

INDIRECT AND CUMULATIVE IMPACT ANALYSIS

A review and synthesis of the requirements for indirect and cumulative impact analysis and mitigation under major environmental laws and regulations.

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I. Introduction

A. Background

The challenges and complex issues involved with transportation project indirect and cumulative impact analyses and mitigation have become more evident in recent years. Indirect and cumulative impact analysis has gained more attention as there has been increased emphasis on a holistic, ecosystem perspective on environmental resources. Increasingly, indirect and cumulative impacts have become a common focus of legal challenges. At the same time, transportation agencies are under increasing pressure to make the environmental review process more efficient, which often takes the form of incorporating all environmental laws, each with its own regulations, policies, and administrative procedures, into one concurrent process during a NEPA study. Indeed, SAFETEA-LU encourages this comprehensive process approach in its provision on “Efficient Environmental Reviews for Project Decision-Making.”¹ This approach carries with it legitimate questions over how to conduct a comprehensive indirect and cumulative impact analysis that complies with all Federal agency requirements.

State departments of transportation, the Federal Highway Administration, other Federal resource agencies and consultants are seeking a better understanding of what Federal agencies may expect or require as they explore various methods, techniques, and tools that can be applied to indirect and cumulative impact assessments. Environmental laws encourage, and in some instances obligate, a transportation project sponsor to thoughtfully consider other agency views and interests. Yet these environmental laws generally lack specific requirements for a particular methodology for indirect and cumulative impact assessment, or for particular mitigation approaches. Trying to sort out what is required for indirect and cumulative impact analysis and mitigation to address the concerns of other agencies, particularly those that must take regulatory action, could cause project delay or denial of permits. This study proposes that early, effective interagency coordination is necessary to a compatible approach to indirect and cumulative impact analysis that complies with all agencies’ laws and regulations.

B. Purpose of this Report

This report is the product of research for the National Cooperative Highway Research Program (NCHRP) Project 25-25, Research for the AASHTO Standing Committee on the Environment. The purpose of this report is to synthesize definitions and requirements under NEPA and other environmental laws for indirect and cumulative impacts analysis and mitigation for transportation projects and to recommend an approach to satisfying Federal agency expectations. This report is designed for transportation agency project sponsors, Federal Highway Administration, resource agency regulatory staff, consultants and other environmental practitioners.

¹ SAFETEA-LU Section 6002, Public Law 109-59; 23 USC Section 139.

C. Other Related Reports

In the interest of brevity, this report seeks to augment rather than reiterate background information contained in other related reports. This section lists the primary sources where extensive discussion on background, specific methodologies for analysis, and other information specific to indirect and cumulative impact analysis is available.

Executive Order 13274 Indirect and Cumulative Impact Work Group Baseline Report

The Executive Order 13274 Indirect and Cumulative Impacts Work Group has developed a baseline of existing information pertaining to indirect and cumulative for transportation projects, and documented existing practices and challenges. The Baseline Assessment Report from the Indirect and Cumulative Impacts Work Group of the Executive Order 13274 Interagency Task Force (“Baseline Assessment Report”)² published in 2005 contains information on:

- Summary of laws and regulations and case law that address indirect and cumulative impacts
- Existing guidance materials and training programs
- Summary of current state of the practice, lessons learned and opportunities
- Case studies on indirect and cumulative impacts practices
- Recommended next steps for the indirect and cumulative impacts Work Group

This research was initiated following the publication of the Baseline Assessment Report. This research is not duplicative of the comprehensive research conducted by the Work Group and its consultant. Instead, this report focuses in detail on the recommendation for an interagency coordination model, which is one of ten recommendations for next steps of the Work Group, and it goes into detail on environmental laws other than NEPA.

CEQ Handbook – Considering Cumulative Effects

Published in 1997, the CEQ Handbook *Considering Cumulative Effects under the National Environmental Policy Act* is an important resource 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 and data sources.

NCHRP Report 403 and 466 – Indirect Effects

NCHRP Report 403: *Guidance for Estimating the Indirect Effects of Proposed Transportation Projects* (1998) and the accompanying Desk Reference contained in NCHRP Report 466 (2002)

² Executive Order 13274 Indirect and Cumulative Impacts Work Group Draft Baseline Report. March 25, 2005. Available at <http://www.fhwa.dot.gov/stewardshipeo/icireport.htm>.

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give background and a suggested approach to indirect effects only. These resources include comprehensive discussions on regulations, case law, published literature, and current experience with indirect effects analysis. These reports present a framework for identifying and analyzing indirect impacts of transportation projects, with particular emphasis on development effects. The Desk Reference is organized in a training course format.

The NCHRP Reports 403 and 466 are primarily focused on meeting NEPA requirements. They provide an eight step process with detailed methodologies and checklists that the practitioner can employ in each step of an indirect impact analysis. Coordination with other agency laws is not emphasized.

Reports on Substantive Methodologies

Other related reports provide guidance on specific methodologies for assessing certain types of impacts. These include the published reports:

- NCHRP Report 423A: *Land Use Impacts of Transportation: A Guidebook*.
- NCHRP Report 456: *Guidebook for Assessing the Social and Economic Effects of Transportation Projects*.
- *Handbook on Integrating Land Use Considerations into Transportation Projects to Address Induced Growth* prepared for NCHRP 25-25 Task 3.

Upcoming research for NCHRP 25-25 will produce two relevant new reports, likely to be published in 2006:

- *Land Use Forecasting for Indirect Impacts Analysis* being prepared for NCHRP 25-25 Task 22.
- *Alternative Mitigation Strategies/Early Mitigation: Streamlining and Achieving Net Benefits for the Natural Environment* being prepared for NCHRP 25-25 Task 10.

What can get lost in current literature is that the same basic NEPA principles apply to an adequate analysis of indirect and cumulative impacts as to an adequate analysis of direct impacts. The continuing goal of NEPA is making informed and better decisions, not conducting the perfect analysis. Any effort to make the analysis formulaic makes it difficult to maintain the fact-specific, case-by-case nature of the process.³ The findings in this report seek to simplify the approach and ultimately the analysis of indirect and cumulative impacts by stressing agency coordination and transparency throughout the decision-making process.

³ Wagner, Fred R. and Mallory, Brenda, Beveridge and Diamond, P.C., "Analyzing the Indirect and Cumulative Impacts of Federal Permitting Actions and Approval Decisions: A Common Sense Approach to Improve the NEPA Process." Transcript of the 65th Northern America Wildlife And Natural Resources Conference, p. 429.

D. Organization of This Report

The research conducted for this report consists of a literature review on the topic of indirect and cumulative impact analysis and related topics, a thorough review of major environmental laws, regulations and guidance from each agency, interviews with over a dozen practitioners and agency representatives, and selected project case study document reviews. The report is organized by the following sections:

- State of the Practice

This section presents some common issues agencies are facing in developing adequate assessment of indirect and cumulative impacts and how those relate to the objectives of this research.

- Components of an Indirect and Cumulative Impacts Analysis

This section presents a compilation and synthesis of provisions from major environmental laws and regulations that address basic components of an indirect and cumulative impact analysis, including what is required for mitigation.

- Adequate Analysis and Mitigation Requirements

This section presents more detailed information on what constitutes adequate analysis and mitigation for indirect and cumulative impact under each major environmental law. How the regulatory requirements are currently being interpreted and applied in agency guidance, policy, and practice is described.

- Recommendations for a Compatible Approach

This section presents a framework for how transportation projects can approach assessment and mitigation of indirect and cumulative impacts analysis in a way that satisfies statutory requirements, meets agency expectations, and avoids project disagreements and delay.

II. State of the Practice

The purpose of this section is to summarize the state of the practice and to introduce concepts that form the basis for the recommendations for a compatible approach to indirect and cumulative impacts analysis. It begins with a brief introduction to the research objectives of this report, then, presents general issues of concern in the current state of the practice in regard to indirect and cumulative impacts for transportation projects. It concludes with an introduction to a compatible approach framework for incorporating other environmental laws into the NEPA process for indirect and cumulative impact assessment and mitigation.

There are a variety of challenges facing project sponsors and Federal resource agencies related to indirect and cumulative impacts analysis for transportation projects. The practice is in a transitional stage; it has not yet matured. According to the 2005 Baseline Assessment Report, the broad state of the practice can be characterized as often limited to a cursory analysis of indirect and cumulative impacts.¹ It is clear that there is confusion regarding the appropriate approach to indirect and cumulative impact analysis and mitigation and that some of that confusion stems from incomplete knowledge of various agency laws, regulations and guidance.

A. Research Objectives

The research objective for this report is to determine what other Federal agencies require under applicable substantive environmental laws and regulations, and how those requirements relate to indirect and cumulative impact assessment and mitigation for transportation projects. The focus of the research conducted for this report can be summed up in these questions:

- What is the definition of indirect and cumulative impacts and is there a difference?
- What do various environmental laws require for assessment of indirect and cumulative impacts on particular resources?
- What measures do resource agencies use to determine the point at which indirect and cumulative impacts are so far removed from a proposed action that they are not reasonably foreseeable or are not worth the expenditure of resources to study it?
- What are the requirements regarding methodology and level of detail when analyzing indirect and cumulative impacts?
- What is required in terms of mitigation for indirect and cumulative impacts?
- How can transportation agencies work with resource agencies to get reasonable analysis and results?

¹ Baseline Assessment Report, p. 23.

This research has found that on projects where there was both a more rigorous analysis and acceptance of the results by Federal agencies, there was also early agency coordination during scoping, prioritization of important resource impacts, and an effective communication process employed. These concepts are universal and provide the framework for overcoming confusion over minimum standards, proper methods of analysis, or other general issues of concern.

B. Issues to be Addressed

Conducting adequate indirect and cumulative impacts analysis has become a paramount concern on many transportation projects across the nation. The 2005 Baseline Assessment Report contains a complete discussion of a wide range of issues regarding the state of the practice.² Listed below are the major issues that are addressed in the research objectives of this report.

