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Inclusive Climate Action: A Scoping Review on the Representation and Inclusion of People With Intellectual Disability in Climate Change Research

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ABSTRACT

Background: Climate change disproportionally affects people with intellectual disability. Despite this, people with intellectual disability are rarely included in conversations about just environmental futures.

Methods: Using PRISMA-ScR guidelines, this scoping review maps the academic literature surrounding intellectual disability and climate change.

Findings: We identified three key themes in the 10 articles included in our review. First, people with intellectual disability experience heightened risks and barriers during and after natural disasters. Second, they are largely absent from government disaster planning and response. Third, inclusive education initiatives are in their infancy. Overall, people with intellectual disability are not involved as leaders or collaborators in research or practice related to climate change. The literature focuses almost exclusively on natural disasters as opposed to the broader context of the climate crisis.

Conclusion: We take a critical lens, calling for further research that reframes the role of people with intellectual disability in climate change discourses: From helpless victims to collaborators, caretakers, and advocates for a safer climate.

1 | Introduction

Climate change is a global issue that will impact everyone. Its effects are already being felt across the world. In the words of UN Secretary-General Antonió Guterres, 'Climate Change is here. It is terrifying. And it is just the beginning' (United Nations, 27 July 2023). As human societies develop responses to the escalating threats of 'global boiling', it is vital that existing social and health inequalities are not exacerbated. Grassroots demands for climate justice have long centred around inclusion, autonomy and sustainability for communities on the frontlines of climate change—most often Brown, Black, and/or poor communities (Schlosberg and Collins 2014). In a similar way, people in the global disability community are more affected by the consequences of climate change than the general population, as evidenced by a growing body of research (for a recent scoping review of 45 studies, see Lindsay et al. 2023). Despite this, people with disability are often marginalised and excluded from adaptation and mitigation efforts (Gaskin et al. 2017). Within the disability community, people with intellectual disability[1] are even less represented in public conversations about climate change and the natural disasters it exacerbates. This article specifically addresses the inclusion of people with intellectual disability in the peer-reviewed academic literature related to climate change, while placing this research within the broader context of policy and practice.

Experience of disability shapes how people interact with their social and physical environments in preparation for and response to climate-related events (King and Gregg 2022).

Unfortunately, nation-states are falling short in their obligations to ensure the inclusion and rights of people with disability in their climate commitments and policies as part of the *Paris Agreement*, adopted under the auspices of the *United Nations Framework Convention on Climate Change* (UNFCCC). A recent systematic analysis of the global policy landscape found that few states include people with disability in their climate adaptation policies, while there are no references to disability in any state's climate mitigation policy (Jodoin et al. 2022).

Research has also highlighted significant gaps in understanding the effects of both climate impacts and mitigation strategies on people with disability. For example, we do not tend to capture data regarding how many people displaced by climate disasters have a disability (are disabled)[2]. If there is data, it does not specify what type of disability people may be experiencing (Battle 2015). We do know that people with disability experience disproportionate vulnerability during natural disasters, which, in the words of Pyke and Wilton (2020), 'speaks to fundamental issues of disability rights and the way societies value lives in the context of an emergency' (also see Kelman and Stough 2015). During COVID-19, these fundamental issues also came to the fore (e.g., see Armitage and Nellums 2020). Many researchers call for forms of participatory action research that aim to dismantle existing social, physical and economic inequalities experienced by people with disability in the context of climate change (Jodoin et al. 2023; Stein et al. 2023).

Various international and national policies and conventions now foreground the rights of disabled people in relation to disaster risk reduction, including the United Nations Convention on the Rights of Persons with Disabilities (CRPD), the Sendai Framework for Disaster Risk Reduction 2015–2030 (Stough and Kang 2015) and the Incheon Strategy. For example, on 10 September 2024, the Committee on the Rights of Persons with Disabilities released a 'Statement on Persons with Disabilities Affected by Disasters'. This statement explicitly comments and expands on Article 11 of the CRPD, which stipulates that state parties must take all necessary measures to ensure the protection and safety of people with disability in situations of risk, including natural disasters. Perhaps less well known, the Incheon Strategy was released in 2012 by the Economic and Social Commission for Asia and the Pacific (ESCAP) and provided the region with the first set of regionally agreed disability-inclusive development goals (United Nations ESCAP 2014). The strategy recognises that people with disability are at higher risk of poor outcomes directly arising from exclusion from policies and plans about climate change and risk reduction. Goal Seven of the Incheon Strategy calls to 'ensure disability-inclusive disaster risk reduction and management', ensuring that emergency communications, protocols, and even evacuation buildings themselves are more accessible to people with disability. This highlights the importance of foundational inclusive practice that recognises, values and includes people with disability in the design and development of all services, processes, products and environments. This means considering different types of disability and the range of inclusive design approaches that lead to greater inclusion and participation. To be 'disability inclusive' implies recognition of diversity within the disability community itself (Kailes and Enders 2007).

1.1 | Intellectual Disability and Neurodiversity

People with intellectual disability form a distinct group within the larger disabled community and require unique support to ensure that existing social, physical, or communication barriers do not exclude them from climate adaptation and mitigation efforts or increase their vulnerability during natural disasters. On top of the systematic exclusion of people with disability in both policy and research, people with intellectual disability are often ignored as a distinct population with distinct needs. Nevertheless, there have been some notable attempts to include people with intellectual disability in international policy communications, for example, the United Nations Human Rights Council (2020) developed an Easy Read version of their *Analytical study on the promotion and protection of the rights of persons with disabilities in the context of climate change*. However, people with intellectual disability are not considered as a distinct group with distinct needs in the report itself.

Intellectual disability is a term that refers to disability related to cognitive capacity. The term is often used interchangeably with other terms including learning disability, developmental disability and intellectual impairment, and there are regional differences in how these terms are used. Approximately 1% of the global population has intellectual disability, or 82 million people given the 2024 global population of 8.2 billion (Maulik et al. 2011). Intellectual disability affects how people function across a range of key areas, including language, interpersonal skills, and personal care. Communication difficulties can mean that people with intellectual disability rely on carers or support workers to access information and services. In situations of emergency, these supports can be significantly disrupted. Furthermore, intellectual disability can be an 'invisible disability', making it difficult for other people to identify the best ways of meeting peoples' specific needs (Yalon-Chamovitz 2009). What's more, the term intellectual disability itself tends to be an umbrella term that captures people with a wide range of medical diagnoses and lived experiences. Regardless of their specific diagnosis, people with intellectual disability are still widely stigmatised in many societies (Scior et al. 2020). It is important that we also focus on the contributions that people with intellectual disability make to their communities while working to address social and environmental vulnerabilities and barriers.

