

Legal Sufficiency Criteria for Adequate Indirect Effects and Cumulative Impacts Analysis as Related to NEPA Documents

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**NCHRP Project 25-25 Task 43:
Legal Sufficiency Criteria for Adequate Indirect Effects and
Cumulative Impacts Analysis as Related to NEPA Documents
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Task 1 – Review, Analysis and Documentation

I. Objective

The objective of Task 1 is to review, analyze and document the relevant materials needed to produce legal sufficiency criteria for state Departments of Transportation (DOT) practitioners on conducting indirect effects and cumulative impacts analyses (IE & CI). The materials that were reviewed include: federal and state guidance, published literature, court decisions and actual Environmental Impact Statements (EISs). These materials were reviewed using web resources including *LexisNexis*, federal agency websites, and State DOT websites. Several of the most current state guidance documents were reviewed for this Task. Court decisions were cross-referenced where applicable to show the extent or “reach” of the decision in helping to set a precedent to be followed in conducting adequate indirect effects and cumulative impacts analysis.

In addition, six recent projects were reviewed, and their court decisions analyzed to determine the factors in the case being decided in favor of, or against the government. The supplemental or new EISs that resulted from the lawsuit were also reviewed for the purpose of a more close-up examination of recent developments in IE & CI analysis. Lessons learned were extracted from these cases and the EISs in terms of the following;

- The determination of scope and boundaries used for the analysis
- Whether a qualitative or quantitative analysis was used
- Whether the state in which the project is located had specific guidance that was applied in the analysis
- The extent of agency coordination and public involvement in the scoping and NEPA processes

II. Terminology

Indirect effects are defined by CEQ as “*effects which are caused by the action and 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 or other natural systems, including ecosystems*” (40 CFR 1508.8(b)). The CEQ NEPA regulations note that the terms “effects” and “impacts” may be used interchangeably. Other terms are frequently used as substitutes for indirect effects, e.g., secondary effects or induced effects (indeed, the research described below will examine whether or not the use of terms other than “indirect” has confounded legal sufficiency review). Cumulative impacts, on the other hand, have been defined by CEQ as “*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 (Federal or non-federal) or person undertakes such other actions” (40 CFR 1508.7).

III. Timeline /History of Relevant Regulations, Guidance and Other Materials

The purpose of this section is to give the reader a listing of the regulations, guidance and other materials to provide a context for the current thinking in indirect effects and cumulative impacts analysis. The following provides a timeline of relevant laws and regulations that require the consideration of impacts whether direct, indirect or cumulative. These laws and regulations provide the foundation for the current guidelines and literature that are discussed at the end of this section.

1970- NEPA. The federal statute most relevant to the assessment of indirect effects is the National Environmental Policy Act (NEPA) of 1970, as amended. While NEPA does not specifically refer to indirect effects, it contains two sections that are related to indirect effects as a concern for federal projects. First, in Section 101(b), NEPA makes it the responsibility of the federal government to:

assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings . . . attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences . . . [and] preserve important historic, cultural, and natural aspects of our national heritage. . . . (42 USC 4331 §101(b))

In addition, it states that:

the Federal Government shall include in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment, a detailed statement by the responsible official on the environmental impact of the proposed action [and] any adverse environmental effects which cannot be avoided should the proposal be implemented. (42 USC 4332 § 102(c))

1970 Federal Aid Highway Act- Section 109(h) requires guidelines to assure that possible adverse economic, social, and environmental effects relating to any proposed project on any Federal-aid system have been fully considered in developing such project such as air, noise, water pollution, man-made and natural resources, aesthetic values, community cohesion and the availability of public facilities and services, adverse employment effects, and tax and property value losses, injurious displacement of people, businesses and farms; and disruption of desirable community and regional growth.

1966- National Historic Preservation Act (as amended) defines adverse effects to include cumulative effects, and those that are reasonably foreseeable in Section 800.5(a)(1).

1966- Transportation Act (as amended) with regards to Section 4(f) concerning parks, the Transportation Act describes indirect impacts as “constructive use and proximity impacts”

1973 Endangered Species Act – Cumulative effects are defined in the ESA as “those 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” Indirect effects are defined as “those effects that are caused by or will result from the proposed action and are later in time, but are still reasonably certain to occur”.

1977- Clean Water Act (as amended) The following sections refer to indirect and/or cumulative impacts; §401 Water Quality Standards, §402 NPDES, §303(d) (requires a list of impaired waters and development of TMDL), and §404(b)(1) dredge and fill.

1978- CEQ Regulations. The meaning of NEPA sections 101 and 102 was clarified when the (CEQ) issued its NEPA regulation in 1978, as part of its mission to provide assistance to federal agencies on implementing NEPA. In the terminology section of the regulation, the CEQ provides definitions of “effects.” Specifically, effects are defined as having two components: direct and indirect.

Direct effects “. . . are caused by the action and occur at the same time and place.”

Indirect effects “. . . are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable” (40 CFR 1508.8).

The CEQ regulation adds that 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.”

CEQ differentiates direct and indirect effects from the term “*cumulative impact*,” which “. . . is 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. . . .”

1986- CEQ Amended Regulations. This amendment directs agencies regarding what to do in situations where there is incomplete or unavailable information. It directs agencies to be clear in stating the information is lacking. If the information is essential to a reasoned choice among alternatives, and is not too costly to obtain, then it must be included. If information cannot be obtained, the agency is no longer required to do a “worst case scenario” analysis. Instead the agency is to evaluate the impacts based on “theoretical approaches or research methods generally accepted in the scientific community”. *40 CFR 1502.22*

1991- Intermodal Surface Transportation Efficiency Act (ISTEA) posed a major change to transportation planning and policy, as the first Federal legislation on

transportation in the post-Interstate Highway System era. It presented an overall intermodal approach to highway and transit funding with collaborative planning requirements, giving significant additional powers to metropolitan planning organizations. Signed into law on December 18, 1991, it expired in 1997 and was followed by TEA-21 and then SAFETEA-LU.

1993- Statewide Planning/ Metropolitan Planning Regulations implementing sections of ISTEA

Issued by FHWA and FTA, the ISTEA planning regulation recognizes the linkage between transportation and an area's development. It considers these linkages and other social, economic, energy, and environmental effects of transportation decisions to be integral parts of the transportation planning process. Also requires coordination with environmental, resource, and permitting agencies when transportation plans and programs are developed.

1994- Executive Order 12898 on Environmental Justice specifically addresses cumulative impacts as they relate to human health.

1997- CEQ Handbook – Considering Cumulative Effects

The CEQ Handbook *Considering Cumulative Effects under the National Environmental Policy Act* is an important resource (not formal guidance) for understanding the complex issue of cumulative effects. The handbook outlines general principles, presents useful steps, and provides information on methods of cumulative effects analysis in the preparation of both EAs and EIS.

1998- NCHRP Report 403. In response to the need for guidance on indirect effects, the NCHRP initiated Project 25-10 (1), "Guidance for Estimating the Indirect Effects of Proposed Transportation Projects." Report 403 is a manual that presents an eight-step framework for estimating indirect effects and was developed with the objective of developing an analysis framework, guidelines, and supporting methods to identify, understand, describe, and evaluate indirect effects of transportation projects.

2002- NCHRP Report 466 was prepared under Project 25-10 (2), and was designed as an update and companion to Report 403 and as a learning tool for practitioners. Both manuals were organized around an eight-step framework for estimating indirect effects that was presented in NCHRP Report 403 and is widely used in many state guidance and policy documents.

2003 FHWA Interim Guidance: Indirect and Cumulative Impacts in NEPA This "Questions and Answers" section of the *Environmental Guidebook* addresses indirect and cumulative impact considerations in the context of the NEPA process. The topics covered include the definitions of and differences between direct, secondary, indirect, and cumulative impacts; what to do when data needed for determining "reasonably foreseeable" actions are unavailable; FHWA's specific policy and requirements regarding indirect and cumulative impact analysis in the NEPA process; and specific strategies for addressing indirect and cumulative impacts as well as requirements for discussing mitigation. These questions and answers also cover legal topics, such as FHWA's legal



authority to mitigate environmental impacts identified in the NEPA process, and include a short review of the case law that addresses the definition of “reasonably foreseeable” actions.

2005- CEQ Guidance on the Consideration of Past Actions in Cumulative Effects Analysis. This memo issued by CEQ provides guidance on the extent to which agencies are required to analyze the environmental effects of past actions with regards to cumulative impacts under NEPA. The guidance addresses the issue of how much information is necessary to conduct an adequate cumulative effects analysis, particularly what level of detail is necessary with regards to individual past actions,. The Guidance suggests that “agencies should be guided in their cumulative effects analysis by the scoping process” and that agency information should be functional by “reducing the accumulation of extraneous background data”. The Guidance goes on to state that “the extent and form of the information needed to analyze appropriately the cumulative effects of a proposed action and alternatives under NEPA varies widely and must be determined by the federal agency proposing the action on a case-by-case basis”. It is stated that “the agency must determine what information regarding past actions is useful and relevant to the required analysis of cumulative effects” however the CEQ regulations “do not require agencies to catalogue or exhaustively list and analyze all individual past actions.” The Guidance suggests programmatic evaluations where practical as well as the use of Environmental Management Systems (EMS) to provide a framework for cumulative effects analysis.

2005- EO 13274 ICI Work Group Draft Baseline Report This report presents “baseline” information developed for the Indirect and Cumulative Impacts Work Group. The purpose of the baseline assessment is to describe existing legal requirements, practices, and challenges being faced in regard to indirect and cumulative impacts; describe opportunities to improve the analysis of indirect and cumulative impacts and interagency agreement on these issues; and to develop recommendations for consideration by the Interagency Task Force that was established under Executive Order 13274. This document is designed both for the Task Force and for practitioners in transportation and resource agencies to provide a common understanding of requirements, resources and mechanisms currently available to improve the analysis, documentation; and mitigation (avoidance, minimization and compensation) of indirect and cumulative impacts.

2006- SAFETEA-LU Environmental Review Process: Final Guidance (Section 6002). FHWA and FTA issued joint guidance on the environmental review process required by Section 6002 of SAFETEA-LU 23 USC 139 (2005). “Section 6002 of SAFETEA-LU describes the roles of the project sponsor and the lead, participating, and cooperating agencies; sets new requirements for coordinating and scheduling agency reviews; broadens the authority for States to use Federal funds to ensure timely environmental reviews; and specifies a process for resolving interagency disagreements”. Specific to indirect effects and cumulative impacts is the scoping process at 40 CFR 1501.7 which describes the method for soliciting public and agency input during scoping with regards to appropriate methodologies to use for evaluation of issues where the



methodology is very open. One such issue is the methodology for indirect effects and cumulative impacts analysis. Section 6002 allows for agencies and the public to participate and make suggestions to the development of methodologies to analyze indirect effects and cumulative impacts. It is up to individual states to gather public and agency input during scoping by way of public meetings and comment periods. Section 6002 requires that the lead agencies communicate decisions made regarding methodologies to participating agencies and also allows methodologies to be defined incrementally. Section 139 of Section 6002(a) also shortened the statute of limitations on judicial review of agency decisions on transportation projects from 6 years to 180 days, as long as notice of the final agency action is published in the Federal Register.

2006- Indirect and Cumulative Impacts Analysis NCHRP 25-25 (11). This study is a review and synthesis of the requirements for indirect and cumulative impacts analysis and mitigation under major environmental laws and regulations. The study recommends a collaborative process, where all agencies should agree on a shared vision, which consists of the following elements: clarity of process expectations; understanding of statutory and regulatory tensions; defined outcomes; and commitment to participation in the process. A transparent and well-documented case-by-case analysis is encouraged for adequate indirect and cumulative impacts analysis with an emphasis on interagency coordination.

2007- Statewide Transportation Planning; Metropolitan Transportation Planning: Final Rule. This Final Rule replaces the 2005 Interim Guidance for Implementing Key SAFETEA-LU Provisions on Planning, Environment, and Air Quality for Joint FHWA/FTA Authorities which includes guidance on implementing Section 6001 of SAFETEA-LU; environmental considerations in planning. The 2007 Final Rule specifically mentions that the information from the transportation planning process can be useful in describing a baseline for the NEPA analysis of indirect and cumulative impacts and provides a list of four criteria for the use of such information in the analysis.

IV. Individual State Guidelines/Guidance

A. Wisconsin Department of Transportation

<http://www.dot.wisconsin.gov/localgov/land/effects.htm>

The Wisconsin Department of Transportation Bureau of Equity and Environmental Services is working to develop, revise and implement department policies for the indirect and cumulative impacts of transportation projects. In support of this effort, WisDOT hosted a peer exchange in August 2005 to share experiences and best practices with five other state DOTs and representatives from FHWA. The result is a detailed report that highlights the best practices that came out of the peer exchange discussions and provides an instructional summary of key terms as presented by FHWA in an effort to outline goals and next steps for addressing indirect and cumulative impacts in Wisconsin.

In November 2007, Wisconsin DOT developed two separate guidance documents; for conducting indirect effects analysis and guidance for conducting cumulative analysis.



Based on NCHRP's Report 466, the guidance is intended primarily for practitioners in the development of analyses for indirect and cumulative effects of WisDOT's proposed transportation projects. Both guidance documents are very informative, up-to-date, provide good examples and give helpful resources for follow-up. These documents are easily and conveniently located on WisDOT's website under "programs for local government".

WisDOT's indirect effects guidance suggests two types of indirect effects that must be examined: "1) Project encroachment effects and 2) Project influenced effects. *Project encroachment* effects occur when a project action could potentially change the natural, cultural, historic or socio-economic conditions at some time in the future. *Project influenced effects* relate to the potential for land use changes to occur as a result of the project action that could reasonably occur some time in the future. These can also be called 'induced growth effects'." The Guidance provides a six step approach in the analysis and review of indirect effects. The document stresses interagency coordination and public participation throughout the scoping process as well as in the analysis phase. Although the type of analysis that will be necessary should be determined on a case-by-case basis, WisDOT suggests a qualitative approach to analyzing indirect effects rather than the use of computerized models. WisDOT also stresses the importance of documenting the consideration of all information used in the process; whether or not it is complete. The Guidance recommends using a "value neutral" approach by being careful not to refer to development that may be an effect of a project as "good" or "bad". This value neutral approach recognizes that individual local governments may differ on their views of development, and some view it as a positive effect.

WisDOT's Guidance for conducting a cumulative effects analysis uses the eleven step framework developed by CEQ. The eleven steps can be divided into three categories: 1) Scoping, 2.) Describing the affected environment and 3.) Determining the environmental consequences. It explains the relationship between conducting a cumulative effects analysis and developing a coordination plan under SAFETEA-LU. WisDOT stresses the importance of consulting with the appropriate agency throughout the process, especially in determining a geographic scope and study area. The Guidance suggests a 20-year time frame for forecasting impacts. Importantly, the Guidance explains that a cumulative effects analysis must be done separately, and not as part of another chapter in the EIS. It stresses the importance of documentation of all data sources and explanation of any assumptions made.

B. North Carolina Department of Transportation

http://www.ncdot.org/doh/preconstruct/pe/ICI_Guidance.html

NCDOT has had guidance in place on indirect and cumulative effects (ICE) since 2001, however, it has continued to update its guidance in recent years. NCDOT's 2001 guidance (also available through FHWA's website) was updated in 2004 to include a pre-screening process which is intended to precede the already established eight step process used in assessing ICEs for transportation projects. The pre-screening process



incorporates guidance already in use from NCDENR's Division of Water Quality (DWQ) on the assessment of indirect and cumulative impacts for the express purpose of dealing with Section 401 Water Quality Certification.

The pre-screening process is intended to take place during systems planning as the project's design concept and scope begin to take shape. The pre-screening describes which types of CE's may require the eight-step ICI assessment and notes that pre-screening is not necessary for EIS-level projects, since it has already been established that the eight-step process will be initiated on all projects classified as Environmental Impact Statements. The eight-step assessment will also likely be needed for urban projects for principal arterial and/or minor arterial system roadways and for rural projects for arterial and/or major collector roadways. The revised guidance describes what these type of projects consist of as well. Certain types of land use changes such as the change in accessibility by lowering the travel time by five minutes or more, thereby increasing the attractiveness of an area; will also warrant the eight-step assessment. Additionally, it is suggested that the eight-step process be initiated for projects located in an area where the population and/or employment of an area is increasing greater than two percent per year; where public water and sewer are available or planned; and if there is weak or no growth management policy for the area. The revised guidance also provides an example of a statement to include in the documentation, should it be found that the eight-step process was not warranted.

Also in 2004, a memorandum was released with the purpose of describing the manner in which the NCDOT/NCDENR Indirect and Cumulative Impact (ICI) Assessment Procedures can incorporate water quality considerations. The goal being that by incorporating such procedures into the ICI assessment guidance, the assessment can provide the basis for addressing cumulative impacts as required by the Department of Environment and Natural Resources, Division of Water Quality to implement Section 401 of the Clean Water Act.

In October 2007, North Carolina DOT took a new look at its treatment of ICE by joining with North Carolina Department of the Environment and Natural Resources (NCDENR) to develop guidance, training and ongoing support for considering changes to land use and the natural and human environment that result from transportation projects. The result was "Indirect and Cumulative Effects; A Primer for Systems Planning" that was developed to assist regional planners in understanding ICE. The primer focuses on the roles and relationships between different levels of government in the planning process and gives ten suggestions for dealing with ICE at the systems-planning level. The Primer is available at this interactive website: <http://iceeffect.pbwiki.com/Guidance+Documents>, where users can receive answers to their posted questions.

C. California Department of Transportation

http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm



Caltrans provided Guidance for Preparers of Cumulative Impact Analysis in January of 2005 which also utilizes the eight-step process for assessing cumulative impacts as related to transportation projects. It provides examples for describing the historical context of the resource, as well as provides a hypothetical example for using the eight step approach. Also available is Guidance for Preparers of Growth-related, Indirect Impact Analysis, updated in May 2006. This guidance deals specifically with surface transportation projects in California that are subject to NEPA and/or the California Environmental Quality Act (CEQA). Specifically, the guidance notes that highway projects built along a new alignment and/or provide new access will typically require a growth-related impacts analysis. Six chapters are provided for approaching this analysis including a discussion of the concepts of “reasonably foreseeable” and “causality” as related to assessing growth-related impacts as well as a chapter which provides a screening approach for identifying the need for, and extent of a growth-related impact analysis. This guidance was prepared to address California’s specific challenges and emphasized early communication, coordination, and involvement among federal, state and local agencies to avoid conflict and delay.

