NEPA - Environmental Analysis

Preparers

Leslie Brandt, US Forest Service Eastern Region and Northern Research Station, St. Paul, MN

Courtney Schultz, Assistant Professor, Colorado State University, Ft. Collins, CO

Background

The environmental analysis stage of the NEPA process is likely where climate change will be considered most. Issues related to climate change will often arise during scoping, which can help identify new or modified alternatives to consider or key effects or issues related to climate change that may be appropriate to evaluate. Below is a summary of climate change considerations for scoping, the development of alternatives, and effects analysis.

Scoping and Responding to Comments

When a proposal has been developed, scoping is used to identify and refine the proposed actions, develop alternatives, and evaluate the issues that will be considered, including those related to climate change.

Scoping is useful to determine if climate change issues are specifically related to the proposed action. It is frequently the point at which issues related to project effects on climate change (e.g., greenhouse gas emissions or sequestration) will emerge. In addition, there may be cases where the viability of a project is questioned in light of current or projected climate change impacts to the area or specific resources. For example, a snowmobile trail may be proposed at an elevation that is no longer expected to receive snow most years.

Note that climate change will not be “outside the scope” of every project nor is a climate change analysis necessary for every project. The interdisciplinary team and other sources can be used to identify potential cause-effect relationships (if they exist) between the proposal and climate change. The cause effect relationships will help determine whether or not climate change is an issue that needs to be addressed.

During scoping, it is helpful to consider whether or not some element of the proposal will result in direct, indirect, or cumulative effects on greenhouse gas emissions or the carbon cycle. Some proposals will not have cause-effect relationships to greenhouse gas emissions or the carbon cycle, or are at such a minor scale that the direct effects would be meaningless to a reasoned choice among alternatives.

If public comments related to climate change arise during scoping, there are many resources available to provide meaningful, science-based responses. The Topics Pages on the Climate

Change Resource Center website can be a good first set of resources for addressing these comments. Regional and national climate assessments and local research literature can also be used if more detailed information is needed.

Not all comments received during scoping related to climate change will be clearly supported by the best available science or warrant a more detailed analysis. Sometimes, it may be determined that there is no direct or indirect relationship between the project and climate change. Other times the relationship may be very weak or lack any scientific support. Providing a thorough response with the most up-to-date supporting scientific literature may be sufficient in these cases. In other cases, that relationship may be important and may warrant a more detailed analysis (see Affected Environment and Direct & Indirect Effects Analysis section below).

Examples of projects that included climate change considerations in responses to scoping comments:

- Lakewood Southeast Project, Chequamegon-Nicolet National Forest, Rhinelander, WI (FEIS pages 146-150, Appendix E)
- Grey's Mountain Ecological Restoration Project, Sierra National Forest, Bass Lake Ranger District, Madera Co, CA (Appendix G)

Developing Alternatives

A range of reasonable project alternatives, including a “no action” alternative, will be analyzed in an EIS and most EAs. Alternatives proposed to address climate change issues need to be relevant to the proposed action’s purpose and need as well as technically and scientifically feasible. Alternatives could include adaptation measures to enhance ecosystem resistance or resilience or to facilitate transitions to current or future climate conditions. In some cases, alternatives may also include efforts to reduce greenhouse emissions or sequester carbon. If it is clear that the project will likely result in direct, substantial greenhouse gas emissions, alternatives that include efforts to reduce these emissions could also be explored. In order to develop scientifically supported alternatives to respond to climate change issues, it is important that these alternatives clearly relate to the cause-effect relationship between the proposal and climate change. Does science suggest there are meaningfully different climate change-related effects when comparing among alternatives?

Where there is a plausible relationship between project effects and the effects of climate change on a resource, there may be a need to consider alternatives to reduce the direct, indirect or cumulative adverse effects of the project. For example, the direct effects (e.g., equipment operation) of a project may impact individuals of a rare or sensitive species, and in combination projected climate change impacts may result in federal listing. In such a case, an alternative that reduces project impacts on the sensitive species may warrant consideration.

Affected Environment

The description of the affected environment can describe the changes to the environment that can be reasonably projected and are relevant to the consideration of the project. Along with other environmental changes, the affected environment section is a place to describe the projected changes and effects that are expected from climate change and the uncertainties associated with these projections. The uncertainty in projections can be described as a range of changes in average temperature (an increase of 1-3 degrees Fahrenheit) and precipitation (10-20 inches of annual precipitation) based on the best projections available. However, a discussion of the pattern of these and other climate changes (e.g. longer drought and heavier storm events) will probably need qualitative description.