In this sense, the term 'neurodiversity' has much to offer. Coined by autistic (or neurodivergent) self-advocate and scholar Singer (2016), and now widely used across a variety of cultures, sectors, and populations, 'neurodiversity' embraces the role of different brains in a pluralistic human society, just as 'biodiversity' enriches our planet. If we learn to honour and celebrate cognitive differences, rather than stigmatise them, perhaps we might also learn something about living well and carefully with the range of sentient and more-than-human beings who share this earth with us. People with intellectual disability think differently. Their experiences also have much to teach the general population about how to navigate formal and informal systems of care. The escalating impacts of climate change require us to radically reconsider the role of diversity and care in the resilience of our human and earth systems.

1.2 | Histories of Exclusion

People with intellectual disability are not often enabled to actively shape their built and natural environments, much less to make decisions that affect not only their personal futures but future generations. For this reason, the representation of people with intellectual disability in decision-making related to climate change is an important point for discussion. It is also important to recognise that many marginalised groups do not get the opportunity to participate in civic decision-making or in governance roles.

The reasons behind the exclusion of people with intellectual disability can be overlapping and include the built environment, strategy and policy structures, information and communication design and social or economic inequalities (Carnemolla, Robinson, and Lay 2021). Global strategies, such as the UN reports highlighted earlier in the article, point to the increasing expectation of disability inclusion in disaster risk mitigation and planning. However, it is unclear what this looks like in practice. It is also unclear what an inclusive approach looks like across the breadth of the disability community: an overarching aim to be inclusive for all does not automatically lead to participation for all people. For this reason, we reflect on the importance of inclusive approaches that respond to the communication and access preferences of people with intellectual disability. This may be one way to address exclusion from local conversations and decision-making on matters relating to climate change.

Approaches to improving the inclusion of people with intellectual disability in climate change and disaster preparedness need to be considered at multiple levels. A systemic lack of accessible information, including how to access services and events, is widely recognised as a cause of isolation in the community for people with intellectual disability (Abbott and McConkey 2006; Johnson et al. 2009). Therefore, more inclusive and accessible materials and information are an important step towards minimising the poorer outcomes from climate-related events that are experienced by people with disability (Neuhauser et al. 2013). In relation to emergency response, accessible information and communication are linked to survival, health and well-being post-disaster. Governments are recognising the importance of inclusive and diverse communication design in emergency preparedness for people with disability. In Australia, the State and Commonwealth Disaster Resilience Programme funded an emergency preparedness toolkit for people with disability, designed to support more inclusive planning for climate change effects (AdaptNSW 2020).

However, accessible information alone will not address the range of social barriers faced by people with intellectual disability to participate in civic and social events. These barriers include a history of rarely being asked their opinion about concerns in local communities, having smaller social networks across local communities, and being at risk of feeling unsafe in the community more generally (Carnemolla, Robinson, and Lay 2021). Therefore, it is important to have more inclusive processes and activities in place to ensure that communities themselves become more socially sustainable and that people with intellectual disability are included in activism, planning, and decision-making related to climate change. This will require systemic, cultural and structural change within local community groups. For example, without more accessible processes and communication, it is unlikely that people with intellectual disability will be aware of and able to participate in climate consultation processes and activities, as noted in research on local planning decision processes (Carnemolla and Steele 2024) and local community activities (Robinson et al. 2022). Disability advocacy organisations repeatedly call for a more intersectional approach to disability inclusion and climate change, one that recognises the multiple and overlapping barriers faced across age, culture, gender and disability type—always citing intellectual disability as a repeatedly marginalised group (e.g., see CBM Australia 2023; Dawson, Kumar, and Atkinson 2024). Intellectual disability and climate change must also be considered in an intersectional context, mindful of the diversity of experiences amongst all people with disability and attentive to how people with intellectual disability interconnect and diverge from the experiences of other marginalised populations. Understanding what practices support inclusion and how they are valued by diverse groups within the disability community is what is needed to ensure that all people, regardless of disability or disadvantage, have opportunities to contribute to matters that are important to them. The lack of inclusive processes and the absence of activist voices from people with disability has been raised globally, including in the responses to COP26 by the International Disability Alliance (IDA 2021) and in COP28 by the European Disability Forum (Felix 2023).

1.3 | Impacts of Climate Disasters

Climate change is already wreaking havoc on global weather systems. We have seen increased numbers and intensity of floods, fires, droughts, storms and other extreme weather events (IPCC 2023). There is a growing body of evidence that such disasters can lead to cognitive decline and increased cognitive disability, and this effect is higher for people from low socioeconomic backgrounds (Helton, Head, and Kemp 2011; Hikichi et al. 2019; Shiba et al. 2021; Walder et al. 2014). Research surrounding the experience of natural disasters for people with cognitive impairments like dementia (distinct from intellectual disability), show specific challenges including difficulties understanding television reporting on the emergency, developing evacuation plans, and comprehending risk factors (Akanuma et al. 2016; Christensen, Richey, and Castañeda 2013). People with Down Syndrome experience higher rates of early-onset dementia than the general population (Fortea et al. 2021), so the intersections between cognitive decline and intellectual disability are pertinent in the context of the climate crisis.

Traumatic experiences, like those caused by natural disasters, can be particularly difficult for people with intellectual disability and/or autism and are more likely to lead to prolonged suffering (Mevissen and de Jongh 2010). A lack of access to disability support during disasters, and a lack of understanding of neurodivergent experiences on the part of emergency responders can lead directly to exclusive and traumatic practices (Reischl, Oberleitner, and Simper 2006). Elderly and disabled people are more likely to die or suffer serious medical consequences during natural disasters; however, considering

their disproportionate vulnerability, they seem only slightly more likely to evacuate the disaster zone before an extreme weather event (e.g., see Behr and Diaz 2013). In the aftermath of natural disasters, support worker and health professional burnout can also impact the quality of care that people with intellectual disability receive (Valenti et al. 2014). Despite the urgent need for evidence-informed support for people with intellectual disability and their communities in the context of climate change, as far as we are aware, no reviews to date have been reported on the academic literature relevant to this subject.

