

Model Protocols for Assessing the Impacts of Climate Change on the Built Environment under NEPA and State EIA Laws¹

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Overarching Principles

1. **Agencies should evaluate and disclose the impacts of climate change when conducting environmental reviews in accordance with NEPA and its state equivalents.² These impacts should be considered in the approval of a categorical exclusion (CE), the preparation of an environmental assessment (EA), and the scoping and preparation of an environmental impact statement (EIS).**
2. **Agencies should assess the impacts of climate change in the following contexts:**
 - a. **Future baseline:** Whether climate change may influence the future baseline conditions which would exist in the absence of the proposed action (the no action alternative).
 - b. **Project description:** Whether the project may be vulnerable to the impacts of climate change, taking into account the location of the project, the project's expected useful life, and the resilience of design features, construction materials, operational processes, and decommissioning processes.
 - c. **Purpose and need for project:** Whether climate change may influence the need for the proposed project or the ability of the project to fulfill its intended purpose.
 - d. **Affected environment and resources:** Whether climate change may increase the vulnerability of the affected environment and any natural and human resources that are impacted by the project.
 - e. **Implications for the environmental consequences of the project:** Whether the impacts of climate change may exacerbate the environmental consequences of the project or generate new consequences which would not have otherwise occurred.

¹ A report accompanying these protocols is available at <http://web.law.columbia.edu/climate-change/resources/nepa-and-state-nepa-eis-resource-center>.

² NEPA terminology is used throughout this document. Many states use different terminology for the same concepts.

3. Due to the uncertainty of the pace and magnitude of climate change, agencies should take a precautionary approach when assessing and disclosing the potential impacts of climate change: they should evaluate impacts by using multiple scenarios, including the most severe climate change projections developed by the IPCC and other authoritative bodies. The probabilities of each of the scenarios should be disclosed if they can be estimated.
4. The timeframe for this analysis should reflect the anticipated duration of the project, taking into account the operational lifetime as well as any decommissioning activities.
5. The scope and depth of this analysis should be proportional to the magnitude of the risk posed by climate change and the correlated vulnerability of the action and its affected environment to the impacts of climate change.
6. The analysis of climate change impacts should inform the selection of design features, alternatives, site location, mitigation measures, and other aspects of the final decision undertaken by the agency.

Categorical Exclusions

1. When reviewing existing or approving new categorical exclusion (CE) lists, agencies should consider whether any existing CEs should be removed or modified as a result of climate-related considerations. Specifically, agencies should consider whether the category of actions may individually or cumulatively have a significant effect on the human environment, taking into account the impacts of climate change on those actions and the environmental settings in which they are typically located.
2. Before approving a CE for a particular action, agencies should consider whether the impacts of climate change on the project and its affected environment constitute “unusual circumstances” which will require the agency to conduct additional environmental studies to determine whether the CE classification is proper. Specifically, agencies should consider whether otherwise insignificant impacts may become significant due to the impacts of climate change on the project and its affected environment.

Environmental Assessments

1. **When preparing an environmental assessment (EA), agencies should:**
 - a. **Identify the potential impacts of climate change on the project and its affected environment.** To identify all relevant impacts, agencies should consider using a checklist like that provided in *Attachment A: Checklist for Identifying Climate Change Impacts* (see page 9).
 - b. **Evaluate whether any of these impacts will influence the agency's significance determination (e.g., by altering the context or intensity of a particular impact).** For example, an agency could conclude that an otherwise insignificant risk of spills or contamination from a hazardous waste facility located on a coastline will be significant in light of sea level rise and increased storm intensity, or that an otherwise insignificant impact on water resources will be significant in light of decreased stream flow caused by precipitation and snowpack changes.
2. **Agencies should also consider whether the impacts of climate change will have implications for:**
 - a. The purpose and need of the proposed project,
 - b. The selection of alternatives, and
 - c. The implementation of any mitigation measures that the agency has relied upon to justify a Finding of No Significant Impact (FONSI).

Environmental Impact Statements (EISs)

Step 1: Identifying Climate Change Impacts during the Scoping Process

1. **The potential impacts of climate change on the project and its affected environment should be identified and disclosed to the public during the scoping phase of an EIS.** This will enable agencies to receive public input on climate-related impacts that warrant evaluation in the EIS *before* the publication of the draft EIS. To simplify the process, agencies should consider using a checklist like that provided in *Attachment A: Checklist for Identifying Climate Change Impacts* (see page 9).

