

# Menu of Adaptation Strategies and Approaches

## Developed for Non-Forested Wetland Ecosystems

### Strategy 1: Maintain and enhance hydrologic processes and water quantity.

- 1.1. Maintain and facilitate infiltration and water storage within wetlands, adjacent uplands, and groundwater recharge areas.
- 1.2. Maintain and restore a natural hydrologic regime.
- 1.3. Restore stream channel processes and restore hydrologic function of waterways connected to wetlands.

### Strategy 2: Maintain and enhance water quality of wetland habitats.

- 2.1. Moderate surface water temperature increases.
- 2.2. Reduce soil erosion and sediment deposition.
- 2.3. Reduce loading and export of nutrients and other pollutants.

### Strategy 3: Maintain and restore wetland vegetation.

- 3.1. Maintain and restore wetland structure.
- 3.2. Maintain and enhance diversity of plant species and their life histories, ecological niches, morphologies, and phenologies.
- 3.3. Promote prescribed fire in fire-adapted wetlands.
- 3.4. Prevent invasive species establishment and limit their impacts where they already occur.

### Strategy 4: Facilitate transformation of wetland communities by adjusting species composition.

- 4.1. Favor and restore native species and genotypes that are expected to be adapted to future conditions.
- 4.2. Increase genetic diversity of seed mixes within appropriate seed transfer zones.
- 4.3. Move at-risk species to locations that are expected to provide more suitable habitat.
- 4.4. Adjust wetland and composition to meet functional values.

### Strategy 5: Adjust wetlands systems to cope with altered hydrology.

- 5.1. Manage systems to cope with decreased water levels and limited water availability.
- 5.2. Manage systems to cope with increased water abundance and higher water levels.
- 5.3. Design and manage enhanced and created wetlands to accommodate changes in hydrologic variability.

### Strategy 6: Design and modify infrastructure to accommodate future conditions.

- 6.1. Reinforce infrastructure to meet expected conditions.
- 6.2. Reroute or relocate infrastructure, or use temporary structures.
- 6.3. Incorporate natural or low impact development into designs.
- 6.4. Remove infrastructure and readjust system.

**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](https://doi.org/10.2737/NRS-GTR-87-2).

**SOURCE:** Staffen, A.; O'Connor, R.; Johnson, S.E.; Shannon, P.D.; Kearns, K.; Zine, M.; Sheehan, M.; Fleener, J.; Panci, H.; Volkening, A. 2019. **Climate adaptation strategies and approaches for conservation and management of non-forested wetlands.** Report NFCH-4. USDA Northern Forests Climate Hub. Houghton, MI: U.S. Department of Agriculture, Climate Hubs. 41 p. Available at: [climatehubs.usda.gov/hubs/northern-forests/topic/non-forested-wetlands-adaptation-menu](https://climatehubs.usda.gov/hubs/northern-forests/topic/non-forested-wetlands-adaptation-menu).

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