1.4 | Rights and Resistance

Through this article, we aim to promote the health and rights of people with intellectual disability in the context of climate change. Drawing from Watts Belser (2020) and others who are thinking radically about the implications of disability politics in this climate era, we wonder: can we simultaneously recognise people with intellectual disability as vulnerable to social and environmental violence, while also being sources of critical knowledge and resistance to business-as-usual (Alaimo 2017; Watts Belser 2020). As such, we reviewed the academic literature through a critical lens, noting limitations, gaps, and opportunities for the development of inclusive and strengths-based approaches.

2 | Methods

We undertook a scoping review, according to PRISMA-ScR (Preferred Reporting Items for Systematic Review and Meta-analysis Extension for Scoping Reviews) guidelines (Tricco et al. 2018) to map the evidence base surrounding climate change and people with intellectual disability. Our literature review protocol was developed using the scoping review methodological framework developed by Arksey and O'Malley (2005). Our aim was to map the peer-reviewed evidence relevant to our research question: How are people with intellectual disability experiencing and responding to the climate crisis?

2.1 | Inclusion Criteria

We included academic literature that reported on people with intellectual disability's experience and/or understanding of climate change, including experiences of natural disasters that are exacerbated by climate change. Grey literature was deliberately excluded from the scope of this review to maintain a clear focus on academic sources, ensuring a robust foundation for this first stage of a wider programme of research, which is to be followed by a grey literature review. We included peer-reviewed research published in English that focused on people with intellectual disability, learning disability, autism and/or cognitive impairment. We included studies focused on Traumatic Brain Injury (TBI), which can be linked to intellectual disability when brain injury occurs early in life. We included autism as a search term due to its common co-occurrence with intellectual disability, and our professional experience of the intersections between these two distinct types of neurodevelopmental disability. However, it is important to note that many people with autism (autistic people) do not have an intellectual disability. We did not time limit our search, which we conducted in March 2023.

2.2 | Exclusion Criteria

We excluded studies that focused only on people with dementia related to ageing, and older people. While these populations experience many similar challenges and barriers to people with intellectual disability, they form a distinct cohort and do not fall within the common characterisation of intellectual disability as a group of neurodevelopmental disorders that begin in childhood. We excluded population-level research examining the effects of natural disasters on cognition. We excluded research that included people with intellectual disability only peripherally within a wider discussion of the links between experiences of disability and climate change, or which only focused on gathering empirical data from service providers or carers of people with intellectual disability.

2.3 | Information Sources and Search Strategy

We conducted comprehensive literature searches, with the aid of a specialist university librarian who suggested that we search for studies in the Medline, CINAHL and Scopus databases because these databases best reflected our subject interest. We scanned the references of all relevant systematic and scoping reviews, and the reference lists of included articles. The specialist university librarian also assisted us with the identification of appropriate search terms, which were informed by our previous scoping reviews

Search terms

1. intellectual disabilit*, learning disabilit*, cognitive disabilit*, autism, down syndrome, cognitive impairment*, neurodiv*, foetal alcohol syndrome, fragile x syndrome, traumatic brain injury

   AND

2. Climate change, global warming, temperature, heat, heatwave, warming, season, hot, flood*, hurricane, drought, forest fire, thunderstorm, cyclone, tornado, bushfire, snowstorm, natural disaster, forced displacement, forced migration, climate refugee, climate migration.

2.4 | Study Selection Process

Studies were screened at two stages by both authors, using the Covidence software. In line with Mak and Thomas's (2022) recommendations regarding the composition of a research team when conducting a scoping review, we both have content expertise in intellectual disability and have published previous scoping reviews (e.g., Carnemolla, Robinson, and Lay 2021; Carter et al. 2022). At stage one, 444 records were identified, of which 12 were removed as duplicates. After screening citations

and abstracts ($N = 432$), we excluded 409 texts that did not meet our inclusion criteria. We reviewed 23 full texts for eligibility and excluded a further 13 articles. Both authors initially conducted independent assessments of the studies based on the predefined inclusion and exclusion criteria. In cases where discrepancies arose, the reviewers engaged in discussion to clarify interpretations and align on inclusion criteria. (Figure 1).

2.5 | Data Items and Data Collection Process

We extracted data on the following:

