

Menu of Adaptation Strategies and Approaches

Developed for Forests

Strategy 1: Sustain fundamental ecological functions.

- 1.1. Reduce impacts to soils and nutrient cycling.
- 1.2. Maintain or restore hydrology.
- 1.3. Maintain or restore riparian areas.
- 1.4. Reduce competition for moisture, nutrients, and light.
- 1.5. Restore or maintain fire in fire-adapted ecosystems.

Strategy 2: Reduce the impact of biological stressors.

- 2.1. Maintain or improve the ability of forests to resist pests and pathogens.
- 2.2. Prevent the introduction and establishment of invasive plant species and remove existing invasive species.
- 2.3. Manage herbivory to promote regeneration of desired species.

Strategy 3: Reduce the risk and long-term impacts of severe disturbances.

- 3.1. Alter forest structure or composition to reduce risk or severity of wildfire.
- 3.2. Establish fuelbreaks to slow the spread of catastrophic fire.
- 3.3. Alter forest structure to reduce severity or extent of wind and ice damage.
- 3.4. Promptly revegetate sites after disturbance.

Strategy 4: Maintain or create refugia.

- 4.1. Prioritize and maintain unique sites.
- 4.2. Prioritize and maintain sensitive or at-risk species or communities.
- 4.3. Establish artificial reserves for at-risk and displaced species.

Strategy 5: Maintain and enhance species and structural diversity.

- 5.1. Promote diverse age classes.
- 5.2. Maintain and restore diversity of native species.
- 5.3. Retain biological legacies.
- 5.4. Establish reserves to maintain ecosystem diversity.

Strategy 6: Increase ecosystem redundancy across the landscape.

- 6.1. Manage habitats over a range of sites and conditions.
- 6.2. Expand the boundaries of reserves to increase diversity.

Strategy 7: Promote landscape connectivity.

- 7.1. Reduce landscape fragmentation.
- 7.2. Maintain and create habitat corridors through reforestation or restoration.

Strategy 8: Maintain and enhance genetic diversity.

- 8.1. Use seeds, germplasm, and other genetic material from across a greater geographic range.
- 8.2. Favor existing genotypes that are better adapted to future conditions.

Strategy 9: Facilitate community adjustments through species transitions.

- 9.1. Favor or restore native species that are expected to be adapted to future conditions.
- 9.2. Establish or encourage new mixes of native species.
- 9.3. Guide changes in species composition at early stages of stand development.
- 9.4. Protect future-adapted seedlings and saplings.
- 9.5. Disfavor species that are distinctly maladapted.
- 9.6. Manage for species and genotypes with wide moisture and temperature tolerances.
- 9.7. Introduce species that are expected to be adapted to future conditions.
- 9.8. Move at-risk species to locations that are expected to provide habitat.

Strategy 10: Realign ecosystems after disturbance.

- 10.1. Promptly revegetate sites after disturbance.
- 10.2. Allow for areas of natural regeneration to test for future-adapted species.
- 10.3. Realign significantly disrupted ecosystems to meet expected future conditions.

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.

This menu was developed through a collaboration of the Northern Institute of Applied Climate Science and other regional partners. The Northern Institute of Applied Climate Science is a collaborative, multi-institutional partnership led by the USDA Forest Service. Learn more about this menu and others at climatehubs.usda.gov/hubs/northern-forests/topic/adaptation-menus-strategies-and-approaches.

USDA is an equal opportunity provider, employer, and lender.

