

Climate Project Screening Tool

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Climate change poses a challenge for resource managers as they review current management practices. Adaptation is a critical means of addressing climate change in the near future because, due to inherent time lags in climate impacts, the effects of increased atmospheric greenhouse gases will be felt for decades even if effective mitigation begins now. To address the impacts of climate change, land managers need techniques for incorporating adaptation into ongoing or pending projects. Here we present a new tool for integrating climate change considerations into project planning. We designed the Climate Project Screening Tool (CPST) as part of the Westwide Climate Initiative (WWCI), a joint project of the three western Forest Service research stations whose goal was to cultivate science/management partnerships that would develop adaptation options for addressing climate change. The objective is to explore options for ameliorating the effects of climate on resource management projects. The CPST also acts as a priority-setting tool, allowing natural resource managers to assess relative vulnerabilities and to anticipate effects of different actions. Finally, it acts to reduce uncertainty by identifying the range of impacts that both climatic changes and management actions

might have on resources. Although focused on climate change adaptation, the CPST could be modified to devise mitigation options for resource managers.

The CPST begins with a list of projected climate change effects for an example focal region, along with a breakdown of these effects in relation to each proposed project activity (see example on next page). Information about projected climate and ecosystem responses can be gathered from scientific literature and other sources and summarized for key indicators of relevance to the local management unit. The major component of the questionnaire is a table separated into typical project types, developed from a Schedule of Proposed Actions (SOPA) or other projects list, which describes projected climatic changes and lists questions to consider given the impacts of these changes on the resource. Examples, such as grazing, are shown on the next page; other examples, e.g., prescribed fire, can be found in Morelli and others (2011).

The questions are general to catalyze the discussion of how climate change might impact different projects and modify its effects. The process should facilitate thinking about the potential impacts of climate change on a particular project type. Questions can be created collaboratively to address parameters that determine the nature, timing, and extent of an action on a particular site. The response narrative is the centerpiece of the CPST, where managers record their answers to the questions and thus their thoughts about the interaction between climate change and the project. The last column is where the user concludes whether to proceed with, modify, or cancel the project given the response narrative. It is intended as a recommendation to the decision-maker regarding whether or not climate change impacts are likely to be substantial enough to require modification to the proposed activities, insignificant enough to proceed as originally designed, or if the project

cannot be modified to consider relevant climate change effects and thus should be withdrawn.

Ideally teams of staff members would fill out the questionnaire together, brainstorming to consider how the effects of climate change would manifest at a project site and re-assessing the assumptions and objectives they used to determine current practices.



Climate Project Screening Tool - Example for the Inyo National Forest

Directions:

Refer to the list of General Climate Change Trends (below) for background information and identify the appropriate project activity that your management unit is considering. Applicable climate change trends and local impacts are identified for each Project Activity in the second column to provide a frame of reference in thinking about the subsequent questions. Work through the Key Questions in the third column with your interdisciplinary team to identify potential climate change implications and record your analysis under the Response Narrative in the fourth column. The final step is to document how your responses impact the project. Does the project still make sense given climate change considerations? If so, should any modifications be made to the project plan? These decisions can be documented in the last column.

General Climate Change Trends (e.g., Inyo National Forest)

1. Generally warming average temperatures
2. Reduced snow pack; longer, drier summers
3. Increased interannual variability in precipitation; increased likelihood of severe flood events
4. Longer fire seasons; atypical fire seasons (e.g., winter, early spring)
5. Increased fuel build-up and risk of uncharacteristically severe and widespread forest fire in traditionally fire-prone forest, woodland, and shrub types
6. Higher-elevation insect and disease and wildfire events
7. Increased stress to forests during periodic multi-year droughts; heightened forest mortality
8. Increased water temperatures in rivers and lakes, lower water levels in late summer, and drying of streams and ponds
9. Decreased water quality as a result of higher temperatures, increased watershed erosion, and sediment flow
10. Loss of seed and other germplasm sources as a result of population extirpation events

