Inclusion for disabled wildlife viewers: A literature review

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Introduction

The Dayer Lab of Human Dimensions at Virginia Tech has been working closely with the Association of Fish and Wildlife Agencies Wildlife Viewing and Nature Tourism Working Group since 2020 to better understand wildlife viewers across the U.S., with the overarching goal of helping wildlife agencies better connect with their constituents in order to increase engagement with their agencies and support for conservation. In 2021, as part of this work, we conducted a national survey of wildlife viewers which had more than 4,000 respondents (Sinkular et al., 2024) and found that 39% reported experiencing accessibility challenges while participating in wildlife viewing. **If one in three wildlife viewers experience accessibility challenges, how can state agencies ensure they are engaging and supporting wildlife viewers with disabilities?**

Disability is part of the human experience, but not much is known about disabled wildlife viewers. The Americans with Disabilities Act (ADA; 1990) states that Title II entities (which includes state governments) must ensure that people with disabilities have an equal opportunity to participate in all programs they offer. And yet, disabled wildlife viewers reported experiencing a wide range of barriers. Although their responses weren't specific to a location it is reasonable to assume that many of these barriers are relevant regardless of the location. Further research is needed to understand more thoroughly how best to include disabled wildlife viewers.

This literature review was developed by an occupational therapist and two social scientists, all of whom identify as wildlife viewers with past or current experience with accessibility challenges when wildlife viewing due to disability or injury. This review provides a quick overview of published information about people with disabilities, wildlife viewing, and barriers to and facilitators of wildlife viewing for people with disabilities. It also collates best practices, based on the literature, to support the inclusion of disabled wildlife viewers. We invite you to explore these studies by visiting the links in the *References* section and expand your knowledge through the *More Resources* section.

This literature review is one of a series of resources developed for state fish and wildlife agencies and their partners to support them in increasing inclusion for disabled wildlife viewers. Throughout 2024, thanks to the support of the U.S. Fish and Wildlife Service's Multistate Conservation Grant Program (grant #F24AP00315) and in collaboration with the Wildlife Viewing and Nature Tourism Working Group, the Dayer Human Dimensions Lab will produce webinars on the research in this literature review, conduct focus groups to learn about the lived experiences of disabled wildlife viewers, co-produce a report and recommendations on increasing inclusion of disabled wildlife viewers, and share these findings via another webinar. As these resources are completed they will be available at https://viewing.fishwild.vt.edu/inclusion-for-disabled-wildlife-viewers

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Disability and Inclusion

What does it mean to have a disability?

The Americans with Disabilities Act (ADA) defines disability as, "a physical or mental impairment that substantially limits one or more major life activities" (ADA National Network, 2023). The Centers for Disease Control (2020a) reports that 61 million American adults, or one in four, live with a disability that impacts their:

- Mobility (walking or going up stairs),
- Cognition (thinking, learning),
- Hearing,
- Vision,
- Ability to live by themselves, and/or
- Self-care (dressing or bathing).

In addition, almost 50 million Americans, or one in 50, live with a diagnosed mental health condition (Mental Health America, 2022), such as generalized anxiety disorder or schizophrenia, which can also be disabling. The World Health Organization (2023) estimates that worldwide, 1.3 billion people, or one in six people, live with a disability, however it can be difficult to collate cross-national data because different cultures define disability in different ways (Brønnum-Hansen, 2014).

Using a manual wheelchair can help people who have mobility disabilities participating in wildlife viewing. Photo by Steve Perry.

Expanding beyond the definition of 'disability' in the ADA, the presence of disability is not equate to being unhealthy (Centers for Disease Control, 2020b). Many disabled people may be perfectly healthy – for example, someone who uses a wheelchair as a result of a spinal cord injury but has no illnesses or disease conditions. Another person might be *disabled* by a disease process, such as chronic obstructive pulmonary disease (COPD) which may cause difficulty walking long distances or up stairs. In this literature review, we use 'disability' to include anyone who is *disabled* from participating in wildlife viewing by something to do with their body or mind. It may be permanent or temporary (such as while recovering from chemotherapy), constant or variable (such as the fluctuating symptoms of a chronic illness like Long Covid), or visible or invisible (such as a mental health diagnosis). **The cause of the disability is rarely important when it comes to inclusion; what is relevant is what the person is *disabled from doing.***

This approach to disability is referred to as the functional model of disability: how does disability impact someone's ability to do the activities in their lives that they want to do (Smart,

The International Symbol of Accessibility developed in 1969 (above), and the more active Accessible Icon Project symbol (below).

2001) – such as going birding? 'Models of disability' are frameworks used to understand the experiences of disabled people (Retief & Letšosa, 2018). The social model of disability, meanwhile, frames disability in the context of the environments we interact with (Retief & Letšosa, 2018): some environments, such as an observation tower with stairs to the top, can *disable* the birder with COPD from accessing it and birding from there. Many wildlife viewers with disabilities identify with the social model of disability (Sinkular et al., 2024). Rather than taking a deficit-based approach (e.g., "you can't participate because your body doesn't work!"), it instead identifies that physical, social, cultural and organizational environments can often be modified to be accessible, which removes the factor that disabled them in the first place.

Historically, having a disability has been viewed in many cultures as a taboo or a tragic loss, and the medical model of disability – which wants to 'fix' people who are 'broken' (Retief & Letšosa, 2018) – feeds into this mindset. Pushing back on this, a strengths-based approach to disability focuses instead on what someone *can* do, is good at doing, and likes doing (Niemiec & Tomasulo, 2023). Through this lens, we view people as whole humans who have their own interests and talents, and reframe activities such as wildlife viewing as something that *is* possible (McGregor et al, in preparation).

What's the difference between the ADA and inclusion of people with disabilities?

The Americans with Disabilities Act (ADA) is a U.S. federal civil rights law signed in 1990 aiming to prevent discrimination against people with disabilities, as well as their families and friends (U.S. Department of Justice, 1990; ADA National Network, 2024). It includes:

- Title I: Employment, which prohibits discrimination in hiring, pay and promotion based on someone's disability.
- Title II: State and Local Government, which requires all people, regardless of disability status, to have an equal opportunity to participate in and/or benefit from the government's programs, services and activities.
- Title III: Public Accommodations, which covers businesses that provide services to the general public, and requires that people with disabilities are not discriminated against or denied the full use of whatever that public accommodation provides.
- Title IV: Telecommunications, which requires telecommunications companies to provide alternative methods of communication, such as TTY (teletypewriters) and VRS (video relay services) for people who are Deaf, deaf or hard of hearing.
- Title V: Miscellaneous, which apply across the other four titles.

