

From a Shorter Winter Season to More Storm Damage: New Hampshire Outdoor Recreation Providers Feel Climate Impacts Far More than Visitors

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→ Key Findings



There are notable differences in New Hampshire's outdoor recreation providers' and visitors' perceptions of how climate conditions impact outdoor recreation.



Three-quarters of outdoor recreation providers in New Hampshire noted a shorter winter impacted outdoor recreation in 2022–2023, compared to 58% of visitors.



Outdoor recreation providers were more likely to report weather-related damage to recreation infrastructure as impacting outdoor recreation than were visitors (86% versus 50%).



Study findings yielded three climate related recommendations for inclusion in the 2024–2028 Statewide Comprehensive Outdoor Recreation Plan; all elevate the importance of adaptation, stewardship, and collaboration in preserving New Hampshire's outdoor recreation resources.

Outdoor Recreation Participation and Climate Impacts Both Growing

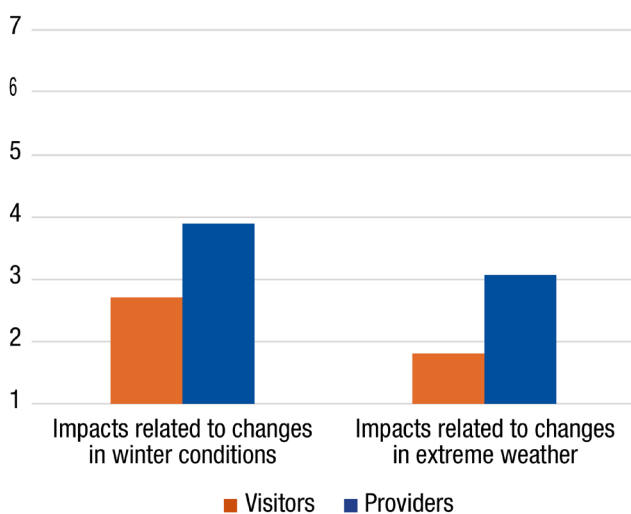
Outdoor recreation is a key part of both the New Hampshire economy and way of life. It is responsible for over 30,000 jobs in the state, representing 3.2 percent of the state gross domestic product (GDP) from both in-state and out-of-state participants.¹ Outdoor recreation visitation has steadily risen in the United States, with a dramatic increase in the last five years, partly due to the COVID-19 pandemic.² Within the White Mountain National Forest of New Hampshire, outdoor recreation increased by close to 50 percent from 2015 to 2020.³

This long-term rise in visitation occurred simultaneously with a range of climate-related impacts on outdoor recreation, including shifting seasons,⁴ increases in the occurrence of extreme weather events,⁵ and warmer winters.⁶ Moreover, the North Central and Northeast regions of the country are experiencing climate change impacts on outdoor recreation more acutely than anywhere else in the contiguous United States.⁷ This combination of stressors poses a risk to both the quality of visitors' outdoor recreation experiences and the natural environments in which these experiences take place.⁸

Climate-related impacts also place unprecedented pressure on the outdoor recreation providers responsible for maintaining outdoor recreation spaces and visitor experiences.⁹ Here, we examine to what extent outdoor recreation providers and visitors in New Hampshire are impacted by annual climatic conditions representative of long-term trends, specifically, through the 2024–2028 New Hampshire Statewide Comprehensive Outdoor Recreation Plan (SCORP). For the first time, the New Hampshire SCORP included an investigation of climate-related impacts on outdoor recreation from the perspective of both visitors (n=1,364) and providers (n=348) (see Box 1).

The findings of the study uncovered notable disparities in how New Hampshire’s outdoor recreation providers and visitors perceive climate conditions’ impact on outdoor recreation, particularly in the categories of “winter” and “extreme weather” (Figure 1). Understanding the perspectives of both providers and visitors is critical to outdoor recreation planning because of outdoor recreation’s contributions to the state economy¹⁰ and the role it plays in incentivizing people to live in New Hampshire.¹¹

Figure 1. Average Level of Perceived Impact on Outdoor Recreation in New Hampshire from Changes in Annual Climatic Conditions Representative of Long-Term Trends (2022–2023)



Note: “M” indicates mean across a 1-7 Likert scale (1 = no impact, 7 = major impact).

Box 1: Definitions

Visitors: New Hampshire residents from across the state who were 18+ years of age and who had participated in outdoor recreation in New Hampshire within the past 12 months.