Confusion about definitions

NEPA documents for transportation projects have tended to lack clear understanding of the terms or consistent use of terms, thus confusing or failing to differentiate between indirect and cumulative impact analysis.³ The definition of those terms is different, the analysis and related requirements are different, and confusing the analysis can create legal vulnerability.⁴ Moreover, when indirect and cumulative impacts are not delineated clearly, resource agencies understandably have trouble demonstrating compliance with their narrower regulatory responsibilities. Finally, considerable confusion can occur when several terms are used for indirect impacts, such as secondary or induced, whether or not the document attempts to differentiate the terms.⁵

Due to confusion over basic definitions of indirect and cumulative impacts, agencies have been moving recently toward establishing a more common use of basic terms. Therefore, this report uses only the terms indirect and cumulative. These terms are sometimes defined in by a particular agency or law in the context of a particular resource.⁶ This report reviews relevant terms, evaluates potential differences and suggests a synthesis of definitions taken from agency

² The following discussion relies on information contained in the Baseline Assessment Report, pp. 21 – 35. The Work Group and its consultants reviewed dozens of transportation project EISs, reviewed existing literature and held discussions with over 50 staff at Federal agencies, MPO staff, State Historic Preservation Officers and consultants to present comprehensive findings regarding the state of the practice for indirect and cumulative impacts for transportation projects.

³ NCHRP Report 43, p. 38.

⁴ Cumulative impacts challenges are increasing in recent years, as documented in “Recent Trends in Cumulative Impact Case Law” by Michael D. Smith, paper presented at the National Association of Environmental Professionals Annual Conference, Alexandria, VA, April 16-19, 2005.

⁵ Both NCHRP Reports 403 and 466 contain a discussion on different interpretations of the terms indirect, secondary, and cumulative. FHWA now prefers the term indirect rather than secondary, and has always defined both terms according the CEQ definition of indirect impacts. See FHWA Interim Guidance: Questions and Answers Regarding Indirect and Cumulative Impact Considerations in the NEPA Process, January 31, 2003, Question # 1.

⁶ See Baseline Assessment Report pp. 5-7.

laws, regulations and guidance. This report's compatible approach framework encourages agreement among agencies on application of and definition of terms early in scoping.

Confusion over what impacts need to be analyzed

An indirect and cumulative impacts analysis can become stalled unless an effort is made to *adequately narrow* the scope of analysis to potentially significant impacts. On the other hand, significant issues may be overlooked in a document that fails to *adequately analyze* indirect and cumulative impacts on a resource. NEPA analysis of direct, indirect and cumulative impacts of a project often takes a broader view than what is required under other substantive laws that focus on a particular resource. This report's compatible approach framework encourages a focus on resources and discussion with the agency responsible for that resource to determine how potential impacts must be analyzed and to limit the analysis to truly "significant" impacts.

Divergent perspectives about the role of transportation in land use development

Divergent policy interpretations about the appropriate role and responsibility of transportation agencies for impacts of future development can cause disagreements about boundaries of analysis, level of detail, and mitigation for a project. This report attempts to make clear the difference between the laws and regulations themselves, the associated agency policies or practice and the elements of agency discretion. The recommendations for a compatible approach suggest early discussion with resource agencies in order to determine the appropriate strategies for avoiding or addressing resource impacts of future development associated with transportation projects.

Determining boundaries of analysis

Lack of clear guidance on how to set appropriate geographical or temporal boundaries can be a barrier to conducting an adequate analysis of indirect and cumulative impacts of transportation projects. Different perspectives on appropriate boundaries also can be a source of disagreement between transportation and resource agencies. This report shows that there is no definitive answer contained in law, regulation, or policy on where to set geographic or temporal boundaries; anything within the realm of reason, as substantiated by agency coordination, would be acceptable. This report's compatible approach framework encourages early discussion with each resource agency during scoping to determine the appropriate boundaries of analysis for each affected resource.

Analysis methods and documentation

The concern over what analysis methods to use for indirect and cumulative impacts is related to determining what constitutes sufficient analysis for purposes of substantive law such as the Clean Water Act or Endangered Species Act. Unlike NEPA which is viewed as a procedural law, these substantive laws require certain documentation for specific resources. The decision of whether to use a sophisticated technique for quantitative analysis or a more qualitative approach should be based on two considerations: 1) the potential significance of resource impacts, as viewed in the context of the health and sustainability of the resource, and 2) the regulatory

requirements relevant to each resource. This report clarifies the applicable regulatory requirements that inform the type of analysis to be conducted and the type of documentation needed. This report's compatible approach framework encourages early determination of environmental resource health and goals in order to determine the appropriate analysis method and documentation. The compatible approach framework also uses early coordination with resource agencies to provide necessary data, determine methods, and analyze a resource's potential impacts.

Mitigation

The general concern over mitigation goes to the lack of specificity about what is required for indirect and cumulative impacts or what agencies want to see considered in a mitigation plan for a transportation project. This report compares the law and policies on mitigation to what is being done in practice and clarifies that most laws do not mandate mitigation for indirect and cumulative impacts. While agencies have limitations in their legal authority to require mitigation, they have broad discretion to suggest mitigation and conservation measures. In practice, the line between legal requirements and agency discretion and is often blurred. The report's compatible approach framework seeks to overcome this ambiguity by treating environmental protection as an aspect of project decision-making (as intended by NEPA) rather than as a function of mitigation for project impacts (whether they be direct, indirect or cumulative).

C. Compatible Approach Framework

The state of the practice clearly suggests the need for greater understanding of the requirements for indirect and cumulative impacts assessment under NEPA and other laws, more information and training on available analysis methodologies, and more consensus building among Federal agencies and project sponsors. As the 2005 Baseline Assessment Report recommended:

Federal agencies and project sponsors need guidance on how to better coordinate in order to avoid disagreements than can lead to delays in project development. This guidance would likely focus on the scoping phase, and include information about coordination throughout the project development process. This coordination model for transportation projects would span applicable statutory requirements and would help to focus consultation and agreement on the proper boundaries of analysis, level of detail, how to address data limitation, and mitigation.⁷

In conducting interviews, reviewing case law and project documents, and synthesizing regulatory requirements for this research report, the following common themes emerged as the framework for a compatible approach to indirect and cumulative impacts:

⁷ Baseline Assessment Report, p. 68.

Understand Laws and Policies for Environmental Protection

The various environmental laws affecting transportation projects establish goals and policies for environmental protection. The laws are intended for Federal agencies to engage in rational decision-making where the environmental standard is weighed against project purposes, impacts and available alternatives. The laws require a thoughtful consideration of these three elements, and different people may place more emphasis on environmental protection or project purpose or the viability of alternatives. Except in cases where an environmental protection standard is clearly exceeded, the laws allow a great deal of discretion on weighing those elements. An appropriate indirect and cumulative impact analysis should inform the weighing process and understanding the legal standards in the applicable environmental laws should assist in rational decision-making.

Focus on Resources (natural, socioeconomic, cultural, etc.)

All categories of resources, such as natural, socioeconomic and cultural, should be examined to determine which resources are potentially affected by indirect or cumulative impacts. For each resource, its health and sustainability must be taken into account, because not all impacts will be of equal concern. Viewing indirect and cumulative impacts in the context of each affected resource makes it easier to determine appropriate analysis methods, significant of impacts and potential mitigation strategies.

Use a Collaborative Process

A collaborative process involves resource agencies in determining available data, analysis methods and mitigation measures. Having resource agencies involved early in the project development process allows them to fully understand the project's purpose and to share information about environmental protection or conservation plans in the area. A collaborative process involves transparency in decision-making, clear and consistent documentation, and early conflict resolution.

Consider Mitigation Strategies to Achieve Resource Goals

Ideally, mitigation ensures that a transportation project does not make it more difficult for resource agencies to achieve long term environmental goals, and if possible, can be formulated to help meet those goals. The indirect and cumulative impacts analysis can inform the mitigation strategy so that it addresses real resource needs and opportunities, rather than just compensates for in-kind impacts.

III. Components of Indirect and Cumulative Impact Analysis

This section presents a compilation and synthesis of provisions from major environmental laws and regulations that address basic components of an indirect and cumulative impact analysis, including what is required for mitigation. These components also represent the areas of potential inconsistencies between laws or areas of common confusion. This research is limited to major environmental laws and regulations, which include **NEPA** (CEQ and Federal Highway Administration (FHWA) Regulations), the **Clean Water Act Section 404** (US Army Corps of Engineers Permitting Regulations and the 404(b)(1) Guidelines), the **Fish and Wildlife Coordination Act**, the **Endangered Species Act** (Section 7 Regulations), and the **National Historic Preservation Act** (Section 106 Regulations).

This section should be read in conjunction with the matrix in Appendix A. Both the matrix and the text in this section address the following components of an indirect and cumulative impact analysis:

- **Definition of Terms**
 - Indirect Impacts
 - Cumulative Impacts
 - Reasonably Foreseeable
 - Mitigation
- **Environmental Standard**
- **Assessment Limits**
 - Temporal and Spatial Boundary
- **Methods of Analysis**
 - Level of Detail
 - Identify Impacts
 - Evaluate Impacts
 - Agency Approval Authority
- **Mitigation Requirements**

The matrix entries are excerpts from either law or regulation. The matrix indicates if some guidance on the topic is available from the relevant agency. An “X” in the matrix indicates that there is no provision in law or regulation and no guidance available on the topic. Agency interpretation and application of these laws and regulations in written guidance and practice is discussed in Section IV of this report.

A. Definition of Terms

One objective of this research is to synthesize definitions from each agency, regulation, and law pertaining to indirect and cumulative effects. The basic terms – indirect and cumulative – each rely on the key concept of reasonably foreseeable. As the matrix shows, the definition of these basic terms varies somewhat under the Section 404(b)(1) Guidelines and the Endangered Species Act (ESA) Section 7 regulations. It is most important to recognize that these variations are

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specifically related to meeting those laws' substantive requirements. For NEPA purposes, the CEQ regulations provide the appropriate definition of terms for analysis of all resource impacts. For other regulatory purposes, the definition is narrowed to a particular resource focus, as shown below.

