



## Model Protocol: Considering the Effects of Climate Change on Natural Resources in Environmental Review and Planning Documents

*Note: This protocol only concerns how the effects of climate change on natural resources and management decisions should be considered in planning documents. It does not address how decision-makers should account for the effect of natural resource management decisions on climate change (i.e., through greenhouse gas emissions or changes in carbon sequestration), nor does it address how decision-makers should account for the effects of climate change on buildings and infrastructure. The Sabin Center has developed a separate protocol for assessing the effects of climate change in NEPA reviews for buildings and infrastructure, which is available on our website.<sup>1</sup>*

*Most of the directives outlined here are based on federal requirements for natural resource planning and environmental reviews. References to the corresponding statutory and regulatory requirements are provided below. The protocol could also be adapted for use by non-federal entities, including foreign, state, and local governments and private actors. Please refer to Section 4 of the accompanying report for examples of documents that contain the type of analysis recommended in this protocol.<sup>2</sup>*

### Overarching Principles

1. Natural resource managers (“managers”) should consider how climate change may affect natural resources in planning and environmental review documents, and use this analysis to inform resource management decisions.
2. The analysis of climate change effects should encompass the following considerations:
  - a. **No action baseline:** How might climate change affect current and future baseline conditions, including temperature, precipitation, hydrology, vegetation, wildlife, and ecosystem function?
  - b. **Sustainable use:** How might climate change affect the sustainable use of natural resources from forests, grazing lands, fisheries, and other managed landscapes?
  - c. **Management implications:** How might climate change affect the implementation and efficacy of resource management actions?
  - d. **Environmental impacts:** How might climate change affect the environmental impacts of resource management actions?

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<sup>1</sup> The buildings and infrastructure protocol is available at: <http://bit.ly/2czpDr0>.

<sup>2</sup> The accompanying report is available at: <http://bit.ly/2czpDr0>.

- e. **Adaptation:** What adaptation measures could be implemented to enhance the resilience and adaptive capacity of natural resources, ensure the long-term sustainable use of natural resources, and otherwise fulfill resource management objectives in the context of a changing climate?
  - f. **Environmental impact mitigation:** If a management activity may have adverse environmental effects that are exacerbated by climate change, what mitigation measures can be implemented to eliminate or reduce those effects?
  - g. **Monitoring and adaptive management:** How can planning and decision-making processes be structured to account on an ongoing basis throughout the life of an activity for uncertainty and new information about the effects of climate change and the efficacy of management actions and to ensure that this information informs future management decisions? What types of monitoring programs are needed to obtain relevant information about the effects of climate change on the managed resources, to assess the outcomes of management decisions, and to modify decisions as appropriate?
3. To address uncertainty about the pace and magnitude of climate change, managers should assess management decisions and environmental outcomes under a range of plausible climate change scenarios. To frame these scenarios, managers should refer to the most recent Representative Concentration Pathways (RCPs) for greenhouse gas emissions that have been released by the Intergovernmental Panel on Climate Change (IPCC), as well as any other relevant projections (such as sea level rise projections) that have been developed or adopted by authoritative bodies. The probabilities of each of the scenarios should be disclosed if they can be estimated.
  4. The analysis of climate change and its effect on temperatures, precipitation, and other environmental phenomena should account for changes in both long-term average conditions and the range of variability. When considering the range of variability, managers should be sure to account for changes in the frequency and magnitude of extreme weather events such as heavy downpours, cold snaps, and heat waves.
  5. The timeframe for this analysis should encompass not only the duration of management activities but also the duration of their long-term effects on the environment and natural resource base.
  6. The scope and depth of this analysis should be tailored to provide useful information for decision-makers, and should reflect the magnitude of the risk posed by climate change and the correlated vulnerability of affected natural resources.
  7. The analysis of climate change impacts should inform final management decisions, including decisions about resource use and conservation, and whether to approve actions that may impair the resilience or adaptive capacity of natural resources.