Providers: Any individual representing an outdoor organization that provides and/or promotes outdoor recreation in New Hampshire.

Figure 1 shows that both groups (e.g., visitors and providers) identified “winter” as the area most impacted by climate. Across all categories, recreation providers reported higher perceived impacts compared to visitors, with the most pronounced differences occurring in the “winter” and “extreme weather” variables. More detailed information, including valid percentages for all impacts measured can be found within the [2024–2028 SCORP](#).¹²

Winter Impacts on Providers and Visitors

New Hampshire winters have historically been characterized by cold and snowy conditions that provide opportunities for many winter outdoor recreation activities. Yet, in the past 50 years, New Hampshire has lost approximately three weeks of snow-covered days¹³ and the ice-out dates¹⁴ on Lake Winnepesaukee are averaging eight days earlier.¹⁵ Although New Hampshire has tools for enhancing snow availability (for instance, machine snowmaking) these technologies still require temperatures below freezing. Moreover, snowmaking does not aid activities that rely on natural winter conditions, such as ice fishing, pond hockey, backcountry skiing, ice climbing, and snowmobiling. As winters continue to shorten,¹⁶ it is anticipated that visitors will adapt their behaviors to capitalize on increased recreational opportunities in the “shoulder seasons,” or the months between peak and off-seasons of recreation.¹⁷ This presents a challenge for providers who manage seasonal staff hires whose availability often does not align with the earlier/later demand for warm weather activities.¹⁸

When asked about the impact of changing winter conditions, the findings suggest that both visitors and providers were impacted (Figure 1). However, the groups diverged in what they identified as the most

impactful change for outdoor recreation: while visitors indicate that “warmer winter seasons” were most impactful, providers indicate that “shorter winter seasons” were top of the list (Table 1).

Table 1: Perceptions of Climate Impacts on Outdoor Recreation in New Hampshire by Item

Construct M (SD)	Item	Visitor M (SD)	Provider M (SD)
Extreme Weather Visitor: 1.81 (1.25) Provider: 3.07 (1.70)	Damage to recreation infrastructure from storms (e.g., downed trees, flooding)	1.83 (1.24)	3.52 (1.83)
	Loss of recreation access from storms (e.g., road/trail closures, poor trail conditions)	1.74 (1.20)	2.89 (1.70)
	Negative travel impacts from storms (e.g., poor road conditions, ice, snow, rain, wind)	1.87 (1.30)	2.80 (1.55)
Water/Wildlife Visitor: 2.08 (1.56) Provider: 2.80 (1.91)	Decreased wildlife populations (e.g., fish, birds, mammals)	2.06 (1.61)	2.46 (1.79)
	Fluctuating water levels (e.g., rivers, ponds, lakes, estuaries, ocean)	2.14 (1.50)	3.23 (1.99)
	Decreased water quality (e.g., E. coli, algal blooms, bacteria)	2.05 (1.58)	2.72 (1.96)
Forests Visitor: 1.84 (1.40) Provider: 2.25 (1.65)	Less vibrant fall foliage (e.g., less fall colors, less intensity)	1.90 (1.46)	2.06 (1.46)
	Later peak foliage (e.g., fall foliage starting later)	1.69 (1.27)	2.07 (1.55)
	Decreased tree populations (e.g., tree death, disease, less species diversity)	1.94 (1.46)	2.63 (1.91)
Summer Visitor: 2.46 (1.83) Provider: 2.82 (1.96)	Hotter summer seasons (e.g., unseasonably warm summer days)	2.63 (1.93)	2.75 (1.95)
	Longer summer seasons (e.g., summer starting earlier, lasting later)	2.11 (1.65)	2.90 (1.95)
	More frequent heatwaves (e.g., extreme summer heat)	2.64 (1.90)	2.82 (1.97)
Winter Visitor: 2.71 (2.04) Provider: 3.90 (2.32)	Warmer winter seasons (e.g., unseasonably warm winter days)	2.80 (2.04)	3.91 (2.33)
	Shorter winter seasons (e.g., snow starting later, snow melting earlier)	2.63 (2.02)	3.93 (2.31)
	Fewer days of snow/ice cover (e.g., reduced snowpack)	2.71 (2.05)	3.85 (2.32)

Note: “M” indicates mean across a 1-7 Likert scale; “SD” indicates standard deviation. (1 = no impact, 7 = major impact).

