali was seen as a place with a *distinct sense of community* that included places with strong social cohesion and bonds among diverse groups of people. These connections are rooted in a deep-seated appreciation for local places and shared interests in the future of these environments. This theme was dynamic regarding ongoing development and technological advancements that diminish the need for neighbors to rely on one another. However, social interaction is purposeful due to awareness of the remote context of community life.

The second theme that emerged from our research was *a landscape of subsistence and tradition.* Denali was seen as a place where harvest and use of wildlife and native plants has been a customary part of family and ancestral community. For example, one respondent emphasized the importance of sharing intergenerational knowledge: "[My father]'s got more intimate knowledge…He spent an incredible amount of time with his grandmother…and she imparted a lot of knowledge into him through stories. I think they're still phenomenal." Both Alaskan Natives and Alaskan settlers shared distinct histories, beliefs and traditions surrounding subsistence. These distinctions were key pieces of residents' identities and livelihoods.

Third, Denali was seen as *a desirable destination*. Specifically, this region brought major economic boons to local communities while also fueling concern about the influence of growth on identity and lifestyle: "For every time there's probably a nice equilibrium, there's more businesses that show up knowing that they can try to make money, but then they don't make enough so they want to get more

people here so there's always this draw to get more and more and more." Alaska, in general, has been portrayed in media as a desirable and romantic destination, and many residents have integrated the media representation into their sense of place.

Fourth, the *rural Alaskan lifestyle* was an important place meaning. Denali as a place was characterized by autonomy, commitment to oneself and family, and reliance on local resources. Residents often live and see places as avenues for character development and personal growth. Their outdoor lifestyles often engage remote landscapes and harsh conditions. There was both widespread concern among residents about preserving freedom to access places and maintain Alaska's landscape without fences, as well as acknowledgement of the need to find balance and compromise to accept some land use regulations.

Fifth, Denali is *a landscape of wildlife habitat*. Specifically, this region is perceived as a natural and wildlife-rich landscape that cannot be reproduced anywhere else. The area is particularly known for protection of ecologically intact landscapes - those with low human footprint and high flora and faunal functionality (Plumptre et al. 2021) - and supporting charismatic megafauna including Grizzly Bear (*Ursus arctos*), Moose (*Alces alces*), Caribou (*Rangifer tarandus*), Wolves (*Canis lupus*), and Dall Sheep (*Ovis dalli dalli*). These charismatic mammals are referred to as the 'Big Five' due to their popularity with park visitors and are prominent species in both tourism discourse and environmental policy interests. However, other species were important for building connections with places, especially from the perspective of residents.

The sixth place meaning identified in this study was w*ildland areas tied to recreation.* Denali as a place was valued for bringing excitement, relaxation, and meaning into life by way of outdoor activities in natural environments. Recreation activities such as hiking, skiing, or biking were pursued by residents from all walks of life in all communities in the region. Due in large part to the remote setting and mostly free access to a vast landscape, these recreation activities played a key role in everyday life.

The final emergent place meaning from this study was *natural resources for human extraction.* Denali was seen as a place that supported the socio-economic well-being of residents through resource use and consumption. The functionality of the Denali landscape and places were considered distinctive because they provide opportunities to obtain the resources needed for revenue streams and livelihood. There was also recognition that tradeoffs are necessary when balancing the interests of different community member groups: "That model of extractive success is starting to change. We're all realizing that that's not really a recipe for success, so… are we setting up the next generation of people, kids to have access to all those same things that drove me here?"
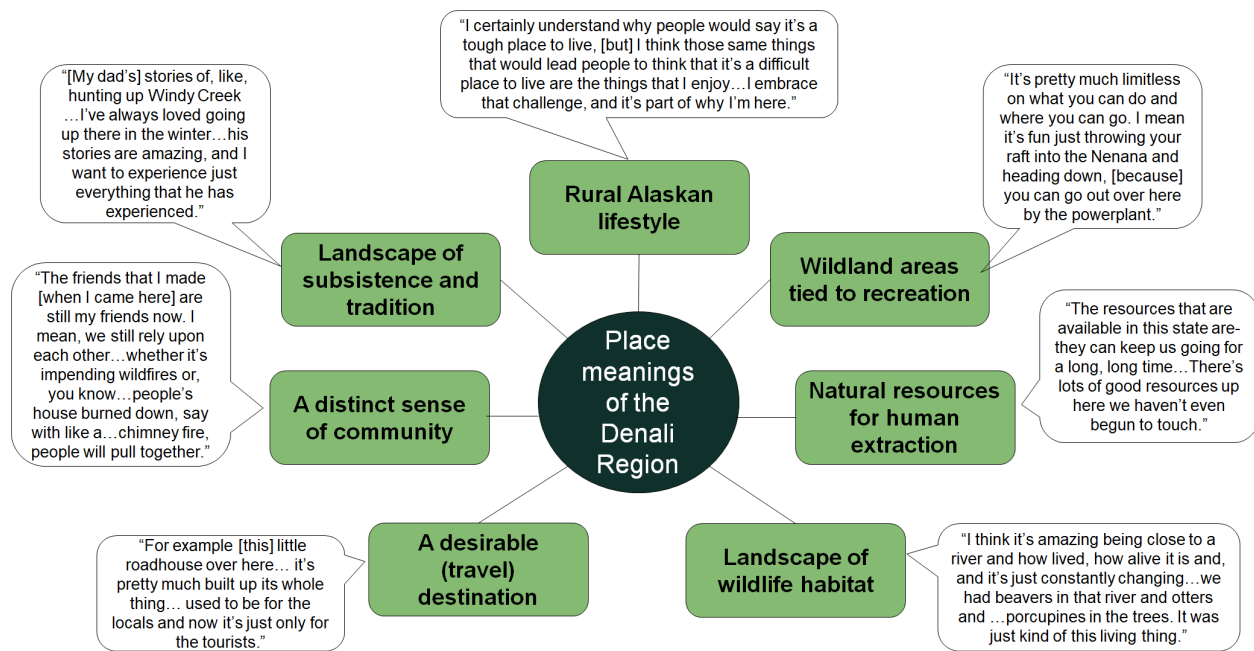
Figure 4. Conceptual map of place meanings and illustrative quotes from participants

2.2.2. Drivers of change

A total of 51 fuzzy cognitive maps were collected from residents across six communities as part of focus groups (n = 37) and semi-structured interviews (n = 14). After aggregating individual maps, *Tourism* emerged as the most central feature in the regional map and was considered an ordinary variable with equal indegree and outdegree centrality scores, indicating it could be interpreted as driving or receiving influence from other variables in the system. *Sense of community*, *subsistence*, and *wilderness* also emerged as highly central variables in the regional map and were affecting fewer (outdegree) than they were affected by other variables (indegree) in the system. According to most participants, *climate change* and *large-scale development* were perceived as drivers of change given their stronger outdegree rather than indegree influences. These drivers of change were perceived as having positive feedback loops in that increasing one driver, resulted in the increase of the other.

Results showed a complex representation of social-ecological features at a regional scale, and centrality scores showed that the region was primarily characterized by *tourism, sense of community, subsistence,* and *wilderness*. *Tourism* had relatively equal indegree and outdegree centrality scores (see Table 1), indicating it could be interpreted as driving or receiving influence from other variables in the system. *Sense of community*, *subsistence*, and *wilderness* also emerged as highly central variables in the regional map and were affecting fewer (outdegree) than they were affected by other variables (indegree) in the system. According to most participants, *climate change* and *large-scale development* were perceived as drivers of change given their stronger outdegree rather than indegree influences (see Figure 5). These results also indicate a departure from the traditional trade-offs associated with national parks related to use versus preservation and provide information about how residents are perceiving future changes in landscape conditions.

Table 1. Centrality scores from the aggregated community map including maps from all communities

Features	Centrality	Outdegree	Indegree
Tourism	10.13	10.24	20.37
Sense of community	6.43	10.46	16.89
Subsistence	6.15	10.37	16.52
Wilderness	8.43	7.84	16.27
Recreation	5.69	10.29	15.97
Climate change	9.63	5.42	15.05
Wildlife	5.63	8.55	14.17
Healthy ecosystems	3.10	9.82	12.92
Local business	4.24	6.64	10.88
Rural lifestyle	4.08	6.28	10.36
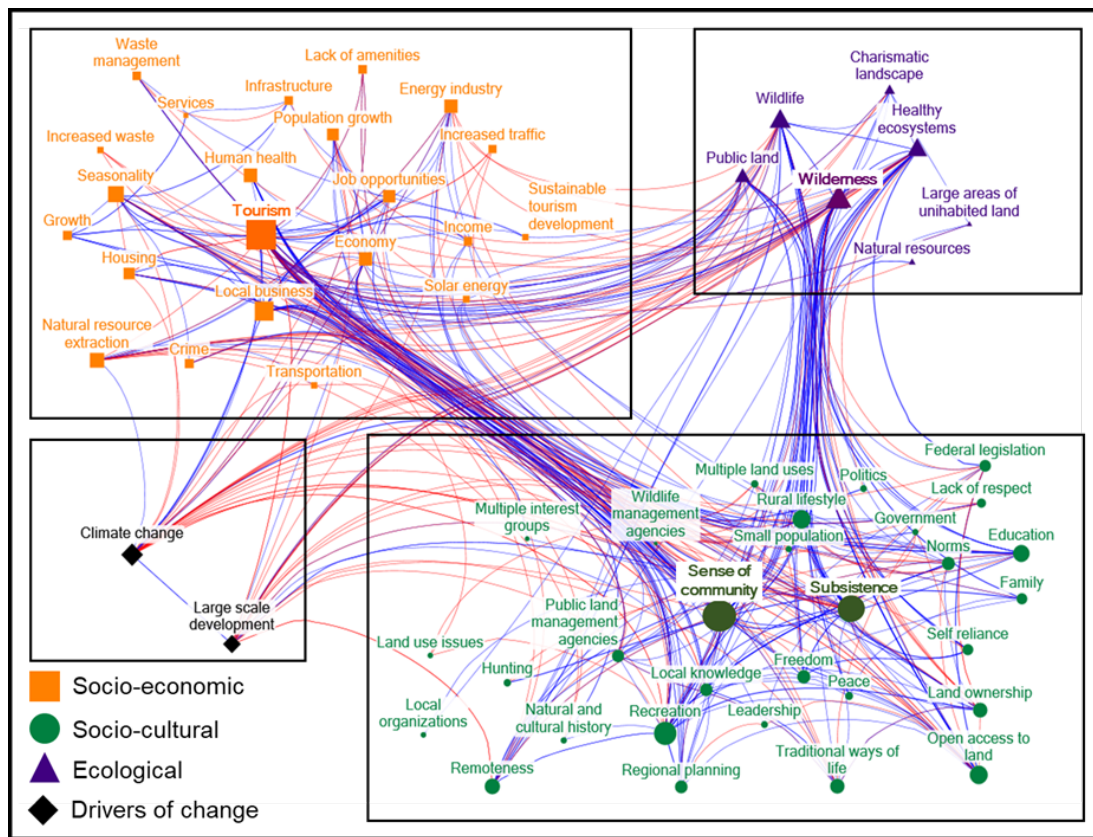
Figure 5. Results from 37 aggregated fuzzy cognitive maps produced by residents from the Denali region, AK. The mapped features spanned socio-economic, socio-cultural, and ecological dimensions of resilience theory, as well as key drivers of change. The lines connecting all features show negative relationships in red and positive relationships in blue. The strength of connections is not represented in the graphic but was used to understand centrality of this highly integrated system. The size of the nodes illustrate the relative importance (i.e., centrality) of each feature in characterizing the region. The four features considered most central to the system (i.e., tourism, wilderness, subsistence, and sense of community) are bolded. Drawn from *Johnson et al. (2022).*

Chapter 3. Understand the experiences, perspectives, and preferences of residents

3.1. Research purpose and methods

Building on two years of in-depth discussions with residents living in the Denali region, we designed a survey that was administered June-September 2020. Specifically, we surveyed all residents in ten zip codes about their use of natural resources, underlying values, place-meanings, perceptions about governance and preferences for future resource management alternatives (see Figure 6). We purchased an address-based sample of 3,000 residents living in the Denali region from the U.S. Postal Service through a marketing research organization called Marketing Systems Group. Our questionnaire was sent to 95% of P.O. boxes and household addresses situated along or near the George Parks' Highway between Nenana and Talkeetna, residents of Lake Minchumina, and a smaller proportion of residents living in one zip code west of Fairbanks (9.7% of total sample). Residents received a copy of the questionnaire and an introductory cover letter by mail during June 2020 and were asked to return a completed hard copy in a postage-paid envelope or submit their responses online. After a week and a half, those who had not returned their questionnaires were sent a reminder postcard. Finally, a second copy of the questionnaire and cover letter were sent to those who had not yet participated a week and a half after receiving the reminder postcard. After removing duplicates and invalid addresses (i.e., "return to senders" due to vacancies or inability to deliver mail to resident; n = 297), the final sample size included 332 residents of the Denali region (12.28% rate). A copy of our questionnaire is available in the Appendix.
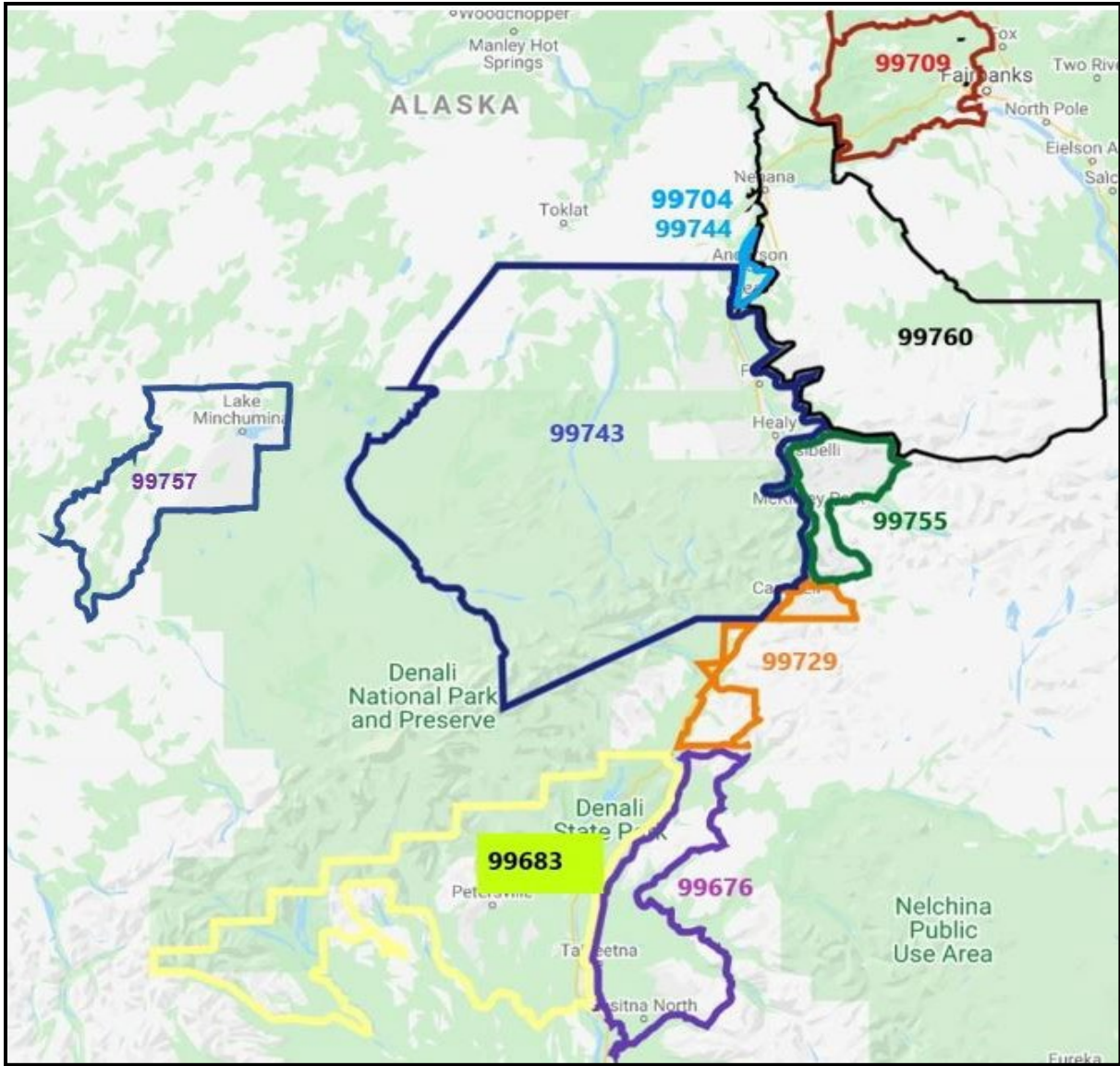
Figure 6. Zip codes of residents invited to participate in the survey

3.1.1. Pilot test

To prepare for data collection and analysis, the survey questionnaire underwent pilot testing and adjustments. An online pilot test was administered in April-May 2020 through Qualtrics to residents of rural areas of Fairbanks, Alaska (n = 36). Participants were recruited on the basis of residing in a Fairbanks zip code, age, and gender. Qualtrics is an online survey administration platform that includes services for recruiting respondents to participate in a given study. Once data collection began, Qualtrics representatives assigned to our project facilitated data collection by sending out email invitations and reminders to complete the questionnaire. Invitations and reminders were delivered daily and on a rolling basis so that new respondents were asked to join throughout the data collection period. Once a respondent opened the questionnaire, they were prompted to indicate their age, gender, and zip code to screen for desired socio-demographics. Once a respondent accessed the

questionnaire, they could save progress and return at any point within 30 days. After 30 days of inactivity, partial responses were saved as complete and added to the database. As quotas for age and gender filled, access to the questionnaire become restricted to certain groups so that not one age or gender category was oversampled. The data generated from this online survey were analyzed and referenced to modify the questionnaire. These various forms of feedback enabled us to: a) tune the wording of survey items; b) diagnose any methodological potential problems with our survey (e.g., completion rates); c) generate prior estimates for an efficiency analysis used to refine the experimental design of the stated choice experiment; and d) increase the likelihood of science transfer at the conclusion of the project in response to the needs of community members and management agencies.

3.1.2. Data analysis and entry

All mail-back survey questionnaires were coded manually by a team of three students over the course of a two-month period. Surveys were returned from June through September 2020. Data cleaning, descriptive statistics and mean value comparisons were performed in SPSS 26, and R Studio packages. Analysis for the stated choice experiment was performed in Nlogit, while structural equation modeling techniques were performed in MPlus and R Studio.

3.2. Descriptive results

3.2.1. Background and views and survey respondents Landscape

This study evaluated respondents' backgrounds to determine who participated in this research. These questions were used to determine how representative the sample was of the general population. Results showed that respondents were primarily White (66.8%), males (50.0%) and females (43.8%) with an average age of 55 (see Table 2). A total of 36.1% reported earning a four-year bachelor's degree, while 24.4% held a graduate degree. Approximately one third (34.6%) reported earning less than $50,000 each year before taxes.

Table 2. Respondent socio-demographics

Value	Count	Freq
Race		
American Indian or Alaska Native	25	6.28
Asian	8	2.01
White	266	66.83
Black or African American	9	2.26
Pacific Islander	4	1.01
Other	23	5.78
Annual household income before taxes		
Less than 24,999	31	9.3
25,000-49,999	84	25.3
50,000-99,999	95	28.6
100,000-149,999	41	12.3
150,000-199,999	14	4.2
200,000-249,999	5	1.5
250,000 or more	4	1.2

Value	Count	Freq
Highest education		
Some high school	1	0.3
High school graduate or GED	51	15.4
Two-year degree	31	9.3
Bachelor's degree	120	36.1
Professional certificate	19	5.7
Graduate degree	81	24.4
Gender		
Female	142	42.8
Male	166	50.0
Age [M, SD]	[55.3, 15.1]	

3.2.2. Experience use history

We asked respondents a series of questions to measure their experience use history (EUH) at the start of the survey to learn about previous engagement with the Denali region. Experience use history is defined within a public land context as the amount and type of activities pursued by an individual participates (Schreyer et al. 1984), with total visits, years, and frequency of use as common EUH measurements (Budruk et al. 2008). Experience use history is thought to influence user perceptions, management preferences, and behaviors (Hammitt et al. 2004).