In addition to this guidance, three support documents are also provided on Caltrans’ website as “issue papers”. One is a primer for Caltrans planners to use in assuring that their assessments meet both NEPA and CEQA. The primer points out that contrary to NEPA, CEQA uses the terms “effects” and “impacts” interchangeably. An issue paper on Defining Resource Study Areas (RSA) is also provided for planners. This paper suggests planners take advantage of the scoping process to use the expertise of other agencies in helping to identify an appropriate RSA and cautions against using political boundaries for an RSA. An in-depth issue paper on Data Gathering is also available and includes a discussion on ways to identify existing data and steps to take when no data is available. It also includes information about which agencies to contact and the types of data they maintain which is very practical and can be very helpful in assisting planners in their assessments. It includes information on data generation techniques such as interviews and the use of expert panels including Delphi Panels and when such techniques are appropriate. This paper also provides actual examples of questions to ask planning agencies, councils of government, resource specialists and advocacy organizations to aid in collecting data for analysis.

Caltrans website also provides a useful question and answer paper on indirect and cumulative impacts.

D. Oregon Department of Transportation

<http://www.oregon.gov/OPRD/PLANS/docs/>

Oregon DOT offers a Guidebook for Evaluating the Indirect Land Use and Growth Impacts of Highway Improvements that was prepared by Portland State University and published in April 2001. It is geared towards planners and environmental specialists working at ODOT and is located on FHWA’s website. The report provides a framework for evaluating the indirect impacts of highway improvements on land use. The report



refers to the NCHRP Report 403 as “the most comprehensive source on methods” and explains that the methods explained in Report 403 have been adapted to apply to estimating indirect land use for the ODOT report.

The ODOT report provides instruction on choosing a study area and gathering the appropriate policy, land use and facility data in order to conduct an analysis on the indirect effects to land use. It also instructs which other impacts to consider in the analysis. The report provides a helpful table for assessing indirect effects by listing the change variable and its data source, and then providing a range of values and the potential for land use change based on those values on a scale of low to high. The report provides a sample analysis which is presented as a journal showing each step that the analyst would go through in the process, as well as a sample land use report.

E. Florida Department of Transportation

<http://www.oppaga.state.fl.us/reports/pdf/0140rpt.pdf>

Florida DOT’s website makes available, a 2001 policy review paper from the Office of Program Policy Analysis and Government Accountability (OPPAGA, an office of the Florida Legislature). Florida Statutes directed OPPAGA to review the Cumulative Impact Consideration under the Environmental Resource Permitting Program, the results of which were presented in this paper. In deciding whether to issue an Environmental Resource Permit, the Department of Environmental Protection and Florida’s water management districts are required to consider the cumulative impacts of an activity on surface waters and wetlands within a drainage basin. OPPAGA’s review addressed the justification for the cumulative impact consideration; whether a practicable, consistent, and equitable methodology for considering cumulative impacts in environmental permitting could be developed; and whether changes could be made in the current process that would provide greater clarity and certainty in applying the cumulative impact consideration. According to the policy paper “Cumulative impacts are considered unacceptable when the proposed activity, in addition to past, present, and anticipated future impacts of regulated activities, would violate water quality standards or cause significant adverse effects on wetland functions or surface waters in the basin. If a permit reviewer determines that the project will have unacceptable cumulative impacts, they should deny the permit application. Recent legislation clarified the cumulative impact consideration stating that if the applicant proposes mitigation that offsets the adverse effects within the affected drainage basin, then the consideration is met.” (p. ii)

OPPAGA’s review of the policy identified two major weaknesses in assessing and preventing cumulative impacts to surface waters and wetlands and making precise determinations. The first weakness being that there is a lack of scientific data and understanding of cause and effect relationships between development activities and their environmental impacts. OPPAGA notes a lack of historic information on impacts to water resources, inadequate or incomplete permit tracking and compliance databases and lack of regional data which can be applied to an entire drainage basin. The second weakness lies in the fact that wetland mitigation may not address cumulative impacts due



to limitations in assessing and conducting mitigation. OPPAGA concludes that there is a lack of scientific understanding of the synergistic effects of development activities especially with regards to the cumulative effects of multiple projects within the same drainage basin and the effects of mitigating multiple projects within the same drainage basin. There are several limitations in assessing and conducting mitigation projects and current methods, monitoring and reporting do not provide a clear indication of the success or failure of wetland mitigation projects.

The policy review paper concluded with the recommendation that cumulative impacts to surface waters and wetlands be addressed proactively as part of an integrated land use planning approach, using the “best scientific information available to identify areas of highest resource values and develop strategies to protect and restore these areas” in the hopes that once these appropriate land uses are assigned, the need for cumulative impacts consideration would be reduced. Three out of the four state regulatory agencies accepted this recommendation.

In 2007, the Florida Center for Environmental Studies prepared a Methodology for Preparing Cumulative Impact Sections of Project Reviews and Assessments in Miami-Dade, Broward, Palm Beach and Martin Counties, Florida. The primary focus of this project is to provide environmental managers and regulators at The Southeast Florida Coral Reef Initiative Maritime Industry and Coastal Construction Impacts Focus Team, a methodology to address cumulative impacts sections in project reviews and assessments. The recommendations of the paper include: “1) developing a comprehensive resource database to review the cumulative impacts of past, present and foreseeable coastal construction projects; 2) establishing measurable goals, baselines and benchmarks against which to evaluate the individual and cumulative impacts of maritime industry and coastal construction projects, 3) optimizing intergovernmental coordination while considering projects’ cumulative effects; and 4) conducting additional research on theoretical and applied issues before the full potential of cumulative impact assessment can be realized for marine ecosystems”.

F. Maryland State Highway Administration

<http://www.sha.state.md.us/>

Maryland State Highway Administration (SHA) Guidelines for Secondary and Cumulative Effects Analysis (SCEA), was last revised in June 2000. It cautions that the guidelines contain general procedures and that the appropriate level of analysis must be determined on a project-by-project basis and that an analysis must be conducted for each build alternative that is selected. Unlike some states, Maryland SHA requires that a single boundary for analysis be determined, which may include all other overlapping sub-boundaries, using the outermost boundaries to establish the overall SCEA boundary. This study area may include the areas affected by traffic, census tracts, county planning areas, sewer and water service and others. For the establishment of time frames, the guidelines recommend using historic events that would have had a major affect on population growth, land use and resources.

Maryland's SCEA does not involve predictive modeling or other predictive tools to fill in data gaps, instead it requires quantitative analysis only where information is readily available. The guidelines also note that the availability of the data (or lack thereof) may require the study area boundaries to be revised. The guidelines describe specific steps for analysis including that of resource and land use mapping for past, present and future land use. Analysis methodologies for planning studies described in the guidelines include trends analysis, overlays, matrices and interviews. The guidelines also break down the SCEA write-up itself into five categories including; scoping, analysis, conclusions, mitigation and appendices.

G. Washington State Department of Transportation

<http://www.wsdot.wa.gov/Environment/Compliance/ComplianceGuidance.htm>

In February 2008, Washington State DOT (WSDOT), FHWA and the EPA Region 10 jointly developed Guidance on Preparing Cumulative Impact Analyses. The guidance is intended to be focused at project level work, when FHWA is the lead agency, and is based on recent cumulative effects guidance from Texas DOT and California DOT. It also uses the eight step process for identifying and assessing cumulative impacts. Using examples and narratives throughout the text, the guidance is very user-friendly. It also provides the reader with a background section which includes definitions of common terms used in cumulative impact analyses and a brief discussion on case law. This background section also explains the differences between WSDOT's guidance and CEQ's guidance for cumulative impacts analysis. Although the steps are similar, they are presented in a different order than those of CEQ's guidance.

The jointly developed cumulative impacts guidance includes a brief discussion of indirect effects in the context of induced growth. For more information, the guidance directs the reader to Chapter 412 of the WSDOT Environmental Procedures Manual. The manual which was last updated September 2007 provides links to other resources for guidance on indirect and cumulative effects analysis.

V. History of IE & CI in the Courts: Precedent Setting Cases

As NEPA does not provide for an independent cause of action, Federal agencies are subject to the Administrative Procedure Act (APA) when their actions are challenged in court. Under the APA, the action of agencies must be final (ripe) before a decision can be challenged in a court. A final agency action is the issuance of a Record of Decision (ROD) on an EIS or Finding of No Significant Impact (FONSI) on an Environmental Assessment (EA).

Most NEPA challenges are brought under Section 102 of the Act, which concerns procedure rather than substance. Procedural challenges are afforded a broad standard of review under the APA known as the arbitrary and capricious standard of review. Under this standard, the agency's final action (ROD/FONSI) will be set aside if the plaintiff can



prove that the agency acted in a way that was “arbitrary, capricious, an abuse of discretion or otherwise not in accordance with the law” 5 U.S.C. §706(2)(A) by issuing the ROD or FONSI.

Substantive challenges under NEPA call into question the adequacy of an EIS under Section 101 and are afforded a much narrower standard of review than procedural challenges. Circuit Courts of Appeals commonly employ the “reasonableness” test to determine the adequacy of the discussion of environmental consequences in a substantive challenge, which consists of ensuring that the agency takes a “hard look” at the consequences of the proposed project.

This standard for judicial review under NEPA comes from the decision in *Calvert Cliffs’ Coordinating Committee v. Atomic Energy Commission* 449 F.2d 1109 (1971) where the Court explained that based on the language used in NEPA, the intent of Congress was to give more flexibility to an agency’s discretion when it comes to substantive aspects of NEPA under Section 101. However, the Court felt that Congress was more specific with procedural requirements under Section 102 since they were to be followed “to the fullest extent possible”. Therefore, the Courts will generally get more involved in procedural challenges than substantive challenges.

The following cases are examples of precedent-setting cases involving the analysis of indirect effects and cumulative impacts. These cases set the foundation for the way courts look at NEPA challenging regarding IE & CI, and are still cited today in the most recent cases. They are not intended to be a comprehensive review of all cases that have involved indirect effects or cumulative impacts.

1975- *City of Davis v. Coleman*, 521 F.2d 661 This case involved a proposal to build an interstate highway interchange to stimulate and service future development in a rural area. Neither an environmental assessment nor an EIS was prepared. Instead, a three-page “Negative Declaration of Environmental Impact” was issued. This declaration neither identified nor discussed the commercial and industrial development that would likely spring up around the interchange, located in a “sparsely populated agricultural area,” instead assessing only the direct impacts related to the construction of the interchange. The court held that the failure to identify and analyze the project’s indirect effects violated NEPA, and noted the significance of the growth-inducing effects of the proposed development, which were essential to the project objectives. Although uncertain, these effects were reasonably foreseeable, and indeed probable. Not being able to predict the exact type of development that would occur could not be used as an excuse for failing to prepare an EIS evaluating the indirect effects of the project. Reasonable forecasting of project-induced development must be conducted in an EIS.

1976- *Kleppe v. Sierra Club* is one of the earliest, continually referenced cases that deals with the extent to which [indirect and cumulative] impacts must be analyzed. The Supreme Court determined that it was not necessary for the Department of Interior to complete a comprehensive environmental impact statement, considering *all* of the possible impacts that might result from the result of one mining project in the region

(*emphasis added*) [*id* at 413-415]. This case established that there are limits to what can be expected on an agency when considering the impacts of a major federal action under NEPA. However, although agencies are not required to consider *all* of the impacts, they are required to consider the ones that are reasonably foreseeable and the Courts expected an adequate discussion of these impacts as seen in later cases.

1980- *Coalition for Canyon Preservation v. Bowers*, 632 F.2d 774. This case involved a proposal to widen a 10.8-mi section of a narrow, two-lane federal highway that connected four small, rural towns in northern Montana and served as the primary access road into Glacier National Park. The widening would create an 88-ft-wide, four-lane highway, including 10-ft parking lanes with new curbing and other improvements in the sections passing through the towns, resulting in the relocation of several businesses. The EIS admitted that the wider four-lane highway could result in project-induced development, but did not assess the indirect impacts of such growth. The court held that the EIS's failure to assess this foreseeable development violated NEPA, as it did not analyze secondary effects.

1985- In *Sierra Club v Marsh*, the Court set forth a three-part test, using the 1978 CEQ regulations as a guide, to determine if a particular set of impacts is definite enough to take into account, or too speculative to warrant consideration:

1. With what confidence can one say that the impacts are likely to occur?
2. Can one describe them now with sufficient specificity to make their consideration useful?
3. If the decision maker does not take them into account now, will the decision maker be able to take account of them before the agency is so firmly committed to the project that further environmental knowledge, as a practical matter, will prove irrelevant to the government's decision?

Sierra Club v. Marsh involved the Court's review of an EA that was prepared for a proposal to build a port and causeway on rural Sears Island in Maine. It was inevitable that development would occur as a result of the construction on the island, as the Court concluded after a review of the administrative record which included a municipal response plan and another EA that projected further industrial development after construction of the cargo port. The Court further assessed whether there was sufficient information available at the time to make their consideration useful. It was concluded that a marketing study in addition to the municipal response plan provided enough information to be included in an EIS, satisfying the specificity question. Third, once the causeway and port were built, the pressure to develop the rest of the island could prove irresistible. Therefore, delaying the preparation of an EIS until a later time would result in environmental knowledge that would not offer the decision maker a meaningful choice about whether to proceed. This satisfied the third part of the test. As a result, the Maine DOT was required to prepare an EIS.

1989-*Robertson v. Methow Valley Citizens Council* 490 U.S. 332 involved the Forest Service's issuance of a special use permit for the construction and operation of a ski area

on federal lands. The issuance of this permit is a major federal action subject to NEPA and therefore resulted in the preparation of an EIS by the Forest Service. Subsequent Court of Appeals decisions stated that the Forest Service did not include an adequate mitigation plan in the EIS, and that they failed to do a “worst case analysis” in the absence of complete information. The Supreme Court however, reversed and remanded the lower Courts judgment explaining that under the 1986 CEQ Amended Regulations, a worst case scenario is no longer required to be prepared when information is lacking. What is required is an acknowledgement of the missing information, and for the agency to “prepare a summary of existing relevant and credible scientific evidence and an evaluation of adverse impacts based on generally accepted scientific approaches or research methods” [354-356]. Additionally, the Supreme Court stressed that although mitigation must be sufficiently discussed in order to allow for a fair evaluation of environmental consequences, a complete mitigation plan is not required.

1992- *Sierra Club v. Marsh (Sierra Club IV)* involved a challenge to the adequacy of the indirect effects evaluation in the EIS prepared for the development on Sears Island. The EIS in this matter restricted its indirect effects analysis to four light-dry industries. Plaintiffs complained that the evaluation was inadequate because it did not evaluate heavy industries. Heavy industries would involve upgrades to water and sewer on the island that were previously determined not to be feasible and were therefore left out of the evaluation. Although the Sierra Club challenged this decision by the agency, the Court held that “the likelihood of these industries developing on Sears Island is too speculative to be reasonably foreseeable” [*id at 778*]. The Court upheld the EIS as a reasoned decision based on the agencies’ evaluation.

1997- The Court was a little more specific about what it would like to see in an indirect and cumulative impacts analysis in *City of Carmel-by-the-Sea v. USDOT*, explaining that the federal and state highway department and officials failed to adequately explore the indirect and cumulative impacts of a proposed highway project in California. The Court noted generalities in describing past projects resulting in insufficient review of their cumulative impacts and a lack of discussion of the impacts that would result from several other future proposed projects as well as the project at issue. [*id at 1160*] Specifically, noting “threats” resulting from other “development pressures” was not a sufficient analysis in this Court’s opinion.

1998- One year later in *Cuddy Mountain v U.S. Forest Service*, the Forest Service prepared an EIS for the Grade/Dukes timber sale on the Payette National Forest in Idaho. The Court ruled that the cumulative impacts analysis was inadequate because it failed to properly take into account other proposed timber sales in the vicinity of the project.

To “consider” cumulative effects, some quantified or detailed information is required. Without such information, neither the courts nor the public, in reviewing the Forest Service’s decisions, can be assured that the Forest Service provided the hard look that it is required to provide...General statements about “possible” effects and “some risk” do not constitute a “hard look” absent a justification regarding why more definitive information could not be provided. [1379]

Specifically, the Forest Service failed to describe the effects that the other timber sales would have on the area, which in turn did not allow for a comparison of those effects of the Grade/Dukes timber sale, thereby making it impossible to really determine the cumulative effect of the proposed sale. The Forest Service did not discuss the impacts on old growth and pileated woodpecker that would occur as a result of the other timber sales, and they did not provide a reason for not doing so. As a result, future logging in the area was enjoined until the Forest Service's analyses complied with NEPA.

2007- Most recently, a very important decision was made by the Ninth Circuit Court of Appeals, which is likely to affect the way cumulative impacts are analyzed when it comes to emissions. In *Center for Biological Diversity v. National Highway Traffic Safety Administration* 508 F.3d 508 (2007), four environmental groups, 11 states, the District of Columbia and the City of New York challenged a rulemaking by National Highway Traffic Safety Administration (NHTSA) setting new corporate average fuel economy (CAFE) standards for light trucks (model years 2008-2011), based on violations of the Energy Policy and Conservation Act of 1975 (EPCA) and NEPA. Plaintiffs were successful on both the EPCA and NEPA challenges, the new CAFE standards were remanded to NHTSA to be revised in accordance with EPCA, and the agency was required to prepare a full EIS (NHTSA had prepared an EA and FONSI).

The NEPA issues in the case involved the adequacy of the cumulative impact analysis in the EA, the range of alternatives considered in the EA, and the decision not to prepare an environmental impact statement. A summary of the cumulative impact analysis issue is provided below.

Cumulative impacts of greenhouse gas emissions on climate change and the environment

- NHTSA's EA identified the amount of CO₂ that would be emitted by the trucks regulated by the rule. The court found this to be an inadequate cumulative impacts analysis because the EA did not evaluate the "incremental impact" that these emissions will have on climate change or on the environment in light of other past, present and reasonably foreseeable actions. The court emphasized that the cumulative impact analysis must describe actual environmental effects—not just the change in emissions. The court cited a U.S. Forest Service NEPA case to support this point (calculation of the numbers of acres harvested in a cumulative impact analysis is not sufficient description of the actual environmental effects of logging those acres).
- "The fact that climate change is largely a global phenomenon that includes actions that are outside of the agency's control does not release the agency from the duty of assessing the effects of its actions on global warming within the context of other actions that also affect global warming." The court also cites the NEPA CEQ regulations definition of cumulative impacts—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.