8. Managers should engage with relevant stakeholders to obtain information about the impacts of climate change, better understand the implications of those impacts for natural resource management decisions, and develop appropriate response measures. Relevant stakeholders may include (but are not limited to) government representatives (from federal, state, local and tribal entities), scientists, businesses, environmental NGOs, and members of the affected public.

### **Definitions**

1. "Adaptation measures" refers to management actions undertaken to either minimize the harm caused by climate change or take advantage of any beneficial opportunities created by climate change.
2. "Adaptive capacity" refers to the ability or potential of a system to adapt to changing conditions, without significant impairment of ecological, social, or economic values.
3. "Areas of special environmental concern" refers to any areas that require special management attention due to the unique value and/or vulnerability of the natural resources located therein. Such areas would include, but not be limited to, critical habitat for endangered and threatened species and the areas of "critical environmental concern" designated by the Bureau of Land Management on public lands.
4. "Ecological integrity" refers to, *inter alia*, the health of an ecosystem, taking into account its ability to support and maintain biological communities, deliver ecosystem services, and withstand and recover from disturbances.
5. "Ecosystem services" refers to beneficial services obtained from ecosystems, including provisioning services (e.g., the production of food and water), regulating services (e.g., control of climate, flooding and water quality), cultural services (e.g., recreational opportunities), and supporting services (e.g., crop pollination).
6. "Environmental mitigation measure" refers to an action that is undertaken to minimize or otherwise mitigate any adverse environmental effects from a proposed action.
7. "Environmental review documents" refers to any documents prepared to fulfill the requirements of the National Environmental Policy Act (NEPA) and state equivalents, including environmental impact statements and environmental assessments.
8. "Natural resources" refers to any natural assets that provide environmental, economic, health, social, cultural, recreational or aesthetic value for present and future generations, including but not limited to ecosystems and the services they provide, fresh water, clean air, biodiversity, wildlife, fisheries, timber, forage, minerals, and scenic views.
9. "No action baseline" refers to baseline conditions that would occur in the absence of a proposed or prospective management action and in the presence of future climate change.

10. "Planning documents" refers to environmental review documents as well as natural resource assessments, resource management plans, and other documents that dictate or guide future management activities for public lands and natural resources in the United States.
11. "Resilience" refers to the ability of natural resources to adapt to changing conditions and withstand, respond to, and recover from disruptions.
12. "Sustainable use" refers to the human use of natural resources in a manner that does not reduce or impair the resource base for the use and enjoyment of future generations.
13. "Sustainable yield" refers to the ecological yield (i.e., harvestable population growth) that can be extracted from a natural resource base without reducing or impairing the resource base for the use and enjoyment of future generations.

### **Natural Resource Assessments and Inventories**

1. Managers should account for the effects of climate change when preparing natural resource assessments and inventories, including but not limited to:
  - a. Renewable resource assessments;
  - b. Multi-resource assessments;
  - c. Landscape-scale assessments;
  - d. Fishery and marine mammal stock assessments;
  - e. Rangeland health assessments;
  - f. Natural resource condition assessments;
  - g. Assessments underpinning Endangered Species Act listing decisions, critical habitat designations, interagency consultations and jeopardy determinations, recovery plans, and habitat conservation plans;
  - h. Assessments underpinning Clean Water Act § 404 determinations; and
  - i. Assessments included in environmental review documents.
2. When conducting this analysis, managers should consider:
  - a. How might climate change affect current and future baseline conditions and natural processes in the area, such as local climate and hydrology?<sup>3</sup>

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<sup>3</sup> Relevant mandates include: 16 U.S.C. §§ 1601(a)(5), 1603 (directing USFS to develop an inventory of present and potential renewable resources which includes "an analysis of the potential effects of global climate change on the condition of renewable resources on the forests and rangelands of the U.S." and to keep the inventory current "so as to reflect changes in conditions and identify new and emerging resources and values"); 43 U.S.C. § 1711(a) (requiring BLM to prepare and maintain an inventory of all public lands and their resource and other values and to keep the inventory "current so as to reflect changes in conditions"); 54 U.S.C. § 100704 (directing NPS to "undertake a program of inventory and monitoring of System resources to establish baseline information and to provide information on the long-term

