The Interface of Recreation and Climate Change
Impacts and Strategies

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By the numbers....

• Federal lands are host to over 938 million recreational visits per year.
• Recreation supports more than 6.1 million jobs
• Generates an estimated $646 billion in spending per year
Climate impacts
Shorter winters with less snow

- Decrease in snow cover duration
- Reductions in winter recreation season, esp. at lower and mid-elevations.
- Winter precip increases, but much of this will come in the form of rain, including rain-on-snow events.
- Increasing snow droughts, with significant periods of no snow cover, and intermittent or patchy snowstorms may result in snowless areas that fragment formerly contiguous regions of snow cover.
- Snowmobiling and undeveloped skiing in particular are projected to see marked declines in both participation rates and user days,
% change in average x-country and snowmobiling season lengths

A

RCP 4.5 2050

B

RCP 4.5 2090

C

RCP 8.5 2050

D

RCP 8.5 2090
Increased Precipitation

- More severe weather events such as hurricanes, ice storms, and spring flooding.
- Stands to test the limits of existing infrastructure.
- Many roads, trails, campgrounds, and other infrastructure were built near water in areas prone to flooding.
- The continued maintenance of this infrastructure stands to increase in frequency and cost.
Visitor Shifts and Use Trends

- Longer season for warm-weather recreational activities, creating a high-demand ‘shoulder season’ of increased use.

- The total number of people participating in outdoor recreation will grow along with projected population increases.

- Challenges in how to permit users, staff facilities, and protect natural resources.

- Use restrictions based on road and trail conditions may no longer be applicable in drier and warmer spring and fall seasons.

- Warmer, drier conditions at low elevation can lead to increased visitation at high elevation.

- In certain areas, both total participant numbers and participation per capita are projected to increase in the realm of water-based recreation, which combined with potential lower baseline summer streamflows, is likely to produce access issues and overcrowding.
Public Health and Safety

- Range-expansion and proliferation of disease-bearing insects, especially mosquitoes and ticks, and of noxious plants, including poison ivy.
- Hazard trees from bugkill.
- Respiratory illnesses from longer pollen season: allergies, respiratory impairments, and asthma.
- Heat-related illnesses: dehydration, heat exhaustion, and exertional heat stroke.
- Avalanche danger from rain-on-snow events.
Menu of Adaptation Strategies for Recreation: Methods and Objectives

• Continental U.S. scope.

• Literature review of academic journals, state action plans, handbooks, case studies, and other grey literature.

• Interviews of 28 recreation professionals, researchers, academics, and climate change scientists.

• Focus on those aspects most relevant to natural resource management

• The menu was designed for recreation professionals and land managers to be used in concert with the NIACS adaptation workbook, in order to inform project, program, and land management planning.
Menu of Adaptation Strategies for Recreation

• Strategy 1: Protect and sustain key infrastructure
• Strategy 2: Enhance measures to prevent ecological damage from variable precipitation
• Strategy 3: Manage impacts from shifting visitation and use trends
• Strategy 4: Account for and communicate risks to health and safety
• Strategy 5: Manage recreational opportunities to address impacts of expected conditions
• Strategy 6: Alter recreational opportunities to accommodate expected conditions
Strategy 1: Protect and sustain key infrastructure

1.1 Stabilize shorelines to reinforce vulnerable infrastructure

1.2 Maintain and improve infrastructure using materials that can withstand a range of climate stressors

1.3 Maintain and improve infrastructure using designs that reduce impacts from variable water levels

1.4 Employ technological innovations to maintain the viability of developed winter recreation areas

1.5 Employ protective measures to minimize damage from disturbance events
Strategy 2: Enhance measures to prevent ecological damage from variable precipitation

• 2.1 Maintain and increase the capacity of stormwater infrastructure to accommodate variable precipitation

• 2.2 Enhance the capacity of natural systems to accommodate variable precipitation

• 2.3 Minimize impacts of existing roads and trails that are compromised by changing conditions
Strategy 3: Manage impacts from shifting visitation and use trends

• 3.1 Redirect visitor access away from at-risk areas
• 3.2 Optimize timing of opportunities to align with changing conditions
• 3.3 Provide alternative means of access
Strategy 4: Account for and communicate risks to health and safety

- 4.1 Train employees to be aware of climate-induced risks to public safety
- 4.2 Prevent or minimize hazards from wildland fire and smoke
- 4.3 Prevent or minimize hazards from extreme heat events
- 4.4 Improve public awareness regarding climate change and climate-induced risks
- 4.5 Communicate the reality of environmental change
Strategy 5: Manage recreational opportunities to address impacts of expected conditions

- 5.1 Enhance sustainability of warm-weather trails and opportunities
- 5.2 Recondition campgrounds and infrastructure located in vulnerable areas
- 5.3 Use appropriate vegetation to increase resilience to climate-related stressors
- 5.4 Alter infrastructure to better capture and use natural snowfall
- 5.5 Employ snow-based options that are functional in low-snow conditions
Strategy 6: Alter recreational opportunities to accommodate expected conditions

- 6.1 Focus on four-season and non-skiing recreation at winter sports areas
- 6.2 Relocate existing infrastructure and opportunities to areas with less risk of climate-induced damage
- 6.3 Integrate long-term siting and climate considerations into recreation management
- 6.4 Use materials and designs that are impermanent or temporary
- 6.5 Remove or decommission vulnerable infrastructure
Testing the workbook

• Green and White Mountain piloted workbook this fall
• Will be testing it in Region 5 this summer
• North Shore of Minnesota
Next Steps

• National Adaptation Forum session this month
• Submit for publication in special issue of the journal Sustainability this fall
Questions or comments?
Methods for reaching out to recreation managers?
What other recreation-related resources would be helpful?


Roads, Trails, and Infrastructure

- NPS Coastal Adaptation handbook, case studies, and more: https://www.nps.gov/subjects/climatechange/coastaladaptation.htm

Visitation and Use Trends:

- Resources Planning Act: https://www.fs.fed.us/research/rpa/
- The Journal of Park and Recreation Administration Special Issue on Climate Change: https://js.sagamorepub.com/ipra/issue/view/921

Public Health and Safety:

- U.S. Global Change Research Program, Climate and Health Assessment: https://health2016.globalchange.gov/

Climate Change Impacts in the U.S.:

- Forest Service Climate Change Resource Center: https://www.fs.usda.gov/ccrc/
- Forest Service Office of Sustainability and Climate: https://www.fs.fed.us/climatechange/advisor/