Menu of Adaptation Strategies and Approaches

Developed for Wildlife Management

Adaptation Strategies for Population Management

Strategy 1: Maintain and enhance genetic diversity.

1.1. Increase genetic exchange between populations.
1.2. Maintain and enhance genetic admixture (interbreeding) zones in order to facilitate adaptive genetic exchange
1.3. Limit genetic exchange to protect isolated populations.
1.4. Prioritize conservation of trailing edge or leading-edge populations.
1.5. Maintain populations in disturbed environments because they may contain adaptive traits.
1.6. Protect areas of high phylogenetic or phenotypic diversity or endemism.
1.7. Translocate individuals with climate-adaptive genetic traits.
1.8. Preserve genetic material (gene banks).
1.9. Restore genetic diversity in isolated or inbred populations (genetic rescue).

Strategy 2: Establish and maintain connectivity between populations.

2.1. Translocate individuals or populations to habitat within the existing range that was formerly occupied and remains suitable (reintroduction).
2.2. Identify and protect source sub-populations.
2.3. Establish and maintain connectivity between sub-populations through corridors or stepping stones.

Strategy 3: Facilitate shifts in the geographic range of the species in anticipation of future conditions.

3.1. Establish corridors and minimize barriers to movement to new suitable habitats.
3.2. Prepare suitable habitat in anticipation of future introduction, reintroduction, or natural range shift of a species.
3.3. Move and release individuals into a population where conditions are now suitable and are expected to improve.
3.4. Reintroduce species where climate is expected to remain suitable.
3.5. Conserve leading-edge populations (high altitude, northern, etc.).
3.6. Introduce species to new areas with suitable current and future climate.

Strategy 4: Manage interspecific and biotic interactions.

4.1. Increase or protect existing biodiversity, for example species richness, functional diversity, and phylogenetic diversity.
4.2. Detect and remove non-native invasive species.
4.3. Manage predator populations.
4.4. Restore historic trophic linkages.
4.5. Maintain functional groups or keystone species that help sustain ecosystem functions.
4.6. Reintroduce extirpated species or functional groups.
4.7. Manage extant and emerging diseases.

Strategy 5: Maintain a sustainable population size by managing reproduction, survival, and dispersal.

5.1. Move and attract individuals to augment an existing population.
5.2. Increase reproduction and survival rates.
5.3. Use captive breeding programs to increase populations of declining or rare species.
5.4. Manage natural predation to increase populations of declining or rare species.
5.5. Control take, harvest, and illegal harvest.

Strategy 6: Adjust harvest regulations to manipulate populations of harvested species.

6.1. Adjust harvest regulations to increase population size for declining species or species anticipated to be impacted by climate change.
6.2. Adjust harvest regulations to decrease population size.
6.3. Adjust harvest regulations to facilitate shifting phenology or species ranges.

Strategy 7: Plan for and reduce human disturbance and human-wildlife conflict.

7.1. Anticipate and manage conflict from increasing populations, range expansions, or changing behaviors.
7.2. Manage conflict associated with societal adaptations to climate change.
7.3. Reduce or limit access to sensitive habitats or environments.
7.4. Reduce or remove human disturbance stress during sensitive time periods.
7.5. Implement nonlethal behavioral control methods (barriers and deterrents).

This menu was developed through a collaboration of the Northern Institute of Applied Climate Science, University of Wisconsin-Madison, Midwest Climate Adaptation Science Center, Michigan Department of Natural Resources, Wisconsin Initiative on Climate Change Impacts, and other 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.

Adaptation Strategies for Habitat Management

Strategy 8: Restore and maintain sources of food, water, and cover as components of habitat.

8.1. Manage for plant species diversity and complexity.
8.2. Promote plant genetic diversity.
8.3. Prioritize native vegetation and suitable site conditions for habitat management and restoration.
8.4. Manage and create suitable microhabitats and microclimates.
8.5. Enhance primary food sources for specialist climate-sensitive species.
8.6. Provide supplemental food sources.
8.7. Create or maintain sources of food, water, and cover in a variety of locations across the landscape.
8.8. Maintain or mimic natural disturbance regimes to enhance habitat quality.

Strategy 9: Adjust management of food, water, and cover to align with expected future conditions.

9.1. Use non-local, future-adapted genotypes in habitat management.
9.2. Create new sources of food, water, and cover in anticipation of future conditions.
9.3. Accommodate altered hydrology, accounting for periods of high water and low water availability.
9.4. Maintain or enhance sources of food, water, and cover across the annual cycle and different life stages in response to changing phenology.
9.5. Establish or redesign infrastructure to protect habitat from anticipated climate impacts.

Strategy 10: Establish and enhance protected areas or habitat reserves.

10.1. Create large, intact, or aggregated protected areas.
10.2. Increase representation and replication of protected species and habitats across the portfolio of protected areas.
10.3. Select reserves that maximize biodiversity protection for a suite of species.
10.4. Orient suites of protected areas in ways that span gradients in climate.
10.5. Create protected areas that maximize topographic and geologic variety.
10.6. Protect areas at high risk of change due to climate or land use change.
10.7. Protect climate refugia across the landscape.
10.8. Protect sites that are expected to provide future suitable habitat.
10.9. Protect stepping stones, adjacent reserves, and corridors.
10.10. Create temporary or dynamic reserves.
10.11. Maintain or enhance habitat across the annual cycle and life stages.
10.12. Protect current safe havens for climate vulnerable populations to ensure those populations are available for future conservation efforts.
10.13. Protect sufficient habitat for viable populations to be self-sustaining and of sufficient quality to create surplus dispersers.

Strategy 11: Promote wildlife habitat conservation on lands outside of protected areas.

11.1. Identify and restore degraded landscapes with high potential habitat quality.
11.2. Reduce or limit barriers to wildlife movement across private land.
11.3. Manage private lands near and between protected lands (buffer zones).
11.4. Enhance green infrastructure and promote sustainable urban landscapes.
11.5. Manage public or private agricultural land to provide compatible wildlife use.
11.6. Manage forest structure to provide compatible wildlife use areas.

Additional Adaptation Strategies

Strategy 12: Intentionally choose to take no action.

12.1. Take no action in some situations as part of an overall triage strategy.
12.2. Designate no action areas as a control to compare with management interventions.
12.3. Allow for autonomous, or unassisted, adaptation to climate change.

Strategy 13: Engage human communities in wildlife conservation.

13.1. Develop outreach and technical assistance programs for the public.
13.2. Provide access for wildlife-dependent recreation.
13.3. Increase local community involvement in wildlife management.
13.4. Promote community-managed conservation lands.
13.5. Respect and incorporate landscape values of indigenous communities in management decisions.
13.6. Pay for ecosystem services that also benefit wildlife.
13.7. Coordinate across landowners and scales to make sure programs are complementary.

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.*

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