- b. How might climate change affect the health, abundance and distribution of natural resources in the near- and long-term?<sup>4</sup>
- c. What implications does climate change have for the productivity and sustainable use of natural resources, the ecological integrity of ecosystems, and the delivery of ecosystem services?<sup>5</sup>
- d. What implications does climate change have for the protection and preservation of natural resources such as endangered species and wilderness areas?<sup>6</sup>
- e. How might climate change affect the anticipated uses of and demand for natural resources?<sup>7</sup>

### **Strategic Plans**

1. Managers should account for the effects of climate change when preparing high-level strategic plans, such as the national strategic plans prepared by federal agencies in accordance with the Government Performance and Results Modernization Act. This analysis should cover the following considerations:

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trends in the condition of System resources”); 16 U.S.C. 1853(a)(3) (requiring NMFS to conduct an assessment of the “present and probable future condition of, and the maximum sustainable yield and optimal yield from” fisheries).

<sup>4</sup> See *id.* (USFS, BLM, NPS, and NMFS mandates); 16 U.S.C.A. § 742d(a) (directing DOI to “conduct continuing investigations, prepare and disseminate information, and make periodical reports” regarding the “availability and abundance and the biological requirements of the fish and wildlife resources” in the country, and any progress that the department has made to acquire additional wildlife refuges and develop wildlife values); 16 U.S.C.A. § 704 (specifying that FWS must consider “the zones of temperature and to the distribution, abundance, economic value, breeding habits, and times and lines of migratory flight of such birds, to determine when, to what extent, if at all, and by what means, it is compatible with the terms of the conventions to allow hunting, taking, capture, killing, possession, sale, purchase, shipment, transportation, carriage, or export of any such bird, or any part, nest, or egg thereof”).

<sup>5</sup> See *id.*; 16 U.S.C. 742f (directing NMFS to develop measures for the maximum sustainable production of fish; make economic studies of the industry and recommend measures to insure stability of the domestic fisheries; and take steps “required for the development, advancement, management, conservation, and protection of the fisheries resources”); 43 U.S.C. §§ 1701(a)(8) (stipulating that BLM should manage public lands “in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values; that, where appropriate, will preserve and protect certain public lands in their natural condition; that will provide food and habitat for fish and wildlife and domestic animals; and that will provide for outdoor recreation and human occupancy . . . .”); 16 U.S.C. § 668dd(a)(4)(A)-(B) (directing FWS to “ensure that the biological integrity, diversity, and environmental health of the System are maintained for the benefit of present and future generations of Americans”); 16 U.S.C. § 1601(a)(2) (specifying that USFS resource inventory should include “an evaluation of opportunities for improving [the] yield of tangible and intangible goods and services” from renewable resources); 36 C.F.R. § 219.6 (specifying that USFS assessments must account for system drivers, including the “ability of terrestrial and aquatic ecosystems on the plan area to adapt to change” and effects on ecosystem services).

<sup>6</sup> See 16 U.S.C. § 1533(d) (directing the FWS and NMFS to promulgate regulations for the protection of endangered and threatened species as they deem “necessary and advisable to provide for the conservation of such species.”); 16 U.S.C. § 1536(a)(2) (directing all federal agencies ensure any “action authorized, funded or carried out” by them “is not likely to jeopardize the continued existence” of any endangered or threatened species); 36 C.F.R. § 219.6 (specifying that USFS assessments must account for the latest science on threatened, endangered, proposed and candidate species, and potential species of conservation concern present in the plan area).

<sup>7</sup> See 16 U.S.C. § 1601(a)(1) (USFS inventory must evaluate the “present and anticipated uses, demand for, and supply of the renewable resources”).