Indirect Impacts

NEPA Definition - applicable to all resources considered¹:

Indirect impacts are caused by the action and are occurring late in time or farther removed in distance, but still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.²

Indirect impacts are caused by the project, but are not the direct impacts. **With indirect impacts, reasonably foreseeable relates to the effects that are caused by the action.** With regard to future land development, the public, agencies and practitioners may simply assume that indirect impacts of transportation projects include changes to land use, development patterns, or growth rates induced by the project, as well as the environmental resource impacts associated with such changes in land use or development. In fact, whether each of these types of impacts are actually indirect impacts of the transportation project according to the definition will depend on several factors: the size of the area potentially affected, the ability to control the change, (e.g. the extent to which growth is controlled by existing land use regulations and plans), community and environmental goals and priorities, and the extent to which future development is certain to occur. These considerations inform the causal relationship between the transportation project and its effect on land use changes or future development.

Section 404(b)(1) Guidelines Definition – narrows analysis to regulated aquatic resources only:

Indirect³ effects are effects on an aquatic ecosystem that are associated with a discharge of dredged or fill materials, but do not result from the actual placement of the dredged or fill material.⁴

In the regulatory context of the Section 404(b)(1) Guidelines, rather than the broader NEPA analysis, indirect impacts are defined in the context of the project's direct impacts to an aquatic resource and the effects that may occur from the placement of dredge or fill materials. Examples

¹ See NCHRP Report 466, Figure 1-3, for examples of indirect effects under NEPA for various resources, including regulated and non-regulated resources.

² 40 CFR 1508.8

³ Note that the Section 404(b)(1) Guidelines use the term "secondary" rather than "indirect" but those two terms are synonymous and to promote clarity, only the term "indirect" will be used in this report.

⁴ 40 CFR 230.11(h).

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include fluctuating water levels downstream associated with the operation of a dam, or surface runoff from a road build on permitted fill. Aquatic resource impacts from future growth or development in a transportation project area would appropriately be considered in the cumulative impact analysis for aquatic resources.

Cumulative Impacts

NEPA Definition – applicable to all resources considered:

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. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.⁵

Cumulative impacts are the total resource condition when the project's direct and indirect impacts are added to the aggregate effects of past, present and reasonably foreseeable future actions. **With cumulative impacts, reasonably foreseeable relates to the *other actions that may contribute to resources impacted by the project.*** If a project will not cause direct or indirect impacts on a resource, it will not contribute to a cumulative impact on that resource. The project's incremental impacts are a necessary component of cumulative impacts. This incremental impact will guide the conclusions to be drawn from the analysis in terms of resource sustainability and potential mitigation strategies.

Section 404(b)(1) Guidelines Definition – focuses analysis to aquatic resources only:

Cumulative impacts are the changes in an aquatic ecosystem that are attributable to the collective effect of a number of individual discharges of dredged or fill material. Although the impact of a particular discharge may constitute a minor change in itself, the cumulative effect of numerous such piecemeal changes can result in a major impairment of the water resources and interfere with the productivity and water quality of existing aquatic ecosystems. Cumulative effects should be predicted to the extent reasonable and practical.⁶

This definition is like the NEPA definition, although again it focuses the analysis on aquatic resources and will include effects only for those resources directly impacted by the project.

ESA Regulations – focuses analysis to threatened or endangered species only:

⁵ 40 CFR 1508.7

⁶ 40 CFR 230.11(g)

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Cumulative effects are 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.⁷

Unlike the NEPA definition, future Federal actions that are unrelated to the proposed action are not included in the ESA definition because they require separate Section 7 consultation.

Reasonably Foreseeable

The term “reasonably foreseeable” is used in concert with the CEQ definitions of indirect and cumulative impacts, but the term itself is not further defined in the regulation. The Section 404(b)(1) Guidelines and ESA regulations use slightly different words expressing a similar concept in defining cumulative impacts. Other regulations as shown in the matrix do not define the meaning of these words, but most do provide guidance on the term.⁸ While there might be some variation in the terms and how they are explained, the concept is sufficiently similar to support a synthesized definition:

Reasonably foreseeable actions or impacts are those that are likely (or reasonably certain) to occur, and although they may be uncertain, they are not purely speculative.

Reasonably foreseeable does not require a guarantee that an action will occur but remaining hurdles to implementation or inherent discretion over the action reduces certainty. Only reasonably foreseeable impacts or actions that would be useful to the project decision-making need be considered.⁹

Mitigation Defined

The definition of mitigation as contained in each law or regulation is presented in the matrix. Although there are some differences in how the concept is defined under each law, a synthesized definition would be:

Mitigation includes all actions in the categories of avoidance, minimization, and compensation for potential adverse impacts.

⁷ 50 CFR 402.2

⁸ 40 Questions and Answers about the NEPA Regulations, 46 Fed. Reg. 18026 (March, 23, 1981); Federal Highway Administration Interim Guidance: Questions and Answers Regarding the Consideration of Indirect and Cumulative Impacts in the NEPA Process, January 31, 2003; US Fish and Wildlife Service & National Marine Fisheries Service, *Endangered Species Act Consultation Handbook: Procedures for Conducting Section 7 Consultations and Conferences*. (1998).

⁹ See Dubois v. U.S. Department of Agriculture, 102 F.3d 1273, 1286 (1st Cir. 1996); Sierra Club v. Marsh, 976 F.2d 763, 767 (1st Cir. 1992).

Sometimes practitioners consider mitigation as only compensation for impacts, but the CEQ regulations and other agency guidance define it to include avoidance and minimization measures as well. In developing a project mitigation plan, strategies for avoidance and minimization of direct, indirect and cumulative impacts should be part of project decision-making, as an integral component of the alternatives development and analysis process.¹⁰

B. Environmental Standards

Focusing on a resource's particular evaluation standard helps to understand the minimum legal requirements for indirect and cumulative impact analysis and mitigation. The environmental standards for resource assessment and protection will guide the analysis.

Evaluation Standard

As shown in the matrix, each environmental law and regulation provides a substantive evaluation standard for the resource being protected. Each agency has a particular role and responsibility in meeting those standards in the context of a transportation project. The transportation agency, as stated in the FHWA regulations, has the overall responsibility for balancing environmental goals with the project goals in a way that serves the public interest. The other agencies inform that process in their particular area of responsibility.

C. Assessment Limits

Temporal and Spatial Boundaries

None of the agency laws or regulations specifies the appropriate temporal or spatial boundaries for an indirect and cumulative impacts analysis. Where boundaries of analysis are mentioned in guidance documents, there is no precise boundary suggested, only the suggestion that an indirect and cumulative impacts analysis is not limited to the immediate area involved in the action. Temporal boundaries should correlate to impacts or actions that would be reasonably foreseeable. Spatial boundaries, as shown in the matrix, correlate to the definition of a study area should be used for assessing direct and indirect impacts to a particular resource.

D. Methods of Analysis

Level of Detail

The major environmental laws or regulations presented in the matrix do not prescribe a certain level of detail or method for indirect and cumulative impacts analysis, but some do suggest that the level of detail is proportionate to the significance of impact or limited by availability of information. Likewise, case law provides relatively little distinct guidance because level of detail is a subjective determination of a sufficient detail that will be useful to the decision-

¹⁰ Federal Highway Administration Interim Guidance: Questions and Answers Regarding the Consideration of Indirect and Cumulative Impacts in the NEPA Process, January 31, 2003, Question 9.

maker.¹¹ Some guidance documents contain suggested approaches, but it is always a matter of judgment depending on the project and the resources involved. As a rule, NEPA's "hard look" standard applies to the level of detail required for an indirect and cumulative impact analysis.

Identify Impacts

The major environmental laws or regulations presented in the matrix do not specify how to identify indirect or cumulative impacts, but the Section 404(b)(1) Guidelines incorporate the concepts of reasonable and practical in predicting cumulative impacts. The ESA regulations describe a framework for establishing an environmental baseline against which to measure a project's additional indirect or cumulative impacts. Finally, the Section 106 regulations also incorporate the concept of reasonableness in identifying impacts, and the regulations provide more specific guidance in how to identify historic properties and potential impacts to them.

Evaluate Impacts

The major environmental laws or regulations presented in the matrix do not specify particular methodologies for evaluation of indirect or cumulative impacts. While there is no mandate on how the analysis is done, there are specific requirements for showing that the evaluation standard has been correctly applied.

Agency Approval Authority

This row of the matrix shows whether the law or regulation grants a resource agency approval authority over the transportation agency in the structure or content of an indirect and cumulative impact analysis. As the Federal action agency, FHWA carries the substantive responsibility for compliance with all environmental laws. As the permitting agency, the US Army Corps of Engineers (USACE) has an independent responsibility for the structure and content of the analysis as it pertains to aquatic resources in order to comply with the Section 404(b)(1) Guidelines and its public interest review. Therefore, the USACE has authority to require the transportation agency to conduct an analysis in a way that satisfies its discretion. All other agencies are advisory only.

E. Mitigation Requirements

The matrix shows which law or regulation contains a substantive requirement to mitigate for adverse impacts, what the law or regulation says about the parameters or limitations on such mitigation requirements, and whether the mitigation requirement is applicable to indirect or cumulative impacts.

¹¹ See Baseline Assessment Report, p. 8-9. See also Federal Highway Administration Interim Guidance: Questions and Answers Regarding the Consideration of Indirect and Cumulative Impacts in the NEPA Process, January 31, 2003.

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There is no substantive mandate to mitigate for impacts under any law other than the Clean Water Act Section 404, although there are procedural mandates to consult regarding effects under the Section 7 of the Endangered Species Act and Section 106 of the National Historic Preservation Act.

In terms of NEPA compliance, the CEQ regulations require consideration and discussion of possible mitigation for project impacts. The FHWA regulations define the legal authority and responsibility for incorporating mitigation measures into a transportation project. The FHWA regulations do not specifically address mitigation for indirect or cumulative impacts. All agencies involved in the NEPA process can recommend mitigation measures (including avoidance and minimization) but the transportation agency has discretion over what measures are ultimately included in a transportation project's mitigation plan.