To measure EUH, our survey included years the person had lived in Alaska, the number of times they had visited Denali National Park and Preserve throughout their life, as well as the number of times they had visited any public land in the last year and throughout their life. There was a broad range of answers to these questions that indicated respondents had lived in Alaska and visited public lands countless times. Because there was such a wide range of responses, we developed four categories for each question to describe the respondents in our sample (see Figure 7). On average, respondents had been living in Alaska for 26.9 years (SD = 16.7). They also reported visiting Denali National Park and Preserve and other Alaskan public lands frequently throughout their life.
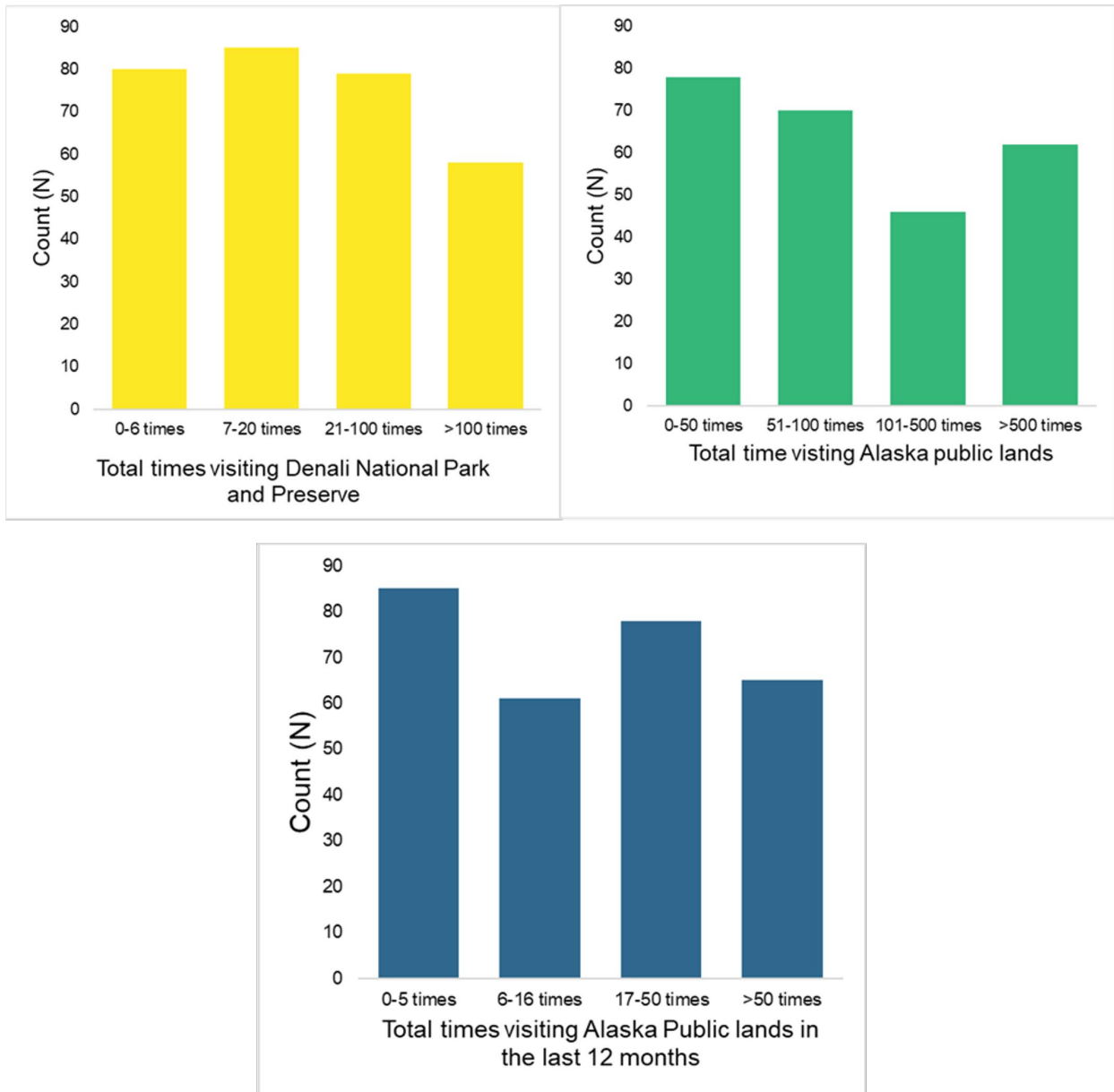
Figure 7. Experience use history of survey respondents

3.2.3. Subsistence use

We evaluated subsistence use practices among survey respondents and defined subsistence in the questionnaire as the livelihood secured by fish, wildlife, and other environmental resources provided by the landscape for personal consumption. Subsistence use is especially important for Alaskans living in rural communities, which harvest between 2-3 times as many resources in pounds as compared to people living in urban areas (see Subsistence Page on ADF&G website). We did not distinguish between Alaskan Natives and Alaskan settlers. Many of the survey respondents identified

as subsistence users (54.0%), with 42.2% of respondents stating that subsistence use was either "very important" or "extremely important" to them (see Table 3).

Table 3. Subsistence use patterns

Value	Count	Freq
Do you identify as a subsistence user?	-	-
Yes	215	54.02
No	98	24.62
How important is subsistence to you?	-	-
Not at all Important	21	5.28
Slightly Important	40	10.05
Moderately Important	82	20.60
Very Important	87	21.86
Extremely important	81	20.35

3.2.4. Information outlets

Respondents used a variety of information sources to learn about public land management in Alaska (Andrade et al. 2022) (see Table 4). Sources of information included friends and family, social media, public agencies, online newspapers, government websites, environmental groups, government officials, hunting/trapping organizations, public meetings, scholarly articles, professional societies, and webinars. We collected trusted sources of information to help drive future efforts connecting residents to decision-makers in the region, communication, and dissemination of research findings. Sources of information were also used to understand how respondents learn and from whom (Figure 8). Sources that include social interactions, such as friends and family, may reflect the process of social learning, whereas other online sources may indicate how respondents learn in virtual environments. Friends and family were the most commonly reported learning source (74%), followed by public agencies (58%), and environmental groups (55%).

Table 4. Shared sources of information

Source	n	%
Friends and family	248	74
Public agencies	192	58
Environmental groups	183	55
Social media	156	47
Public meetings	149	45
Government websites	142	43
Online newspapers	141	42
Government officials	137	41
Hunting/trapping organizations	94	28
Scholarly articles	79	24
Professional societies	41	12
Webinars	17	5
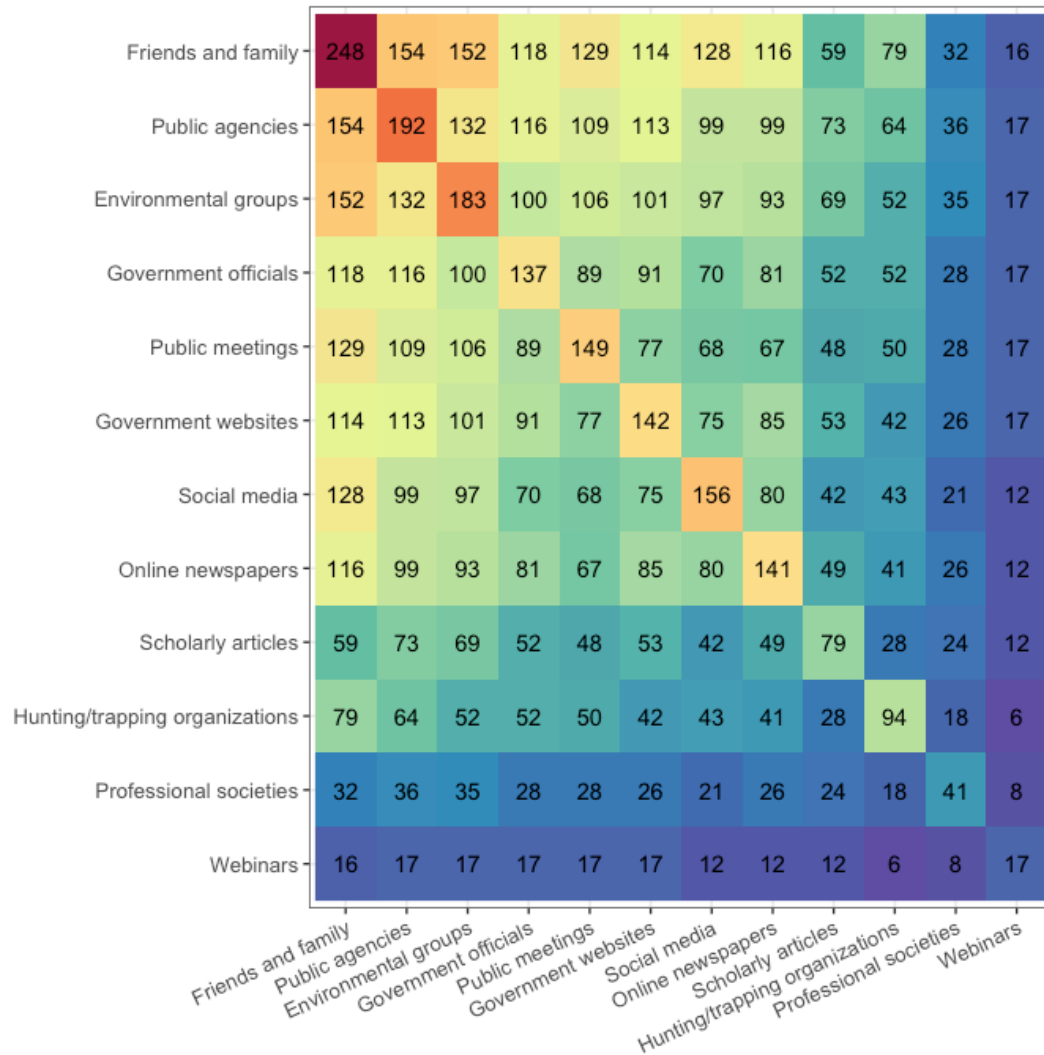
Figure 8. Shared sources of information that were self-identified by survey respondents who were asked how they learned about public land management in Alaska. Respondents could select more than one option. The frequency of responses is presented along a spectrum of color, in that higher numbers correspond to the color red and lower numbers correspond to the color blue.

3.3. Pro-environmental behavior, concerns, norms, and values

3.3.1. Pro-environmental behavior

Respondents were asked to report how frequently they engaged in behaviors that benefit the environment, also known as "pro-environmental behavior." Three different types of behavior were evaluated across private, public, and social contexts (Stern 2000; Larson et al. 2015; van Riper et al. 2019a; van Riper et al. 2019b; Winkler-Schor et al. 2020). Private sphere behaviors, which encompass actions taken at the individual level with direct impact on the environment, were performed most frequently ($M = 3.65$, $SD = 0.79$) (see Figure 9), followed by social sphere behaviors that involved interacting with other people to express environmentalism. In line with previous research (e.g., van Riper et al. 2019), participation in public sphere behaviors (e.g., donating money)

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were lowest ($M = 2.39$, $SD = 1.03$), possibly owing to the difficulty of performing these behaviors. Uneasy relationships between residents and resource management agencies may also have prevented feelings of moral obligation from manifesting in civic engagement more broadly.
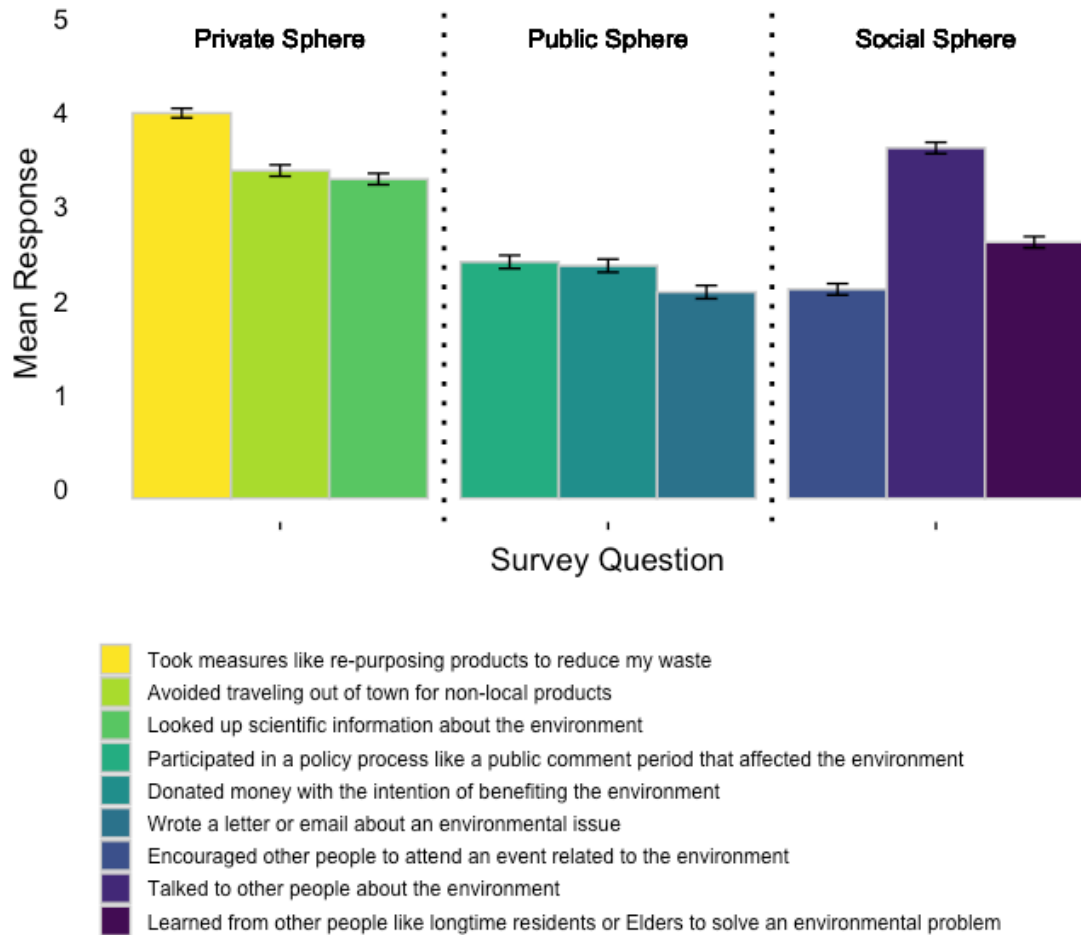
Figure 9. Mean value scores of the pro-environmental behavior findings. Survey items were measured using a 5-point scale: Very Rarely (1), Rarely (2), Occasionally (3), Frequently (4), Very Frequently (5)

3.3.2. Environmental concern

Environmental concern refers to the extent to which people are concerned about the environment and was measured as affective (emotional), cognitive (knowledge), and conative (behavioral) types of concern using six questions (Best and Mayerl 2013; Enzler et al. 2019; van Riper et al. 2020). General agreement with questions measuring environmental concern was reported (see Figure 10) given average response ranging from 3 (neutral) to just under 4 (agreement).
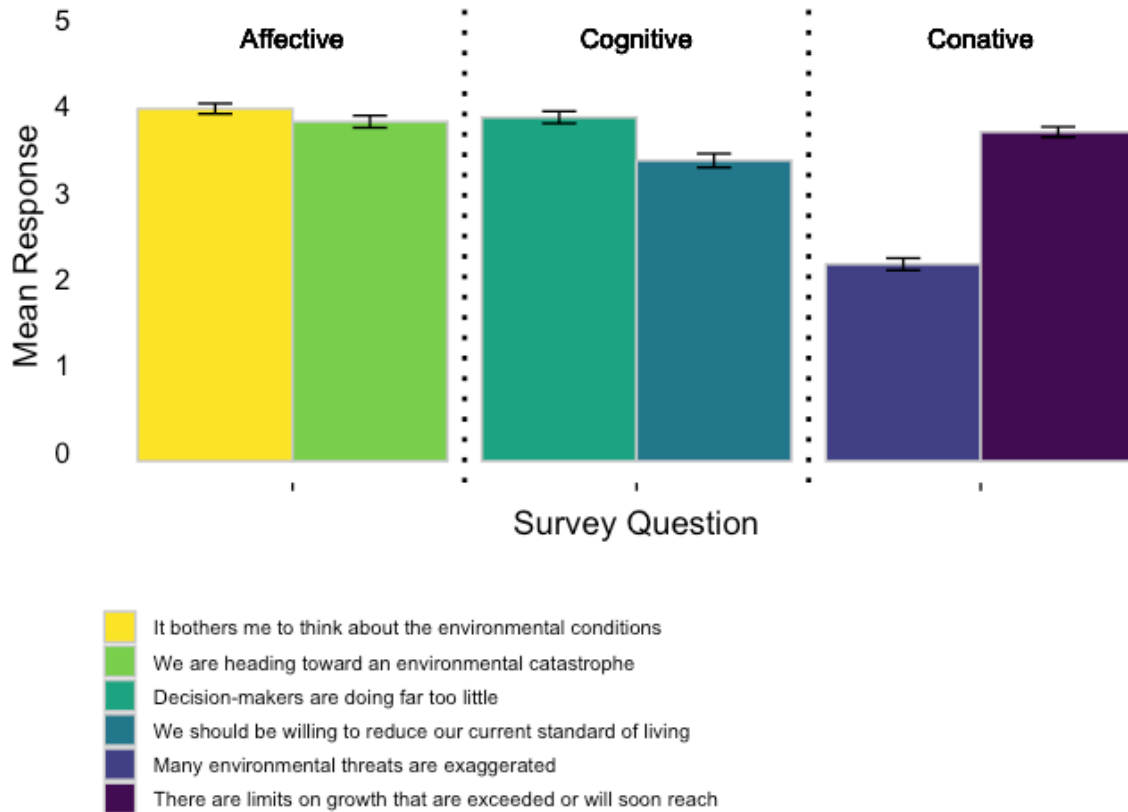
Figure 10. Mean value scores for environmental concern items. Survey items were measured using a 5-point scale: Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), Strongly Agree (5)

3.3.3. Beliefs about other people and climate change

The decision to engage in behavior stems from a feeling of moral obligation (i.e., "personal norms") to take actions that minimize environmental impacts. We drew on previous research in protected areas that has defined personal norms as beliefs that people should behave in a certain way (van Riper and Kyle 2014; Johnson et al. 2021). Respondents felt a strong sense of obligation to protect public lands in the Denali region ($M = 4.35$; $SD = 0.66$) (see Figure 11).
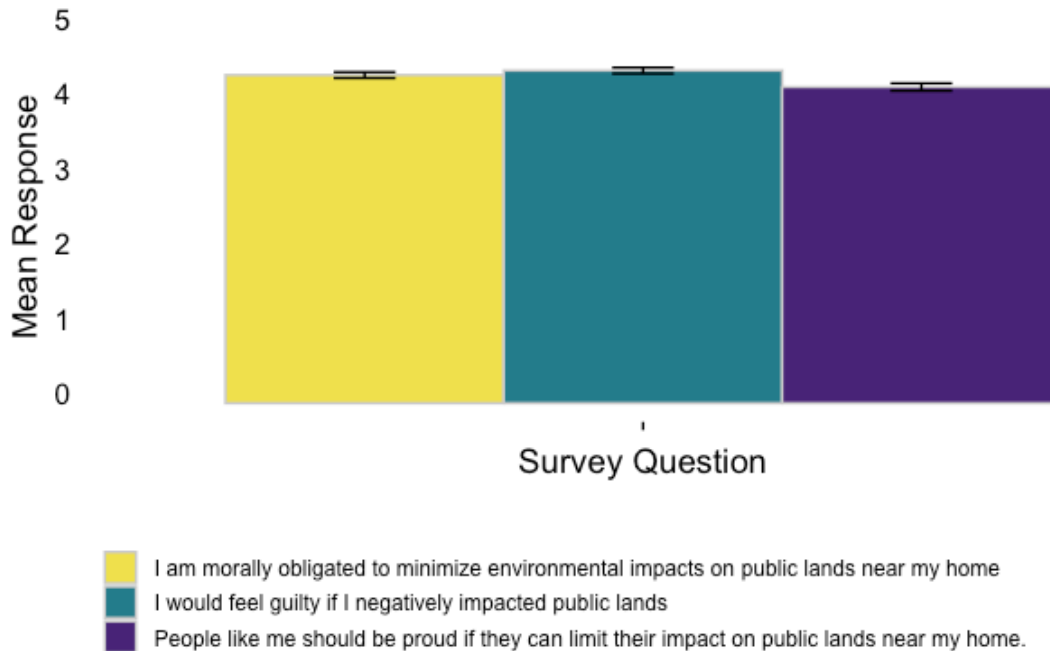
Figure 11. Mean value scores for personal norm items. Survey items were measured using a 5-point scale: Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), Strongly Agree (5)

We drew from a general public survey developed by Leiserowitz et al. (2018) called Climate Change in the American Mind to assess whether respondents believed global warming was occurring (see Figure 12), the extent to which they were certain it was occurring, and beliefs about the primary causes of global warming (see Figure 13). Most respondents were relatively certain ($M = 4.43$; $SD = 0.88$) that global warming was occurring (85.2%).
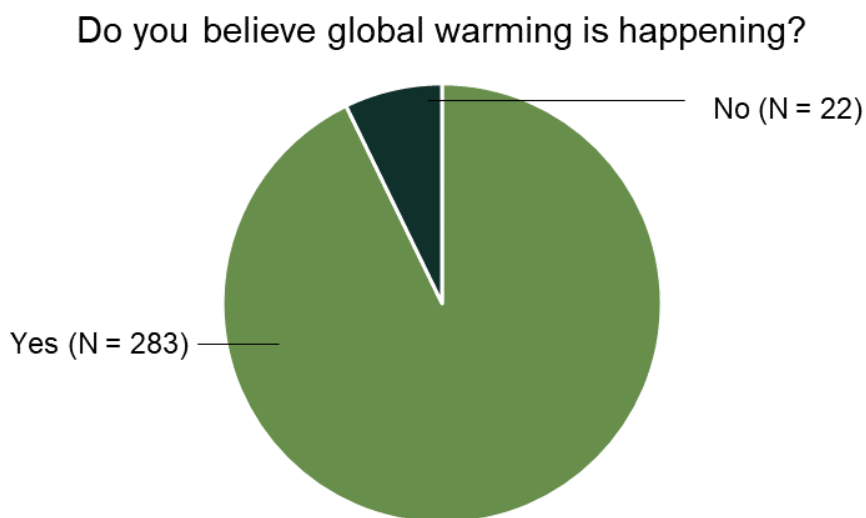
Figure 12. Beliefs about global warming

Do you think global warming is primarily caused by....?