- a. Broadly speaking, how might climate change affect the natural resources that are managed under the strategic plan? What are the most serious and pervasive impacts? To what extent do these impacts create new risks, opportunities, or implications for management?<sup>8</sup>
- b. What are the manager's overarching natural resource management objectives and implementation strategies, and how should these be modified to account for the effects of climate change?<sup>9</sup>
- c. What are the manager's top adaptation priorities, and how can these be integrated into its objectives and implementation strategies?<sup>10</sup>
- d. What indicators does the manager currently use to assess the health and productivity of natural resources under its jurisdiction, and should these be modified to account for the effects of climate change?
- e. Are there major gaps in information about the effects of climate change on the natural resources managed under the strategic plan, and if so, what sort of broad-scale research and data collection efforts could be implemented to fill these gaps?<sup>11</sup>
- f. Does the manager's capacity to respond to climate change impacts depend on actions undertaken by other entities, and how might partnerships be formed with these entities to fulfill management and adaptation objectives?<sup>12</sup>

### **Resource Management Plans**

1. Managers should account for the effects of climate change when preparing management plans for specific regions or units, including but not limited to:
  - a. Land Management Plans (LMPs) for National Forest System units,
  - b. Resource Management Plans (RMPs) for public land units,
  - c. Comprehensive Conservation Plans (CCPs) for wildlife refuges,
  - d. General Management Plans (GMPs) for national parks,
  - e. Fishery management plans,
  - f. Species recovery plans,

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<sup>8</sup> See 5 U.S.C. § 306 (a)(7) (federal agency strategic plans shall identify "those key factors external to the agency and beyond its control that could significantly affect the achievement of the [agency's] general goals and objectives").

<sup>9</sup> See 5 U.S.C. § 306 (a)(2) (strategic plans shall specify general goals and objectives of the agency).

<sup>10</sup> See *id.*

<sup>11</sup> See 5 U.S.C. § 306(a)(4)(A) (strategic plans shall include a description of the resources required to achieve goals and objectives).

<sup>12</sup> See 5 U.S.C. § 306 (a)(4)(B) (strategic plans shall include a description of how the agency is working with other agencies to achieve its goals and objectives).

- g. Habitat conservation plans,
  - h. Water management plans,
  - i. Livestock allotment plans, and
  - j. Wildlife and wetland mitigation plans.
2. **In general**: The effects of climate change should be considered when developing the following components of resource management plans (to the extent applicable):
- a. Resource management objectives and desired natural resource conditions, and the agency's ability to meet these objectives and conditions;<sup>13</sup>
  - b. The manager's determination of the sustainable yield of specific resources;<sup>14</sup>
  - c. Any other assessments related to the productivity and sustainable use of natural resources, such as assessments regarding the carrying capacity of ecosystems and the delivery of ecosystem services;<sup>15</sup>
  - d. The management practices, protective measures, and any other actions that will be implemented to restore landscapes and ecosystems, conserve natural resources for future generations, and otherwise fulfill planning mandates related to the sustainable use and non-impairment of natural resources;<sup>16</sup>

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<sup>13</sup> See 36 C.F.R. § 219.7(e) (NFS plans must specify desired conditions for the area and standards for attaining those conditions); 43 C.F.R. § 1601.0-5(n) (resource management plans for public lands shall specify "resource condition goals and objectives to be attained"); 50 C.F.R. § 25.12 (comprehensive conservation plans for wildlife refuges should describe the "desired future conditions" of the refuge or planning unit and provide long-range guidance on management direction to achieve the purposes of the refuge).

<sup>14</sup> See 16 U.S.C. § 1604(e)(1) (NFS plans must provide for multiple use and sustained yield of the products and services obtained therefrom) 16 U.S.C. §§ 1851, 1853 (fishery management plans must specify the maximum sustainable yield and optimum yield from the fishery and provide for catch limits to ensure that harvests do not exceed the optimum yield); 43 U.S.C. § 1701(a) (public lands must be managed on the basis of multiple use and sustained yield).

