Author's Accepted Version, Published Article Available At: https://doi.org/10.1080/10871209.2024.2325157

Accessible birding in the United States: Constraints to and facilitators of birding with disabilities

Emily N. Sinkular[a], A.A. Dayer[a]*, F.A. McGregor[a], and M.J. Karns[a]

[a] *Department of Fish and Wildlife Conservation, Virginia Tech, Blacksburg, United States*

Address correspondence to Ashley A. Dayer, Department of Fish & Wildlife Conservation, College of Natural Resources and the Environment, Virginia Polytechnic and State University, Cheatham Hall, 310 West Campus Drive (MC0321), Blacksburg, VA 24061, USA. E-mail: dayer@vt.edu

Acknowledgments:

First, we would like to thank our survey participants for taking the time to contribute to our research. We would also like to thank the Association of Fish and Wildlife Agencies Wildlife Viewing and Nature Tourism Working Group for their collaboration on the wildlife viewer survey. We'd like to thank Christy Pototsky for assistance with figures. We'd also like to acknowledge the Associate Editor and anonymous reviewers who contributed to the improvement of this manuscript. This project was funded by the U.S. Fish and Wildlife Service's Multistate Conservation Grant Program (grant # F21AP00617-00), which is jointly managed by the Association of Fish and Wildlife Agencies and the Service's Wildlife and Sport Fish Restoration Program.

Author's Accepted Version, Published Article Available At: https://doi.org/10.1080/10871209.2024.2325157

Accessible birding in the United States: Constraints to and facilitators of birding with disabilities

While approximately one-quarter of the U.S. population has a disability, many people with disabilities remain excluded from equitable participation in birding. In this study, we compared the constraints and facilitators of birders with and without disabilities from a nationwide survey of U.S. wildlife viewers. Next, we analyzed open-ended responses in a survey of birders with disabilities to characterize constraints and facilitators using models of disabilities, or different frames of reference to understand disabilities. We found that birders with disabilities, compared to those without, experienced constraints to birding to a greater extent. However, birders with and without disabilities expressed interest in various facilitators (e.g., access to more high-quality birding locations, information about birding), suggesting that facilitators can benefit both groups. Birders invoked multiple models when describing their constraints to and facilitators of birding, highlighting a need for a multi-faceted approach to fostering greater levels of inclusivity in birding.

Keywords: accessibility; birding; models of disability; people with disabilities; wildlife viewing

Introduction

One in four adults in the United States have a disability, defined as "any condition of the body or mind (impairment) that makes it more difficult for the person with the condition to do certain activities (activity limitation) and interact with the world around them (participation restrictions)" (Centers for Disease Control, 2020). People with disabilities[1] are historically

[1] Some members of the disability community want to be recognized as "disabled people" and other people prefer "people with disabilities." In this paper we use a mixed approach to this terminology, along with using "birders who experience accessibility challenges", to be as inclusive as possible.

underserved in wildlife-related recreation (Freudenberg & Arlinghaus, 2009), including birding (Rolim et al., 2021), contributing to inequitable opportunities to benefit from documented mental health benefits that can result from birding and spending time in nature (Hammoud et al., 2022; Jakubec et al., 2016; Murawiec et al., 2021). This is in spite of the inherent adaptability of birding, which can be done stationary or from one's window, by ear, alone, or in a group, and so can be modified to suit an individual's access needs (McGregor, 2021). The persistence of ableism, or discrimination in favor of nondisabled people, restricts the participation of people with disabilities in equitably experiencing nature (Bell, 2019). Birding has been shown to decrease feelings of loneliness (Bell, 2021), making it even more important to make birding more inclusive to people with disabilities, who generally report increased feelings of loneliness compared to nondisabled people (MacDonald et al., 2018)

To overcome ableism in birding and to better support disabled birders' experiences, researchers and practitioners alike need to better understand the constraints to and facilitators of birding with disabilities. In leisure activities, constraints "affect [recreationists'] leisure preferences, inhibit their desire to undertake new activities, reduce their enjoyment in leisure, and limit their full involvement in leisure" (Tsai & Coleman, 1999, p. 243). Conversely, facilitators are factors that support leisure participation (Raymore, 2002). While a variety of constraints limit the participation of people with and without disabilities in outdoor recreation, people with disabilities may experience constraints to a greater degree, highlighting the need to compare constraints between these two groups (Freudenberg & Arlinghaus, 2009; Smith, 1987). Additionally, identifying facilitators desired by target audiences may support better management of wildlife viewing, including birding (Lauber et al., 2002) and clarify who will

benefit from the investment in programming or infrastructure. The purpose of this study is to understand the experiences of people with disabilities in birding by characterizing the constraints and facilitators of disabled birders.

Models of disability

Models of disability are different lenses used to characterize the experiences of people with disabilities and create frameworks for how to support people with disabilities (Smart, 2009). Importantly, models of disability cannot be considered mutually exclusive from one another; they are representations of the reality of disability (Smart & Smart, 2006). Additionally, models are subjective (Beaudry, 2016) as their definitions evolve over time. When properly harnessed, models provide value to shaping and guiding research (Llewellyn & Hogan, 2000) and recreation management (von Benzon, 2009). For example, models of disability may be used to characterize the constraints to and facilitators of birding. Recreational literature suggests no single model exists to create inclusive experiences for all people with disabilities; rather, a mix of models must be considered in wildlife-related recreation (Freudenberg & Arlinghaus, 2009; Zajadacz, 2015). Relevant models to birding may include the geographic model, which places emphasis on the built or natural physical environment, and the social model, which concerns society's acceptance of and attitudes toward disability and frames these attitudes and the outcomes of them as the disabling factor, rather than the individual inherently having a deficit (Table 1).

Constraints and facilitators to birding

A variety of constraints can impact participation in outdoor recreation, including birding. These include crowds in birding locations, having few people to bird with, financial costs associated

with birding, lack of facilities at viewing locations, lack of free time to participate in birding, not knowing where to go birding, and safety concerns when birding (Green et al., 2009; Ghimire et al., 2014). Other constraints include the distance to birding locations, lack of transportation to birding locations, lack of birding skills, and lack of access to equipment for birding (Green et al., 2009; Grooms et al., 2020; NAWMP, 2021). Finally, lack of organized birding opportunities (such as educational programs or community groups to join for wildlife viewing) and a scarcity of people who support birding also constrain participation (Rutter et al., 2021).

Researchers in Virginia identified twelve facilitators to wildlife viewing and birding: information about when and where to view birds, information about birds, access to more birding locations, information about when and where to bird where there is no hunting, information about how to bird, more opportunities for children or youth to bird, more birding events, more programs to improve birding skills, more programs to interact with other birders, more training for birding guides, more volunteer data collection opportunities, more birding staff (in state agencies), more birding amenities, and more volunteer opportunities not related to data collection (Grooms et al., 2020). Other facilitators include more virtual programs (Skibins & Sharp, 2019) and more accessible features in birding locations (Rolim et al., 2021).

Study aims and research questions

This study aims to understand key characteristics of experiences of birders with disabilities through examining constraints to and facilitators of birders and the birding experience. First, we compare the constraints and facilitators of birders with and without disabilities. Second, we use different models of disability to characterize the constraints and facilitators identified by disabled birders. We will address the following research questions:

(1) To what extent, if any, does the extent of constraints to and interest in birding facilitators differ between birders with and without disabilities?