In terms of Section 404(b)(1) Guidelines compliance, the USACE Regulatory Program Regulations define mitigation to include avoiding, minimizing, rectifying, reducing or compensating for resource losses. Neither the regulatory definition of mitigation nor the applicable guidance refers to mitigation for indirect or cumulative impacts, although such considerations are not explicitly excluded.¹² The USACE regulatory definition of mitigation places distinct limits on the potential reach of avoidance, minimization or compensatory mitigation for indirect and cumulative impacts. The regulations limit mitigation that can be required to minor project modifications that are considered feasible and generally meet the applicants purpose and need, including incorporation of certain construction methods, materials, operation and maintenance practices, such as erosion control; methods of placing and disposing of dredge and fill material as suggested in the Section 404(b)(1) Guidelines; and other measures to ensure that the project meets legal requirements and is not contrary to the public interest, as determined by the District Engineer to be reasonable and justified. All compensatory mitigation must be for significant resource losses which are specifically identifiable, reasonably likely to occur, and of importance to the human or aquatic environment. All mitigation must be directly related to the impacts of the proposal, appropriate to the scope and degree of those impacts, and reasonably enforceable.¹³

A synthesis of these legal and regulatory authorities regarding mitigation suggests the following guidelines:

Agencies should identify and discuss potential measures to mitigate for any significant adverse impacts, including direct, indirect or cumulative impacts. Federal agencies may not require mitigation measures for any adverse effects unless such measures are directly

¹² Ibid. See also, Memorandum of Agreement between the Environmental Protection Agency and the Department of the Army Concerning the Determination of Mitigation under the Clean Water Act Section 404(b)(1) Guidelines [February 6, 1990], and US Army Corps of Engineers Regulatory Letter: Guidance on Compensatory Mitigation Projects for Aquatic Resource Impacts Under the Corps Regulatory Program Pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899 [December 24, 2002].

¹³ 33 CFR 320.4(r)

related to the proposed action, justified by the project scope and degree of impacts, and reasonable.

Case Study: I-93 Widening Project, New Hampshire

The New Hampshire Department of Transportation engaged in a collaborative process with state and federal resource agencies on the EIS for a high priority project to improve efficiency and safety along I-93 between Salem and Manchester. The project will add two lanes in each direction to the current four lane facility and improve five existing interchanges. The project's mitigation and enhancement plan for aquatic resources seeks to protect large ecologically valuable parcels in all five cities along the 19 mile project with wetland creation, restoration and preservation to offset direct impacts to 77 acres of wetlands. The project's indirect and cumulative impact analysis showed that development pressure in southern New Hampshire would increase in the future with or without the project. The extraordinary wetland mitigation plan takes into account the aquatic resource needs throughout the future growth area, with 1,000 acres of largely preservation lands that far exceeds the minimum required to obtain a permit under the Section 404(b)(1) Guidelines. However, taking into account the project scope, and the value and context of the resources directly impacted, the project's mitigation and enhancement plan was determined to be a reasonable contribution toward achieving New Hampshire's environmental resource goals.

IV. Adequate Analysis and Mitigation

The purpose of this section of the report is to identify what constitutes adequate analysis and mitigation for indirect and cumulative impacts under each major law and regulation, and to clarify inconsistencies between the laws. Practitioner interviews, case studies, policy guidance and relevant case law are used to demonstrate what agencies may expect in terms of meeting minimum requirements for indirect and cumulative impact analysis and mitigation. Particular emphasis has been placed on the Clean Water Act Section 404 and the Endangered Species Act Section 7, as specified in the research problem statement.

A. National Environmental Policy Act and CEQ Regulations

NEPA contains a Congressional declaration of national environmental policy and directs all Federal agencies for taking a systematic, interdisciplinary approach to integrating environmental considerations in planning and decision-making. There is no specific mention of indirect or cumulative impacts in the statute, but as to impacts generally, NEPA states that agencies shall “utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and decision-making which may have an impact on man’s environment.”¹ Importantly, NEPA also specifies that:

Prior to making any detailed statement, the responsible Federal official shall consult with and obtain the comments of any Federal agency which has jurisdiction by law or special expertise with respect to any environmental impact involved.²

In practice, the implementation of this provision is often restricted to agency comment periods on completed documents prepared by the lead agency, but such restrictive practices have contributed to what many agree is a failure to substantively meet the goals of NEPA.³ Finding ways to increase successful Federal and intergovernmental collaboration is a key focus for improving NEPA implementation.⁴

For a transportation project, compliance with NEPA is the responsibility of the lead transportation agency, which for purposes of this report is primarily the Federal Highway

¹ 42 USC 4332; NEPA Section 102(2)(A)

² NEPA Section 102(2)(C)

³ See generally, “Reclaiming NEPA’s Potential: Can collaborative Processes Improve Environmental Decision Making?” Report from a March 1999 Workshop on the National Environmental Policy Act. O’Connor Center for the Rocky Mountain West, The University of Montana and Institute for Environmental and Natural Resources, The University of Wyoming. March, 2000.

⁴ Federal and intergovernmental collaboration is one of six focus areas for opportunities to improve and modernize the NEPA process, presented in “Modernizing NEPA Implementation.” Report to the Council on Environmental Quality by the NEPA Task Force. September, 2003.

Administration.⁵ The Council on Environmental Quality has clarified that the lead agency “has the authority for and responsibility to define the ‘purpose and need’ for purposes of NEPA analysis...In the case of a proposal intended to address transportation needs, joint lead or cooperating agencies should afford substantial deference to the Department of Transportation agency’s articulation of purpose and need.”⁶ Moreover, Congress recently passed legislation⁷ providing that the “Department of Transportation shall be the Federal lead agency in the environmental review process for a [transportation] project.”⁸ Congress defined the term “environmental review process” to include the process for preparing NEPA documents as well as the process for completion of any environmental permit, approval or study required under any other Federal law. Transportation agencies have authority to lead the NEPA process, incorporating requirements of substantive environmental laws, even though other agencies maintain independent authority and responsibility under those laws.

Differentiating Indirect and Cumulative Impacts

Only when “a reasonably close relationship” exists between a transportation project and future growth will the growth-related impacts come within the definition of an indirect impact.⁹ The “reasonably close” cause-and-effect between the transportation project and the environmental impacts must be more than a “but for” causal relationship, and closer to the legal concept of proximate cause.¹⁰ Proximate cause generally exists when the action produces an impact in a natural and continuous sequence unbroken by any new independent cause. Factors in determining the causal relationship between a transportation project and future development can include the extent of local land use control or the influence (or lack of influence) that the project will have on patterns of development. Moreover, proximate cause analysis turns on policy considerations and considerations of the “legal responsibility” of agencies.¹¹

A transportation agency has no legal responsibility or authority to approve or direct the course of development, and usually other local or regulatory entities must take intervening actions before such development could occur. Therefore even when a “but for” relationship exists between a transportation project and development trends, a transportation project may not necessarily be the proximate cause of land use changes, pace or location of development and resultant

⁵ This report focuses the issues discussed herein on Federal highway projects. The Baseline Assessment Report found that highway projects experience the most contentious issues and mitigation concerns related to indirect and cumulative impacts. Baseline Assessment Report p. 24, 29.

⁶ Letter from James L. Connaughton, CEQ Chairman to Norman Mineta, US Secretary of Transportation, May 12, 2003. See also “Guidance on Purpose and Need”, Federal Highway Administration/Federal Transit Administration, July 23, 2003.

⁷ SAFETEA-LU Section 6002; Public Law 109-59; 23 USC Section 139.

⁸ 23 USC 139(c). This provision is applicable to all projects that require an environmental impact statement and US DOT is to determine how it is applied to other environmental documents. 23 USC 139(b).

⁹ DOT v. Pub. Citizen, 541 U.S. 752, 767 (2004).

¹⁰ Ibid. See also City of Shoreacres v. Waterworth, 420 F.3d 440 (5th Cir. 2005).

¹¹ DOT v. Pub. Citizen, 541 U.S. 752, 767 (2004).

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environmental impacts.¹² For a transportation project that has economic development as part of the project purpose, the causal relationship is made closer as a matter of policy, and land use changes or future development may be considered as indirect impacts of the project.

In any case, the NEPA analysis should examine the local government's capacity for controlling land use or environmental impacts in the planning and development decision-making processes. Transportation agencies should also consider strategies within their control to address these effects, such as alignment location, access management, context sensitive design, purchase of access rights, land acquisition and conservation easements or incentives for infill development.¹³

Even if the transportation project's indirect impacts include growth-inducing impacts such as land use changes or increased development, the causal relationship of resultant environmental impacts is tenuous. A complex interplay of intervening public and private actions must occur before development takes place; variables other than transportation, such as market demand, site suitability, capital availability, market feasibility, and regulatory controls, play a significant role in making development decisions.¹⁴ In terms of proximate cause, the transportation project is usually not the sole influence on development decisions which must be made before the resultant environmental impacts occur. Therefore, the environmental impacts of future development would not necessarily be indirect impacts of a transportation project.

When future development is reasonably foreseeable, its environmental impacts should be considered in the NEPA cumulative impact analysis. The environmental impacts that may result from future development are more appropriately considered in the cumulative impact analysis, which may influence project decisions on location or alignment, access management or other avoidance and minimization strategies. The difference between indirect and cumulative impacts goes to the causal relationship between the future development's environmental impacts and the transportation project. The environmental impacts are not necessarily caused by the transportation agency's action, even if the development is closely related to the transportation project. This distinction between indirect impacts and cumulative impacts is all too often blurred. Transportation and resource agencies must distinguish between them early in the project development process both for analytical clarity and mitigation purposes.

¹² Ibid, p. 770. "We hold that where an agency has no ability to prevent a certain effect due to its limited statutory authority over the relevant actions, the agency cannot be considered a legally relevant "cause" of the effect."

¹³ NCHRP Project 25-25 Task 3: Handbook on Integrating Land Use Considerations into Transportation Projects to Address Induced Growth (March, 2005), p. 33 et seq.