<sup>15</sup> See *id.*; 54 U.S.C. § 100101 (national parks must be managed "to conserve the scenery, natural and historic objects, and wildlife... and to provide for the enjoyment of the scenery, natural and historic objects, and wildlife in such manner and by such means as will leave them unimpaired for the enjoyment of future generations"); 16 U.S.C. § 668dd (the Wildlife Refuge System should be managed in a fashion that will "ensure the biological integrity, diversity, and environmental health of the System are maintained for the benefit of present and future generations of Americans"); 16 U.S.C. § 1604(e)(2) (NFS plans must determine forest management systems, harvesting levels, and procedures as necessary to ensure the sustained yield of resources).

<sup>16</sup> See 116 U.S.C. 1853(a)(1)(A) (fishery management plans must list conservation and management measures that will "protect, restore and promote the long-term health and stability of the fishery") 43 C.F.R. § 1601.0-5(n) (resource management plans for public lands shall specify resource protection measures that may be needed to achieve resource condition goals); 36 C.F.R. § 219.8 (NFS plans must include components, including standards or guidelines, to maintain or restore the ecological integrity of terrestrial and aquatic ecosystems); 36 C.F.R. § 219.9 (establishing detailed criteria for the protection of biodiversity in National Forest service units).

- e. The timing, nature, scale, and location of any resource uses, including but not limited to timbering, grazing, hunting, fishing, and recreational use, and whether the agency should suspend or seriously limit certain uses;<sup>17</sup> and
  - f. The designation of any protected areas or areas of special environmental concern.<sup>18</sup>
3. Monitoring and Adaptive Management: To manage uncertainty, managers should incorporate a system of monitoring and adaptive management into resource management plans. Such systems should be designed to allow managers to collect data and respond to new information about the effects of climate change as well as the efficacy of management actions and adaptation measures.<sup>19</sup> The descriptions of such systems should clearly specify:
- a. The monitoring system (e.g., which indicators will be monitored, what technology will be used, how frequently will data be collected, and how the data will be reported);
  - b. The triggers and other criteria for determining when to implement, terminate or modify management actions in response to new information (e.g., a triggering event could be when a species population or stream flow falls below a certain level); and
  - c. The types of management activities that will be implemented, terminated, or modified when triggers occur or criteria are met. This should be a tentative list of management actions that can be adjusted based on new information about the impacts of climate change and the efficacy of different management responses.
4. Revisions: Managers should consider whether existing management plans should be updated in light of the considerations outlined above, the results of monitoring programs, and new information about the present and future effects of climate change.

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<sup>17</sup> See *id.*; 36 C.F.R. § 219.7 (NFS plans shall identify the suitability of areas for resource management and uses, the maximum quantity of timber that may be removed from the plan area, and standards for resource uses as necessary to protect ecology integrity in the area); 43 C.F.R. § 1601.0-5(n) (resource management plans for public lands shall specify allowable resource uses and related levels of production or use to be maintained and the sequence of implementation actions).

<sup>18</sup> See 36 C.F.R. § 219.7 (NFS plans must identify areas that are not suitable for timber production); 43 C.F.R. § 1601.0-5(n) (public lands management plans must specify land areas for limited, restricted or exclusive use); 16 U.S.C. § 1271 (declares that rivers with “outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar values” shall be “protected for the benefit and enjoyment of present future generations.”).

<sup>19</sup> See 16 U.S.C. § 1604(g)(3)(C) (requiring USFS to develop guidelines to ensure that there will be continuous monitoring and assessment of the effect of management systems to confirm that they do not produce substantial and permanent impairment of the productivity of the land); 36 C.F.R. § 219.2(b)(1) (describing the management planning process for the NFS as a “responsive planning process that informs integrated resource management and allows the Forest Service to adapt to changing conditions, including climate change, and improve management based on new information and monitoring”); 36 C.F.R. § 219.5 (describing USFS monitoring program guidelines); 54 U.S.C. § 100704 (directing NPS to undertake a program of inventory and monitoring for the National Park System); 43 C.F.R. § 1601.0-5(n)(8) (requiring BLM plans for public lands to include intervals and standards for monitoring and valuating the plan to determine its effectiveness); 50 C.F.R. § 31.1 (FWS guidelines for monitoring in wildlife refuges).



