

Wildlife Adaptation Menu

This is a draft version of the Wildlife Adaptation Menu. Please do not distribute. Visit www.forestadaptation.org/focus/wildlife to learn more about the project, and contact Stephen Handler (sdhandler@fs.fed.us) for more information. Authors of this menu include: Olivia LeDee (USGS Northeast Climate Adaptation Science Center), Ben Zuckerberg (University of Wisconsin), Chris Hoving (Michigan Dept. of Natural Resources), Stephen Handler (USDA Forest Service and Northern Institute of Applied Climate Science), and Chris Swanston (USDA Forest Service and Northern Institute of Applied Climate Science).

Adaptation Strategies for Population Management

1. Maintain and enhance genetic diversity

Approaches

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

2. Maintain metapopulation processes

Approaches

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

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

Approaches

- 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

4. Sustain positive and reduce negative interspecific and biotic interactions

Approaches

- 4.1. Increase or protect existing biodiversity.
- 4.2. Manage native competitor species to allow other species to persist or thrive
- 4.3. Detect and remove non-native invasive species

- 4.4. Manage predator populations
- 4.5. Restore historic trophic linkages
- 4.6. Protect functional groups or keystone species that help sustain ecosystem functions
- 4.7. Reintroduce extirpated species or functional groups
- 4.8. Manage extant and emerging diseases

5. Maintain a sustainable population size by managing reproduction, survival, and migration

Approaches

- 5.1. Move and release 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.

6. Manage harvest regulations to manipulate populations of harvestable species

Approaches

- 6.1. Regulate hunting to increase population size for declining species or species anticipated to be impacted by climate change
- 6.2. Regulate hunting to decrease population size
- 6.3. Regulate hunting to facilitate shifting phenology or species ranges

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

Approaches

- 7.1. Anticipate and manage conflict from increasing populations and range expansions
- 7.2. Manage conflict associated with societal adaptations to climate change (coastline hardening, land-use changes, etc.)
- 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)

Adaptation Strategies for Habitat Management

8. Protect, restore, and maintain sources of food, water, and cover as components of habitat.

Approaches

- 8.1. Manage for plant species diversity and complexity
- 8.2. Promote plant genetic diversity
- 8.3. Prioritize native vegetation for habitat management and restoration
- 8.4. Protect and create a diversity of 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 replicated 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

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

Approaches

- 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. Identify temporary water storage during times of high water
- 9.4. Manage for sources of food, water, and cover across the annual cycle and different life stages in response to changing phenology
- 9.5. Establish green infrastructure or hard defenses to protect habitat from anticipated climate impacts

10. Establish and enhance protected areas or habitat reserves

Approaches

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

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

Approaches

- 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 public lands (buffer zones)
- 11.4. Enhance green infrastructure in urban or developed landscapes
- 11.5. Manage agricultural land to provide compatible wildlife use
- 11.6. Manage forest land to provide compatible wildlife use
- 11.7. Influence land use to prevent habitat loss on private land (legal, financial, regulation)

Additional Adaptation Strategies

12. Intentionally choose to take no action

Approaches

- 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 adaptation, or unassisted adaptation to climate change

13. Engage human communities in wildlife conservation

Approaches

- 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 or provide subsidies for income losses
- 13.7. Coordinate across agencies and scales to make sure programs are complementary
- 13.8. Promote sustainable urbanization