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Is one the loneliest number? Impact of tourists' ability to identify individual bears on conservation outcomes

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Introduction: A fundamental component of ecotourism is resource conservation. Oftentimes, that resource is wildlife. Within the wildlife-centric ecotourism experience, tourists' encounters are most often with individual animals, or a small subset of the population (i.e., not the species as a whole). However, most conservation efforts are focused at the species level. This article explores the relationship between tourists' ability to identify individual animals and conservation outcomes.

Methods: Data were obtained from 3,853 online surveys from viewers of the Katmai National Park and Preserve webcams (bearcams).

Results: The majority of respondents (70%) indicated they could identify individual bears. Respondents who could identify individual bears had significantly higher scores for conservation outcomes (i.e., awareness, behavioral intention, and emotional connection). Furthermore, identifying an individual bear as a favorite yielded significantly higher scores for emotional connectivity and support for conservation programs.

Discussion: Thus, the ability to identify individual animals, when viewing wildlife, can improve conservation outcomes. Practitioners could consider incorporating strategies to improve tourists' identification skills as a method to cultivating conservation outcomes.

KEYWORDS

brown bears, conservation, flagship species, individual identification, online ecotourism, webcams, Katmai National Park and Preserve

Introduction

Oftentimes, conservation strategies fall victim to the adage, "the whole is greater than the sum of its parts." Within the context of wildlife conservation, this has led to ecosystem focused solutions and/or species management at a population level. Although generally successful, this approach tends to privilege the overall functionality of the population at the expense of the value of the individual animal (Bartoń et al., 2019; Balasubramaniam et al., 2021; Ford et al., 2021).

Tourism-related impacts to wildlife are a prime example of the individual/population conundrum. Tourists will be cautioned against behaviors that can have negative impacts on observed individual animals (e.g., approach distance, food provisioning) (Rode et al., 2007; Fortin et al., 2016). Oftentimes, messaging will explain how negative impacts to an individual animal can affect the population as a whole (Abrams et al., 2020). Thus, the experience with a single animal flows up to the population.

This pattern is repeated with pro-conservation behaviors such as philanthropy and/or site donations. Tourists who had positive encounters with individual animals are encouraged to donate to conservation efforts, which traditionally target populations or even ecosystems (Ballantyne et al., 2009; Richardson and Lewis, 2022). Thus, there is precedent for utilizing experiences with individual animals for population level outcomes.

However, from the standpoint of ecotourism, tourists generally do not experience populations. Most often, tourists have experiences with individual animals within a population. And it is these, highly individualized encounters, that can help facilitate a bond with that species, which in turn can improve conservation behaviors within tourists (Pearce et al., 2017).

There is growing evidence that the connection developed from encounters with individual animals improves species specific and generalized biodiversity behaviors within people (Apps et al., 2018; Finkler et al., 2019; Bueddefeld and Erickson, 2022). However, facilitating a connection between a visitor and a specific individual animal is often dismissed as an ineffective conservation strategy as conservation efforts (e.g., funding, management) cannot be directed toward an individual. Furthermore, the likelihood of tourists repeatedly encountering the same individual animal and/or being able to successfully identify it as such is often low.

Charismatic megafauna (CMF) have been used as a mechanism to bridge the gap between individual animal based tourism experiences and population level conservation outcomes. CMF are commonly, though not exclusively, large carnivorous mammals (e.g., bears, wolves, African "Big 5") that have physical features and behaviors that stimulate a connection within tourists (Woods, 2000; Higginbottom, 2004; Albert et al., 2018). CMF can be aligned with socially-based conservation outcomes (e.g., pro-conservation awareness and behaviors) linked to that species.

CMF are popular within an ecotourism framework as they can assist in meeting systems-level expected conservation outcomes (Santarém et al., 2019; Flower et al., 2021). For example, Akhshik et al. (2022) found tourists' memorable encounters with bison was a strong predictor of support for conservation related to reintroduction. Furthermore, the context of the experience facilitated opportunities for tourists to personally contribute to conservation. Hausmann et al. (2017) found linkages between tourists' preferences for specific biomes and species assemblages. Their findings provided support for a broader distribution of conservation benefits across a wider array of species. CMF have also been used to model future ecotourism markets, mitigate impacts, and better align tourists' expectations with management objectives (Arbieu et al., 2017).

CMF have also been used to target local issues and foster positive emotional responses within tourists. For example, Komodo dragons have been linked to increased entrance fees (Walpole and Leader-Williams, 2002); great white shark tourism has been used to improve pro-conservation attitudes and behaviors (Apps et al., 2018); and koalas have been used to create public support for policy change to improve community level conservation (Schlagloth et al., 2018). Positive emotional responses within tourists have also been reported as a key outcome of CMF encounters during an ecotourism experience. Joy, wonder, awe, and amazement are common variables tourists use to describe such encounters (McIntosh and Wright, 2017; Buckley, 2022).

Emotional connections may also serve as a bridge between the individual experience and population level outcomes, as tourists are encouraged to translate the positive affect derived from the one-on-one encounter to species-based pro-conservation behaviors. However, results for this application are mixed. For example, Flower et al. (2021) investigated experiential impacts on tourists' concern for elephant welfare. Findings revealed increased tourist concern for elephant conservation and welfare following the experience. What is of particular importance within this study is the model fluidity between conservation outcomes at a systems level (i.e., elephant tourism) and individual level (specific elephant). However, Thomas-Walters and Raihani (2017) found no statistical difference in respondents' donation level for well-known species compared to unknown species. While McIntosh and Wright (2017) suggest that deeper emotional connectivity may need time to form after the experience, it remains unclear if/how tourists' ability to identify individual animals affects conservation outcomes.

Bear tourism

Bears in general, and brown bears in particular, are one of the most popular species to observe in the wild. Their presence in western North American national parks and protected areas is a primary draw for tourists and generates considerable economic benefits (Penteriani et al., 2017; Richardson et al., 2017; Keating and Krannich, 2020). Tourists' desire to see bears has been explored as a function of emotional connections to wildlife (Verbos et al., 2017). Bears also pose extreme management issues due to their intelligence and potential lethality (White et al., 2017). The combination of high viewing desire and intensive management showcases the individual/population conundrum.

Emotional connectivity to wildlife has been advanced as a potent variable to influence behaviors (Jacobs et al., 2012, 2014). Within this context, conservation caring has been proposed as a scale to measure an individual's connection to a species. Conservation caring has been shown to be a valid measurement of tourists' encounters with wildlife and a predictor of pro-conservation behaviors (Skibins et al., 2013). Within bear tourism, conservation caring has been used as a predictor of viewing patterns, support for management, and general pro-conservation behaviors (Skibins and Sharp, 2017; Verbos et al., 2017). Similar to the previously mentioned studies on CMF, these authors have extrapolated individualized experiences to the population level.

Proper food storage and garbage disposal in bear country is a common management issue. As part of the messaging strategy, tourists are informed that bears learn to associate food with human presence and scavenge garbage. Furthermore, sows can pass this learned behavior to cubs. In extreme cases, euthanizing the bear may be the only option (Fortin et al., 2016; Penteriani et al., 2017). Thus, in order to prevent altered feeding behaviors and unnecessary bear deaths, tourists are encouraged to conform to food management behaviors. In this way, they are helping population level management one bear at a time.

Hiking behaviors are another example of wildlife population management through individual animals. Hikers are encouraged to carry bear spray, as a non-lethal deterrent, should a bear encounter turn aggressive. The rationale parallels food management. Hikers' proper carrying and use of bear spray discourages undesired individual bear behavior, thereby benefitting the population (Smith et al., 2008; Miller, 2019).

