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### 412.01 Introduction

This chapter deals with some of the most challenging sections of an environmental document, namely consideration of:

- Indirect (or secondary) impacts
- Cumulative impacts
- Climate change as a cumulative effect
- Irreversible and irretrievable commitments of resources
- Relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity

See **Table 412-1** for a summary comparison of direct, indirect and cumulative effects. **Exhibit 412-1** illustrates these relationships in the form of flowcharts. **Exhibit 412-2** shows where indirect effects analysis fits in the process of analyzing impacts and developing proposed mitigation.

In recent years, the potential for indirect and cumulative impacts – particularly to aquatic resources from a watershed perspective and to air quality – has been increasingly recognized. However, indirect effects and cumulative effects are difficult to understand and assess. Indirect and cumulative effects can have repercussions for social and economic conditions, natural resources, cultural and historical resources, and other conditions.

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\*Web sites and navigation referenced in this chapter are subject to change. For the most current links, please refer to the online version of the EPM, available through the WSDOT Environmental Services Office (ESO) home page: <http://www.wsdot.wa.gov/environment/>

**Table 412-1: Summary of Direct, Indirect, and Cumulative Effects**

Type of Effect	Direct	Indirect	Cumulative
Nature of effect	Typical/inevitable/predictable	Reasonably foreseeable/probable	Reasonably foreseeable/probable
Cause of effect	Project	Project's direct and indirect effects	Project's direct and indirect effects and effects of other activities
Timing of effect	Project construction and implementation	At some future time after direct effects*	At time of project construction* 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

\*Indirect and cumulative effects could potentially occur before the project is built (i.e., speculators initiating land use actions in anticipation of project construction).

Source: *A Guidebook for Evaluating the Indirect Land Use and Growth Impacts of Highway Improvements*, Final Report SPR 327, Oregon DOT and FHWA, April 2001.

Part of the confusion around indirect and cumulative effects is due to differing guidance derived from several statutes, primarily the National Environmental Policy Act (NEPA), and Endangered Species Act (ESA). For example, both NEPA and ESA regulations require cumulative and indirect effects analysis, but regulators differ in their application and interpretation. Similarly, NEPA and the ESA share a common threshold for determining whether to include growth-inducing effects on the rate of growth among the indirect effects of a proposed action. Though the scope of the indirect effects analysis differs greatly under NEPA and ESA, 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**). Since there can also be some slight differences in application of these terms, depending on the discipline, the analyst should check the applicable discipline chapter along with this chapter before proceeding.

In early 2008, WSDOT, EPA, and FHWA issued new guidance on preparing cumulative effects analyses (see **Section 412.05(5)**).

### (1) **Summary of Requirements**

Both NEPA and SEPA require consideration of cumulative as well as direct and indirect impacts, any irreversible and irretrievable commitments of resources, and the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity. Cumulative impacts should be discussed in individual sections on each element of the environment, along with direct and indirect impacts. Cumulative impacts may also be included in a separate section. This is most appropriate when there are a lot of cumulative impacts that are interrelated across disciplines. Environmental documents should also include a separate discussion of any irreversible and irretrievable commitments of resources, and the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity.

Federal implementing regulations are at 23 CFR 771 (FHWA) and 40 CFR 1500-1508 (CEQ). State implementing regulations are in WAC 197-11 and WAC 468-12 (WSDOT). For details on NEPA/SEPA procedures, see **Chapter 410** and **Chapter 411**.

**(2) Abbreviations and Acronyms**

None specifically related to indirect and cumulative impacts. See **Appendix A** for a general list of abbreviations and acronyms referenced in the EPM.

**(3) Glossary**

See **Appendix B** for a general glossary of terms used in the EPM.

**Effect** – See “Impact.”

**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. [40 CFR 1508.7]

**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).

**Direct Effect** – Effect caused by the proposed action and occurring at the same time and place.

**Impact** – Synonymous with “Effect.” Includes ecological impacts (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health impacts, whether direct, indirect, or cumulative. Effects may also include those resulting from actions that may have both beneficial and detrimental effects, even if on balance the agency believes the effect will be beneficial.

**Indirect Impacts/Effects** (NEPA) – Effects which are caused by the action that are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced 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.

**Resource** – Referred to in NEPA and SEPA implementing regulations as “natural or depletable” resources (CEQ 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.