- Greenhouse gas emissions from any one action might have an individually minor impact on the environment, but over time may be “collectivity significant actions taking place over a period of time”.

VI. Reviews of Recent Projects Where the Adequacy of the Indirect Effects and/or Cumulative Impacts Assessment Assessments Were Challenged in Court

*“The process prescribed by the statute does not seek the ideal; it demands the adequate”
-Judge Jenkins in Jones v. Peters (on NEPA)*

The following cases are examples of recent challenges to transportation projects with regards to the analysis of indirect effects and cumulative impacts.

A. I-11400, Utah

1. Summary

Davis v. Slater 148 F. Supp. 2d 1195 (2001). Plaintiffs in this case sought a preliminary injunction in the construction of a highway project in Salt Lake County, Utah. The twenty-six million dollar project involved several components including a new freeway interchange, a new bridge and highway through the Jordan River Parkway and over the Jordan River, as well as other road and highway improvements. FHWA was the lead agency in approving the project, as approximately three million dollars in federal funding was allocated for the project. FHWA published an EA/4(f) document and issued a FONSI on October 13, 2000.

Plaintiffs alleged that FHWA failed to comply with both NEPA and the Department of Transportation Act. Plaintiff’s claimed that the EA/4(f) was inadequate and that the project merited a full EIS. The Court was to decide whether FHWA acted arbitrarily and capriciously in their decision to issue a FONSI. Plaintiffs challenged the agencies Purpose and Need, as well as their analysis of the alternatives, their analysis of impacts including impacts to water quality, farmlands, noise, and historic resources. Plaintiffs also accused the FHWA of segmentation. The court disagreed with Plaintiff’s argument on all of these issues finding FHWA’s analyses to be adequate, and no evidence of segmentation.

Additionally, Plaintiffs challenged the fact that FHWA took the issue of mitigation into consideration when considering the impacts from the proposed project. The Court cited *Robertson v. Methow* on this issue, explaining that “all that is required in an environmental document is that ‘mitigation be discussed in sufficient detail to ensure that environmental consequences have been fairly evaluated’”. [1214] The Court decided that FHWA’s inclusion of mitigation measures in the impacts analysis was appropriate because the amount and type of mitigation available can be a factor in determining the significance of the impact. The Court relied heavily on the decision in *Methow* on this issue and decided that “all that is required for an environmental document to be sufficient is that such measures are discussed in sufficient detail.” [1214]

One of the impacts that the Plaintiffs alleged FHWA did not consider fully was the impact of induced growth. The EA/4(f) statement concluded that the project would not induce growth in the area because even absent the project “development in the area has already been intense and rapid...and that current zoning practices in the areas suggest the same conclusion”. [1216] The court decided that FHWA took the requisite “hard look” at this impact and that its analysis satisfied NEPA.

In the end, the Court denied the Plaintiff’s motion for a preliminary injunction because they were unable to demonstrate a substantial likelihood of success on the merits.

Davis v. Mineta 302 F.3d 1104 (2002) Plaintiffs appealed the District Court of Utah’s decision a year later and the Tenth Circuit Court of Appeals had a different opinion regarding the adequacy of the methodology and conclusions in the EA/4(f) document.

The Court of Appeals found that the EA contained an inadequate discussion of alternatives and an inadequate discussion of impacts including induced growth. The Court explained “a conclusory statement that growth will increase with or without the project, or that development is inevitable, is insufficient; the agency must provide an adequate discussion of growth-inducing impacts.” [1122] The Court pointed out that the EA/4(f) itself acknowledges that “the rate of development on lands east of the Jordan River may increase as a result of the project”. The Court also referred to a comment letter from the EPA stating that increased growth would result from the project and that the EPA disagreed with the FONSI because all impacts have not been fully identified and assessed. The EA/4(f) contained a graphic analysis of socioeconomic growth in the area from 1970 and extrapolated through 2020, and showed that continued growth was anticipated. However the Court explained that the graph “contains no discussion or comparison of the local effects in the areas directly impacted by this project of induced growth caused by the extension of I-11400 South as compared to a no-build alternative or the use of other alternatives.” [1123] The Court of Appeals found that FHWA’s refusal to study induced growth was arbitrary and capricious.

The Court briefly addressed the issue of cumulative impacts in this case, and concluded that the EA did not provide an adequate discussion of the cumulative impacts of the proposed project on the human environment. The Court noted impacts that would occur as a result of the project such as the bisection of two parks, affects to historic structures,

and impacts related to noise and traffic. The Court concluded that the project would have significant cumulative environmental impacts and that FHWA's conclusion to issue a FONSI was an error in judgment.

On June 20, 2002 the Court of Appeals reversed the order of the District Court who denied the preliminary injunction and remanded the case for entry of a preliminary injunction barring further road construction pending resolution of the case on the merits. Immediately prior to the Court of Appeals ruling on this same day, FHWA withdrew its FONSI based upon input from UDOT concerning its intended changes to the proposed 11400 South Project. In light of the withdrawal of the FONSI, after remand the *Davis* case was dismissed as moot.

FHWA issued a FEIS and Section 4(f) analysis three years later on June 3, 2005 and issued its ROD on September 13, 2005. Two years later in *Jones v. Peters* 2007 U.S. Dist. Lexis 70332, this FEIS was challenged using many of the same arguments as previously presented in *Davis v. Slater* in 2001. The challenge of the 11400 South FEIS was combined with the challenge of an EA for a nearby project 10400 South, but 10400 South is not discussed in this analysis. Regarding 11400 South, Plaintiffs requested declaratory and injunctive relief requiring the agencies to prepare and issue an EIS comprehensive of all transportation projects planned for the southwest quadrant of the Salt Lake Valley.

In *Jones v. Peters*, the indirect and cumulative impacts analysis was once again at issue, with the addition of the complaint that the FEIS did not adequately analyze the cumulative impact of the 11400 South project taken together with other transportation projects in the area "other than to say that they may have some effect". In addition to Plaintiffs assertion that the FEIS overlooked cumulative impacts on pedestrians, equestrians, bicyclists, farmlands, residential and commercial relocations, economic and social conditions, Plaintiffs also submit that all of the proposed transportation projects in the southwest portion of the Salt Lake Valley should have been studied and evaluated in a comprehensive regional environmental impact statement. The agencies attempted to validate their analysis by explaining that the summary presented in the FEIS was the result of an interdisciplinary workshop on cumulative impacts of the 11400 South project, the resulting report of which was included in the Administrative Record.

The District Court in *Jones v. Peters* decided that a regional EIS prepared for all transportation projects was not required. The Court explained that "the fact that projects originate in a regional transportation plan addressing regional transportation needs does not *require* that their environmental impacts be evaluated in a single EIS." [86] Nevertheless, effects of the other regional projects were taken into consideration in the traffic modeling in the FEIS and the Court found this to be adequate for purposes of analysis. In the words of the District Court "the process did not attain the ideal, but it did achieve the adequate" [*id* at 88] and it was decided that FHWA's determinations were neither arbitrary nor capricious nor an abuse of discretion or not in accordance with the law. The Plaintiff's request for declaratory and injunctive relief was denied.

2. Lessons Learned from the 3 Cases Regarding Utah I-11400

The first case regarding I-11400 shows that as decided in *Robertson v. Methow*, it is appropriate to include a discussion of mitigation measures in the analysis of indirect effects and cumulative impacts. The courts feel that the type of mitigation available is one of the issues to consider in evaluating the severity of the indirect and cumulative impacts of a proposed project. When Courts follow the decision in *Methow*, they tend to find that as long as mitigation is sufficiently discussed, a challenge regarding the adequacy of the indirect effects and cumulative impacts analysis on the basis of mitigation will not hold up in court. A “worst-case” analysis nor a complete mitigation plan is required for purposes of IE & CI analysis.

The second case involving I-11400 points out the fact that the conclusion that growth will not be induced by the proposed project, will not hold if the environmental document itself contradicts this finding. In either case, a discussion within the analysis is required on this issue, and not just a conclusory statement that growth will or will not occur.

In the third case, the Court explained that although separate projects may originate in a regional transportation plan, this does not require that their impacts be evaluated in a single EIS and it was adequate to take their effects into consideration in the subject FEIS.

B. I-93 Improvement Project (Salem to Manchester), New Hampshire

1. Summary

A Final EIS was issued in April 28, 2004 by FHWA and NHDOT proposing the widening of a 20-mile segment of I-93 from the Massachusetts state line to Manchester, New Hampshire. A ROD was issued on June 28, 2005 approving the Four Lane Alternative. Conservation Law Foundation (CLF) challenged the issuance of this ROD in 2007 in *CLF v. FHWA 2007 DNH 106*.

Conservation Law Foundation’s (Plaintiff’s) indirect and cumulative impacts argument stems from the use of outdated population growth forecasts from the Office of Energy and Planning (OEP) presented to the Delphi Panel that was assembled for purposes of identifying the induced growth effects that the project would have on the area. The original OEP forecast given to the Panel was based on 1990 Census and the Delphi Panel used this forecast to develop a baseline population growth forecast which was used in the FEIS. However, the Panel was later given an updated OEP forecast, which was approximately ten percent higher than the original, which was also used by the Panel to develop a revised baseline population growth forecast. However, the original forecast prepared was the only one presented in the FEIS. The Defendants failed to justify the reasoning for not including the second, revised baseline forecast in the FEIS and the Court decided that this decision was in error.

Although the Delphi Panel’s forecast was used in predicting the indirect effects of induced growth, water quality and wildlife resulting from the proposed project in the area

and these results were presented in the FEIS, the results of the forecast's applications to traffic projections and effects on air quality, was not presented in the FEIS and this decision was also challenged by CLF. Defendants claimed that the Delphi Panel's induced population growth forecast is too speculative to be used in traffic projections. Several reasons were cited by the Defendants including concern over the validity and subjectivity of the Delphi process and the difficulty in assessing the interactions among the relevant variables in the quantification of induced population growth. The Defendants also claimed that the OEP forecast was prepared with knowledge of the proposed project. The Court responded to these reasons by pointing out that "forecasts are always marked by a degree of uncertainty, yet NEPA often requires agencies to forecast uncertain events...an agency may not treat a foreseeable effect as nonexistent simply because the magnitude of the effect is difficult to quantify." [76] The Court explained that the Defendants had used the Delphi Panel for forecasting induced growth, but did not explain why induced growth was not included as a factor in the traffic projections. The Court offered that "Defendants should have performed the TSA, disclosed its results in the FEIS, and explained why the analysis did not affect their decision to proceed with the Four Lane Alternative. Their failure to do so was error." [77]

Finally, Defendants argued that the forecast was not included in the FEIS because the additional traffic predicted by the Traffic Sensitivity Analysis (TSA) was not significant. The Court disagreed with this reasoning, stating that "reliable information produced by the agency's own experts that casts doubt on the agency's statements concerning a selected alternative's effectiveness is not insignificant." [79] The Court explained that the additional traffic projected by the TSA is significant in that it will have indirect effects on secondary road traffic and air quality and that the "unexcused failure to disclose these effects in the FEIS was arbitrary and capricious". [82]

The result of the *CLF v. FHWA* case was that FHWA and NHDOT are required to prepare a Supplemental EIS (SEIS), and to include in it a consideration of how the Delphi Panel's population forecasts of induced population growth will impact the effectiveness of the Four Lane Alternative as a traffic congestion reduction measure. The SEIS must also address how the indirect effects of induced population growth will impact air quality and traffic on secondary roads. By reviewing the Administrative Record, the Court found the analysis of indirect effects on land use, water quality, and wildlife issues to be reasonably thorough.

2. Lessons Learned from the I-93 Improvement Project Case

After putting together a Delphi Panel, and having it produce two separate forecasts, the agency decided only to use the data from the most recent forecasts for some aspects of the indirect effects analysis and not for others. Agencies may not hand select which information to include in the EIS and which information to leave out, even if they feel it is speculative. What the courts want to see is the data included, along with a discussion as to how it was applied to the agency's decision. Time and time again the courts have

stressed that actions must be accounted for even if the conclusion of the study does not support the preferred alternative, it must still be disclosed.

C. Winston-Salem Northern Beltway (Western Section) North Carolina

1. Summary

On March 29, 1996, NCDOT published the FEIS for the Western Section of the Winston-Salem Northern Beltway and the ROD was issued by FHWA on May 7, 1996. The day after the issuance of the ROD, FHWA announced that the Transportation Improvement Plan (TIP) for the Winston-Salem metropolitan area was no longer in conformance with the requirements of the Clean Air Act. Since the ROD had already been issued for the Western Section the day before, the project was still eligible for federal funding and would not be affected by the non-conformity announcement. Prompted by the lawsuit initiated against FHWA and NCDOT and the non-conformity announcement, FHWA effectively withdrew the previously issued ROD, which reopened the NEPA process. Because of this decision, the pending lawsuit became moot and the Court entered an order of dismissal on June 29, 1999. In June 2001, North Carolina Alliance for Transportation Reform, Inc and Friends of Forsyth County filed a motion for the award of attorney's fees and expenses.

Although the case brought by the Alliance challenging FHWA's decision to issue a ROD for the Western Section of the Winston-Salem Northern Beltway did not proceed, the Court analyzed the contents in the 1996 FEIS in *North Carolina Alliance for Transportation Reform v. Slater* 151 F. Supp. 2d 661 (2001) for purposes of deciding whether the Plaintiffs were entitled to fees and expenses. In order for the Plaintiffs to be entitled to fees and expenses under the Equal Access to Justice Act at 28 U.S.C. §2412(d)(1)(A), the Court must find that the position taken by the Defendants was not "substantially justified". The Plaintiffs argued that FHWA was not substantially justified in the production and approval of an inadequate FEIS for the Western Section, which required the Court to examine whether the FEIS complies with NEPA. Plaintiffs made several claims of inadequacy throughout the FEIS, including the indirect effects and cumulative impacts analyses.

The Plaintiffs claim, among other things, that the analysis of indirect effects in the FEIS was inadequate. Plaintiffs referred to a comment made by the Fish and Wildlife Service after their review of the DEIS, which stated that the DEIS failed to address "impacts expected due to other construction and development within the project area likely to result from the new highway". Fish and Wildlife suggested that the DEIS "be revised to fully assess both the direct and indirect effects on resident and migratory wildlife resulting from habitat loss and alteration associated with each alternative". However, the analysis was not revised as suggested in the FEIS and Plaintiffs argued that "the FEIS should have more fully analyzed the growth-inducing effects these interchanges would have because 'a large interchange on a major interstate highway in an agricultural area where no connecting road currently exists will have a substantial impact on a number of environmental factors'". [696] The Court compared this argument to that in *City of*

Davis v. Coleman in that western Forsyth County has significant growth potential and although “demographic trends indicate that the area affected by the Western Section is growing faster than other parts of Forsyth County...this does not necessarily mean that the proposed project would have no effect on the amount or pace of development”[696]. The Court pointed to a contradiction on page 4-22 of the FEIS where in the discussion on the economic impact of the project it is acknowledged that the proposed Northern Beltway “would potentially serve as a catalyst for regional economic development”. The Court felt that this underscored the need for a complete analysis and subsequently found that FHWA neglected their statutory duty under NEPA.

Plaintiffs also claimed that the cumulative impacts analysis was inadequate, and that a lack of information is not acknowledged in the FEIS. Defendants argued that infrastructure improvements and land use decisions of local government would cause indirect impacts associated with development, even without the proposed project. The Court pointed out that although the FEIS contained a list of reasonably foreseeable major transportation projects in the county, there was no consideration of the probable impacts of those projects in the FEIS. “In addition, the list of reasonably foreseeable major transportation projects consists of only those projects that would be undertaken if construction of the Western Section did not occur. The list does not include the Eastern Section and the FEIS does not contain an analysis of the cumulative environmental impact caused by construction of both the Western and Eastern Sections.” [697] Cumulative impacts were apparently discussed for the Eastern Section in a separate EIS, but the Court found that by separating these two discussions into separate documents, they were taken out of context, and comprehension of the overall environmental effects of the projects could not be fully understood. The Court found that the Defendants violated NEPA by inadequately addressing cumulative impacts in the FEIS.

Of eight deficiencies alleged by the Plaintiffs, the Court only found that two of them were substantially justified actions, and that the FEIS failed to comply with NEPA on six of the shortcomings. Since the Defendants failed to show that they were substantially justified in preparing and approving the FEIS, the Plaintiffs were successful in their case and found to be entitled to the recovery of attorney’s fees and expenses from Federal Defendants under the Equal Access to Justice Act.

2. Lessons Learned from the Winston-Salem Northern Beltway Case

Agencies must be aware of statements made elsewhere in the EIS that are then contradicted in the analysis of indirect effects and cumulative impacts. Induced growth was not discussed thoroughly enough. Agencies need to take into consideration other agency’s comments on the EIS and address them accordingly. It is not enough just to list other projects that may occur in the area, agencies must consider the probable impacts of those projects. Caution must be taken in addressing the impacts of projects that are essentially part of the same overall improvements but may be addressed in other EISs that they are not taken out of context.

D. I-4400, North Carolina



1. Summary

Project I-4400 involves the expansion of 13.6 miles of I-26 in Henderson County, North Carolina, from four lanes to six lanes. An EA was published on January 18, 2002 and a FONSI was issued for the project. On October 7, 2002, the Court granted Plaintiff's motion for Preliminary Injunction and enjoined the Defendants from proceeding further with the project pending resolution of the lawsuit or further order of the Court. In *Western North Carolina Alliance v. NCDOT* 312 F. Supp. 2d 765 (2003), the Plaintiffs seek a Motion for Summary Judgment and the issuance of a permanent injunction until Defendants comply with NEPA.

