Chapter 412 Indirect and cumulative effects

412.01 Introduction

This chapter provides the policy direction regarding the assessment of indirect and cumulative effects for projects requiring a National Environmental Policy Act (NEPA) environmental assessment (EA) or a NEPA/State Environmental Policy Act (SEPA) environmental impact statement (EIS). This chapter also contains WSDOT's policy regarding the consideration of climate change as a cumulative effect.

NEPA requires that any agency proposing a major federal action that may significantly affect the environment, consider the environmental impacts of the proposed action, any unavoidable adverse environmental impacts, and the relationship between local short term uses and long-term productivity of the environment (42 U.S.C. § 4332(c)). 40 CFR 1508.1(q) provides definitions and criteria for major federal actions.

SEPA rules direct state agencies to identify and evaluate probable impacts, alternatives, and mitigation measures, emphasizing important environmental impacts and alternatives (including cumulative, short-term, long-term, direct and indirect impacts).

The Council on Environmental Quality (CEQ) NEPA regulations require federal agencies to evaluate three types of effects in environmental reviews: (i) direct effects, which are "caused by the action and occur at the same time and place;" (ii) indirect effects, which are "caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable;" and (iii) cumulative effects, which result from "the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions".

Exhibit 412-1 Highlights the distinctions between direct, indirect and cumulative

Distinctions between direct, indirect, and cumulative effects			
Type of Effect	**Direct**	**Indirect**	**Cumulative**
Nature of effect	Typical, predictable	Reasonably foreseeable, probable	Reasonably foreseeable
Cause of effect	Project	Project's direct effects	Project's direct and indirect effects *together with* effects of other activities
Timing of effect	Project construction and implementation	At some future time after direct effects	Past, present, or in the future
Location of effect	Within project impact area	Within boundaries of systems affected by project	Within boundaries of systems affected by the project

Adapted from: *NCHRP Report 403, Guidance for Estimating the Indirect Effects of Proposed Transportation Projects* (1998), reprinted in AASHTO Practitioner's Handbook #12 (2016)

412.01(1) Recent changes

In 2022, CEQ revised its NEPA regulations to restore some of the basic elements of its 1978 NEPA regulations that had been eliminated by the 2020 rulemaking. The 2022 rule change:

- Restored the requirement for federal agencies to evaluate all relevant environmental impacts of projects and decisions, including direct, indirect, and cumulative effects.
- Restored agency flexibility to develop the Purpose and Need and to work with interested participants to mitigate impacts, regardless of stated project goals.
- Established CEQ's NEPA regulations as the floor rather than the ceiling so federal agencies could customize their NEPA procedures consistent with CEQ NEPA regulations, as needed.

The proposed rule adds direction related to cumulative effects in § 1502.15, stating: "Agencies should use high-quality information, including the best available science and data, to describe reasonably foreseeable environmental trends, including anticipated climate-related changes to the environment, and when such information is lacking, provide relevant information consistent with § 1502.21. This description of baseline environmental conditions and reasonably foreseeable trends should inform the agency's analysis of environmental consequences and mitigation measures (§ 1502.16).

On January 9, 2023, the CEQ published updated Guidance on Consideration of Greenhouse Gas Emissions and Climate Change on the Federal Register. This was directed by EO 13990 Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis. The new CEQ guidance is now in effect and directs WSDOT's NEPA analysis. For more information about CEQ guidance, see Section 412.04(2), Chapter 425 and WSDOT's Air Quality, Energy & Greenhouse Gas Emissions and Cumulative Effects and Climate Change webpages.

At the state level, WSDOT has new direction because of the passage of the Healthy Environment for All (HEAL) Act codified in RCW 70A.02. This state law directs the consideration of cumulative health impacts, climate-related effects and more. Project teams should follow the direction in Chapters 458 and 460 regarding the use of the Environmental Health Disparity tool and consider cumulative human health effects. Environmental justice is an important topic that should be considered during the assessment of direct, indirect, and cumulative effects.