## 412.02 Applicable Statutes and Regulations

This section lists the primary statutes and regulations applicable to indirect and cumulative impacts issues. See **Appendix D** for a list of statutes referenced in the EPM.

### (1) *National Environmental Policy Act/State Environmental Policy Act*

The National Environmental Policy Act (NEPA), 42 USC Section 4321, requires that all actions sponsored, funded, permitted, or approved by federal agencies undergo planning to ensure that environmental considerations, including direct, indirect, and cumulative impacts, are given due weight in project decision-making. The State Environmental Policy Act (SEPA), RCW 43.21C, mandates a similar procedure for state and local actions. See **Chapter 410** and **Chapter 411** for detailed guidance.

In addition to direct and observable effects, agencies are required to examine effects that may be indeterminate and not easily recognized; these are referred to as “indirect (secondary) and cumulative impacts.”

Under NEPA and SEPA, an EIS also is to include “the relationship between local short-term uses of man’s environment and the maintenance and enhancement of long-term productivity;” and “any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.” SEPA includes “significant irrevocable commitments of natural resources” in a discussion of “Significant impacts” (RCW 43.21C.031).

A good overview of NEPA requirements for indirect and cumulative impacts and FHWA guidance is available on FHWA’s Web site at:

☞ <http://environment.fhwa.dot.gov/projdev/tdmimpacts.asp>

### (2) *NEPA Implementing Regulations*

#### (a) *CEQ Rules*

The 1978 regulations of the Council on Environmental Quality (CEQ) implemented the action provisions of NEPA. These regulations broadly define the direct, indirect, and cumulative effects that must be evaluated.

Generally, indirect effects are caused by the action. They include a variety of effects such as changes in land use, water quality, economic vitality, and population density. Cumulative impacts are less defined and may be undetectable when viewed in the context of direct and indirect impacts, but nonetheless can add to other disturbances and eventually lead to a measurable environmental change. They require that agencies examine consequences that may occur in areas beyond the immediate influence of a proposed action and at some time in the future (40 CFR 1508).

**(b) FHWA Rules**

FHWA implements NEPA and the CEQ guidelines with its environmental regulations (23 CFR 771). These regulations interpret the CEQ guidelines on indirect and cumulative impacts. These impacts are referenced when justification is required for the use of categorically excluded actions. Categorical Exclusions (CE) are actions which “do not induce indirect significant impacts to planned growth or land use...” or “do not otherwise, either individually or cumulatively, have any significant impacts.

**(3) SEPA Implementing Regulations**

The SEPA implementing regulations also specify that direct, indirect, and cumulative impacts must be considered in the EIS (WAC 197-11-70-92). For example, impacts include those resulting from growth caused by a proposal, as well as the likelihood that the present proposal will serve as a precedent for future actions. The range of impacts to be analyzed (direct, indirect, and cumulative) may be wider than the impacts for which mitigation measures are required of applicants (WAC 197-11-060(4)).

### **412.03 Policy Guidance**

Joint WSDOT, FHWA, and EPA guidance specific to WSDOT project-level analyses is now available. See **Section 412.05**.

FHWA policy guidance is incorporated in the technical guidance documents described in **Section 412.05**.

Since Washington is a growth management state, local governments make land use decisions. More information on Growth Management can be found on our Growth Management page at:

 <http://www.wsdot.wa.gov/planning/LandUse/localgmareqs>

### **412.04 Interagency Agreements**

None identified. See **Appendix E-1** for a complete index to interagency agreements referenced in the EPM.

## 412.05 Technical Guidance

### **New Joint WSDOT, FHWA and EPA Guidance**

In February 2008, the agencies issued a comprehensive guide on cumulative effects designed for preparers of cumulative effects studies for transportation projects in Washington State. WSDOT project teams should use this guidance when analyzing cumulative effects of projects. This new guidance can be found on the WSDOT Environment Web site at:

☞ <http://www.wsdot.wa.gov/environment/>

### **Climate Change and Greenhouse Gases**

Starting in March 2008, 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 impact. The discussion should include efforts currently underway in Washington State to reduce greenhouse gas (GHG) emissions, a legislative update, effects of current project on GHG emissions, and when appropriate, how the project will adapt to climate change (e.g., adaptations to rising sea level, increased fire potential, etc.).