General encounters between tourists and bears have also been shown to have undesired physiological impacts on bears and alter foraging behaviors. Results of these studies have helped to inform managers in their implementation of minimum approach distances and regulated viewing opportunities. Tourists are encouraged to comply with management requirements in order to minimize

negative impacts on bears, which in turn can improve bears' fitness thereby contributing to a healthy population (Herrero et al., 2005; Smith et al., 2005; Rode et al., 2006, 2007).

Recently, bear-based tourism has expanded to include webcams. Webcams can provide similar experiences to being onsite while simultaneously eliminating onsite based impacts of a tourist. Webcams have also been shown to be capable of generating desired conservation outcomes of awareness, pro-conservation behaviors, and emotional connectivity (Loomis et al., 2018; Skibins and Sharp, 2019). Given the associated outcomes, webcam viewing may also be considered a new form of pro-conservation behavior (Miller and Freimund, 2017b; Schuler and Skibins, 2022).

The role of internet-based resources, within ecotourism, is emerging as a focus of research. Studies support social media as an effective substitute for traditional surveys and a viable source of data regarding visitor preferences and experiences in parks and protected areas (Heikinheimo et al., 2017; Hausmann et al., 2018). Bergman et al. (2022) reviewed positive and negative conservation impacts related to social media and found it could increase pro-conservation behaviors and policy support. Kamphof (2011) sought to address the "ambiguous potential" of webcams. While he advocates for more conceptual work to be done surrounding viewing paradigms, he does support the role webcams can play in conservation and tourism. Shreedhar and Mourato (2019) tested the efficacy of conservation videos and found a positive impact on pro-conservation behaviors.

As such, webcam viewing could be explored in a manner similar to other tourist-based behaviors. However, the majority of studies have sought to inform communication strategies to improve tourist-based behaviors. Few, if any, have sought to understand tourists' ability to identify bears as an experiential component and/or its effect on pro-conservation behaviors. The purpose of this study was to determine (1) if bearcam viewers could identify individual and/or favorite bears, and (2) if this ability affected conservation outcomes associated with ecotourism (i.e., awareness, behavioral intention, and emotional connection).

Study site

The study site for this project was based on webcam views of Katmai National Park and Preserve (hereafter Katmai), located on the Alaskan Peninsula, Alaska, USA (Figure 1A). A total of six live webcams were placed around the Brooks Falls area to capture brown bear activity: Falls, Falls Low (eye-level with bears), Riffles, Lower River, River Watch, and Dumpling Mountain (Figure 1B). Study participants responded solely on the basis virtual visitation, i.e., having viewed the webcams, not being physically present at Katmai.

Methods

Survey instrument development

The survey was pretested in early 2019. The quantitative survey was developed following Vaske (2008) (e.g., easy/relevant items at the beginning and demographic items at the end; use of close-ended items; no double-negative items; use of easily understandable language), Dillman (2011), Dillman et al. (2017), and Johnston et al. (2017). The majority of items were categorical or yes/no owing to the exploratory nature of this study.

Independent variables

Independent variables were adapted from literature surrounding onsite and online bear viewing (Verbos et al., 2015; Skibins and Sharp, 2017, 2019; Loomis et al., 2018; Keating and Krannich, 2020). Experiential items consisted of close-ended items addressing frequency/duration of viewing experience, preferences for webcam locations, and previous experience of webcam viewing. Items pertaining to the ability to identify an individual bear consisted of mutually exclusive categorical responses that addressed ability to identify, number of identifiable bears, number of favorite bears, and viewing habits.

Dependent variables

Dependent variables (i.e., emotional connection, awareness, and behavioral intent) were adapted from expected tourist-based outcomes derived from an ecotourism experience (Hausmann et al., 2017; Storie and Vining, 2018; Flower et al., 2021). An emotional connection to brown bears was operationalized using the conservation caring scale. The conservation caring scale was developed by Skibins et al. (2017), and has been shown to be a reliable and valid scale to assess respondents' emotional connection to a species across onsite (Skibins and Sharp, 2017) and online venues (Skibins and Sharp, 2019). Conservation caring consists of six items scored on a 1 (strongly disagree) to 9 (strongly agree) scale and is analyzed as a composite variable. Following Tabachnick and Fidell (2007), data related to the conservation caring scale were screened for missingness (more than 50% of items per factor), univariate (±3 SD), and multivariate outliers [$\chi^2_{(25)} = 52.62$; $P < 0.001$]. A total of 1,919 cases were removed.

Awareness and behavioral intent were assessed *via* responses to a Likert-type scale 1 (strongly disagree) to 7 (strongly agree). Respondents were provided the stem question, "the ability to learn about and/or identify individual bears…" followed by "is the main reason I watch the live bearcams" and "influences my willingness to support conservation programs" which represented awareness and behavioral intent, respectively.

All analyses were performed using SPSS v23. ANOVAs with Bonferroni adjusted *post-hoc* tests were performed to assess differences in item and composite variable means. All *P*-value cutoffs were 0.05 unless stated otherwise.

Survey administration

A link to the survey was placed on the main brown bear webcam page of explore.org and in periodic bearcam comments by explore.org staff and moderators. It was also promoted during live bearcam chats with explore.org staff and posted on the Bears of Brooks River Facebook page once per month. The survey was available from July–October, 2019, which coincided with the salmon runs at Brooks River and

A

Map of Brooks Camp area of Katmai National Park and Preserve (National Park Service, 2022)

B

Map of explore.org bearcam locations (Google, 2022)

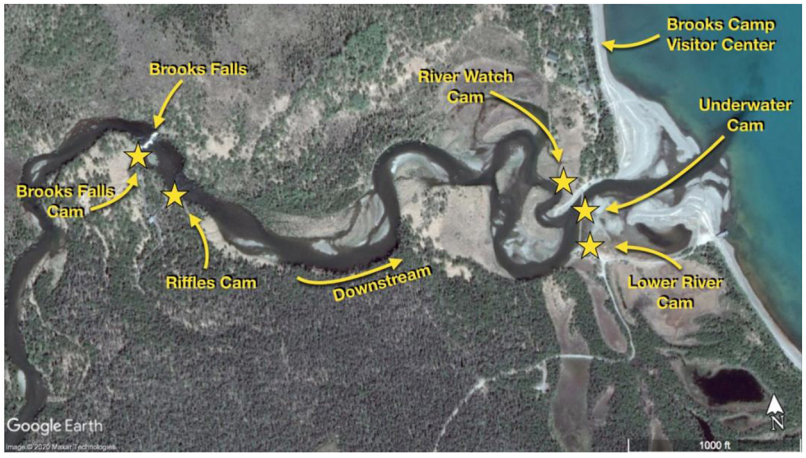

FIGURE 1
(A) Map of Brooks Camp area of Katmai National Park and Preserve (National Park Service, 2022). **(B)** Map of explore.org bearcam locations (Google, n.d.).

subsequent peak bear activity. A total of 5,756 surveys were generated. All respondents were 18 years of age or older. Response rate was unobtainable as the survey link was open to any webcam viewers.

Results

Survey sample description

The sample (N = 3,853) was 21% male (M age 61) and 74% female (M age 58); 5% missing. Ninety percent were residents of the USA, 4% were residents of Canada, all other countries were 1% or less of respondents. Twenty-seven percent reported completing undergraduate studies as the highest level of schooling, and 27% reported completing graduate school; 23% reported a total household income of $100,000 (USD) or higher, and 18% reported a total household income of <$25,000 (USD). Twenty-seven percent reported being in a single person household, 53% were in a two-person household, and 20% were in a household of three or more people.