412.02 Applicable statutes, regulations, and executive orders

412.02(1) Federal

- National Environmental Policy Act (NEPA), 42 USC Section 4321, 42 USC 4332(c) re: relationship to long term productivity of the environment
- CEQ NEPA Implementing Regulations – 40 CFR 1500 - 1508 (Note: WSDOT refers to the 1978 version)
- FHWA, FRA, and FTA Rules – 23 CFR 771

412.02(2) State

- State Environmental Policy Act (SEPA), RCW 43.21C, and RCW 43.21C.031.
- SEPA implementing regulations are WAC 197-11-792 and WAC 197-11-060(4).
- RCW 70A.02 Environmental Justice, also referred to as the HEAL Act.

412.02(3) Local

- N/A

412.03 Considerations during project development

412.03(1) Planning

Chapter 200 explains how planning projects such as Purpose and Need or a range of reasonable alternatives, can consider environmental issues. Cumulative effects include long-term issues like climate change and land use conversion. These issues can be effectively considered at a planning level to inform the proposed solutions.

412.03(2) Scoping

Chapter 300 explains the importance of public and agency outreach during pre-NEPA and scoping of our environmental documents. Often the members of the public raise concerns around issues that may seem outside the project. These concerns may indicate cumulative effects, that should be captured early and considered as important context for the project. For example, a pattern of development in the flood plain, increased flooding, and concerns surrounding future climate change projections.

412.03(3) Design

Project NEPA documents should disclose all the effects and respond to public and agency concerns. The proposed project should highlight ways to address the direct and indirect effects, and ways to be resilient to climate and other hazards. See WSDOT's Cumulative Effects and Climate Change webpage for additional guidance.

412.03(4) Construction

- N/A

412.03(5) Maintenance and Operations

- N/A

412.04 Analysis and documentation requirements

412.04(1) Right size to classification (CE, EA, EIS)

Indirect effects

Any project regardless of NEPA classification may have indirect effects. These should be assessed and described alongside direct effects. This is consistent with both the 1978 and the 2020 versions of the CEQ NEPA regulations. WSDOT project teams should follow the AASHTO's guide "*Practitioner's Handbook #12: Assessing Indirect and Cumulative Impacts* under NEPA."

Cumulative effects

The level of the environmental document being prepared will dictate whether a cumulative effects analysis should be prepared. If so, the scope of the cumulative effects analysis should be limited to those resources that are directly affected by the proposed action. If a project will not directly or indirectly impact a resource, it will not contribute to a cumulative effect on the resource. The one exception to this is climate change impacts. Regardless of project impacts, WSDOT's EAs and EISs should include a discussion of climate change, within the cumulative effects analysis, as presented below.

- **Categorical Exclusion (CE): Not Required –** These projects are minor projects without significant environmental impacts, and as such should not require a cumulative effects analysis. There may be unusual circumstances requiring such an analysis, but this should be very rare.
- **Environmental Assessment (EA): Required –** These are projects in which the significance of environmental impacts is unknown. As one of the primary purposes of the EA is to help decision makers and the public understand whether an EIS is needed, you need to consider potential cumulative effects. The degree to which resources may be impacted will determine the extent of the cumulative effects analysis needed. Where direct and indirect effects are found to be present, you will need to complete a cumulative effects analysis.
- **Environmental Impact Statement (EIS): Required –** These are projects in which there are anticipated significant environmental impacts, and a cumulative effects analysis may assist decision makers and the public in making informed decisions. The cumulative effects analysis should include substantial information about affected resources, past actions that have contributed to trends, and reasonably foreseeable effects.

412.04(2) Analysis and Methodology

The NEPA project lead determines the approach for documenting cumulative effects. Options are to:

1. Prepare a separate chapter or section on cumulative effects.
2. Integrate the disclosure of cumulative effects within the individual discipline studies and report within those chapters or sections.

In either case, a separate cumulative effects discipline report or technical memo may help to keep the document size to a minimum.

