

Menu of Adaptation Strategies and Approaches

Developed for Outdoor Recreation

Strategy 1: Protect and sustain key infrastructure.

- 1.1. Stabilize shorelines to reinforce vulnerable infrastructure.
- 1.2. Maintain, improve, and construct infrastructure using materials that can withstand a range of climate stressors.
- 1.3. Maintain, improve, and construct 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. Reduce visitor impacts to vulnerable 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 human well-being.

- 4.1. Train employees to be aware of climate-exacerbated risks to public safety.
- 4.2. Prevent or minimize hazards from wildland fire.
- 4.3. Prevent or minimize hazards from extreme heat events.
- 4.4. Improve public awareness regarding climate change and climate-exacerbated risks.
- 4.5. Communicate the reality of environmental change.

Strategy 5: Manage recreational opportunities to address impacts of expected conditions.

- 5.1. Recondition recreation-related infrastructure located in vulnerable areas.
- 5.2. Use appropriate vegetation to increase resilience of recreation settings to climate-related stressors.
- 5.3. Alter infrastructure to better capture and use natural and man-made snow.
- 5.4. Employ snow-based options that are functional in low-snow conditions.

Strategy 6: Alter recreational opportunities to accommodate expected conditions.

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

MORE INFORMATION: *This menu of adaptation strategies and approaches can be used within the Adaptation Workbook decision-support framework found in Swanston, C.W.; Janowiak, M.K.; Brandt, L. A.; Butler, P.R.; Handler, S. D.; Shannon, P.D.; Derby Lewis, A.; Hall, K.; Fahey, R.T.; Scott, L.; Kerber, A.; Miesbauer, J.W.; Darling, L.; Parker, L.; St. Pierre, M. 2016. **Forest adaptation resources: climate change tools and approaches for land managers, 2nd ed.** Gen. Tech. Rep. NRS-GTR-87-2. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 161 p. doi.org/10.2737/NRS-GTR-87-2.*

SOURCE: O'Toole, D.; Brandt, L.A.; Janowiak, M.K.; Schmitt, K.M.; Shannon, P.D.; Leopold, P.R.; Handler, S.D.; Ontl, T.A.; Swanston, C.W. 2019. **Climate change adaptation strategies and approaches for outdoor recreation.** *Sustainability*. 11: 7030. doi.org/10.3390/su11247030.

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