¹⁴ ULI – The Urban Land Institute, Federal Highway Administration. Influence of Transportation Infrastructure on Land Use. A ULI Advisory Services Workshop Report, Washington, DC. December 6-8, 2004, p. 14, 16.

Determining Reasonably Foreseeable Projects

Much case law and analysis exists on the question of what constitutes a reasonably foreseeable action such that it must be included in a cumulative impact analysis. Generally, the more certain it is that a given project will be completed, the more foreseeable that project is for NEPA purposes.¹⁵ For projects mentioned in government planning documents, these do not need to be considered if there is no evidence that realization of the plans is expected to materialize.¹⁶ In addition, even if a local government has drawn up plans for a future development project, those plans will be considered too “amorphous” to include in an environmental analysis if they had not yet been published to the public.¹⁷

A private party’s plan to develop private land is less foreseeable than a planned project by a government agency. A private project that has already been approved by appropriate government agencies adds more certainty. The completion of a future project is more difficult to predict where the necessary permits have yet to be procured.¹⁸ Plans that are part of a comprehensive government plan tend to be more concrete, do not require as many assumptions, and are, therefore, more likely to be included in a cumulative impact analysis.¹⁹ Finally, a future action is less foreseeable when it is susceptible to the political process.

Adequate Analysis

An adequate analysis will be guided by a factual determination of the context and intensity of potential indirect and cumulative impacts.²⁰ Each project must be evaluated individually, using

¹⁵ *Society Hill Towers Owners’ Ass’n v. Rendell*, 210 F.3d 168, 182 (3d Cir. 2000).

¹⁶ See *id.*

¹⁷ *First Nat’l Bank of Chicago v. Richardson*, 484 F.2d 1369, 1377 (7th Cir. 1973). Compare *Texas Comm. on Natural Res. v. Van Winkle*, 197 F. Supp. 2d 586, 619 (N.D. Tex. 2002) (holding that other flood control projects on city river were foreseeable where financing had been approved by voters in bond election and the Corps admits that three of them were foreseeable but failed provide any analysis of cumulative impacts).

¹⁸ See *Airport Impact Relief, Inc. v. Wykle*, 45 F. Supp. 2d 89, 105 (D. Mass. 1999) (holding that although airport construction plan would make it possible for airport to expand to an adjacent parcel of land, the future expansion did not need to be included in cumulative impact analysis of the construction project where airport had not received necessary permits and approvals to expand the airport; and had not drawn up official plans for the expansion or secured funding for the project). Compare *Fritiofson v. Alexander*, 772 F.2d 1225, 1247-48 (5th Cir. 1985) (Corps must consider cumulative impacts of other anticipated projects in an EA for development on Galveston Island where the city had annexed part of the island and created a tax zone with development incentives; and the Corps’ had granted permits for large housing developments on Island).

¹⁹ For instance, in *Blue Mountain Biodiversity Project v. Blackwood*, 161 F.3d 1208 (9th Cir. 1998), the court held that the Forest Service must consider the cumulative impacts of five proposed timber sales developed as part of a comprehensive forest recovery strategy, where they were all to take place within the same watershed and the estimated sale quantities and timelines had been disclosed to timber companies. *Id.* at 1214-15.

²⁰ 40 CFR 1508.27

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either an environmental assessment or an environmental impact statement. Adequate analysis under NEPA is influenced by case law, although individual cases are always decided on the particular fact situation presented.²¹ Nonetheless, NEPA case law has set forth some broadly applicable guidelines on how a project should approach an indirect or cumulative impact analysis. These guidelines focus the analysis on issues of significance that would be important to making project decisions.²²

For indirect impacts, three questions guide in determining whether potentially significant effects are reasonably foreseeable and would be useful to decision-making:

- (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?²³

A meaningful cumulative effects analysis must identify:

- (1) the area in which effects of the proposed project will be felt;
- (2) the impacts that are expected in the area from the proposed project;
- (3) other actions - past, proposed, and reasonably foreseeable - that have had or are expected to have impacts in the same area;
- (4) the impacts or expected impacts from these other actions; and
- (5) the overall impact that can be expected if the individual impacts are allowed to accumulate.²⁴

²¹ For discussion of cases relevant to indirect and cumulative impact analysis, see Baseline Assessment Report Appendix B: Case Law; and NCHRP Report 403, Guidance for Estimating the Indirect Effects of Proposed Transportation Projects, pp. 16-22.

²² As articulated by the Supreme Court, NEPA "ensures that the agency, in reaching its decision, will have available, and will carefully consider, detailed information concerning significant environmental impacts." Second, NEPA "guarantees that the relevant information will be made available to the larger audience that may also play a role in both the decision-making process and the implementation of that decision." *Robertson v. Methow Valley Citizens Council*, 490 US 332, 339 (1989)

²³ *Sierra Club v. Marsh*, 976 F.2d 763, 768 (1st Cir. 1992)

²⁴ *Fritiofson v. Alexander*, 772 F.2d 1225, 1245 (5th Cir. 1985), abrogated on other grounds, *Sabine River Auth. v. United States Dep't of Interior*, 951 F.2d 669 (5th Cir. 1992), cert. denied, 506 U.S. 823 (1992).

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The extent and form of information to be developed under these legal guidelines will vary widely and must be determined by the Federal agency on a case-by-case basis.

The CEQ recently prepared guidance on consideration of past actions in cumulative effects analysis.²⁵ The guidance emphasizes the NEPA principles for a cumulative impact analysis, by recommending that agencies should use scoping to focus on the extent to which information is “relevant to reasonably foreseeable significant adverse impacts,” is “essential to a reasoned choice among alternatives,” and can be obtained without exorbitant cost.²⁶ In terms of past actions, agencies are not required to list or analyze the effects of individual past actions, and generally, agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions.²⁷

The US Environmental Protection Agency (EPA) has guidance on addressing cumulative impacts in the NEPA process.²⁸ The guidance offers information on what issues to look for in the analysis, what practical considerations should be kept in mind when reviewing the analysis, and what should be said in EPA comments concerning the adequacy of analysis.

Mitigation

NEPA requires that indirect and cumulative impacts and appropriate mitigation measures be fully disclosed in an EIS. The minimum level of detail to meet this requirement will be related to the significance of the impacts. There is no substantive requirement for the lead transportation agency to fund or carry out identified mitigation measures, although the CEQ regulations require a statement of whether or not, and why not, mitigation measures have been adopted. Providing this information will satisfy the minimum legal requirements under NEPA.

As a matter of policy, resource agencies, including EPA, recognize that mitigation of indirect or cumulative impacts associated with future development often goes beyond the authority or responsibility of the transportation agency. The responsibility for protection of resources from land development is appropriately placed at the local level where development decisions and mitigation are subject to local regulation. The resource agency’s interest is in protecting the resources, and the agencies hope that if integrated planning is being conducted properly, then the local land use planners can address environmental issues of future development at the local level. Where adequate local planning is lacking or inadequately enforced, or where resource agencies

²⁵ See CEQ Handbook, Considering Cumulative Effects; “Guidance on the Consideration of Past Actions in Cumulative Effects Analysis”, Memorandum from James L. Connaughton, CEQ Chairman, to Heads of Federal Agencies, June 24, 2005.

²⁶ Ibid, p. 1, quoting 40 CFR 1502.22.

²⁷ Ibid, p. 2.

²⁸ US Environmental Protection Agency, Office of Federal Activities. Consideration of Cumulative Impacts in EPA Review of NEPA Documents. EPA 315-R-99-002 (May, 1999).

express concerns over indirect or cumulative impacts from future development, transportation agencies are being encouraged to partner with other stakeholders to become more engaged in land use planning.²⁹ Examples include:

- The Community Technical Assistance Program, funded at \$3.5 million by the New Hampshire DOT, to help communities in the area influenced by the widening of Interstate 93 to better deal with and manage growth-related issues.³⁰
- Identification and discussion of smart growth initiatives for consideration in local planning to reduce cumulative impacts of future growth contained in the FEIS for the Interstate 15 Corridor in Montana.³¹

These examples are of areas where local land use jurisdictions are short on resources needed for effective planning in a growing region. In such cases, it makes sense for transportation agencies to provide leadership and assistance in regional growth planning efforts which have a relatively low cost and could inform future transportation decisions. By partnering with local jurisdictions, the transportation agency may be wary of stepping into the local land use planning, so it is important to have clear expectations among federal, state and local agencies about appropriate roles and implications.

Transportation projects are not required to provide compensatory mitigation for future cumulative impacts caused by other foreseeable actions. Some projects have incorporated avoidance and minimization measures related to the project's relative contribution to cumulative impacts, depending on the project scope and degree of impacts. Likewise, some projects incorporate appropriate mitigation measures for indirect impacts to significantly affected resources.³²

B. Clean Water Act Section 404 Permits

The Clean Water Act Section 404 does not contain reference to indirect and cumulative impacts applicable to transportation projects. Instead, more detailed information is contained in the Section 404(b)(1) Guidelines and the USACE regulations. The USACE is solely responsible for

²⁹ See NCHRP Project 25-25 Task 3: Handbook on Integrating Land Use Considerations into Transportation Projects to Address Induced Growth (March, 2005), p. 16-17. In Chapter 4, pp. 31-46, this report discusses the pros and cons of other strategies to avoid undesirable land use impacts of transportation projects, which include access management, purchase of access rights, context sensitive design, land acquisition and conservation easements and incentives for infill development.

³⁰ See Federal Highway Administration Record of Decision, FHWA-NH-EIS-02-01-F, I-93, Salem to Manchester, New Hampshire. (2002), available at <http://www.state.nh.us/dot/10418c/study.htm#finalEIS>.

³¹ Federal Highway Administration and Montana Department of Transportation, Final Environmental Impact Statement, Interstate 15 Corridor, Montana City to Lincoln Road (2003), p. 5-79 to 5-136, available at www.i-15helenaeis.com/default.htm.