Ability to identify individual bears

When asked if they could identify individual bears, 14% (538) of viewers responded yes, 56% (2,177) responded sometimes, and 30% (1,135) responded no (Figure 2A). Viewers who could identify individual bears were asked how many individual bears they could identify, 21% (575) indicated they could identify one bear, 45% (1,210) could identify 2–4 bears, 20% could identify 5–7 bears, and 14% could identify more than 7 bears (Figure 2B). When asked if

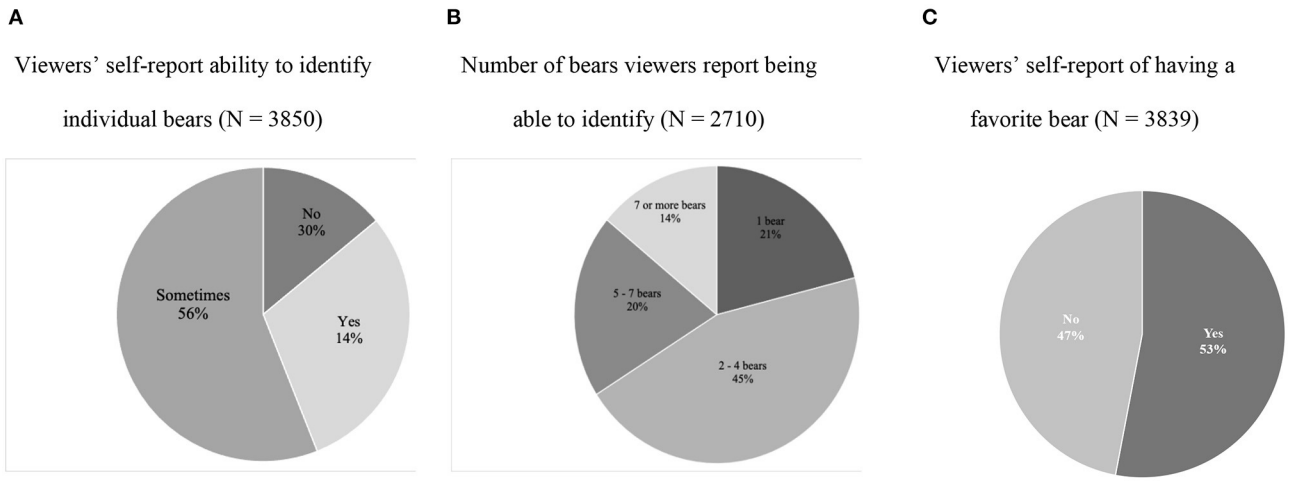

FIGURE 2
(A) Viewers' self-report ability to identify individual bears ($N = 3,850$). **(B)** Number of bears viewers report being able to identify ($N = 2,710$). **(C)** Viewers' self-report of having a favorite bear ($N = 3,839$).

they have a favorite bear, 53% (2,046) responded yes, and 47% (1,793) responded no (see Figure 2C).

Viewers were asked to rate the statement, the ability to learn about and/or identify individual bears is the main reason I watch the live bearcams, on a 7-point Likert-type scale from 1 (strongly disagree) to 7 (strongly agree). One-way ANOVAs were used to determine if viewers' ability to identify individual bears had varying levels of agreement (M ± SD). The model was significant [$F_{(2,3823)} = 362.73$, $p < 0.001$, eta = 0.40]. Viewers who could identify individual bears had significantly higher ($p < 0.001$) agreement levels (5.15 ± 1.68) than viewers who could only identify individual bears sometimes (4.62 ± 1.69) and viewers who could not identify individual bears (3.14 ± 1.75) ($p < 0.001$). Viewers who could only identify individual bears sometimes had significantly higher agreement levels ($p < 0.001$) compared to viewers who could not identify individual bears.

One-way ANOVAs were used to determine if viewers' who could identify varying numbers of individual bears had varying levels of agreement (M ± SD). The model was significant [$F_{(3,2,694)} = 92.08$, $p < 0.001$, eta = 0.30]. See Table 1 for pairwise comparisons. Overall, as number of identifiable bears increased agreement levels increased.

Viewers were asked to rate the statement, the ability to learn about and/or identify individual bears influences my willingness to support conservation programs, on a 7-point Likert-type scale 1 (strongly disagree) to 7 (strongly agree). One-way ANOVAs were used to determine if viewers' ability to identify individual bears had varying levels of agreement (M ± SD). The model was significant [$F_{(2,3,772)} = 199.33$, $p < 0.001$, eta = 0.33]. Viewers who could identify individual bears had significantly higher ($p < 0.001$) agreement levels (4.78 ± 1.86) than viewers who could only identify individual bears sometimes (4.54 ± 1.81) and viewers who could not identify individual bears (3.31 ± 1.80) ($p < 0.001$). Viewers who could only identify individual bears sometimes had significantly higher agreement levels ($p < 0.001$) compared to viewers who could not identify individual bears.

One-way ANOVAs were used to determine if viewers' who could identify varying numbers of individual bears had varying levels of agreement (M ± SD). The model was significant [$F_{(3,2,660)} = 35.32$, $p < 0.001$, eta = 0.20). See Table 1 for pairwise comparisons. Overall, as number of identifiable bears increased agreement levels increased.

Ability to identify individual bears and conservation caring

Cronbach alpha score for conservation caring ($N = 3,756$) was 0.90, with no improvement from removing any items, all items retained. The mean (SD) was 6.56 (±0.59). These scores are consistent with past studies (Verbos et al., 2017; Skibins and Sharp, 2019). As such, the scale was deemed acceptable.

One-way ANOVAs were used to determine if viewers' ability to identify individual bears had varying levels of conservation caring (M ± SD). The model was significant [$F_{(2,3751)} = 160.13$, $p < 0.001$, eta = 0.28). Viewers who could identify individual bears had significantly higher ($p < 0.05$) conservation caring levels (7.06 ± 1.68) than viewers who could only identify individual bears sometimes (6.81 ± 1.54) and viewers who could not identify individual bears (5.85 ± 1.70) ($p < 0.001$). Viewers who could only identify individual bears sometimes had significantly higher conservation caring levels ($p < 0.001$) compared to viewers who could not identify individual bears.

One-way ANOVAs were used to determine if viewers' who could identify varying numbers of individual bears had varying levels of conservation caring (M ± SD). The model was significant [$F_{(3,2,639)} = 51.27$, $p < 0.001$, eta = 0.23]. All pairwise comparisons were significantly different at the $p < 0.05$ level. Conservation caring levels were significantly higher for each group, as number of individual bears identified increased. See Table 2 for individual pairwise comparisons.

Having a favorite bear

Viewers were asked to rate the statement, the ability to learn about and/or identify individual bears is the main reason I watch the live

TABLE 1 Pairwise comparisons of agreement levels (M ± SD) based on number of bears identified.

Number of bears identified	M ± SD	2–4 bears	5–7 bears	More than 7 bears
At least 1 bear				
Main reason I watch the live bearcams	4.01 ± 1.78	$p < 0.001$	$p < 0.001$	$p < 0.001$
Influences my willingness to support conservation programs	4.06 ± 1.88	$p < 0.001$	$p < 0.001$	$p < 0.001$
2–4 bears				
Main reason I watch the live bearcams	4.55 ± 1.67		$p < 0.001$	$p < 0.001$
Influences my willingness to support conservation programs	4.50 ± 1.79		$p < 0.001$	$p < 0.001$
5–7 bears				
Main reason I watch the live bearcams	5.31 ± 1.46	$p < 0.001$		NS
Influences my willingness to support conservation programs	5.00 ± 1.70	$p < 0.001$		NS
More than 7 bears				
Main reason I watch the live bearcams	5.49 ± 1.43	$p < 0.001$	NS	
Influences my willingness to support conservation programs	5.07 ± 1.77	$p < 0.001$	NS	

Agreement scored on a 1 (strongly disagree) to 7 (strongly agree) Likert-type scale.
NS, not significant.

TABLE 2 Pairwise comparisons of conservation caring levels (M ± SD) based on number of bears identified.