The 2010 ADA Standards for Accessible Design (US Department of Justice, 2010), often referred to as the 'ADA Standards', provide specific requirements for Title II and Title III entities' buildings, parking areas and recreation facilities that are newly constructed or being altered, to ensure they are physically accessible to people with disabilities.

The Architectural Barriers Act (ABA) of 1968 covers buildings and facilities, including trails, that are designed, built, or altered with federal funds. The ADA Standards do not cover hiking trails. Therefore, it is not possible for a trail to be an 'ADA trail' or 'ADA accessible.' Alternative names for these trails may be 'accessible trails,' or 'wheelchair-friendly trails' if the trails meet certain minimums related to their surfaces, gradient, width and obstacles (see p.16). A visitor center could be referred to as 'ADA compliant' (as in, it complies to the ADA Standards), but this designation is only appropriate if all elements of this facility do comply.

Inclusion can be defined as an active and ongoing effort to intentionally welcome and incorporate people of diverse backgrounds and life experiences (The George Washington University, no date.). Although the ADA was developed to facilitate the inclusion of people with disabilities, many Title II and Title III entities do not comply with them (Chandlee, 2017). In addition, **the social environment – how we interact with each other – can create barriers to inclusion (Sinkular et al., 2024), and this is not addressed in the ADA**. Staff, volunteers and other wildlife viewers can be unwelcoming, ableist or dismissive of people with disabilities, and inaccessible wildlife viewing programs may exclude disabled viewers from participating (Sinkular et al., 2024). Just because a facility complies to the 2010 ADA Standards for Accessible Design and otherwise meets their obligations under the Americans with Disabilities Act does not automatically mean that people with disabilities will feel included there.

Wildlife Viewing and Disability

What is wildlife viewing, and how does it benefit people and conservation?

In 2022, the National Survey of Fishing, Hunting, and Wildlife-Associated Recreation found that one in two Americans participate in wildlife viewing, defined as observing, feeding, or photographing wildlife, or maintain plantings for the benefit of wildlife (U.S. Department of the Interior & U.S. Fish and Wildlife Service, 2023). See *What can we learn from the research about hunters and anglers with disabilities?* On p.13 for more about the differences and similarities between the different kinds of wildlife-related recreation.

Participating in wildlife viewing provides additional mental health and well-being benefits including:

- Time to relax, unwind, and reduce stress (Curtin, 2009);
- Decreased symptoms of depression and anxiety (Lackey et al., 2021); and
- Increased mental well-being and fulfillment (Randler et al., 2022).

In addition to the benefits experienced from wildlife viewing, **wildlife viewers are conservationists and likely to contribute financially to state fish and wildlife agencies, collect data about wildlife or habitat, and participate in civic engagement for the benefit of wildlife** (Cherry, 2018; Cooper et al., 2015; Williams et al., 2021). Wildlife viewers also represent a target audience for state fish and wildlife agencies to connect with as they seek to enhance their relevancy and engage support from a broader constituency (AFWA & WMI, 2019).

A wildlife viewing trip in Colorado. Photo: Sami Livingston.

What do we know about participation in outdoor recreation and wildlife viewing for people with disabilities?

Having a disability does not exclude someone from wanting to take part in outdoor recreation; people with disabilities enjoy the thrills and risks just as much as nondisabled people (Burns et al., 2013). Indeed, a survey of recreationists who visited the U.S. National Forest Service system found that 20% had a member of their household with a disability (Burns & Graefe, 2007).

In a study of outdoor recreationists, 585 U.S.-based people with mobility disabilities were compared to the other 12,000+ survey respondents without mobility disabilities (Williams et al., 2004). There was no significant difference in participation rates between disabled and nondisabled respondents who engaged in wildlife viewing (Williams et al., 2004), and similar barriers were reported by disabled and nondisabled respondents as listed in *What are the barriers to wildlife viewing and outdoor recreation for people with disabilities?* (p.10). Sinkular et al. (2024) found that disabled respondents expressed a higher level of interest in programs and support than nondisabled wildlife viewers. These findings indicate that **disabled wildlife viewers are not under-represented in wildlife viewing, but are likely underserved**.

Most wildlife viewing surveys have not asked questions about disability prevalence, types, or impact, including the 2022 National Survey of Fishing, Hunting and Wildlife-Associated Recreation (U.S. Fish and Wildlife Service) or the National Survey on Birdwatchers (Patton, 2021). However a nation-wide survey of more than 3,400 birders by Sinkular et al. (2024), found that 39% of respondents experienced an access challenge related to disability while birding. In addition to *viewing* wildlife, people with disabilities also connect to nature through smells (Gomes & Eusébio, 2023), sounds (Bell, 2021), and other senses (Small et al., 2012). The multisensory experience that birding can offer can connect people with disabilities to the place more deeply (Rolim et al., 2021), which can result in conservation behavior changes (Ballantyne et al., 2011).

Some scholars and disability advocates have criticized the literature and the outdoor recreation industry for not including people with disabilities. This is a form of ableism: a bias against disabled people (Wolbring, 2008). A report by Garrison et al. (2005) interviewed birders and grouped them into categories of 'serious birders,' 'disabled birders,' and 'casual birders.' The authors of this literature review caution against apparent ableist assumptions that disabled birders are not also 'serious' birders. Indeed, Sinkular et al. (2024) found that more disabled birders rated their birding skills higher than nondisabled birders did. Reducing ableism in outdoor recreation requires the inclusion of people with disabilities in planning efforts (Bell, 2019) and conducting more research on their needs and experiences (Chen, 2013; Darcy, 2006).

Are there specific benefits of nature and wildlife viewing for people with disabilities?

Time in nature can be extremely beneficial to everyone. Spending more time in nature and with wildlife can decrease symptoms of depression in adults with disabilities (Wilson & Christensen, 2012) and decrease symptoms of stress in patients with cancer (Pearson et al., 2021). It has been proposed as an educational tool for people with disabilities and can help participants improve their social-communication and problem solving skills (Zachor et al., 2017).

McAvoy et al. (2006) found that the benefits of inclusive wilderness experiences for people with disabilities transfer into everyday life, including:

- Experiencing personal growth or a sense of accomplishment;
- Nature appreciation;
- Spirituality benefits;
- Developing or improving their relationships with others;
- Rest, relaxation or reflection;
- Improving or developing new skills;
- Improving physical fitness; and
- Increasing their awareness of their own abilities.