A further uncertainty is in describing how the specific project environment is likely to change in response to the change climate. For example, there is likely to be greater uncertainty as to whether stream temperatures will increase proportionally to the increase in average temperature. There may be an expected trend such as declining snowpack in mountainous regions of the West, decreased summer runoff and higher water temperatures, but there may be local considerations, such as increased shading or underground aquifers where the expectation of higher future water temperatures may be less certain.

An analysis of climate change trends and effects on the area of analysis for the project and related resources will be best supported by peer-reviewed science. Scientific literature that is specific to the project's geographic area and ecosystem type(s) can be consulted when available. Vulnerability assessments and broader national assessments can also be excellent resources for information (see Proposal Development section).

The Affected Environment section can describe these trends related to climate change and the uncertainties associated with them. In particular, the discussion in the Affected Environment section related to climate trends should be commensurate with the important issues associated with the project. For example, when considering a new snowmobile trail, a good analysis in the Affected Environment of recent snow levels, their trends and future projections may be highly relevant. A project thinning trees on an overstocked stand may analyze trends and projections of fire risk instead.

A good description of the Affected Environment sets the context in which the effects of the project can be evaluated. Is the project reasonable given the changing condition of the environment? Does the project contain measures that can mitigate or adapt to some of the expected climate changes? Would the project exacerbate negative trends that are expected given the nature of expected climate changes?

Direct & Indirect Effects Analysis

Direct and indirect effects analysis is where the effects of the project on climate change via greenhouse gas emissions or carbon sequestration may be analyzed, if appropriate. As with any environmental impact, it is important to consider greenhouse gas emissions and carbon cycling in proportion to the nature and scope of the project in question. When the project is expected to lead to substantial changes in greenhouse gas emissions or carbon stocks, a more detailed quantitative analysis with acknowledgement of uncertainty may be warranted. In other situations, a brief qualitative discussion may be sufficient. If the project is of a type and magnitude that was analyzed in a programmatic environmental document for effects on greenhouse gases and carbon stocks, the project may be able to explicitly tier to that analysis in describing these effects.

Effects of a Project on Climate Change

Quantitative Analysis

Quantifying greenhouse gas emitted or sequestered may help the decision-maker choose between alternatives based on the tradeoffs among direct and indirect effects. Projects having the potential to emit or sequester substantial quantities of greenhouse gases, such as energy facilities, oil and gas development or leases, and some permitting decisions, are some examples that may warrant quantitative analyses.

When a proposed project would be anticipated to emit relatively large amounts of greenhouse gases, the following general approach may be appropriate:

- Quantify the expected annual and total emissions from the project alternatives, using data generated from air quality analyses or from equivalency calculators.
- Provide context for these numbers by comparing them to other comparable emission sources or sectors.

Quantifying greenhouse gas emissions from vegetation management projects could be more challenging, and may not be appropriate at the scale of an individual project. There are a number of reasons for this. First, data on carbon stocks have a high amount of error at small spatial scales. Second, models for assessing the effects of management or disturbances are often not designed for these scales. Third, the difference in carbon emissions or storage among alternatives is usually indistinguishable. The scale for quantitative analysis of biogenic sources of carbon such as from prescribed fire and harvest may be more appropriate at a regional or programmatic level. Individual projects may be able to tier to analysis of carbon stock changes done in a programmatic NEPA decision.

If a quantitative analysis is deemed appropriate (e.g., for regional or programmatic level assessments), a number of tools have been developed to analyze carbon storage, and in some cases carbon cycling, through forest vegetation management. The Climate Change Resource Center has developed a primer on these tools. Note that many of these tools and the associated datasets were not designed to be used at the spatial scale of individual projects or do not calculate carbon cycling into the future. In many cases, the long-term difference in carbon storage between two alternatives may not be distinguishable from the uncertainty in the estimates, especially if a forest stand remains forested or is revegetated (either naturally or through planting) following harvest.

Examples of projects that have quantitatively analyzed greenhouse gas emissions or sequestration:

- D-Bug Hazard Reduction Timber Sale Project, Umpqua National Forest, Douglas County, OR (pages 240-247)
- Fishlake Oil and Gas Leasing, Fishlake National Forest, UT (Appendix E)
- Spruce Beetle Epidemic and Aspen Decline Management Response, Grand Mesa, Uncompahgre, and Gunnison National Forests, CO (pages 137-146)

Qualitative Analysis

When a quantitative analysis is not feasible or appropriate, a qualitative analysis of a project's impacts on greenhouse gas emissions and carbon sequestration may be an option. This can be framed in terms such as the ecosystem's role in the carbon cycle, describing relative impacts of alternatives and tradeoffs between short-term and long-term emissions, sequestration, and ecosystem resilience. In a qualitative analysis, descriptions will focus on the nature and direction (short-term and long-term) of the impacts as opposed to the specific magnitude of the impacts.