Check with WSDOT's Air Quality, Acoustics and Energy Program for the most current direction. The Program's Web site is available at:

☞ <http://www.wsdot.wa.gov/Environment/Air/default.htm>

Also, see the state of Washington climate change Web site hosted by the Department of Ecology at:

☞ <http://www.ecy.wa.gov/climatechange/index.htm>

Some general sources of technical guidance are the FHWA and CEQ reference materials described below.

#### **(1) FHWA Technical Advisory**

FHWA Technical Advisory T 6640.8A (October 1987) gives guidelines for preparing environmental and Section 4(f) documents. The advisory suggests the type of indirect (secondary) impacts that should be discussed in several environmental topics (land use, farmland, socio-economic, and energy). These generally involve resources that can be sensitive to change caused by a transportation project, such as the social and economic structure of a community, floodplains, and area-wide water quality. While it does not specifically address cumulative impacts, the advisory does include guidance for preparing sections on the relationship between local short-term uses and the maintenance and enhancement of long-term productivity and on any irreversible and irretrievable commitments of resources. This document is available on FHWA's Web site:

☞ <http://www.fhwa.dot.gov/legsregs/directives/techadvs/t664008a.htm>

**(2) FHWA Guidance on Indirect and Cumulative Effects**

The FHWA issued interim guidance on indirect and cumulative impacts in the NEPA process on January 31, 2003. The guidance is online at:

☞ <http://www.environment.fhwa.dot.gov/guidebook/qaimpactmemo.asp>

FHWA also hosts a “community of practice” Web site where information is exchanged by NEPA practitioners, including ongoing discussions on indirect and cumulative impacts. The Web site is available at:

☞ <http://nepa.fhwa.dot.gov>

**(3) CEQ Guidance on Cumulative Effects**

A good resource for cumulative effects analysis is *CEQ Handbook: Considering Cumulative Effects under the National Environmental Protection Act* (January 1997). This handbook presents the results of research and consultations by CEQ concerning the consideration of cumulative effects. It introduces the complex issue of cumulative effects, outlines general principles, presents useful steps, and provides information on methods of cumulative effects analysis and data sources. The handbook includes an 11-step process for analyzing cumulative impacts.

The handbook does not establish requirements for such analyses. It should not be viewed as formal CEQ guidance, nor are its recommendations intended to be legally binding. The handbook is available via FHWA’s Web page at:

☞ <http://ceq.hss.doe.gov/nepa/ccenepa/ccenepa.htm>

**(4) NCHRP Report 466**

An excellent reference for analyzing indirect effects is NCHRP Report 466: Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects. This reference handbook includes the results of research and well as guidance and a framework to help the analyst estimate these effects.

☞ [http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_rpt\\_466.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_466.pdf)

**(5) Additional Resources**

The most current information and additional resources can be found on the American Association of State Highway and Transportation Officials (AASHTO) Center for Environmental Excellence Internet site.

☞ [http://environment.transportation.org/environmental\\_issues/secondary\\_impacts/](http://environment.transportation.org/environmental_issues/secondary_impacts/)

See also: *A Guidebook for Evaluating the Indirect Land Use and Growth Impacts of Highway Improvements*, Final Report SPR 327, Oregon Department of Transportation and FHWA, April 2001. The guidebook is available online at:

~ [http://www.oregon.gov/ODOT/TD/TP\\_RES/docs/Reports/AGuidebookforUsingIndirLand.pdf](http://www.oregon.gov/ODOT/TD/TP_RES/docs/Reports/AGuidebookforUsingIndirLand.pdf)

Appendices are available at:

~ [http://www.oregon.gov/ODOT/TD/TP\\_RES/docs/Reports/AGidbookUsingIndirLandAPDXA-C.pdf](http://www.oregon.gov/ODOT/TD/TP_RES/docs/Reports/AGidbookUsingIndirLandAPDXA-C.pdf)

See also *Executive Order 13274* (on Environmental Stewardship and Transportation Infrastructure Project Reviews) and *Indirect and Cumulative Impacts Work Group, Draft Baseline Report*, March 15, 2005, online at:

~ <http://www.dot.gov/execorder/13274/workgroups/>

Click on “Executive Order 13274” and “Work Groups,” and then “Indirect and Cumulative Impacts.”

#### **412.06 Permits and Approvals**

None required for these disciplines.