(2) What models of disability best characterize constraints to and facilitators of birding for disabled birders?

Based on previous research about outdoor recreation and disabilities (Smith, 1987), we hypothesize that disabled birders will be limited to a greater extent by all constraints compared to birders without disabilities, and that a greater proportion of birders with disabilities will desire more birding facilitators in comparison with birders without disabilities. We predict there will be no dominant model of disability to characterize constraints to and facilitators of birding, rather a mix of models will emerge (Zajadacz, 2015).

Methods

This study consists of two separate survey efforts. First, to address research question one, we used an online panel survey of wildlife viewers to compare birders with and without disabilities. Next, we analyzed a dataset from a free-response survey of birders with disabilities to address research question two.

Nationwide survey of wildlife viewers

Survey construction and administration

All human subject research in this study was conducted with approval from, and in accordance with, the Virginia Tech Institutional Review Board (Protocol #20-1018). We conducted a panel survey of wildlife viewers in the United States in collaboration with the Association of Fish and Wildlife Agencies (AFWA) Wildlife Viewing and Nature Tourism Working Group. In the context

of declining response rates to mail and phone surveys, electronic surveys, including panel surveys, have shown to be a valuable tool for conducting online social science research (Wardropper et al., 2021). In this panel survey the company Qualtrics recruited potential survey takers and then provided them with financial compensation for completing surveys administered directly by Qualtrics. Following best practices for panel survey research (Wardropper et al., 2021), we incorporated three strategies to ensure high-quality responses: minimum completion time; quotas based findings from the 2016 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation on age, education, and binary gender; and attention checks. We required that 22% of respondents be between 18 and 34 years old, 33% be between 35 and 54 years old, and 45% be 55 years old or older (U.S. DOI et al., 2018). Those who violated two or more attention checks were not included in the complete responses.

We developed a questionnaire that opened with a statement about the study and asked for respondent consent. Next, we used screening questions to ensure all respondents were over the age of 18 and participated in wildlife viewing in the last five years (defined as intentionally observing, feeding, or photographing wildlife, or traveling to parks or other natural areas to observe, feed, or photograph wildlife, or taking pictures of wild birds). We provided respondents a list of 13 constraints to wildlife viewing and asked them to indicate the extent to which each limited their participation from a scale of 1 (*not at all)* to 5 (*extremely*; Table 2). We also provided respondents with a list of 16 facilitators to wildlife viewing and asked them to select all they were interested in (Table 2).

After constructing the survey, we piloted it with colleagues and Qualtrics panel participants. We then purchased a minimum of 1,000 responses from each of the four AFWA regions (Northeast, Southeast, Midwest, and West) of the United States and received 4,030 complete responses. Qualtrics administered our questionnaire to panel participants from August 6 to September 27th, 2021.

Survey analysis

We calculated weights for the data to account for total populations of wildlife viewers across the U.S. based on state of residency (U.S. DOI et al., 2018) and conducted analysis in the Statistical Package for Social Sciences (SPSS Version 28.0.1.1). In this study, we only analyzed birders, defined as wildlife viewers who reported that they fed and/or observed wild birds in the past five years. We considered birders to be disabled if they reported experiencing *somewhat*, *quite a bit*, or *a great deal* of accessibility challenges, defined as "the difficulties someone experiences in interacting with or while using the physical or social environment while trying to engage in a meaningful activity (such as wildlife viewing). This may be a result of a mobility challenge, blindness or low vision, intellectual or developmental disabilities (including Autism), mental illness, being Deaf or hard of hearing, or other health concerns" (Birdability, 2021). An exploratory factor analysis revealed no patterns across the constraints so we examined them independently. We checked for normal distribution of data and conducted an independent sample t-test with Bonferroni-corrected p-values to compare the extent to which constraints limited participation in birding based on birders' self-reported levels of accessibility

challenges. Finally, we used a Chi-Square test to compare the proportion of disabled and nondisabled birders who expressed interest in different facilitators ($p < .001$).

Survey of birders with disabilities

Survey construction and administration

One of the co-authors (FM) administered a survey to a convenience sample (Etikan et al., 2016) of birders who identified as having a disability. This questionnaire consisted of a mix of free-response and close-ended questions on constraints, facilitators, social support, and information about their disabilities. Virginia Tech received a de-identified dataset from the co-author and the analysis was deemed "not research involving human subjects" (IRB 21-1074). The questionnaire began with a consent statement about the use of data to inform management and improve understanding of birders with disabilities. All questions analyzed in this study were free-response. To understand constraints, the response prompt was, "Please describe for each obstacle how it impacts your ability to go birding." To examine the facilitators to birding with disabilities, the prompt was, "Based on your previous experiences, what kinds of changes to birding accessibility (including the accessibility of birding sites) would benefit you most?" Finally, in order to broadly categorize the disability of respondents, the questionnaire stated "The primary disability, illness, injury, medical condition or other health concern that impacts my ability to go birding is… (It's OK not to answer if you'd rather not.)." The survey was administered online from October 16, 2020 – February 7, 2021, through social media, online events and email listservs.

Survey analysis

Following survey administration, Virginia Tech received the dataset and removed five verbatim duplicate responses. Then, we qualitatively coded the responses to questions about the constraints of and facilitators to birding with disabilities (Table 1). We utilized deductive coding, meaning we began with predefined codes from existing theory (LaRossa, 2005), specifically models of disability. All co-authors reviewed and agreed upon definitions in the codebook prior to coding. To ensure high interrater reliability, two co-authors (ES & MK) coded 20 responses together from each question, then moved on to independently coding and reaching consensus via discussion when discrepancies occurred (Belur et al., 2021). In results, we present models in descending order based on prevalence of the codes in the responses.

Results

Nationwide survey of wildlife viewers

Of 4,030 complete responses, 85% of respondents (n = 3,418) were birders. The mean age of birders was 51 years old (sd = 18) and 41% were women, which aligns with previous findings that the mean age of birders was 52 and 44% were women (U.S. Fish and Wildlife Service, 2019). Over a third of the birders (39%; n = 1,294) self-identified as experiencing an access challenge while birding. Birders with disabilities were significantly younger (M = 47; sd = 17) than birders without disabilities (M = 55; sd = 17; t = 12.06; df = 3,387; $p < .001$). When comparing binary gender, the gender of birders with and without accessibility challenges did not vary significantly ($\chi^2 = 5.68$, df = 1, $p = .017$). Birders with accessibility challenges generally self-rated their skill level higher than birders without accessibility challenges ($\chi^2 = 111.8$, df = 4, $p < .001$). Specifically, 17.3% of disabled birders said they were *advanced* or *expert* birders, compared to only 6.6% of birders without disabilities.

Constraints to birding

Descriptive tests revealed that birders with disabilities were significantly more limited than nondisabled birders by all constraints (Figure 1). The absolute value of effect size (Cohen's *d*) ranged from 0.65 - 1.34 (Supplementary Table 1), which is considered a typical to substantial relationship (Vaske, 2019). A lack of accessible features, safety concerns, and crowds at birding sites, as well as a lack of time, money, knowledge and equipment limited birders with disabilities to a greater extent than nondisabled birders. Additionally, lack of social support (specifically, lack of organized wildlife viewing opportunities, people to go birding with, and people who support viewing) limited birders with disabilities to a greater extent than nondisabled birders. Distance to wildlife viewing locations was the most limiting constraint for birders with and without disabilities. Lack of people who support their wildlife viewing was the least limiting constraint for disabled birders, and accessibility challenges for themselves or people they view with was the least limiting to birders without disabilities.