A study of people with developmental disabilities (Armstrong et al., 2022) found that outdoor recreation provides:

- Mental reprieve and calmness;
- Satisfaction and appreciation for the outdoors and fresh air;
- Empowerment for individuals and the opportunity to overcome challenges;
- The chance to increase skills;
- Social connectedness with friends and family members; and
- An opportunity for thrill or risk.

Some benefits of spending time in nature: Connection with others, appreciation of the outdoors, decreased symptoms of depression, and improving problem solving skills. Illustration by Emily Sinkular.

Bell (2019) found that birders who are blind or have low vision report that the sounds of birds, and sometimes associated smells and touch, contribute to:

- A sense of companionship, connectedness and interconnectedness with other beings;
- Feelings of curiosity and playfulness, awe and wonder;
- An opportunity for reflection, including on the fragility of life;
- An opportunity for creative anthropomorphism and storytelling; and
- Taking action to care for birds, eg. through native plant gardening, wildlife rehabilitation.

These feelings were specific to interactions with birds and contrast to interactions with other people, who may cast a negative light on living with a visual disability (Bell, 2019).

What are the barriers to wildlife viewing with a disability?

Numerous barriers to participation in wildlife viewing for people with disabilities have been documented. The most robust evidence comes from a nation-wide survey of more than 3,400 birders by Sinkular et al. (2024), in which disabled birders reported being impacted by barriers to a greater extent than nondisabled birders. Additional evidence comes from Karns et al. (2023), who surveyed 147 disabled birders regarding the barriers they experience when birding. Additionally, other studies exploring the barriers experienced by individuals with disabilities in outdoor recreation are included.

We have categorized the reported barriers into four groups, all of which state wildlife agencies may be able to impact in order to reduce or remove these as barriers.

- Personal barriers: Related to an individual. Note that these factors are not always within control of the person.
- Interpersonal barriers: Related to engaging with other people, which may include friends, family members, other wildlife viewers, and staff and volunteers at wildlife viewing locations.
- Lack of accessible features: Barriers within the built environment, such as visitor centers and trails.
- Programming barriers: Barriers that are related to the development and delivery of wildlife viewing programs.

Additional notes are included in parentheses from this report's authors to help explain why this barrier may exist.

Personal barriers

- Lack of time available (may be related to increased time needed for personal care in the mornings, difficulty obtaining time-efficient transportation to the birding location, etc.) (Sinkular et al., 2024);
- Lack of money (e.g. for optics, for birding organization membership, for entrance or programming fees) (Sinkular et al., 2024);
- Lack of knowledge (of where to go that would be accessible to them, and of where to go that has good wildlife viewing opportunities) (Sinkular et al., 2024); and
- Lack of equipment (including adaptive birding equipment such as a wheelchair-mounted scope) (Sinkular et al., 2024).

Hiking poles, an example of adaptive equipment, may support someone to go birding. Photo: Patrick Oaks.

Interpersonal barriers

- Lack of a birding 'buddy' to go with (Sinkular et al., 2024);
- Lack of other people in their lives who support them to go birding (such as a spouse who provides childcare to their children so they could go birding) (Sinkular et al., 2024);
- Negative attitudes from others (Karns et al., 2023);
- Crowds at birding locations (note: this survey was conducted in August-September, 2021 during the Covid-19 pandemic) (Sinkular et al., 2024); and
- Lack of staff understanding of disability, e.g. staff not knowing how to create accessible and accommodating experiences for people with disabilities (Anderson & Heyne, 2000).

Lack of accessible features

- Distance to wildlife viewing locations (possibly impacted by lack of accessible transport) (Sinkular et al., 2024);
- Lack of transportation (many people with disabilities cannot transport themselves to recreation sites, so they rely on family members, caregivers, or public transportation) (Darcy, 2006; Karns et al., 2023; Mahmoudzadeh & Kourdi Sarjaz, 2018);
- Lack of accessible facilities, trails and features (Dippenaar & Kotze, 2005; Sinkular et al., 2024), including:
    - Lack of accessible trails (27% of respondents; Karns et al., 2023);
    - Lack of benches and rest areas (13% of respondents; Karns et al., 2023);
    - Lack of accessible bathrooms (9% of respondents; Karns et al., 2023);
    - Lack of accessible or available parking (6% of respondents; Karns et al., 2023. Also Dippenaar & Kotze, 2005);
- Obstacles including bollards, boulders and trails around gates (Schahfer & Robison, no date); and
- Safety concerns (e.g. poorly maintained trails may tip a wheelchair user out of their chair) (Sinkular et al., 2024).

This bollard reduces the trail width significantly enough that it prevents wheelchair and scooter users from accessing it.
Photo: Freya McGregor.

Programming barriers

- Lack of access to information (Karns et al., 2023), including lack of accessibility information (Dippenaar & Kotze, 2005);
- Lack of wildlife viewing programs (Sinkular et al., 2024) and lack of inclusive programs (Karns et al., 2023); and
- Lack of wheelchair accessible wildlife viewing tour vehicles such as on-site trams (Dippenaar & Kotze, 2005).

It is important to note that the **barriers identified by disabled wildlife viewers are barriers found in the physical, social, or institutional environments.** These barriers are external to the person, and in order to be reduced or eliminated must be modified by wildlife viewing agencies and/or other wildlife viewers. Focusing on what disabled people can, rather than cannot, do using a strengths-based approach will likely support engagement in wildlife viewing (McGregor et al., in preparation).

Finally, a lack of awareness of the impacts of intersectionality has been identified as a barrier; this exists within the interpersonal and programming realms. 'Intersectionality' refers to the phenomenon that people with multiple historically marginalized identities (including gender identity, ethnoracial identity, and sexual orientation) are not marginalized by just one of their identities, but that those identities intersect and result in a person having to navigate multiple systems of oppression (Crenshaw, 2017). People with multiple historically marginalized identities, for example, someone who is Black and deaf, may experience more constraints than people without multiple marginalized identities (Ghimire et al., 2014; Green et al., 2009). For example, a 2009 study found that women with disabilities were more constrained by their disability than men, Black people were more constrained by having a disability than white people, and older people were more constrained by having a disability than younger people (Green et al., 2009).

A tram tour at a wildlife viewing location. This is not a wheelchair accessible tram, and is an example of a programmatic barrier for wheelchair users. Photo: Freya McGregor.