Project Activity	Climate Change Trends and Local Impacts	Key Questions for Managers	Response Narrative (please complete, include references where possible)	Continue with the Project?
Thinning for Fuels Management <i>EXAMPLE: McMullen Mixed Conifer Forest Treatment</i>	Trends: Increased water temperatures in rivers and lakes and lower water levels in late summer; increased stress to forests during periodic multi-year droughts; increased interannual variability in precipitation, leading to fuels buildup, additional forest stress, and risk of uncharacteristically severe and widespread forest fire; longer fire seasons; decrease in water quality from increased sedimentation; and higher elevation insect, disease, and wildfire events. Local Impacts: Increased risk for erratic fire behavior; decreased window of opportunity for prescribed fire conditions; increased risk of fire spread in high elevation areas; flashier, drier fuels; decreased water storage in soils	☐ How will the projected density of the stand after it has been thinned respond to erratic and severe wildfire events, given the projected increase in forest stress and mortality? How does the spacing between trees need to increase, if at all? ☐ At what interval should stands be thinned to mitigate for increased forest stress and fire susceptibility or for changed growth patterns? ☐ How does the project area include anticipated future fire-prone areas (i.e., higher elevation sites or riparian areas)? ☐ How will the season of harvesting need to change given the reduced snow pack and extreme flood events to mitigate for ground disturbance, if at all? Will it need to change given shortening and less reliable winters? ☐ How will the proposed project help offset the projected impacts due to climate change?	– <i>The thinning should make the area more resilient to common fire and less vulnerable to severe fire (Dale and others 2001). Ponderosa pines will be thinned from a mean of 336 trees/ha to 152 trees/ha (Egan and others 2010).</i> – <i>The project area includes a narrow canyon with high density development, making it logistically difficult for log removal, risky for prescribed fire, and also creates aesthetics issues. To balance, a wider swath will be thinned and treatments will be done more commonly.</i> – <i>The thinning will incorporate riparian areas that were not previously considered. Most of the treatment is in the WUI so not very high.</i> – <i>Considering projections for earlier spring and later winter in the area (Morelli and others 2011), the season of harvest will need to be shifted somewhat. However, the soils in the area are very permeable so not too much of an issue.</i> – <i>This project should help to increase forest vigor and resilience in the face of projected climate change impacts such as increased vulnerability to insects and disease (Wargo and Harrington 1991; Gottschalk 1995), water stress (Smith and others 1997; Papadopol 2000), and more frequent and extreme fire (Westerling and others 2006).</i>	☐ Yes without modification ☐ No ☐ Yes with modification:
Aspen Restoration	Trends: Reduced snowpack, longer, drier summers Local Impacts: Reduced plant and animal species diversity; reduced water storage in soils; changed fire regimes with more severe effects	☐ Given the anticipated changes, how will this site be capable of retaining quaking aspen over time? ☐ Will aspen occupying this site be able to persist under extreme weather events? ☐ Are there better opportunities for sustaining aspen in other locations that would provide for sustained migration? ☐ How will the proposed project help offset the projected impacts due to climate change?		☐ Yes without modification ☐ No ☐ Yes with modification:

Aquatic and Wildlife Species Restoration	Trends: Loss of seed and other germplasm sources as a result of population extirpation events; increased water temperatures in rivers and lakes and lower water levels in late summer; reduced snow pack; longer, drier summers, decreased water quality as a result of increased watershed erosion; general shifts in temperature ranges; severe widespread forest fire; longer fire seasons; higher elevation insect and disease and wildfire events Local Impacts: Historic availability of food and water sources may be altered geographically and temporally; changing forest stand structure (wildfire, species extirpation) may alter suitable habitat range	Aquatic ☐ How will target species be viable in the future given changes in surface water temperatures? ☐ Describe the future range of flow. Will the hydrologic system change from a perennial to an intermittent system? ☐ Given an increase in extreme weather events, how will the hydrologic regime change? Will it go from a snowmelt to a rain on snow regime? ☐ Is the restoration area vulnerable to increased fire events and erosion? Terrestrial ☐ What is the future range of habitat for the target species? Does this lie within management boundaries? ☐ How will target species be viable in the future given changes in food and water availability, as well as the range of future habitat? ☐ How will breeding, fawning, and forage seasons be altered with the changing habitat and climate? Will hunting seasons need to be altered? ☐ How will the proposed project help offset the projected impacts due to climate change?	☐ Yes without modification ☐ No ☐ Yes with modification:
Grazing	Trends: Historic availability of forage and water sources may be altered geographically and temporally; suitable range for livestock grazing may be altered; key species for forage monitoring may change on a site-specific basis	☐ How should the recommended season of use change for grazing, if at all? ☐ Are recommended utilization levels still appropriate? ☐ Is the mapping of suitable range for the allotment still accurate? Will there be water available for this operation? Will there be suitable vegetation for forage? ☐ How will the proposed project help offset the projected impacts due to climate change?	☐ Yes without modification ☐ No ☐ Yes with modification:
Road Maintenance and Construction	Trends: Increased interannual variability in precipitation; decreased water quality as result of increased watershed erosion and sediment flow; increased likelihood of severe flood; increased risk of uncharacteristically severe and widespread fire Local Impacts: Changed hydrologic regimes; soil disturbance due to increased runoff and movement of waterways; likelihood of road washouts and closures increase; storm events exacerbate sedimentation and erosion from burned areas	☐ Given that hydrologic regimes may change, how are your crossings designated? How are sediment flow crossings designed and engineered to withstand the predicted changes? ☐ Is the project sited at the right location to mitigate for watershed erosion and sediment flow? ☐ Will the proposed road design be able to withstand extreme weather events? ☐ How are current road structures and surface treatments able to withstand the increased likelihood of severe flood events and future use? ☐ Is the surrounding topography and vegetation susceptible to increased fire vulnerability and subsequent erosion? ☐ How will the proposed project help offset the projected impacts due to climate change?	☐ Yes without modification ☐ No ☐ Yes with modification:
Recreation Planning	Trends: Lower water levels in late summer; reduced snow pack; decreased water quality as a result of increased watershed erosion and sediment flow; increased likelihood of severe floods; increase forest stress and fuel build-up; longer fire seasons Local Impacts: Lower lake levels; decreased water table for campground and developed site water systems; snow range shifts; developed sites adjacent to waterways may be impacted by flood events; wildfires could damage structures	☐ Is the project site located adjacent to a water feature? If so, will lower water levels or frequent floods affect the proposed developed site? ☐ How will reduced snowpack impact developed winter recreation such as snow-parks and skiing? How does a potentially reduced season of use impact the contractual language in special use permits? ☐ How might the transportation and access to the project site be affected by more severe flood events and increased fire risk? ☐ How will the proposed project help offset the projected impacts due to climate change?	☐ Yes without modification ☐ No ☐ Yes with modification:

Users should take initiative to modify the CPST questions so as to address issues that are broader in temporal or spatial scale or that span several resource areas that may not be covered by focusing on a single project (e.g., the programmatic level).

The CPST is intended as a platform from which natural resource managers can reflect on the potential impacts of climate change on projects and consider concrete adaptation options at the pre-NEPA (National Environmental Policy Act) project-planning phase. For example, the recently introduced "Performance Scorecard for Implementing the Forest Service Climate Change Strategy" requires action on adaptation efforts that are directly addressed by the CPST. The CPST addresses ongoing or near-term projects that would benefit from review for consistency with adaptation goals. It acts as an audit or review tool to ensure that managers have considered climate change in current and impending projects; if issues arise during the review that suggest climate implications conflicting with project design, modifications to projects can be recommended. The CPST also serves as a review of priorities among current projects; whereas project goals and treatments may not need modification, climate concerns might trigger changes in resource allocation. Finally, some projects as originally designed might be found to be inappropriate altogether, and these would be recommended for comprehensive redesign or removal from activity lists.

As climate change considerations become part of the federal mandate, we hope that the CPST will be used by USFS, National Park Service, and other land managers to incorporate climate change adaptation thinking into project planning.

Additional Information

This series describes short subjects from the National Forest chapter in SAP 4.4: Preliminary Review of Adaptation Options for Climate-Sensitive Ecosystems and Resources: A Report by the U.S. Climate Change Science Program and the Subcommittee on Global Change Research (<http://www.globalchange.gov/publications/reports/scientific-assessments/saps/sap4-4>). More information about the specific research described in this short subject and all references cited here can be found in Morelli and others (2011), <http://www.treeseearch.fs.fed.gov>. For more information about climate change and natural resource management, see the U.S. Forest Service Climate Change Resource Center Web site: <http://www.fs.fed.us/ccrc>.



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