Plaintiffs challenged the scope of the EA in this case, faulting Defendants for not addressing impacts of other projects along the I-26 corridor which total about forty miles of improvements. Defendants justified their decision by explaining that funding had not been assigned for some of the projects and projects were at different planning stages, and that those projects are therefore not "reasonably foreseeable" and cannot be meaningfully evaluated. The Court referred to *Sierra Club v. Marsh* in order to determine whether the projects in question were reasonably foreseeable. The Court concluded that since they were not highly speculative nor were they indefinite, they were reasonably foreseeable and should have been included in the cumulative impacts analysis. The Court also explained that a project did not need to have finalized design to be meaningfully evaluated. Especially since the other I-26 projects were referred to as "reasonably foreseeable" in the FONSI's discussion of whether project I-4400 will restrict other projects. The Courts also took issue, once again, with the mere listing of projects without consideration of the actual impacts of the projects. "One half of one page of the EA lists "other areas TIP projects" and gives a brief factual description of the projects. The EA does not contain any reference to the potential for cumulative environmental impacts from these other projects, even so as to dismiss the possibility...". [773]

The Court decided that FHWA had acted arbitrarily and capriciously in issuing its EA and FONSI in violation of NEPA and granted injunctive relief to the Plaintiffs. The Court stated "if Defendants are allowed to proceed with project I-4400 without complying with NEPA, any subsequent consideration of the cumulative environmental impacts will be a mere formality and NEPA's goal of taking action only after a full consideration of the environmental impacts will be defeated". [778] FHWA and NCDOT were enjoined from proceeding further with the project without first complying with NEPA and considering the cumulative impacts of the overall expansion of the I-26 corridor.

2. Lessons Learned from the I-4400 Case

Nearby projects are still reasonably foreseeable even if they do not yet have funding in place and they must be discussed in the analysis. Additionally, a project does not have to have final design to be meaningfully evaluated. A listing of projects is not sufficient, the impacts of those projects must be discussed. Agencies need to be careful not to



contradict their own conclusions within the environmental documentation, in this case in the FONSI.

E. Chittenden County Circumferential Highway, Vermont

1. Summary

In August 1986, Vermont Agency of Transportation (VTrans) assisted by FHWA, published a Final Environmental Impact Statement for the Chittenden County Circumferential Highway (CCCH) project in Chittenden County, Vermont. The ROD was issued on November 5, 1986. The project was divided into segments, and Segment C-F was constructed and open to traffic in 1993. In late 1998, VTrans began a reevaluation of Segment A-B (which would join Segment C-F with I-89) and concluded that the 1986 FEIS remained adequate and that a SEIS was not necessary. However, FHWA had never adopted the 1986 document, and determined that in order to move forward and fund the project it was appropriate to adopt the 1986 FEIS at that time in July 2002. It was then that FHWA decided to reevaluate all segments and issued a revised reevaluation in May 2003 and then a final revised reevaluation (FREA) in August 2003, concluding that no new or additional significant environmental impacts had been identified and subsequently issued a ROD. Shortly after, the project was designated as a high-priority transportation infrastructure project under Executive Order 13274.

Plaintiffs in *Senville v. Peters* 327 F. Supp. 2d 335 (2004) argued five violations of NEPA. Among them was that FHWA violated NEPA when it adopted the 1986 FEIS and they challenged the adequacy of the FEIS on several grounds, including inadequate analysis of indirect and cumulative impacts. Although the FEIS identified several planned highway improvements in the region, it failed to discuss the potential cumulative impact of these projects or other major projects in the area that may have similar impacts on environmental resources. Additionally, the FEIS acknowledged that the project would have “indirect secondary impacts on agricultural lands in the project area” [22] however these assumptions were not supported, nor were mitigation measures discussed. It was noted that “VTrans indicated that it intended to complete a study ‘to determine the indirect impacts on agricultural lands that would result from construction of the highway’. The FHWA protested at the time that such a study should have been done as a part of the EIS process, and that if there were agricultural impacts that had not been studied for the EIS, then the FEIS should be withdrawn and a proper agricultural land impact study completed and incorporated into a revised FEIS”, but the FEIS was not withdrawn [22].

The Court determined that the EIS lacked sufficient information for it to be legally adequate and that FHWA could not have properly adopted it on the grounds that it failed to provide, among other things, an adequate discussion of cumulative and secondary environmental impacts. Further construction on Segment A-B was enjoined until FHWA complied with NEPA.

2. Lessons Learned from the CCCH Case



Other projects in the area and their impacts must be adequately discussed in the EIS. An EIS should not be published under the pretense that although a discussion of indirect impacts to a particular resource may be inadequately presented in the EIS, more studies will be done at a later time. Those studies should be done ahead of time and included in the analysis of indirect effects and cumulative impacts in the FEIS.

VII. Review of Recent, Instructional Environmental Impact Statements

The following section is intended to give examples of instructive indirect effect and cumulative impacts analyses. These particular EISs were chosen for examination because they have been subject to intensive review and sometimes legal action, with regards to the adequacy of the original analyses. In general these projects tend to be quite large and somewhat controversial in nature adding to the complexity of the analyses. The purpose for examining these EISs is to determine the basic steps taken in the approach to conducting these indirect effects and cumulative impacts analysis.

A. St. Croix River Crossing Project, Minnesota to Wisconsin; SFEIS, June 2006

How were the scope and boundaries of the indirect effects and cumulative impacts assessment determined?

The study area boundary for the indirect effects assessment was defined based on the area that would receive regional mobility improvements as a result of the project, as measured by a travel demand model. The indirect effects study area was defined as Washington County in Minnesota, and St. Croix County, southern Polk County and northern Pierce County in Wisconsin. For the cumulative impact assessment, the study area was defined based on the boundaries of the Lower St. Croix River watershed to include five counties: Washington and Chisago counties in Minnesota and St. Croix, Polk, and Pierce counties in Wisconsin.

The analysis year for the indirect effects assessment was the year 2030, selected based on the capabilities of the available travel demand model. Consistent with the CEQ NEPA regulations requirement to consider past, present, and reasonably foreseeable future actions, a twenty year past and present timeframe (1980 to 2025) was selected for the cumulative impact assessment. This time frame was selected based on the availability of historic data sources, and future demographic forecasts and comprehensive plans.

How was it determined to use either a qualitative or quantitative analysis?

Potential indirect land use effects were assessed quantitatively and qualitatively. The quantitative accessibility analysis was unique. The construction of a new river crossing was an assumption in the St. Croix County Development and Management Plan and the socioeconomic forecasts used in the travel demand modeling for the project. Theoretically, the growth-related effects of the project were already accounted for in these forecasts. Therefore, the accessibility analysis examined the potential growth

related effects of *not building the bridge*, such as lower levels of development because of congestion and a reduction in accessibility to employment. These results were then discussed in the converse to show the influence of improved accessibility as a result of the new bridge.

The evaluation of the potential influence of the project on land use change was evaluated based on a series of meetings with local government and planning officials. Effects on specific areas and environmental resources were qualitatively discussed, including explicit recognition of the uncertainties inherent to these types of evaluations. The indirect effects evaluation identifies planning tools available to local governments to manage indirect effects, and includes mitigation funding for water resources planning and protection, local government planning and zoning support, and a greenspace protection program.

The cumulative impact assessment was primarily qualitative, although quantitative analysis results for direct and indirect effects are incorporated into the description of potential cumulative impacts. The SFEIS does not explicitly state why quantitative cumulative impact measures were not considered, but based on the indirect effects section description of data limitations, it can be inferred that there was insufficient data and reliable analysis procedures available. The St. Croix River Crossing Project SFEIS cumulative impact assessment considered the following resources/topics: land use and development, prime agricultural land, social conditions, regional economy, air, noise, wetlands, water quality and quantity, aquatic resources, vegetation, wildlife, parks and recreational lands, aesthetics, and historic resources. For each resource, the SFEIS described the existing condition of the resource (how it has been affected by other actions), the impacts of the project (direct and indirect impacts), impacts of other present actions and reasonably future actions on the resource, and the potential for cumulative impacts. The cumulative impacts evaluation considers regulatory protections and planning measures that may minimize negative effects on each resource. The cumulative impact assessment concludes with a chart categorizing the potential for cumulative impacts to each resource as “greater potential” or “less potential.”

Does the state have relevant guidance and was this guidance applied to the subject project(s)?

A search of Minnesota DOT’s website revealed that it does not appear that the state of Minnesota has any state specific guidance on conducting indirect effects and cumulative impacts analyses. Documents show reference to FHWA’s 2003 “Interim Guidance: Questions and Answers Regarding Indirect and Cumulative Impact Considerations in the NEPA Process”. This EIS is especially noteworthy for having distinct indirect effects and cumulative impacts chapters, allowing for a more thorough examination of both types of effects.

What was the extent to which the public, other agencies and local communities were engaged in the assessments?

According to the SFEIS, a Cumulative Impacts subgroup was voluntarily formed and participated in the discussion of the cumulative impacts analysis, meeting five times in the course of six months. The subgroup consisted of participants from the involved federal agencies, Minnesota and Wisconsin state agencies, citizen groups and environmental advocacy groups. The primary responsibilities of the group were to define the study area and time frame for the analysis, and identify the resources that should be included in the analysis. The evaluation of indirect effects included multiple formal and informal discussions with local government and planning officials to identify the land use change that would likely be attributable to the project.

B. Winston-Salem, North Carolina Northern Beltway; SFEIS, January 2007

How were the scope and boundaries of the indirect effects and cumulative impacts assessment determined?

The study area for the analysis of indirect and cumulative impacts evaluation for the Winston-Salem Northern Beltway encompassed the entire county in which the project is located; Forsyth County. One of the reasons for using the county as the boundary for the study area is that it allows for examination of both the corridor itself as well as the buffer area around the corridor area, where indirect and cumulative impacts may occur. This study area follows geographical boundaries that are natural, built and political and were based on a review of relevant case studies, current literature and interviews with local planning officials. The time frame for the analysis was the year 2025, which corresponded with the design year for the project.

How was it determined to use either a qualitative or quantitative analysis?

This analysis used a combination of both qualitative and quantitative methods for analyzing indirect and cumulative impacts of the Northern Beltway. In order to determine indirect impacts on land use, a detailed accessibility analysis was performed, utilizing land use data and travel times to determine changes in land use.

For the purpose of analyzing indirect impacts on general growth patterns, the study area was divided into Traffic Analysis Zones (TAZs). A more detailed analysis was then conducted for each TAZ using a variation of the Hansen gravity model, to identify specific regions in the County that would encounter increased housing density as a result of building sections of the Northern Beltway. The Hansen gravity model empirically determines the effects of various effects, including vacant land and accessibility, on the location decisions of future households and employers based upon changes in accessibility. The form of these models and a literature review indicates that these models are capable of helping determine areas of increased development pressures, but cannot be used to predict specific development actions.

A qualitative analysis was performed to analyze the indirect impacts related to interchange-development potential by rating the potential of each interchange as having a low, medium or high potential for commercial development based upon review of five

criteria. Commercial development potential was the focus of the interchange-level indirect effects analysis because commercial development typically represents the highest and best use of land in the vicinity of interchanges based on there being relatively higher land values in the vicinity of interchanges. The assignment of ratings based on the criteria was confirmed through interviews with local planners, real estate specialists, and business and industry representatives.

Indirect impacts from induced travel was analyzed by using FHWA's SMITE (Spreadsheet Model for Induced Travel Estimation) with modifications made to better represent the study area. The SMITE model estimated both diverted travel and induced travel and is not intended to be used alone, but should supplement a traditional travel demand model.

Two general methods were employed to analyze cumulative impacts, as follows:

- A county-wide assessment which compared county-wide features and resources to the anticipated areas of high growth in the region under the analysis scenarios listed above.
- A sub-area analysis which focused on the features and resources in those traffic analysis zones identified as having the highest potential for increased housing under each of the analysis scenarios.

The resources examined included communities, natural habitat, historic sites, water quality, and air quality.

Does the state have relevant guidance and was this guidance applied to the subject project(s)?

North Carolina has its own guidance on assessing indirect and cumulative impacts. *Guidance for Assessing Indirect and Cumulative Impacts of Transportation Projects in North Carolina. Volume II: Practitioner's Handbook (NCDOT ICI Guidance)* was used in defining the boundaries for the study area.

What was the extent to which the public, other agencies and local communities were engaged in the assessments?

In assisting the qualitative assessment of indirect impacts related to interchange development potential, surveys were sent to 21 stakeholders. These stakeholder groups included representatives of local government, the private sector, and environmental groups. Interviews were also conducted with local planners, real estate specialists, and business and industry representatives in order to determine the criteria on which to base the analysis of commercial development potential.

C. Circ-Williston Transportation Project, Chittenden County, Vermont; DEIS/Section 4(f) Evaluation, July 2007

How were the scope and boundaries of the indirect effects and cumulative impacts assessment determined?

Two separate types of study areas were defined for the Circ-Williston EIS evaluation of indirect effects and cumulative impacts: a regional area of influence and a localized area of influence. The regional area of influence was the broad geographic area where the project had the potential to influence land use patterns due to changes in accessibility, while the localized area of influence allowed for detailed study of the potential for development in the immediate area in the vicinity of the alternatives (e.g., around interchanges, intersections, and connecting roadways).

The regional study area was defined to encompass the six-county Northwest Vermont region—Addison, Chittenden, Franklin, Grand Isle, Lamoille and Washington counties. The definition of the regional study area was based on the consideration of factors such as political boundaries, concentrations of population and employment, U.S. Census Urbanized Areas and Metropolitan Statistical Areas, water and sewer service areas, planned future growth areas, commutesheds, and watershed and habitat areas, and public outreach. Key considerations in choosing Northwest Vermont as the regional study area included the potential future expansion of the Chittenden County Metropolitan Planning Organization jurisdiction beyond Chittenden County, the commuteshed for the Chittenden County employment core includes the other five Northwest Vermont counties, key habitat areas and watersheds that extend beyond Chittenden County, and comments received during scoping indicating that indirect effects and cumulative impacts beyond Chittenden County should be evaluated.

The localized area of influence study area was defined as one-half mile around the centerlines of the proposed alternatives alignments, one-mile around proposed interchanges or intersections, and additional areas along intersecting roadways. The localized area of influence study area was defined based on the typical land use effects of roadway projects identified in indirect effects assessment guidance documents (e.g. NCHRP Report 466) and empirical studies.

The time frame for the analysis was set as the year 2030, based on the time horizon of the next Metropolitan Transportation Plan for Chittenden County, and to allow for an interval of at least 15 years between the completion of the project and the analysis year.

How was it determined to use either a qualitative or quantitative analysis?

For the regional study area, a combination of rigorous quantitative methods and qualitative interpretation of results was used to describe potential indirect effects and cumulative impacts. Based on feedback from agencies and the public during scoping that indicated that existing population and employment forecasts were out of date, a new household and employment projections for the Northwest Vermont region were prepared as part of the EIS study. The primary analysis tool for assessing the influence of the alternatives on land use change was the Land Use Allocation Module (LUAM) of the Chittenden County transportation model. LUAM allocates household and employment

growth to Traffic Analysis Zones based on accessibility (e.g. travel time), zoning, and land use development constraints (e.g. wetlands, steep slopes etc.). The model operates in five year increments with iterative feedback between changes in accessibility due to improvements in the transportation system, and congestion attributable to growth and new development patterns. The use of LUAM was recommended during consultations with agencies and the public during scoping, and this type integrated land use-transportation model is advocated as a “best practice approach” for land use modeling.

The application of LUAM was limited to the boundaries of Chittenden County. To analyze land use change outside of Chittenden County, a separate transportation model, the Vermont Statewide model, was utilized. An accessibility index was created to measure the relative changes in attractiveness of particular areas for a development as a result of the alternatives. The accessibility index was used to proportionally reallocate statewide control total household and employment forecasts between zones based on the changes in accessibility under each alternative. The control total inputs into the Chittenden County analysis with LUAM were adjusted based on the results of the Vermont Statewide Model analysis to reflect the potential for shifts of households and employment from Chittenden County to the surrounding counties.

Using the results of the land use modeling effort, potential environmental impacts were estimated for the no build and build alternatives. The environmental change indicators developed and analyzed using GIS data and tools included: land consumption, agricultural land conversion, wildlife habitat conversion (including habitat fragmentation and rare, threatened and endangered species habitat), water resources impacts as measured by changes in impervious surface cover, water usage and wastewater generation. Indirect effects and cumulative impacts were quantitatively and qualitatively described on a resource by resource basis, as influenced by past, present and future actions. An important component of the cumulative impact assessment was describing the regulatory protections afforded each resource and their effectiveness in preventing or minimizing potential impact of future development patterns.

The evaluation of indirect effects and cumulative impacts in the localized area of influence study area was primarily qualitative. Quantitative evaluation of effects in the immediate area surrounding the alternatives was not possible because regional transportation and land use models are capable of predicting change at a parcel-level scale. The smallest geographic unit in transportation models typically is the Traffic Analysis Zone. The methodology applied a “low”, “medium”, or “high” development potential rating to each interchange or corridor segment based on several factors that influence the location decisions of households and businesses, including: the level of existing development, traffic volumes on intersecting roadways, accessibility to properties fronting intersecting roadways, location with respect to existing commercial activity centers, availability of water and sewer service, zoning and planning considerations, and the availability of land. The evaluation discussed specific parcels that had a high likelihood of being developed, and the potential effects of this development on environmental features through the use of GIS mapping.

Does the state have relevant guidance and was this guidance applied to the subject project(s)?

Vermont does not have state-specific guidance on conducting indirect effects and cumulative impacts analyses. The guidance documents applied in the indirect effects and cumulative impacts assessment for the Circ-Williston EIS included FHWA's Interim Guidance: Questions and Answers Regarding the Consideration of Indirect and Cumulative Impacts in the NEPA Process, CEQ's Considering Cumulative Effects under the National Environmental Policy Act (1998), NCHRP Report 466: Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects (2002), NCHRP Report 403: Estimating the Indirect Effects of Proposed Transportation Projects (1998), and NCHRP Report 423A: Land Use Impacts of Transportation- A Guidebook (1999).

What was the extent to which the public, other agencies and local communities were engaged in the assessments?

Extensive public and agency coordination and outreach activities were conducted as part of the assessment of indirect effects and cumulative impacts for the Circ-Williston project. During the scoping phase of the project, interviews were conducted with the staff and elected officials of Chittenden County municipalities, planning staff of regional planning commissions in the surrounding counties, environmental organizations, and citizens. The information on land use and development obtained during these interviews was used to identify the potential indirect effects and cumulative impacts for analysis.