Facilitators to birding

Generally, more birders with disabilities expressed interest in nearly all surveyed facilitators than birders without disabilities, with only a few exceptions. Effect size (Cramer's V) ranged from 0.00 - 0.13 (Supplementary Table 2), which is considered a minimal relationship (Vaske, 2019). More disabled birders expressed interest in more wildlife viewing staff and programming than nondisabled birders, specifically, programs to interact with other viewers, programs to improve their wildlife viewing skills, training for wildlife viewing mentors, opportunities to volunteer for data collection, and virtual programs. Further, a higher proportion of disabled

birders expressed interest in more information about where to view wildlife, and information about accessible features at wildlife viewing locations. A similar percentage of birders with and without disabilities were interested in more access to wildlife viewing locations, information about where and when to view wildlife where there is no hunting, information about wildlife in their state, volunteer opportunities not related to collecting data, and wildlife viewing amenities. Notably, twice as many birders without disabilities, in comparison to birders with disabilities, reported they were interested in none of the options.

Survey of birders with disabilities

The survey of disabled birders received 148 unique responses. Less than one-tenth (8%) of respondents were 10-25 years old, 24% were 26-40 years, 45% were 41-65 years old, 22% were 66+ years old, and one respondent did not disclose their age. Over half (59%) of respondents had a mobility disability, most often as a result of a spinal cord injury or multiple sclerosis. Approximately one-quarter (27%) reported having a chronic illness, including chronic fatigue, Lyme disease, lupus, or irritable bowel syndrome. One-tenth (10%) of respondents reported they are Deaf (they primarily use sign language to communicate; Napier, 2002) or have mild to severe hearing loss. Approximately one-fifth of respondents reported being neurodivergent or having a learning disability, mental illness, visual disability, or a neurological condition or brain injury. Less one-tenth (7%) of respondents did not state their disability, and one-fifth (22%) reported having multiple disabilities.

Characterizing constraints and facilitators to birding using models of disability

No single model emerged as the dominant model to characterize constraints to and facilitators of birding: when describing constraints, 81% of birders invoked more than one model, as did 85% of birders when describing facilitators. The social and geographic models most commonly appeared as both constraints to and facilitators of birding (see Table 1 for definitions of models of disability). Birders frequently used the identity model when describing their constraints to birding, but never as a facilitator. Additionally, neither the moral nor charity models emerged as constraints to nor facilitators of birding.

Geographic model

The geographic model emerged when birders described how birding locations and built structures such as bridges, ramps and viewing blinds can render locations inaccessible to them. This model does not consider the physical distance between a birder's home and a birding location. Most commonly, birders discussed being limited by a lack of benches or rest areas, lack of accessible parking, lack of bathrooms, including accessible bathrooms, and uneven, unreliable or unmaintained trail surfaces or poor trail design. For example, one birder noted, "Any uneven terrain impacts an experience and creates anxiety when one is with other people [who are] expecting a certain pace - rocky, loose surface[s], many slippery tree roots, numerous long slopes, or uneven surfaces requiring steps larger than 8 inches high." Respondents also discussed the importance of flexible trail design that incorporates various trail lengths and provides an exit strategy for those who need to leave early. When the geographic model emerged as a facilitator, birders were requesting modifications of and improvements to features that limited their participation.

Social model

The social model appeared when birders described both physical and intangible aspects of the birding experience. As a constraint, respondents often reflected on the attitudes and actions of nondisabled birders: irritation, lack of willingness to adapt (for example, slow down or talk louder), and dismissing disabilities due to the disabled birder's age or the presence of an invisible disability. When birders mentioned facilitators in line with the social model, they discussed the importance of creating more inclusive birding-related programming that incorporates, for example, traveling at a slower pace, building in stops, birding trips that pause near benches, and guides who have some knowledge of disability etiquette and are able to incorporate both visual and auditory birding skills into their programs. Birders also discussed the need for a societal change in attitudes toward disabilities (e.g., "normalizing not 'pitying' people with disabilities"). Birders noted that it was not enough for accessible spaces to simply exist, but that detailed information about their existence needs to be shared in many places in order for the spaces to be useful. As one respondent explained, "limited information about trail accessibility causes me to keep returning to tried and true trails and avoid exploring new sites." Importantly, when invoking the social model, birders also noted the importance of feeling that a space was designed with them in mind; this model overlaps slightly with the geographic model.

Cultural model

Constraints categorized under the cultural model focused on the importance of acceptance and birding with similar people. Birders often expressed feelings of shame, embarrassment, or self-

consciousness associated with their disability. The cultural model emerged as a facilitator when birders discussed coming together with other disabled birders to create a community and foster a sense of belonging. For example, birders who were Deaf or hard of hearing explicitly discussed a desire to bird with other birders with similar access challenges. One birder noted, "Bird trips geared to specific disabilities would be helpful especially if the leader is knowledgeable about limitations." Birders also hoped to find other birders without disabilities who were more welcoming of their disability and willing to adapt their birding experience to accommodate the disabled birder.

Identity model

Constraints that fell under the identity model were focused on the experiences of disabled birders. This included judgment from others, feeling isolated, and frustration with other people, organizations, or the inability to navigate a location. Birders tended to reflect the identity model as a facilitator when advocating for other disabled birders, including noting the need to normalize disabilities and raise awareness of them. Some birders noted their identity as a holistic, multi-faceted person, "When you look at me, I am a birder who is also disabled. I am not a disabled person who also birds."

Medical model

This model emerged as a constraint when birders described their disability using a range of medical language. Birders primarily described constraints that fell under the medical model when they explained their disability or how it prevented them from full participation. For example, a birder with chronic Lyme disease explained, "I have joint pain and get easily

fatigued. Birding is great for so many reasons and lets me be adventurous even though my body cannot do as much as it used to." No birders described any facilitators that fell under the medical model.

Human rights model

When birders discussed facilitators that fell under the human rights model they primarily focused on application and advancement of policy. Many birders relied heavily on locations that were compliant with trail accessibility standards: "So basically anywhere that is not fully ADA [Americans with Disabilities Act] compliant, I cannot bird." Other birders discussed that ADA compliance was not enough for a site to be truly accessible for them with comments such as, "[There should be] enhanced accessible restrooms that include toilet lifts for people with sit to stand challenges. ADA compliant toilet[s] are not high enough." Birders also talked about a need for equitable access to public transportation.

Limits model

The limits model reflected constraints related to traveling to birding locations, walking or standing for long periods of time, carrying or holding heavy items such as binoculars, or performing self-care tasks necessary for birding (such as changing into a rain jacket when it rains). A birder with mobility challenges stated, "I am limited on the distance I can walk as it becomes too painful to hike on uneven surfaces for long periods of time." Only one birder employed the limits model as a facilitator.

Additional models of disability

Only two birders invoked the functional model when describing constraints associated with birding. Specifically, they discussed a gradual loss of mobility due to aging and their progressive disability, but noted the desire to find birding sites they could still navigate. The economic model appeared once as a constraint when a birder noted they could not afford to travel to sites unless its accessibility was guaranteed. Birders did not use the functional or the economic model when describing facilitators to birding.