As explained in the SEPA Handbook on the Washington State Department of Ecology SEPA guidance webpage, "When describing the environmental impacts of a proposal, the lead agency should consider direct, indirect, and cumulative impacts. For example:

- A new residential development may propose to place fill in a wetland to construct a road (a direct impact).
- The new road may encourage increased development in the area because of the improved access (an indirect impact). *[Note that if the development is already forecast by a locally approved plan, the road project is not inducing the growth, but the relationship can be noted.]*
- Increased runoff and contaminants from the development would be added to the volumes and levels of contamination from similar developments surrounding the wetland (cumulative impacts)."

Recommended resources

WSDOT is following the CEQ NEPA regulations about indirect and cumulative effects analysis.

WSDOT project teams should use the AASHTO guidance for cumulative effects analysis. AASHTO's guide "Practitioner's Handbook #12: Assessing Indirect and Cumulative Impacts under NEPA" recommends five general stages, and five analytical steps:

I. Information gathering

II. Initial assessment of cumulative effects

III. Determining the scope and methodology (count what counts)

IV. Conducting the analysis

   1) Describe resource conditions and trends

   2) Summarize proposed project's effects on key resources

   3) Describe other actions and their effects on key resources

   4) Estimate combined effects

   5) Consider minimization and mitigation (be sure to reflect the distinction between the proposed action and other actions)

V. Documentation

WSDOT has useful information in GIS on several topics, including climate change and natural hazards. Local agencies maintain land use information as well as emergency management plans that contain valuable information on flooding and other natural hazards. Transportation planners can reach out to locals, tribes, and representatives from traditionally underrepresented, underserved, and overburdened communities to find out what issues are of most concern. The State Department of Health's Environmental Health Disparities tool is a great resource.

Indirect effects

Any project, regardless of NEPA classification, may have indirect effects. Analysis of indirect effects is needed when effects are reasonably foreseeable and have a reasonably close causal relationship to the proposed action. These should be assessed and described alongside direct effects consistent with CEQ NEPA regs 1500-1508. A separate indirect effects analysis is not recommended, except in rare cases when a project is likely to cause otherwise unplanned changes in land use patterns.

Most indirect effects are derived from project-related changes in land uses. Under the Growth Management Act, land use changes are controlled by local planning decisions. However, indirect effects may be associated with a transportation project if the project affects the rate and pattern of land use development. For example, if WSDOT constructs a bypass route around a town, the rate of planned growth around the new route may increase. WSDOT's projects should consider the potential indirect effects, including whether there is a likelihood that development and economic vitality along the original route may decline. Other examples of indirect effects include changes in wildlife habitat selection or migration patterns due to direct project-related effects on habitat, for example – increased park use due to improved access.

It is very important to determine if the project is likely to support planned land use. Ask whether the project will alter the type, rate, or timing of planned growth. Consider whether there is potential for indirect effects on either the natural or the human environments (including environmental justice populations).

To evaluate the potential for indirect effects, consider the likelihood of development in the project area following project construction. Carefully examine the land use discipline study for your project (See Chapter 455 for land use analysis). Consider the following:

- Look at population and land use trends in the project area and region or subarea. How has the area developed? How fast is it planned to develop? Will the project affect the rate of development? Are people building in the area? Look at the pattern of zoning. Has it recently changed or is it about to change?
- Review the local comprehensive plans. Is the project area within the urban growth boundary or outside it? Is the local jurisdiction considering changes in the urban growth boundary to allow for growth or are they concentrating on infill? Confirm that the proposed project is aligned with the transportation element of the plan. Would the transportation project support other modal decisions contained within adopted plans? Do the city planners expect the project to support or encourage development?

Document your conclusion and describe the indirect effects associated with the proposed action. If your project is likely to induce growth that is not planned, refer to AASHTO's guide "Practitioner's Handbook #12: Assessing Indirect and Cumulative Impacts under NEPA" for direction and national best practices.

Cumulative effects

For EAs and EISs, potential cumulative effects should be considered as early as possible in the NEPA process. Use information from existing environmental documents and other relevant information such as natural resource plans, local comprehensive plans, existing zoning, recent building permits, and interviews with local government. These may also be good sources for information on past actions.