Number of bears identified	M ± SD	2–4 bears	5–7 bears	More than 7 bears
At least 1 bear	6.44 ± 1.59	$p < 0.005$	$p < 0.001$	$p < 0.001$
2–4 bears	6.70 ± 1.53		$p < 0.001$	$p < 0.001$
5–7 bears	7.17 ± 1.52	$p < 0.001$		$p < 0.002$
More than 7 bears	7.54 ± 1.38	$p < 0.001$	$p < 0.001$	

Conservation caring scored on a 1 (strongly disagree) to 9 (strongly agree) Likert-type scale.

bearcams, on a 7-point Likert-type scale 1 (strongly disagree) to 7 (strongly agree). An unequal variance t-test was used to determine differences in agreement levels (M ± SD) based on having a favorite bear ($t = 29.26$, $df = 3567$, $p < 0.001$, Cohen's $d = 0.95$). Viewers who reported having a favorite bear had significantly higher agreement levels (5.01 ± 1.58) than viewers who did not have a favorite bear (3.40 ± 1.79).

Viewers were asked to rate the statement, the ability to learn about and/or identify individual bears influences my willingness to support conservation programs, on a 7-point Likert-type scale 1 (strongly disagree) to 7 (strongly agree). An unequal variance t-test was used to determine differences in agreement levels (M ± SD) based on having a favorite bear ($t = 21.87$, $df = 3{,}637$, $p < 0.001$, Cohen's $d = 0.72$). Viewers who reported having a favorite bear had significantly higher agreement levels (4.82 ± 1.75) than viewers who did not have a favorite bear (3.53 ± 1.85).

An unequal variance t-test was used to determine differences in conservation caring levels (M ± SD) based on having a favorite bear ($t = 20.99$, $df = 3528$, $p < 0.001$, Cohen's $d = 0.69$). Viewers who reported having a favorite bear had significantly higher conservation caring levels (7.07 ± 1.50) than viewers who did not have a favorite bear (5.98 ± 1.67).

Outcomes for specific bears

Katmai managers have assigned numbers to many of the bears commonly observed on the webcams. Several of these bears have also been given nicknames by viewers or Katmai staff. During the 2019 viewing season four bears were deemed most popular in pretesting and conversations with experts. These bears also garnered a large amount of web-based public comments. Those bears were #480—Otis, #435—Holly, #503 (no nickname), and #409—Beadnose.

Viewers were randomly presented with one of these four bears and asked if they spent more time watching the live bearcam if bear X was on the screen. For respondents who received Otis, 30% of viewers reported yes, 46% reported no, and 24% reported sometimes; for Holly, 19% reported yes, 55% reported no, 26% reported sometimes; for Bear #503, 19% reported yes, 55% reported no, 26% reported sometimes; and for Beadnose, 12% reported yes, 65% reported no, 23% reported sometimes.

Using the yes/no/sometimes categories, one-way ANOVAs were run for each bear for the following dependent variables: the ability to learn about and/or identify individual bears is the main reason I watch the live bearcams, the ability to learn about and/or identify individual bears influences my willingness to support conservation programs, and conservation caring. For Otis, all three models were significant. Model results are presented respectively: $F_{(2,941)} = 118.15$, $p < 0.001$, eta = 0.45; $F_{(2,931)} = 69.23$, $p < 0.001$, eta = 0.36; $F_{(2,920)} = 67.49$, $p < 0.001$, eta = 0.35. For Holly, all three models were significant. Model results are presented respectively: $F_{(2,945)} = 92.38$, $p < 0.001$, eta = 0.40; $F_{(2,932)} = 78.30$, $p < 0.001$, eta = 0.38; $F_{(2,931)} = 62.55$, $p < 0.001$, eta = 0.34. For Bear #503, all three models were significant. Model results are presented respectively: $F_{(2,962)} = 86.83$, $p < 0.001$, eta = 0.39; $F_{(2,950)} = 63.44$, $p < 0.001$, eta = 0.34; $F_{(2,945)} = 48.02$, $p < 0.001$, eta = 0.30. For Beadnose,

all three models were significant. Model results are presented respectively: $F_{(2,940)} = 74.98$, $p < 0.001$, eta = 0.37; $F_{(2,927)} = 42.52$, $p < 0.001$, eta = 0.29; $F_{(2,920)} = 81.29$, $p < 0.001$, eta = 0.39. For pairwise comparisons for all three dependent variables per bear see Table 3.

Discussion

The purpose of this study was to determine (1) if bearcam viewers could identify individual/favorite bears, and (2) if this ability affected conservation outcomes associated with ecotourism (i.e., awareness, behavioral intention, and emotional connection). In so doing, this study sought to provide empirical support for broadening strategic components of ecotourism to include, where possible, identification of individual animals. Within the context of this study, watching the bearcams was considered an ecotourism experience. This is supported by previous work that shows the role internet-based resources can play in ecotourism (Ardoin et al., 2015; Skibins and Sharp, 2019).

Ability to identify individual/favorite bears

Nearly three-quarters of online bearcam viewers indicated they could identify an individual bear when it was onscreen. Furthermore, of those respondents, 79% could identify two or more bears and more than half had a favorite bear (see Figures 2A–C). These data support and extend onsite bear viewing experiences, wherein tourists were able to distinguish sows, boars, juveniles, and cubs. Additionally, the frequencies of bearcam viewers' ability to identify one or more bears align with frequency distributions for onsite viewing of bear groupings (Keating and Krannich, 2020).

However, this issue raises the question if online and onsite results are an artifact of study design, or if they are accurate representations of tourists' identification abilities. For example, Keating and Krannich (2020) found the majority of tourists saw groups of bears. It is possible that online and onsite viewers' identification ability was correlated with bears being in groups. The ability to parse out this potential mediating variable was beyond the scope of this study but warrants further analysis.

In addition to their ability to identify an individual bear, online viewers were asked if they had a favorite bear(s). Responses were not dependent on ability to identify an individual. More than half of all respondents reported having a favorite bear(s) (Figure 2C). Shifting from identifying individual bears to having a favorite may be indicative of one or more variables known to influence tourism-related conservation outcomes. For example, anthropomorphism (Manfredo et al., 2020), charismatic characteristics (Skibins et al., 2017), and emotional valence and novelty (Abidin and Jacobs, 2019) have been shown to positively influence wildlife tourism experiences and conservation outcomes. Such variables could also help viewers identify individuals and favorites. Future studies could quantify and qualify the influence of these variables, as the purpose of this study was restricted to exploring if favorites were present.

The high percentage of viewers having one or more favorite bears may also be linked to Lorimer's (2007) three facets of non-human charisma (ecological, aesthetic, and corporeal). Extended online viewing of bears may provide haecceity (i.e., moments of enchanting proximity) wherein all three facets of charisma are being activated within viewers (Lorimer, 2007). If this is the case, the charismatic potential of Alaskan brown bears could be a potent tool to further expand internet-based components of ecotourism experiences. Operators and managers could explore such capacities in other species to help form bridges between online and onsite tourism experiences.

These results support the capacity of online viewers' ability to identify individual/favorite bears. The ability to identify individuals and favorites contributes to the growing literature surrounding the increasing sophistication of ecotourists. Ecotourists are not only demonstrating a greater demand for specialty tourism experiences, they are also bringing an evolving skill set (Rodriguez-Giron and Vanneste, 2019; Abrams et al., 2020; Ghazvini et al., 2020). The combination of more nuanced interests combined with better field skills could allow operators and managers to better blend experiential and conservation opportunities.

It is important to note that respondents' success rates for accurately identifying an individual bear were not assessed. That is to say, this study did not seek to evaluate identification accuracy, but rather presence/absence of the variable. To that end, the self-reported ability to identify individual bears, regardless of accuracy, emerged as meaningful experiential variable.