When conducting a qualitative analysis, it is helpful to consult scientific literature that is specific to the project's geographic area and ecosystem type of interest when available. When locally relevant information is unavailable, the Climate Change Resource Center Forests and Carbon Storage topic page can provide information about general carbon sequestration and greenhouse gas implications of various categories of project activities. Literature on the "reading" tab, in particular Ryan et al. (2010) and McKinley et al. (2011), describe concepts and provide language explaining general connections between management activities and the carbon cycle that can be incorporated by reference in qualitative discussions.

Examples of projects that included a qualitative analysis and discussion of greenhouse gas emissions:

- Angora Fire Restoration Project, Lake Tahoe Basin Management Unit, Region 5—USDA Forest Service (section 3.11)
- Demumbers Creek Area, Land Between The Lakes National Recreation Area, Lyon County, Kentucky (pages 74-79)

Implications of Climate Change for the Environmental Effects of a Proposed Action

A basic approach to the analysis of climate change effects on project area resources is to first discuss how the environment (which includes an evaluation of climate change) may be affected under the no-action alternative as a baseline. Then, discuss whether the proposed action and alternatives may contribute to or alleviate those effects. Thus, the analysis compares the likely project consequences associated with climate change. For example, if the Affected Environment section projects an increase of 1-3 degrees Fahrenheit in stream temperature, a thinning project in or near a riparian zone may be expected to contribute to some additional increase in temperature in specific stream segments in the short term, but may reduce the risk of wildfire in the longer term which could result in avoiding a greater increase in stream temperature. Since there is some degree of uncertainty in climate change projections, it may also be appropriate to acknowledge a range of potential effects associated with climate change or the general level of confidence in that projection. The amount of uncertainty in projections means that most potential effects of the project in relationship to climate change will be qualitative (e.g., increase in mean annual temperature, decrease in suitable habitat) and not specifically quantified effects (e.g., an 3 °F increase in mean annual temperature or a 20 percent decrease in suitable habitat by 2050).

Not every resource in the project area necessarily needs to be analyzed in relation to the changing climate. If there is no direct or indirect relationship between the project alternatives and the effects of climate change described in the Affected Environment, a detailed analysis is not needed.

Examples of documents that analyzed project effects in relationship to climate change:

- Fremont and Pineknot East Woodland Restoration Project, Eleven Point Ranger District, Mark Twain National Forest, Shannon and Carter Counties, Missouri (pages 196-201)
- Canyon Fuels and Vegetation Management Project, Lookout Mountain Ranger District, Ochoco National Forest, Crook County, OR (pages 217-219)

Cumulative Effects Analysis

Cumulative effects analysis may warrant extra attention with respect to the effects of the project in combination with the effects of climate change on area resources. However, as GHG emissions are integrated across the global atmosphere, it is not possible to determine the cumulative impact on global climate from emissions associated with any number of particular projects. Nor is it expected that such disclosure would provide a practical or meaningful effects analysis for project decisions.

For some projects, it may be useful to consider the cumulative impacts of the project and climate change on a resource. The resources considered can be identified based on scoping comments, plausible cause-and-effect relationships, and other standard criteria for inclusion in a cumulative effects analysis. As with project planning for climate adaptation, these analyses may draw upon data in vulnerability assessments and climate change impact assessments, as well as the professional analysis of resource specialists familiar with the project area. The analyses can help to identify when the cumulative effects of the project along with past, present, reasonably foreseeable actions, climate change and other stressors may lead to a significant impact on a resource (for example, a species in jeopardy of being federally-listed).

If a quantitative effects analysis is performed for greenhouse gas emissions or sequestration, it may be helpful to provide context for these numbers by comparing to other emission sources (e.g., individual, regional, national, global), and qualitatively describe the effects of GHG emissions on climate change. A qualitative cumulative effects discussion could incorporate a summary of local, regional, or national climate change scientific assessments to recognize overall climate change effects expected as a result of all contributions to climate change. In some cases, it may be helpful to tier to a higher-level regional or programmatic analysis to understand the relative magnitude and importance of the project's greenhouse gas emission or carbon sequestration effects.