Natural changes in the environment (N = 55)

Human activities (N = 220)
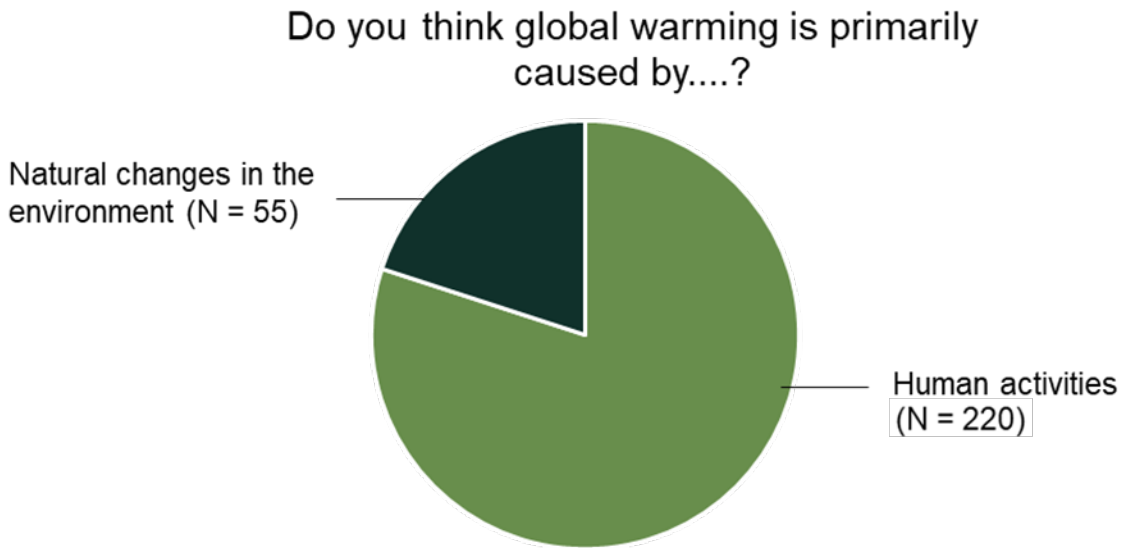
Figure 13. Primary cause of global warming

3.3.4. Social values

Social values describe the reasons why a particular place is special. This information is helpful, because social values can reflect tensions about how people interact with and utilize natural resources. To understand the many reasons why the Denali region was considered important, respondents were asked to respond to a battery of questions that measured different qualities of places in the Denali region. This scale was developed from qualitative data collected with residents (Salcido et al. 2023) in the Denali region and builds on previous scales that aim to measure perceived benefits of places (Cai et al. 2023; Cerveny et al. 2017; Brown and Reed 2000). Findings indicated that respondents felt Denali was special for myriad reasons, especially due to opportunities for wildlife ($M = 4.60$; $SD = 0.72$), recreation ($M = 4.58$; $SD = 0.59$), aesthetics ($M = 4.53$; $SD = 0.76$), and rejuvenation ($M = 4.52$; $SD = 0.76$) (see Figure 14).
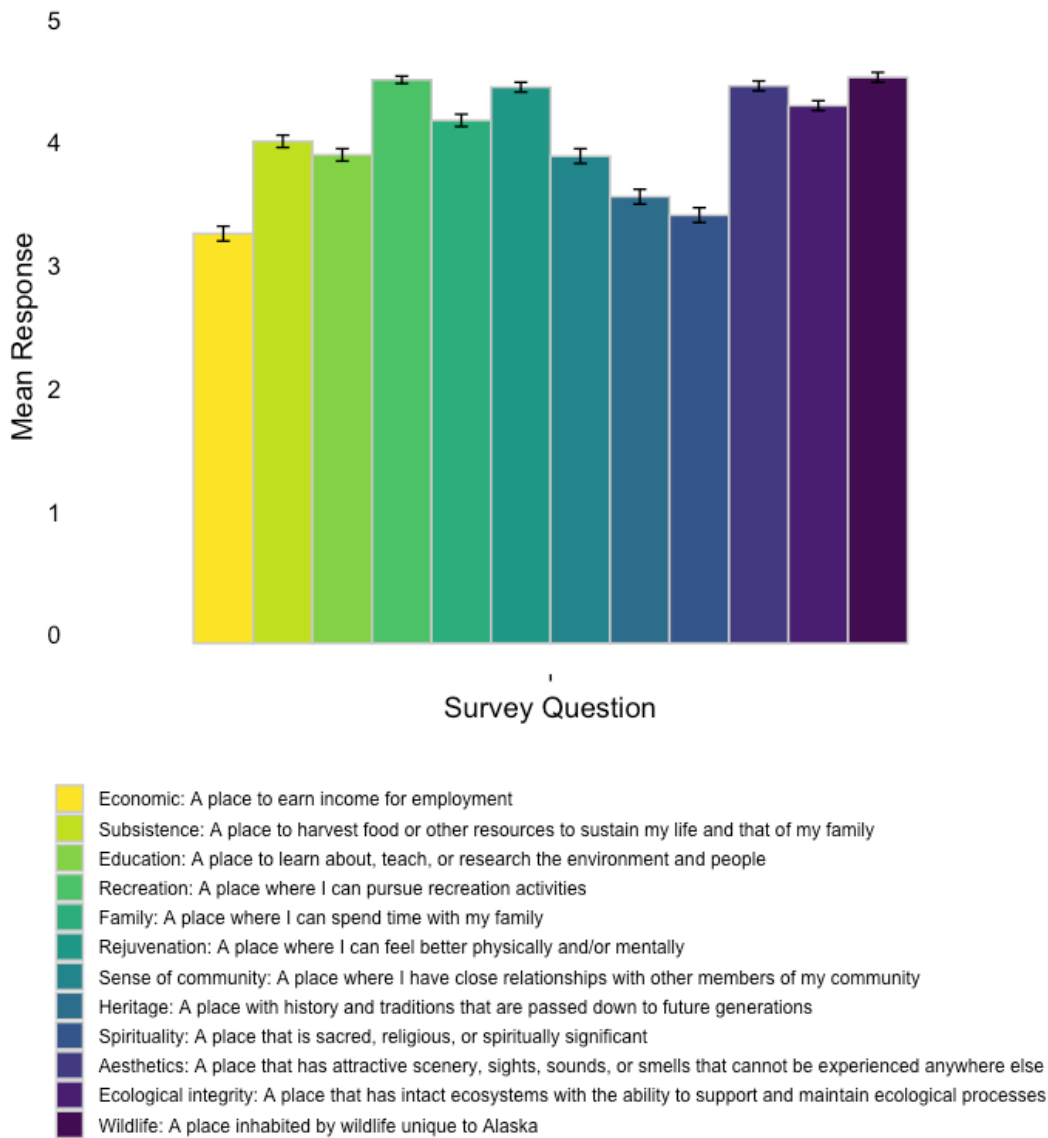
Figure 14. Mean value scores for social value items. Survey items were measured using a 5-point scale: Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), Strongly Agree (5)

3.3.5. Personal values

This study evaluated "personal" values, defined as fundamental, guiding principles in life that define moral codes of conduct. Personal values are stable representations for what people care about and can be helpful from a public land management perspective because they explain what may guide individuals and help explain their views (Stern et al. 1999; Steg and Groot 2010; van Riper et al. 2019b). We measured five personal value orientations including those related to other people (i.e., Altruistic values), to ecosystems or the biosphere (i.e., biospheric values), to pleasure-seeking

tendencies (i.e., hedonic values), to human well-being (i.e., eudaimonic values), and to individual power or achievement (i.e., egoistic values).

Respondents largely identified with values related to other people (i.e., altruistic) and ecosystems or the biosphere (i.e., biospheric) (see Figure 15). Values related to personal fulfillment (i.e., hedonic and eudaimonic) were important, but to a lesser degree. Values related to individual power or achievement (i.e., egoistic) were least important to respondents. Specifically, respondents held the strongest altruistic ($M = 4.34$, $SD = 0.83$), biospheric ($M = 4.33$, $SD = 0.76$), and eudaimonic values ($M = 4.30$, $SD = 0.59$) followed by Hedonic ($M = 4.02$, $SD = 0.68$) and Egoistic ($M = 2.53$, $SD = 0.78$) value orientations.
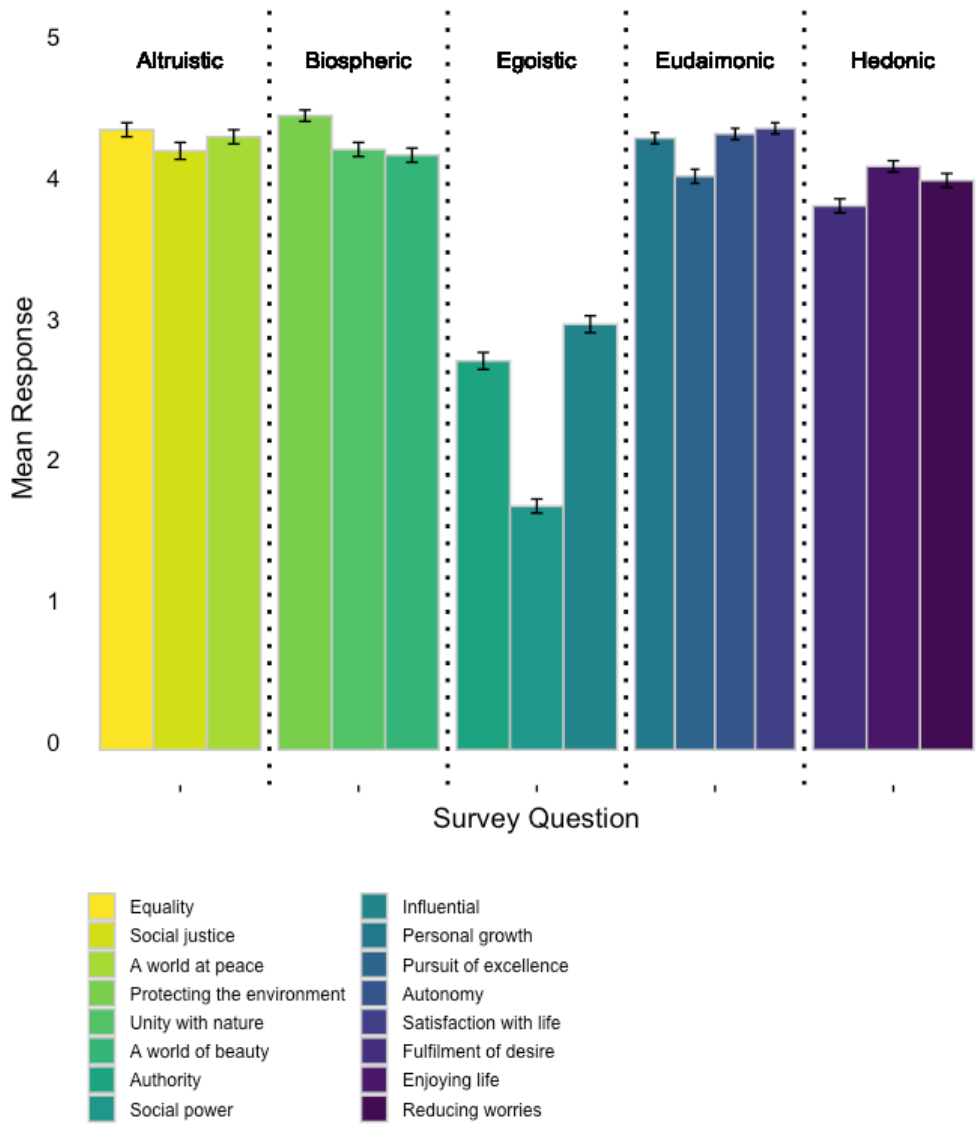
Figure 15. Mean value scores for personal value items. Survey items were measured using a 5-point scale ranging from Unimportant (1), Of Little Importance (2), Moderately Important (3), Important (4), Very Important (5).

3.4. Preferences for landscape change and attitudes toward future growth

We developed a discrete choice experiment to quantify tradeoffs that residents were willing to make to obtain their preferred futures (Louviere et al. 2000). Using survey data from residents in the Denali region, we tested how four landscape features likely to be impacted by climate change influenced respondents' evaluations of the future: 1) moose populations, 2) off-season tourism growth rates, 3) acres of forested land managed for fire suppression, and 4) cost. We asked questions about possible changes to landscape conditions that may occur over the next 30 years in the area where respondents lived. For each question, respondents were asked to indicate their preferences for the future by choosing between two hypothetical future scenarios or the current condition. Each scenario included the four features held at various levels which represented conditions influenced by different management agencies and potential policies. The levels of each feature were identified using qualitative data collected as part of phase one of this study, available data about projected future conditions, and feedback from project partners. These features and corresponding levels are described in Figure 16. An example scenario is presented below (see Figure 17).

Moose Population	The total number of moose in the largest game management unit of Interior Alaska is estimated to be 55,000. These numbers are expected to increase due to fires that create open spaces, providing ideal moose habitat. This feature is set at three levels that may occur **over the next 30 years:** 1. **0% increase in moose population** 2. **15% increase in moose population** 3. **30% increase in moose population**
Off-season Tourism	Off-season tourism is the number of out of town visitors who travel to Interior Alaska from October – April. Over the past 10 years, visitation has varied, but increased by about 20%. During off-season months in 2019, there were 19,332 visitors to Denali National Park and Preserve. This feature is set at three levels that may occur **over the next 30 years:** 1. **25% decrease in off-season tourism growth rate** 2. **Maintain current off-season tourism growth rate** 3. **25% increase in off-season tourism growth rate**
Acres Managed for Fire	Fire protection is provided by several public land management agencies. Currently, about 10% (10,581,937 acres) of all forested acres in Interior Alaska are managed to a limited degree. This feature is set at three levels of acres that could be managed **over the next 30 years:** 1. **0% increase in acres managed** 2. **15% increase in acres managed** 3. **30% increase in acres managed**
Annual Cost	Residents of Alaska receive payments each year from the Alaska Permanent Fund. In 2019, residents accepted into this program each received $1,606. To minimize impacts from the other features described above, everyone's dividend could be reduced. We would like to know how much you would be willing to pay from this fund to prevent changes to the landscape in Interior Alaska. This feature is set at five levels ranging from **$0 to $100 over the next 30 years.**

Figure 16. Description of discrete choice attributes and levels.

Figure 17. Example of a hypothetical choice question presented to respondents.

To understand respondents' preferences for the future, we estimated two random parameter logistic regression models. First, we estimated a model that accounted for the main effects only to understand the effect of the four features on respondents' choices (see section 3.4.1.). Second, we estimated a model that accounted for the main effects and interaction effects to understand differences between respondents with strong versus weak attitudes toward each of the four discrete choice features (see section 3.4.2).

3.4.1. Results concerning evaluations of future management scenarios

Results from the discrete choice experiment quantified tradeoffs that residents were willing to make to obtain their preferred futures. Specifically, we tested how four landscape characteristics likely to be impacted by climate change influenced respondents' evaluations of the future: 1) moose populations, 2) off-season tourism growth rates, 3) acres of forested land managed for fire suppression, and 4) cost. We analyzed 1,716 sets of observations, which represented the total number of choices made across our sample of respondents, using a random parameters logistic regression. Findings showed that all four significantly influenced choices made by survey respondents. Specifically, we found the likelihood a respondent would select an alternative scenario increased to a statistically significant degree when the number of moose in the regional population increased (β = 0.018) and when the number of acres of forest managed for fire suppression increased (β = 0.015). We also found that the likelihood a respondent would select an alternative scenario decreased when the growth rate of tourism increased (β = -0.008) and the amount deducted from the Alaska

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Permanent Fund dividend increased (β = -0.009) (see Table 5). Overall, our model accounted for a moderate degree of variation among respondents' choices as indicted by a McFadden's pseudo R^2 of 16% (Hensher and Johnson 1981). We also observed significant standard deviations of the random parameters in our model, indicating heterogeneity in preferences across each feature.

Table 5. Mean and distribution of five random parameters from the random parameters logit model, including coefficients, standard deviations, and standard errors (SE).