What can we learn from the research about hunters and anglers with disabilities?

Hunting, fishing (also known as angling), and wildlife viewing are all forms of wildlife-related recreation, and wildlife viewers can also be hunters and anglers (Grooms et al., 2023; U.S. DOI & USFWS, 2023). In fact, **nearly 90% of hunters and anglers also participate in wildlife viewing** (Leonard, 2023). Historically, state wildlife agencies in North America have relied heavily on hunters and anglers as their target audience. This led to a wealth of scholarly literature related to hunting and angling, including a handful of studies about supporting hunters and anglers with disabilities. Given that these state wildlife agencies are responsible for managing wildlife viewing and are also responsible for managing hunting and angling, we include, below, a short review of the hunting and angling literature that may be applicable to including people with disabilities in wildlife viewing.

Hunters with disabilities

When compared to nondisabled hunters, many hunters with disabilities report similar motivations to, and satisfaction from, hunting (Grilliot & Armstrong, 2005), as well as similar constraints to participation (Gransee, 2002). However, disabled hunters face additional constraints to participation. Hunters with disabilities note that their biggest barrier to hunting was finding locations that were accessible for them to hunt (Manfredo et al., 1989). Other constraints to hunting with a disability include:

- Lack of knowledge of available resources;
- Stress or intimidation between the person with a disability and the instructor; and
- Lack of knowledgeable instructors qualified in providing accessible and inclusive instructions (Gransee, 2002).

Unwelcoming messages can be a barrier for disabled hunters. Photo: Freya McGregor.

A study of female hunters with disabilities (Gransee, 2002) generated the following recommendations to increase inclusion in hunting:

- Provide disability awareness and skills training for instructors;
- Develop specific instructor training which supports programming that is accessible for and inclusive of all people;
- Increase instructor knowledge of disability issues, adaptive equipment, resources, etc;
- Coordinate participant needs with instructors;
- Network with agencies that provide disability services to find instructors, interpreters and adaptive equipment;

- Increase the use of accessible facilities; and
- Change language to reflect inclusiveness and use welcoming messages.

Anglers with disabilities

Fishing has therapeutic impacts on participants: one study found that taking part in recreational fly-fishing reduced stress and functional impairment of veterans with combat related disabilities (Bennett et al., 2017). Anglers with disabilities participate in fishing at the same frequency and prefer the same target species as their nondisabled counterparts (Freudenberg & Arlinghaus, 2009). Once they have overcome barriers to participation, such as not finding an accessible place to fish, their angling experience is similar to their nondisabled counterparts (Freudenberg & Arlinghaus, 2009). These similarities include the number of days spent fishing, target species preferences, and the benefits they experienced from fishing, like social connection with others and appreciation of nature. Anglers with disabilities rely more on public transportation or transportation from family or a friend than their nondisabled counterparts (Freudenberg & Arlinghaus, 2009; Lindsay et al., 2022), highlighting the importance of considering transportation in accessible recreation.

Fishing can have therapeutic effects on all anglers. Stock photo.

Best Practices for Including Disabled Wildlife Viewers

What would make wildlife viewing more accessible for people with disabilities?

The 1,294 disabled birders in a nation-wide survey of disabled and nondisabled wildlife viewers (Sinkular et al., 2024) reported that the following facilitators[1] supported their birding, or would support their birding if they were in place.

- More wildlife viewing staff (21% disabled birders; 12% nondisabled birders).
- More information about:
    - The wildlife in their state (42% disabled birders; 44% nondisabled birders);
    - Where to go to view wildlife (38% disabled birders; 44% nondisabled birders);
    - Where to view wildlife where there is no hunting (30% disabled and nondisabled birders); and
    - Information about how to view (31% disabled birders; 28% nondisabled birders).
- More wildlife viewing programming, including:
    - Programs that involve interacting with other wildlife viewers (24% disabled birders; 18% nondisabled birders);
    - Programs focusing on improving their wildlife viewing skills (28% disabled birders; 23% nondisabled birders);
    - Training for their 'birding buddy' or other wildlife viewing mentor/s (24% disabled birders; 18% nondisabled birders);
    - Programs that upskill them so they can volunteer for data collection projects (21% disabled birders; 15% nondisabled birders); and
    - Virtual programs related to wildlife viewing (27% disabled birders; 19% nondisabled birders).

Other birders with disabilities in Sinkular et al. (2024) noted that additional facilitators include:

- Program leaders who are knowledgeable about disabilities and disability etiquette;
- Locations that go above baseline accessibility guidelines;
- The physical accessibility of wildlife viewing locations; and
- Other birders who are willing to adapt to the disabled birders' access needs, such as walking more slowly, or speaking louder for a birder who is hard of hearing.

While the percentage of disabled wildlife viewers requesting various types of support is consistently higher than nondisabled viewers, the interest in these supports from nondisabled viewers is still robust. These findings highlight that **improving accessibility and inclusion for disabled birders benefits nondisabled birders too**.

[1] The number in parentheses is the percentage of birders who expressed that this factor would support them. Note that a similar percentage of disabled and nondisabled birders requested all of these facilitators.

How should we design trails for people with disabilities?

The Principles of Universal Design are seven strategies to apply when designing anything, including trails, to ensure they are accessible and usable by the broadest number of people (Center for Universal Design at North Carolina State University, 1997). These principles are:

- Equitable use: All users can use it the same way.
- Flexibility in use: There are various ways to use it successfully.
- Simple and intuitive use: It is easy to understand how to use it successfully.
- Perceptible information: Provides various methods of receiving information.
- Tolerance for error: Built-in hazard reduction.
- Low physical effort: Can be used in a neutral body position without excessive force.
- Size and space for approach and use: Adequate circulation space for mobility devices, a clear line of sight, and all operable components are within a reasonable reach.

Various agencies have their own guidelines for accessible trail design, and all federal agencies follow the Architectural Barriers Act Accessibility Standards (U.S. Access Board, 1968). Table 1 (below) summarizes recommendations from the following resources for select trail accessibility features. Additional trail design guidelines are listed under *More Resources* (see p.29).