Four technical workshops on indirect effects and cumulative impacts were held to allow for public and agency input into assessment process. During one workshop, participants were presented with information on the advantages and disadvantages of various land use change assessment methodologies and asked for their input on the analysis approaches and methodologies that were most appropriate for evaluating land use change in Northwest Vermont. Other workshops focused on the development of baseline demographic, economic, and land use modeling inputs, and the presentation of the results of the land use change analysis. Workshop summaries, flip chart notes, and presentation materials were documented in an appendix to the EIS.

D. I-93 Improvements (Salem to Manchester), New Hampshire; FEIS, June 2004

How were the scope and boundaries of the indirect effects and cumulative impacts assessment determined?

The study area for indirect land use effects included the five municipalities where the proposed improvements to I-93 would occur, and 24 other municipalities in the region surrounding the project. The study area boundaries were first recommended by an oversight committee of representatives of federal and state agencies and regional planning commissions. Additional areas north of the study area were also evaluated at a general level in additional areas north of the study area based on the recommendation of the members of the expert panel (described below). The analysis year for the indirect

effects evaluation was the year 2020. The FEIS did not provide an explanation of the rationale for the selection of the analysis year.

Explicit geographic study area boundaries and timeframes were not explicitly defined for the cumulative impacts evaluation, but the types of effects discussed include southern New Hampshire and the Boston, Massachusetts metro area.

How was it determined to use either a qualitative or quantitative analysis?

To facilitate the assessment of induced growth and land use change attributable to the I-93 project, NHDOT and FHWA utilized an expert panel methodology called the Delphi Technique. In general, the Delphi Technique produces forecasts or predictions based on expert opinion. Each member of the panel of experts is asked to answer a questionnaire. The responses are shared with the panel, but the answer of each individual panel member is kept anonymous. The questionnaire is then repeated, and each panel member may revise their estimates based on the responses of the other panel members. After a number of iterations, the results of the Delphi technique may be summarized through measures of central tendency.

For the I-93 project, a 16 member expert panel was assembled, including experts in real estate, planning, and environmental policy. Through application of the Delphi Technique, the panel members allocated 2020 population and employment growth to 29 communities in a secondary impact study area. There was considerable variation in the response of individual panelists, ranging from the Build Alternative having no effect on growth, to large effects on growth. The results of the Delphi Technique process were summarized through the use of a blended average—the average of the median and the mean. The blended average method gives some weight to very high and low outlying values, but gives less weight to these values than using a mean. The expert panel's blended average allocations indicated a five-percent increase in population and employment under the Build Alternative when compared to the No Build Alternative.

The blended average population and employment allocations were used as the basis for estimating potential land consumption and related environmental impacts, utilizing GIS data of important environmental features, existing build-out analyses and calculations of the area of land available for development. For most environmental resources, impacts were discussed qualitatively due to “uncertainty about the size, type, and location of such future development.” To mitigate for potential growth-related indirect effects, NHDOT has committed to a \$3.5 million Community Technical Assistance Program.

The cumulative impact assessment section of the FEIS was much less detailed than the indirect or secondary land use change impact assessment conducted with the expert panel study. It provided a summary of other projects in the region and a one-page bulleted list of potential cumulative impacts in the region.

Does the state have relevant guidance and was this guidance applied to the subject project(s)?

New Hampshire does not have state-level guidance on the preparation of indirect effects and cumulative impacts assessments.

What was the extent to which the public, other agencies and local communities were engaged in the assessments?

Agencies and planning commissions were part of the oversight committee that defined the study area for the indirect effects assessment. The initial lists of candidates recommended for participation in the Delphi panel were also identified by the oversight committee. The expert panel members included representatives from the real estate industry, academics specializing in planning and environmental resource analysis, members of public interest groups, members of local planning boards, and a regional water pollution control agency. The results of the indirect effects analysis were shared with the public in a series of five public information meetings on secondary impacts. Planning for the Community Technical Assistance program was coordinated through extensive meetings with federal, state, and local agencies.

Task 2: Guidebook for State DOT Practitioners

I. Objective of the Guidebook

The Objective of this Guidebook is to provide practitioners and others involved in project development and review a reference that provides the supporting context and criteria for analyzing and documenting indirect effects and cumulative impacts of projects as related to documents prepared on the projects in accordance with regulations implementing the National Environmental Policy Act (NEPA).

II. Lessons-Learned from Review of Case Law and States' Guidance

A. Best Practices

Perhaps one of the most difficult issues with analyzing indirect effects and cumulative impacts is that because the circumstances of each project are different, the specific methodology of analysis needs to be tailored specifically to the project. There is no “one size fits all” approach. The best thing that practitioners can do is to thoroughly understand the elements of the analysis and keep in mind the big picture. Getting lost in terminology and missing data can distract from the end product and result in potential challenges to the EIS and litigation. The following section summarizes some of the best practices of methodologies that have been utilized across several states.

1. Indirect Effects Assessment

Seeking the input of others

Proper scoping is one of the most important steps that practitioners can take in developing an indirect effects and cumulative impacts assessment methodology. This is important in order to be sure that everyone agrees on which resources need to be analyzed under IE & CI. This is an important opportunity to learn about any issues or concerns that may be specific to that area and to be sure that they are taken into consideration and discussed thoroughly upfront to minimize the possibility of disagreements on methodology. Resource agencies have important information to add to the methodology at this point in the process and their knowledge should be utilized to help determine resources and define a study area that is appropriate. Complete collaboration is one of the best ways to be sure that all possible issues have been considered, and to minimize the likelihood of disagreements as early as possible in the process. Documenting the results of this collaboration and coordination is of the utmost importance.

If individual states do not have in place their own methodologies for collaboration and agency coordination, Section 6002 of SAFETEA-LU may be of some assistance. The November 2006 Guidance suggests that lead agencies on a transportation project collaborate with the participating agencies regarding the appropriate methodologies and the level of detail to be used. Although not requiring consensus among agencies, the consideration of input from all agencies is necessary. Section 6002 suggests that agencies aggressively use the scoping process to “solicit public and agency input on methodologies and to reach closure on what methodologies will be used to evaluate important issues”. A comment period on the methodologies may also be held. Section 6002 notes that methodologies may have to be developed on a project-by-project basis. It also acknowledges that some situations may call for a comprehensive methodology to be developed and applied to projects within a particular program or region, including watersheds. The development of such a comprehensive methodology “depends on an unambiguous description of the methodology and the impacts to which it applies”.

For states with existing guidance on Indirect Effects and Cumulative Impacts analysis, soliciting agency input as well as public input may already occur as part of the overall environmental scoping process. In this case, it is imperative that this portion of the scoping be documented for use in IE & CI analysis. Some states, such as California and North Carolina use pre-screening techniques to determine whether or not a project is likely to result in indirect effects and/or cumulative impacts. Since indirect effects often deals with induced growth, these pre-screening techniques are geared towards growth-related impacts screening. These pre-screening techniques would precede the scoping process, and in the case of California and North Carolina; include flowcharts which guide the practitioner through a series of questions to arrive at an initial conclusion regarding the need for further scoping and analysis of indirect effects.

Study Areas

There are several different types of study areas that can be used for IE & CI analysis. One option is choosing a different study area for each resource. Another option is then taking all of those individual resource study areas and combining them to make one study area for IE & CI. It must be understood that the study area for IE & CI will be different and larger than the project study area used in determining direct impacts as a result of the proposed project. It may sometimes be practical to develop ecosystem or watershed level study areas and methodologies, but this must be determined on a case-by-case basis.

Wisconsin DOT Guidance suggests considering study areas according to the following categories: commutershed, trafficshed, 20-year growth boundaries or by interviewing experts to determine the boundary for study. Interviews, whether formal or informal, tend to be applicable to the widest range of different types of transportation projects in different settings. This option, which somewhat resembles the scoping process, may be one of the best and most flexible options in order to determine a study area that is agreeable to all parties and stakeholders involved. Sometimes it might be best to combine one of these methods with another in order to determine a defensible study area.

Geographic(al) or Geospatial Information Systems (GIS) can be very helpful in assisting practitioners in determining a study area for an indirect effects analysis. GIS can help locate wetlands, habitats, endangered plant species, and aid in establishing study areas for these resources. GIS can be used to create overlays of proposed projects and developments in this aspect as well. Most states' guidance encourage and suggest the use of GIS in helping to determine the appropriate geographic area to be included in the analysis.

In order to determine the current health and stability of the resources in question, study areas must be established temporally as well as physically. While most future projections use the project's design year, uncertainty exists regarding the issue of how far into the past to begin discussing events that have shaped the current, or baseline environmental conditions. According to CEQ Guidance, "review of past actions is required to the extent that it informs agency decision making on the proposed action". Although vague, this statement at least notes that it is not necessary to list every past action since the beginning of time, only those actions that are relevant and will allow an informed decision regarding impacts as a result of the proposed project.

Maryland State Highway Administration's Secondary and Cumulative Effects Analysis Guidelines suggests collecting data on historical events that had a major effect on population growth, land use and environmental resources by comparing census data. Examples of such events include the opening or closing of a bridge, military base or major employment center. Another possible event could include the dates when roads were built in the study area boundary. This can show how the introduction of infrastructure affected the population, employment and environmental resources in an area.

8-Step Process:

Common among many states' guidance is the recommended use of the 8-Step Process, as originally presented in *NCHRP Report 403: Guidance for Estimating the Indirect Effects of Proposed Transportation Projects (1998)* and further elaborated on in *NCHRP Report 466: Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects (2002)*. In many cases, the eight steps have been slightly modified to suit the specific needs or circumstances of the state in which it is used, but originally consist of:

- Step 1 – Define the Study Area Boundaries. Set appropriate study area boundaries for the analysis of indirect effects as well as the timeframe for the analysis.
- Step 2 – Identify the Study Area Communities' Trends and Goals. Gather information on community trends and goals in the study area, focusing on socioeconomic and land use issues.
- Step 3 – Identify Resources for Analysis. Identify specific valued, vulnerable or unique elements of the natural environment that will be analyzed in the assessment of indirect effects.

- Step 4 – Describe Cause and Effect Relationships. Identify all the potential impact-causing activities of the project and select specific impact-causing activities for analysis.
- Step 5 – Identify Potential Impacts For Analysis. Compare the impact-causing activities developed in Step 4 with the inventory of goals in Step 2 and the resources in Step 3.
- Step 6 – Analyze Impacts. Determine the magnitude and location of the potential impacts identified in Step 5.
- Step 7 – Evaluate Analysis Results. Evaluate the uncertainties in the methodology used to evaluate impacts, in order to better understand the analysis results.
- Step 8 – Assess Consequences and Develop Mitigation. When an impact conflicts with a goal from Step 2 or a resource from Step 3, assess the consequences of that impact and develop strategies and potential mitigation to address it accordingly.

Although the CEQ definition of indirect effects specifically mentions induced growth, which is frequently the focus of many indirect effect assessments for transportation projects, the definition of indirect effects is much broader than induced growth and induced growth growth-related environmental effects. Other environmental effects that alter the function of natural systems that are separated from the project location by time and distance must also be considered. NCHRP Report 466 labels this type of indirect effect as “encroachment-alteration” effects. Encroachment alteration effects (for example, habitat fragmentation) are often addressed in NEPA documents along with the direct effects of the project. In certain situations, indirect effects may be addressed along with the direct impacts to a specific resource in the pertinent section of the document, while the issue of induced growth may be addressed separately in the indirect effects analysis due to their unique and complex nature.

The question also exists whether to use qualitative or quantitative methods when conducting an indirect effects analysis. Qualitative methods are the most flexible and user friendly for indirect effects analysis as opposed to quantitative analysis. The use of expert panels such as in the Delphi Technique, to assist in qualitative analyses is also growing among the states for use in identifying indirect effects. The Delphi Technique uses a panel of experts given a round of carefully structured and sequential questionnaires in order to arrive at expert opinions for delineating probable future actions. This method is often employed in lieu of or to supplement quantitative analyses, particularly in situations where there is not an established regional travel demand model. It is important to remember however, that all results must be documented and there must be transparency in the processes used. If certain results do not correspond with other results or support the project, they still must be discussed and documented.

Regardless of whether qualitative or quantitative methods are used, or a combination of both, one of the most important things to remember in the indirect effects analysis is the clear documentation of methods used and lack of or discrepancies in data. Not only do agencies need to be able to follow the trail of logic in an indirect effects analysis, so does the public, and possibly the courts. **Transparency in the process and clearly explaining all assumptions and methodologies will save time in the end.**

2. Cumulative Impacts Assessment

Guidance on Cumulative Impacts assessments are addressed in a similar manner among many of the states. Some states have separate guidance for cumulative impact assessment while some combine the guidance with guidance on conducting indirect effects analysis. Consequently, some cumulative impacts analyses are combined with the indirect effects analyses in the EIS, and sometimes a separate chapter is allotted for each analysis. It has become clear that separate documentation is preferable because the topics, although related are different and because separate documentation provides a better basis for a full accounting of effects and impacts.

Since a cumulative impacts analysis will build off of the indirect effects analysis, they should be developed concurrently. Likewise, if a project will not cause direct or indirect impacts on a resource it will not contribute to a cumulative impact on the resource such as in the case of a project that classifies as a Categorical Exclusion (CE). Environmental Assessments (EAs) will most likely require (and EISs will certainly require) a cumulative impacts assessments. The analysis of cumulative impacts should not be postponed since the development of methodology can benefit from the scoping process, similar to the process for indirect effects. Additionally the analysis of cumulative impacts can aid in the development of alternatives to the proposed action. Like the process for developing methodology for indirect effects assessments, the process used in the cumulative impacts assessment must also be thoroughly documented.

8-Step Process

A similar 8-step process to that used for the analysis of indirect effects can be used for cumulative impacts analysis. Washington State, who has developed recent guidance on preparing cumulative impacts analyses in February 2008, identifies the following eight steps:

1. Identify the resources that may have cumulative impacts to consider in the analysis;
2. Define the study area and timeframe for each affected resource;
3. Describe the current health and historical context for each;
4. Identify direct and the indirect impacts that may contribute to a cumulative impact;
5. Identify other historic, current and reasonably foreseeable actions that may affect resources;
6. Assess potential cumulative impacts to each resource; determine magnitude and significance;
7. Report the results; and
8. Assess and discuss potential mitigation issues for all adverse impacts.

As is the case with indirect effects analysis, cumulative impacts analysis must be conducted with the same transparency in the process and documentation. Although several of the steps in the process mirror those in the indirect effects assessment, some issues present themselves as more subjective than others.

Other Current and Reasonably Foreseeable Future Actions

One of the most difficult issues with cumulative impacts analyses is the assessment of impacts from other projects in the area that will be combined with direct and indirect impacts of the proposed action in order to determine the cumulative impacts as a result of the proposed project. Projects that are being undertaken by both public and private entities and developers must be considered in the analysis. Additionally, proposed comprehensive land use plans or zoning changes not necessarily related to the proposed project must be considered for their contribution to cumulative impacts on the study area. Projects slated to proceed both with and without the proposed project must be considered. This information is often part of the “no build” scenario, some of which may have already been obtained. During scoping, information about other projects in the area can be gathered from public and private entities, the incremental impacts of which must be considered in the cumulative impacts analysis. A degree of uncertainty exists with regards to how to determine which projects or actions to include based on their progress. The Courts have upheld the “reasonably foreseeable” standard in determining which projects are likely to occur. With this in mind, each case and situation is unique and must be carefully considered because this part of the analysis has historically been subject to scrutiny and legal challenges.

Washington State DOT Guidance provides examples of the types of foreseeable actions that should be included in the cumulative impacts analysis such as:

- Projected land use and other information in local or regional comprehensive plans
- A development proposal, which has been filed with the local government, county or other plat-approving agency and has state environmental permit applications complete
- Population/ employment trends which are identified in local or regional comprehensive land use plans
- Planned and funded transportation improvements by city or county governments
- Building permits issued by the local agency with jurisdiction, but that are not built yet.
- Local or regional infrastructure projects that could impact resources (schools, hospitals, manufacturing, shipping, etc.)
- Trends related to global climate change, as we currently understand them and related to the project
- Trends in land development patterns, such as growth/expansion around interchanges; zoning changes to accommodate development pressures once transportation improvements occur.

Washington State notes that besides scoping, another source for gathering information on both past and future projects is local comprehensive plans, building permits, existing zoning and interviews with local government. Interviews and other forms of collaboration

can be extremely beneficial to the project as a whole in terms of incorporating mitigation requirements, identifying project alternatives that avoid or minimize (thereby avoiding the need for mitigation) and assuring consistency with regional habitat and restoration planning efforts in the area.

In addition to gathering information on current and reasonably foreseeable future developments, the incremental impacts of these actions must be analyzed in the cumulative impacts analysis. It is the impacts resulting from these actions, added to the impacts of the proposed action that result in cumulative impacts. A common mistake in this part of the analysis is to merely list all future actions. This listing in place of an actual discussion has been the subject of several legal challenges and has been found to be insufficient by the courts. The incremental impacts of the other projects must be discussed, even if information is missing or lacking. A list will not be sufficient.

B. Typical Vulnerable Points

The following section highlights the vulnerable points of both indirect effects and cumulative impacts analyses that are typically encountered. One of the most effective ways to do this is to look at past court cases and identify any common themes among them involving agencies who are challenged on their indirect effects and cumulative impacts assessments. By examining similarities between the cases and comparing them to other situations, it is possible to reveal trends in thinking among the courts which is the essence of case law.

1. Indirect Effects Assessment

What is “Reasonably Foreseeable” When Analyzing Induced Growth?

Induced growth is intertwined with the issue of what is “reasonably foreseeable” because an indirect effects analysis somewhat requires practitioners to use their professional judgment and look into the future. Discussing the indirect effects of a proposed project is a requirement of NEPA, the purpose of which is to ascertain whether the agency has given a good faith consideration to environmental concerns and to be sure that the EIS provides information to the public and interested departments of government. Additionally, the discussion of indirect effects is intended to “prevent stubborn problems or significant criticism from being shielded from internal and external scrutiny” *Sierra Club v. Marsh* 976 F.2d 763 citing *Grazing Fields Farm* 626 F.2d 1072. In order to avoid these problems and criticisms, an indirect effects analysis should most likely involve a discussion of induced growth. However, predicting growth that may result from a project is subjective and will vary depending on the practitioner and the project.