Variables	Attributes only	
	Coeff. (SE)	SD (SE)
Moose population	0.018*** (0.005)	0.055*** (0.006)
Acres managed for fire	0.015*** (0.005)	0.056*** (0.006)
Off-season tourism	-0.008** (0.004)	0.051*** (0.004)
Annual cost	-0.009*** (0.002)	0.012*** (0.003)
Constant	- 0.807*** (0.172)	1.581*** (0.183)
Attitudes toward moose * Moose population	-	-
Attitudes toward fire management * Acres managed for fire	-	-
Attitudes toward off-season tourism * Off-season tourism	-	-
Attitudes toward cost * Annual cost	-	-
LL = -1,515.54; AIC = 3,053.1; N = 1,716; Pseudo R^2 = 0.16		

Significance at 1% = ***, at 5% = **, and at 10% = *

[++] LL=Log likelihood; AIC=Akaike information criterion

To further interpret findings from our choice experiment, we converted the regression coefficients which are calculated as logits and transformed these values into predicted probabilities. We then graphically represented the changes in predicted probability that an alternative scenario was selected based on the changes in levels of each feature that was measured. Changes in probability that an alternative scenario was selected over 'no change' for the four landscape features are shown in Figure 18. Additionally, we calculated a marginal willingness-to-donate from the Alaska Permanent Fund dividend to pay for changes in each landscape feature (see Table 6). We found that respondents would be willing to donate $2.00 annually from their Alaska Permanent Fund dividend to see a 1% increase in moose populations. That is, a respondent would be willing to pay $30 for a 15% increase in moose populations. Respondents would be willing to donate $0.89 annually from their dividend to see a 1% decrease in off-season tourism growth rates or pay $22.35 for a 25% decrease in off-season tourism growth rates. Finally, respondents would be willing to donate $1.81 annually from their dividend to see a 1% increase in acres managed for fire suppression. That is, a respondent would be willing to pay $27.15 for a 15% increase in acres managed for fire suppression.
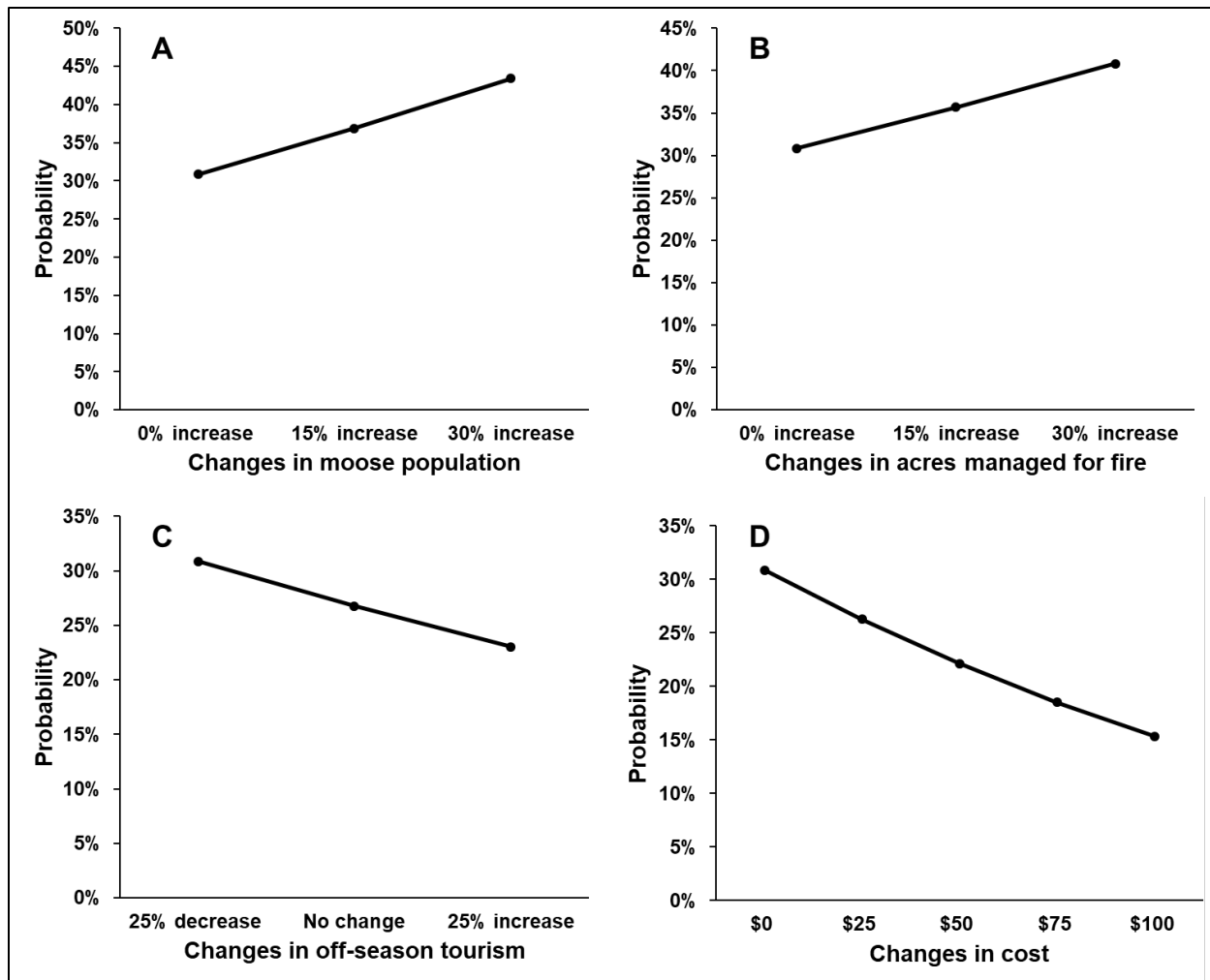
Figure 18. Probability that a respondent would choose an alternative future scenario over no change with changing levels of A) moose population, B) acres of forest managed for fire suppression, C) off-season tourism growth rate, and D) cost.

Table 6. Marginal willingness-to-pay for changes to each study attribute

Variable	Pooled sample WTP
Moose population	$2.00
Off-season tourism	$0.89
Acres managed for fire supression	$1.61
Annual cost	-

3.4.2. Attitudes towards landscape features

We were interested in understanding how choices varied based on attitudes toward each of the four study features. To test this, we developed an environmental attitudes scale to measure attitudes toward regional moose populations, fire management, off-season tourism, and the Alaska Permanent Fund (Dupéy & Smith, 2018; Loomis et al., 2001; Nielsen-Pincus et al., 2017). Findings showed that

attitudes toward moose were the strongest ($M = 4.16$; $SD = 0.61$), followed by attitudes toward fire management ($M = 3.65$; $SD = 0.87$), attitudes toward the Alaska Permanent Fund ($M = 3.47$; $SD = 0.98$; and attitudes toward off-season tourism ($M = 3.10$; $SD = 0.98$) (see Table 7). To test the moderating effects of environmental attitudes on the relationship between attributes and preferences, each type of environmental attitudes was split at the median value to create four dichotomous variables. We then estimated a random parameters logistic regression model that accounted for the main effects of the four study features and interaction effects of attitudes toward each feature on respondents' choices. Findings indicated that respondents' preferences for future conditions were significantly influenced by attitudes toward each study feature (see Table 8). After converting raw coefficients into probabilities, we found that respondents with strong attitudes toward moose and fire management expressed a higher probability of choosing a scenario with changing conditions over the status quo with increasing levels of these attributes, while those with weak attitudes toward each of these attributes were relatively unaffected by changes in the levels of moose populations and acres managed for fire suppression (see Figure 19). In contrast, respondents with strong attitudes toward the cost attribute represented by the Alaska Permanent Fund Dividend, were relatively unaffected by changes in cost, while those with weak attitudes were less likely to choose a scenario with increasing costs over the status quo. Finally, those with strong attitudes toward off-season tourism were more likely to choose a scenario over the status quo that had increasing levels of this attribute, while those with weak attitudes were less likely to choose scenarios with increasing levels of off-season tourism over the status quo. Overall, our model accounted for a moderate degree of variation among respondents' choices as indicted by a McFadden's pseudo R2 of 22% (Hensher and Jonnson, 1981). We also observed significant standard deviations of the random parameters in our model, indicating heterogeneity in preferences across each feature.

Table 7. Attitudes toward landscape characteristics mean values, standard deviations, and factor loadings.

Variables	λ	M (SD)
Attitudes toward moose (α=0.55)	-	4.16 (0.61)
I like knowing that there are healthy populations of moose	0.663	4.53 (0.64)
It is important that others in my community see moose	0.581	3.82 (0.91)
The opportunity to hunt moose is an important part of living in my community	0.487	4.12 (0.95)
Attitudes toward fire management (α=0.75)	-	3.65 (0.87)
Fire protection provided by public land management agencies reduces the chance of high-intensity wildfires	0.658	3.83 (1.02)
Increasing numbers of forest fires pose as a serious threat to my way of life	0.719	3.74 (1.08)
The number of forested acres managed for fire protection should be increased	0.802	3.38 (1.05)
Attitudes toward off-season tourism (α=0.84)	-	3.10 (0.98)
Off-season tourism (October-April) supports economic well-being	0.81	3.57 (1.02)
Increases in off-season tourism are extremely beneficial for my community	0.913	3.27 (1.13)
My personal quality of life would increase with more off-season tourism	0.705	2.48 (1.21)
Attitudes toward Alaska Permanent Fund dividend (α=0.71)	-	3.47 (0.98)
Dividends from the Alaska Permanent Fund benefit all generations of Alaskans	0.534	4.09 (0.94)

| | | 0.931 | 3.56 (1.19) |

Reductions in the amount of money per dividend would negatively impact local communities — 0.931 — 3.56 (1.19)

I support the reduction of my dividend from the Alaska Permanent Fund to benefit the environment — 0.615 — 2.77 (1.49)

All items were measured on a Likert scale where 1 = "Strongly disagree" and 5 = "Strongly agree"

α = Cronbach's alpha; λ = Factor loading score

Table 8. Mean and distribution of five random parameters from the random parameters logit model, including coefficients, interaction terms, standard deviations, and standard errors (SE).

Variables	**Interactions with environmental attitudes**	
	Coeff. (SE)	SD (SE)
Moose population	- 0.034** (0.015)	0.053*** (0.006)
Acres managed for fire suppression	-0.084*** (0.014)	0.042*** (0.006)
Off-season tourism	-0.129*** (0.014)	0.044*** (0.004)
Annual cost	-0.017*** (0.005)	0.008** (0.004)
Constant	-0.793*** (0.181)	1.809*** (0.187)
Attitudes toward moose * Moose population	0.035*** (0.009)	-
Attitudes toward fire management * Acres managed for fire suppression	0.071*** (0.009)	-
Attitudes toward off-season tourism * Off-season tourism	0.075*** (0.008)	-
Attitudes toward cost * Annual cost	-0.017*** (0.003)	-

LL = -1,395.03; AIC = 2,818.1; N = 1,716; McFadden R^2 = 0.22
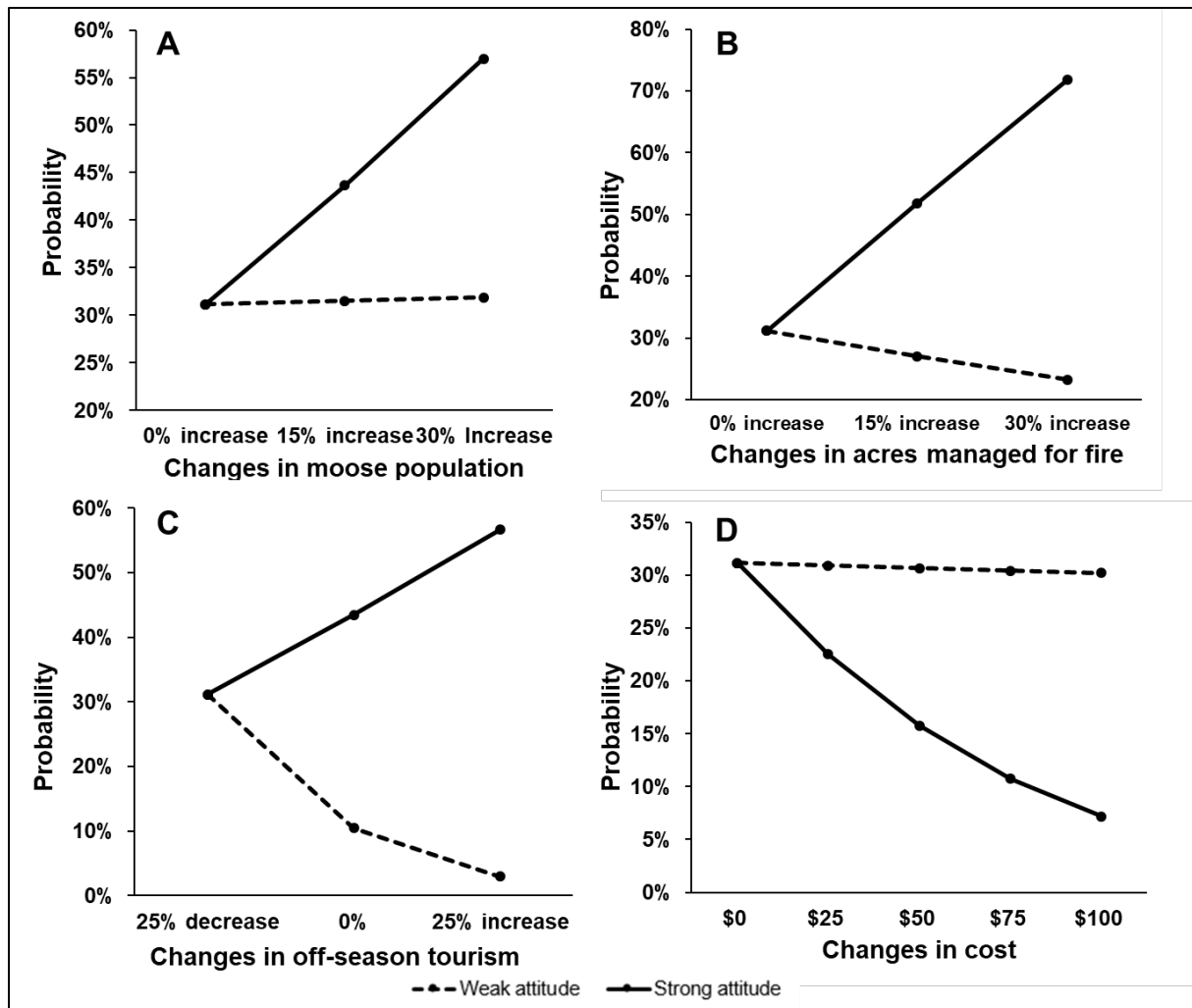
Figure 19. Probability that a respondent would choose an alternative future scenario over no change with changing levels of A) moose population, B) acres of forest managed for fire suppression, C) off-season tourism growth rate, and D) cost across those with strong (i.e., solid line) versus weak (i.e., dotted line) toward each attribute.

3.5. Open-ended responses

3.5.1. Perceived inclusivity

Respondents were asked an open-ended question to identify the tools or mechanisms that could be leveraged for better representation in public land management:

> *We would like to understand how resident's perspectives are reflected in decisions being made about Denali National Park and Preserve. Are your perspectives represented? Also, how can the process for including public opinions in decision-making be improved?*

In response to results from a thematic content analysis, the mechanisms to improve decision-making included increased access to institutions for decision-making, greater transparency in public

engagement, and collecting more information about public opinion (Goodson et al. 2022) (see Table 9). Increased access to institutions for decision-making highlighted:

1. The importance of increasing transparency about opportunities to engage in public land management decision-making (n = 65 responses)
2. The need for more information on plans and decision-making to provide greater transparency in public engagement (n = 59 responses)
3. Increasing access to decision-making processes (n = 58 responses)

Table 9. Potential mechanisms for improving inclusivity in public land management

Mechanisms (No. respondents)	Example quotation
Increased transparency about opportunities to engage	-
More information on plans/decisions (20)	"Very little information comes here re plans/activities/development in the park. Not even the Subsistence Resource Commission (SRC) has been well-included"
More publicity on public comment periods (30)	"Better public notice. Local/regional community councils, NGOS/nonprofits should be kept in the public process. Local public radio and Talkeetna KTNA (public radio)"
Greater transparency (10)	"Commenting opportunities seem adequate. However, it's impossible to determine what, if any weight is given to them in the decision-making process. More transparency here would be any improvement."
Connect residents to park/each other (5)	"The area consists of several independent spheres (Healy, Park Service, McKinley Village, Cantwell) that operate very independently from one another (in part due to weather and distances). We would all benefit from more frequent overlap and intermixing, perhaps through community sponsored events."
More information on public opinions	-
Public ballot and voting opportunities (8)	"It's hard to say. there are competing interests and each interest group fights pretty hard to push its agenda. I think people would be more likely to express opinions if they felt they would be heard. It seems that in many cases folks in charge have their opinions made up already, that's why they signed up to do the job. Maybe this type of "vote by computer" system could at least allow people to express their opinions in a relatively easy way without having to show up in a contentious town hall meeting."
Surveys (15)	"surveys like this are a good idea. I like getting paper copies in the US mail better than electronic mail"
Online comment periods and surveys (21)	"Open house and public comment periods are tough to meet sometimes. easier online tools, mailed surveys."

Mail in survey and comment cards (15)	"Receiving this survey via mail prompted me to pay attention to it as compared to an online survey that would most likely scroll past. Physical surveys, much like a vote, could be successful in gathering data from people that care."
Increased access to decision making processes	-
Online information (12)	"More information shared on local social media form"
More avenues for information and opinion sharing (23)	"a variety of methods to communicate when and where meetings are taking place or decisions are being discussed - email and regular mail and public announcements via radio, print media, online, TV."
Hold discussions (22)	"Publicize comment periods as widely as possible (mail, social media, post flyers etc). Holding local information/comment meetings is very important. Soliciting comments in as many ways as possible (mail, in person, online)."
More access to public officials (1)	"Better access to elected official"

3.5.2. Organizations that influence public land management

An open-ended question was asked to identify key organizations that respondents believed were included in decision-making processes. Specifically, we identified the organizations that influenced resource management decisions and how residents believed their interests were (or were not) reflected in policymaking. Findings showed that organizations within the federal and state government alongside the tourism industry had the greatest influence on decision-making, as compared to local residents (see Table 10). We also consulted regional experts on organizations they found to be influential in the decision-making process that were not mentioned by local residents to leverage multiple forms of knowledge when evaluating perceived versus actual governance (Cebrián-Piqueras et al. 2020). Frequently reported entities included the US National Park Service, US Department of Interior, and Holland America Princess.

Table 10. Entities that influence protected area governance in Denali

Organizations (No. respondents)	Preliminary description of organizations
State: Federal government	-
Department of Interior (24)	A federal executive department of the U.S government that includes multiple agencies charged with protecting the Nation's natural resources and cultural heritage.
US National Park Service (88)	An agency of the federal government that manages national parks. This agency is responsible for protecting natural and cultural resources in perpetuity while providing the enjoyment of experiences to people on public lands.
Bureau of Land Management (2)	An agency of the federal government that manages public lands for multiple uses.
State: Alaska-based government	-
Alaska Board of Game (4)	An appointed body in the state of Alaska responsible for conserving and developing wildlife resources. This organization makes decisions regarding

hunting on state owned lands along the park boundaries that affects management of wildlife within the preserves.

Alaska Department of Fish and Game (9)	An agency in Alaska that protects, maintains, and improves the fish, game, and aquatic plant resources of the state. This organization manages trapping outside of the protected area.
Alaska Department of Natural Resources (4)	An agency that is responsible for developing Alaska's resources for maximum use and benefit to the public.
Alaska Congressional Delegation (3)	The group of officials from Alaska elected to the U.S. Congress
State of Alaska (19)	The largest and most northwestern state of the United States, Alaska became the 49th state of the U.S. on January 3, 1959. The state government is responsible for keeping the state operating and providing public services as well as enacting the laws of the state of Alaska.
Non-state: Civil society actors	-
Citizens Park Advisory Commission (1)	A membership organization that researches and holds hearings on effects of Federal regulations on the state, monitors the consistency of Federal law, and provides recommendations based on public concerns to State and Federal lawmakers.
Denali Borough (5)	The Denali Borough is a governance organization that contains four recognized communities: Anderson, Healy, McKinley Park, and Cantwell.
Denali Citizens Council (5)	A grassroots conservation organization to provide citizens' conservation voices in management of Denali National Park and Preserve.
Environmental groups/NGOs/Animal rights groups (15)	Organizations that seek to protect, analyze or monitor the environment. Groups such as the World Wildlife Fund, Green Peace and the Sierra Club were mentioned.
Hunting organizations (2)	Organizations that focus on sportspeople and game conservation. Examples include the Alaska Professional Hunters Association, the Alaska Hunter Preservation Fund, and Alaska Backcountry Hunters and Anglers
Northern Alaska Environmental Center (2)	An Alaska based conservation organization dedicated to protecting the land, water, and wildlife in interior and arctic Alaska for current and future generations.
Denali Chamber of Commerce (n/a)	An organization that aims to grow and enhance community businesses. It also serves as a source of information for businesses and experiences in the Denali Borough.
Alaska Wilderness League (n/a)	A nonprofit organization that works to protect Alaska's most significant wild lands from oil and gas drilling and from other industrial threats.
Alaska Wildlife Alliance (n/a)	Grassroots organization that aims to protect Alaska's Wildlife through citizen mobilization, advocacy and education.
Alaska Conservation Association (n/a)	Public foundation dedicated to the conservation in Alaska.
Environmental Defense Fund (n/a)	A United States-based nonprofit environmental advocacy group.
Non-state: Native corporations	-
Large Corporations (6)	An organization - usually a group of people or a company - authorized by the state to act as a single entity. Examples in the Denali region include cruise ship lines and commercial guiding services.
Non-state: Tourism companies	-
Doyon, Limited (4)	One of the Alaska Native regional corporations for Interior Alaska and it is not only one of the largest private landholders in Alaska, but in North America as a whole. With their headquarters in Fairbanks, Doyon is a for-profit

	organization led by a board of 13 directors. Their goal is to promote economic and social well-being of their shareholders today and in the future.
Holland America Princess (11)	Holland America Princess land operations and customer service operates hotels, rail services, motor coach transportation, shore services and tour operations in Alaska and the Yukon.
Aramark Corporation (15)	American food service, facilities, and uniform services, provider to clients in areas including education, healthcare, business, prisons and leisure.
State economic interests (9)	Economic interests refer to a substantial financial interest in investments, employment, awarding of contracts, purchases, leases, sales or similar matters within the state of Alaska. They lie greatly in nature based, cruise and state tourism in Alaska.
Transportation Canada (n/a)	Federal program responsible for transportation policies and programs in Canada.