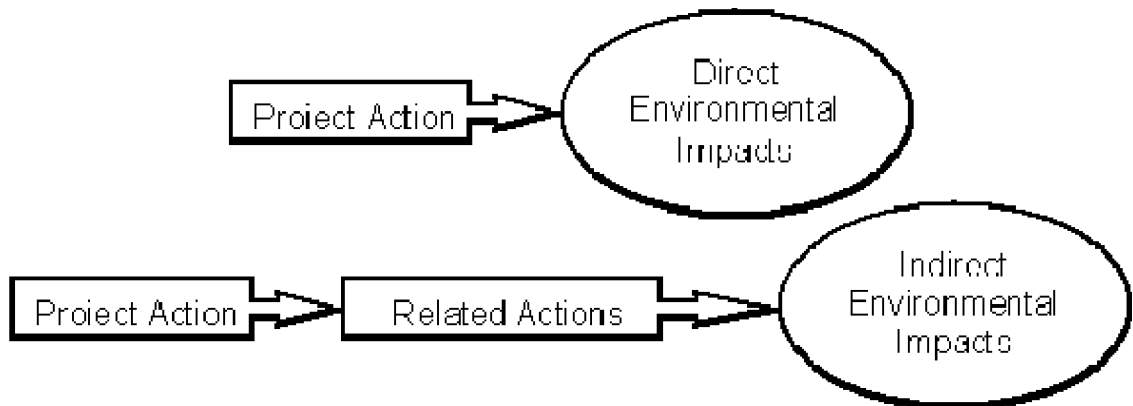
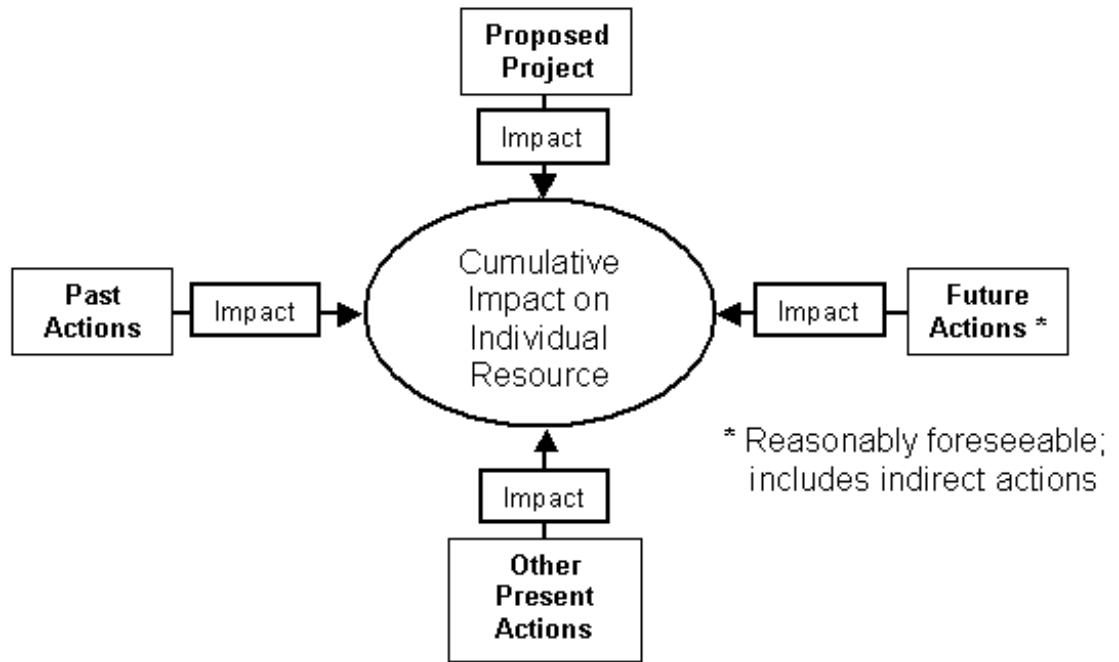
#### **412.07 Non-Road Project Requirements**

Ferry, rail, aviation, and nonmotorized transport systems are generally subject to the same policies and procedures that apply to road projects.