Quantifying cumulative effects may be difficult, since a large part of the analysis requires projections about what may happen in a project area. The analyst must develop a list of reasonably foreseeable future actions taken by governmental and private entities. We recommend coordinating with the authors of the social, environmental justice, and land use and transportation studies to capture the information they have on future actions. Coordinate your outreach to other agencies and the public so that you understand the likely future context for the project and the surrounding area.

A cumulative effect analysis builds upon information derived from direct and indirect effect. This makes it tempting to postpone the identification of cumulative effects until the direct and indirect effect analyses are well under way. However, early consideration of cumulative effects may facilitate the design of alternatives to avoid or minimize impacts. Do not defer the consideration of cumulative effects. Instead, as you begin to consider a project's potential direct and indirect effects, start outlining the potential cumulative effects as well. As more information about direct and indirect effects becomes available, use it to further refine the cumulative effects analysis. If you determine that cumulative effects are not an issue, document that decision along with the reasons for the decision.

Climate Change and Greenhouse Gases

WSDOT follows CEQ's 2023 Guidance on Consideration of Greenhouse Gas Emissions and Climate Change. The new CEQ guidance is now in effect and directs NEPA analysis to:

- Quantify reasonably foreseeable indirect gross and net GHG emissions increases or reductions, both for individual GHG pollutants and aggregated in terms of carbon dioxide equivalence;
- Use the best available estimates of the social cost of GHGs to monetize the climate change effects of a project's GHG emissions;
- Use information from the NEPA process to help inform decisions that align with climate change commitments and goals, such as evaluating reasonable alternatives that would have lower GHG emissions;
- Consider the projected future state of the environment and the effects of climate change on a proposed action based on the best available climate change reports;
- Consider the proposed action in the context of the emissions from past, present, and reasonably foreseeable actions when assessing cumulative climate change effects;
- Consider effects of climate change on vulnerable communities when designing a project and identifying alternatives.

Greenhouse gases – The emission of greenhouse gases (such as carbon dioxide) and issues related to global climate change should be discussed in environmental assessments and environmental impact statements as a cumulative effects. The discussion should include efforts currently underway in Washington State to reduce GHG emissions and the effects of current projects on GHG emissions (see WSDOT's Air Quality, Energy & Greenhouse Gas Emissions and Cumulative Effects and Climate Change webpages. More information is available in Chapter 425).

Climate change and project resilience – Project teams are expected to examine available information about climate trends and to use the results of WSDOT's assessment of vulnerable infrastructure. By doing this, project teams will satisfy WSDOT's directive to consider ways to make their proposed projects more resilient to future climate impacts and severe storm events. Past trends for a specific resource (water, habitat, air) may not be accurate predictions for the future; instead, we need to look at science-based projections of the changing climate as part of our analysis of cumulative effects. WSDOT advises project teams to use the current climate projections available from the University of Washington's Climate Impacts Group in combination with the WSDOT Climate Impacts Vulnerability Assessment (completed November 2011) and *WSDOT's Guidance for Project-Level Climate Change Evaluations*, or contact WSDOT's NEPA-SEPA Program.

412.04(3) Required documentation for cumulative effects

WSDOT projects that are preparing a NEPA EA or EIS should document the analysis of cumulative effects in the same way they did under the 1978 CEQ NEPA regulations. WSDOT project teams should follow the documentation requirements described in:

1. AASHTO's guide "Practitioner's Handbook #12: Assessing Indirect and Cumulative Impacts under NEPA." That direction is consistent with WSDOT policy and SEPA rules.
2. WSDOT's procedures for climate change and greenhouse gas.

Cumulative effects can either be discussed in individual sections on each element of the environment or included in a separate section. A separate section is most appropriate when there are a lot of cumulative effects that are interrelated across disciplines. Most project teams find it useful to have a separate discipline report or technical memo to document the details of methodology and findings. In some cases where there are few cumulative effects, a project team can write cumulative effects entirely within the EA or EIS.

Whatever approach you take, be sure that the reader can find your discussion of cumulative effects.