3.5.3. Open-ended responses about the study

At the end of the survey questionnaire, respondents were asked to provide any additional information they felt was necessary. Comments were shared by 165 respondents, but 67 comments were excluded from thematic analysis (e.g., "Glad this is taking place!", "Good luck in your results!" "Yes, I want a copy.") given lack of substance in the comment. A total of 65 respondents requested the results from the survey, with quotes provided for illustrative purposes (rather than being exhaustive).

- Most respondents had a negative attitude towards the non-local tourism industry (n = 14).
  - "I am opposed to more cruise ship/mega tourism/large corporately owned type travel in the off season. I am in support of more independent travelers to locally owned businesses."
  - "I've lived in tourist areas all my adult life and have seen how tourists change life for the locals. (Near England, Colorado, Montana, and Wyoming.) Traffic, crime, prices are more than local's wages. This is the "last frontier," and I'd hate to see it turn into a place that is 'turned to death.'"
  - "You'll probably find, out here in the rural communities of Alaska, we don't really care too much about tourism - especially off-season. Off-season tourists clog the roads in the winter and attribute to fatal car wrecks which we end up paying for anyway. We care about our land being clean, water being un-polluted and our animals thriving."
  - "Off-season tourism can help the economy but does impact the quality of life for residents not directly associate with it."
- Comments expressing environmental awareness were frequent (n = 13).
  - "I am very concerned about what my grandchildren will face environmentally. I am disgusted that our current national government ignore the climate crisis."
  - "Denali is a national treasure and should be treated as such. Limiting daily access with buses has been an excellent way to regulate traffic. It is my hope and prayer that we can look beyond individual wants and consider the future generations."

- - "What happens to the lands, waters, and animals happens to us, vice versa. In order to have a livable future, we need to shift our economies, interactions, and ways of living that support a just transition"
- Some respondents expressed their issues with poor fire and general park management in Denali (n = 9).
  - "I am pro-fire management if it is necessary to protect human infrastructure, but only if it does in the right way to promote healthy forests and not with unnecessary fire suppression."
  - "The park buys road gravel from outside the park then has it trucked in and dumped. Then the Park picks up the gravel, trucks it further into the park and sometimes moved two more times. The Park has millions of yards of gravel, out of sight tourist, that could be processed for use. This would save the park XX$'s but that's not the way they do business. Cost is no object."
- Frustration with extractive industries within Alaska was expressed frequently. While this can be joined with environmental awareness, these comments specifically mentioned extractive resource management (n = 8).

  - "We need the elimination of more mines and oil wells (and roads) in our wilderness. We can get by without destroying our land."

  - "Alaska should raise taxes on big oil + mining. Use the money to build the best university engineering programs in the USA. Developing renewables and building infrastructure for generations verse patching the hole again and again. Building standards that raise the bar. Minnesota is leaps and bounds ahead, example solar panel implementation, insulated studs, geothermal heating."

- Some respondents felt that there was too much emphasis on moose in the survey and in environmental management (n = 6).
  - "One reflection on the questions is why all the focus on moose? They are highly managed by the State and the use of predator control to increase their numbers is a detriment to the environment and morally repulsive. The numbers of moose is an odd suggestion as a relationship to our environment. I recognize the importance of moose for subsistence but in the community where I live (and most places) subsistence is an artificial, outdated frontier mentality that is overused to justify intensive management."
  - "I'm not sure why only moose populations are addressed? I assume it relates to subsistence and hunting? One BIG PROBLEM with "increase moose populations" I sit is often at the expense of wolf and or bear populations! Wolf and bear populations increase is JUST AS (underlined) important for a truly healthy ecosystem/environment"
- Some respondents suggested the negative tourism attitude is shifting due to COVID-19 impacts (n = 4).

- "What an interesting time you have chosen for your research. Before the pandemic crippled the tourism industry in Alaska. You would find that most local employees resented the presence of tourists and the negative impacts their visits had on the environment. Now that many of these people are unemployed, their attitudes have shifted."

    - "The main things people care about here is tourism especially w/ covid hitting small inns and B&Bs like it did."

- There is disagreement among some respondents on the representation of the Alaskan Permanent Fund in the survey (n = 4).

    - "The Permanent Fund is for the people of Alaska NOT for use in managing parks or the environment. Leave the Permanent fund alone. Get money from big corporations for the environment, their greed is a major factor in what's happening in the world and I include tourism along with corporate America."

3.5.4. Responses that may explain non-response bias in the survey process

We analyzed the open-ended responses to identify potential sources of non-response bias given the risks of misrepresenting residents in this research, particularly given the rural context (Coon et al. 2020). Comments were color-coded into preliminary thematic areas with some duplicated when overlap occurred. Data consolidation and analysis continued with multiple passes to identify the main themes. A total of 61 respondents mentioned hesitation and/or dislike of the survey.

- Some questions were not understood, particularly the assessment of future management scenarios section was the most common source of confusion among respondents (n = 18).

    - "The scenario section was difficult for me because I care more about the HOW than the specific outcome."

- Some respondents felt the survey content was irrelevant or biased (n = 17).

    - "This study appears to be placing strong emphasis on mgmt of Denali N.P. Not that it's mgmt isn't important, just that it is of lesser importance directly, both economically and environmentally, to the bush areas 100's of miles away."

    - "This survey doesn't consider that a large portion of this community (Cantwell to Healy) has a significant population of seasonal workers/seasonal community members, many of whom return every year, own property + participate in the community/economy/etc."

- Distrust of non-Alaskans involved with Alaskan environmental affairs and of the survey process was expressed (n = 14).

- ○ "I don't think folks in Illinois should be making decisions on what happens with public lands or policies up here in Alaska, just as I don't think I would have any business doing anything similar with public lands or policies in Illinois."

- ○ "I am returning these surveys unanswered. As an Alaska Native, I am tired of the constant studies - My people and culture is dying so you can say we should have done something."

- Respondents felt the questions had limited answer choices (n = 5).

  - ○ "Leave questions more open-ended; questions, especially survey questions shouldn't have right or wrong answers. Also, I always learned that comments were the most insightful/helpful part of any survey"

- Some respondents expressed anti-environmentalist views (n = 5).

  - ○ "Government along with well paid sell out scientists are selling a lie to the American people who are not told the whole story. Rather we should learn to adjust to climate change as we have always done in the past and thrive in the environment by using technology to adapt. Besides do you expect Alaskans not to want a little global warming?"

- Accessibility issues may have been a cause for low response rates (n = 5).
  - ○ "You would probably get more responses if this was sent out in the winter."
  - ○ "I have low vision and filling out a form like this is very difficult. It would have been much easier if available online."

Chapter 4. Evaluate social learning about inclusive conservation through deliberation

4.1. Research purpose and methods

We recruited participants for the Denali Discussion Forum during the mail-back survey of residents in the Denali region. At the end of the survey, residents were able to indicate if they were interested in an online learning program. From this offer, 96 residents expressed interest and provided their contact information, 37 of whom participated. We organized residents into three subgroups that were defined by individual values. Three groups were defined based on the results of the initial household survey. The value subgroups were defined by those who held stronger versus weaker Altruistic and Biospheric values, or what we refer to as "self-transcendence" values that extended beyond care for oneself. Group A was held stronger self-transcendence values, Group B held weaker self-transcendence values and Group C was a mixture of both (Andrade et al. 2023).

In December 2020, we held three online focus groups as "meet and greet" opportunities for residents to get to know the research team and other participants. We created a password protected website to host the four-week discussion forum. Participants were able to select their own username and profile picture to remain anonymous if desired. The Denali Discussion Forum was then administered January-February 2021. Each week, the participants were provided a prompt which related to public land management and asked to respond to the prompt as well as other people's comments. Our research team then summarized the conversations across the three groups at the end of each week and provided summary documents to the participants, who had the opportunity to provide feedback on our interpretation of the discussion. We qualitatively coded the major themes from each week that emerged from the 460 comments posted by residents. During this four-week experiment, two residents dropped out, which resulted in 35 residents completing all four weeks of the Denali Discussion Forum. These 35 residents received $100 for participating. After the forum concluded, participants were asked to retake the mail-back survey to measure any changes that may have resulted from their participation. A wrap-up webinar was held to disseminate our research results in April 2021.

4.2. Evaluation of the Denali landscape

4.2.1. Benefits and threats in the Denali region

In Week 1, we asked residents to discuss the benefits and threats associated with the Denali landscape (see Figure 20). A total of 15 interconnected benefits were shared in Week 1 (see Figure 21). When residents discussed the benefits of the Denali region, the importance of wilderness experiences that were unique to the region quickly became a focal point of conversation. As conversations continued, residents began to discuss the value of the Denali landscape outside of its delivery of resources. Exchanges around a responsibility to "honor" and "preserve" the landscape seemed to resonate with many respondents. This commitment to the land also appears to be a key tenet of "an Alaskan way of life" which was described in the forum. Residents expressed the enjoyment they derived from "living with less" in an environment that is not "conventionally convenient…both socially and environmentally". An Alaskan way of life was also frequently

associated with unique recreational freedoms and close-knit relationships. While Alaska provided solitude for some, a strong sense of community was shared among many residents. For example, one resident posted, "Our neighbors are more physically spread out than in many places, but the community is the most helpful and supportive I've ever encountered." However, others challenged the notion of a tight knit community due to factors such as the inequitable distribution of wealth and the marginalization of some groups.
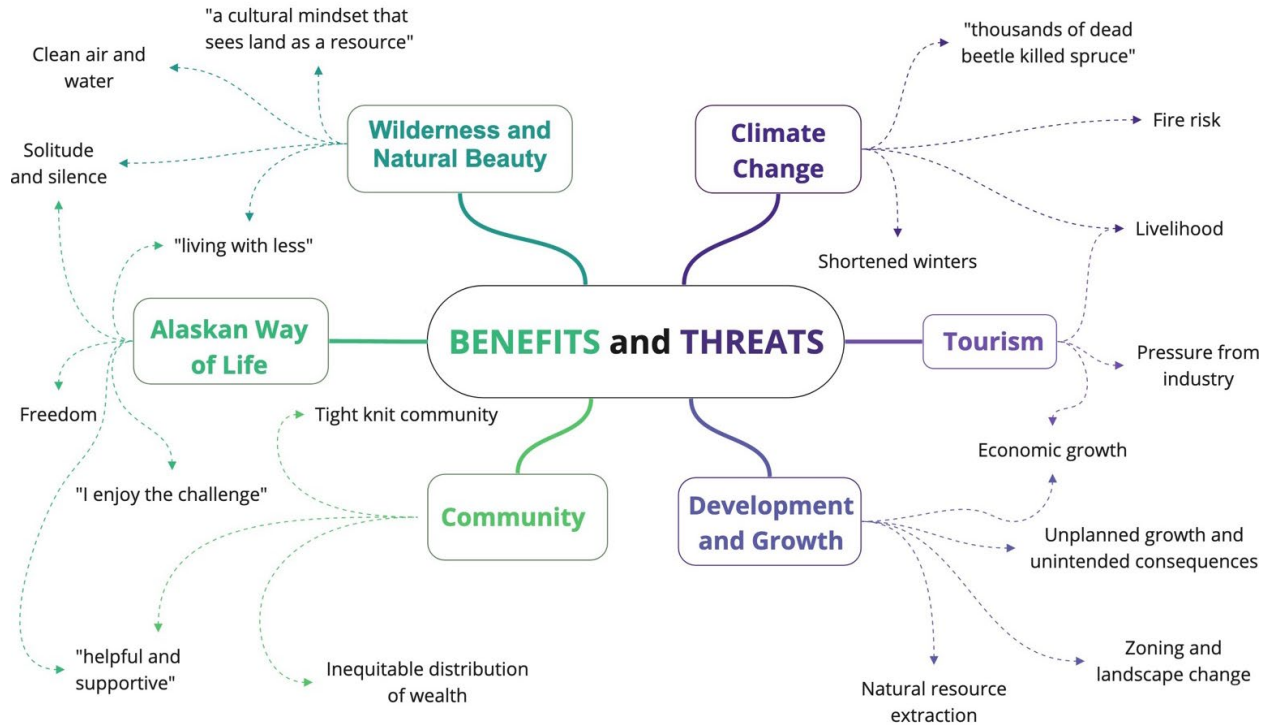
Figure 20. Summary of benefits and threats discussed during Week 1 of the Denali Discussion Forum
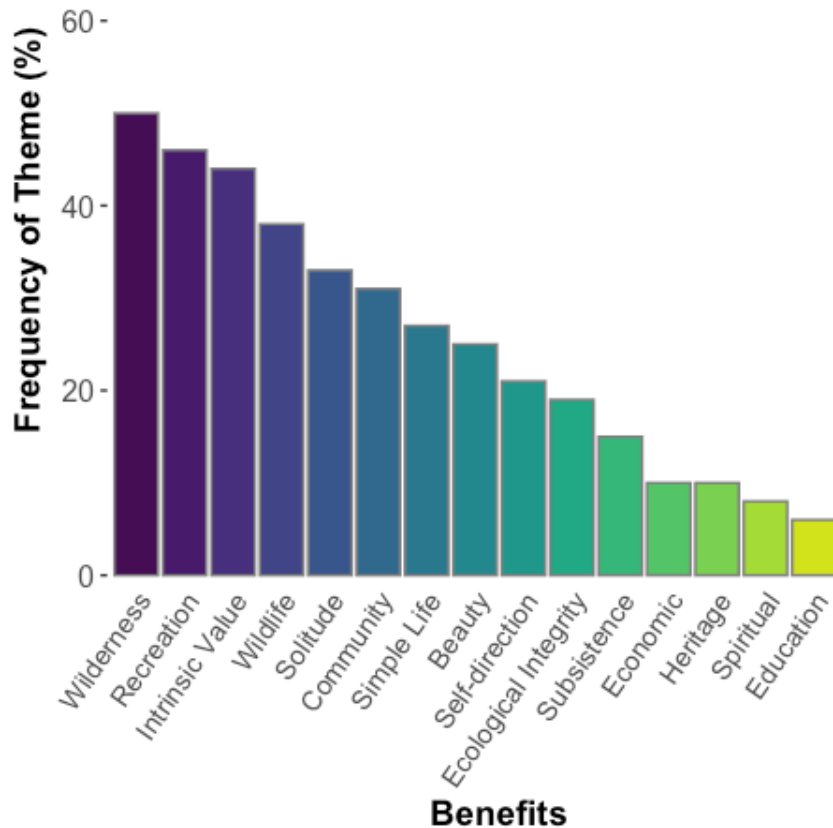
Figure 21. Summary of the multiple benefits identified during Week 1 of the Denali Discussion Forum

In addition to discussing benefits, many residents were intimately familiar with the different landscape conditions in the Denali region and the ways in which they are negatively changing. While many topics pertaining to warming temperatures were discussed, residents largely commented on the "thousands and thousands of beetle-killed spruces" and the resulting fire hazard. Negative changes to a valued landscape were also discussed regarding development and growth of the region. Topics such as zoning, pipelines, dams, powerplants, housing, trails, and storefronts were discussed. Overall, there was a strong interest in re-thinking growth and a recognition that this would be challenging, with one resident noting that, "Zoning, practically a swear word here in Alaska it often seems." Ambivalence towards tourism was the final key topic explored by residents during Week 1. On one hand, some residents explained how their livelihoods depended on tourism and that there is a net gain from economic growth. On the other hand, various residents pointed out how tourism organizations are often able to benefit at the expense of residents.

4.2.2. Management of the Denali region
In Week 2 we asked residents to build on their discussions from Week 1 to identify management practices that best support the benefits they associate with the Denali region landscape (see Figure 22). Residents overwhelmingly expressed their support for management practices related to environmental preservation. However, a range of issues complicated environmental preservation, including trail development and use, drones, motorized vehicles, and hunting/trapping. Community-

led planning was also widely discussed and supported throughout the forum with one resident stating, "…community-led planning isn't some big-government bogeyman, it's a way to show that we care about each other and our home." Alternatively, we also asked residents how management practices should change in order to reduce the threats facing the Denali landscape. Due to concerns about the future development of the region, resident discussed practices that regulate human development. Many residents stated a general unease or dislike for formal regulations, but also acknowledged practices such as zoning that may be a necessary response.
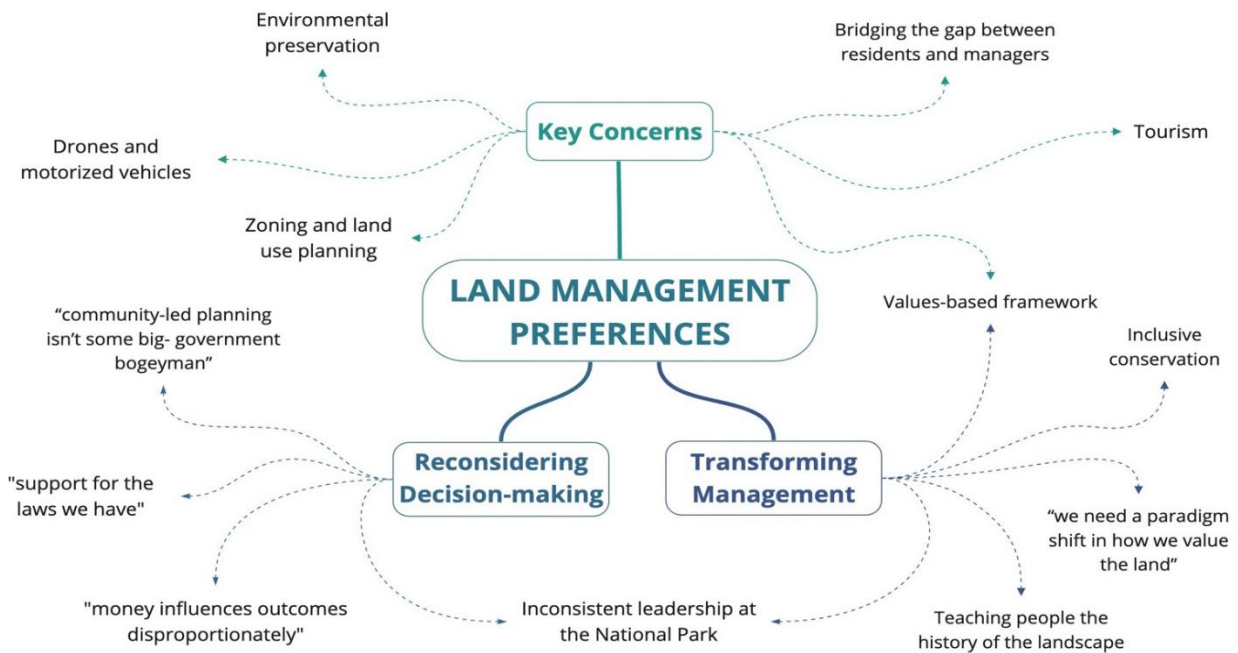

Figure 22. Summary of land management preferences discussed during Week 2 of the Denali Discussion Forum

Denali residents also discussed how to transform land management and the decision-making process. The role of education in teaching people about the landscape and its history was considered as a way to create long-term change in the region. Another recommendation was to manage the land from a values-based framework to better align the decision-making process with community values. Still others maintained that "we need a paradigm shift in how we value the land," because current values stemmed from instrumental worth of the land and not intrinsic value. Frustration around a variety of topics also drove future management considerations. Resident's felt that "money influence[d] outcomes disproportionately," and the "ever-changing leadership at the National Park" served as a barrier for effective management. Through meaningful public engagement, consistent leadership, and more support for the laws currently in place, residents felt that management could be significantly improved.

