Climate Change Adaptation Workbook – Short Form

This is a short version of the Adaptation Workbook (Forest Adaptation Resources: Climate Change Tools and Approaches for Land Managers, General Technical Report NRS-87 2012). This form can be used as a supplemental handout to record your thoughts related to each of the steps in the framework.

For more information on the framework visit http://forestadaptation.org/
An interactive version of this framework is at http://adaptationworkbook.org/

1: Define the area of interest, management goals and objectives, and time frames.

This step identifies the project area and desired management outcomes that will be used for consideration of climate change effects.

Consider the following:

- What is your area of interest for this analysis?
- Are there multiple ecosystem types, stands, or other distinct areas that you want to consider individually?
- What are your management goals, objectives, and plans for each of these areas?
- Are there short- or long-term milestones in the future that can be used to evaluate progress?

What are the management goals and objectives for the area of interest?

2: Assess climate change impacts and vulnerabilities for the area of interest.

This step helps to assess how climate change will specifically affect the project area based upon site-level conditions.

Consider the following:

- What general, broad-scale climate change impacts and vulnerabilities are anticipated?
- What are some more specific ways that the area of interest may be affected by a changing climate?
- How vulnerable is your area of interest to the anticipated effects of climate change?

Need information on the anticipated effects of climate change for your region?

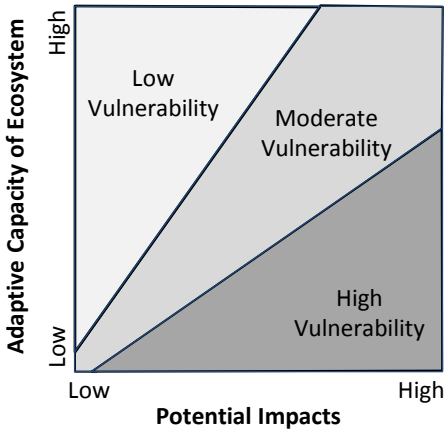
Information on forest ecosystems and potential climate change effects is available for much of the Midwest and Northeast. Visit www.climateframework.org and click on 'vulnerability assessments' for more information.

Site-specific factors that may increase or reduce an ecosystem's adaptive capacity include:

- Landscape context
- Site conditions, such as topographic position, soils, or hydrology
- Past and current management
- Species composition
- Structural characteristics
- Susceptibility to pests, diseases, or other stressors that may increase

What are the potential effects of a changing climate on the area of interest?

What about the project area might make the existing forests more or less vulnerable?



Consider the potential impacts of climate change to the area, as well as the area's unique adaptive capacity (see figure at left).

How vulnerable is your area of interest to the anticipated effects of climate change…

… in the short term?

☐ High ☐ Medium ☐ Low

…in the long term?

☐ High ☐ Medium ☐ Low

3: Evaluate management objectives given projected impacts and vulnerabilities.

This step explores opportunities and challenges that may arise under changing conditions. If challenges are so great that management goals may not be viable, goals may need to be changed.

Consider the following:

- For each of your management objectives, what management challenges may arise as a result of climate change? What opportunities?
- What is the feasibility of meeting each of your management objectives under current management?
- What other considerations (e.g., administrative, legal, or social considerations) affect your ability to meet your management objectives?

What management challenges and opportunities may occur under future conditions?

Given the challenges that you've identified, do any of your management goals need to be altered?

☐ Yes ☐ No

If yes, adjust management objectives before proceeding to the next step.

Menu of Adaptation Strategies and Approaches

Strategy 1: Sustain fundamental ecological functions.
Maintain or restore soil quality and nutrient cycling.
Maintain or restore hydrology.
Maintain or restore riparian areas.

Strategy 2: Reduce the impact of existing biological stressors.
Maintain or improve the ability of forests to resist pests and pathogens.
Prevent the introduction and establishment of invasive plant species and remove existing invasives.
Manage herbivory to protect or promote regeneration.

Strategy 3: Protect forests from severe fire and wind disturbance.
Alter forest structure or composition to reduce risk or severity of fire.
Establish fuelbreaks to slow the spread of catastrophic fire.
Alter forest structure to reduce severity or extent of wind and ice damage.

Strategy 4: Maintain or create refugia.
Prioritize and protect existing populations on unique sites.
Prioritize and protect sensitive or at-risk species or communities.
Establish artificial reserves for at-risk and displaced species.

Strategy 5: Maintain and enhance species and structural diversity.
Promote diverse age classes.
Maintain and restore diversity of native tree species.
Retain biological legacies.
Restore fire to fire-adapted ecosystems.
Establish reserves to protect ecosystem diversity.

Strategy 6: Increase ecosystem redundancy across the landscape.
Manage habitats over a range of sites and conditions.
Expand the boundaries of reserves to increase diversity.

Strategy 7: Promote landscape connectivity.
Use landscape-scale planning and partnerships to reduce fragmentation and enhance connectivity.
Establish and expand reserves and reserve networks to link habitats and protect key communities.
Maintain and create habitat corridors through reforestation or restoration.

Strategy 8: Enhance genetic diversity.
Use seeds, germplasm, and other genetic material from across a greater geographic range.
Favor existing genotypes that are better adapted to future conditions.
Increase diversity of nursery stock to provide those species or genotypes likely to succeed.

Strategy 9: Facilitate community adjustments through species transitions.
Anticipate and respond to species decline.
Favor or restore native species that are expected to be better adapted to future conditions.
Manage for species and genotypes with wide moisture and temperature tolerances.
Emphasize drought- and heat-tolerant species and populations.
Guide species composition at early stages of stand development.
Protect future-adapted regeneration from herbivory.
Establish or encourage new mixes of native species.
Identify and move species to sites that are likely to provide future habitat.

Strategy 10: Plan for and respond to disturbance.
Prepare for more frequent and more severe disturbances.
Prepare to realign management of significantly altered ecosystems to meet expected future environmental conditions.
Promptly revegetate sites after disturbance.
Allow for areas of natural regeneration after disturbance.
Maintain seed or nursery stock of desired species for use following severe disturbance.

4: Identify and adaptation approaches and tactics for implementation.

This step uses the "menu" of adaptation strategies and approaches to identify actions that can help you to meet the desired outcomes. Prescriptive actions, or "tactics", are developed and selected for implementation.

Consider the following:

- What actions can be taken to enhance the ability of the area to adapt to potential changes and meet management goals?
- What benefits, drawbacks, and barriers are associated with each tactic?
- Is each tactic effective? Feasible?
- Which tactics will you recommend for consideration in future management decisions and activities?

What actions can we take to enhance the ability of the area to adapt to anticipated changes and meet management goals?

5: Monitor and evaluate effectiveness of implemented actions.

This step identifies metrics that can be used to assess whether tactics were effective in achieving management objectives and reducing climate-related risks.

Consider the following:

- What can you monitor to evaluate whether you have achieved your management goals and objectives and whether the adaptation tactics had the intended effect?
- How will you implement this monitoring so that you can learn from the information over time?

What information can be used to evaluate whether the selected actions were effective and inform future management?