- Architectural Barriers Act (1968) Section 1017 which covers trails. These guidelines are replicated by:
    - The Accessibility Standards for Federal Outdoor Developed Areas, from the United States Access Board, published in 2014,
    - The U.S. Forest Service Trail Accessibility Guidelines, from the U.S. Forest Service, published in 2013, and
    - The Accessibility Guidebook for Outdoor Recreation and Trails from the U.S. Department of Agriculture, published in 2012.
- Design Guidelines for Accessible Outdoor Recreation Facilities, Parks Canada, published 1994. This includes helpful illustrations that explain why some of the guidelines are in place, and very clear guidance on recommended trail surfaces, trail edges, safety barriers ("guards") and more. Note that this link sometimes has difficulty opening on different internet browsers, and it may be worth trying using Microsoft Edge, Explorer or Chrome if you are having trouble opening it.
- Accessibility Design Standards for all Future Projects, Oregon Parks and Recreation Department, 2023.

All of these design guidelines specify that **accessible trails should have firm and stable surfaces**, which may include concrete, asphalt, wood or composite boardwalk or hard-packed crushed stone. If using hard-packed crushed stone, the Trails for All People manual (2021) recommends 3/8" aggregate mix, which is both comfortable to walk or wheel on and requires low maintenance over time.

Table 1: Summary of recommendations from various accessibility guidelines that include hiking trails.

Access feature	**Architectural Barriers Act Section 1017: Trails, U.S. Access Board, 1968***	**Design Guidelines for Accessible Outdoor Recreation Facilities, Parks Canada, 1994**	**Accessibility Design Standards for all Future Projects, Oregon Parks and Recreation Department, 2023**
Surface	Firm and stable.	Firm, stable and slip-resistant.	Firm and stable.
Length	Any length.	No limit.	Not specified.
Clear tread width	36” minimum.	1,200mm (47”) minimum.	48”.
Passing spaces	60” x 60” minimum. Required at least every 1,000’ if trail width is less than 60”.	1,500mm x 1,500mm (59” x 59”) minimum. Required every 45-120m (148-394’).	60” x 60” minimum, every 750’.
Tread obstacles	½” maximum if concrete, asphalt or boards. 2” maximum if constructed with other materials.	6mm (¼”) maximum.	½” maximum if concrete, asphalt or boards. 2” maximum if constructed with other materials.
Openings in the surface, e.g. gaps between boards on a boardwalk, gratings	½” maximum.	13mm (½”) max.	½” maximum.
Grade/slope	Up to 5% or 1:20. Distance limits provided for steeper sections.	Not steeper than 1:20 or 5%.	Up to 5% or 1:20. More requirements provided for steeper sections.
Cross slope	No steeper than 2% if concrete, asphalt or boards. Otherwise no steeper than 5%.	Not steeper than 1:50 or 2%.	1:25 or 4% maximum.

Access feature	Architectural Barriers Act Section 1017: Trails, U.S. Access Board, 1968*	Design Guidelines for Accessible Outdoor Recreation Facilities, Parks Canada, 1994	Accessibility Design Standards for all Future Projects, Oregon Parks and Recreation Department, 2023
Protruding/ freestanding objects	Shall not extend more than 4" into the trail tread between 27" and 80" from the surface.	Shall not reduce the width or overhang no more than 300mm (12") between 680-1,980mm (27-78") from the surface.	Shall not extend more than 4" into the trail tread between 27" and 80" from the surface.
Headroom	Not specified for trails. 80" above the surface for Outdoor Recreation Access Routes**.	2,500mm (98").	Not specified for trails. 80" above the surface for Outdoor Recreation Access Routes**.
Number of benches/rest areas.	Not specified.	Every 45-60m (148-197').	Every 1,000' minimum for the first mile, and every 2,000' beyond.
Trailhead signs	Must include information on trail length, surface, typical and minimum width, typical and maximum grade/slope, and typical and maximum cross slope.	Not stated.	Same as Accessibility Standards for Federal Outdoor Developed Areas.

*The Accessibility Standards for Federal Outdoor Developed Areas, the U.S. Forest Service Trail Accessibility Guidelines, and the Accessibility Guidebook for Outdoor Recreation and Trails from the U.S. Department of Agriculture follow these recommendations.
** Outdoor Recreation Access Routes (ORARs) are different from trails. ORARs are paths connecting accessible elements such as accessible parking spaces and accessible bathrooms.

What are the best practices for designing accessible exhibits and interpretive signs?

The 2010 ADA Standards for Accessible Design include guidance on signage for government and private entities. Various agencies have their own standards for interpretive signs which go beyond font requirements. A summary of these standards are found in Table 2, and include:

- 2010 ADA Standards for Accessible Design, Section 703 covers signs.
    - A resource to help interpret these Standards is Signage and the 2010 ADA Standards for Accessible Design, compiled by Luminant Design, 2011. Includes illustrations that help explain the Standards, and information on sign height, font choice and size and contrast.
- Wayside Exhibits, National Park Service, 2009 includes information on different types of signs, guidance on locating interpretive signs and interpretive writing, a breakdown of each step of the project, and common pitfalls to avoid.
    - The National Park Service also has its own Programmatic Accessibility Guidelines for National Park Service Interpretive Media, 2017, which goes into specific detail about text, colors etc.
- Design Guidelines for Media Accessibility, Parks Canada, 1994. Comprehensive resource developed in consultation with various disability groups, and full of illustrations and many concepts related to and extending from those summarized below, such as why trail widths are relevant for different people's access needs.
- Smithsonian Guidelines for Accessible Exhibition Design, no date. Includes guidance on lighting, color, furniture and more, with clear explanations about each recommendation. Note that these guidelines are designed for indoor interpretive signs and museum labels on exhibits, so are particularly relevant to nature center exhibits.

This interpretive sign has a tactile component in the top right corner, and a solar-powered audio option. Photo: Freya McGregor.

Table 2: Summary of recommendations from various accessibility guidelines regarding interpretive signs.

Feature	2010 ADA Standards for Accessible Design*	National Park Service guidelines (combined)	Design Guidelines for Media Accessibility, Parks Canada	Smithsonian Guidelines for Accessible Exhibition Design**
Colors	Text shall contrast with the background.	Strong contrast: 70-90%, eg. white text on a black background. Use dark to mid-tone backgrounds. Avoid white backgrounds as they create glare.	The text and background should contrast at least 70%. No white backgrounds on outdoor exhibits; use 5-10% values in cream or off-white.	High contrast. Dark text on a light background. Solid background only.
Font	San serif. Avoid italic, script or highly decorative fonts.	Approved fonts are Frutiger and Rawlinson. Avoid italics, underlining, decorative fonts and using all upper case.	Avoid italics, cursive, outlined or shadowed fonts. Approved fonts are Times Roman, New Century Schoolbook, Helvetica, Univers 55 and Futura.	Sans serif or simple serif. Avoid italics or script. Do not use all capitals. Must have clear extensions of lower case letters, eg ‘g’, ‘y’, ‘t’.
Font size/height	Minimum ⅝” if the viewing distance is less than 72”.	Use the largest size for the layout.	Size 48 (⅜” high for ‘X’) if the viewing distance is less than 1m (39”). Size 100 (¾” high for ‘X’) if the viewing distance is less than 2m (78”).	Same as Parks Canada.
Character proportions	The width of “O” is 55% minimum, and 110% maximum, of the height of “I”.	Built into the approved fonts.	Percentage of width to height of ‘X’ should be 65-95%.	Same as Parks Canada.