4.2.3. Guiding values in Denali communities and land management

In Week 3, we asked residents to consider the values that guide their life and how these values influenced their views of public land management (see Figure 23). Similar to previous discussions, residents identified their commitment to the land as an important guiding value. Many residents felt that Alaska's landscape and ecosystems deserved their continual consideration. Furthermore, residents expressed a commitment to their community through values related to being a good neighbor and a moral citizen. These conversations involved consideration of equality, justice, representation, and compassion. In addition to wanting to give back to Alaska and local communities, many residents expressed interests in personal fulfillment and well-being. Moreover, while many similarities emerged, residents acknowledged that everyone in the Denali region does not hold the same values. Values were described as being dramatically different between communities.
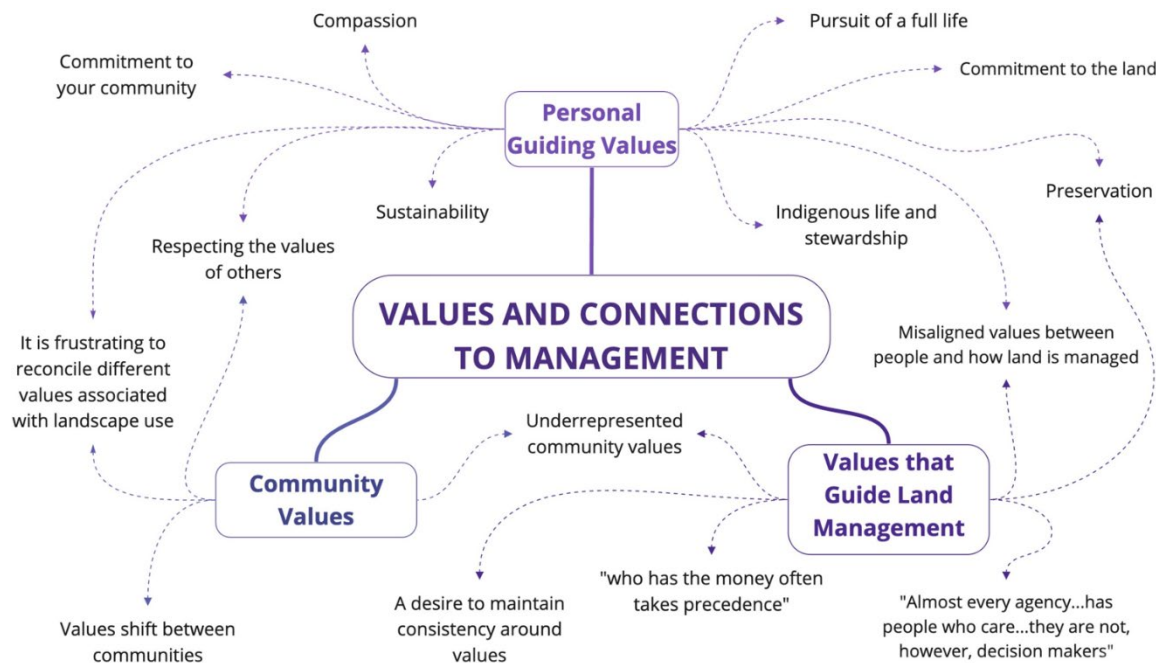
Figure 23. Summary of the values discussed during Week 3 of the Denali Discussion Forum

We also asked residents in Week 3 to comment on the values that guide land management decisions. Some agreed that managers shared their values for environmental preservation, whereas others believed their values were not reflected by people making decisions about the region. Regardless of residents' positions, an overarching concern was that resident and manager values were misaligned due to a range of factors, including inconsistencies in leadership. For example, some residents expressed concern about high turn-over rates of staff, which can sever pre-existing relationships and disregard the knowledge of community interests that may have been acquired by previous park employees. Relatedly, the structure of resource management agencies was critiqued. One resident exclaimed, "The thing about NPS that frustrates me is that the decisions made stem from the current Superintendent, whoever that is at the time. The Park is subject to the "whim" of whomever gets the

job as Superintendent. Then everyone else has to scramble to work with that person's vision/legacy/development plan."

Value misalignment was also attributed to economic influences and pressures to develop natural resources. Specifically, one resident recounted that, "NPS in particular pays lip service to respecting the ecosystem, but doesn't always act accordingly. Denali administration in particular seems to be far too influenced by the big tour operators and economic concerns." These sentiments were echoed by another resident that stated, "the current direction of NPS (e.g., expanding bus services, encouraging use in Kantishna) is both going to encourage degradation of the resource and disruption of wildlife, without necessarily increasing that engagement or connection to the land." Others noted that development and growth were key drivers of management but not resident decisions: "Again, public land management can have a big impact here. Does NPS or state or borough invest in more development, access points, infrastructure, etc. or in education to promote tourism or use that doesn't require extensive infrastructure?" Additionally, a resident lamented, "Unfortunately though, there has been a lot of change recently in upper management and I am afraid that the bottom line has become more important than preservation of the resources." The incongruity of resident and land management values was, thus, contested.

4.3. Assessment of learning that occurred throughout the Denali Discussion Forum

Denali residents were asked to reflect on their learning experiences at the end of the three-week discussion regarding values for protected area management. The primary purpose for the final prompt was to gauge social learning amongst participants, as well as test the association between learning with any value changes. For the purposes of our research project, we defined social learning as the change in multiple types of understanding that occurs through interactions between actors in a social network—such as the deliberation of conflicting values and trade-offs—which become situated within broader communities of practice (Reed et al. 2010). Social learning has been framed as an idea that relates to changes in *cognitive*, *normative*, and *relational* understandings. Cognitive learning encompasses knowledge acquisition and synthesis about facts and/or experiences. Normative learning is associated with expectations about the way things should be. Relational learning occurs through trust-building, gaining a broader understanding of other's perspectives, and identifying points of (dis)agreement across various issues. The Week 4 prompt was structured to capture these cognitive, normative, and relational types of learning. Participants were asked:

> *What – if anything – have you gained a better understanding of through the Denali Discussion Forum? How did other people play a role in your learning process and what do you hope they learned in turn? How did your expectations for public land management change after engaging in the discussions?*

Responses from the Week 4 prompt were analyzed using a qualitative content analysis to identify how learning occurred in the forum. Specifically, we coded participant responses into three types to measure the cognitive, relational, and normative aspects of learning (see Table 11).

Table 11. Types of social learning measured as part of the Denali Discussion Forum

Learning Type	Definition
Cognitive Learning	Knowledge, beliefs, and perceptions of facts or experiences
Normative Learning	The way things should be, norms, expectations for management and decision-making
Relational Learning	Understanding of others, shared positions, trust, exclusion, dis/agreement

4.4. Learning types identified in the Denali Discussion Forum

Relational learning was the highest cited type of learning in participant responses, followed by normative and cognitive learning (see Figure 24). A small portion of participants in each of the discussion groups indicated they did not learn anything new.
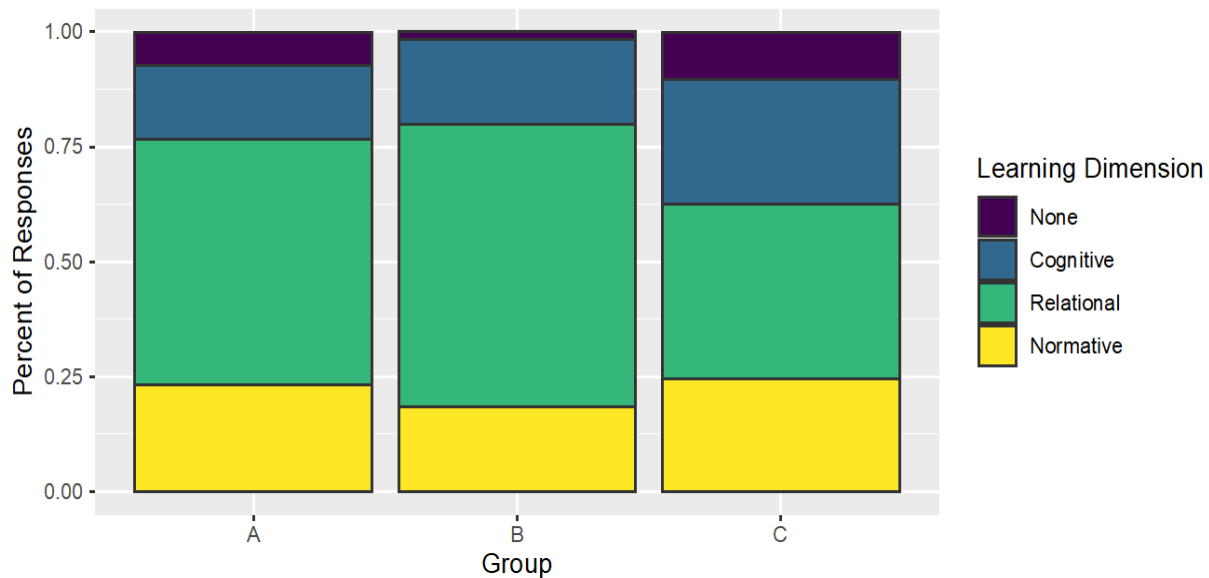
Figure 24. Participant learning (as percent of responses per group) in the Denali Discussion forum across social learning types (cognitive, relational, and normative) for the three discussion value groups (A, B, C)

We used an Analysis of Variance (ANOVA) to test for differences in learning types between groups. We did not find a statistical difference between learning types across the three groups (Cognitive: $F = 1.09$, $P = 0.08$; Normative: $F = 1.57$, $P = 0.224$; $P = 0.35$; Relational: $F = 2.67$), confirming the relative importance of each of the learning types within our study. Cognitive learning, which encompasses knowledge and awareness of facts or experiences, was the least common learning type mentioned in Week 4 responses. Residents who did indicate that their knowledge increased mentioned planning and regulations undertaken by neighboring communities, trail designation, as well as the processes and scope of public land management in the region. Responses regarding normative learning had a great deal of variation between individuals, largely depending on previous

experiences engaging in civic processes related to public land management. For these experienced individuals, the discussion fortified perspectives that changing the public land management framework was slow, worthwhile goal. In contrast, participants who had not been as engaged in land management efforts previously pointed out the development of expectations on how management may improve. Almost 90% if the residents mentioned relational learning as a result of participating in the discussion forum, which created a shared sense of purpose:

> *"Hearing about shared values for the area in which we choose to live was empowering, creating shared experiences and goals. I feel more connected to my greater Denali region because I heard voices from Nenana to Talkeetna instead of just my little neighborhood around mile 230 and the Park entrance."*

After responding to the Week 4 prompt, participants were asked to retake the household survey to measure value shifts that may have resulted from learning in the discussion forum. Learning was assessed using a mixed methods approach, which included a quantitative variable derived from content analysis of social learning types in addition to a learning scale on the discussion post-survey to measure individual learning versus learning situated within a broader societal context (see Table 12).

Table 12. Survey scale used to measure individual and situated learning

Survey Items	M	SD
Individual learning: learning by engagement in forum	-	-
I thought about the Denali Discussion Forum, even when I was not online participating	3.91	0.82
I took the time to review and think about the responses and links shared by others	4.23	0.60
I actively participated in the Denali Discussion Forum	4.03	0.71
I was comfortable volunteering my opinion to my discussion group members	4.14	0.85
Situated learning: Learning situated in and/or applied to broader context	-	-
I talked about the Denali Discussion Forum with friends, family, or other community members	3.71	0.96
I took the time to review and think about the summary documents	3.97	0.75
I compared the topics my group discussed in the Forum with things I have learned elsewhere	4.03	0.66
I would like to participate in public land management with my discussion group members in the future	3.86	0.77

We used changes between responses that occurred between the pre- and post-surveys to measure multi-level value shifts. To do so we calculated the multi-variate distance for each participant between their pre-and post-forum responses in multivariate space using Euclidean distance for social,

self-transcendental, and eudaimonic values. Participants who rated the value items as less important post-forum had lower negative values, whereas participants who rated the value items as more important post-forum had higher positive values. Participants whose responses did not shift between the two surveys anchored the scale at 0 to indicate no change. We used a piecewise SEM to account for discussion group membership and test the relationship between learning and multi-level value shifts. Figure 25 is a graphical representation of the model results, including the learning dimensions (see Section 4.4), situated versus individual learning, and changes in social, self-transcendence, and eudaimonic values (see Section 4.1). We found that learning was positively related to changes in different kinds of values, in that as learning increased, so too did changes in the importance of values as guiding principles in life. Additionally, learning influenced changes in values to different degrees in accordance with the idea of "psychological distance" that indicates values vary in the likelihood that they will change over the course of a person's life. The most stable value (i.e., eudaimonia) is unlikely to change from new information whereas the least stable value (i.e., social values) can be more easily altered by management interventions such as educational outreach and first-hand experiences interacting with an environment. We found that eudaimonic values changed the least, followed by self-transcendence values, and finally social values, as predicted. The key results that emerged from this analysis are summarized as follows:

- Learning types positively influenced both situated and individual learning

- Situated and individual learning positively predicted shifts in multi-level values

- Three value levels changed to different degrees in accordance with psychological distance

- Value shifts were subtle, but varied along with both situated and individual learning

    o Participants who situated learning within broader context were more likely to rate self-transcendent values as more important and self-enhancement values as less important post-survey

    o Participants who learned through active engagement in the forum (individual learning) were more likely to rate social values assigned to landscape, as well as eudaimonic values as more important post-survey

- Learning explained the greatest degree of shift in social values, followed by self-transcendent and eudaimonic values
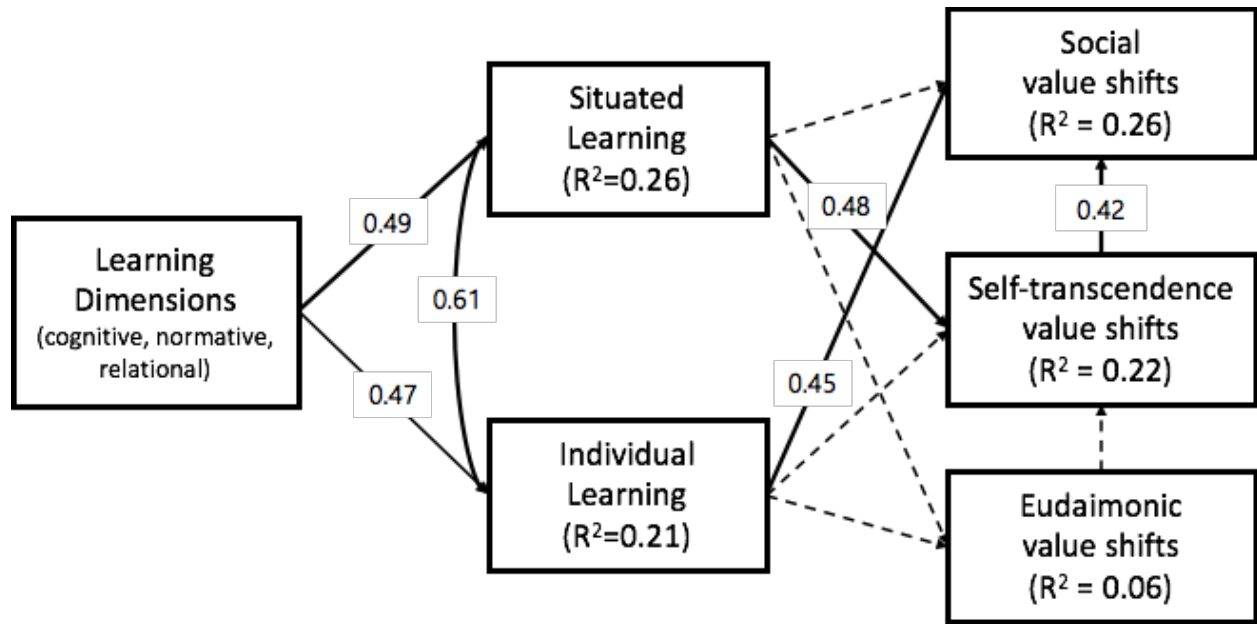
Figure 25. Piecewise structure equal model of the relationship between social learning and multi-level values. Black arrows show significant effects and dashed arrows were non-significant. Each variable is included in a box and standardized regression coefficients are placed on the paths between boxes.

Chapter 5. Conclusions and management considerations

This research supported the idea of 'inclusive conservation' whereby community members in the region surrounding Denali National Park and Preserve and Denali State Park were provided with a platform to deliberate and voice their opinions about multiple, changing values of protected areas in the Denali Region of Alaska. In this way, our study was process-based, but also focused on generating scientific results to inform discussions among residents and resource management agencies about the future. We facilitated the development of partnerships across diverse sectors in the local community to help facilitate a conversation about competing preferences for growth (see Section 5.1.1). Throughout the project, we ground-truthed our findings through member checks with participants who opted into our research, engagement with an Executive Committee and discussions with agencies and research partners.

We pursued three phases of research to: 1) characterize the meanings of places and how they are changing in the region; 2) understand the experiences, perspectives, and preferences of residents; and 3) evaluate social learning about inclusive conservation through deliberation. The implications below are organized in terms of these three phases of research.

5.1. Characterize the meanings of places and how they are changing.

- According to results from the initial in-depth phase of this research, tourism was a central feature within the Denali region and one of the most important reasons why residents developed connections to places. However, there were two distinct roles of tourism, with some residents recognizing and valuing the economic and developmental boons on their communities, while others were sensitive to perceived disruptions to their local identities and lifestyles stimulated by growth within the tourism industry. Most participants recognized that both views were simultaneously expressed by community members.

  o Following the COVID-19 pandemic and resultant decreases in tourism, many residents would welcome visitation returning to pre-pandemic levels. Tolerance of tourism and development is also likely to increase if associated operations undertake visible efforts to "give back" and re-invest in the community.

  o **Management consideration:** Off-season tourism threatens place meanings and is inconsistent with social values due to perceptions of it being an extension of summer. Resource management agencies might consider building strategies for off-season tourism that are pro-active and "give back" to local communities.

- Residents of the Denali region shared a strong sense of community and social cohesion rooted in the remote setting, shared appreciation for local places, and common interests in maintaining communal character.

  o Residents are likely to appreciate a slower and deliberative approach to discussions about broad topics such as large-scale development and climate change.

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- o **Management consideration:** Involvement of federal employees in the local community, especially outside of working hours, is received well. Ways to further integrate park staff into the surrounding communities might be considered.

- Residents of the Denali region agreed that subsistence practices - as defined by the federal government as representing both native and non-native hunting, fishing, and gathering practices - play a central role in regional identity and lifestyle. Outside of this context of subsistence use, questions regarding "who should qualify as a federally defined subsistence user?" and "what is subsistence use?" surfaced across the region, particularly in the Village of Cantwell, and were a source of social tension.

  - o Subsistence use is a multi-faceted and contentious facet of local culture and tradition involving both Alaskan Natives and Alaskan settlers in the Denali region.

  - o **Management consideration:** As a way to recognize the full set of contexts for subsistence use, agencies might explore possibilities to engage the social and cultural contexts of subsistence practices to soften what seems like a growing source of tension that affects people who have a stake in subsistence activities and the federal government.

- The vast and largely intact wildlands of the Denali region were universally valued among different community members. While the underlying reasons for appreciating their local wild spaces varied (e.g., recreation activities, resource use, charismatic wildlife, intrinsic values of nature), residents were nearly unanimous in positioning the wilderness and wildlife as what made the Denali region a special place.

  - o Community members shared interests in keeping Alaska's natural environment intact. As one small part of agency activities, messaging could continue to focus on "keeping Alaska wild."

  - o Sustaining wildlife habitat and ecological integrity would align with the expressed priorities of residents. Moose and other "Big 5" were important, alongside less charismatic species.

- Findings from the fuzzy cognitive mapping study reinforced that the region was predominantly characterized by tourism, sense of community, subsistence, and wilderness.

  - o Climate change and large-scale development (i.e., increases in commercial and industrial developments) were primary drivers of change. Given that both forces occur at a scale that is unlikely to be affected by individuals, there is a risk that residents may feel helpless and consequently disengage in behavior that benefits the environment and human wellbeing. Both drivers of change warrant attention because of the uncertainty from how residents will react to novel ecosystems and (re)form parts of their identities.

- The distinct sense of community in the region was particularly vulnerable to large-scale development, especially among individuals who rely on neighbors to maintain robust social bonds and cohesion.

5.2. Understand the experiences, perspectives, and preferences of residents

- Descriptive information about Denali residents

  - Drawing from findings of a mixed mode survey of 3,000 residents living in the Denali Region, we learned that respondents (N = 332) had been living in Alaska for an average of 27 years and frequently visited Denali National Park and Preserve and other public lands in Alaska.

  - Respondents learned about public land management through a variety of information sources, the most common of which were friends and family, public agencies, and environmental groups. The least common sources were scholarly articles, professional societies, and webinars.

  - Approximately half of residents considered themselves to be subsistence users and indicated that subsistence use was very or extremely important.

  - The sample of residents who participated in this study were mostly White, highly educated, and equally split between males and females who were approximately 50 years old.

- Drivers of pro-environmental behavior

  - Engagement in behaviors that benefitted the environment was evaluated. Respondents "occasionally" to "frequently" took actions that reflected a conservation lifestyle, while participation in behaviors that benefited public and social spheres were "rarely" to "occasionally" performed.

  - Respondents were highly concerned about the environment and expressed broad agreement with questions that assessed their emotions, knowledge, and behaviors, thus indicating care for broader environmental issues.