Conservation outcomes associated with identifying individual/favorite bears

Viewers who could identify individual/favorite bears reported higher levels of conservation outcomes (i.e., awareness, behavioral intention, and emotional connection) compared to viewers who could not identify individual/favorite bears. Furthermore, conservation outcomes improved with increases in the number of individuals viewers could identify. These results support the benefits of tourists' ability to identify individual/favorite bears within an ecotourism experience. These results are also consistent with Richardson and Lewis (2022) who found the ability to identify individuals positively influences willingness to pay to protect individual brown bears.

This study treated the following two statements as internet-based conservation outcomes that could be derived from a traditional ecotourism experience (Weaver, 2005), as well as being achieved from watching bearcams: (1) learning about and identifying bears (i.e., awareness) is main reason to watch, and (2) support for conservation programs (i.e., behavioral intention) (see Methods section for complete statements and survey context). For both statements, viewers who could identify an individual bear had significantly higher levels of agreement compared to viewers who could not identify a bear (Figure 3). Furthermore, for both statements, the effect size indicated a substantial relationship (Vaske, 2008) between identifying a bear and conservation outcomes.

Additional analyses revealed viewers' agreement with both statements increased with increases in number of identifiable bears (Table 1). Effect sizes for both statements indicate a substantial relationship. Taken in concert, these data support the efficacy of tourists' ability to identify individual bears as positively influencing conservation awareness and behavioral intention. It should be noted

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TABLE 3 Pairwise comparisons for specific bears, based on viewer response to increased time watching bearcam if bear is visible.

Bear	Yes	Sometimes	No
Otis			
Main reason I watch the live bearcams[#]	5.17 ± 1.56^{a}	4.75 ± 1.58^{b}	3.35 ± 1.77^{c}
Influences my willingness to support conservation programs[#]	4.96 ± 1.70^{a}	4.50 ± 1.82^{b}	3.42 ± 1.80^{c}
Conservation caring	7.20 ± 1.43^{a}	6.92 ± 1.52^{a}	5.90 ± 1.63^{b}
Holly			
Main reason I watch the live bearcams[#]	5.22 ± 1.48^{a}	5.05 ± 1.59^{a}	3.60 ± 1.85^{b}
Influences my willingness to support conservation programs[#]	5.20 ± 1.65^{a}	4.91 ± 1.68^{a}	3.60 ± 1.84^{b}
Conservation caring	7.42 ± 1.39^{a}	7.10 ± 1.40^{a}	6.11 ± 1.66^{b}
#503			
Main reason I watch the live bearcams[#]	5.29 ± 1.57^{a}	4.97 ± 1.58^{a}	3.67 ± 1.80^{b}
Influences my willingness to support conservation programs[#]	5.03 ± 1.88^{a}	4.97 ± 1.67^{a}	3.68 ± 1.82^{b}
Conservation caring	7.22 ± 1.56^{a}	7.02 ± 1.50^{a}	6.08 ± 1.67^{b}
Beadnose			
Main reason I watch the live bearcams[#]	5.07 ± 1.71^{a}	5.19 ± 1.42^{a}	3.70 ± 1.87^{b}
Influences my willingness to support conservation programs[#]	4.83 ± 2.03^{a}	5.04 ± 1.65^{a}	3.81 ± 1.86^{b}
Conservation caring	7.64 ± 1.44^{a}	7.38 ± 1.28^{a}	6.13 ± 1.63^{b}

[#]Agreement scored on a 1 (strongly disagree) to 7 (strongly agree) Likert-type scale. Conservation caring scored on a 1 (strongly disagree) to 9 (strongly agree) Likert-type scale. Items within rows with different superscripts differ at $p < 0.05$.

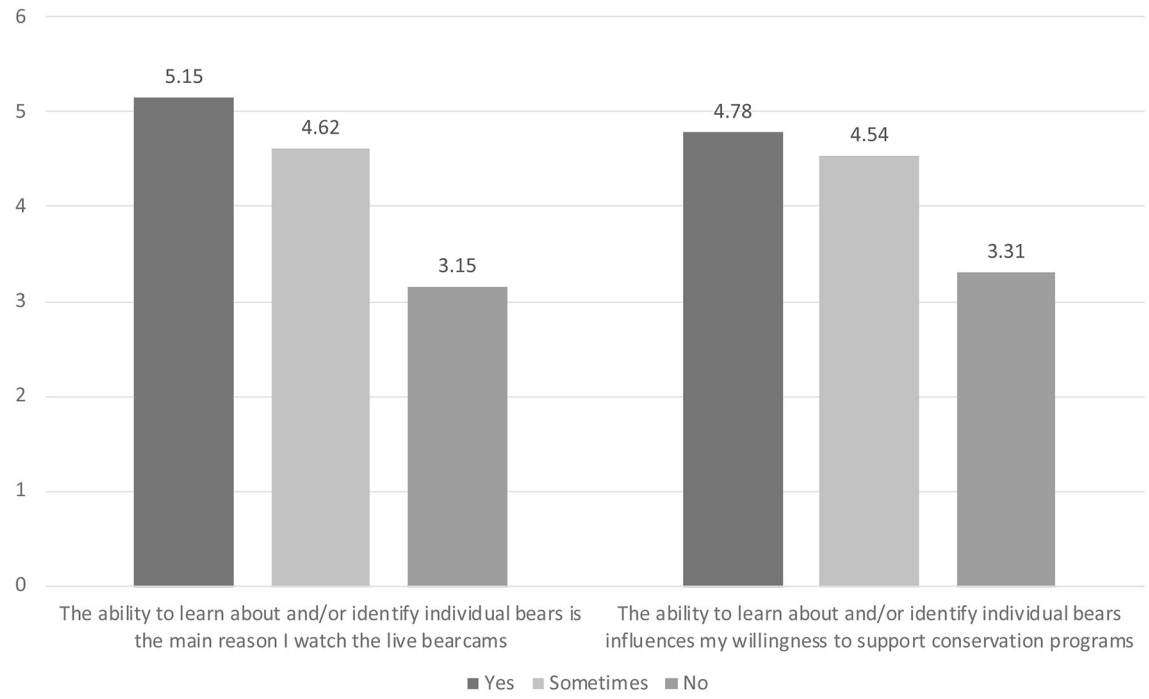

FIGURE 3
Conservation outcomes based on ability to identify individual bears. Agreement scored on a 1 (strongly disagree) to 7 (strongly agree) Likert-type scale.

that results only address mean differences between *a priori* categorical variables. Due to the exploratory nature of this study, it was not possible to structure the number of identifiable bears as a continuous variable, thus allowing for regression analyses. Future studies could be designed in such a manner to better explain this relationship.

Awareness and behavioral intention were also assessed based on viewers having a favorite bear(s). The pattern of agreement increasing (as noted above) based on having a favorite was observed for both statements. Effect sizes for both statements were close to the substantial relationship level (0.80) (Vaske, 2008). In combination

with the large percentage of viewers who were able to identify a favorite bear, these results support the positive role of bearcam viewers' capability of being keen observers of wildlife. Such skills could be applied to citizen science and volunteerism experiences within an ecotourism framework.

The relationship between identifying individuals and conservation caring was also assessed. Conservation caring is a measure of a person's emotional connection to wildlife. Emotional connectivity has been shown to be a predictor of conservation outcomes (Powell and Bullock, 2014). Conservation caring followed the same patterns as awareness and behavioral intention. Individuals who could identify a bear had significantly higher levels of conservation caring relative to viewers who could not identify a bear. Conservation caring levels increased as the number of identifiable bears increased (Table 2). In both instances, the effect size was typical as compared to substantial (Vaske, 2008) as was the case for awareness and behavioral intention.