The concept of reasonably foreseeable development applies to both the analysis of indirect effects as well as cumulative impacts assessments. In the case of *Sierra Club v. Marsh* (1992), which was one of several in an ongoing series of cases involving the environmental documentation in the development of a new port facility in Maine, the

project was expected to result in major growth impacts and it raised the issue of what kind of development is “reasonably foreseeable”. The Court noted that “the terms ‘likely’ and ‘foreseeable’ as applied to a type of environmental impact, are properly interpreted as meaning that the impact is sufficiently likely to occur that a person of ordinary prudence would take it into account in reaching a decision”. Citing previous cases for further clarification on the issue, the Court explains, “the EIS need only ‘furnish such information as appears to be reasonably necessary under the circumstances for evaluation of the project’”. [767] Further discussion of *Sierra Club v. Marsh* can be found in the section below as it relates to cumulative impacts analysis.

Consistency with Purpose and Need Statements

The need to analyze growth-inducing effects of this economic development resulting from the Proposed Action surfaced in 1975 in *City of Davis v. Coleman*. In this case, an interchange was proposed for a heavily agricultural area, with very little population. It was evident to project opponents that the interchange was clearly not being built in response to a public demand, but was being built to encourage development in the area around the interchange. To support this argument, was the fact that large tracts of land near the interchange were zoned agricultural, but labeled as “Industrial Reserves” in the General Plan. In addition, the county had begun to promote a Research Park to be located in this industrial preserve near the interchange.

Neither an EA nor an EIS was prepared for this project, despite the fact that the DOT’s own governing procedures stated that “the improved access and transportation afforded by a highway may generate other related actions that could reach major proportion and which would be difficult to rescind. An example would be a highway improvement which provides access to a non-accessible area, acting as a catalyst for industrial, commercial, or residential development of the area”. Instead, a 3-page Negative Declaration was prepared. The Court found this to be extremely inadequate, deciding that it would not be speculative to assume that this project would result in development and “that the exact type of development is not known is not an excuse for failing to file an impact statement at all”. The Court goes on to explain that “while ‘foreseeing the unforeseeable’ is not required, an agency must use its best efforts to find out all that it reasonably can...” [676].

Although this case involved the lack of preparation of the appropriate document, it was clear that the Courts took very seriously the issue of induced growth and the need to analyze the effects of it. The case laid down some very important groundwork for the preparation of indirect effects assessments and in consideration of the fact that the project’s purpose and need statement will need to be compatible with the indirect effects of the proposed action. Although an EIS had not yet been prepared for this project at the time, the State will need to remember that it is important to have consistency between the purpose and need statement in the EIS and the results of the discussion in the indirect effects analysis. When it is clear that a proposed action or project is being promoted with the idea in mind of new development, goals of economic development will need to be

discussed in the purpose and need statement and will also need to be reflected in the indirect effects assessment. If economic development is a selling point of the proposed action, then the effects of that economic development need to be analyzed as part of the indirect effects and cumulative impacts analyses.

Taking a “Hard Look” at “Worst Case” Analysis

Uncertainty about the impacts resulting from a project does not mean that their discussion or consideration can be neglected. CEQ regulations no longer require a “worst case” analysis of impacts, but instead require that agencies take a “hard look” at the possibility of impacts and disclose these potential impacts to the public, even in the event of unavailable or incomplete data or information. *In Mid States Coalition for Progress v. STB*, 345 F.3d 520 (8th Cir. 2003), the Court pointed to CEQ regulations for the appropriate procedure when dealing with incomplete or unavailable data or information, when the Surface Transportation Board failed to consider the indirect effects that a large rail project involving the transport of coal, would have on greenhouse gas emissions. The Court explained “when the *nature* of the effect is reasonably foreseeable but its *extent* is not, we think that the agency may not simply ignore the effect [*id* at 549]. According to CEQ regulations, if there is unavailable or incomplete data or information, “the agency shall always make clear that such information is lacking”. Procedures for dealing with incomplete information, found at 40 C.F.R. §1502.22(b)(1) include:

- (1) A statement that such information is incomplete or unavailable;
- (2) a statement of the relevance of the incomplete or unavailable information to evaluating reasonably foreseeable significant adverse impacts on the human environment;
- (3) a summary of existing credible scientific evidence which is relevant to evaluating the reasonably foreseeable significant adverse impacts on the human environment, and
- (4) the agency's evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community. For the purposes of this section, "reasonably foreseeable" includes impacts which have catastrophic consequences, even if their probability of occurrence is low, provided that the analysis of the impacts is supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason.

Along the same lines is the issue of discussing possible mitigation. When information is lacking, it can be very difficult to estimate what kinds of mitigation might be appropriate for a particular project. Again, what is important here is to include in the EIS, a discussion which shows that the agency has taken a “hard look” at the environmental consequences of the proposed federal action, and include in that discussion possible mitigation measures. Mitigation of indirect effects is not required by NEPA, but a discussion of possible mitigation will aid in proving that the agency has taken the required “hard look”. FHWA’s *Questions and Answers Regarding the Consideration of Indirect and Cumulative Impacts in the NEPA Process* cites *CEQ 40 Questions and Answers* when addressing the issue of how much mitigation to discuss in the EIS. Other

"All relevant, reasonable mitigation measures that could improve the project are to be identified, even if they are outside the jurisdiction of the lead agency or the cooperating agencies, and thus would not be committed to as part of the RODs of these agencies. This will serve to alert agencies or officials who can implement these extra measures, and will encourage them to do so. To ensure that environmental effects of a proposed action are fairly assessed, the probability of the mitigation measures being implemented must also be discussed. Thus the EIS and the Record of Decision should indicate the likelihood that such measures will be adopted or enforced by the responsible agencies."legislation is consistent with this suggestion as well, such as Section 6001 of SAFETEA-LU, which suggests that a "long-range transportation plan shall include a discussion of types of potential environmental mitigation activities and potential areas to carry out these activities, including activities that may have the greatest potential to restore and maintain the environmental functions affected by the plan".

In *Robertson v. Methow Valley Citizens Council* 490 U.S. 332 (1989), worst case analysis is one of the issues that went before the U.S. Supreme Court. In this case it was previously decided by the Ninth Circuit Court of Appeals, that the Forest Service had produced an adequate EIS. NEPA was triggered in this case, by the Forest Service's consideration of issuing a 30-year special-use permit for the development of a ski area in the North Cascade Mountains in Washington, 3900 acres of which were located in Okanogan National Forest. Environmental Groups had challenged the EIS arguing that among other things, since the Forest Service had a difficult time obtaining adequate information to make a reasoned assessment of the environmental impact on a large migratory deer herd, that they had a duty to make a "worst case analysis". The Ninth Circuit Court of Appeals agreed with this argument and concluded that the EIS was inadequate.

However, the US Supreme Court did not agree and explained that "NEPA does not require federal agencies to include in an EIS a "worst case analysis" of potential environmental harm, because (a) while such a 'worst case analysis' was once required by a governing Council on Environmental Quality regulation, the regulation has since been amended . . . to retain the duty to describe the consequences of a remote but potentially severe impact, but to ground [that] duty in evaluation of scientific opinion rather than in the framework of a conjectural 'worst case analysis'" [332]. Based on this explanation, the Court of Appeals decision was reversed and remanded by the Supreme Court.

2. Cumulative Impacts Assessment

Reasonably Foreseeable Development and Documentation

An adequate cumulative impacts analysis includes a discussion of other reasonably foreseeable future actions in the area of the proposed project and what the incremental effects of those actions will be on the environment. However, selecting which actions to include in the analysis can be complicated since projects can be at different stages in the processes of funding and development.

In *Sierra Club v. Marsh* (also discussed above), the EIS devoted 47 pages to discussion of possible secondary impacts as a result of the proposed port, including a proposed industrial park on Sears Island. The discussion assumed four certain types of industry known as “light-dry”, however, there was no discussion of other types of development including heavy industry, food processing and forest project industries. The lower court relied heavily on the administrative record, to explain the rationale for limiting the discussion to light-dry industry only, and in looking for some indication on how the agencies arrived at their decision. Although controversial, with the administrative record lacking, the lower court looked to affidavits provided by the agencies. [768] However, Plaintiffs challenged that the use of affidavits by the lower court violates NEPA’s goal of public disclosure. The Court of Appeals was careful to explain that the affidavits did not provide any new information, only that they provided a rationale for the agency’s decision that a certain possible indirect effect of a proposed project is not within the scope of the EIS because it is not “reasonably foreseeable”.

The affidavits revealed that the methodology used by the agencies in determining the likelihood of light-dry industries locating to Sears Island included the review of a “target market analysis” which was a marketing study included in the 1980 Land Use Plan. In addition to this analysis was a report prepared for the town of Searsport which also targets the same type of industry for development on the Island. Although the use of these documents was not obvious in the analysis itself, through affidavits, the Courts decided that the agencies had not acted in an arbitrary and capricious manner by deciding that light-dry industry was reasonably foreseeable and that its impacts needed to be analyzed, as suggested by the two reports. The affidavits revealed that “a key factor in the selection of [light-dry] industries as ‘reasonably foreseeable’ tenants of the industrial park was that ‘industries locating in the industrial parks had to be those which do not require substantial water and sewer capabilities in order to function’ because existing sewer and water facilities [on the island] are limited”. [776]

The Court found in favor of the agencies in this case, deciding that the affidavits revealed a logical reasoning for choosing one industry as more likely to develop on the island as a result of the proposed project. This case however, exemplifies the need for adequate documentation in the EIS. If it had been revealed that these reports were part of the methodology used in the development of the IE & CI in the original EIS, the issue might not need to have been discussed in the courts.

Reasonably Foreseeable and Study Areas

Reasonable Foreseeability can also apply to the selection of a study area. In *Kleppe v. Sierra Club* (1976), several environmental groups attempted to stop further coal mining projects in what is known as the Northern Great Plains Region. Environmental groups attempted to argue that agencies were required to prepare a comprehensive regional EIS and evaluate impacts to the entire Northern Great Plains Region. The U.S. Supreme Court found that in the absence of an existing or proposed plan or program on the part of the Federal Government for the regional development of the area, the preparation of a regional EIS was not required. This is because “it is impossible to predict the level of

coal-related activity that will occur in the region...and thus impossible to analyze the environmental consequences and the resource commitments involved in, and the alternatives to, such activity”. The Court explained that “agencies must consider only those indirect effects that are ‘reasonably foreseeable’. They need not consider potential effects that are highly speculative or indefinite”. [402] The Court decided that predicting the level of coal related activity for the entire region was impossible, and therefore it would be impossible to analyze what the environmental effects would be as a result.

Incremental Impacts

A discussion of the incremental impacts that would occur as a result of the reasonably foreseeable actions is required by NEPA. In recent cases, courts have been looking very closely at whether the incremental impacts from actions have been evaluated thoroughly in NEPA documents. In late 2007, the Ninth Circuit Court of Appeals ruled in *Center for Biological Diversity v. National Highway Traffic Safety Administration* 508 F.3d 508, that an EA prepared by the National Highway Traffic Safety Administration was inadequate in that it did not include a discussion of the cumulative impacts of greenhouse gas emissions on climate change and the environment. The EA was prepared in advance of a Final Rule pursuant to the Energy Policy and Conservation Act of 1975 (EPCA), that set new corporate average fuel economy (CAFE) standards for light trucks model years including SUVs and minivans with model years 2008-2011. A new CAFE structure was created for model years beyond 2011 that sets varying fuel economy targets depending on vehicle size and requires manufacturers to meet different fuel economy targets depending on their vehicle fleet mix. [513]

The Court quoted their previous ruling in *Klamath-Siskiyou Wildlands Center* 387 F.3d 968 (2004);

“Cumulative impacts of multiple projects can be significant in different ways. The most obvious way is that the greater total magnitude of the environmental effects...may demonstrate by itself that the environmental impact will be significant. Sometimes the total impact from a set of actions may be greater than the sum of the parts.” 387 F.3d at 994

The Court was very clear in *Klamath-Siskiyou* that data and calculations are necessary to the analysis, but even more necessary is the actual discussion of what those data and calculations mean. In *Klamath-Siskiyou*, the BLM’s cumulative impact analysis was found to be inadequate because a “calculation of the total number of acres to be harvested in the water-shed is a necessary component of a cumulative effects analysis, but it is not a sufficient description of the actual environmental effects that can be expected from logging those acres” and “stating the total miles of roads to be constructed is similar to merely stating the sum of the actual acres to be harvested- - it is not a description of the actual environmental effects. 387 F.3d at 995

The *Center for Biological Diversity* case is also worth noting because it deals with documentation at the EA level. Requirements for analysis of indirect effects and

cumulative impacts are not usually differentiated between the EA and the EIS level. The Court in *Center for Biological Diversity* attempts to clarify by citing *Native Ecosystems Council v. Dombeck* 304 F.3d 866 that an EA “must in some circumstances include an analysis of the cumulative impacts of a project...an EA may be deficient if it fails to include a cumulative impact analysis...” [895]. In the *Center for Biological Diversity* case however, the Court ruled that this situation required the preparation of a full Environmental Impact Statement.

As air quality and emissions continue to be a growing concern worldwide, modern issues like this are likely to continue to surface as regulations and guidance continue to be revised and refined. As the Court points out in *Center for Biological Diversity* “the impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct.” [550] Decisions such as *Center for Biological Diversity* force practitioners to look beyond the current regulations and guidance and use their own best judgment as to what kind of impacts must be considered in the analysis. Because it is not always possible to keep federal regulations and state guidance up-to-date and reflecting the most current environmental issues it is important for practitioners to have a firm grasp of how to identify indirect effects and assess the cumulative impacts on our environment.

III. A Working Definition of the Term “Legal Sufficiency” Under NEPA

Although NEPA is frequently described by the courts as a primarily “procedural” statute, the considerable body of NEPA case law developed since 1970 has also focused on the substantive adequacy of environmental evaluations published in the NEPA process. To be determined legally sufficient, agencies’ analyses of indirect effects and cumulative impacts should generally satisfy several key standards of technical adequacy that courts use to review the content of environmental impact analyses across a range of subject areas. This section provides an overview of these general standards of legal sufficiency under NEPA. Further detailed discussion of courts’ application of these standards to specific cases involving project analyses of indirect effects and cumulative impacts is presented in Section II of Task 2 in this report.

NEPA requires an agency contemplating a major federal action to take a “hard look” at a proposed project’s environmental effects before acting, *Kleppe v. Sierra Club*. An agency takes this “hard look” by providing a reasonably thorough discussion of the significant aspects of the probable environmental consequences, *Center for Biological Diversity v. NHTSA* (quoting *Oregon Natural Resources Council v. Lowe*, 109 F. 3d 521 (1997)), sufficient to foster informed agency decision-making and informed public comment. The elements of an agency’s “hard look” would include, for example, obtaining opinions from experts outside the agency, giving careful scientific scrutiny to the issues, and responding to all legitimate concerns that are raised. *Hughes River Watershed v. Johnson*, 165 F. 3d 283 (1999).

Judicial review of whether the agency's substantive analyses have met these objectives under NEPA is limited to determining whether the agency's decision is "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law." Under this narrow standard of review, a court's role is only to assess whether the agency's environmental findings are "within the bounds of reasoned decision-making" [Audubon citing others]. The agency must examine the relevant data and articulate a satisfactory explanation for its action, a rational connection between the facts found and the choice made. *Center for Biological Diversity v. NHTSA* (quoting *Motor Vehicle Manufacturers Association v. State Farm Mutual Automobile Insurance Co.*, 463 U.S. 29 (1983)). But the court may not substitute its judgment for the agency regarding the correctness of the agency's decision, so long as the agency has considered all relevant factors and credible evidence. Courts are not required, equipped, or inclined to question an agency's scientific expertise or project recommendations, provided that the agency's analysis has relied on appropriate factors, has included all important aspects of the problem, and has offered rational explanations for its judgments based on the evidence. While the agency should strive for reasonable accuracy and thoroughness in its evaluation of project impacts, complete accuracy and exhaustive thoroughness are not the measures of compliance with NEPA. *Jones v. Peters*, 2007 U.S. Dist. Lexis 70332 (2007); *Audubon Naturalist Society of the Central Atlantic States, Inc. v. U.S. Department of Transportation*, 524 F. Supp. 2d 642 (2007).

What would this "hard look" mean as applied to substantive agency evaluations of indirect effects and cumulative impacts (or, of other similarly technically-complex impact studies prepared for environmental impact review documents)? The case law interpreting NEPA suggests several types of criteria of adequacy.

1. *Appropriate and transparent study methodology.* First, in preparing analyses of indirect effects and cumulative impacts for environmental statements or assessments, the agency should seek to identify, use, and clearly explain appropriate methodologies for analysis. The CEQ Regulations implementing NEPA, 40 CFR 1502.24, require agencies to ensure the scientific integrity of analyses by identifying and discussing the methodologies used and explicitly footnoting scientific sources. A particular challenge for achieving these goals with regard to indirect and cumulative impact assessment (as noted in the 2003 FHWA Interim Guidance: Indirect and Cumulative Impacts in NEPA) is that specific methodologies for secondary and cumulative impact studies are not as well established or universally accepted as those associated with evaluation of direct impacts. However, courts defer to agencies' reasonable choice of methodologies, *Hughes River Watershed v. Johnson*, 165 F. 3d 283 (1999), and have held that analysis of effects which can be ascertained, if at all, only through uncertain modeling techniques will be acceptable as a basis for informed decision-making under NEPA, *Audubon Naturalist Society v. U.S. DOT*. The agency, not the court, has the "responsibility of considering the various modes of scientific evaluation and theory and choosing the one appropriate for the given circumstances." *Audubon Naturalist Society*, quoting *Sierra Club v. U.S. Department of Transportation*, 753 F. 2d 120 (1985).