412.05 External engagement

Public involvement and inclusive engagement are central to NEPA and SEPA. It is part of how you successfully identify direct, indirect, and cumulative effects of a proposed project. We must reach out to others. Work with your project team, communications, tribal liaison, and the other subject matter experts to find out what they've heard about cumulative effects. Tribal leaders and staff have very deep knowledge of the trends that have adversely impacted tribal resources. This information is very useful in preparing the cumulative effects analysis and in identifying potential mitigation. Environmental justice community members and local government staff have very valuable insights as well.

412.06 Internal Roles and responsibilities

The following offices have a key role in indirect and cumulative effects analysis. See the NEPA Roles Table on the NEPA & SEPA webpage for more information about general NEPA documentation roles.

412.06(1) Region/Modal Planning Office

Conduct environmental screening to locate WSDOT assets that are vulnerable to climate threats. Consult with local planning partners to determine availability of additional area-specific climate data. Use this information to document how climate change and extreme weather vulnerability are considered and to propose practical long-term solutions that improve resilience. Provide documentation and recommendations to environmental staff.

412.06(2) Region/Modal Environmental Office

Identify resource areas that require a cumulative effects analysis under NEPA. Prepare analysis or review analysis prepared by environmental technical experts.

412.06(3) Environmental technical experts

Perform technical analysis to determine effects, including cumulative effects, for the range of environmental disciplines evaluated under NEPA. Consultants may also fulfill this role. WSDOT environmental technical experts can help develop consultant scopes of work. WSDOT environmental technical experts review consultant work to ensure requirements are met and the analysis is technically sound.

412.06(4) Headquarters Environmental Services Office

The Environmental Services Office (ESO) keeps the indirect and cumulative effects guidance current and consistent with rules and regulations. The ESO NEPA Specialist provides support and technical assistance with EA and EIS projects. The NEPA-SEPA Program is available to consult on cumulative effects and climate analysis.

412.07 Mitigation

It is the project team's responsibility to define mitigation for direct and indirect effects. Mitigation requirements are discussed within the other discipline chapters. With regard to cumulative effects and potential mitigation, refer to the AASHTO practitioners guide.

412.08 Applicable permits and approval process

There are no permits or approvals associated with indirect or cumulative effects.

412.09 Abbreviations and acronyms

AASHTO	American Association of State Highway and Transportation Officials
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
EA	Environmental Assessment
EIS	Environmental Impact Statement
ESA	Endangered Species Act
NEPA	National Environmental Policy Act
SEPA	State Environmental Policy Act

412.10 Glossary

Cumulative Effect – Effects on the environment that result from the incremental effects of the action when added to other past, present, and reasonably foreseeable actions, regardless of what agency or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.8).

Cumulative Effects (ESA) – Effects of future state or private activities, not involving federal activities, that are reasonably certain to occur within the action area of the federal action subject to consultation (50 CFR 402.02). ***Note:*** NEPA and ESA share a common threshold for determining whether to consider the potential for the action to change the rate of growth thereby increasing the indirect effects of an action. Therefore, the same causal relationship should be used for writing the NEPA document as for writing the biological opinion for ESA compliance (see Section 436.05).

Cumulative Impact/Effect (NEPA) – The impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. (This is the CEQ definition as it was established 1978. See note in introduction regarding the repeal effective 9/14/2020.)

Direct Effect – Direct effects are caused by the proposed action and occur at the same time and place. Direct effects may occur during construction or operation of the project. Effects may be ecological, aesthetic, historic, cultural, economic, social, or health related. (40 CFR 1508.8).

Effects (or Impacts) – Changes to the human environment that are from the proposed action or alternatives that are reasonably foreseeable, including direct effects, indirect effects, and cumulative effects. Effects include ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effects will be beneficial. (40 CFR 1508.1).

Indirect Effect (NEPA) – Indirect effects are caused by the proposed action or alternative and occur later in time or are farther removed in distance but are still reasonably foreseeable. Indirect effects may include effects related to changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems (40 CFR 1508.8).