Discussion

In this study we found that 39% of birders identified as having a disability that led to access challenges that impacted their birding. Birders with disabilities faced more constraints, yet desired similar facilitators as nondisabled birders. When describing both their constraints to and facilitators of birding with disabilities, respondents alluded to a mix of models of disability.

Comparing disabled and nondisabled birders

We found that younger birders were more likely to self-identify as having a disability compared to older birders, which aligns with previous research that found younger individuals in the United States reported more acceptance of disabilities (Robbins et al., 2022). Our finding that over one-third of surveyed birders (39%) identified as having accessibility challenges shows that having a disability does not equal a lack of desire to participate in birding for all.

All people, with and without disabilities, experience constraints to participation in leisure activities (Smith, 1987). We found that birders with disabilities, compared to those without disabilities, were limited to a greater extent by constraints. For example, a lack of transportation to birding locations was a common constraint to participation in birding for

people without accessibility challenges (Grooms, 2020); however, people with disabilities are often further constrained by lack of access to transportation due to unique needs for accessibility in transportation (Loi & Kong, 2016). While promoting around-the-home birding, such as bird feeding, may allow birders with disabilities to still engage in this pastime, systemic change and policy solutions are needed to truly address this barrier.

The literature suggests people with disabilities may feel more lonely or socially isolated than people without disabilities (MacDonald et al. 2018). In line with this finding, we found that disabled birders were more limited by constraints related to programming and social support from others (specifically, lack of organized wildlife viewing opportunities within their community or social groups, few people to participate in wildlife viewing with, and few people who support wildlife viewing activities). Increasing accessibility for disabled birders may also provide them with more opportunity to experience the mental health benefits associated with birding (Hammoud et al., 2022; Jakubec et al., 2016; Murawiec et al., 2021).

Accessibility improvements often have benefits that go beyond the original audience (Blackwell, 2016). A similar proportion of birders with and without disabilities expressed interest in certain facilitators to birding, suggesting that birding programs or services that agencies or organizations offer could benefit all birders. For example, birders with and without disabilities expressed similar interest in access to more information (specifically, information about where and when to view wildlife where there is no hunting, more information about wildlife in their state, and more information about how to view wildlife). At a minimum, to facilitate accessible birding experiences, birding sites could provide detailed information about the location's overall accessibility and specific access features.

Birders with disabilities expressed interest in more wildlife viewing staff and more training for wildlife viewing guides than nondisabled birders. We suggest that agencies and non-profit organizations that work with wildlife viewers and other recreationists implement trainings for staff and volunteers on how to be inclusive of people with disabilities (Mahmoudzadeh & Kourdi Sarjaz, 2018). Additionally, disabled birders were more interested than nondisabled birders in having more programs to interact with other wildlife viewers. Many factors could contribute to this finding, such as a lack of accessible wildlife viewing programs (Rolim et al., 2021), or that disabled people are more likely to be socially isolated (MacDonald et al. 2018), which may increase their desire to socialize with others while enjoying a mutual hobby.

Qualitative analysis reveals need for a multimodal approach to inclusive birding

We found that the majority of birders invoked more than one model of disability when describing both their constraints to and facilitators of birding. Past research in accessible recreation shows a "need for a flexible 'mix of various models' aimed at finding optimal solutions" (Zajadacz, 2015, p. 189). Our research also supports this notion with no single model best capturing the experience of all or most birders with disabilities. Rather, we encourage researchers and managers to utilize a variety of models of disability to increase access for disabled birders.

In this study, the social and geographic models were most relevant when birders described both their constraints to and facilitators of birding, which may indicate that these models could be the most effective place for agencies and non-profit organizations to focus initially. The prominence of the social and geographic models highlights the importance of

changing attitudes, awareness, and physical designs of birding locations to increase accessibility and inclusion. The social model of disability views accessibility as society's responsibility to address, rather than the responsibility of a disabled individual (Michopoulou et al., 2015). To this end, community structures, both tangible (e.g., a poorly designed birding location) and intangible (e.g., an unwelcoming attitude from others), can prevent a person from participating. An increase in knowledge and skills around inclusion, accessibility and disability in staff and volunteers, especially in the context of birding, would likely support disabled birders in participation. Disability etiquette training that focuses on the social model of disability approach may be most beneficial. Importantly, agencies acknowledging the responsibility to support participation of disabled birders rests in society and the environment, not on the disabled person, may be crucial.

The geographic model of disability characterizes disability as "spatial exclusion" (Zajadacz, 2015, p. 191), in that disability occurs when somebody is unable to navigate a space. When describing both constraints and facilitators to birding, birders with disabilities consistently mentioned the importance of an inclusively designed space. To this end, thoughtful design of birding locations using the Principles of Universal Design (Zajadacz, 2015), or retrofitting to improve accessibility, may support disabled birders, such as improving the availability of accessible bathrooms, using firm and stable trail surfaces, maintaining trails, removing steps or steep slopes, and increasing the frequency of benches.

Our findings align with the literature stating that certain models of disability are no longer appropriate or desired by people with disabilities (Retief & Letśosa, 2018). For example, people with disabilities largely reject the charity model, which encourages pity from people

without disabilities (Retief & Letśosa, 2018). In line with these findings, this model did not emerge as either a constraint or facilitator to birding. This result highlights the need for nondisabled people to understand people with disabilities and approach them with respect and dignity, not pity. Similarly, birders did not invoke the moral/religious model, which describes disabilities as a curse or blessing (Retief & Letśosa, 2018). The absence of the moral or the charity model suggests that approaches under those models are not desired from disabled birders nor would they be beneficial as a basis for messaging or other interventions. Interestingly, birders with disabilities frequently employed the medical model, which characterizes disabilities as a deficit which must be cured (Ludwig, 1975), when describing constraints, but never facilitators. This suggests that while the medical model can resonate with constraints to participation in an activity, people with disabilities are not expecting medical approaches from wildlife managers to support their participation in birding. We expect this is something birders with disabilities seek from medical practitioners, which is why they did not mention it in the context of changes to birding accessibility (including the accessibility of birding sites) that would benefit them most.

Limitations and future research needs

While this study provides several insights, we note some limitations. Notably, both survey questionnaires were implemented from 2020 – 2021, during which time the COVID-19 pandemic and associated lockdown policies disproportionately impacted and restricted people with disabilities (Caleb & Gallin, 2020). Additionally, several respondents from the disabled birders survey noted difficulties completing the form due to an interface which was not compatible with screen reader technology, which may have resulted in the inability to capture

data from potential respondents who have visual disabilities, dyslexia, or visual processing disorders, among others. We were unable to conduct any nonresponse sampling or provide additional adaptations for people with difficulties navigating electronic interfaces because the survey was completed anonymously. Future surveys of people with disabilities should be designed to be accessible to screen reader software (Oh et al., 2021). While two of the authors of this paper identify as disabled birders and wildlife viewers, we encourage future research to be even more inclusive of disabled participants in research co-production by continuously engaging with this population throughout the research process, including when developing survey questions and sharing initial results. To help managers prioritize these strategies, further research is recommended to uncover which facilitators are most requested and also most impactful, and which facilitators have the greatest impact on facilitating opportunities for birders with different disabilities. We recommend similar research on models of disability be extended globally to explore if there are cross-cultural differences. We might expect similar studies in different countries may vary given different disability legislation and perceptions across the globe (Small & Darcy, 2010).