  - We observed strong feelings of moral obligation to take action that would minimize negative impacts on public lands. Invoking feelings of pride, guilt, and/or worry can induce behavior change.

  - Most respondents believed that climate change is happening and is primarily caused by human activities. This stance should be acknowledged and used to guide communication with residents about climate change problems and solutions.

  - Respondents ascribed myriad social values to the Denali landscape, particularly wildlife, recreation, aesthetics, and rejuvenation.

- o In an assessment of the most deeply held, personal values, we learned that non-human species (e.g., plants and animals), other people, and long-term care for oneself were guiding principles in life.

    - **Management consideration:** Value-based messages that emphasize goals such as environmental protection and unity with nature, alongside the long-term gains that people can receive for 'living a good life' will likely be received well by residents in the Denali region. This framing will be more likely to motivate action, whereas messaging about management that relates to enjoying life, fulfillment, and reducing worries would be less likely to resonate.

- Summary of residents' evaluations of future management scenarios

    - o Residents' preferences for the future were examined to understand tradeoffs in decision-making. In a series of questions, respondents were asked to choose between two scenarios that included varying levels of:

        - Moose population: the total number of moose in the Denali region

        - Off-season tourism growth rate: the growth rate in the number of visitors during the "off-season" tourism months from April through October

        - Acres of forest managed for fire: the total number of acres of forest that are managed for fire suppression.

        - Cost: a mandatory donation from a residents' annual dividend from the Alaska Permanent Fund.

    - o All four of these features significantly influenced respondent preferences for the future. Specifically, the probability of choosing a scenario increased with increasing moose populations, more total acres of forest managed for fire suppression, lower off-season tourism growth rates, and lower donations from the dividend.

    - o In an analysis of cost in relation to the other three features, increasing moose populations was most valuable, followed by increasing the number of forested acres actively managed for fire suppression. Conversely, the growth rate of off-season tourism was not of great value. In fact, respondents were willing to pay for less off-season tourism in the future.

    - o The probability that a respondent would prefer a future that was different than the status quo varied on the basis of attitudes toward those same features. We observed that respondents were attuned to projected impacts through their reported preferences for conditions that aligned with predominant challenges resulting from climate change.

- - **Management consideration:** Residents will most likely be most receptive to management decisions that prioritize sustaining wildlife populations and mitigating forest fires. Efforts to increase off-season tourism may be faced with more resistance.

  - **Management consideration:** Attitudes toward off-season tourism brought to the surface residents' equivocation of future growth of tourism – an industry that they both appreciated benefits yet were concerned about negative impacts. Further investigation of attitudes toward off-season tourism, as well as assessing resident sensitivities of various impacts, could provide useful information for decision-making.

- An analysis of open-ended responses to questions about protected area governance generated useful recommendations for management agencies.

  o Organizations within the federal and state government alongside the tourism industry had the greatest influence on Denali governance, as compared to local residents. The most frequently reported entities were the US National Park Service, US Department of Interior, and Holland America Princess.

  o **Management consideration:** Respondents emphasized the importance of increasing transparency about opportunities for engagement, greater access to decision-making processes, and the need for more information on plans for public input.

5.3. Evaluate social learning about inclusive conservation through deliberation
- Key threats, benefits, and management options were identified

  o A four-week online learning program was administered, whereby three sub-groups of residents (n = 35) defined by their value orientations were engaged in discussions about benefits, threats and management of Alaskan protected areas. A before-and-after assessment was conducted to identify changes that may have come about as a result of participation in the Denali Discussion Forum.

  o Key benefits of the landscape that were identified across subgroups were wilderness and natural beauty, being able to live a unique "Alaskan" way of life, and a sense of community.

  o Key threats facing the Denali region included development and growth, industrial tourism, and climate change.

  o We evaluated management practices that residents believed would best support the benefits they associated with the Denali region. A deep understanding of landscape change was conveyed through the identification of multiple concerns, as well as suggestions from residents for how to reconsider decision-making and transform resource management.

- **Management consideration:** Residents called for a paradigm shift in public land management that would be more inclusive of multiple resident perspectives. That is, residents were concerned about lack of representation in federal land management policies, which differed from the perceived relationships that residents formed with state-based agencies.

- A common discussion point was the perceived mismatch between resident values and the managers in public agencies.

  - Residents were asked to consider the values that guide their life and how these values influenced their views of public land management. They had a complex and sophisticated understanding of their values, emphasized the importance of sharing values with land managers, and acknowledged challenges in the potential exclusion of marginalized voices.

  - Perceptions of value mismatches between public agencies and residents were noted. The primary reasons why residents saw incongruities were because of inconsistencies in leadership, pressures to develop natural resources, and the influence of economic gains that motivated manager but not resident decisions about the region.

  - **Management consideration:** Residents would like land managers to work towards inclusivity in decision making. In addition to public comment periods and other public input sources, work could be done to transparently communicate expectations and processes for input, and in turn, support residents' understanding of how their efforts are affecting change for their community and public land management.

- When asked to reflect on learning that occurred throughout the four-week Denali Discussion Forum, most residents indicated they had grown and developed a more informed perspective about protected area management. They most identified with "relational learning" that encompassed growth around their understanding of others, shared positions, and trust building. "Cognitive learning" about knowledge, beliefs, and perceptions of facts or experiences was less emphasized as an outcome of participating in the forum.

  - Residents expressed interest in participating in similar discussions with public land managers and other community members, which could build trust and shared understandings amongst various groups through relational learning.

- Results from the before-and-after assessment of residents showed that social learning situated through interactions with others resulted in shifts in long-term individual values, whereas learning through reflections from the participant was related to shifts in social values assigned to the Denali Landscape.

  - **Management consideration:** To encourage learning about a protected area landscape, resident engagement in venues (e.g., webinars) where there is a one-way flow of information will create short-term learning opportunities. However, deeper

and long-lasting shifts in how people understand places is more likely to emerge from social learning. This in-depth learning process can be realized from facilitated social interactions over time.

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Appendix A: Survey information sheet for the Inclusive Conservation Executive Committee

Survey Information Sheet for the Inclusive Conservation Executive Committee

Introduction
We will soon be launching the next phase of our Inclusive Conservation research project with communities in the Denali region. This information sheet provides an overview of our current research plans. We welcome any feedback or thoughts from members of our Executive Committee about how we can improve our process.

Why are we conducting this research?
The purpose of our project is to understand multiple viewpoints on the future of public land management in Alaska. Building on two years of in-depth discussions with residents living in the Denali region, we have two populations that we will be sampling in the next phase of the project, and so we refer to them as two different surveys. The survey of residents along the Parks Highway – or the Interior Alaska survey – examines people's experiences and uses of natural resources in Interior Alaska, as well as preferences for the future alternatives of public land management. The second survey draws from a broader population and is directed at representing residents across the state of Alaska. This state-wide survey also examines experiences, uses and perspectives on natural resources and will be a point of comparison. Findings from both surveys will be shared widely in various forms (e.g., reports, presentations, a film), and we hope can be used for planning and management related to the diverse interests of both residents and their associations with public lands.

Who will receive our surveys?
For our Interior Alaska survey, we have purchased contact information for 3,000 residents living in the Interior Alaska from the U.S. Postal Service (Fig. 1). Our questionnaire will be sent to ~95% of residents living between Nenana and Talkeetna that are located on or near the Parks Highway, as well as all residents in Minchumina and a small number (9.7%) of people living in one zip code west of Fairbanks. These addresses include PO boxes and street addresses where mail is received.

For our state-wide survey, we have purchased a sample of approximately 500 residents in the state from a company called Qualtrics. The majority of these residents live in Anchorage, Fairbanks, and Juneau. This sample will be representative of Alaskan demographics on the basis of age and gender according to the 2010 Census.

Figure 1. Zip codes of residents in our Interior Alaska survey who will be asked to participate

What is our survey process?
While our state-wide survey will be administered online only, our Alaska Interior survey will be administered in three waves. First, we will send the questionnaire and an introductory letter to all 3,000 residents in the Interior. We will invite them to complete and return the questionnaire by mail using a postage paid envelope or complete it online using an ID number. That is, we will track who participates in the study to calculate a response rate so the online version can only be completed with an ID number. Next, after approximately one week, all people who did not respond will receive a reminder post-card. Finally, after two weeks, another packet including the questionnaire and final cover letter will be distributed to all non-respondents.

How will we encourage participation?
We will encourage participation for our Alaska Interior survey in several ways. In addition to contacting potential respondents on three occasions, we will draw on "best practices" established in previous research. Our team will be hand addressing envelopes to personalize correspondence, using first class stamps, printing our questionnaire covers and introductory letters in color, signing our cover letters, and use distinctly colored envelopes. We will also be posting flyers, making announcements in the media (e.g., radio, Facebook) and distributing our newsletter when the survey is launched to raise awareness. Members of our Executive Committee will also be asked to encourage participation of people at their places of employment. It is our hope that at least 30% of residents contacted with participate in the study.

What are the next steps?
We are pilot testing our survey with 30 residents who live in a rural zip code west of Fairbanks. The pilot test is being administered online through a company called Qualtrics. Results from our pilot test will be used to make adjustments to formatting and identify any issues with how our questions are worded. Both surveys are projected to launch May 2020. We would welcome any thoughts about the proposed process that we have outlined in this information sheet. Feedback on the questionnaire sent along with this email would also be appreciated and very much welcomed – either email or telephone discussions would work well to receive your feedback. We will look forward to entering and analyzing our data in summer/fall 2020 and sharing results in various formats as they become available over the coming years.
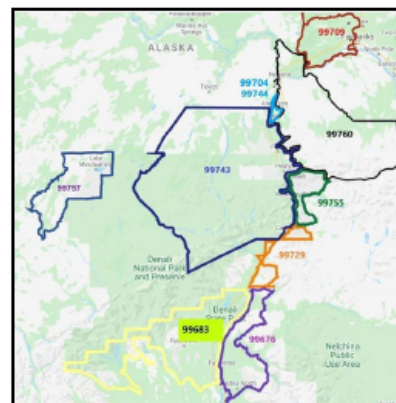
Appendix B: Survey instrument delivered to residents of the Denali region

A Survey of Residents in Alaska:

Understanding your experiences and preferences for public land management

Alaska is a great place to live, yet there are many changes influencing the landscape. To understand how residents like you are responding to these changes, the University of Illinois is partnering with local organizations to learn more about your opinions and experience. You are one of a small number of people chosen for this study, because you live in the region. Your response is important to us. Results from this research will be made publicly available and shared with community leaders and decision-makers. All personal information will be kept confidential and your participation is voluntary.

Please answer each question carefully and save any additional comments for the final page. This questionnaire will take about 20 minutes to complete.

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https://publish.illinois.edu/inclusive-conservation-in-denali/

Section 1 of 5: Your Background and Views of the Landscape

In this section, we ask you to provide information about yourself and your views of public land management.

1. How many <u>years</u> have you been living in Alaska?   _____Years

2. How many <u>times</u> in your life have you visited Denali National Park?   _____Times

3. How many <u>times</u> in your life have you visited public lands in Alaska?   _____Times

4. How many <u>times</u> have you visited public lands in Alaska in the last 12 months?   _____Times

5. Where have you learned about issues related to public land management in the area where you live? (✓all that apply)

❏ Public agencies	❏ Environmental groups	❏ Social media
❏ Government officials	❏ Government websites	❏ Webinars
❏ Scholarly articles	❏ Online newspapers	❏ Public meetings
❏ Professional societies	❏ Hunting/trapping organizations	❏ Friends and family

6. How frequently have you engaged in the following activities over the <u>past 12 months?</u>

	Very Rarely	Rarely	Occasionally	Frequently	Very Frequently
a. Took measures like re-purposing products to reduce my waste	❏	❏	❏	❏	❏
b. Avoided traveling out of town for non-local products	❏	❏	❏	❏	❏
c. Looked up scientific information about the environment	❏	❏	❏	❏	❏
d. Participated in a policy process like a public comment period that affected the environment	❏	❏	❏	❏	❏
e. Donated money with the intention of benefiting the environment	❏	❏	❏	❏	❏
f. Wrote a letter or email about an environmental issue	❏	❏	❏	❏	❏
g. Encouraged other people to attend an event related to the environment	❏	❏	❏	❏	❏
h. Talked to other people about the environment	❏	❏	❏	❏	❏
i. Learned from other people like longtime residents or Elders to solve an environmental problem	❏	❏	❏	❏	❏

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7. We would like to understand the extent to which residents' perspectives are reflected in decisions being made about Denali National Park and Preserve. How could the process for including your opinions in decision-making be improved?

_____
_____
_____
_____
_____

8. We would like to understand why you think the landscape around your home is different from other places. Please use the space below to describe why, if at all, the place where you live is special.

_____
_____
_____
_____
_____
_____

9. There are many ways a place could be considered distinctive. Below we describe some of the ways you might think about the place where you live. To what extent do you agree with <u>each</u> of the following statements about why this place is special?

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
a. **Economic:** A place to earn income for employment	❑	❑	❑	❑	❑
b. **Subsistence:** A place to harvest food or other resources to sustain my life and that of my family	❑	❑	❑	❑	❑
c. **Education:** A place to learn about, teach, or research the environment and people	❑	❑	❑	❑	❑
d. **Recreation:** A place where I can pursue recreation activities	❑	❑	❑	❑	❑
e. **Family:** A place where I can spend time with my family	❑	❑	❑	❑	❑
f. **Rejuvenation:** A place where I can feel better physically and/or mentally	❑	❑	❑	❑	❑
g. **Sense of community:** A place where I have close relationships with other members of my community	❑	❑	❑	❑	❑
h. **Heritage:** A place with history and traditions that are passed down to future generations	❑	❑	❑	❑	❑
i. **Spirituality:** A place that is sacred, religious, or spiritually significant	❑	❑	❑	❑	❑
j. **Aesthetics:** A place that has attractive scenery, sights, sounds, or smells that cannot be experienced anywhere else	❑	❑	❑	❑	❑
k. **Ecological Integrity:** A place that has intact ecosystems with the ability to support and maintain ecological processes	❑	❑	❑	❑	❑
l. **Wildlife:** A place inhabited by wildlife unique to Alaska	❑	❑	❑	❑	❑

Section 2 of 5: Future Management Scenarios

Landscapes in Interior Alaska are rapidly changing in ways that impact local residents. In this section, we ask you questions about possible changes to landscape conditions that may occur <u>over the next 30 years</u> in the area where you live. For each question, please indicate your preferences for the future by choosing between two possible future scenarios or the current condition. Each scenario includes three or five environmental "features" that represent conditions influenced by different management agencies and potential policies. These features are described below.

Please read this material carefully.

Moose Population	The total number of moose in the largest game management unit of Interior Alaska is estimated to be 55,000. These numbers are expected to increase due to fires that create open spaces, providing ideal moose habitat. This feature is set at three levels that may occur <u>over the next 30 years</u>: 1. 0% increase in moose population 2. 15% increase in moose population 3. 30% increase in moose population
Off-season Tourism	Off-season tourism is the number of out of town visitors who travel to Interior Alaska from October – April. Over the past 10 years, visitation has varied, but increased by about 20%. During off-season months in 2019, there were 19,332 visitors to Denali National Park and Preserve. This feature is set at three levels that may occur <u>over the next 30 years</u>: 1. 25% decrease in off-season tourism growth rate 2. Maintain current off-season tourism growth rate 3. 25% increase in off-season tourism growth rate
Acres Managed for Fire	Fire protection is provided by several public land management agencies. Currently, about 10% (10,581,937 acres) of all forested acres in Interior Alaska are managed to a limited degree. This feature is set at three levels of acres that could be managed <u>over the next 30 years</u>: 1. 0% increase in acres managed 2. 15% increase in acres managed 3. 30% increase in acres managed
Annual Cost	Residents of Alaska receive payments each year from the Alaska Permanent Fund. In 2019, residents accepted into this program each received $1,606. To minimize impacts from the other features described above, everyone's dividend could be reduced. We would like to know how much you would be willing to pay from this fund to prevent changes to the landscape in Interior Alaska. This feature is set at five levels ranging from $0 to $100 <u>over the next 30 years</u>.

Each scenario below is independent and includes three options. Please select the option that you would prefer for the area where you live.

Future Scenario 1

Suppose Option A and Option B were the *only* options available besides "No change" over the next 30 years. Which would you choose? *Please check the box that represents your choice.*

Attribute	Moose population	Off-season Tourism	Acres Managed for Fire	Annual Cost $	I would choose
Option A	15% Increase	25% Decrease in growth rate	15% Increase	$0	❑ A
Option B	15% Increase	25% Increase in growth rate	15% Increase	$75	❑ B
Option C	No change				❑ C

Future Scenario 2

Suppose Option A and Option B were the *only* options available besides "No change" over the next 30 years. Which would you choose? *Please check the box that represents your choice.*

Attribute	Moose population	Off-season Tourism	Acres Managed for Fire	Annual Cost $	I would choose
Option A	0% Increase	25% Increase in growth rate	15% Increase	$100	❑ A
Option B	30% Increase	25% Decrease in growth rate	15% Increase	$0	❑ B
Option C	No change				❑ C

Future Scenario 3

Suppose Option A and Option B were the *only* options available besides "No change" over the next 30 years. Which would you choose? *Please check the box that represents your choice.*

Attribute	Moose population	Off-season Tourism	Acres Managed for Fire	Annual Cost $	I would choose
Option A	30% Increase	25% Decrease in growth rate	30% Increase	$25	❑ A
Option B	0% Increase	25% Increase in growth rate	0% Increase	$75	❑ B
Option C	No change				❑ C

Future Scenario 4

Suppose Option A and Option B were the *only* options available besides "No change" over the next 30 years. Which would you choose? *Please check the box that represents your choice.*

| Attribute	Moose population	Off-season Tourism	Acres Managed for Fire	Annual Cost $	I would choose
Option A	15% Increase	25% Increase in growth rate	0% Increase	$50	❑ A
Option B	15% Increase	25% Decrease in growth rate	30% Increase	$50	❑ B
Option C	No change				❑ C

Future Scenario 5

Suppose Option A and Option B were the *only* options available besides "No change" over the next 30 years. Which would you choose? *Please check the box that represents your choice.*

Attribute	Moose population	Off-season Tourism	Acres Managed for Fire	Annual Cost	I would choose
Option A	30% Increase	Maintain current growth rate	0% Increase	$75	☐ A
Option B	0% Increase	Maintain current growth rate	30% Increase	$0	☐ B
Option C	No change				☐ C

Future Scenario 6

Suppose Option A and Option B were the *only* options available besides "No change" over the next 30 years. Which would you choose? *Please check the box that represents your choice.*

Attribute	Moose population	Off-season Tourism	Acres Managed for Fire	Annual Cost	I would choose
Option A	0% Increase	Maintain current growth rate	15% Increase	$0	☐ A
Option B	30% Increase	Maintain current growth rate	15% Increase	$100	☐ B
Option C	No change				☐ C

Section 3 of 5: Your Attitudes and Beliefs

This section includes questions about the features from the future management scenarios in the previous section, including moose population, off-season tourism, fire management, and annual costs from the Alaska Permanent Fund. We also ask about your beliefs related to global warming.

10. We would like to understand your attitudes toward key features of landscape change. To what extent do you agree with the following statements for the <u>area where you live</u>?

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
a. I like knowing that there are healthy populations of moose	☐	☐	☐	☐	☐
b. It is important that others in my community see moose	☐	☐	☐	☐	☐
c. The opportunity to hunt moose is an important part of living in my community	☐	☐	☐	☐	☐
d. Fire protection provided by public land management agencies reduces the chance of high-intensity wildfires	☐	☐	☐	☐	☐
e. Increasing numbers of forest fires pose as a serious threat to my way of life	☐	☐	☐	☐	☐
f. The number of forested acres managed for fire protection should be increased	☐	☐	☐	☐	☐
g. Off-season tourism (October-April) supports economic well-being	☐	☐	☐	☐	☐
h. Increases in off-season tourism are extremely beneficial for my community	☐	☐	☐	☐	☐
i. My personal quality of life would increase with more off-season tourism	☐	☐	☐	☐	☐
j. Dividends from the Alaska Permanent Fund benefit all generations of Alaskans	☐	☐	☐	☐	☐
k. Reductions in the amount of money per dividend would negatively impact local communities	☐	☐	☐	☐	☐
l. I support the reduction of my dividend from the Alaska Permanent Fund to benefit the environment	☐	☐	☐	☐	☐

11. Global warming refers to the idea that the world's average temperature has been increasing over the past 150 years and may increase more in the future. Do you think that global warming is happening?