Feature	2010 ADA Standards for Accessible Design*	National Park Service guidelines (combined)	Design Guidelines for Media Accessibility, Parks Canada	Smithsonian Guidelines for Accessible Exhibition Design**
Stroke thickness/ weight	The thickness of "I" should be 15% maximum of the height.	Built into the approved fonts.	Thickness of the vertical stroke in 'h' should be 10-15% of the height of 'X'. Thin lines should be no less than 5%.	Same as Parks Canada.
Line spacing/ leading	135-170% of the character height.	At least 20% greater than the font size used. Use a space between paragraphs rather than indenting the first line.	15-20% of the height of 'X'.	At least 20% larger than the font size used.
Text alignment	Not stated.	Flush left. Avoid hyphens at the end of a line.	Justify the left. Keep the right edge ragged.	Same as Parks Canada.
Finish	Non-glare.	Avoid glare. Maintain signs to ensure legibility.	Avoid glare.	Eggshell, matte or other non-glare surfaces.
Alternative formats	If text is raised, braille, positioned below printed text, is required.	Consider incorporating tactile components. Provide an audio alternative with the sign.	Braille, audio descriptions and large print (size 14-16) must be available for all signs.	Same as Parks Canada. Provide drawings and photographs that complement the text.
Use of language	Not stated.	Avoid buzzwords or jargon. Text should connect with and enhance the experience. Key points should be understood	Use plain language, short sentences and simple structures. Avoid jargon, complex words, colloquialisms, and	Same as Parks Canada.

Feature	2010 ADA Standards for Accessible Design*	National Park Service guidelines (combined)	Design Guidelines for Media Accessibility, Parks Canada	Smithsonian Guidelines for Accessible Exhibition Design**
		within 45 seconds of reading.	technical terms.	
Text complexity	Not stated.	Main text no more than 100 words. Concise; short paragraphs. No more than 8-10 on the Flesch-Kincaid Scale (available through Microsoft Word's Readability Statistics).	Keep sentences 15-25 words long.	Same as Parks Canada.
Column width	Not stated.	Not stated.	25-55 characters.	Same as Parks Canada.
Position of signs	Signs with braille shall be mounted to the wall 48-60" above the floor, measured from the base of the braille. (Note: this is for indoor signs for rooms, such as "Accessible bathroom" etc.).	Low profile waysides: 45° angle. 32" from the bottom of the sign to the finished trail surface. Common sizes of the signs themselves are: 42" x 24", 36" x 24", and 24" x 24".	45° angle is ideal. Align outdoor signs along the axis of the sun's movement to prevent glare, i.e. sun shines sideways onto signs, instead of creating a shadow from the viewer's body or shining directly into their face.	45° angle.

* The 2010 ADA Standards for Accessible Design doesn't specifically cover interpretive signs, but it does cover signs for rooms, on doorways etc. Key requirements that may be relevant for interpretive signs are shared here.

** The Smithsonian guidelines are for indoor exhibits, so many contradict some of the guidelines for outdoor signage.

How do we ensure programs are inclusive for people with disabilities?

People with disabilities want program and park staff to "view them as a normal person" (Chikuta et al., 2018, p. 9). It is important for staff and program leaders to be educated on best practices to include people with disabilities (Anderson & Heyne, 2000); indeed, disabled birders report that training for wildlife viewing guides facilitates their participation in birding (Sinkular et al., 2024). Training for wildlife viewing staff and volunteers to increase access and inclusion for disabled wildlife viewers may include:

- Disability awareness and cultural humility (Schleien et al., 1997), including up-to-date language preferences of the disability community;
- Strategies to use during development or during a program to modify the activity for an individual's needs, which may include adaptive equipment (Armstrong et al., 2022); and
- "Training in soft skills (e.g., patience, direct communication)" (Armstrong et al., 2022, p. 10), especially for staff/volunteers working with people with developmental disabilities.

Birding or nature walks can be modified to better include people with disabilities by building in more breaks, moving at a slower pace, or creating space for stationary birding (Karns et al., 2023). Disabled birders want more programming at wildlife viewing locations that include opportunities to interact with other wildlife viewers, improve their skills, and engage as a volunteer both in data collection activities and as a volunteer not related to data collection (Sinkular et al., 2024). Planning programming or wildlife viewing trips near public transportation locations may also help increase inclusion, as many people with disabilities rely on public transportation (James et al., 2018), and holding programs at locations that are physically accessible is vital (Schleien et al., 1997). Accurate information about the accessibility of these nature locations is also key, along with welcoming messaging (Brown, 2017).

"Nothing about us without us" is a central tenet of the disability rights movement (Charlton, 1998; Frantis, 2005; Jodin et al., 2023). When designing programs for people with disabilities it is important, and more effective, to **work with the disability community directly, rather than developing something separately and 'presenting' it to the community** – co-designing a program will likely lead to increased buy-in and participation from the very people agencies are trying to serve (National Recreation and Park Association, 2018). Developing inclusive wildlife viewing programs may involve building relationships with the local disability community in a genuine effort to understand their needs and then "provide the conditions so they can grow for themselves" (Sutton-Long et al., 2016). Networking with local disability organizations, and establishing an advisory board of people with disabilities may be an effective way to do this (Schleien et al., 1997). The National Council on Aging (2021) provides a list of potential disability community organizations who may be interested in partnering with agencies and others at Developing Partnerships with the Disability Community.

How do we best communicate with people with disabilities when marketing programs?

Being aware of the most up-to-date disability-related language is important. McGill University's Inclusive Writing Guide (2023) has extensive links to other resources that cover words and phrases to use and avoid when discussing ability and disability, ethnicity and race, gender and sexuality, and class discrimination and socio-economic status. Other valuable resources are the National Center on Disability and Journalism's Disability Language Style Guide (2021) and the ADA National Network's Guidelines for Writing about People with Disabilities (2018).