- Year of publication
- Country of research
- Journal

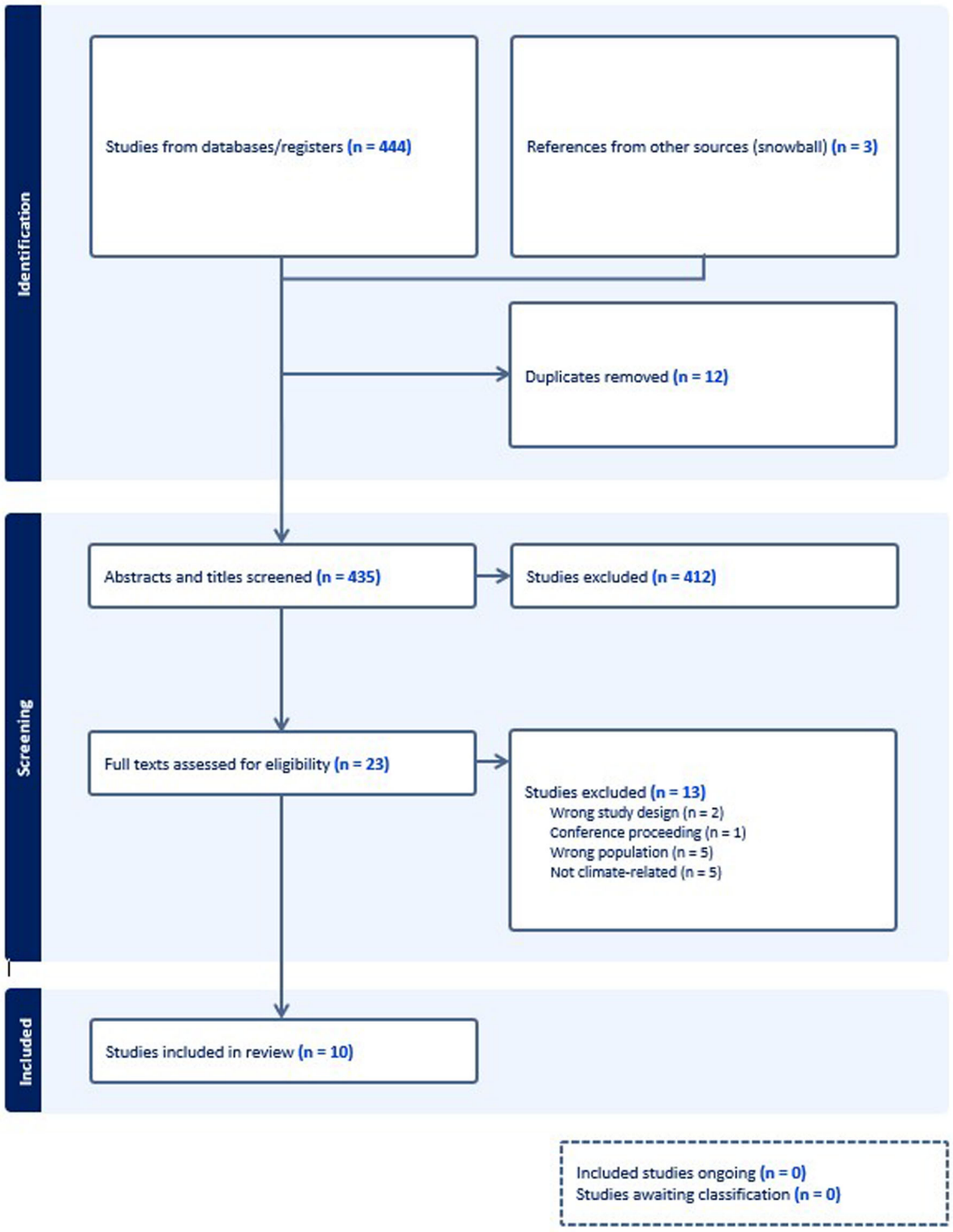

FIGURE 1 | PRISMA-ScR flow chart showing the selection, inclusion and exclusions of studies identified in the search process. [Color figure can be viewed at wileyonlinelibrary.com]

- Aim of study
- Study population
- Sample size (if applicable)
- Data collection methods
- Main findings
- Themes/categories
- Limitations
- Practice implications

Data extracted on each paper was shared between the researchers. The final matrix was verified as a whole by one of the researchers.

2.6 | Methodological Quality Appraisal

As this was a scoping review, we did not specifically appraise methodological quality or risk of bias; comparability across included studies was also difficult, given the heterogeneity of the research designs. However, we did capture research design and limitations, with a particular focus on whether/how people with intellectual disability were included in the research process.

3 | Results

We identified 10 articles that were relevant to this review. They were published between 2007 and 2022 and are described in Table 1. The countries that the research was conducted were Australia (1), Canada (1), Costa Rica (1), Indonesia (2), Iran (1), Philippines (1), the United Kingdom (1) and the United States (2). Table 1 for a summary of the included studies.

Of the 10 articles, nine focused on disaster preparedness and responses, while one related to climate change education. Three of the articles focused on people with intellectual disability. Two of the articles focused on people with autism (autistic/neurodivergent people). One article focused on people with traumatic brain injury. Four articles included people with a range of backgrounds, including health/social care professionals, educators, and people with disability. Of these four articles, the substantive focus included enough of an emphasis on the experiences of people with intellectual disability and/or autism to warrant inclusion in this review.

The research methods were varied and included qualitative interviews (Barker, Malpass, and West 2022; Pyke and Wilton 2020), document analysis (Stough 2015), and surveys (Self et al. 2007; Fino et al. 2017; Edmonds 2017; Sheehy et al. 2022). Sample sizes are documented in Table 1, and ranged from 769 to three, with three articles not directly collecting data from research participants. Whilst reviewing the included articles, the authors were interested in how the research designs were structured to be inclusive of people with disability, for example within the research team structures or in accessibility of information. There was a notable absence of strengths-based, inclusive research. In other words, none of the studies involved people with intellectual disability and/or autism in the research design, data collection, or dissemination.

4 | Key Themes in the Included Literature

We identified key themes in the literature and organised them inductively while remaining informed by our overarching research question: How are people with intellectual disability experiencing and responding to the climate crisis? We used the matrix of information we extracted from the articles as a starting point and referred to each article as needed to further develop the conceptual clarity of each theme. The three themes that we identified are illustrated in Figure 2 and expanded upon further below.

4.1 | Theme One: Unequal Impacts

4.1.1 | Heightened Risks and Barriers During and After Natural Disasters

People with intellectual disability appear more likely to experience poor outcomes, including increased Post Traumatic Stress Disorder (PTSD), anxiety, and stress, following natural disasters such as hurricanes and cyclones (Barker, Malpass, and West 2022; Shapiro et al. 2020; Stough 2015). Notably, the published literature does not include any research surrounding other chronic and acute climatic events, such as floods, fires, and droughts. Shapiro et al. (2020) highlight how, during catastrophic hurricanes, impairments associated with brain injury may make people less likely 'to take self-protective actions' (p439). For example, people with traumatic brain injury may forget to purchase essential supplies and have difficulty responding to evacuation warnings, adjusting to disrupted routines and communicating with emergency workers. This summary could be flipped, or at least recalibrated—that is, the onus could also be put on ensuring adequate and informed systems of support, rather than solely focusing on overcoming individual impairments. Barker, Malpass and West (2022) found that people with disability's experiences of sheltering during tropical cyclones in North Queensland, Australia, were influenced by a dynamic interaction between three elements. First, the physical environment of the shelter, second, the physical and psychological impact of the cyclone, and third, the availability and capacity of support people. For example, a lack of seating and laying options, poor lighting, and other access issues within shelters led to increased dependence on support and worse psychological impacts. Relationships with carers and other supports were central to the experience of people with intellectual disability during a natural disaster, but carer strain, anxiety and stress were a significant concern, particularly when paid supports were not able to work.

Recommendations to improve experiences for people with intellectual disability include enabling support workers and health professionals to help identify the unique needs of their clients in the context of natural disasters while encouraging planning and readiness (Barker, Malpass, and West 2022;

TABLE 1 | Summary of included articles (see attached file).