Conclusion

Studying and planning for including people with disabilities in recreation will ultimately support broader social inclusion for this large population (Kastenholz et al., 2015). To this end, we suggest this study be used to guide future research and managerial actions to make the outdoors inclusive for people with disabilities. To support and promote birding for people with disabilities, managers can frame their approach in line with the social and geographic models identified as prominent in this study. Considering that we found that birders with disabilities

are constrained to a greater degree in their participation in birding when compared to birders without disabilities we call for further research about the experiences of birders with disabilities. We suggest future researchers explore place-based, social and cultural, and programming constraints in more detail through further surveys or focus group research, and that this research could be broadened to include wildlife viewing beyond birds. We also suggest that research and accessibility projects should be conducted in collaboration with disability groups or organizations. Increasing facilitators of inclusive experiences and identifying and reducing constraints that disabled birders identify will help agencies and organizations reach a broader audience and ensure access to nature is more equitable for all.

References

Armstrong, S., Noble, M., & Rosenbaum, P. (2006). Deconstructing barriers: The promise of socioeconomic rights for people with disabilities in Canada. In R. E. Howard-Hassmann & C. E. Welch (Eds.), *Economic Rights in Canada and the United States* (pp. 149–168). University of Pennsylvania Press. 10.9783/9780812204780.149

Beaudry, J. S. (2016). Beyond (models of) disability? *The Journal of Medicine and Philosophy: A Forum for Bioethics and Philosophy of Medicine, 4*(2), 210-228. https://doi.org/10.1093/jmp/jhv063

Bell, S. L. (2019). Experiencing nature with sight impairment: Seeking freedom from ableism. *Nature and Space, 2*(2), 304-322. https://doi.org/10.1177/2514848619835720

Bell, S. L. (2021). Nurturing sociality with birdlife in the context of life with sight impairment: A role for nonhuman charisma. *Social & Cultural Geography, 22*(7), 917–935. https://doi.org/10.1080/14649365.2019.1667018

Belur, J., Tompson, L., Thornton, A., & Simon, M. (2021). Interrater reliability in systematic review methodology: Exploring variation in coder decision-making. *Sociological methods & research, 50*(2), 837-865. https://doi.org/10.1177/0049124118799372

Birdability. (2021). *Birdability... Because birding is for everybody!* https://www.birdability.org

Blackwell AG. (2017). The curb-cut effect. *Stanford Social Innovation Review*, *15* (1), 28-33. https://ssir.org/articles/entry/the_curb_cut_effect

Caleb, A. M., & Gallin, S. (2020). Policies of exclusion: The impact of COVID-19 on people with disabilities. *Saint Louis University Journal of Health Law & Policy, 14*(2), 321-344. https://scholarship.law.slu.edu/jhlp/vol14/iss2/7

Centers for Disease Control and Prevention [CDC]. (2020). *Disability & Health Overview.* https://www.cdc.gov/ncbddd/disabilityandhealth/disability.html

Clare, E. (2001). Stolen bodies, reclaimed bodies: Disability and queerness. *Public Culture*, *13*(3), 359-365. https://muse.jhu.edu/pub/4/article/26252

Creamer, D. B. (2010). Embracing limits, queering embodiment: Creating/creative possibilities for disability theology. *Journal of Feminist Studies in Religion*, *26*(2), 123-127. https://doi.org/10.2979/fsr.2010.26.2.123

Devlieger, P., Rusch, F., & Pfeiffer, D. (2003). Rethinking disability as same and different! Towards a cultural model of disability. In P. Devlieger, F. Rusch & D. Pfeiffer (Eds). *Rethinking disability: The emergence of new definitions, concepts and communities* (pp. 9-16). Garant.

Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics*, *5*(1), 1-4. https://doi.org/10.11648/j.ajtas.20160501.11

Freudenberg, P., & Arlinghaus, R. (2009). Benefits and constraints of outdoor recreation for people with physical disabilities: Inferences from recreational fishing. *Leisure Sciences*, *32*(1), 55–71. https://doi.org/10.1080/01490400903430889

Gaines, D. (2004). Geographical perspectives on disability: A socio-spatial analysis of the mentally disabled population in Russia. *Middle States Geographer*, *37*(1), 80-89. https://middlestates.wpenginepowered.com/wp-content/uploads/2013/05/10-Gaines.pdf

Ghimire, R., Green, G. T., Poudyal, N. C., & Cordell, H. K. (2014). An analysis of perceived constraints to outdoor recreation. *Journal of Park and Recreation Administration*, *32*(4), 52-67. https://js.sagamorepub.com/jpra/article/view/6074

Gill, C. J., Kewman, D. G., & Brannon, R. W. (2003). Transforming psychological practice and society: Policies that reflect the new paradigm. *American Psychologist*, *58*(4), 305. https://psycnet.apa.org/doi/10.1037/0003-066X.58.4.305

Green, G. T., Bowker, J. M., Wang, X., Cordell, H. K., & Johnson, C. Y. (2009). An examination of perceived constraints to outdoor recreation. *Journal of Public Affairs and Issues, 12*(1), 28-53. https://www.srs.fs.usda.gov/pubs/ja/2009/ja_2009_green_001.pdf

Grooms, B., Rutter, J. D., Barnes, J. C., Peele, A., & Dayer, A. A. (2020). *Supporting wildlife recreationists in Virginia: Survey report to inform the Virginia Department of Wildlife Resources' Wildlife Viewing Plan*. Virginia Tech. http://hdl.handle.net/10919/101046

Hammoud, R., Tognin, S., Burgess, L., Bergou, N., Smythe, M., Gibbons, J., Davidson, N., Afifi, A., Bakolis, I., & Mechelli, A. (2022). Smartphone-based ecological momentary assessment

reveals mental health benefits of birdlife. *Scientific Reports*, *12*(1), Article 1. https://doi.org/10.1038/s41598-022-20207-6

Jakubec, S. L., Carruthers Den Hoed, D., Ray, H., & Krishnamurthy, A. (2016). Mental well-being and quality-of-life benefits of inclusion in nature for adults with disabilities and their caregivers. *Landscape Research*, *41*(6), 616–627. https://doi.org/10.1080/01426397.2016.1197190

Kastenholz, E., Eusébio, C., & Figueiredo, E. (2015). Contributions of tourism to social inclusion of persons with disability. *Disability & Society*, *30*(8), 1259–1281. https://doi.org/10.1080/09687599.2015.1075868

LaRossa, R. (2005). Grounded theory methods and qualitative family research. *Journal of Marriage and Family, 67*(4), 837-857. https://doi.org/10.1111/j.1741-3737.2005.00179.x

Lauber, T.B., Chase, L.C., & Decker, D.J. (2002). Informing the planning process through citizen participation. In M.J. Manfredo (Ed.), *Wildlife viewing: A management handbook* (pp. 124 - 142). OSU Press.