Providers Feel the Impact of Extreme Weather

Strong winds, heavy rainfall, ice storms, and high tides have an immediate effect on outdoor recreation areas and programs as well as long-term, post-disaster impacts.¹⁹ From 1980 to 2023, New Hampshire experienced 20 separate billion-dollar disaster events.²⁰ In February 2023, New Hampshire was actively managing recovery efforts for eight natural disasters,²¹ and in December 2023 New Hampshire experienced one of its most significant storms on record in the form of a heavy rain-on-snow event.²² According to the New Hampshire Climate Assessment, extreme precipitation dramatically increased between 1996 and 2016.²³ For visitors, extreme weather events can deter plans to travel for recreation²⁴ or negatively impact their experiences.²⁵ Increasing intensity and frequency of storms causes financial strain for providers who need to keep up with annual maintenance costs and find additional funds for emergency repairs.²⁶

“Some tremendous damage to many forests and parks. Fallen trees and other damage caused by storms.” — Visitor

When asked about extreme weather events, our findings suggest that providers were substantially more impacted than visitors (Figure 1). Additionally, the extreme weather category is where the two stakeholders’ perceptions of impact differed the most (Table 1).

Outdoor Recreation Providers—The ‘Canary in the Coal Mine’ for Climate Impacts

Outdoor recreation represents a cornerstone of New Hampshire’s economy and is a staple of the state’s identity and lifestyle. Yet, increased participation may collide with increased climate impacts and result in a perfect storm of more people competing for fewer recreation days/opportunities.

In turn, that collision of impacts has the potential to negatively impact both provider and visitor experiences. This study’s findings suggest New Hampshire outdoor recreation providers are considerably more aware of the impacts from climate conditions than visitors—a finding consistent with research on general differences between visitor and providers perceptions.²⁷ Within this study, the most substantial differences occurred in “damage to recreation infrastructure from storms” and “shorter winter seasons.”

“We have had to cancel winter snowshoe trips and XC [cross country] ski trips; have had to buy a supply of micro spikes for trips that now traverse ice rather than snow conditions” — Provider

Higher perceived impacts amongst providers could, in part, be shaped by negative feedback from a small group of visitors who do not accurately represent the average visitor experience. However, it is also important to note that providers may be more in tune with recreation resources and activities due to a substantially greater number of days on-site compared to visitors.²⁸ As such, providers often serve as the “canary in the coal mine” for climate condition impacts on outdoor recreation. They detect early indicators of change and/or danger given their recreation management roles.

Can New Hampshire Outdoor Recreation Adapt to a Changing Climate?

Our study findings aligned with prior research on New Hampshire providers impacted by winter and extreme weather impacts,²⁹ which suggests that New Hampshire providers may disagree with the notion that outdoor recreation can easily adapt to meet a changing climate.³⁰ As one provider noted, “To put it plainly, I’m not sure how much longer operating in New Hampshire in the winter is going to be viable. We have already begun looking for opportunities elsewhere.”

“I’ve been reconsidering season passes at ski areas for my kids and myself due to the shorter winter season and poorer snow conditions.” — Visitor

Findings on visitors were also consistent with previous reports on winter impacts,³¹ with more than half of visitors perceiving climate-related impacts. One visitor remarked, “I’ve been reconsidering season passes at ski areas for my kids and myself due to the shorter winter season and poorer snow conditions.” However, findings differed from the literature on the potential impact of extreme weather on the visitor experience.³² Visitors reported minimal impact in this area, suggesting that a majority are either unaware of the extent of damage caused by extreme weather in New Hampshire³³ or are more ready to adapt their outdoor recreation to accommodate the changes caused by extreme weather events. Overall, these findings suggest that providers are more aware of climate related impacts on outdoor recreation than visitors. Utilizing provider perceptions as a guide when shaping outdoor recreation climate adaptation plans could prevent further impacts from reaching visitors.

