

CHAPTER V - ENVIRONMENTAL STUDIES

7.0 Indirect and Cumulative Impacts (ICI)

7.1 Overview

Indirect (also referred to as secondary) impacts are changes that result from the proposed project facilitating development in the region. Indirect effects are those “caused by an action and are later in time or farther removed in distance but are still reasonably foreseeable” (40 CFR 1508.8). Examples of indirect impacts are changes in land use, water quality, and population density.

Cumulative effects are impacts that result from the incremental impacts of the proposed transportation action when added to other past, present, and reasonably foreseeable future actions, regardless of the agency or person(s) that undertakes the project (40 CFR 1508.7). These impacts should describe the indirect consequences which result in the immediate project area and beyond at some point in the future. An example of cumulative effects is the cumulative commercial and residential development resulting from new highway construction that facilitates greater numbers of people to travel in the region.

An ICI analysis is required for all Environmental Assessment (EA) and Environmental Impact Statement (EIS) documents. If the previous approval did not include ICI, the next reevaluation must include this analysis. Occasionally, a Categorical Exclusion (CE) determination will require an ICI analysis so the NEPA analyst must discuss this requirement with the Federal Highway Administration (FHWA) reviewer.

The ICI analysis must address each resource type identified in the project area. Please note that if the project is not directly or indirectly affecting a resource, a cumulative effects analysis is not required.

7.2 Analysis

7.2.1 Indirect impacts

The discussion on indirect impacts should include the foreseeable indirect social, economic, and environmental changes caused by the development, which results from the proposed transportation project. This evaluation should note the existing conditions of the natural and human environment and document the changes that may occur. For example, if this wetland were lost, then what impact would its loss have on water quality? Another example is if this business were displaced, what impact would it have on the local economy? However, the functional relationship between cause and effect is not always well defined. The indirect impact evaluation should include how the alternatives (including the No- Build alternative) under consideration would stimulate low density, non-transit oriented, sprawl-type development, or assist in achieving sustainable development. In many cases, the historical development of a community or region can be an indicator of future development patterns. According to the FHWA Position Paper, the “acceptable guideline for determining the area of influence is the

geographic extent to which the project will affect traffic levels.” The area of influence for the indirect effects analysis should be clearly defined (and preferably shown in a graphic) and may vary from resource to resource.

The indirect effects discussion should demonstrate the impact of the proposed project on the community and how the proposed project would benefit the community. The study should also include the regional impact of the proposed project with respect to employment opportunities, infrastructure, tax revenues, and access to activity centers. The analysis should demonstrate the effect of the proposed action on the existing and foreseeable future connectivity of bike paths, pedestrian sidewalks, train, and automobile travel. The discussion on indirect impacts should delineate the cause and effect relationships among the proposed action and natural and human environments of concern. Once indirect impacts have been evaluated, mitigation of adverse impacts may include involvement of local planning agencies.

7.2.2 Cumulative Impacts

Scoping is critical for a cumulative effects analysis. Scoping will identify the baseline conditions and the relevant past, present, and future actions that relate to the analysis. The evaluation should establish a geographic scope and time scale for the project impact area (these parameters may vary resource to resource). The baseline conditions and the meaningful changes in the natural and human environment should be described. The discussion on cumulative impacts should delineate the cause and effect relationships among the multiple actions and the natural and human environment of concern. The study should also consider prior NEPA analyses of similar actions or nearby actions and also evaluate the proposed route in context with other planned projects in the region, including non-transportation projects. Elements of the discussion may include: culturally valued landscapes, air and water quality, demographic diversity, habitat fragmentation, vegetative resources, soils, wildlife, fisheries, land use, coastal zone, recreation, and socio-economics of the region. Determining the consequences should include analyzing the additive and long-term effects of the projects. Some topics to address in the cumulative impacts analysis include: traffic, induced growth, natural environment (i.e., soils, geology, groundwater), housing, energy, air quality, cultural resources, water quality, aquatic ecology, land use, hazardous waste, noise, access, socioeconomics, and visual changes.

If possible, quantifiable methods for analysis should be utilized for easy comparison. Possible methods of analysis include: interviews, checklists, matrices, modeling, GIS, ecosystem analysis, economic impact analysis, and social impact analysis. A table listing the resource, the past actions, the present actions, the proposed transportation action, the future action, and the cumulative effects would be a useful tool for analysis. A significant cumulative effect on the environment would mean that incremental individual effects on the environment would produce a substantial change in the physical conditions of the area.

According to the Council on Environmental Quality (CEQ) guidance, a step-by-step approach includes the following:

1. Identify the significant cumulative effects issues associated with the proposed action and define assessment goals.

2. Establish the geographic scope and time frame for the analysis.
3. Identify other actions affecting the resources, ecosystems, and human communities of concern.
4. Characterize the resources, ecosystems and human communities in terms of their response to change.
5. Characterize the stresses affecting these resources.
6. Define a baseline condition of the resources in the natural and human environment.
7. Identify the cause and effect relationships between human activities and resources.
8. Determine the magnitude and significance of the cumulative effects.
9. Modify or add alternatives to avoid, minimize, or mitigate the significant cumulative effects.
10. Monitor the cumulative effects of the selected alternative.

7.3 Consultant deliverables

A separate report is not required; analysis and findings will be submitted as part of the NEPA document. Phone logs of discussions with locals and any studies referenced should be referenced in the document and possibly attached in an appendix.

7.4 References

- [Guidebook for Evaluating Indirect Land-use and Growth Impacts of Highway Improvements, Oregon DOT \(April 2001\)](#)
- [Considering Cumulative Effects Under the National Environmental Policy Act \(January 1997\)](#)
- [Consideration of Cumulative Impacts in EPA Review of NEPA Documents \(May 1999\)](#)
- [Guidance for Estimating the Indirect Effects of Proposed Transportation Projects \(1998\), NCHRP Report 403 \(available from the National Academies Bookstore\)](#)

Regulations

- National Environmental Policy Act of 1969
- 23 CFR 771; 40 CFR 1508.7, 1508.8