Llewellyn, A., & Hogan, K. (2010). The use and abuse of models of disability. *Disability & Society*, *15*(1), 157-165. https://doi.org/10.1080/09687590025829

Loi, K. I., & Kong, W. H. (2017). Tourism for all: Challenges and issues faced by people with vision impairment. *Tourism Planning & Development*, *14*(2), 181–197. https://doi.org/10.1080/21568316.2016.1204357

Ludwig, A. M. (1975). The psychiatrist as physician. *JAMA*, *234*(6), 603-604. https://doi.org/10.1001/jama.1975.03260190031016

Macdonald, S. J., Deacon, L., Nixon, J., Akintola, A., Gillingham, A., Kent, J., Ellis, G., Mathews, D., Ismail, A., Sullivan, S., Dore, S., & Highmore, L. (2018). 'The invisible enemy': Disability, loneliness and isolation. *Disability & Society*, *33*(7), 1138–1159. https://doi.org/10.1080/09687599.2018.1476224

Mahmoudzadeh, S., & Kourdi Sarjaz, N. (2018). Environmental barriers to tourism development for people with disabilities. *Acta Turistica*, *30*(1), 87–114. https://doi.org/10.22598/at/2018.30.1.87

Manfredo, M. J., Sneegas, J. J., Driver, B., & Bright, A. (1989). Hunters with disabilities: A survey of wildlife agencies and a case study of Illinois deer hunters. *Wildlife Society Bulletin (1973-2006), 17*(4), 487-493. https://www.jstor.org/stable/3782718

McGregor, F.A. (2021, August 2). It's time to redefine 'birding'. *Audubon Magazine*. https://www.audubon.org/news/its-time-redefine-birding

Michopoulou, E., Darcy, S., Ambrose, I., & Buhalis, D. (2015). Accessible tourism futures: The world we dream to live in and the opportunities we hope to have. *Journal of Tourism Futures*, *1*(3), 179–188. https://doi.org/10.1108/JTF-08-2015-0043

Murawiec, S., Tryjanowski, P., & Nita, A. (2021). An ornithological walk to improve the well-being of mental health professionals during the COVID-19 pandemic: a pilot study. *Psychiatry/Psychiatria*, *18*(3).

Napier, J. (2002). The D/deaf—H/hearing debate. *Sign Language Studies, 2*(2), 141-149. https://www.jstor.org/stable/26204794

North American Waterfowl Management Plan [NAWMP]. (2021). *National Survey of Birdwatchers: Nationwide and Flyway Comparisons.* *https://nawmp.org/document/national-survey-birdwatchers-nationwide-and-flyway-comparisons*

Oh, U., Joh, H., & Lee, Y. (2021). Image accessibility for screen reader users: A systematic review and a road map. *Electronics*, *10*(8), 953. https://doi.org/10.3390/electronics10080953Raymore, L. A. (2002). Facilitators to leisure. *Journal of Leisure research*, *34*(1), 37-51. https://doi.org/10.1080/00222216.2002.11949959

Retief, M., & Letśosa, R. (2018). Models of disability: A brief overview. *HTS Teologiese Studies / Theological Studies*, *74*(1). https://doi.org/10.4102/hts.v74i1.4738

Robbins, C. R., Huskin, P. R., & Kwon, S. (2022). Millennial attitudes toward disability in three social contexts. *The Social Science Journal*, *60*(1), 1-18. https://doi.org/10.1080/03623319.2022.2105592

Rolim, A. M., Pinto, V. C., & Rosa, M. P. (2021). Birdwatching and birding by ear: An accessible and inclusive tourism proposal for the city of Lagos. *Journal of Accessibility and Design for All*, *11*(1), 48–85. https://doi.org/10.17411/jacces.v11i1.316

Rutter, J. D., Dayer, A. A., Harshaw, H. W., Cole, N. W., Duberstein, J. N., Fulton, D. C., Raedeke, A. H., & Schuster, R. M. (2021). Racial, ethnic, and social patterns in the recreation specialization of birdwatchers: An analysis of United States eBird registrants. *Journal of Outdoor Recreation and Tourism, 35*, Article 100400. https://doi.org/10.1016/j.jort.2021.100400

Skibins, J. C., & Sharp, R. L. (2019). Binge watching bears: Efficacy of real vs. virtual flagship exposure. *Journal of Ecotourism*, *18*(2), 152-164. https://doi.org/10.1080/14724049.2018.1553977

Small, J., & Darcy, S. (2010). Tourism, disability and mobility. In S. Cole & N. Morgan (Eds.), *Tourism and inequality: Problems and prospects* (pp. 1–20). CABI. https://doi.org/10.1079/9781845936624.0001

Smart, J. F. (2009). The power of models of disability. *Journal of Rehabilitation*, *75*(2), 3–11. https://www.proquest.com/docview/236294941

Smart, J. F., & Smart, D. W. (2006). Models of disability: Implications for the counseling profession. *Journal of Counseling & Development*, *84*(1), 29-40. https://doi.org/10.1002/j.1556-6678.2006.tb00377.x

Smith, R. W. (1987). Leisure of disable tourists: Constraints to participation. *Annals of Tourism Research*, *14*(3), 376–389. https://doi.org/10.1016/0160-7383(87)90109-5

Swain, J., & French, S. (2000). Towards an affirmation model of disability. *Disability & Society*, *15*(4), 569–582. https://doi.org/10.1080/09687590050058189

Tsai, E. H., & Coleman, D. J. (1999). Leisure constraints of Chinese immigrants: An exploratory study. *Loisir et societe/Society and Leisure*, *22*(1), 243-264. https://doi.org/10.1080/07053436.1999.10715587

United States Department of Interior [USDOI]. (2018). United States Fish and Wildlife Service [USFWS], United States Department of Commerce [USDC], and United States Census Bureau [USCB]. *2016 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation*.

U.S. Fish and Wildlife Service. (2019). *Birding in the United States: A demographic and economic analysis* (Addendum to the 2016 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation 2016–2). U.S. Department of the Interior.

Vaske, J. J. (2019). Hypothesis testing and effect size. In *Survey Research and Analysis* (2nd ed.). Sagamore Venture.

Von Benzon, N. (2010). Moving on from ramps? The utility of the social model of disability for facilitating experiences of nature for disabled children. *Disability & Society*, *25*(5), 617-626. https://doi.org/10.1080/09687599.2010.489313

Wardropper, C. B., Dayer, A. A., Goebel, M. S., & Martin, V. Y. (2021). Conducting conservation social science surveys online. *Conservation Biology*, *35*(5), 1650-1658. https://doi.org/10.1111/cobi.13747

Zajadacz, A. (2015). Evolution of models of disability as a basis for further policy changes in accessible tourism. *Journal of Tourism Futures*, *1*(3), 189–202. https://doi.org/10.1108/JTF-04-2015-0015

Tables and figures

Table 1. A brief definition of eleven models of disability used for coding in this paper. These definitions include each model's approach for disability and suggestions for how to support people with disabilities.

Model	Approach to disability
Charity	Calls for nondisabled people to support people with disabilities through financial donations, etc.; actions are driven by pity. (Clare, 2001).
Cultural	People with similar disabilities develop strong, close-knit groups (Delvinger et al., 2003).
Economic	Disability creates a financial cost to society (Armstrong et al., 2006).
Functional (or rehabilitation)	Disability in the context of a hindrance to a job or task; disability not present if disability doesn't prevent completion of task (Gill et al., 2003).
Geographic	Result of built or natural physical environments around a person; disabled person may not be disabled by modified environment (Gaines, 2004).
Human rights	An issue of policy barriers; calls for policy changes to support people with disabilities (Armstrong, 2006).
Identity (or affirmation)	A positive aspect of an individual's identity to embrace; benefits accompany this identity (Swain & French, 2000).
Limits	The absence or presence of limits; if an individual is not limited in completing a certain activity, their disability is not present (Creamer, 2010).
Medical	Biological insufficiency that requires medical treatment or curing (Ludwig, 1975).
Moral (or religious)	Disability is present as a result of a curse or source of shame; punishment to a family (Retief & Letśosa, 2018).
Social	Calls for society to address burdens of disability and create spaces that do not disable people (Michopoulou et al., 2015).