This finding may suggest that online experiences are more effective for cognitive-based outcomes rather than affective-based outcomes. This is not incongruous with the nature of the online wildlife viewing experience, which may sporadically, intentionally or not, include elements known to facilitate an emotional connection. Although in this instance conservation caring levels were an important outcome, were quite high, and were aligned with onsite bear viewing studies (Verbos et al., 2015; Skibins and Sharp, 2017). This may be attributable to an inherent connection already present within an ursophile audience. The stronger relationship between online viewing experiences and cognitive-based outcomes may be fertile ground for operators and interpreters to explore.

Conservation outcomes were also evaluated based on viewing patterns associated with specific bears (Table 3). Respondents were asked if they spent more time watching when a specific bear was observable onscreen. Viewers who answered "yes" or "sometimes" had significantly higher conservation outcomes relative to viewers who did not spend extra time watching. In other words, intentionally watching the bearcams, when a specific bear was onscreen, yielded better conservation outcomes. This contributes to the work of Schuler and Skibins (2022) who proposed the use of internet-based resources as an emerging pro-conservation behavior for tourists, and Miller and Freimund (2017a) who link park management and interpretation objectives with social media use. Future studies could explore if webcams of other species have similar patterns.

Taken in concert, data from this study supports that assisting ecotourists to identify individual animals can make meaningful contributions to conservation outcomes. For operators and managers, this can expand their toolbox of interpretation and experiential components. For example, tourists who are able to identify individuals may form longer lasting connections to the venue, as they may be drawn to follow phenological and stochastic events. Additionally, strategically interlacing virtual and onsite experiences could provide a mechanism to overcome experiential issues such as crowding, cost, and access, as well as negative impacts to wildlife such as approach distances and forage disruption.

Individual identification may also spur new applications of theoretical ecotourism frameworks. For example, the idiosyncratic nature of identifying an individual animal during an ecotourism experience could enhance aspects of co-creation, which is being recognized as a useful bridge between tourist and guide (Conti, 2021). Alternatively, tourists' ability to identify individuals could contribute to multivariate sense of place models that expand the concept to address landscape and life story elements (Luci and Prat, 2021). This expansion better aligns sense of place with the triple bottom line of ecotourism.

Several factors limit the generalizability of these findings. First, the accuracy of viewers' ability to identify bears was not verifiable. Identification rates may have been over estimated. This caveat is paralleled in the identification of favorite bears. Viewers may have misidentified bears. Rates of successful recognition were unable to be calculated. Second, conservation outcomes were rudimentary in nature. Future studies could explore more detailed outcomes. Third, sample demographics may not align with onsite demographics. Fourth, sample demographics represented a higher proportion of female respondents. Future studies could explore more robust methodologies to align onsite and online sampling, and better balance demographic representation. Lastly, this study only explored behavioral intentions. While this is recognized as an acceptable proxy for behaviors (Smith and Sutton, 2008; Barua et al., 2010; Ballantyne et al., 2011), future studies could investigate actual behaviors as well as longitudinal adoption rates.

Conclusion

Within bear tourism, bearcam viewers may represent a new market segment, that of ursophile (i.e., bear lover). Evidence suggests online wildlife viewers spend large amounts of time watching bearcams, developing online communities, and recruiting friends and family (Skibins et al., 2022). Although these elements occur in traditional ecotourism experiences, their new online role coupled with a highly dedicated audience (Skibins and Sharp, 2017, 2019; Loomis et al., 2018; Richardson and Lewis, 2022), committed to a single species, can broaden engagement opportunities.

Self-report data from this study support bearcam viewers' ability to identify and connect with individual bears and select favorites. While this component of wildlife viewing may not be broadly applicable to *in situ* tourism experiences, it does contribute to the growing literature surrounding the role of web-based experiences within ecotourism (Skibins and Sharp, 2019; Ma et al., 2021; Richardson and Lewis, 2022). While the reliable and consistent concentration of megafauna, such as that at Brooks River, is rare, it is not unique. For example, many parks experience large and predictable concentrations of elk and bison. These species possess characteristics that aid in identifying individuals and behaviors that facilitate extended viewing. As such, managers in these locations could develop interpretation that could help viewers identify and connect to individuals. Furthermore, this information could be linked to web-based platforms to contribute to visitors' extended experiences (e.g., the infinite visit) (Skibins, 2021).

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by Bates College IRB. The Ethics Committee waived the requirement of written informed consent for participation.

Author contributions

JS: manuscript development, data analyses, survey development, and study design. LR, LL, and MF: survey development and study design. All authors contributed to the article and approved the submitted version.

Conflict of interest

MF was employed by Explore.org.

The remaining authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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References

Abidin, Z. A. Z., and Jacobs, M. (2019). Relationships between valence towards wildlife and wildlife value orientations. *J. Nat. Conserv.* 49, 63–68. doi: 10.1016/j.jnc.2019.02.007

Abrams, K. M., Leong, K., Melena, S., and Teel, T. (2020). Encouraging safe wildlife viewing in national parks: Effects of a communication campaign on visitors' behavior. *Environ. Commun.* 14, 255–270. doi: 10.1080/17524032.2019.1649291

Akhshik, A., Tusznio, J., and Strzelecka, M. (2022). Equifinal paths to megafauna conservation through memorable wildlife tourism experiences: evidence from the restitution of the European bison (*Bison bonasus*) in Poland. *Curr. Issues Tour.* 2021:1–21. doi: 10.1080/13683500.2022.2111298

Albert, C., Luque, G. M., and Courchamp, F. (2018). The twenty most charismatic species. *PLoS ONE* 13, e0199149. doi: 10.1371/journal.pone.0199149

Apps, K., Dimmock, K., and Huveneers, C. (2018). Turning wildlife experiences into conservation action: Can white shark cage-dive tourism influence conservation behaviour? *Mar. Policy* 88, 108–115. doi: 10.1016/j.marpol.2017.11.024

Arbieu, U., Grünewald, C., Martín-López, B., Schleuning, M., and Böhning-Gaese, K. (2017). Mismatches between supply and demand in wildlife tourism: Insights for assessing cultural ecosystem services. *Ecol. Indic.* 78, 282–291. doi: 10.1016/j.ecolind.2017.03.035

Ardoin, N. M., Wheaton, M., Bowers, A. W., Hunt, C. A., and Durham, W. H. (2015). Nature-based tourism's impact on environmental knowledge, attitudes, and behavior: a review and analysis of the literature and potential future research. *J. Sustain. Tour.* 23, 838–858. doi: 10.1080/09669582.2015.1024258

Balasubramaniam, K. N., Bliss-Moreau, E., Beisner, B. A., Marty, P. R., Kaburu, S. S. K., and McCowan, B. (2021). Addressing the challenges of research on human-wildlife interactions using the concept of Coupled Natural and Human Systems. *Biol. Conserv.* 257, 109095. doi: 10.1016/j.biocon.2021.109095

Ballantyne, R., Packer, J., and Falk, J. H. (2011). Visitors' learning for environmental sustainability: testing short- and long-term impacts of wildlife tourism experiences using structural equation modelling. *Tour. Manage.* 32, 1243–1252. doi: 10.1016/j.tourman.2010.11.003

Ballantyne, R., Packer, J., and Hughes, K. (2009). Tourists' support for conservation messages and sustainable management practices in wildlife tourism experiences. *Tour. Manage.* 30, 658–664. doi: 10.1016/j.tourman.2008.11.003

Bartoń, K. A., Zwijacz-Kozica, T., Zieba, F., Sergiel, A., and Selva, N. (2019). Bears without borders: long-distance movement in human-dominated landscapes. *Glob. Ecol. Conserv.* 17, e00541. doi: 10.1016/j.gecco.2019.e00541

Barua, M., Tamuly, J., and Ahmed, R. A. (2010). Mutiny or clear sailing? Examining the role of the Asian elephant as a flagship species. *Hum. Dimens. Wildl.* 15, 145–160. doi: 10.1080/10871200903536176