☐ Yes   ☐ No   ☐ Don't know

11b. If yes, how sure are you that global warming is happening?

☐	☐	☐	☐	☐
Not at all sure	Somewhat sure	Moderately sure	Very sure	Extremely sure

11c. Do you think global warming is…?

☐	☐	☐
Caused mostly by human activities	Caused mostly by natural changes in the environment	None of these because global warming is not happening

Section 4 of 5: Your Values and Environmental Concerns

We would like to better understand your personal values and concerns about the environment. This information is helpful to understand the things you care about most. Please only provide the information that you are comfortable sharing.

12. These questions are about your personal values. Please rate the extent to which you consider each value to be a guiding principle in your life.

	Unimportant	Of Little Importance	Moderately Important	Important	Very Important
a. Protecting the environment: preserving nature	☐	☐	☐	☐	☐
b. Unity with nature: fitting into nature	☐	☐	☐	☐	☐
c. A world of beauty: beauty of nature and the arts	☐	☐	☐	☐	☐
d. Equality: equal opportunity for all	☐	☐	☐	☐	☐
e. Social justice: correcting injustice, care for others	☐	☐	☐	☐	☐
f. A world at peace: free of war and conflict	☐	☐	☐	☐	☐
g. Authority: the right to lead or command	☐	☐	☐	☐	☐
h. Social power: control over others, dominance	☐	☐	☐	☐	☐
i. Influential: having an impact on people and events	☐	☐	☐	☐	☐
j. Fulfilment of desire: food, fun, pleasure	☐	☐	☐	☐	☐
k. Enjoying life: pursuing hobbies, leisure, socializing	☐	☐	☐	☐	☐
l. Reducing worries: seeking comfort and relaxation	☐	☐	☐	☐	☐
m. Personal growth: development of new skills, learning, or gaining insight into something	☐	☐	☐	☐	☐
n. Pursuit of excellence: attaining a personal ideal in life	☐	☐	☐	☐	☐
o. Autonomy: deciding your own future and doing what you believe in	☐	☐	☐	☐	☐
p. Satisfaction with life: finding meaning, value, and relevance to a broader context	☐	☐	☐	☐	☐

13. I am morally obligated to minimize environmental impacts on public lands near my home.

☐	☐	☐	☐	☐
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

14. I would feel guilty if I negatively impacted public lands near my home.

☐	☐	☐	☐	☐
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

15. People like me should be proud if they can limit their impact on public lands near my home.

☐	☐	☐	☐	☐
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

16. There are many different perspectives on how society should be organized. How strongly do you agree with the following statements?

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
a. When I have problems, I try to solve them on my own	☐	☐	☐	☐	☐
b. I prefer tasks where I work something out on my own	☐	☐	☐	☐	☐
c. The freedom of an individual should not be limited	☐	☐	☐	☐	☐
d. There are limitations in life that we have to accept whether we want to or not	☐	☐	☐	☐	☐
e. There is no use in doing things for other people – you only get taken advantage of	☐	☐	☐	☐	☐
f. I would not participate in civic action groups. Those in power do what they want anyway	☐	☐	☐	☐	☐
g. It is important to preserve our customs and traditions	☐	☐	☐	☐	☐
h. I prefer clear instruction from my supervisors about what to do	☐	☐	☐	☐	☐
i. In a family, adults and children should have different degrees of influence on decisions	☐	☐	☐	☐	☐
j. Firms and institutions should be organized in a way that everybody can influence important decisions	☐	☐	☐	☐	☐
k. In the case of important issues for a family, everyone should contribute to decisions	☐	☐	☐	☐	☐
l. Important questions for our society should not be decided upon by experts, but by the people	☐	☐	☐	☐	☐

17. We would like to understand more about your concern for the environment. How strongly do you agree with the following statements?

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
a. It bothers me when I think about the environmental conditions in which our children and grandchildren will probably have to live in	☐	☐	☐	☐	☐
b. If we continue down the same path, we are heading toward an environmental catastrophe	☐	☐	☐	☐	☐
c. Decision-makers are doing far too little to protect the environment	☐	☐	☐	☐	☐
d. To protect the environment, we should all be willing to reduce our current standard of living	☐	☐	☐	☐	☐
e. In my opinion, many environmental threats are exaggerated	☐	☐	☐	☐	☐
f. There are limits on growth that our industrialized world has already exceeded or will soon reach	☐	☐	☐	☐	☐

18. When you think about management of Denali National Park and Preserve, which organizations have the most influence on decisions and why?

_____
_____
_____
_____

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Section 5 of 5: About You

Our final questions are about your socio-demographic characteristics. Please enter only the information that you are comfortable sharing.

19. What is your gender? ❑ Female ❑ Male

20. What is your age? _____

21. What is the name of the community where you live? _____

22. "Subsistence" is when residents use wild, renewable resources (such as hunting or gathering) for personal consumption.

22a. Do you identify as a subsistence user? ❑ Yes ❑ No

22b. How important is subsistence use to you?

❑	❑	❑	❑	❑
Not at all Important	Slightly Important	Moderately Important	Very Important	Extremely Important

23. With which racial group(s) do you identify? (Please ✓ all that apply)
- ❑ American Indian and Alaska Native
- ❑ Asian
- ❑ White
- ❑ Black or African American
- ❑ Pacific Islander
- ❑ Other: _____

24. What is your annual household income before taxes? (Please ✓ one)
- ❑ Less than $24,999
- ❑ $25,000-$49,999
- ❑ $50,000-$99,999
- ❑ $100,000-$149,999
- ❑ $150,000-$199,999
- ❑ $200,000-$249,999
- ❑ $250,000 or more
- ❑ Prefer not to answer

25. What is the highest level of education you have completed? (Please ✓ one)
- ❑ Some high school
- ❑ High school graduate or GED
- ❑ Two-year degree
- ❑ Bachelor's degree
- ❑ Professional certificate
- ❑ Graduate degree

Are you interested in continuing to participate in this research?

We are designing an online program to learn more about how protected areas and communities are changing in Alaska. We are looking for people to enroll in this program! <u>Monetary incentives will be provided.</u> If you are interested in sharing thoughts about the environment while exchanging ideas with others in your community, please provide your information below.

Name: _____

Email address and/or phone number: _____

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Thanks for your participation!

Use the space below to share any additional thoughts about this study and indicate if you would like a copy of our final report.

Please place the completed questionnaire into the addressed postage-paid return envelope and mail it back to us.

If you have any questions, please contact:

Carena van Riper
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Project website: https://publish.illinois.edu/inclusive-conservation-in-denali/

Institutional Review Board Approval: 18679
Expiration Date: May 25th, 2023

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Appendix C: Newsletter distributed by the University of Illinois research team to the Denali region

KEEPING IN TOUCH

The latest and greatest from our team at the University of Illinois

The National Park Service cares for special places saved by the American people so that all may experience their heritage

NOTES FROM THE TEAM!!

INSIDE THE ISSUE

1. Notes from the team
2. Characterizing the Denali region
3. Engaging our Executive Committee
4. Touring CLEAR Air Force Station
5. Sharing findings
6. Life during COVID-19
7. Look out for an upcoming survey
8. Introducing new team member
9. Contacting the team

~Wishing you well from afar ~

Although our research will be continuing remotely due to COVID-19, we are following news from Alaska with anticipation and hope you are staying healthy and in good spirits!

We are delighted to share the third issue of the "Keeping in Touch" newsletter as part of our research about building scenarios and reflecting the future visions of communities around Denali National Park and Preserve!! We are excited about this opportunity to keep members of the local community like you up to speed on our project happenings.

In the pages of this newsletter, you'll see that we share highlights from what we are learning about community perspectives on future growth, and explain how we are working toward our goal of enhancing processes for inclusive conservation across all communities in the Denali region. Each of our

newsletters aims to share different parts of our project and keep you posted on our plans for opening up a dialogue and building strategies that respond to community needs and conservation objectives.

We are grateful for your interest in and support of our ongoing research with communities in the region. We hope you enjoy Keeping in Touch as we strive to enhance the impact of our research and make sure you benefit from this study.
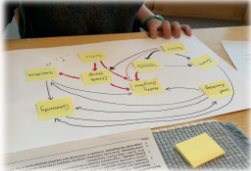
BELMONT FORUM biodiversa

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CHARACTERIZING THE DENALI REGION

During our last visit in January, we learned a lot about people's connections to places in the region, their histories, knowledge, relevant resource management challenges, and concerns about the future. We spoke with residents of Talkeetna, the Stampede, and McKinley Village, and prioritized meeting people who could share perspectives on local business operations. Through conversations and individual mapping exercises, we collected data on the challenges that many business owners are facing and their views of the future. A rapidly changing social-ecological landscape has created uncertainty around the future of tourism and recreation - facets of the Denali region that many local businesses depend on. Understanding how to best prepare for this change is a top priority for Denali business owners.

Thanks to all of the people we met with this past winter and who shared such interesting perspectives during our mapping exercises shown here!

We appreciated the chance to learn about people's perspectives and reflect on findings from the interviews we have conducted over the past two years. Key lessons from conversations with residents across the Denali region have helped us better understand the importance of the area and the unique challenges faced by people living there. Some of these lessons include:

- Tensions exist between environmental sustainability and growth of tourism in the Denali region. The tensions at play in Denali differ from the traditional tradeoffs associated with national parks related to use versus preservation.

- Subsistence use is a complex and sensitive issue in Alaska. Several residents are concerned by the policies and approach to subsistence use eligibility of Denali National Park and Preserve, and the federal government more broadly.

- Residents' attitudes toward the decision-makers overseeing public lands in Alaska range from an uneasy alliance with the federal government to a sense of betrayal and deceit. The extent of each of these feelings is an open question.

- There is an expressed lack of representation of residents' voices in federal policies related to protected area management.

In addition to interviews, findings from the individual mapping exercises we've conducted have helped us see how residents characterize the Denali region and identify potential "drivers of change" that are playing the biggest role in shaping the landscape. These data have shed light on the features that should be most carefully considered by decision-makers. Here are some highlights from our ongoing analysis:

- The shared importance of wildlife, sense of community, subsistence, and healthy ecosystems were most valued across all communities within the scope of our research.

- Tourism has been described as one of the most central features characterizing Cantwell, McKinley Village, the Stampede, and Talkeetna, but not Healy or Anderson.

- Main drivers of change include federal legislation, public land management agencies, industrial tourism, and natural resource extraction.

- Features that were identified as most vulnerable to change include the economy, sense of community, and local customs

- Features that were considered less vulnerable to change include wilderness and public land

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ENGAGING OUR LOCAL EXECUTIVE COMMITTEE

Our local Executive Committee came together for a discussion about our project the last time we were in town. This committee consists of ten key leaders in the region representing sectors such as education, local government, subsistence use, local business, public land management (at the state and federal level), and industrial tourism. This was a tremendous opportunity to receive feedback on our research direction and identify ways that our findings could be used by residents. During this exchange, we were particularly grateful for the input offered on our upcoming survey process, future directions of our research and our approach to partnerships. Our team looks forward to engaging members of the local Executive Committee during our next site visit!

We very much appreciated the discussion with our Executive Committee at the Murie Science and Learning Center. This group of experts is providing continued input and guidance on our project!

TOURING CLEAR AIR FORCE STATION

A highlight of our trip was touring CLEAR Air Force Station, and learning about the station's main duty of detecting incoming intercontinental and submarine-launched ballistic missiles. It was fascinating to tour the facilities, gain a sense of the Air Force station's operations, and hear about upcoming advancements. We also learned about the importance of CLEAR's contribution to the local economy, and were struck by the year-round employment opportunities available to many residents in the surrounding communities. Beyond surveillance, we learned that CLEAR is an integrated part of the communities in the Denali region. We heard from several employees about CLEAR's provision of emergency services (e.g., fire suppression) to residents throughout the Interior region and several community events (e.g., high school social events) that have been hosted by the Air Force station. We're grateful to have had the chance to learn more about CLEAR and its significance to residents of the Denali region.

A special thank you to Major Erik Haugen for the fantastic tour of CLEAR!

SHARING FINDINGS IN OUR PROFESSIONAL COMMUNITY

The University of Illinois hosted the 2020 Academy of Leisure Sciences' Conference on Research and Teaching, and our team was eager to make our presence felt! Evan Salcido presented research examining the relationship between values assigned to features of the park landscape, and the behavioral activities of park visitors. Drawing from a 2016 on-site survey, this research indicated that park visitors most heavily value the park as a pristine wilderness area with high ecological integrity, and left Denali intending to act more pro-environmentally than they reportedly had prior to their visit. Understanding how values relate to behavior before and after visiting the park is key to understanding pro-environmental behavior in protected areas, and to sustaining outdoor recreation opportunities and landscape integrity.

Ben Leitschuh sharing his Alaska Native and non-native subsistence use research

Meanwhile, Ben Leitschuh presented research focused on understanding subsistence use in both Alaska Native and non-native communities, and exploring policy strategies to enhance representation of native voices. Preliminary findings showed complex subsistence use patterns in and around Denali, with differing motives among Alaska Natives and non-native residents. Many non-native users linked subsistence to views of the land as a harsh place that requires self-reliance, but also allows for personal freedoms not available in urban areas. Alaska Native users often tied subsistence use – or "customary and traditional use" – to practicing sovereignty and maintaining their connection to a land imbued with the memories, spirits, and stories of their ancestors. Undergraduate student David Nguyen also presented results from an analysis of interviews that commented on off-road vehicle policy implementation in the region. These findings suggest a need for the federal and state government to re-visit current structures of subsistence regulations and adaptive management. Let us know if you'd like to learn more about any of these results!

LIFE DURING COVID-19

Our lives have changed so much during the COVID-19 global pandemic. We understand that the people and businesses in the Denali region have been deeply affected, and we are keeping you all in our thoughts. Team member Ruth Colianni has been keeping us posted about local happenings and the efforts of the Denali Recovery Alliance, Chamber of Commerce, and Denali Borough to consider the effects of the pandemic on local communities. We have also appreciated updates from our partners the Talkeetna Community Council and National Park Service. Out team recognizes the strong and nimble leadership of the Denali area, and are impressed with the proactive position being taken to engage current events.

In Illinois, starting in March, our campus shifted to remote teaching and learning, and we transitioned to working from home and in physical isolation. We've become conscious of social distancing and doing what we can to follow good practices. It feels overwhelming at times, but we're coming together and looking forward to being on the other side of this virus. While we've postponed our plans to spend time in Denali this summer and fall, we continue to keep in touch through friends and associates living and working there. We are all in this together!

LOOK OUT FOR AN UPCOMING HOUSEHOLD SURVEY!

We are excited to announce that we will be launching a regional household survey as part of the next phase of our 'Inclusive Conservation' research project with communities in the Denali region. Building on two years of in-depth discussions with residents, our survey aims to evaluate Denali region residents' connections to places, pro-environmental behavior, visions for the future, values, and more!

Our survey will be sent to 3,000 residents living between Fairbanks and Talkeetna in communities along the Parks Highway and residents of Minchumina (including you!). We will be launching our survey in June and copies will be sent via mail to P.O. boxes and residential addresses. There will be an option to mail back a completed hard copy using a postage paid envelope, or to fill in your responses online. Keep an eye out for the survey in your mailbox during the month of June! Your responses are tremendously important to us, and we hope that you take this opportunity to express your opinion and help us better represent and understand issues related to public land management.

A Survey of Residents in Alaska:
Understanding your experiences and preferences for public land management

INTRODUCING NEW TEAM MEMBER

Riley Andrade has joined our team as a Postdoctoral Research Associate! Riley is a Landscape Ecologist and Geographer from Arizona State University. Her research is focused on human-environment interactions, including attitudinal factors, landscape management, and biodiversity. Outside of her research, Riley enjoys outdoor activities such as hiking and rock climbing, as well as a good craft beer! She is excited to join the team to work on inclusive conservation topics in the Denali region.

Riley will be responsible for leading a social learning forum, where the team hopes to engage with residents of the Denali region to deliberate on issues surrounding environmental change and management. Look for the invitation to participate in the upcoming regional household survey!

We are very fortunate to have Riley join our University of Illinois team!

Meet Riley!

Please contact us if you have any questions about this project!

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Check out our project website:
https://publish.illinois.edu/inclusive-conservation-in-denali/

Other Key Members of our Team

Rose Keller	Riley Andrade	Gillian Rowe	David Nguyen
Amy Craver	Evan Salcido	Ben Leitschuh	Cynthia Segura
Erik Johnson	Dana Johnson	Haley Ware	Gina Fumagalli
Christopher Raymond	Ruth Colianni	Yen-Hsuan Chang	

THANK YOU FOR CONTINUING TO SHARE YOUR EXPERIENCES & THOUGHTS WITH US!

BELMONT FORUM   biodiversa

Appendix D: Introduction to the Inclusive Conservation Executive Committee

Introduction to the Inclusive Conservation Executive Committee

What is the Inclusive Conservation project?

This research project aims to develop a more inclusive approach to balancing multiple community visions for protected area management. We are particularly interested in understanding residents' preferences for future growth of the region surrounding Denali National Park and Preserve. Our goal is to open up a dialogue about social and environmental change happening around Denali using a range of scientific tools and community engagement processes. We are also committed to developing strategies for the stakeholders of Denali to be better positioned for achieving their goals. This is a five-year project (2018-2022) funded by the National Park Service, University of Illinois at Urbana-Champaign, and the National Science Foundation through the Belmont Forum.

What is the Executive Committee for Inclusive Conservation in the Denali Region?

The Executive Committee is a group of stakeholders that represent a diversity of perspectives on visions for the future of the region surrounding Denali National Park and Preserve. The members of this group will help our research team understand different interests that govern the region surrounding Denali and provide feedback for maintaining the relevancy of our research outcomes. This group will be engaged to understand the impacts of various policies options and approaches for supporting resource management and human well-being tied to the region. There will be representation from local government, education, environmental management, Alaska Native Corporations, industry, local businesses, and state agencies.

What functions will it have?

Members of the Committee will be invited to:

1. Provide guidance to the project team throughout the research process. Members will be asked to come together approximately two times per year in-person and/or through the Zoom platform.
2. Advise on and review research instruments, including a survey questionnaire, policy toolkit, and short film to enhance the relevance and usefulness of these documents and outcomes.
3. Participate in a 'Summit' in late September 2020 where the aims will be to discuss the social and ecological consequences of different community visions for protected area management. This event will be held in Denali National Park and Preserve and attended by the Committee, alongside a consortium of researchers working with other local communities surrounding Kromme Rijn and Utrechtse Heuvelrug regions (The Netherlands), Sierra de Guararrama National Park (Spain), Västra Harg nature reserve (Sweden) and Denali National Park and Preserve (United States).
4. Help shape and promote the vision of inclusive conservation in the Denali Region and its deliverables throughout their professional networks.

What are the benefits of being involved?

Access will be provided to the results that emerge from our research, which may inform local and regional policy and planning. Involvement in the Committee will also provide opportunities for knowledge-sharing and exchange between different organizations, as well as networking through discussions about the opportunities and constraints facing protected area management. Participation will be critically important for keeping research with communities around Denali National Park and Preserve transparent, relevant, and effective.

Who is a member of the Executive Committee?

Darren Bruning, Division of Wildlife Conservation Regional Supervisor, Alaska Department of Fish & Game
Gordon Carlson, Ahtna Inc. member and Native Village of Cantwell Tribal Council member
Jenna Hamm, Owner of Camp Denali
Erika Jostad, NPS Chief Ranger and Acting Superintendent of Denali National Park and Preserve
Vanessa Jusczak, Denali Chamber of Commerce Director
Stuart Leidner, Superintendent of the Mat Su and Copper River Basin Region
Justin Mason, Owner of Denali Fly Fishing Guides
Dan Polta, Denali Borough School District Superintendent
Clay Walker, Denali Borough Mayor
Bonnie Westlund, General Manager of Denali Princess Wilderness Lodge

Where will the first meeting be held?

Although select members of the Committee have met previously, the first full group meeting will be held in winter 2019-20. An email (and link to the teleconference) will be sent out separately to find a suitable time. We will plan to hold an event every six months thereafter or periodically as needed.

How do I find out more information?

For more information, go to https://publish.illinois.edu/inclusive-conservation-in-denali/ or www.inclusive-conservation.org.

Principal Investigators

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Research staff and students

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Ruth Colianni, Research Technician

Project Collaborators

Rose Keller, National Park Service
Amy Craver, National Park Service
Christopher Raymond, University of Helsinki