## **Environmental Impact Analysis**

1. **Scoping**: Managers should conduct a preliminary analysis of climate change impacts and possible responses to those impacts during the scoping phase to identify issues that should be explored in greater depth in subsequent environmental review documents, and to receive public input on the scope of the climate change impact analysis before the publication of the draft environmental impact statement or environmental assessment.<sup>20</sup> In particular, through the scoping process, the manager should:
  - a. Identify the most important ways in which climate change may affect natural resources in the management area, taking into account different climate change scenarios and how these could influence average conditions and the range of variability in the area;
  - b. Identify previous studies and assessments on how climate change may affect the management area, so that these can be incorporated by reference into the subsequent environmental review document;
  - c. Consider whether adaptation measures or environmental mitigation measures are needed to address the impacts of climate change and how these should inform the development of action alternatives;
  - d. Consider whether and how the effects of climate change may influence the purpose of, need for, or size or timing of the proposed action;
  - e. Solicit information from stakeholders regarding any data or local knowledge that is relevant for the purpose of assessing the impacts of climate change on natural resources and developing action alternatives and environmental mitigation measures to address those impacts; and
  - f. Use the “rule of reason” to determine the scope of the analysis for subsequent environmental review documents and to eliminate from detailed study those issues which are not significant.<sup>21</sup>
2. **Categorical Exclusions**: Managers should consider whether and how the impacts of climate change may affect determinations that a particular class of actions will not have individually or

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<sup>20</sup> See 40 C.F.R. § 1501.7 (“Scoping”); CEQ, *Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in NEPA Reviews*, 27 (2016) (guidance on scoping for climate change impacts).

<sup>21</sup> The “rule of reason” dictates that the scope of the environmental review should focus on information that is most useful to decision-makers and the public for the purpose of evaluating environmental impacts and making an informed decision about the proposal under review. This is implied by CEQ regulations, which require “[e]mphasizing the portions of the environmental impact statement that are useful to decisionmakers and the public and reducing emphasis on background material” and “[u]sing the scoping process, not only to identify significant environmental issues deserving of study, but also to deemphasize insignificant issues, narrowing the scope of the environmental impact statement process accordingly.” 40 C.F.R. § 1508.7.

cumulatively significant effects on the environment and should therefore be categorically excluded from environmental review.<sup>22</sup>

3. **Environmental Assessments:** When preparing an environmental assessment, managers should evaluate how climate change may affect natural resources in the area, and determine whether these impacts have implications for:
  - a. The purpose and need for the proposed project;
  - b. The selection of alternatives;
  - c. The agency's determination of whether the proposed action may have significant environmental impacts; and
  - d. The efficacy of any mitigation measures, including but not limited to mitigation measures that are used to justify a finding of no significant impact (FONSI).<sup>23</sup>
4. **Environmental Impact Statements:** When preparing an environmental impact statement, agencies should account for climate change in the following ways:
  - a. **Describe the impacts of climate change on the affected environment, including both near- and long-term impacts, under the no action baseline.** This discussion should encompass any significant impacts on natural resources in the management area, and should describe both the primary impacts (e.g., increases in precipitation or temperature), and the processes through which these impacts could affect the abundance, distribution, and health of natural resources, taking into account the vulnerability, resilience, and adaptive capacity of these resources.<sup>24</sup>
  - b. **Describe how climate change may affect the proposed action and alternatives.** This discussion should encompass whether the impacts of climate change have implications for: (i) the purpose of and need for the proposal; (ii) the commitment of resources required to implement the proposed action and alternatives, and (iii) the efficacy of natural resource management activities included in the proposed action and alternatives. Managers should use this information to inform decisions about the design, location, and other features of the proposed action and alternatives.<sup>25</sup>

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<sup>22</sup> For example, BLM has a categorical exclusion for the issuance of livestock grazing permits and leases where the new permit/lease is consistent with the terms of the old lease and the allotment is either meeting land health standards or not meeting land health standards due to factors that do not include existing livestock grazing. DOI, Departmental Manual, Part 516, Ch. 11, § 11.9(D)(11) (2008). The BLM may want to revisit this categorical exclusion, particularly for grazing allotments that are not meeting land health standards, since the combined effects of grazing and climate change can result in further deterioration of the allotment area.