2. **During the scoping process, agencies should also solicit information from relevant stakeholders regarding any climate-related considerations and local data or knowledge that is relevant for the purpose of assessing the impact of climate change on the project and its affected environment.** Relevant stakeholders may include:
 - a. Other government agencies who are directly involved in the project;
 - b. Tribal, state and local authorities in the area where the project will be sited;
 - c. Any tribal, state or local agency or non-governmental entity with specific expertise on climate change impacts in the area where the project will be sited; and
 - d. Members of the affected public.

3. **When deciding how many resources to dedicate to the scoping and subsequent assessment of climate change impacts, agencies should pay special attention to actions that are particularly sensitive to climate change due to the nature of the action or the geographic location where it will occur.** To identify highly sensitive projects, agencies should consider:
 - a. **Geographic location**
 - i. Coastal projects;
 - ii. Projects in arid climates and regions subject to heat wave and/or drought; and
 - iii. Projects in areas that are frequently exposed to storms or flooding.

 - b. **Nature of the project**
 - i. Projects that require substantial water resources, e.g., electricity generation facilities or water supply facilities;
 - ii. Projects that are particularly susceptible to increased temperatures, e.g., electric transmission and distribution systems, residential buildings, hospitals, nursing homes, and prisons;
 - iii. Projects that have particular risks which may be further compounded by climate impacts, e.g., wastewater treatment facilities and hazardous and nuclear waste facilities; and
 - iv. Critical facilities, such as hospitals and electric infrastructure.

Step 2: Evaluating the Impacts of Climate Change

After identifying the potential impacts of climate change on the project and its affected environment, agencies should evaluate and disclose those impacts in accordance with the following framework.

- 1. Evaluate the impacts of climate change on the affected environment of the proposed action.**
 - a. Identify sources of information and uncertainty:** Identify scientific studies and planning documents that contain information about the impacts of climate change within the project area and the corresponding vulnerability of the local environment. Identify any major information gaps or areas of uncertainty.
 - b. Summary of climate change impacts:** Disclose any existing information about the likelihood and severity of climate change impacts in the affected environment over the duration of the project, and integrate this information into the description of the environmental baseline (no action alternative). When making this disclosure, agencies may incorporate by reference any scientific studies and planning documents, as long as the materials are reasonably available for inspection by potentially interested persons in accordance with 40 CFR § 1502.21.
 - c. Vulnerability and/or resilience of affected environment:** Disclose any existing information about the extent to which specific components of the affected environment are vulnerable and/or resilient to the impacts of climate change. The environmental components that should be reviewed include:
 - i. Natural systems that are affected by the project;
 - ii. Human systems that are affected by the project; and
 - iii. Key resources required for project and systems impacted by project (e.g., water resources).
 - d. Address uncertainty by:**
 - i. Describing impacts under a range of different scenarios, including any worst case scenarios published by the IPCC and USGCRP;
 - ii. Considering past extremes as an indicator of future trends; and
 - iii. Complying with the regulatory guidelines for dealing with “incomplete or unavailable information” in NEPA reviews (40 CFR § 1502.22).
 - e. Clearly state all underlying assumptions and sources of data used.**

2. **Describe how the proposed action will be affected by the impacts of climate change.**
 - a. **Identify project-specific impacts:** Identify any climate change impacts that will directly affect the physical or operational elements of the proposed project.
 - b. **Assess project resilience:** Determine whether any of the project-specific impacts may have an adverse effect on the project (e.g., by impairing longevity and/or productivity) and assess the resilience of the project with respect to those effects.
 - c. **Project need and resources:** Determine whether any of the project-specific impacts will modify the need for the project or the resources that must be committed to the project.
 - d. **Identify adaptation options:** Identify design features or operational changes which could be used to improve the resilience of the project to any adverse effects identified in this analysis.
3. **Determine whether the impacts described in step 1 or 2 will have implications for the environmental consequences of the proposed project.**
 - a. **Implications for project impacts:** Evaluate whether climate change may alter the nature or magnitude of environmental impacts of the action or generate new impacts that would not have otherwise occurred.
 - b. **Implications for susceptibility of resources to project impacts:** Evaluate whether any of the environmental systems or resources that are affected by climate change will be more susceptible (or resilient) to the adverse environmental consequences of the project as a result of climate change.
4. **Conduct a similar assessment for all reasonable alternatives to the project.**
 - a. **Environmental baseline:** The no-action alternative should simply reflect the baseline environmental analysis conducted in Step #1
 - b. **Comparison of alternatives:** For other alternatives, the agency should identify where the analysis re: climate change impacts is the same as that conducted for the preferred alternative, and should discuss any climate change impacts that may differ across alternatives.
5. **Identify resilience/adaptation measures when impacts are deemed significant or risks are deemed unacceptable.** Such measures may include the selection of a more resilient alternative, modifications to the preferred alternative, or the implementation of actions to mitigate adverse environmental impacts that are exacerbated by climate change.