Title	Year	Authors	Country	Journal	Aim of study	Population	Total number of participants (if applicable)	Data collection	Main findings	Themes
A virtual approach to teaching safety skills to children with autism spectrum disorder	2007	Scudder, R. R. Weheba, G. Crumrine, D.	USA	Topics in Language Disorders	To determine the benefits of using VR in comparison with a more traditional integrated/visual treatment model for teaching safety skills	People with autism	8 children (6–12 years)	control ($N = 4$) versus intervention ($N = 4$) trial, baseline versus after training measures of safety skills	Visually structured learning environments are helpful for children with autism (e.g., picture cues, comic strip conversations, social stories). Virtual Reality (VR) taps into this visually enhanced learning—enhanced visual details, concrete organisation, ability to modify activities to encourage generalisation. In this study, both the control and the VR strategies to teach fire and tornado drills were deemed successful—VR allowed students to practice skills in a safe simulated environment, hard to create by educators.	Awareness and preparedness
World Report on Disability, Intellectual Disabilities, and Disaster Preparedness: Costa Rica as a Case Example	2015	Stough, Laura	Costa Rica	Journal of Policy & Practice in Intellectual Disabilities	To address points raised in the World Report on Disabilities that are related to the specific concerns of people with intellectual disability and to illustrate how progressive policies can support people with intellectual disability affected by disaster or conflict through the example of Costa Rica.	People with intellectual disability	N/A	Summary/ analysis of world report on disabilities, and Costa Rica policy	The specific needs of people with intellectual disability are not detailed in the World Report. It does state that people with disability experience disproportionate risks in disaster situations, and are often excluded from relief and rehabilitation processes. They have diverse and specific needs, which are often not met by disaster support services. In Costa Rica, people with intellectual disability live in the community (they do not have a tradition of housing people in institutions), and are at risk of the same disaster impacts as the general population. Two cross-cutting policy mechanisms—The National System for Disaster Risk Management, which guides the National Emergency	Disaster policy; unequal impacts.

(Continues)

TABLE 1 | (Continued)

Title	Year	Authors	Country	Journal	Aim of study	Population	Total number of participants (if applicable)	Data collection	Main findings	Themes
									Commission, and The Equal Opportunity Law for Persons with Disabilities—inform interagency cooperation in disaster response for people with intellectual disability.	
Disaster awareness simulation for children with autism spectrum disorder using Android virtual reality	2017	Fino, Razor; Lin, Mark Jessel; Caballero, Arlene; Balahadia, Francis Fernandez	Philippines	Journal of Tele-communication, Electronic and Computer Engineering	To design a disaster awareness VR simulation	People with autism	4?	Prototyping, evaluation survey	The VR system was deemed acceptable to the experts consulted. Only consulted professional 'experts' in IT, psychology, and one carer. Deficit focus. No indication if this software has been used or developed any further.	Awareness and preparedness
Designing Emergency Preparedness Resources for Children with Autism	2017	Edmonds, Casey Olivia	United Kingdom	International Journal of Disability, Development and Education	To identify how emergency preparedness resources can be developed for children and teenagers with autism	People with autism; Other: Autism experts, academics and practitioners	Consultation with three autism experts during resource development, evaluation with 18 academics and practitioners	Resource codesign and evaluation survey	There is a lack of emergency preparedness resources for children with autism and other developmental disabilities. Author used successful resources already developed for primary aged children in Essex, UK, and adapted them using social stories techniques. No involvement of young people with autism in the design or evaluation.	Awareness and preparedness
Preparing Survivors of Traumatic Brain Injury for Catastrophic Hurricanes in the Time of Climate Change	2020	Shapiro, Lauren T. Jimenez, Viviana Espinel, Zelde Galea, Sandro Kossin, James P. Shultz, James M.	United States	Journal of Head Trauma Rehabilitation	To highlight the unique challenges faced by individuals living with traumatic brain injury (TBI) before, during, and in the aftermath of major storms	Other: People with traumatic brain injury	N/A	Commentary	Disasters like hurricanes aggravate existing risks (e.g. PTSD, depression/anxiety); people with traumatic brain injury have difficulty understanding warnings, experience disorientation, and may find it difficult to prepare their home, and/or evacuate. Author offers tips to prepare, including the role that health care professionals can play before, during and after a storm. For example, patients should be encouraged to create a personal support network of	Unequal impacts; awareness and preparedness

(Continues)

TABLE 1 | (Continued)

Title	Year	Authors	Country	Journal	Aim of study	Population	Total number of participants (if applicable)	Data collection	Main findings	Themes
									at least three people in close proximity who would be ready and willing to assist in the event of an emergency. They should have at least a 7-day supply of food, water, medications, batteries and any other health supplies, and have preprepared individual/family emergency plans.	
Planning for inclusion? An assessment of Ontario's emergency preparedness guide for people with disabilities	2020	Pyke, C. Wilton, R.	Canada	International Journal of Disaster Risk Reduction	To examine the planning and consultation process that informed the development of the emergency preparedness guide; to assess the extent to which the guide captures the needs and experiences of people with disability.	People with intellectual disability; People with autism; Health/ social care professionals; Other: people with disability more generally	15 reps from government and disability organisations, four people with intellectual disability	Case study: scan of policy and planning documents, key-informant interviews.	People with intellectual disability and/or psychiatric/ mental health issues are largely absent from Ontario's emergency preparedness guide, and there was no consultation with organisations representing people with intellectual disability in the process of the guide's development. The format and usability of the guide is inaccessible for this population. The guide was seen as valuable in that it helped raise awareness of the needs of people with disability during disasters. Government representatives saw it as a tool for building individual resilience, for example 'how can they be more ready?... if individuals can be more ready, then that's less impact on the system.' The guide emphasises informal support networks, without acknowledging issues of social isolation, something particularly acute for people with autism. Disability organisations highlighted connections between individual resilience and formal supports/	Disaster policy; awareness and preparedness.

(Continues)

TABLE 1 | (Continued)

Title	Year	Authors	Country	Journal	Aim of study	Population	Total number of participants (if applicable)	Data collection	Main findings	Themes
									system-level conditions. For example, it's 'essential to have accessible built environment in the event of an evacuation.' Authors highlight the need to reposition people with intellectual disability as 'interconnected experts who may have nuanced and informative experiences to share in policy and planning fora'. For people with intellectual disability, informal and formal social supports were key to their ability to prepare for, and respond to, emergencies.	
Improving students with intellectual disabilities' science process skills through photosynthesis experiments in enhancing climate change awareness	2021	Manullang, T. I. B. Nandiyanto, A. B. D. Suryadi, A. Rochyadi, E. Haerudin, D. Muspita, R. Sumiroh, E. Manullang, L. S.	Indonesia	Journal of Engineering Science and Technology	To enhance climate change awareness through photosynthesis experiments	People with intellectual disability	6	Demographic data, academic learning outcomes, and subject information (collected through interviews with students' teachers)	The only article in this review focused on climate change education/awareness. The authors highlight that it was challenging for students to learn about climate change at the same time as they were learning about photosynthesis. The authors propose that Enquiry-based learning approaches may be helpful for the students to learn through discovery, observation, trying and drawing conclusions, rather than teacher speaking only.	Awareness and preparedness.
Representation of disasters in school textbooks for children with intellectual disabilities in Iran: A qualitative content analysis	2021	Seddighi, H. Sajjadi, H. Yousefzade-h, S. La Pez, M. Vameghi, M. Rafiey, H. Khankeh, H. R.	Iran	International Journal of Disaster Risk Reduction	To investigate the representation of disasters in school textbooks for children with intellectual disability in the education system in Iran.	People with intellectual disability	N/A	Qualitative content analysis of school textbooks used in 2019–2020	Of 164 Iranian textbooks, 18 had content about hazards. Natural disasters are well covered in textbooks and use a variety of forms for example images, storytelling, notes. However, there was a lack of role models with disability, lack of cultural diversity (all characters from majority Persian ethnic group).	Awareness and preparedness