Agencies can validate the analysis techniques selected through various means, such as reference to scientific and professional literature, to methods that have been successfully applied to the issue for other projects, to agency and/or independent expert review of the modeling techniques, and through verification of results by comparing alternative or updated modeling techniques. The agency must disclose and discuss potential shortcomings or uncertainties of the selected methodologies; impact analyses have been found insufficient where the agency ignored or did not disclose such shortcomings or did not meaningfully address scientific uncertainty regarding assumptions of effects, but courts have upheld use of methodologies that were transparently presented and explained even in the face of conflicting experts' opinions about their reliability. On the other hand, analyses using methodologies whose reliability the agency has not attempted to verify, that an agency has used uncritically without adequate explanation of the complexities involved, or that an agency has selected but not used consistently in its analyses, are more likely to be found legally insufficient. *Ecology Center, Inc. v. Austin*, 430 F. 3d 1057 (2005); *Northwest Environmental Advocates v. National Marine Fisheries Service*, 460 F. 3d 1125 (2006); *Conservation Law Foundation v. FHWA*, 2007 DNH 106 (2007); *Border Power Plant Working Group v. Department of Energy*, 467 F. Supp. 2d 1040 (2006); *Hughes River Watershed v. Johnson*; *Great Rivers Habitat Alliance v. U.S. Army Corps of Engineers*, 437 F. Supp. 2d 1019 (2006).

2. *Factual documentation.* A second critical component of legal sufficiency is that impact analyses must use, document and disclose accurate, up-to-date factual information on which the conclusions about environmental consequences are based. Both the CEQ Regulations, 40 CFR 15.02.1 (environmental impact statements "shall be supported by evidence that the agency has made the necessary environmental analyses") and case law stress the requirement that accurate underlying data be provided and disclosed in the published environmental impact statement or assessment. *Border Power Plant Working Group v. Department of Energy*; *Ecology Center v. Austin*. While NEPA does not require an agency to update factual information, such as population and growth forecasts, continuously whenever new updates become available, the agency should use the most recent complete information readily available in the course of preparing an EIS. *CLF v. FHWA*; compare *Audubon Naturalist Society v. DOT*. Inaccurate information or unpublished information can render an EIS insufficient because the absence of full and correct data skews both the agency's and the public's evaluation of environmental effects. Use of modeling techniques unaccompanied by on-site field data verification of the model's predictions (for example, regarding soil quality in the project area) has also been found to be insufficient, *Ecology Center v. Austin*.

3. *Conclusions supported by relevant analysis and reasonable rationale.* Third, the agency's technical conclusions regarding environmental consequences, such as indirect and cumulative impacts, must be supported by logical analysis and plausible reasoning. The analyses presented must not simply list the metrics which would drive environmental consequences -- such as amounts of air pollutant emissions, number of acres harvested, or road miles affected -- but must also actually evaluate the incremental impacts that such quantitative factors could have on the human and natural environment. *Center for Biological Diversity*. The most frequent inadequacy identified in cumulative

impact analyses for transportation and other federal projects is agencies' failure to go beyond a "mere listing" of ongoing and planned projects in the geographic area to discuss substantively how that group of projects together might affect environmental resources. *Cuddy Mountain v. U.S. Forest Service*, 137 F. 3d 1372 (1998); *Davis v. Mineta*, 302 F. 3d 1104 (2002); *Western North Carolina Alliance v. NCDOT*, 312 F. Supp. 2d 765 (2003); *Senville v. Peters*, 327 F. Supp. 2d 335 (2004). In contrast, traffic modeling can be shown to account for cumulative effects of future region-wide projects on traffic flow has been upheld as a sufficient basis for assessment of cumulative impacts. *Jones v. Peters*.

Failure to explain a reversal in position on specific project impacts, reliance on conclusory expert opinion without presenting or explaining the underlying environmental data, and failure to disclose or explain how a key impact threshold was determined are other types of defects in logic and rationale for which environmental impact statements and assessments have been found legally insufficient under NEPA. *Ecology Center v. Austin*. Courts have also rejected secondary impact analyses which simply inferred in a conclusory manner that regional land use growth and development would continue with or without the highway project under study, and therefore did not discuss or compare potential impacts of project alternatives on localized growth patterns or the resulting impacts of such growth on natural resources. *Davis v. Mineta*; *Western North Carolina Alliance v. NCDOT*.

In contrast, an indirect impact analysis was found to be adequate where the agency (1) projected population and employment growth by city and town, with and without the highway widening ; (2) used the induced population growth projections to identify, albeit qualitatively, the extent of expected community level residential and commercial development; and (3) considered in some detail the resulting indirect effects of estimated growth on land use, surface water, groundwater, flood plains, wetlands, and wildlife. *CLF v. FHWA*.¹ At least as to these categories of indirect effects, the agency provided a reasoned and logical evaluation which the court found to be sufficiently detailed, along with adequate explanation that a more detailed analysis would be beyond the predictive ability of the available population/land use growth methodology.

IV. Criteria for Legally Sufficient Indirect Effects Analysis

Explains Definitions

The indirect effects assessment should reference and explain the CEQ definition of indirect effects and how the components of this definition are met by the analysis. Indirect impacts are those effects that ". . . are caused by the action and are later in time and 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

¹However, the court in that case held other aspects of the project's impact analysis insufficient, specifically, the agency's disregard of the more accurate populations forecasts developed for indirect impact analysis in the project's traffic and air quality modeling, and its failure to disclose or publish in the EIS a transportation sensitivity analysis that used these more accurate population forecasts for alternative traffic projections.

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(b)).

The CEQ definition of indirect effects specifically mentions induced growth, which is frequently the focus of many indirect effect assessments for transportation projects. However, the CEQ definition of indirect effects is much broader than induced growth and induced growth-related environmental effects. It can include other environmental effects that alter the function of natural systems that are separated from the project location by time and distance. NCHRP Report 466 labels this type of indirect effect as “encroachment-alteration” effects. Encroachment alteration effects (for example, habitat fragmentation) are often addressed in NEPA documents along with the direct effects of the project.

Owen Schmidt’s *Mistakes and Gaps in CEQ’s Regulations* explains why it is not possible to defensibly distinguish direct and indirect effects (especially encroachment-alteration type indirect effects): “The definition in the regulations of “direct effect” as one that occurs at the same time as its cause is wrong, because all effects occur later than their cause. The definition of “indirect effect” is partly correct, but because all effects occur later in time, indirect effects cannot be safely distinguished from direct effects.” There is no need to label all effects of an action as either direct or indirect. This view is reflected in recent NEPA guidance from the Bureau of Land Management:

The value in requiring analysis of both direct and indirect effects is to make certain that no effects are overlooked. Because it can be difficult to distinguish between direct and indirect effects, you do not have to differentiate between the terms. When you are uncertain which effect is direct and which is indirect, it is helpful to describe the effects together. Effects are weighted the same; you do not consider an indirect effect less important than a direct effect in the analysis (BLM, 2008).

If the indirect effects assessment does not explicitly separate all direct and indirect effects, the documentation should explain that certain types of indirect effects (e.g. encroachment-alteration) are addressed along with direct impacts in the resource-specific sections of the document, while other types (e.g. induced growth and induced growth related) are addressed in a separate section due to their unique and complex nature. This approach will ensure that document reviewers will understand that the full range of indirect effects described in the CEQ definition are addressed in the document, not just induced growth effects.

Identifies Study Area Boundaries and Time Frame

The indirect effects assessment should identify explicit study area boundaries and a time frame for the analysis, and explain the process by which these boundaries were selected.

The study area boundaries should be set to include the extent of the expected indirect effects. The study area boundary for indirect effects analysis is typically broader than the study areas used for direct effects analysis. The study area boundaries could be criticized

if they are not large enough to include all reasonably foreseeable indirect effects. However, a study area that is too large unnecessarily increases data gathering requirements, and diminishes the effects of an individual project. Setting the study area boundaries requires a screening-level consideration of the type and extent of indirect effects that could be expected based on the characteristics and location of the project. Caltrans's Guidance for Preparers of Growth-related, Indirect Impact Analysis recommends that the following factors be considered in a "first-cut" at an induced growth analysis: accessibility, project type, project location, and growth pressures in the area. According to NCHRP 466, the extent of indirect effects is primarily a function of project type, maturity of the regional transportation system, and land development. Greater effects are associated with new facilities relative to expansion of existing facilities. Further, linear projects (e.g. new highways) typically have the most extensive effects compared with new interchanges, transit stations, or bridges, or with new ports, airports and related facilities.

The following types of factors are recommended by NCHRP 466 as methods for defining study area boundaries. One of the best ways to ensure that the study area boundaries are reasonable is to provide mapping and discussion of how each of these factors was considered.

- Political/Geographic Boundaries.
- Commuteshed.
- Growth Boundaries.
- Watershed and Habitat Boundaries.
- Interviews and Public Involvement.

A good example of the consideration of multiple factors in setting study area boundaries is the Intercounty Connector (ICC) Secondary and Cumulative Effects Analysis Technical Memorandum. The ICC study defined the study area limits by combining a series of sub-boundary areas into a single study area. The sub-boundary areas included the study area for direct impacts, the traffic area of influence (traffic analysis districts with a 10 percent change in traffic volumes between build and no build), watersheds, community planning areas, sewer and water service areas, census tracts, and zones predicted to experience a five percent or greater change in household and employment growth between the build and no build by an expert panel.

The time frame should be short enough in duration to anticipate reasonably foreseeable events, but should be long enough in duration to capture the development and relocation effects that may only transpire over the course of several business cycles. NCHRP Report 466 states that most IE & CI evaluations set a time horizon equal to the design life of a project, and the horizon of local and regional plans (typically 20 years). The use of the horizon of the most accurate planning document available and/or the long-range transportation plan for a region as the basis for a temporal boundary is accepted as appropriate by a majority of transportation and resource agency staff (Executive Order 13274 Indirect and Cumulative Impacts Workgroup, 2005). Regional transportation and land use plans typically contain future population and employment forecasts. An added

benefit of using the outlook of these plans is that these forecasts can be used directly in the analysis.

Identifies Resources for Analysis

The indirect effects assessment should identify specific elements of the natural and human environment that are the focus of the analysis and explain how these resources were selected for analysis. For many major transportation project indirect effects assessments, considerable effort is put into developing complex household and employment forecasts for the build and no build scenarios to define the incremental effect of the project on the magnitude and/or location of future growth. These types of assessments are necessary, but do not constitute a sufficient indirect effects assessment. The analysis needs to be taken to the next level to answer the question- what are the environmental effects of the land use changes predicted by the analysis? The first step in ensuring that indirect land use effects are translated into environmental impacts is to decide which resources merit inclusion in the analysis.

It is important to note that for induced growth and induced growth-related indirect effects, the direct impacts of the project are not a consideration in selecting the resources for analysis. Typical resources analyzed for indirect effects include agricultural land, water resources, wildlife habitat, wetlands, cultural resources, and social and economic conditions. Public involvement and agency coordination should be an important component in ensuring that relevant resources are considered in the analysis. The indirect effects assessment should make use of the best available data on environmental and community conditions, it is not typically necessary to create new data or conduct extensive field work as is typically done with direct impact analysis.

Describes Cause and Effect Relationships

The indirect effects assessment should explain the relationship between the project and the anticipated indirect effects. For induced growth effects, the chain of causality between the transportation project, accessibility changes, household and employment location decisions, and environmental impacts should be discussed. One way to ensure that cause and effect relationships are fully evaluated is to identify all the potential impact-causing activities of the project and select specific impact-causing activities for analysis, as outlined in Steps 4 and 5 of the NCHRP 466 report. This process ensures that the effects selected for analysis are logical and based on facts.

Utilizes Reasonable Methodologies

One of the contributing factors to litigation over indirect effect issues is the existence of substantial disagreement over the influence of transportation on development. The indirect effects assessment should be conducted using generally accepted methodologies. The methodology is not required to be perfect or accepted by all experts, but the agency must show that it was not arbitrary and capricious in selecting the methodology. A good way to show that the methodology is accepted is to reference research literature discussing the methodology. For indirect land use change effects, NCHRP 25-25 Task 22 Forecasting Indirect Land Use Effects of Transportation Projects provides a comprehensive description of the available tools, including the advantages and

disadvantages of each. The report also discusses when and how to incorporate more complex levels of rigor to the land use analysis. The six types of analysis techniques are discussed on pages 28-29 of the NCHRP 25-25 Task 22 report;

- **Planning Judgment** is a structured process for analyzing and forecasting land use change that relies on an understanding of the basics of transportation/land use interactions, basic data sources, asking the right questions and using rules of thumb from research to make informed judgments. If more sophisticated tools are not available, Planner judgment may be the most expedient approach to use.
- **Collaborative Judgment** extends the solo planner's understanding through soliciting advice from others knowledgeable about the study area. When no other resources are available, collaborative judgment may be the only sufficient approach for indirect land use effects. In such cases, it is particularly important to structure this input so that the weight of given individuals, personalities and agendas are evened out.
- **Elasticities** bridge the gap between practice and research by providing a synthesis of the best theoretical and empirical research that allows analysts to better sort out the complexities of induced demand, indirect land use effects, and induced investment effects. The elasticities relate change in highway capacity (e.g., assessed through Vehicle Miles Traveled [VMT]) to change in travel behavior and in land use effects. They can be used to check the results of other approaches for reasonableness or as a standalone tool in combination with the above two approaches.
- **Allocation Models** can allow the analyst to distribute a defined amount of indirect land use change at a disaggregate level (e.g. to TAZs) by making areas more or less attractive for development based on a number of factors that include accessibility. Typically a set of allocation rules that work through GIS-based spatial datasets, these models can also help define the amount of growth that is induced, as well as distribute it but in such situations they must be used in careful combination with other tools. Planner and collaborative judgment are necessary in the creation of the rules and the evaluation and tweaking of the results.
- **Four Step Models** refer to the standard travel demand models that simulate travel behavior by generating, mode-splitting, distributing and assigning trips (the four steps) to a travel network. These computer-based models can provide very useful information for inferring land use change by accounting for changes in accessibility, and can even be used to allocate land use change by modifying interim model outputs and rerunning the model to explore the effects of indirect land use effects on transportation facility performance. While complex procedurally, the four step model process can be coordinated with and informed by any of the three foundational tools.

- **Integrated Transportation-Land Use Models** combine the interaction of land use and transportation in one seamless modeling process and would thus seem to be the ideal way to address indirect land use effects. Unless structured to do so, however, they will not necessarily provide this information adequately. Their extensive data needs and complexity (e.g., linked submodels) make them attractive where these resources exist and where the project warrants such an intensive effort.

Quantitative vs. Qualitative Analysis Methods

NEPA and the courts do not require quantitative analysis of induced growth effects, qualitative analysis methods (e.g. expert panels) are equally valid, as long as the documentation shows that the agency has taken the “hard look” at the issues and potential impacts. As noted in NCHRP 25-25 Task 22, qualitative methods based on planning judgment and/or the collaborative judgment of several people with knowledge of study area trends may be the only type of analysis possible based on data availability in a particular area. Even when quantitative methods are available, a qualitative methodology may be more appropriate when considered in comparison to the drawbacks of quantitative methods. For example, the complexity of regional transportation models can make them an easy target for criticism, as a result of disagreement over input data or as the result of errors in the model. Regardless of the methodology used, the transportation agency should document the reasonableness of its decision and describe the factors that contributed to the rejection of alternative methodologies (data requirements, cost, lack of validity).

In addition to the NCHRP 25-25 Task 22 report, guidance on the application of expert panels can be found in the NCHRP 8-36 Task 4 Report, *The Use of Expert Panels in Analyzing Transportation and Land Use Alternatives* and in the FHWA report, *The Use of Expert Panels in Developing Land Use Forecasts*.

Estimating Environmental Impacts of Land Use Change

It is important to note that the NCHRP 25-25 Task 22 report is focused on the land use effects of transportation projects; it does not discuss methods for translating land use change estimates into environmental and community impacts. Typical methods for estimating environmental impacts based on land use change include purely qualitative descriptions of the location and magnitude of potential effects, impact calculations based on simple assumptions about land consumption per unit of household and employment growth, and trend analyses of future impacts based on the historical relationship between land use change and environmental impacts. There is a lack of detailed guidance available on selecting appropriate methods for analyzing environmental impacts of land use change effects. The type of analysis largely depends on the type of land use forecasting employed, with the more detailed modeling approaches producing information better suited for the quantitative analysis of environmental impacts. Regardless of the methodology used, the agency should document how the methodology was selected, allow for public and agency input, and consider the effect of planning and environmental regulations in determining the ultimate environmental effect.

Identifies Incremental Indirect Effect of Build Alternatives (compared to No Build)

The indirect effects assessment needs to describe the incremental effect of the build alternatives. This is the essential bottom line conclusion needed to meet the analysis requirements of the CEQ NEPA regulations. For induced growth type indirect effects, the incremental effect of the project must be expressed both as effects on the location of household and business growth and the environmental impact of these changes in growth (e.g. changes in impervious surface cover as an indicator for water quality impacts, fragmentation and conversion of wildlife habitat). As with direct impacts, the indirect effects need to be presented in the context of the impacts that will occur without the project (the no build alternative). Considerations for defining the No Build Alternative are provided in the section on Cumulative Impacts.

Internal Document Consistency

Case law repeatedly shows that NEPA documents cannot contain internal contradictions that put the analysis results into question. The completed indirect effects assessment should be checked for consistency with several other sections of the document, including the purpose and need statement, economic analyses, and traffic analyses. If the purpose and need statement includes economic development, then the indirect effects analysis is expected to consider the environmental effects of this development. The growth predicted as a project benefit in an economic impact analysis must match up with the growth predicted in the indirect effects analysis. Finally, if the indirect effects assessment predicts a change in the magnitude and/or location of population and employment growth as a result of the project, these changes should be accounted for in the transportation analysis of the project.

Public Involvement and Agency Coordination

Public involvement and agency coordination is a fundamental technique for improving the adequacy of indirect and cumulative impact analysis, and is strongly recommended by most guidebooks. Public involvement and agency coordination should be conducted to allow input into key steps in the assessment process, including, but not limited to: setting study area boundaries and time frames, selecting resources for analysis, identifying cause and effect relationships, selecting analysis methodologies, conducting the analysis and developing mitigation. Particular attention needs to be paid to comments from organized opposition groups (who may raise similar issues in potential future litigation), and resource agencies (that are viewed by judges as subject matter experts). The public involvement process needs to be fully documented to provide the following information for the record:

- Time and place of the meeting
- Meeting agenda and format
- Attendees
- Material presented and hand outs
- Summary of comments and discussion at the meeting
- Disposition of comments

Mitigation



Mitigation for direct, indirect or cumulative impacts is not required by NEPA, which only requires that possible mitigation be disclosed. The Clean Water Act does have guidelines which require aquatic resource mitigation under Section 404(b)(1). However, according to NCHRP Report 25-25 Task 11, “neither the regulatory definition of mitigation [in the 404 (b)(1) guidelines] nor the applicable guidance refers to mitigation for indirect or cumulative impacts, although such considerations are not explicitly excluded” (p. 16). It is important to identify all the possible mitigation techniques for indirect effects and to provide information to decision-makers, state/federal agencies, local and regional governments and the public about what techniques can be useful and who has authority to impose or implement those mitigation techniques and/or controls. Mitigation strategies typically discussed in indirect and cumulative impact assessments include: access management, zoning and comprehensive planning, transfer of development rights, growth management regulations, resource management and preservation regulations, land acquisitions and conservation easements, and incentives for infill development. Wisconsin DOT’s *Guidance for Conducting an Indirect Effects Analysis* recommends using a table or matrix outlining the various mitigation activities with the respective agency/stakeholder that has the authority to implement them. The mitigation discussion should also note which mitigation measures are already being implemented or are planned to be implemented. WisDOT guidance recommends that for potential mitigation measures not currently being implemented, the likelihood of the mitigation being implemented should be discussed.