<sup>23</sup> See 40 C.F.R. § 1508.9 ("Environmental assessment"). See also CEQ, *Appropriate Use of Mitigation and Monitoring and Clarifying the Appropriate Use of Mitigated Findings of No Significant Impact* (2011).

<sup>24</sup> This is consistent with CEQ's guidance on accounting for climate change in NEPA reviews, which specifies that the "current and projected future state of the environment without the proposed action... should be described based on authoritative climate reports." CEQ Final Guidance (2016), *supra* note 19, at 20-21.

<sup>25</sup> See CEQ Final Guidance (2016), *supra* note 19, at 9.

- c. **Describe how the effects described in (a) and (b) may have implications for the environmental consequences of the proposed action and alternatives.** This discussion should address whether proposed alternatives (and management components within each alternative) may exacerbate or alleviate adverse impacts of climate change on natural resources or take advantage of beneficial impacts, and vice versa (e.g., whether climate change may exacerbate adverse impacts from the action).<sup>26</sup>
  - d. **Evaluate alternatives and management components based on environmental and adaptation objectives.** Based on the analysis described above, managers should consider which alternatives and management activities are most likely to advance environmental objectives (and, where appropriate, adaptation objectives). In conducting this analysis, managers should also consider whether the alternatives and management activities would yield climate mitigation co-benefits, such as through enhanced carbon sequestration, since climate change mitigation often also advances environmental and adaptation objectives.
  - e. **Identify whether there is a need for additional adaptation or environmental mitigation measures.** Managers should consider whether any additional measures—beyond those envisioned in the alternatives and their management components—could be implemented to adapt to the impacts of climate change or mitigate the environmental impacts of the proposed action. They should also consider whether climate change has implications for how environmental mitigation and restoration projects should be designed, sited, and implemented.
5. **Decision Document:** When issuing final decisions, managers should disclose whether and how their analysis of how climate change may affect the proposal and its environmental outcomes has influenced their final decision about the proposed action, and whether any adaptation or environmental mitigation measures may be implemented in response to concerns about the impacts of climate change.
  6. **Data sources:** Managers should clearly disclose the sources of data used in the climate change impact analysis, and should incorporate by reference the relevant scientific literature, data sources, models, and other resources used in the analysis. Whenever possible, managers should provide hyperlinks to these resources to allow the public to easily obtain them for further review. Managers should also use the best available scientific data in their analysis of climate change impacts.<sup>27</sup>

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<sup>26</sup> See CEQ Final Guidance (2016), *supra* note 19, at 21-22.

<sup>27</sup> NEPA regulations require federal agencies to “insure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements” and to “identify any methodologies used and... make explicit reference by footnote to the scientific and other sources relied upon for conclusions.” 40 CFR § 1502.24.

7. Uncertainty: Managers should disclose all assumptions that underpin their climate change impact analysis, and any major information gaps or areas of uncertainty. Agencies can address uncertainty by:
  - a. Describing impacts under a range of different scenarios, referring to the most recent Representative Concentration Pathways (RCPs) for greenhouse gas emissions that have been released by the Intergovernmental Panel on Climate Change (IPCC), as well as any other relevant projections (such as sea level rise projections) that have been developed or adopted by authoritative bodies; and
  - b. Where appropriate, considering past extremes as an indicator of future trends; and
  - c. Complying with the regulatory guidelines for dealing with “incomplete or unavailable information” in NEPA reviews.<sup>28</sup>
8. Monitoring Mitigation Measures: If a manager decides to implement environmental mitigation measures in an area that may be affected by climate change, it should also conduct monitoring to gauge whether it should change its approach in light of new information about climate change or the efficacy of the mitigation measures.

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<sup>28</sup> See 40 CFR § 1502.22.