³² See Baseline Assessment Report pp. 36-65 for project examples of various approaches to avoidance, minimization and compensation for indirect or cumulative impacts.

making final determinations of compliance with the USACE permit regulations and the Section 404(b)(1) Guidelines. In general, the decision of whether to issue a permit is based on an evaluation of the public interest in a proposed activity against the probable impacts to the human and natural environment.³³ The USACE will fully consider EPA's comments when determining compliance with relevant statutes, regulations, and policies and in determining whether to issue the permit. A detailed description of the USACE permit requirements as they relate to indirect and cumulative impacts is contained in Appendix B.

Adequate Analysis

Both the NEPA process and the USACE permit process are meant to ensure that Federal agencies give environmental factors appropriate consideration and weight in decision-making. The difference is that permit compliance incorporates substantive environmental resource standards while NEPA is a purely procedural statute. On a transportation project, the transportation agencies have primary responsibility for the environmental review process, and the USACE role is properly limited to aquatic resource concerns. USACE regulations state that other Federal agency determinations to proceed with a project are entitled to substantial consideration in the USACE public interest review.³⁴ An adequate analysis of indirect and cumulative impacts to aquatic resources requires the USACE to work in concert with the lead transportation agency to ensure that the NEPA documents adequately incorporate the environmental resource standards that must be met for permit compliance.

No USACE guidance or policy documents specifically address indirect and cumulative impacts. USACE guidance on the appropriate level of analysis for compliance with the Section 404(b)(1) Guidelines emphasizes the concepts of proportionality and flexibility.³⁵ By proportionality it is meant that the analysis should be commensurate with functions and values of the aquatic resources, the level of direct impact, and the scope/cost of the project. Flexibility means that regulatory decisions are made based on the relative severity of the environmental impact of proposed discharges of dredged or fill material.³⁶

An adequate cumulative effects assessment according to the USACE is an evaluation of a specific project's net effects on the aquatic environment when viewed in conjunction with past impacts to those resources and similar impacts of other present and reasonably foreseeable future projects that affect aquatic resources in the same geographic area. Informal guidance by way of

³³ 33 CFR 320 – 331. Available at <http://www.usace.army.mil/inet/functions/cw/cecwo/reg/sadmin3.htm>.

³⁴ 33 CFR 320.4(j)(4)

³⁵ Regulatory Guidance Letter 93-02, "Guidance on the Flexibility of the Section 404(b)(1) Guidelines and Mitigation Banking." US EPA and ACE, August 23, 1993.

³⁶ Ibid.

USACE training on conducting indirect and cumulative impacts analysis can be summarized by the following principles:³⁷

- Focus on the aquatic environment
- Utilize existing information
- Think holistically
- Use as a tool for developing an effective mitigation plan

Mitigation

The USACE has several guidance documents related to mitigation for aquatic resource impacts under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act.³⁸ None of these guidance documents refer specifically to direct, indirect or cumulative impacts, but use the general term “impacts” and therefore are applicable to all types of impacts. The USACE has regulatory authority to require mitigation to offset activities within USACE scope of control and broad discretion in determining what is appropriate mitigation, within certain limits.³⁹ The USACE and EPA rely on a sequence of mitigation generally known as avoidance, minimization and compensation, and the determination of what level of mitigation is appropriate is based solely on the values and functions of the aquatic resource that will be impacted.⁴⁰

Indirect impacts as defined by the Section 404(b)(1) Guidelines, namely those impacts that are associated with but do not result from the placement of dredge or fill material and that produce an adverse affect on the aquatic ecosystem, must be considered in the permit decision.

Mitigation guidance documents suggest that indirect impacts are also subject to the requirement to take appropriate and practicable steps which will avoid or minimize potential adverse indirect impacts.⁴¹ Appropriate and practicable compensatory mitigation is only required for

³⁷ This information is taken from a presentation by Jennifer Moyer on *Indirect and Cumulative Effects Assessment*. Washington, DC. February, 2004. (presentation available at http://environment.transportation.org/documents/workshop/Moyer_files/frame.htm).

³⁸ See US Army Corps of Engineers, Regulatory Guidance Letter 02-2, *Guidance on Compensatory Mitigation Projects for Aquatic Resource Impacts Under the Corps Regulatory Program Pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbor Act of 1899* (2002) (RGL 02-2). See also MOA Between the Department of the Army and the Environmental Protection Agency, *The Determination of Mitigation under the Clean Water Act Section 404(b)(1) Guidelines* (1990).

³⁹ See Section III.H, *infra*, for USACE mitigation limitations contained in the regulations.

⁴⁰ MOA Between the Department of the Army and the Environmental Protection Agency, *The Determination of Mitigation under the Clean Water Act Section 404(b)(1) Guidelines* (1990), p. 2.

⁴¹ Compare 40 CFR 230.10(d) to RGL 02-2, stating “Under existing law the Corps requires compensatory mitigation to replace aquatic resource functions unavoidably lost or adversely affected by authorized activities.”

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unavoidable adverse impacts which remain after all appropriate and practicable minimization has been applied, subject to the limitations contained in the USACE regulations and guidance.⁴²

Cumulative impacts have two components: the project's incremental direct or indirect impact, and the total cumulative impact to the resource. The USACE rarely requires that a project mitigate for cumulative impacts to the resource. The USACE has limited authority under the Section 404(b)(1) Guidelines to require mitigation. Under the regulations, mitigation must be closely related to the wetlands unavoidably lost or functions adversely affected by the project's direct discharges of dredge and fill material, rather than to the discharges of other foreseeable actions. Under current regulatory authority and agency policy a transportation agency could not be required to implement avoidance, minimization or compensatory mitigation actions for cumulative impacts to the aquatic ecosystem that may result from future development.

Nonetheless, USACE guidance on compensatory mitigation further encourages "a watershed-based approach to aquatic resource protection that considers entire systems and their constituent parts."⁴³ Therefore, in developing mitigation strategies for a transportation project's direct or indirect impacts, the cumulative effects on the aquatic resources could be an important consideration in the watershed-based approach. Still, some transportation agencies are concerned that as indirect and cumulative impact analysis becomes more sophisticated, mitigation for transportation projects will be expanded to require preservation of ecological resources, sometimes at a high cost to the project.

National Wetlands Mitigation Action Plan

In response to independent critiques of the effectiveness of wetland compensatory mitigation for authorized losses of wetlands and other waters under Section 404 of the Clean Water Act, the EPA, the USACE, and the Departments of Agriculture, Commerce, Interior, and Transportation released the National Wetlands Mitigation Action Plan on December 26, 2002. The Plan includes 17 tasks that the agencies will complete by the end of 2005 to improve the ecological performance and results of compensatory mitigation.⁴⁴ The Plan addresses areas of concern, including data collection and availability, clarifying performance standards, improving accountability, and integrating mitigation into the watershed approach. While there is no action item specifically related to indirect and cumulative impact mitigation, the plan evidences that agencies are moving toward using mitigation to achieve aquatic resource goals, taking a more holistic approach within the limits of Section 404 regulatory authority.

⁴² MOA Between the Department of the Army and the Environmental Protection Agency, *The Determination of Mitigation under the Clean Water Act Section 404(b)(1) Guidelines* (1990), p. 3.

⁴³ RGL 02-2. p. 1.

⁴⁴ www.mitigationactionplan.gov

One of the action items for the national wetlands interagency group is to produce Federal guidance on the use of preservation as compensatory mitigation under Section 404.⁴⁵ The regulatory basis for the use of preservation is the USACE authority to require compensatory mitigation to offset unavoidable impacts to aquatic resources. Preservation may augment or substitute for compensatory mitigation only in exceptional circumstances. There must be clear evidence of destructive land use changes that pose a demonstrable threat to the resource to be preserved.⁴⁶ Even though it may be more common in some growing regions for resource agencies to encourage consideration of preservation measures related to indirect and cumulative impacts, the regulatory basis for these to be required is quite limited. In cases where these are discretionary considerations, the transportation agency will have sole authority to determine whether preservation measures are sufficiently related to the proposed action, justified by the project scope and degree of impacts, and reasonable.

C. Endangered Species Act

The broad purpose of the Endangered Species Act (ESA) is to conserve the ecosystems upon which endangered and threatened species depend and to conserve and recover listed species. The ESA is a comprehensive law, covering the species listing process, designation of critical habitat, prohibitions and consultation procedures. Section 7 of the ESA governs the process whereby Federal action agencies work together with the US Fish and Wildlife Service and National Marine Fisheries Service (the Services) to ensure that proposed actions are not likely to jeopardize the continued existence of listed species or destroy or adversely modify their designated critical habitats.⁴⁷

The ESA Section 7(a)(1) provides that all Federal agencies shall, in consultation with and with the assistance of the Services carry out programs for the conservation of endangered and threatened species. Section 7(a)(2) of the ESA requires every Federal agency, in consultation with and with the assistance of the Secretary, to insure that its action is not likely to jeopardize the continued existence of any listed species or results in the destruction or adverse modification of critical habitat. In meeting this requirement, each agency must use the “best scientific and commercial data available.”⁴⁸

⁴⁵ This guidance was released for comment in draft and is under revision considering stakeholder comments. The draft is based on current agency guidance and policy. DRAFT Federal Guidance on the Use of Preservation as Compensatory Mitigation Under Section 404 of the Clean Water Act. (August 27, 2004). Available at <http://www.mitigationactionplan.gov/guidancetext.html>.

⁴⁶ RGL 02-2.

⁴⁷ ESA Section 7(a)(2); 16 USC 1536(a)(2).

⁴⁸ ESA Section 7(a)(2); 16 USC 1536(a)(2). See the Joint Agency Agreement for an analysis of the term “best scientific and commercial data available: “The duty to use *best scientific and commercial data available* does not mean doing new research, nor reaching scientific certainty. Even if there is only limited or weak data available, an action agency can still proceed to use it if it is the ‘*best scientific and commercial data available*’” (emphasis in original).