V. Criteria for Legally Sufficient Cumulative Impact Analysis

Explains Definitions

The cumulative impact assessment should reference and explain the CEQ definition of cumulative effects and how the components of this definition are met by the analysis. Cumulative impacts are “environmental impacts resulting from the incremental effects of an activity when added to other past, present and reasonably foreseeable future activities regardless of what entities undertake such actions. Cumulative effects can result from individually minor but collectively significant activities taking place over time and over a broad geographic scale, and can include both direct and indirect impacts” (40 CFR 1508.7). According to the FHWA’s Interim Guidance: Questions and Answers Regarding the Consideration of Indirect and Cumulative Impacts in the NEPA Process, cumulative impacts include the total of all impacts to a particular resource that have occurred, are occurring, and will likely occur as a result of any action or influence, including the direct and reasonably foreseeable indirect impacts of a proposed project.

Identifies Resources for Analysis

The cumulative impact assessment should identify specific elements of the natural and human environment that are the focus of the analysis and explain how these resources were selected for analysis. There are a vast number of potential elements of the natural and human environments that could be considered in a cumulative impact assessment of a transportation project. However, the time and resources available for conducting these assessments is limited, so it is necessary for the analysis to focus on a small number of

notable features. Rather than present a superficial analysis of cumulative impacts on dozens of resources, tailoring the analysis to address only the key resource issues allows for a more detailed and meaningful assessment. Several state DOT cumulative impact assessment guidance documents recommend that the analysis focus on those resources that could be substantially affected by the project in combination with other past, present, and reasonably foreseeable future actions, and resources currently in poor or declining health or at risk even if project effects are relatively small.² Most guidance documents indicate that it is acceptable to exclude from the cumulative impact analysis resources that are not expected to experience any direct or indirect effects as a result of the project. The best way to confirm that the agency's selection of resources for the cumulative impact analysis is reasonable is to obtain public and agency feedback through a workshop or similar venue.

Identifies Study Area Boundaries and Timeframe

The cumulative impact assessment should identify explicit study area boundaries and a time frame for the analysis, and explain the process by which these boundaries were selected.

There is general agreement in guidebooks and from practitioners that the boundaries of the cumulative impact assessment should be resource-based. According to EPA, the "geographic boundaries and time periods used in cumulative impact analysis should be based on all resources of concern and all of the actions that may contribute, along with the project effects, to cumulative impacts" (EPA, 1999). California's Guidance for Preparers of Cumulative Impact Assessments recommends resource-specific study area boundaries that are "large enough to provide the context necessary for understanding the health of the resource and compact enough to present a proper perspective" (Caltrans, 2005). Typical types of resource boundaries used to define cumulative impact assessment study areas include watersheds and contiguous habitat areas.

As a practical matter, the cumulative impact assessment boundaries must be at least as large as the direct and indirect effect study areas because direct and indirect effects are components of cumulative impacts. If the indirect effects assessment already used the boundaries of the natural resources of concern in defining a study area then it may be convenient to use the same study area as the boundary for assessing cumulative impacts.

The future analysis year used in the cumulative impact assessment should have a logical basis, such as the future year used for regional transportation and land use plans. The future analysis year should be the same as the indirect effects assessment for clarity. Some cumulative impact assessments establish an explicit analysis time frame for examining "past actions." A formal historical temporal boundary is not strictly necessary based on case law, as long as the discussion of resource trends summarizes the important effects of past actions on the health of each resource. If it is decided to establish a formal timeframe for looking at past actions, the timeframe should be at least 10 years and be

² See for example: Washington State Department of Transportation, 2008. *Guidance on Preparing Cumulative Impact Analyses*; and Texas Department of Transportation, 2006. *Guidance on Preparing Indirect and Cumulative Impact Analyses*.

based on a development event that was important in shaping the current land use of the study area (e.g. opening of major regional employer, major transportation project, or other turning point).

Identifies Resource Condition and Trends (Impacts of Past and Present Actions)

The best way to meet the CEQ regulation requirement to study the impacts of past and present actions is to describe the current health of each resource, how it got to its current state, and major trends affecting the health of the resource. This approach is recommended by several state guidance documents, including Texas, California, Wisconsin and Washington State. It is not necessary or informative to list every individual past action that affected resources (*CEQ Guidance on the Consideration of Past Actions in Cumulative Effects Analysis*, 2005). The analysis must consider the impact of all types of public and private past actions, not just past transportation projects. Data on resource status and trends should be obtained from reliable sources, such as federal and state agencies with expertise in the resource. The analysis should discuss the environmental protection measures (such as regulations or conservation programs) that have been implemented to protect or restore the resource, and the effectiveness of these measures in reducing impacts.

Identifies Impacts of Other Reasonably Foreseeable Future Actions

The cumulative impact assessment must identify other reasonably foreseeable actions that will impact the resources of concern. One best practice for meeting this requirement is to define the No Build alternative for all of the project analyses (direct, indirect, and cumulative) to include all “reasonably foreseeable future actions” as this term has been interpreted in case law. The Lessons Learned section discusses the definition of reasonably foreseeable actions that has emerged from case law.

The no build scenario actions that need to be considered depend on the boundaries of the various study areas used for the analysis of cumulative impacts. If a methodology such as the concept of Resource Study Areas (RSAs) is used to define different study area boundaries for each resource in the cumulative impact analysis, then it is possible that different no build actions will be considered for different resources. Three main types of actions need to be included in the no build scenario: other major transportation projects, other (non-transportation) major development proposals, and future population and employment growth forecasts.

Transportation Projects. One key source of reasonably foreseeable transportation projects is the long-range transportation plan prepared by the metropolitan planning organization or other planning organization for the area where the project is located. These plans are required to be fiscally constrained. Statewide transportation plans can also be consulted as a source of information on future transportation projects. The accepted practice of using long-range transportation plans as a source of information about future transportation projects is a key reason to consider using the future year outlook of these plans as the future analysis year for the cumulative impact analysis. The cumulative impact assessment does not need to include minor projects, just the major

projects that have the potential to impact the environment for example: new roadways, large roadway widening projects, and new rail alignments.

Other Major Development Proposals. The no build scenario should contain the impacts of other reasonably foreseeable developments, such as new residential subdivisions, office parks and commercial centers. The key information sources for non-transportation development proposals include regional and local land use plans, minutes of local planning meetings on the review of proposed developments, and interviews with private developers. The record should demonstrate a good faith effort to obtain information on major planned developments.

Population and Employment Growth Forecasts. The no build scenario must account for reasonably foreseeable future population and employment growth, as this growth is typically the major driver of environmental impacts. These future population and employment growth forecasts should be obtained from regional planning organizations that typically generate these forecasts as an input for transportation modeling for the long-range transportation plan. Before using forecasts generated by others, the agency must make a determination that the forecasts are reasonably up to date and were conducted using a reasonable methodology. As discussed in greater detail in the NCHRP 25-25 Task 22 report, the agency must also delve into the assumptions embedded in the forecast- is the forecast already accounting for indirect and cumulative effects by assuming the project is built? In this situation, the forecast represents the build condition, and the agency must conduct an analysis to estimate the no build condition.

Note that a simple listing of projects included in the no build scenario is not enough to constitute an adequate cumulative effects analysis- the environmental effects of these projects must be estimated. This can be challenging because there is typically a lack of detailed information about proposed projects that are in an early planning stage. For other transportation projects, the analysis can discuss probable impacts based on an overlay analysis between the general alignment and mapping of environmental resources. Exact calculations of impacted areas are not necessary. For projects where detailed environmental studies have been conducted, the impacts identified in these studies should be summarized. For future population and employment growth, environmental impacts can be estimated by examining the density of past development on a TAZ or town level. Assuming future development occurs at the same density, how much land will be converted to developed uses based on the population and employment forecasts for the town? The sophistication of this type of analysis can be improved by taking into account the amount of available land in the area and making reasonable assumptions about which types of land are likely constrained from future development (e.g. parks, steep slopes, wetlands). Where GIS information on zoning districts is available, this information can be utilized to further refine the impact analysis.

Summarizes Total Incremental Effect of Build Alternatives (Direct +Indirect)

The cumulative impact assessment needs to address the “incremental effects of an activity” component of the CEQ definition of cumulative impacts by summarizing the direct and indirect project impacts on the resources of concern. This information should

already be included in other places in the environmental document, but it needs to be summarized in a concise way here so that the reader can understand the total increment of the project in the context of the impacts of all other actions.

Describes Cumulative Impacts

The cumulative impact assessment must draw conclusions about the aggregate or total impact on each resource as a result of all the actions included in the no build scenario, plus the direct and indirect impacts of the proposed project. These conclusions regarding cumulative impacts need to take into account the health of each resource (the result of past and present actions), and countervailing trends, such as restoration programs and environmental regulations that could lead to overall improvements in the health of a resource, even though it is being impacted by development. Where appropriate data is available, the discussion of cumulative impacts should incorporate quantitative information regarding the total impacts anticipated for each resource. It is important that the conclusions about cumulative impacts are based on facts generated by the cumulative impact assessment process, not speculation.

Public Involvement and Agency Coordination

Coordination with the public and agencies is important in cumulative impact assessment, as with indirect effects assessment (See Section IV, Public Involvement and Agency Coordination). Public involvement and agency coordination should occur at several points in the assessment process to allow comments and input on the resources selected for analysis, study area boundaries and timeframes, resource health and trends, the identification of other reasonably foreseeable actions, and cumulative impact assessment conclusions.

Mitigation

Mitigation needs to be discussed in the cumulative impact assessment, even though the actions of others are not within the control of the transportation agencies. The mitigation discussion will likely be similar to the indirect effects mitigation discussion (See Section V, Mitigation), and should identify land use planning and resource protection policies to avoid, minimize, rectify, reduce, or compensate for cumulative impacts.

VI. Criteria for Adequate Documentation of Indirect and Cumulative Impact Analyses

Explains Process and Methodology

Regardless of the technical merits of an IE & CI assessment, if a judge cannot understand it, then the project is at risk during litigation. The IE & CI assessment needs to explain what indirect effects and cumulative effects are, how they were analyzed, why the analysis methodologies are reasonable, and what the results of the analysis mean. This is probably the most important aspect of producing a legally sufficient analysis, and represents a key cause of IE & CI-related court decisions decided against transportation agencies. The IE & CI assessment documentation should be reviewed by attorneys and others not involved in conducting the analyses to ensure that they can understand the process, methodology, and conclusions. Reviewers should make sure that the assessment

provides evidence of a “hard look” and reasoned decision making, and answers all questions that could be reasonably asked about potential project impacts. Projects with complex IE & CI assessments need to plan schedules and budgets to account for the need to conduct a thorough review of the IE & CI assessment and rewrite it for readability if necessary.

One way to help make the IE & CI assessment process comprehensible is to structure the analysis and documentation around a clearly defined process with a logical flow path. The NCHRP 466 report, CEQ’s Considering Cumulative Impacts Under the National Environmental Policy Act, the NCHRP 25-25 Task 11 report, and several state guidance documents each provide an organizational framework for explaining the IE & CI assessment process. However, not all of these guidance documents address both indirect and cumulative impacts. It is extremely important that both types of effects are clearly documented, not just one or the other. There is also a risk that in rigidly following a formulaic step-by-step process that factors unique to a particular project will not receive full consideration. Practitioners should use the available process guidance as valuable tool for structuring the analysis, but the extent and areas of focus need to be tailored to the key issues for particular projects and areas.

VII. Assessing and Managing IE & CI Litigation Risk

Assessing IE & CI litigation risk for any particular project during the NEPA process is inherently uncertain. However, based on past IE & CI cases, the following factors are important to consider in understanding and managing IE & CI litigation risks: organized opposition, interagency disagreements, complicated resource or regulatory issues, and project characteristics.

Organized Opposition

The existence of environmental or community groups opposed to the project due to real or perceived indirect and cumulative impacts is a NEPA litigation risk. Litigation risk can be particularly high when the opposition group or groups have previously pursued legal action against the project, and/or have a history of litigation against similar types of projects. It is important for the preparers of the IE & CI assessment to understand the point of view of potential plaintiffs by carefully reviewing the following documents:

- *Comments from the organized opposition during the NEPA process.* The comments of an organized opposition group during scoping or on a DEIS may be similar to issues that could be raised in future litigation. An IE & CI assessment process that allows for the opposition group to comment on the IE & CI assessment methodology *before* it is used in the environmental document is particularly desirable in demonstrating the willingness of the transportation agency to consider all viewpoints. The IE & CI analysis should be modified to address the issues raised by the organized opposition, or alternatively the environmental document should clearly explain that the recommendations of organized opposition were considered and rejected, and the specific reasons why they were rejected.

- *Comments and legal briefs from the organized opposition on similar projects.* Review of these documents can provide the IE & CI document preparers with background on reoccurring themes in litigation brought by the opposition organization. This review may suggest key areas of focus for the IE & CI assessment.
- *Opposition from organization websites and other documents.* The preparers of the IE & CI assessment should be familiar with the goals and objectives of opposition organizations. Frequently these organizations will maintain project-specific websites for transportation projects they are actively opposing. These websites may contain arguments and documentation of the organization's concerns related to IE & CI. Key things to look for include mention of natural resource or community features of importance, and other transportation and non-transportation projects that the organization believes will impact the environment in combination with the proposed project. These other projects and actions should be considered for inclusion in the cumulative impact analysis. The transportation agency should also be prepared to publically respond to the IE & CI –related claims published by opposition organizations, as these issues may be raised in questions from the press and the public.

By understanding the point of view of organized opposition groups, the IE & CI assessment can be tailored to specifically address their concerns. For example, if an organized group believes that a project will spread residential and commercial development in a rural town near the project, the IE & CI assessment should clearly state whether or not and what magnitude of potential effects are anticipated for this town. It is particularly important to thoroughly address comments from an opposition group on a draft environmental document challenging the adequacy of the IE & CI assessment methodology. A judge is likely to look closely at how the agency addressed these comments if the opposition group raises the same issues with the analysis during litigation.

Interagency Disagreement

Interagency disagreement is a litigation risk factor because unresolved agency comments critical of the IE & CI assessment will likely be used by the plaintiffs in any litigation. Courts often look to resource agencies as subject matter experts; therefore failure to address or respond to their comments can present serious problems. Among other cases, resource agency disagreement over IE & CI analysis methods and conclusions were cited by the plaintiffs in *North Carolina Alliance for Transportation Reform v. Slater* 151 F. Supp. 2d 661 (2001) (Fish and Wildlife Service comments on DEIS requesting additional analysis of the indirect and cumulative impacts of the Winston Salem Northern Beltway (Western Section) on wildlife habitat), and *Senville v. Peters* 327 F. Supp. 2d 335 (2004) (U.S. EPA comments on Chittenden County Circumferential Highway EA/Reevaluation requesting additional analysis of induced growth related impacts). Early and continuous resource agency coordination in scoping and conducting the IE & CI assessment can help to avoid agency disagreements over IE & CI assessment methodologies and results.

When IE & CI disagreements do occur, the transportation agency needs to make a good faith effort to address the resource agency concerns and clearly document any outstanding areas of disagreement in the FEIS response to comments and in the ROD.

Complex Regulatory Issues

When the NEPA process is integrated with other environmental laws for streamlining purposes, the IE & CI assessment needs to address the specific requirements of all applicable laws, not just NEPA. These other laws have definitions of indirect effects and cumulative impacts that are different from the NEPA definitions. In addition to legal challenges of the adequacy of an IE & CI assessment under NEPA, IE & CI assessments have been challenged under the provisions of other environmental laws, including the Endangered Species Act and Section 404 of the Clean Water Act (see NCHRP 25-25 Task 11, *Indirect and Cumulative Impact Analysis: A Review and Synthesis of the Requirements for Indirect and Cumulative Impact Analysis and Mitigation Under Major Environmental Laws.*) Transportation agencies need to ensure that environmental documents clearly demonstrate compliance with all applicable requirements. For example, the Army Corps of Engineers and U.S. EPA have statutory duties to review projects impacting waters of the United States in the context of the Section 404 (b)(1) guidelines. The review of project NEPA documents by these agencies could be improved by providing a section of the IE & CI assessment specifically addressing the Section 404 (b)(1) requirements with respect to secondary and cumulative impacts on aquatic resources, or explaining where in the document this information is located.

Project Type and Characteristics

Certain types of transportation projects are consistently more likely to be targets of IE & CI litigation. Highway projects, particularly new alignment highway projects are the focus of the majority of transportation IE & CI litigation. For example, of the 35 indirect and cumulative impact cases reviewed in the Executive Order 13274 Indirect and Cumulative Impacts Work Group Draft Baseline Report, 19 cases involved highway or bridge projects, 7 involved airport projects, and 9 involved other types of projects. A new alignment highway project or a new interchange on an interstate highway in a rural area has a greater probability of IE & CI litigation than a transit project in an urban area. Resource agency and environmental organization often have the perception that highway projects cause undesirable changes in growth patterns (e.g. “sprawl”). Transit projects in urban areas are often perceived as having primarily beneficial growth impacts (e.g. “smart growth”, “transit-oriented development”). The preparers of IE & CI assessments need to be aware of these differences and plan the scope of the analysis to match. Although many highway projects have little or no potential to influence development patterns, a detailed analysis may nevertheless be required to demonstrate that the transportation agency took a “hard look” at the issue.

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