(Continues)

TABLE 1 | (Continued)

Title	Year	Authors	Country	Journal	Aim of study	Population	Total number of participants (if applicable)	Data collection	Main findings	Themes
Inclusive disaster risk reduction education for Indonesian children	2022	Sheehy, K. Vackova, P. van Manen, S. Saragih Turnip, S. Rofiah, K. Twiner, A.	Indonesia	International Journal of Inclusive Education	To understand Indonesian disaster risk reduction education (DRRE) research and DRRE programmes that consider children with special education needs and Disability (SEND) and collect data regarding current materials, practices and needs	People with intellectual disability; Other: People with disability, teachers	769 Indonesian teachers	Literature review, questionnaire for Indonesian teachers	Children with special education needs and disability (SEND) entirely absent from systemic reviews on the topic of children and DDRE, and from recommendations for future research. Twelve articles included DDRE programmes or guidance documents, only one of which considered children with SEND, however notions of inclusive pedagogy were not considered. Results from the teacher survey suggest that DDRE programmes are not accessible, and unlikely to accomodate children with SEND. Authors highlight need for guidance regarding how to develop and implement inclusive DRRE.	Awareness and preparedness
The lived experience of sheltering for individuals with disabilities during severe tropical cyclones in northern Queensland, Australia	2022	Barker, Ruth Malpass, Andrée West, Caryn	Australia	International Journal of Disaster Risk Reduction	To gain the perspective of individuals with disabilities on the experience of sheltering during the three most recent severe tropical cyclones in northern Queensland, Australia	People with intellectual disability; people with autism; people with disability	12	Qualitative, interpretive methodology: semi-structured interviews, inductive thematic analysis	Public cyclone shelters in northern QLD have no minimum requirements to ensure safety for people with disability. Overall, interviewed participants' experience of sheltering was influenced by a dynamic interaction between the physical and psychological impact of the cyclone (damage and physical changes to environment, as well as anxiety/trauma created by the experience e.g. cyclone warnings, disruption to routines, sound sensitivities, exacerbation of challenging behaviours), the availability and capability of supports (increased need for support, relocation to be with supports,	Awareness and preparedness; unequal impacts.

(Continues)

TABLE 1 | (Continued)

Title	Year	Authors	Country	Journal	Aim of study	Population	Total number of participants (if applicable)	Data collection	Main findings	Themes
									reduced access to paid supports), and the physical environment of the shelter (extent to which it kept the person safe and accommodated their changing needs). Authors suggest use of social stories for psychological preparedness. The findings reinforce the importance of an individualised, person-centred risk reduction approach.	

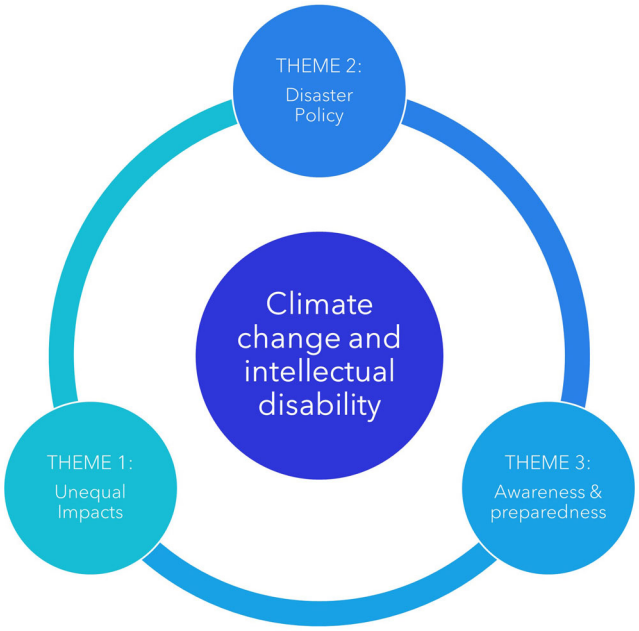

FIGURE 2 | Three key themes identified in the peer-reviewed literature surround climate change and intellectual disability. [Color figure can be viewed at wileyonlinelibrary.com]

Shapiro et al. 2020). For example, it may be important to help people with intellectual disability identify a personal support network ready and willing to assist in the event of an emergency or to help them create preparedness and supply checklists. Synthesising previous research related to emergency evacuation behaviours of people with intellectual disability, Stough (2015) suggests that methods typically used to communicate disasters, such as sirens, flashing lights, and fire drills, may particularly distress people with intellectual disability and impede safe evacuation. At another level, shelters and other emergency response services need to address access issues, including communication and built environment barriers (Barker, Malpass, and West 2022).

Overall, the evidence regarding the unequal impacts of natural disasters on people with intellectual disability is sparse, and there are no population-level or large-scale studies demonstrating the extent to which outcomes may differ between groups, across states, or with different types of disasters. Rather, the literature to date suggests that people with intellectual disability may face more challenges when experiencing disasters than others who do not have to negotiate communication barriers and disrupted support systems.

4.2 | Theme Two: Disaster Policy

4.2.1 | Absence From Government Disaster Planning and Response

Unfortunately, the literature suggests that people with intellectual disability are neither involved in nor specifically mentioned in policy and planning initiatives related to natural disasters (Pyke and Wilton 2020; Stough 2015). For example, Stough (2015) highlights that people with intellectual disability

are not explicitly included in the World Report on Disabilities. She draws out the implications of disaster planning for this population through an in-depth analysis of the policy landscape in the mountainous and disaster-prone Central American country, Costa Rica. Here, interagency cooperation is promoted between emergency management and disability rights through progressive legislation, although its implementation in practice is still variable. Pyke and Wilton's (2020) critical examination of Ontario's emergency preparedness guide for people with disability found that people with intellectual disability are largely absent from the guide and were not involved in its development. The authors question the guide's focus on promoting individual resilience when, for people with intellectual disability, both informal and formal social supports are crucial to emergency preparedness.