Bergman, J. N., Buxton, R. T., Lin, H.-Y., Lenda, M., Attinello, K., Hajdasz, A. C., et al. (2022). Evaluating the benefits and risks of social media for wildlife conservation. *FACETS* 7, 360–397. doi: 10.1139/facets-2021-0112

Buckley, R. C. (2022). Sensory and emotional components in tourist memories of wildlife encounters: intense, detailed, and long-lasting recollections of individual incidents. *Sustainability* 14, 4460. doi: 10.3390/su14084460

Bueddefeld, J. N., and Erickson, B. (2022). Wild bears, real bears and zoo bears: authenticity and nature in Anthropocene tourism. *Tour. Stud.* 22, 373–392. doi: 10.1177/14687976221131894

Conti, E. (2021). "Guides as forest experience co-creators: lessons learned at Fulufjället National Park, Sweden," in *Managing Visitor Experiences in Nature-based Tourism*, ed. J. N. Albrecht (Wallingford: CAB International), 34–49. doi: 10.1079/9781789245714.0004

Dillman, D. A. (2011). *Mail and Internet Surveys: The Tailored Design Method—2007 Update With New Internet, Visual, and Mixed-Mode Guide*. Hoboken: John Wiley and Sons.

Dillman, D. A., Hao, F., and Millar, M. M. (2017). "Improving the effectiveness of online data collection by mixing survey modes," in *The SAGE Handbook of Online Research Methods*, eds N. G. Fielding, R. M. Lee, G. Blank (London: SAGE), 220–238. doi: 10.4135/9781473957992.n13

Finkler, W., Higham, J. E., León, B., and Aitken, R. (2019). Bridging the void: science communication videos for sustainable whale watching. *Int. J. Sci. Educ. B* 9, 312–326. doi: 10.1080/21548455.2019.1671636

Flower, E. K., Burns, G. L., Jones, D. N., and McBroom, J. (2021). Does the experience make a difference? Comparing tourist attitudes pre-and post-visit towards the elephant tourism industry. *Ann. Tour. Res. Empir. Insights* 2, 100025. doi: 10.1016/j.annale.2021.100025

Ford, A. T., Ali, A. H., Colla, S. R., Cooke, S. J., Lamb, C. T., Pittman, J., et al. (2021). Understanding and avoiding misplaced efforts in conservation. *Facets* 6, 252–271. doi: 10.1139/facets-2020-0058

Fortin, J. K., Rode, K. D., Hilderbrand, G. V., Wilder, J., Farley, S., Jorgensen, C., et al. (2016). Impacts of human recreation on brown bears (*Ursus arctos*): a review and new management tool. *PLoS ONE* 11, e0141983. doi: 10.1371/journal.pone.0141983

Ghazvini, S. A. M., Timothy, D. J., and Sarmento, J. (2020). Environmental concerns and attitudes of tourists towards national park uses and services. *J. Outdoor Recreat. Tour.* 31, 100296. doi: 10.1016/j.jort.2020.100296

Google (n.d.). *Google Map of Brooks Camp*. Available online at: https://www.google.com/maps/place/Brooks+Camp/@58.5568378,-155.7819485,477m/ (Retrieved January 12, 2023).

Hausmann, A., Slotow, R., Fraser, I., and Di Minin, E. (2017). Ecotourism marketing alternative to charismatic megafauna can also support biodiversity conservation. *Anim. Conserv.* 20, 91–100. doi: 10.1111/acv.12292

Hausmann, A., Tuuli, T., Rob, S., Henrikki, T., Atte, M., Vuokko, H., et al. (2018). Social media data can be used to understand tourists' preferences for nature-based experiences in protected areas. *Conserv. Lett.* 11, e12343. doi: 10.1111/conl.12343

Heikinheimo, V., Di Minin, E., Tenkanen, H., Hausmann, A., Erkkonen, J., and Toivonen, T. (2017). User-generated geographic information for visitor monitoring in a national park: a comparison of social media data and visitor survey. *ISPRS Int. J. Geo-Inform.* 6, 85. doi: 10.3390/ijgi6030085

Herrero, S., Smith, T., DeBruyn, T. D., Gunther, K., and Matt, C. A. (2005). From the field: brown bear habituation to people—safety, risks, and benefits. *Wildl. Soc. Bull.* 33, 362–373. doi: 10.2193/0091-7648(2005)33[362:FTFBBH]2.0.CO;2

Higginbottom, K. (2004). *Wildlife Tourism: Impacts, Management and Planning*. Sydney, NSW: Common Ground Publishing Pty Ltd.

Jacobs, M. H., Vaske, J. J., and Roemer, J. M. (2012). Toward a mental systems approach to human relationships with wildlife: the role of emotional dispositions. *Hum. Dimens. Wildl.* 17, 4–15. doi: 10.1080/10871209.2012.645123

Jacobs, M. H., Vaske, J. J., and Sijtsma, M. T. J. (2014). Predictive potential of wildlife value orientations for acceptability of management interventions. *J. Nat. Conserv.* 22, 377–383. doi: 10.1016/j.jnc.2014.03.005

Johnston, R. J., Boyle, K. J., Adamowicz, W., Bennett, J., Brouwer, R., Cameron, T. A., et al. (2017). Contemporary guidance for stated preference studies. *J. Assoc. Environ. Resour. Econ.* 4, 319–405. doi: 10.1086/691697

Kamphof, I. (2011). Webcams to save nature: online space as affective and ethical space. *Found. Sci.* 16, 259–274. doi: 10.1007/s10699-010-9194-7

Keating, J. M., and Krannich, R. S. (2020). An assessment of factors influencing bear viewing experiences on the Kodiak National Wildlife Refuge: implications for management. *Hum. Dimens. Wildl.* 25, 268–280. doi: 10.1080/10871209.2019.1705438

Loomis, J., Richardson, L., Huber, C., Skibins, J., and Sharp, R. (2018). A method to value nature-related webcam viewing: the value of virtual use with application to brown bear webcam viewing. *J. Environ. Econ. Policy* 7, 453–462. doi: 10.1080/21606544.2018.1483842

Lorimer, J. (2007). Nonhuman charisma. *Environ. Plan. D Soc. Space* 25, 911–932. doi: 10.1068/d71j

Luci, A. R., and Prat, A. G. (2021). "Sense of place and meaning attributed to nature as a tool for understanding tourists' experiences in nature-based tourism destinations-the visitor perspective," in *Managing Visitor Experiences in Nature-Based Tourism*, ed J. N. Albrecht (Wallingford: CAB International), 49–66. doi: 10.1079/9781789245714.0005

Ma, A. T., Ng, S. L., Cheung, L. T., and Lam, T. W. (2021). How do uses of and gratifications from social media platforms drive responsible birdwatching behavior? *Glob. Ecol. Conserv.* 27, e01614. doi: 10.1016/j.gecco.2021.e01614

Manfredo, M. J., Urquiza-Haas, E. G., Carlos, A. W. D., Bruskotter, J. T., and Dietsch, A. M. (2020). How anthropomorphism is changing the social context of modern wildlife conservation. *Biol. Conserv.* 241, 108297. doi: 10.1016/j.biocon.2019.108297

McIntosh, D., and Wright, P. A. (2017). Emotional processing as an important part of the wildlife viewing experience. *J. Outdoor Recreat. Tour.* 18, 1–9. doi: 10.1016/j.jort.2017.01.004

Miller, Z. D. (2019). A Theory of Planned Behavior approach to developing belief-based communication: Day hikers and bear spray in Yellowstone National Park. *Hum. Dimens. Wildl.* 24, 515–529. doi: 10.1080/10871209.2019.1655682

Miller, Z. D., and Freimund, W. (2017a). Using visual-based social norm methods to understand distance-related human-wildlife interactions. *Hum. Dimens. Wildl.* 23, 176–186. doi: 10.1080/10871209.2017.1397825

Miller, Z. D., and Freimund, W. (2017b). Virtual visitors: facebook users and national parks. *J. Park Recreat. Admin.* 35, 136–150. doi: 10.18666/JPRA-2017-V35-I3-8010

National Park Service (2022). Available online at: https://www.nps.gov/katm/planyourvisit/brooks-camp.htm (accessed January 12, 2023).