Table 2. Concepts explored for each component of research question one, including the concept, survey text, and measurement scale presented to each respondent from the questionnaire.

Concept: Constraints to birding	Concept: Facilitators to birding
To what extent do each of the following limit your participation in wildlife viewing in a typical year? Note: By "a typical year" we mean a recent year (within the last ~5 years) that was not impacted by unusual circumstances like the COVID-19 pandemic. (Please select one response per statement.) Response options: 1 = "Not at all" 2 = "Very little" 3 = "Somewhat" 4 = "Quite a bit" 5 = "A great deal" ● Crowds in wildlife viewing locations ● Distance to high-quality locations for wildlife viewing ● Few people to participate in wildlife viewing with ● Few people who support your wildlife viewing activities ● Financial costs associated with wildlife viewing ● Lack of access to equipment or supplies for wildlife viewing ● Lack of wildlife viewing skills ● Lack of facilities at wildlife viewing locations ● Lack of free time to participate in wildlife viewing ● Lack of organized wildlife viewing opportunities within your community or social groups ● Lack of transportation to wildlife viewing locations ● Not knowing where to go wildlife viewing ● Safety concerns when wildlife viewing	Which of the following potential programs or services from [Respondent's state fish and wildlife agency] would better support your wildlife viewing activities in [Respondent's state]? (Please select all that apply.) [Respondent's state fish and wildlife agency] can better support my wildlife viewing activities by providing… ● More information about where to go to view wildlife ● More information about wildlife in [Respondent's state] ● Access to more places to go wildlife viewing ● More information about where and when to view where there is no hunting ● More information about how to view various types of wildlife ● More accessible features in wildlife viewing locations (such as paved trails, accessible parking, or tactile signage) ● More opportunities for youth to learn how to participate in wildlife viewing ● More wildlife viewing events (such as wildlife viewing festivals or competitions) ● More programs to improve wildlife viewing skills ● More virtual programs for wildlife viewing (such as video classes, online presentations, or wildlife cameras) ● More programs to interact with other wildlife viewers ● More training for wildlife viewing guides or mentors ● More opportunities to be involved in volunteer research or wildlife data collection activities ● More agency staff to support wildlife viewing ● More opportunities to be involved in other volunteer activities, not related to data collection ● More amenities for wildlife viewing (such as viewing platforms, blinds, or signs)

Figure 1: Constraints to birding. The mean extent to which birders with and without disabilities expressed that they were limited by constraints to birding from a scale of 1 (not at all) to 5 (a great deal). Dots indicate the mean extent of agreement on a 5-point scale, and error bars indicate one standard deviation (black for birders with disabilities, gray for birders without disabilities). A t-test indicated a statistically significant difference in the extent of limitation for the two groups for all surveyed items.

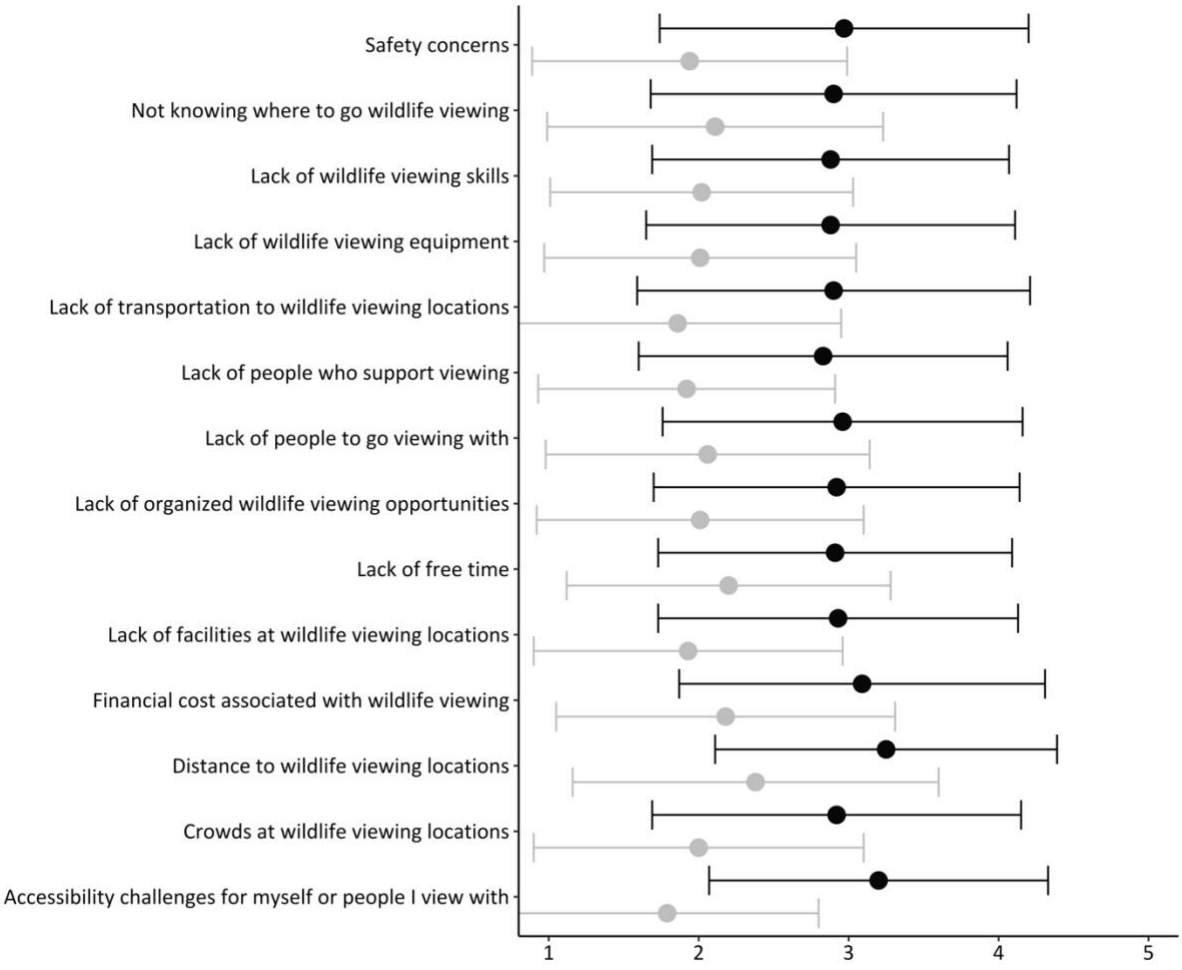
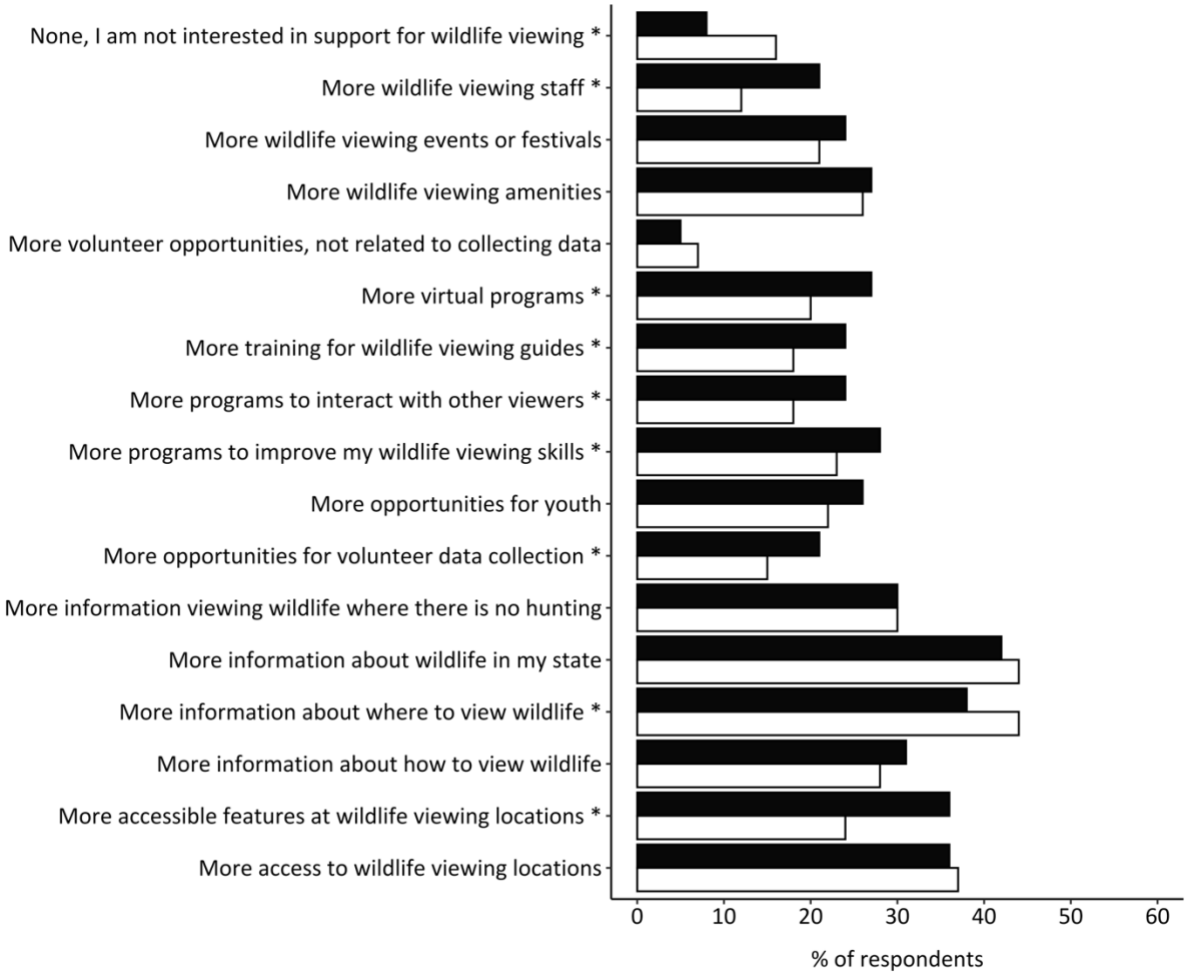