From this literature, it seems that inclusive approaches to policy development and implementation, which meaningfully involve people with intellectual disability in the consultation and/or final outputs, are largely missing at global and local levels. This quote from a participant in Pyke and Wilton's (2020) article is a clarion call to action:

> *Come talk to us. Ask us. What do you need from us? What kind of an emergency plan do you want to put in place? You know, don't judge us because of our disabilities because we are all different. (p7)*

The two articles on this theme cannot be expected to cover the wide range of potential policy implications of climate disaster and intellectual disability, and they examine very different levels of decision-making and planning—local versus national governments, in developed versus developing countries. However, both articles suggest that disaster policy and its implementation would be strengthened through the involvement of people with intellectual disability.

4.3 | Theme Three: Awareness and Preparedness

4.3.1 | Importance of Accessible and Inclusive Education Addressing Natural Disasters and Climate Change

Accessible and inclusive education initiatives for disaster preparedness and response were the focus of much of the literature in this review, although all studies highlight the relative lack of examples and evidence surrounding disaster education for people with intellectual disability. For example, a review of inclusive disaster risk reduction education in Indonesia found that children with intellectual disability were largely absent from both the published research and disaster preparedness programmes (Sheehy et al. 2022). In Iran, many school textbooks for children with intellectual disability describe natural disasters, but few contain information about preparing for disasters or safe response strategies (Seddighi et al. 2021).

Three articles reported on initiatives designed specifically for children with autism, that is, autistic/neurodivergent children (Edmonds 2017; Fino et al. 2017; Self et al. 2007). These used virtual reality (VR) (Fino et al. 2017; Self et al. 2007), visually structured learning environments including picture cues and comic strips, and social stories (Edmonds 2017), to teach children skills for emergency preparedness. For example, Edmonds' (2017) UK resources describe what to expect and how to behave in a situation like a flood or fire. They also help emergency personnel and communities better understand how people with autism will be affected during a disaster.

The only article reporting on education focused on climate change (rather than disaster response) was very limited (Manullang et al. 2021). It reported on an education programme that used photosynthesis experiments as a model for explaining climate change. This was not a successful pedagogical tool for learning about climate change, although students did show the capacity to learn science through an enquiry-based approach. None of these initiatives—whether focused on natural disasters or climate change— involved neurodivergent collaborators in the design or evaluation of their programmes. From this body of evidence, it is unclear what people with intellectual disability would like to know and do to prepare for climate-related disasters. It is also unclear if/how people with intellectual disability are learning about climate change through their schools and communities.

5 | Discussion

Overall, the small body of research that we reviewed for this article paints a bleak picture. On the one hand, the literature suggests that people with intellectual disability experience heightened risks and barriers during natural disasters, including inadequate shelters and difficulties accessing support. On the other hand, researchers, educators, communities and governments have a long way to go in prioritising the unique contributions (and vulnerabilities) of people with intellectual disability in the context of climate change. People with intellectual disability are not included in conversations about climate change, let alone in defining how we might respond as individuals and communities—whether through advocacy or governance. The one article reporting on climate change and intellectual disability, outside of disaster risk reduction, is a small education case study in which climate change is inadequately integrated into the classroom (Manullang et al. 2021). This lack of academic attention begs the question: how might people with intellectual disability be centred in future research, policy and practice related to climate change, acknowledging all of the implications this crisis carries for human life (including, but not limited to, the impacts of natural disasters)? For example, what are people with intellectual disability thinking and feeling about climate change? Do they want to be involved in climate mitigation and adaptation efforts and, if so, how? Not knowing the answers to these questions, or even asking them, is a climate justice issue that affects the inclusion, autonomy, and sustainability of people with intellectual disability (Schlosberg and Collins 2014).

There was a notable absence of inclusive research methods across this literature. People with intellectual disability were not involved in any stage of the studies as collaborators or co-researchers. When experts were consulted, they represented

professionals rather than people with lived experience of disability. Furthermore, this absence seems to extend into the policy and education sectors, where people with intellectual disability have not been involved in or consulted with during the development of government guides or pedagogical tools related to natural disaster preparedness and response. When it comes to climate change research more broadly, formative work needs to be done to establish what people with intellectual disability would like to understand about climate change, and where and how they would like to contribute to public research, discourse and action. Returning to our initial framing of this article in terms of rights and resistance—how might we simultaneously recognise people with intellectual disability as vulnerable to social and environmental violence, while also being sources of critical knowledge and resistance to business-as-usual? To date, the literature has yet to centre the second part of this provocation.

Despite the small number of studies, it is worth noting that a broad range of countries are represented, with half of the studies focused on low- or middle-income countries (Costa Rica, Indonesia, Iran and the Philippines). However, there is no cross-national research focused on the role of cultural or societal differences in shaping how individuals with intellectual disability experience the impacts of natural disasters, or on the relative inclusivity of policy and decision-making processes. Authors such as Stough (2015) do note the importance of country context. For example, in some developing countries, illiteracy and innumeracy are more common, making the specific access needs of people with intellectual disability less unique. Furthermore, low- and middle-income countries tend to be more vulnerable to the escalating impacts of climate change, which in turn has ramifications for people with disability.

Our findings relate to and deepen the wider literature surrounding climate change and disability. For example, we know that across the broad spectrum of the disability community, people tend to experience disproportionate impacts from climate disasters (Pyke and Wilton 2020; Kelman and Stough 2015). Our review highlights unique barriers to and enablers of inclusive disaster planning and response, which must address physical, cognitive, and social accessibility. In such a way, inclusive communication methods are vital if we are to minimise the impacts of climate disasters on people with intellectual disability. For example, the use of social stories and Easy Read formats might improve not only disaster preparedness and response but also other varied climate change adaptation and mitigation efforts. Extrapolating from the findings we have canvassed here, and drawing from other research on inclusive design, we argue that creating such inclusive communication tools with and for people with intellectual disability might help improve access for all (Coleman et al. 2016). Crucially, it is helpful to understand experiences of disability through an intersectional lens. Intellectual disability is not a singular, immutable condition but one facet of an individual's experience of the world, which will encompass other identities, including cultural background and, perhaps, different forms of disability (Kailes and Enders 2007).