When writing government documents for the public, federal agencies are required to follow the Federal Plain Language Guidelines (2011) as a result of the Plain Writing Act (2010). We recommend these guidelines are applied by any agency or organization when writing social media posts, emails and other program-related copy. These guidelines include:

- Use headings;
- Organize content logically;
- Write short paragraphs;
- Write short sentences;
- Use the active voice;
- Choose familiar, concrete words;
- Avoid jargon;
- Remove unnecessary words;
- Use lists with bullets to break up lots of text; and
- Use bold text to make important points stand out (avoid using all capital letters).

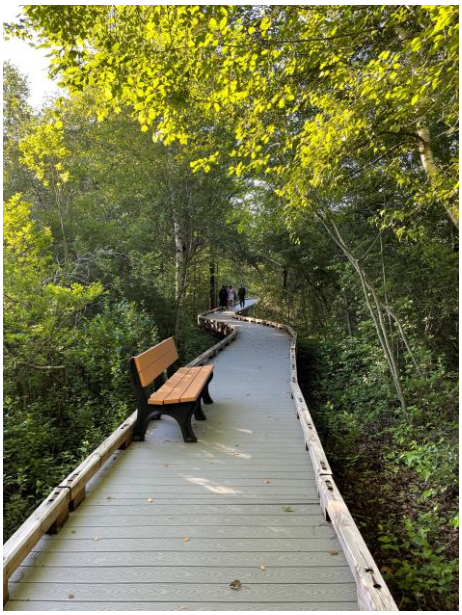
Using plain language (as above) helps all readers understand easily what is being communicated (Boldyreff et al., 2001) and reduces the cognitive load, which can be especially important for minority populations (Cheung, 2017). Plain language may be particularly important for people with learning disabilities, fatigue, pain or acute mental health symptoms, which may all impact someone's thinking and understanding (Radomski & Trombly Latham, 2008). Indeed, the Americans with Disabilities Act (1990) requires government agencies and private businesses that provide programs or services to the public to provide effective communication, and using plain language is one strategy that should be used in an effort to achieve this.

A helpful resource for guidance about inclusive language, ethical and inclusive storytelling, and designing accessible graphics, social media posts and emails is River Network's Inclusive Communications for the Water Movement Best Practices and Broad Guidelines (2023). In addition to meeting best practices for visual accessibility of any marketing materials, website accessibility is important for many people with disabilities, and websites should conform to the latest Web Content Accessibility Guidelines (2023).

State wildlife agencies and organizations can help remove social barriers to outdoor participation by explicitly welcoming people with disabilities to programs, including disabled wildlife viewers in marketing materials, and including accessibility information into all program information – not just the programs designed specifically for people with disabilities (Schahfer & Robison, no date).

For programs held on trails, the disability-led nonprofit Access Recreation developed Guidelines for Providing Trail Information to People with Disabilities (2013). These guidelines recommend the following information is provided about all trails:

- Contact information to find out the latest condition of the trail;
- Parking availability, including the number of van accessible parking spaces;
- Public transportation availability, including stop numbers or station names, and how to travel from the stop or station to the trailhead;
- Toilets, including if any are accessible;
- Availability of drinking water;
- If there is a visitor center on site;
- Surface/s;
- Distance;
- Typical and minimum width;
- Availability of benches or resting areas, including covered shelters and viewpoints;
- Typical and maximum slope;
- Typical and maximum cross slope;
- Any obstacles (which may be seasonal), and where they are located;
- An indication of the trail's difficulty for someone with a mobility disability;
- Any interpretive opportunities, including signage and printed flyers, and if alternative formats of this information are available (eg. large print, audio);
- What a visitor might see or hear along the trail;
- Other trail users, e.g. dog walkers, mountain bikers, horses;
- Loaner equipment available, e.g. manual wheelchairs;
- Printed or tactile trail maps, including information about elevation changes; and
- Photos showing the trail and trail conditions, such as gates or other obstacles.



A photo of a trail with a bench, which also shows the surface type, lips along the edge of the trail, shade available, and the placement of the bench that impacts the usable trail width. A photo sharing this sort of information can be invaluable to disabled wildlife viewers. Photo: Freya McGregor.

Disabled birders report that programs emphasizing interaction with other wildlife viewers and those that improve their wildlife viewing skills support their birding experience (Sinkular et al., 2024). If a state wildlife agency is providing this type of programming, marketing and communication about these features of the program may foster participation.

How can organizations and individuals practice allyship to disabled wildlife viewers?

Allyship is actively and intentionally supporting, uplifting and advocating for a person or group that you do not belong to, often using your privilege to help dismantle systems of oppression and promote social change (Kutlaca & Radke, 2022; Wolbring & Lillywhite, 2023). Engaging in allyship requires the person to understand their own power and privileges (Kim, 2019), and is in stark contrast to the charity model of disability, which views disabled people as those who need pity and financial donations (Clare, 2001).

Individuals and organizations that want to be true allies should avoid performative allyship (Kutlaca & Radke, 2022), which is expressing support in a way that is easy, superficial, not helpful, and may be harmful (Kalina, 2020; Wolbring & Lillywhite, 2023). Performative allyship is motivated by an external reward such as being seen as 'doing the right thing' or gaining popularity, rather than by moral values (Kalina, 2020; Kutlaca & Radke, 2022).

All people hold multiple identities (Crenshaw, 2017), e.g. someone may identify as autistic, first generation American, mother, biologist, and a program manager. The intersection of multiple historically marginalized identities (such as being a person of color *and* neurodivergent) means that many people are impacted by multiple systems of oppression – referred to as intersectionality (Crenshaw, 2017). As a result, practicing allyship to disabled wildlife viewers inherently includes practicing allyship to Black, Indigenous and people of color, members of the LGBTQ+ community (people who are lesbian, gay, bisexual, transgender, queer and more), women, and other historically marginalized communities.

Sutton-Long et al. (2016) and the National Recreation and Park Association (2018) recommend co-designing programs with the disability community – working together to create something that meets the needs of the historically marginalized community is an example of allyship. (For more on co-designing inclusive programs, see *How do we ensure programs are inclusive of people with disabilities?* On p.23.)