**Case Study: Shortgrass Prairie Conservation Banking Program
Colorado**

The Colorado DOT partnered with the US Fish and Wildlife Service, FHWA, the Colorado Department of Natural Resources and The Nature Conservancy on a proactive approach to conservation of priority habitats for multiple species in Colorado's Eastern Plains. To determine species and habitats and effects of future transportation improvements, the partnership employed an independent panel of scientific experts, evaluated long range transportation plans and estimated impacts on critical habitat based on right of way disturbance and acreage by habitat type. The Colorado DOT contracted with the Nature Conservancy to protect, through conservation easements, about 40,000 acres of critical habitat meeting specified criteria. The Nature Conservancy has committed to monitor and maintain the conservation easements in perpetuity. While not a substitute for ESA Section 7 Consultation on future transportation projects, it is anticipated that saving just six months in the consultation process would more than offset the cost of implementing this conservation banking program.

Lessons Learned: Patience and creativity were key attributes in the five years it took to develop this program. Both scientific and legal issues took longer than anticipated to resolve. Early conceptual agreement on common goals by top agency officials meant there were no reluctant partners and there was a common interest in success.

The Section 7(a)(2) interagency consultation process is guided by implementing regulations in 50 CFR Part 402 and by a comprehensive guidance document, the ESA Section 7 Consultation Handbook.⁴⁹ The FHWA and US Fish and Wildlife Service recently issued a joint agency agreement that reiterates the minimum legal requirements and agency responsibilities under the Section 7 consultation process.⁵⁰ “The Service performs strictly an advisory function under Section 7 by consulting with other Federal agencies to identify and help resolve conflicts between listed species and their critical habitat and proposed actions.”⁵¹ The Federal action agency makes the ultimate decision as to whether its proposed action will satisfy the substantive requirements of Section 7(a)(2). The Service has no veto power over a project.⁵² Appendix C contains more detailed descriptions of the general purposes and requirements of the ESA and its informal and formal consultation processes.

⁴⁹ US Fish and Wildlife Service and National Marine Fisheries Service, Endangered Species Consultation Handbook Procedures for Conducting Consultation and conference Activities Under Section 7 of the Endangered Species Act (March, 1998), available at <http://www.fws.gov/endangered/consultations/s7hndbk/s7hndbk.htm>. (Hereinafter, “ESA Section 7 Handbook”).

⁵⁰ Federal Highway Administration and Fish and Wildlife Service Memorandum, Endangered Species Act Legal Analysis and Joint Agency Agreement on ESA's Formal Consultation Process (February 18, 2005). (Hereinafter, “Joint Agency Agreement”).

⁵¹ Preamble to 50 CFR Part 402 Final Rule, 51 FR 19926 (June 3, 1986).

⁵² Joint Agency Agreement, p. 11.

Adequate Analysis

Indirect and cumulative impacts of transportation projects on listed species or critical habitat are considered somewhat differently during informal and formal consultation. The objective of informal consultation is to determine whether the project is likely to cause adverse affects. The objective of formal consultation is to determine whether the project will jeopardize the continued existence of an endangered species or result in the destruction or adverse modification of designated critical habitat. Transportation projects are routinely subject to informal and formal consultations, although a finding of jeopardy is quite rare.

The Services may suggest conservation measures during informal consultation to reach a finding of not likely to adversely affect, thus allowing for consultation to be completed quickly.⁵³ If there may be any listed species present in the study area of a transportation project where indirect and cumulative impacts are an issue, it may be difficult to establish a finding of not likely to adversely affect and it would be more desirable to move directly into formal consultation process which has specific time requirements that add more certainty.⁵⁴

The Services regulations and guidelines for what goes into a formal consultation biological opinion provides insight into what the agency will consider as an adequate analysis of indirect and cumulative impacts for listed species and critical habitat. The important components of an adequate analysis under the ESA are defining the action area, establishing the environmental baseline, and defining and evaluating the indirect and cumulative effects.

Action Area

In assessing impacts on a listed species or critical habitat, the action area “means all areas to be affected directly or indirectly by the Federal action and not merely the immediate are involved in the action.”⁵⁵ “The Service is not able to define specific spatial and temporal limits for the concept of indirect effects that would satisfy every conceivable situation.”⁵⁶ The action area should be defined based on the best scientific and commercial data available.

Environmental Baseline

The environmental baseline is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species, its habitat and ecosystem within the action area. The environmental baseline is a snapshot of the species health at a specified point in

⁵³ Ibid, p. 5.

⁵⁴ Ibid.

⁵⁵ 50 CFR 402.02

⁵⁶ 51 FR 19226.

time.⁵⁷ The Services will expect an adequate analysis to first establish an environmental baseline before considering the direct, indirect or cumulative impacts of a project.

Indirect Impacts

Indirect impacts are defined by the ESA regulations as those that are caused by the project and are later in time but still reasonably certain to occur.⁵⁸ Future development areas where species could be adversely affected, even if not directly impacted by the project, may be considered as indirect impacts of the transportation project only if there exists a logical link from the transportation project to the future development to the species impacts that may cause jeopardy or modify critical habitat.⁵⁹ When disagreements over the scope and content of an indirect impact analysis cannot be readily solved at the local level, “it is in the best interests of both transportation agencies and the Service to quickly elevate the issue to the headquarters office of the Federal agencies involved.”⁶⁰

Cumulative Impacts

Cumulative impacts include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area. Future Federal actions that are unrelated to the proposed action are not considered because they require separate Section 7 consultation, a difference from the NEPA requirements related to cumulative impacts. Factors that make an action reasonably certain to occur may include approval, imminent grant of authority, assurance of project sponsor, obligation of capital, initiation of contracts.⁶¹ The cumulative effects analysis conducted in compliance with NEPA may be submitted, and the Service will use its own narrower definition of cumulative effects when analyzing whether a proposed action, along with cumulative effects, would result in jeopardy or adverse modification of critical habitat.⁶²

⁵⁷ ESA Section 7 Handbook, p. 4-22.

⁵⁸ 50 CFR 402.02

⁵⁹ In *National Wildlife Federation v. Coleman* 529 F.2d. 359, 374-5 (5th Cir. 1976), the court found that DOT failed to adequately consider indirect impacts of future private development that was proximate to the placement of the highway and interchanges when those impacts could place the species in jeopardy or modify critical habitat. The project was stopped until project modifications were made to one of the interchanges and to the borrow pit locations, but the court stated that it was “confident that the Secretary of Transportation and the Secretary of Interior will take all actions necessary on remand to protect the continued existence of the Mississippi Sandhill Crane and its habitat” and therefore did not order the DOT to acquire replacement land for critical habitat which would be directly or indirectly impacted by the project.

⁶⁰ Joint Agency Agreement, p. 10.

⁶¹ ESA Section 7 Handbook, p. 4-30.

⁶² 51 FR 19926.

Evaluating the Effects of the Action

The effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, which will be added to the environmental baseline.⁶³ The Section 7 consultation will analyze whether the “effects of the action” on listed species plus any additional, cumulative effects of State and private actions which are reasonably certain to occur in the action area, are likely to jeopardize the continued existence of the species. Based on the results of the consultation, the Federal action agency makes the final determination whether it can proceed without exceeding the jeopardy standard.⁶⁴ The continued existence of the **entire** species is the key to the jeopardy standard, placing an emphasis on injury to a species survival and also to its recovery. A proposed action cannot proceed if the jeopardy standard is exceeded, but adverse affect to a listed species does not violate the substantive mandate of Section 7(a)(2).⁶⁵ If an action affects critical habitat, but does not appreciably diminish the value of constituent elements essential to the species conservation, the adverse modification threshold is not exceeded.⁶⁶

Mitigation

Section 7 of the ESA does not use the term mitigation. In the ESA regulations, there are three concepts that are related to the NEPA definition of mitigation: conservation recommendations, reasonable and prudent alternatives, and reasonable and prudent measures. Conservation recommendations are discretionary recommendations that are to be provided separately from biological opinions and are advisory only.⁶⁷ Reasonable and prudent alternatives are actions identified during formal consultation that could avoid the likelihood of jeopardy to the species or adverse modification of critical habitat.⁶⁸ Reasonable and prudent alternatives do not encompass mitigation measures which would be designed to reduce adverse effects on a species, as these would be conservation recommendations.⁶⁹ Reasonable and prudent measures are actions necessary or appropriate to minimize the amount or extent of incidental take, and are thus directed at affected individuals. Reasonable and prudent measures to reduce incidental take by definition do not apply to indirect or cumulative impacts.

⁶³ 50 CFR 402.02. Effects on the action also include interrelated or interdependent actions which are relevant when the proposed action is part of a larger action that could not occur “but for” the proposed action. With transportation projects, interrelated and interdependent actions would rarely arise, and should not be confused with indirect impacts of reasonably foreseeable future actions.

⁶⁴ 51 FR 19926.

⁶⁵ Ibid.

⁶⁶ ESA Section 7 Handbook, p. 4-39.

⁶⁷ 50 CFR 402.14(h)

⁶⁸ 50 CFR 402.02

⁶⁹ 51 FR 19926

D. The Fish and Wildlife Coordination Act

The Coordination Act requires consultation early in the planning process with the US Fish and Wildlife Service or the National Marine Fisheries Service (where marine species are involved).⁷⁰ The law itself only applies to an agency action's direct impacts, but encourages wildlife conservation and development. The minimum legal requirement for such consultation is automatically fulfilled by the NEPA process in the general consideration of water resource and wildlife impacts.⁷¹ In practice agency coordination may result in requests for conservation measures that may be adopted as part of the project for mitigation of wildlife impacts, although mitigation is not required, and a transportation agency is not required to implement the requests of the Services.

A comprehensive discussion of the Fish and Wildlife Coordination Act and the Service's role in conservation partnerships is found in "Water Resources Development Under the Fish and Wildlife Coordination Act."⁷² This document is meant to serve as guidance for Service biologists and government and non-government partners in collaborative efforts to advance positive water projects and conserve fish and wildlife resources. The document also contains detailed descriptions of Service mitigation policies and its resource evaluation framework, although there is not specific guidance directed at indirect and cumulative impacts analysis or mitigation.

E. Section 106 of NHPA

Section 106 of the National Historic Preservation Act of 1966, as amended, requires Federal agencies to take into account the effects of their undertakings on properties included, or eligible for inclusion, in the National Register of Historic Places ("National Register") and to afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on such undertakings.⁷³ The regulations implementing Section 106 are contained in 36 CFR Part 800. The minimum requirements for components of an indirect and cumulative impact analysis are well described in these regulations, as referenced in the matrix.