Furthermore, as we described in the introduction, the inclusion and rights of the broader disability community are still being fought for in the context of climate change policy, research, and other forms of action. The marginalisation of intellectual disability in these debates represents one important facet of the issues that need to be addressed in the movement for disability climate justice. Across the disability and climate research communities, we need to build modes of scholarship and action that enable people from all kinds of backgrounds to contribute and be heard (King and Gregg 2022; Jodoin et al. 2023; Stein et al. 2023).

5.1 | Inclusive Climate Research and Action

There is a need for researchers and other professionals working in this important field to explore inclusive and participatory approaches to knowledge creation, including through supporting the leadership of people with intellectual disability in projects. Inclusive research methods emphasise the expertise of people with intellectual disability regarding the issues that affect their lives, including care, work, education, and the environment (Nind and Vinha 2014; Walmsley and Johnson 2003). In this work, it is vital to explore different ways of generating knowledge, including through nonverbal and arts-based approaches (Boydell and Belliveau 2017; Fox and Macpherson 2015; Watfern 2024). Transdisciplinary and inclusive work in this field will increasingly require the building of diverse teams that include people with intellectual disability as strategists, leaders and analysts (Carnemolla et al. 2022).

A key limitation of this review is the absence of people with intellectual disability as co-researchers. This article is a critical first step in seeking funds to pay people with intellectual disability to undertake research into climate justice alongside us. However, we have already been involved in creative projects focused on climate change that are led by people with intellectual disability. For example, Chloe Watfern supported the Australian neurodivergent artist and environmental advocate Guy Fredericks to develop an exhibition and workshop programme exploring climate change and care for the natural environment. They described the project as follows:

> *Have you ever noticed that signs of care are spotted all over our local ecosystems? Have you ever wondered who is quietly, patiently, tending the wild places in our midst? Too often, people with intellectual disability are looked upon as recipients of care. But if we really pay attention, their creative contributions to communities and the natural environment become abundantly clear. This project uses art to document and celebrate the careful labour of people with intellectual disability as they make the world a better place. It sparks conversations about climate change and environmental crisis in a safe, inclusive way, that also holds space for stories of regeneration and restoration. (Fredericks, Watfern, and Studio A 2024)*

This project invited people with intellectual disability to share their experiences through drawing and sculpture that responded to natural materials from the local environment (See Figure 3).

FIGURE 3 | Neurodivergent environmental worker tracing a weed in an art workshop in preparation for an exhibition about climate change and care for the place (Bleedings Hearts and Morning Glory, Manly Art Gallery and Museum, March–April 2024). [Color figure can be viewed at wileyonlinelibrary.com]

The final exhibition celebrated the care that neurodivergent environmental workers and volunteers offered for ecosystems under threat from climate change and biodiversity loss.

In this literature review, there was a notable absence of strengths-based framings like the one advanced in the creative project outlined above. Future initiatives could consider the contributions that people with intellectual disability can make to climate adaptation and mitigation. For example, how might people with intellectual disability help guide and lead regenerative and restorative green futures? How might we mobilise the social care sector to help take care of this precious planet in a time of crisis? These are questions of not only adapting and surviving but thriving in a climate-change world. Questions like these, attending to the skills and strengths of some of our most vulnerable people, could lead to the development of exciting new policies and practices that centre care for people and the planet. As a first step, policy-makers, educators, and social care organisations need to embed better structures for listening to people with intellectual disability to understand their experiences of climate change.

Neurodivergent thinkers, writers, and environmentalists without intellectual disability have already done much to highlight the plight of the more-than-human world in this era of global boiling. The high-profile climate activist Greta Thunberg has withstood significant public bullying in relation to her Asperger's diagnosis, which she claims is a 'superpower' (Limburg 2019). The conservationist and author Dara McAnulty and Extinction Rebellion supporter Chris Packham are other notable examples of neurodivergent people who have driven global advocacy for climate action, while autistic scientists Temple Grandin and Dawn Prince Junior have each pioneered empathic, innovative, and ethical approaches to human-animal relationships. Grandin has written extensively about her intensely visual, sensitive, and detail-oriented experience of the world, which has given her a special ability to understand other animals and their needs (Grandin 1995). However, Grandin is also a controversial figure within the neurodiversity movement and has been criticised for ableist comments, including her support of particular 'treatments' for autistic traits (Crosman 2019).

Beyond such high-profile individuals, how might we honour the contributions that all neurodivergent people and people with intellectual disability can make to both local ecosystems and the planet at large? For example, forms of 'green care' may offer a way to reconceptualize the role of people with intellectual disability—not simply as recipients of care, but as active participants in caring for each other and the environment (Gallis 2013; Rotheram, McGarrol, and Watkins 2017). Structured programmes and initiatives could help amplify this role, offering co-benefits for both the planet and individual mental health and well-being. Whether we think about it in terms of neurodiversity or care, it is vital that we recognise interdependence and mutual support as a fundamental part of our collective response to accelerating climate change and its unequal impacts on people with intellectual disability. Future research could develop, investigate and evaluate new models of social care that centre neurodivergent perspectives and incorporate the health and well-being of the more-than-human world.

6 | Conclusion

Despite global strategies in support of greater inclusion of people with intellectual disability in climate change advocacy and governance, they continue to be excluded from local and global conversations about just environmental futures. This scoping review, conducted according to PRISMA-ScR guidelines, maps the evidence base surrounding climate change and intellectual disability. Our synthesis of the included ten papers highlights the critical need for increased inclusion of people with intellectual disability in climate change research, advocacy, and planning. Our findings reveal the alarming absence of personal accounts, perspectives and lived experiences in research, education and policy development related to natural disasters. Even more striking was the absence of any research related to climate awareness and climate advocacy for and by neurodivergent groups. To address this gap, we reiterate the call of many disability advocacy groups and Disabled People's organisations worldwide for more inclusive and participatory approaches that prioritise the leadership of people with intellectual disability in climate action. There is also a need for more accessible communication materials to support greater awareness of and opportunities for participation by people with intellectual disability. Ultimately, we encourage future research and practice that reframes the role of people with intellectual disability in climate change discourses: from helpless victims to potential change-makers, caretakers and advocates for a safer climate.

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Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

Data that support the findings of this study are available from the corresponding author upon reasonable request.

Endnotes

[1]Here, we use the term intellectual disability while acknowledging that it is often used interchangeably with other terms, including learning disability, developmental disability, and intellectual impairment, and that there are regional differences in how these terms are used.

[2]Different people and groups have different preferences regarding identity-first versus person-first language (i.e. disabled people vs. people with disability). In our home country of Australia, person-first language is largely advocated for, although we recognise that no language is perfect or fits everyone's needs.

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