Written for working with natural history collections but applicable to many realms, Phillips & Bledsoe (2021) suggest would-be individual and organizational allies:

- Develop and uphold codes of conduct for staff, volunteers and participants that help create safe and inclusive spaces for all, including guidelines on language and behavior and methods of reporting incidents and enforcing the code of conduct.
- Actively respond to situations that do not abide by the code of conduct, e.g. by speaking up at the time and indicating that such behavior is not appropriate for this space.
- Provide empathy to someone who has experienced a code of conduct violation.
- Learn about microaggressions and how to respond to them in the moment. Be prepared to exclude repeat offenders from a program to ensure it remains safe and inclusive.
- Ask how you or your organization can best support a historically marginalized community rather than assuming you know. Consider if your resources would be best

spent supporting existing efforts that are community-led, rather than developing your own.

- Proactively build in accessibility features whenever possible rather than relying on participants to bring up access barriers or request accommodations, and needing to respond retroactively.
- Use up-to-date and appropriate language around disability.
- Develop thoughtful, actionable land (Lambert et al., 2021) and labor acknowledgements.
- Share personal pronouns (e.g., he/she/they) when introducing yourself.
- Respond respectfully and not defensively when mistakes are pointed out:
    - Thank the person for pointing out the problem,
    - Apologize for the impact,
    - Do not defend the intent of the action, and
    - Focus on what will be done better in the future. (And be sure to do it!)
- Introduce people and organizations from historically marginalized communities to your networks and connections, and promote their work and effort.
- Share the communities' own words or work, rather than trying to rephrase or repurpose it yourself (which could be interpreted as co-opting their work). Be sure to credit the individual or community whose work you are sharing.
- Always credit the original author, creator or person or community who wrote the guidelines, took the photo, created the social media graphic, or came up with an idea.
- Continue seeking personal and professional education and training around social justice and the communities and people you are trying to serve without demanding emotional labor from them.

Close up of the welcome sign at the Manchester Cedar Swamp All Persons Trail in New Hampshire. The Nature Conservancy collaborated with many community groups to develop this trail and signage, which is an example of organizational allyship. This sign also explicitly expresses a code of conduct for trail users, and provides representation of trail users in the illustrations who have various skin tones, multiple types of disabilities, and who are queer parents or caregivers. Photo: Freya McGregor.

Going Further

What do we still need to know?

There is very little published research specifically about disabled wildlife viewers, and much of the literature we have included here draws from other contexts or gray literature. Most surveys of wildlife viewers appear not to have collected any demographic data related to disability status. Collecting this information will be even more helpful if it delves further into the **type/s of disabilities respondents have, such as a mobility disability, visual disability etc., so that agencies can develop programs that specifically address the needs of these different communities**. In addition to gaining a more complete knowledge of who participates in different kinds of wildlife viewing, this more specific information could help wildlife viewing agencies prioritize barrier removal and inclusive program development.

While the Architectural Barriers Act (1968) covers hiking trails, only facilities designed, built or adapted with federal funds are required to follow those standards. The Americans with Disabilities Act 2010 Standards for Accessible Design does not cover hiking trails or observation blinds. Other guidelines exist for designing or modifying hiking trails, but there are no large-scale studies that we are aware of that based their guidelines on research-based experiences and preferences of wildlife viewers with disabilities, such as their preferred trail surfaces or the most effective designs of safety barriers at observation platforms. “Nothing about us without us,” is an often-heard reminder from the disability community, and agencies that want to be inclusive need to involve the diverse disability community in the design and implementation of wildlife viewing facilities and programs.

One of the barriers reported by disabled birders (Sinkular et al., 2024) was a lack of accessible programming. Best practices for the design and implementation of various accessible wildlife viewing programming can also be determined in consultation with disabled wildlife viewers to be inclusive and supportive of the community. Studying the efficacy of programs intentionally designed to be accessible will provide insights on what truly works. The breadth of the disability community and the endless variety of possible wildlife viewing programs suggests a toolkit of successful strategies could be invaluable to agencies hoping to implement such programs. It would be invaluable to co-produce future research with the disability community, such as strategies for state wildlife agencies and organizations to implement on their allyship journey, as co-created research is more likely to be more useful and usable.

Throughout 2024, the authors of this literature review, in consultation with nature tourism and accessibility staff at various state wildlife agencies, will be conducting focus groups with disabled wildlife viewers in an attempt to begin addressing some of these research needs. We look forward to sharing the results, and the co-produced recommendations, from this research. Check https://viewing.fishwild.vt.edu/inclusion-for-disabled-wildlife-viewers for the outcomes of this study.

More resources

Additional resources are listed below that have not been referenced elsewhere in this literature review and which may be helpful as you work to increase inclusion for disabled wildlife viewers.

Disability-related resources

- Accessible Icon Project.
- Understanding Disabilities in Native American and Alaska Native Communities Toolkit Guide is a 240+ page toolkit published by the National Indian Council on Aging, 2023.
- Wheelchairs and Other Power-Driven Mobility Devices factsheet, from the National ADA Network, 2018.
- Service Animals and Outdoor Recreation factsheet, from the U.S. Forest Service, no date.

Accessible trail resources

- U.S. Forest Service Trail Accessibility Guidelines (FSTAG), published in 2013.
- Accessibility Guidebook for Outdoor Recreation and Trails, U.S. Department of Agriculture, U.S. Forest Service, published in 2012. Contains lots of background information about why different access features matter to different trail users.
- Trails Handbook, California Department of Parks and Recreation, published in 2019. Download individual chapters from this home page, or go directly to the chapter on Accessible Trail Design, which doesn't deviate from the Federal recommendations, but does include lots of photos to illustrate different concepts.
- Universal Access Trails and Shared Use Paths: Design, Management, Ethical, and Legal Considerations, Pennsylvania Land Trust Association, 2014.
- All Persons Trails: Guidelines for planning and designing All Persons Trails. Suggestions around trail planning, facilities, navigation, tactile elements, how to communicate about trails online, working with disabled consultants, and creating trails for neurodiverse trail users. Trans Canada Trail, 2023.
- The New Hampshire All Persons Trail Guidebook. What we learned: The Manchester Cedar Swamp All Persons Trail. The Nature Conservancy, 2022. See p. 29 and beyond for specific barriers to access identified through community-based listening sessions with BIPOC (Black, Indigenous and People of Color), disabled, queer and senior community members.
- Inclusionary Trail Planning Kit: A guide to planning and programming equitable trail networks, Pennsylvania Environmental Council, no date.
- Trails For All People: Guidance for accessibility and inclusive design. Detailed manual about all aspects of trail design and trail features for disabled trail users. We Conserve PA, 2021.

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