- a. **Modified design elements:** Consider opportunities to incorporate adaptation and resilience into the design of the project, the operational plan for the project, and any environmental management plans or mitigation measures that are implemented as part of the project.
- b. **Siting decisions:** Consider whether the project could be sited in an alternate location to address concerns about the impacts of climate change and the implications of those impacts for the environmental consequences of the project.
- c. **Adaptation measures with co-benefits:** Consider adopting adaptation and resilience measures that have environmental and/or economic co-benefits (e.g., building insulation that improves energy efficiency).
- d. **Addressing uncertainty:** To address uncertainty about future impacts, the agency should consider: (i) whether to expressly incorporate monitoring and risk management procedures into the final project or action, and (ii) whether to include provisions for incremental adaptation measures that can be implemented in the event that certain impacts do occur (e.g., operational changes)

Step 3: Justifying the Final Decision

1. **In making its final decision, the agency should describe how the agency's analysis of climate change impacts on the action and the affected environment has influenced:**
 - a. The selection of design features, operational practices, etc.;
 - b. The choice between the preferred alternative and other reasonable alternatives (including the no action alternative); and
 - c. The selection of measures to mitigate any adverse environmental impacts that are exacerbated or caused by climate change.
2. **Monitoring for incremental adaptation measures:** If an agency decides to mitigate climate-related risks through a system of incremental adaptation measures (i.e., measures which are conditioned on the occurrence of specific climate impacts), the agency should also include adequate monitoring and evaluation mechanisms to accompany these measures.

Step 4: Communicating Results to the Public

- 1. Clear communication of both analysis and decisional outcomes:** The agency's assessment of climate change impacts and the manner in which this assessment has influenced the agency's final decision should be clearly communicated to the public in both the draft and final EIS.
- 2. Summary for public review:** To better inform the public about the analysis conducted on climate change impacts and risks, agencies should consider summarizing this information in a table like that provided in *Attachment B: Table Summarizing Climate Change Impacts and Response Measures* (see page 10).

Attachment A

Checklist for Identifying Climate Change Impacts

Climate-related phenomena		Possible impact on project or affected environment?
Temperature and Humidity	Increased average temperatures	
	Increased peak temperatures (heat waves)	
	Freeze-thaw damage (e.g., melting permafrost)	
	Cold spells	
	Increased humidity	
Precipitation	Increased average precipitation in project area	
	Decreased average precipitation in project area	
	Increase in extreme precipitation events in project area	
	Drought	
	Increased precipitation in upstream area, modifying flow quality or quantity of water resources in affected env't	
	Decreased precipitation upstream, modifying flow quality or quantity of water resources in affected env't	
	Change in the type of precipitation in project area or upstream (e.g., rainfall instead of snow)	
Storms	Increased storm severity	
	Increased storm frequency	
	Increased uncertainty associated with storm patterns	
Inland Flooding	Inland flooding, erosion, and other on-the-ground impacts from altered precipitation and storms	
Coastal impacts	Sea level rise	
	Higher storm surge	
	Coastal inundation, erosion, subsidence	
	Saltwater intrusion	
Air Quality	Reduced local air quality	
Wildfire	Greater wildfire risk due to heat and/or drought impacts	
Biodiversity	Increased vulnerability of species and habitats	
	Invasive species	
Public Health	Threats to public health	
Other Impacts	Humidity	

Attachment B

Table Summarizing Climate Change Impacts and Response Measures

Impact	Likelihood	Severity	Risk to affected envt.	Risk to project	Implications for envtl. impacts	Response and mitigation
<p>Likelihood – The likelihood that a particular impact will occur within the project area (e.g., certain, almost certain, likely, possible, unlikely, rare, or N/A).</p> <p>Severity – The magnitude of the impact (e.g., minor, moderate, significant, severe).</p> <p>Risk to affected environment – The extent to which the impact poses a risk to environmental systems and resources within the affected environment (this could be assigned a ranking – e.g., low, medium, high – or a qualitative description could be provided in the appropriate box).</p> <p>Risk to project – The extent to which the impact poses a risk to the physical or operational aspects of the project (ranking or qualitative description).</p> <p>Implications for environmental impacts – Whether the climate-related impact will have implications for the environmental consequences of the project.</p> <p>Response and mitigation - Summary of how the agency intends to respond to and mitigate any risks to the affected environment and project or implications for the environmental impact of the project (e.g., through modified design features, selection of alternatives, or adoption of measures to mitigate an environmental impact).</p>						