Examples of projects that addressed climate change in cumulative effects analysis:

- Deerfield Wind Project, Updated Information, Application for a Land Use Authorization to Construct and Operate a Wind Energy Facility, Special Use Authorization Permit, Green Mountain National Forest, Bennington County, VT (pages 83-93)

Objections

There may be cases where the public files an objection on the basis of a missing or an inadequate analysis of climate change effects. In some cases this is because the objector believes (either correctly or incorrectly) that the effects of the project on climate change are significant and warrant a more detailed EIS when an EA was performed. In such cases, it may be necessary to review the analyses that were done in the EA or EIS to determine whether they were sufficient or additional analysis is needed. The tools and resources in the environmental analysis section can be a good place to start when conducting an objection review.

Examples of projects that addressed climate change in an objection response:

- Administrative review response, Boulder County, Eldora Mountain Resort Ski Area Projects (page 26)
- Administrative review response, Rocky Mountain Wild, Village at Wolf Creek Access Project (pages 28-31)

Findings of No Significant Impact

If an EA is completed and no significant effects are identified, a Finding of No Significant Impact (FONSI) is filed. A FONSI documents a federal agency's reasons why a proposed action will not have a significant effect on the quality of the human environment and an EIS will not be prepared (40 CFR 1508.13).

The responsible official determines the "significance" of effects of a proposal, given the context and intensity of the effects, among other factors. Significance varies with the context or setting of the proposed action. For a site-specific action, significance usually depends on the effects in the locale rather than the world as a whole. Few individual forest management actions are of a magnitude likely to affect the global atmosphere. In fact, U.S. forestry results in net sequestration overall (Ryan et al. 2010). Thus, individual forest management projects are unlikely to be determined significant from a climate change standpoint.

It is unlikely that environmental analysis would lead to a significance finding, even if direct greenhouse gas emissions are quantified. There are currently no federal statutes or regulatory standards regarding the direct, indirect, or cumulative GHG emissions and climate change effects of a proposal. As states and counties begin to develop such standards, be aware of the current local situation and how this may need to be addressed in a FONSI. The Center for Climate and Energy Solutions provides information on state-level actions.

Until federal or state thresholds for emissions are defined, the most likely trigger for a significance finding would be a situation in which the effects of the proposal, coupled with climate change, and other reasonably foreseeable actions violated a standard in a forest plan or crossed a regulatory threshold for another resource, such as jeopardizing a species listed under the Endangered Species Act.

Examples where climate change is discussed in a FONSI:

- BLM Federal Coal Lease Project, Wayne National Forest, OH (pages 6 and 7)

How to cite

Brandt, Leslie; Schultz, Courtney (June, 2016). Climate Change Considerations in National Environmental Policy Act Analysis. U.S. Department of Agriculture, Forest Service, Climate Change Resource Center. www.fs.usda.gov/ccrc/topics/nepa

Recommended Reading

McKinley, D.C.; Ryan, M.G.; Birdsey, R.A.; Giardina, C.P.; Harmon, M.E.; Heath, L.S.; Houghton, R.A.; Jackson, R.B.; Morrison, J.F.; Murray, B.C.; Pataki, D.E.; Skog, K.E. 2011. A synthesis of current knowledge on forests and carbon storage in the United States. Ecological Applications. 21(6): 1902-1924.

Ryan, M.G.; Harmon, M.E.; Birdsey, R.A.; Giardina, C.P.; Heath, L.S.; Houghton, R.A.; Jackson, R.B.; McKinley, D.C.; Morrison, J.F. 2010. A synthesis of the science on forests and carbon for U.S. forests. Issues in Ecology. 13: 1-16.

Related Topics

Uso del análisis del inventario forestal para detector migraciones de árboles en respuesta al cambio climático

NEPA - Decision Documents and Implementation

NEPA - Proposal Development

NEPA - Introduction to Incorporating Climate Change

Vegetation Models for Climate Change Impacts

Predicting Changes in Forest Composition and Dynamics

Tree Habitat Shifts

Detecting Tree Migration with Forest Inventory Analysis

Species Distribution and Climate Change

Climate Change Impact Assessments

Climate Change Assessments

Climate Change Vulnerability Assessments

Climate Change in Natural Resource Assessments

About the Climate Change Resource Center

The Climate Change Resource Center welcomes your comments and suggestions:

ccrc@fs.fed.us, USDA FS Climate Change Resource Center