#### **412.08 Exhibits**

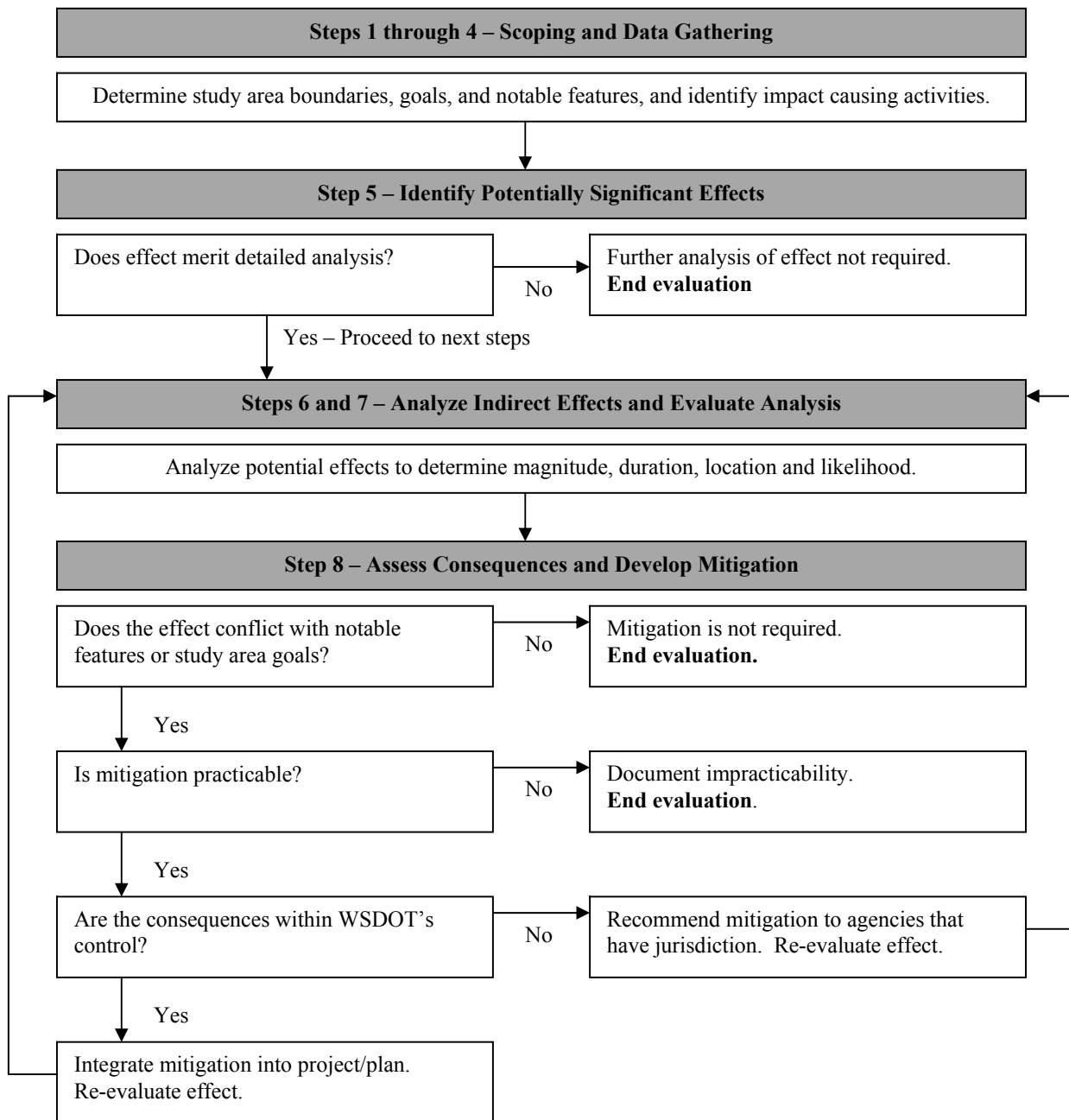
Exhibit 412-1 Indirect and Cumulative Effects Flow Charts

Exhibit 412-2 Framework for Indirect Effects Analysis



Source: *Questions and Answers Regarding the Consideration of Indirect and Cumulative Impacts in the NEPA Process*, FHWA, 2003.

## Exhibit 412-2 Framework for Indirect Effects Analysis



Source: *Guidance for Assessing Indirect and Cumulative Impacts of Transportation Projects in North Carolina: Volume II: Practitioner’s Handbook*, State of North Carolina, Department of Transportation/Department of Environment and Natural Resources, November 2001.