“We had a storm impact our facility last summer that caused extensive damage. It has financial implications as well as risk management changes that are necessary to ensure the safety of our campers”— Provider

Visitors’ perceptions suggest that providers are doing well at maintaining positive outdoor recreation experiences in the face of both climate and crowding impacts. By contrast, providers’ responses suggest that climate conditions are already impacting their experiences. While they can maintain positive visitor experiences right now, additional support is needed to continue doing so, particularly in response to changing winter conditions and extreme weather events. Within

outdoor recreation, examples of adaptive management strategy include building floating docks for fluctuating water levels, implementing reservation systems for crowd control, and offering live snow reports to manage expectations. However, a challenge associated with any climate adaptation strategy is the cost associated with implementation and maintenance. This challenge is further complicated by the fact that many parks and protected areas are funded by visitor fees. This visitor-funded model may exacerbate climate-related issues because, currently, additional funding to combat climate impacts would need to come from increased visitation, creating a negative feedback loop.³⁴

Supporting Outdoor Recreation and Its Providers

Our results indicate that for outdoor recreation to continue thriving in New Hampshire, climate adaptation responses should prioritize the providers responsible for maintaining outdoor recreation spaces and experiences. Based on study findings from both stakeholder groups, three overarching climate adaptation recommendations were created and included in the “recreation and the environment” priority area of the 2024–2028 SCORP.

1. Design and redesign outdoor recreation areas to be adaptable to seasonal shifts and to minimize visitor impacts on the natural environment.
2. Foster stewardship for New Hampshire outdoor recreation areas through educational messaging and programs.
3. Strengthen interagency relationships and work collaboratively to develop a shared set of guiding principles for sustainable outdoor recreation management across New Hampshire parks and protected areas.

Each recommendation has accompanying action steps and performance measures aimed at supporting outdoor recreation providers. Providers seeking additional support could benefit from

programs like the Northern Institute of Applied Climate Science's adaptation workshop and workbook³⁵ or National Centre for Outdoor Risk and Readiness Weather and Environmental Conditions Hub through Outward Bound Australia.³⁶ More information about New Hampshire efforts to preserve outdoor recreation experiences and spaces for future generations can be found in the [2024-2028 New Hampshire Statewide Comprehensive Outdoor Recreation Plan](#).

Methods

Every five years, New Hampshire completes a Statewide Comprehensive Outdoor Recreation Plan (SCORP) to qualify for federal land and water conservation funding to support outdoor recreation across the state. The SCORP helps justify federal and state outdoor recreation expenditures and serves as a guidebook for growth, planning, and management for the ensuing five years. A key characteristic of the SCORP is that it identifies challenges facing outdoor recreation in the state through extensive public engagement surveys of New Hampshire outdoor recreation visitors and providers.

The study utilized a mixed-methods approach, asking questions in five thematic areas or categories plus one open-ended follow-up question. The categories were derived from the 2019–2023 SCORP³⁷ and included: 1) extreme weather (three items); 2) water/wildlife (three items); 3) forests (three items); summer (three items); and winter (three items).³⁸ Visitors to outdoor recreation spaces were defined as New Hampshire residents from across the state who were 18+ years of age and who had participated in outdoor recreation in New Hampshire within the past 12 months. Providers were defined as any outdoor organization that provides and/or promotes outdoor recreation in New Hampshire.

The visitor survey was conducted in late winter/spring 2023 through a partnership between the University of New Hampshire (UNH) Recreation Management and Policy (RMP) research team

and the UNH Survey Center. The Survey Center's Granite State Panel randomly selected New Hampshire residents over 18 who participated in outdoor recreation in New Hampshire within the past year. The visitors were asked "*to what extent have the following climate conditions impacted your outdoor recreation experience(s) in New Hampshire in the last 12 months?*" The 15 individual climate items were evaluated on a seven-point Likert scale (1= no impact and 7= major impact) (Table 1). In total, 1,364 visitors responded to the survey, yielding a response rate of 19 percent.

For the provider survey, the UNH RMP research team worked with the New Hampshire Office of Outdoor Recreation Industry Development to acquire an inventory of all New Hampshire outdoor recreation providers. Respondents were asked "*To what extent have the following climate conditions impacted the outdoor recreation resources, areas, facilities, programs, and/or staff that your visitors/constituents/clients utilize in New Hampshire over the last 12 months?*" The same 15 individual climate items asked of visitors were evaluated on the same seven-point Likert scale (Table 1). In total, 348 providers responded to the survey, resulting in a response rate of 39 percent. More detailed information can be found within the 2024–2028 SCORP.³⁹

Provider and visitor responses are in reference to the winter and early spring of 2022 through winter and early spring of 2023. Winter 2021–2022 was 3.3 °F above average, and winter 2022–2023 was 8.2 °F above average.⁴⁰

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