Figure 2: Facilitators to birding. Facilitators that would better support respondents' birding activities, for birders with and without disabilities. Note that individual categories sum to more than 100% because respondents were able to select more than one program or service. Black (top bar) represents birders with disabilities and white (bottom bar) represents birders without disabilities. Asterisks (*) indicate a significant difference in the number of birders with disabilities and without who were interested in the facilitator.



Supplemental Table 1: Constraints to birding. The mean extent to which birders with and without disabilities expressed that they were limited by constraints to birding from a scale of 1 (not at all) to 5 (a great deal). Table includes standard deviation, degrees of freedom, t-test statistic, and effect size (Cohen's *d*). Asterisks (*) indicate a significant difference in the Bonferroni adjusted p-value in the mean extent of limitation between birders with and without disabilities.

Constraint	Extent of limitation						
	With accessibility challenge		Without accessibility challenge				
	M	SD	*M*	SD	*df*	t	Effect size (Cohen's d)
Accessibility challenges for myself or people I view with	3.20	1.11	1.79	1.01	3,975.00	-41.25*	-1.34
Crowds at wildlife viewing locations	2.92	1.22	2.00	1.11	3,031.71	-23.95*	-0.80
Distance to wildlife viewing locations	3.25	1.14	2.38	1.20	3,423.21	-22.92*	-0.74
Financial cost associated with wildlife viewing	3.09	1.21	2.18	1.13	3,976.00	-24.19*	-0.79
Lack of facilities at wildlife viewing locations	2.93	1.18	1.93	1.03	2,946.14	-27.25*	-0.92
Lack of free time	2.91	1.17	2.20	1.07	3,999.00	-19.55*	-0.65

Lack of organized wildlife viewing opportunities	2.92	1.21	2.01	1.09	3,046.90	-23.99*	-0.80
Lack of people to go viewing with	2.96	1.20	2.06	1.08	3,971.00	-24.62*	-0.80
Lack of people who support viewing	2.83	1.21	1.92	1.00	2,846.34	-24.62*	-0.84
Lack of transportation to wildlife viewing locations	2.90	1.30	1.86	1.09	2,865.95	-26.20*	-0.89
Lack of wildlife viewing equipment	2.88	1.23	2.01	1.05	2,912.63	-23.00*	-0.78
Lack of wildlife viewing skills	2.88	1.19	2.02	1.02	2,919.02	-23.33*	-0.79
Not knowing where to go wildlife viewing	2.90	1.21	2.11	1.12	3,964.00	-21.04*	-0.69
Safety concerns	2.97	1.23	1.94	1.06	2,923.45	-26.89*	-0.91

Supplemental Table 2: Facilitators to birding. Facilitators that would better support respondents' birding activities, for birders with and without disabilities. Asterisks indicate significantly significant difference between groups ($p < .001$). Note that individual categories sum to more than 100% because respondents were able to select more than one program or service Table includes significance and effect size. For all tests, degrees of freedom = 1.

Facilitator	With accessibility challenges (%)	Without accessibility challenges (%)	Significance (χ^2)	Effect size (Cramer's V)
None, I am not interested in support for wildlife viewing	7.6	15.9	49.33*	0.12
More wildlife viewing staff	20.5	11.9	45.49*	0.12
More wildlife viewing events or festivals	24.4	21.0	5.2	0.04
More wildlife viewing amenities	27.4	25.5	1.57	0.02
More volunteer opportunities, not related to collecting data	5.1	6.6	3.2	0.03
More virtual programs	26.6	19.7	22.26*	0.08
More training for wildlife viewing guides	23.7	17.5	18.76*	0.07
More programs to interact with other viewers	23.8	18.1	16.06*	0.07
More programs to improve my wildlife viewing skills	28.2	22.6	13.57*	0.06
More opportunities for youth	26.2	22.3	6.62	0.04
More opportunities for volunteer data collection or citizen science	21.4	15.4	19.30*	0.08

More information about wildlife in my state	42.3	44.3	1.3	0.02
More information about where to view wildlife	38.2	44.3	11.94*	0.06
More information about where and when to view wildlife where there is no hunting	29.9	29.8	0.01	0.00
More information about how to view wildlife	31.3	28.1	3.88	0.03
More accessible features at wildlife viewing locations	35.7	23.5	57.98*	0.13
More access to wildlife viewing locations	36.1	37.2	0.43	0.01