Induced Growth or Growth Inducing Effect – Terms used as examples of an indirect effect related to changes in the pattern of land use, population density, or growth rate. (WSDOT discourages the use of these terms because they are vague and confuse the local decisions regarding planned growth under the Washington State Growth Management Act with project-specific effects).

Irretrievable – Impossible to retrieve or recover.

Irreversible – Impossible to reverse.

Mitigation – According to 40 CFR 1508.1(s), includes: (a) Avoiding the impact; (b) Minimizing impacts by limiting the degree or magnitude; (c) Rectifying the impact by repairing, rehabilitating, or restoring; (d) Reducing or eliminating the impact over time; and (e) Compensating by replacing or providing substitute resources.

Reasonably Foreseeable – An action is reasonably foreseeable if it is considered "likely to occur" and isn't too "speculative." Reasonably foreseeable impacts are predictable and probable. They are not impacts that are just merely possible. EPA's Consideration of Cumulative Impacts in EPA Review of NEPA Documents (May 1999) states that "Court decisions . . . have generally concluded that reasonably foreseeable future actions need to be considered even if they are not specific proposals. The criterion for excluding future actions is whether they are "speculative." The NEPA document should include discussion of future actions to be taken by the action agency. The analysis should also incorporate information based on the planning documents of other federal agencies, and state and local governments. For example, projects included in a 5-year budget cycle might be considered likely to occur while those only occurring in 10–25-year strategic planning would be less likely and perhaps even speculative."

Language from court decisions can be helpful in formulating questions and criteria as practitioners proceed with analysis to determine which actions may be reasonably foreseeable. For example, one court case defined "reasonably foreseeable" as an action that is "sufficiently likely to occur, that a person of ordinary prudence would take it into account in making a decision." Sierra Club v. Marsh, 976 F.2d 763, 767 (1st Cir. 1992) (Sierra Club IV). Courts have also recognized that "An environmental impact is considered 'too speculative' for inclusion in an EIS (Environmental Impact Statement) if it cannot be described at the time the EIS is drafted with sufficient specificity to make its consideration useful to a reasonable decision maker." Dubois v. US. Dept. of Agriculture, 102 F.3d 1273,1286 (1st Cir. 1996).

Factors that indicate whether an action or project is "reasonably foreseeable" for the purposes of cumulative effects analysis include: whether the project has been federally approved; whether there is funding pending before any agency for the project; and whether there is evidence of active preparation to make a decision on alternatives to the project. Clairton Sportmen's Club v. Pennsylvania Turnpike Commission, 882 F. Supp 455 (W.D. Pa 1995).

Resource – Referred to in NEPA and SEPA implementing regulations as "natural or depletable" resources (40 CFR 1502.16, WAC 197-11-440(6)) and renewable or nonrenewable resources (WAC 197-11-444). FHWA Technical Advisory T 6640.8A (October 30, 1987) refers to "natural, physical, human, and fiscal resources" in guidance on irreversible and irretrievable commitments of resources.

Resource Study Area – A Resource Study Area is specific for each resource and focused on the area where cumulative effects on the resource are expected to occur. It may be the same or larger than the study area for direct and indirect effects.

Significance – The significance of a potential impact on the natural or built environment depends upon context, setting, likelihood of occurrence, and severity, intensity, magnitude, or duration of the impact. Almost every transportation project that would be recognized as major federal action, no matter how limited in scope, has some adverse impact on the environment.

Review and consideration of case law can help clarify interpretations of the term "significance." In deciding whether a project will significantly impact the environment, case law suggests that agencies should review the proposed action in light of the extent to which the action will cause adverse environmental effects in excess of those created by existing uses in the affected area and the absolute quantitative adverse environmental effects of the action itself, including the cumulative harm. In any proposed major federal action, the public must have an opportunity to submit factual information on this issue which might bear on the department's threshold decision of significance. Hanley V. Kleindienst, 471 F.2d 823 (2nd Cir. 1972, cert. denied, 412 U.S. 908 (1973). If you are concerned about the role that the level of significance and controversy may have, you should consult your Attorney General's office or other legal counsel.