Pearce, J., Strickland-Munro, J., and Moore, S. A. (2017). What fosters awe-inspiring experiences in nature-based tourism destinations? *J. Sustain. Tour.* 25, 362–378. doi: 10.1080/09669582.2016.1213270

Penteriani, V., López-Bao, J. V., Bettega, C., Dalerum, F., Delgado, M., d,. M., et al. (2017). Consequences of brown bear viewing tourism: a review. *Biol. Conserv.* 206, 169–180. doi: 10.1016/j.biocon.2016.12.035

Powell, D. M., and Bullock, E. V. (2014). Evaluation of factors affecting emotional responses in zoo visitors and the impact of emotion on conservation mindedness. *Anthrozoos* 27, 389–405. doi: 10.2752/175303714X13903827488042

Richardson, L., Huber, C., and Loomis, J. (2017). Challenges and solutions for applying the travel cost demand model to geographically remote visitor destinations: a case study of bear viewing at Katmai National Park and Preserve. *Hum. Dimens. Wildl.* 22, 550–563. doi: 10.1080/10871209.2017.1369196

Richardson, L., and Lewis, L. (2022). Getting to know you: individual animals, wildlife webcams, and willingness to pay for brown bear preservation. *Am. J. Agric. Econ.* 104, 673–692. doi: 10.1111/ajae.12249

Rode, K. D., Farley, S. D., Fortin, J., and Robbins, C. T. (2007). Nutritional consequences of experimentally introduced tourism in brown bears. *J. Wildl. Manage.* 71, 929–939. doi: 10.2193/2006-075

Rode, K. D., Farley, S. D., and Robbins, C. T. (2006). Behavioral responses of brown bears mediate nutritional effects of experimentally introduced tourism. *Biol. Conserv.* 133, 70–80. doi: 10.1016/j.biocon.2006.05.021

Rodriguez-Giron, S., and Vanneste, D. (2019). Tourism systems thinking: towards an integrated framework to guide the study of the tourism phenomenon. *Tour. Cult. Commun.* 19, 1–16. doi: 10.3727/109830419X15489421397219

Santarém, F., Pereira, P., Saarinen, J., and Brito, J. C. (2019). New method to identify and map flagship fleets for promoting conservation and ecotourism. *Biol. Conserv.* 229, 113–124. doi: 10.1016/j.biocon.2018.10.017

Schlagloth, R., Santamaria, F., Golding, B., and Thomson, H. (2018). Why is it important to use flagship species in community education? The Koala as a case study. *Anim. Stud. J.* 7, 127–148.

Schuler, G. M., and Skibins, J. C. (2022). #oldnews: Diffusion of pro-conservation behaviors and social media in wildlife tourism. *Hum. Dimens. Wildl.* 2022, 1–15. doi: 10.1080/10871209.2022.2078522

Shreedhar, G., and Mourato, S. (2019). Experimental evidence on the impact of biodiversity conservation videos on charitable donations. *Ecol. Econ.* 158, 180–193. doi: 10.1016/j.ecolecon.2019.01.001

Skibins, J. C. (2021). "The infinite visit: a unifying temporal/spatial framework for visitor management," *in Managing Visitor Experiences in Nature-Based Tourism*, ed. J. N. Albrecht (Wallingford: CAB International), 21–33. doi: 10.1079/9781789245714.0003

Skibins, J. C., Das, B. M., and Schuler, G. (2022). Digital modalities, nature, and quality of life: mental health and conservation benefits of watching bear cams. *Hum. Dimens. Wildl.* 2022, 1–15. doi: 10.1080/10871209.2021.2024629

Skibins, J. C., Dunstan, E., and Pahlow, K. (2017). Exploring the influence of charismatic characteristics on flagship outcomes in zoo visitors. *Hum. Dimens. Wildl.* 22, 157–171. doi: 10.1080/10871209.2016.1276233

Skibins, J. C., Powell, R. B., and Hallo, J. C. (2013). Charisma and conservation: charismatic megafauna's influence on safari and zoo tourists' pro-conservation behaviors. *Biodivers. Conserv.* 22, 959–982. doi: 10.1007/s10531-013-0462-z

Skibins, J. C., and Sharp, R. L. (2017). Evaluation of the brown bear viewing experience at Katmai National Park and Preserve: implications for management. *Hum. Dimens. Wildl.* 22, 476–482. doi: 10.1080/10871209.2017.1336584

Skibins, J. C., and Sharp, R. L. (2019). Binge watching bears: efficacy of real vs. virtual flagship exposure. *J. Ecotour.* 18, 152–164. doi: 10.1080/14724049.2018.1553977

Smith, A., and Sutton, S. (2008). The role of flagship species in the formation of conservation intentions. *Hum. Dimens. Wildl.* 13, 127–140. doi: 10.1080/10871200701883408

Smith, T. S., Herrero, S., and DeBruyn, T. D. (2005). Alaskan brown bears, humans, and habituation. *Ursus* 16, 1–10. doi: 10.2192/1537-6176(2005)016[0001:ABBHAH]2.0.CO;2

Smith, T. S., Herrero, S., Debruyn, T. D., and Wilder, J. M. (2008). Efficacy of bear deterrent spray in Alaska. *J. Wildl. Manage.* 72, 640–645. doi: 10.2193/2006-452

Storie, M., and Vining, J. (2018). From Oh to Aha: characteristics and types of environmental epiphany experiences. *Hum. Ecol. Rev.* 24, 155–180. doi: 10.22459/HER.24.01.2018.08

Tabachnick, B. G., and Fidell, L. S. (2007). *Using Multivariate Statistics (5th ed.)*. London: Pearson Education, Inc.

Thomas-Walters, L., and Raihani, N. J. (2017). Supporting conservation: the roles of flagship species and identifiable victims. *Conserv. Lett.* 10, 581–587. doi: 10.1111/conl.12319

Vaske, J. J. (2008). *Survey Research and Analysis: Applications in Parks, Recreation and Human Dimensions*. Andover, MA: Venture Publishing, Inc.

Verbos, R. I., Brownlee, M. T. J., and Skibins, J. C. (2015). Understanding visitors' commitment to grizzly bear conservation at Denali National Park and Preserve. *Alaska Park Sci.* 14, 60–69.

Verbos, R. I., Zajchowski, C. A. B., Brownlee, M. T. J., and Skibins, J. C. (2017). 'I'd like to be just a bit closer': wildlife viewing proximity preferences at Denali National Park and Preserve. *J. Ecotour.* 17, 409–424. doi: 10.1080/14724049.2017.1410551

Walpole, M. J., and Leader-Williams, N. (2002). Tourism and flagship species in conservation. *Biodivers. Conserv.* 11, 543–547. doi: 10.1023/A:1014864708777

Weaver, D. B. (2005). Comprehensive and minimalist dimensions of ecotourism. *Ann. Tour. Res.* 32, 439–455. doi: 10.1016/j.annals.2004.08.003

White, P. J., Gunther, K. A., and Van Manen, F. T. (2017). *Yellowstone Grizzly Bears: Ecology and Conservation of an Icon of Wildness*. Crow Agency, MT: National Park Service, Yellowstone National Park.

Woods, B. (2000). Beauty and the beast: preferences for animals in Australia. *J. Tour. Stud.* 11, 25–35.