⁷⁰ 16 USC 661 et. seq.

⁷¹ County of Bergen v. Dole, 620 F. Supp. 1009, 1063 (D.N.J. 1985) *aff'd* 800 F.2d 1130 (3rd Cir. 1986)

⁷² Smally, Daniel H. and Mueller, Allan J. Water Resources Development Under the Fish and Wildlife Coordination Act (November 2004). Available at <http://www.fws.gov/habitatconservation/fwca.pdf>.

⁷³ 16 U.S.C. 470(f)

F. Environmental Justice

Executive Order 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations” requires Federal agencies to adopt strategies to address environmental justice concerns within the context of their operations. The US EPA is often particularly interested in making sure environmental justice concerns are addressed in the NEPA process.⁷⁴ Both CEQ and EPA guidance for incorporating environmental justice concerns in the NEPA analysis include consideration of indirect and cumulative impacts and mitigation measures. In urban settings, transportation projects can produce significant direct or indirect impacts that raise environmental justice concerns.

While the Executive Order itself applies to the Federal action agency only, EPA could raise environmental justice concerns under its regulatory authority over Section 404 permits that may have a disproportionately high and adverse health or environmental effect on a minority community or low-income community. EPA can address such effects when they result directly from a discharge of dredged or fill material (e.g., the filling of a waterbody), or are the indirect result of the permitted activity (e.g., the fill will allow construction of an industrial facility that will cause water pollution due to runoff). In general, an adequate analysis and mitigation for indirect and cumulative impacts would depend on the proposed action, the scope and degree of impacts, and reasonableness of mitigation measures.

Case Study: Newtown Pike Extension, Lexington, Kentucky

The Kentucky Department of Highways is planning to fund a \$35 million environmental justice mitigation strategy in addition to the \$35 million construction cost for a major arterial extension designed to take 25,000 cars around rather than through downtown Lexington, KY. The alignment is next to one of the lowest income neighborhoods in the city. It has been on the plans for 60 years, which contributed to the on-going lack of infrastructure maintenance in the community. This extraordinary environmental justice mitigation strategy is modeled on lessons learned in the Crest Street Community mitigation plan for the East-West Expressway in Durham, North Carolina. The Lexington project will completely rebuild the infrastructure in the affected neighborhood, including drainage, utilities, and noise barriers. Residents will be relocated either permanently or temporarily. The majority of funding will go toward a community land trust to be held by a non-profit organization. The land trust will hold a 99-year lease on the land and will own the improvements to the land. The most important aspect of the land trust is a mechanism to control housing values to keep the costs at below-market value for successive low income buyers.

⁷⁴ US EPA. Final Guidance for Incorporating Environmental Justice Concerns in EPA’s NEPA Compliance Analyses (April, 1998); Council on Environmental Quality. Environmental Justice Guidance under the NEPA (December 19, 1997).

V. Compatible Approach Framework

The purpose of this section is to present a compatible approach framework incorporating into the NEPA process the distinct regulatory responsibilities that apply to each resource for adequate indirect and cumulative impact analysis and mitigation. Ultimately, agencies and practitioners must determine the methods and scope of analysis based on the size and type of the project, its location and ability to affect resources, and any unique circumstances. The framework presented here provides suggestions on how to ensure that methodologies and definitions for all agencies and regulations are addressed.

The compatible approach framework is based on the following key conclusions and observations gained from the foregoing research into major environmental laws, regulations and agency guidance regarding indirect and cumulative impacts:

- A synthesized definition of indirect and cumulative impacts and other key terms is properly based on the CEQ regulatory definitions.
- The laws, regulations and policy guidance require a strict causal relationship between a transportation project and future development impacts before future development impacts could be considered as indirect impacts of a transportation project.
- An adequate cumulative impact analysis would address the sustainability of impacted resources.
- An indirect and cumulative impact analysis is properly limited to significantly affected resources.
- Consideration of indirect and cumulative impacts is necessary to comply with all major environmental laws, although no agency has specific official guidance on how to conduct an adequate indirect and cumulative impacts analysis.
- Boundaries of analysis are properly determined based on particular resource attributes.
- Resource agencies welcome early project coordination to ensure that regulatory needs are being met in the project analyses.
- Laws and regulations do not explicitly require mitigation (including avoidance, minimization and compensation) for indirect and cumulative impacts, although agency policies encourage a holistic view of mitigation measures for any adverse impacts.
- Federal agencies may not require mitigation measures for any adverse effects unless such measures are directly related to the proposed action, justified by the project scope and degree of impacts, and reasonable.

A flow chart has been prepared to illustrate the compatible approach framework to indirect and cumulative impact analysis (Appendix D). The flow chart begins with a list of affected resources and the agencies with a regulatory interest or expertise in each resource. The compatible approach framework concentrates on interagency and interpersonal coordination, which often involves many agencies with regulatory authority by law to comment or advise on resource protection issues. The framework is built around three principles, which will be described in more detail below:

- Use a collaborative process throughout the analysis.
- Focus on resources to conduct adequate analysis.
- Consider mitigation strategies to achieve resource goals.

A. Use a Collaborative Process

The coordinated approach presented in the flow chart applies the common characteristics of successful collaboration to the very specific goal of conducting an indirect and cumulative impact analysis that satisfies all agency requirements. A collaborative process ensures that resource agency issues and interests are addressed as early as possible. It is not intended to give resource agencies additional regulatory or decision-making authority beyond what is supported by law.

Collaboration is a deceptively simple concept that can be elusive to implement.¹ To use a collaborative process, 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.

The transportation agency role is to provide leadership in the collaborative process, to involve other agencies through sharing resources and information, and to foster trust through transparent decision-making. Other agency roles and authorities are defined by the legal requirements under major environmental laws as presented in the foregoing report. It is important in the collaborative process for all agencies to recognize and respect each other's missions, responsibilities, authorities and expertise.

¹ The NEPA Task Force Report to the CEQ, *Modernizing NEPA Implementation* (Sept. 2003), p. 24. Much of the discussion that follows is based on Chapter 2 of this report which presents the CEQ NEPA Task Force findings and recommendations for achieving greater Federal and intergovernmental collaboration.

The following discussion presents specific questions that transportation agencies should pose to each resource agency, individually or collectively, depending on the resource being affected. The questions are presented in the sequential order that would correspond to the flow chart.

Elements of a Collaborative Process

Practitioners with experience in a collaborative process recommend starting with an initial comprehensive agency meeting to present initial proposals on how affected resources will be addressed. Depending on how involved each agency wants to be, the transportation agency project team could develop a coordination process for each individual resource.

The following questions should be posed and answered at the start of a project to establish the basic elements of a collaborative process:

- How does each agency expect to participate in the collaborative process for conducting an adequate analysis of indirect and cumulative impacts and consideration of mitigation strategies for this project?
- What are the statutory and regulatory requirements that need to be met in on this project?
- What does each agency expect will be the outcome of the indirect and cumulative impact analysis for this project?
- What commitment of time and availability can each agency make to this project (e.g. regular interagency meetings, field meetings, individual coordination)?

On some complex projects, professional facilitators can help the process take shape and stay focused. Neutral facilitators can also develop and maintain trust between parties. Trust is an important element of a collaborative process, and can be achieved by taking the time at the start of scoping to discuss a vision for the process and how conflicts will be resolved if they arise.²

Following a collaborative process can be initially time consuming, particularly if the analysis does not proceed until each interested agency is comfortable with their role, the process and the expected outcome. Taking the time to resolve differences early in the scoping stage usually leads to better decisions, better documents, can streamline the analysis, and avoids delays later in the project development process.

² See US Department of Transportation, Collaborative Problem Solving: Better and Streamlined Outcomes for All, Guidance on Managing Conflict and Resolving Disputes between State and Federal Agencies During the Transportation Project Development and Environmental Review Process (2002).

The Scoping Stage

As illustrated in the bottom row of the flow chart, much agency coordination takes place in the scoping stage of a project. The transportation agency should conduct coordination with local, state and federal agencies to gather baseline information in the scoping stage. On transportation projects, the federal agencies may have limited information regarding potential indirect effects of a project, particularly related to growth and development, and greater information related to resource protection standards and cumulative impacts. The information gathered from local and state agencies should be shared during scoping with the federal agencies in order to proceed through the collaborative process and address the following questions:

- How will the definitions of indirect impacts and cumulative impacts be applied to this project?
- What are the resources potentially affected in a significant way by the project's direct, indirect or cumulative impacts?
- What is the baseline condition of each affected resource (i.e. resource health and sustainability)?
- What issues should be addressed in terms of the characteristics, function and importance of the affected resources?
- What data or information does each agency have to contribute to the evaluation of these issues?
- What are the appropriate spatial and temporal boundaries for the indirect and cumulative impact analysis of each resource?
- What method of analysis and level of detail would be appropriate to address the resource impact issues identified?
- What are the Federal, state or local goals for important resource protection, management or enhancement?

**Case Study: I-95
Woodrow Wilson Bridge Replacement,
Maryland - Virginia**

During scoping and before analysis, the project team met with US EPA at their offices to discuss the scope of indirect and cumulative impact study for this major interstate bridge replacement. Based on EPA feedback, the project team made a later presentation to the full interagency group. Many resource agencies had anticipated that the analysis would include the I-95 corridor all along the east coast, but the transportation agency knew that the area of traffic influence was quite tight. This early coordination focused on just this issue to get it resolved so that agencies understood in the beginning that the spatial boundary was appropriately constrained. Agencies had an opportunity to get their questions answered at the appropriate time and avoided future disagreements over alternative expectations or positions.

Clear documentation should consist of the answers to these questions, including any assumptions and inherent uncertainties, and any decision-making involvement or agreements with other agencies.³

The Analysis and Decision Stage

As the project transitions from scoping into analysis, agency coordination consists of using the collaborative process established from the beginning to provide transparency in the project analysis and decision-making. Other agencies should be asked for information relevant to the analysis before it is conducted, and should be made aware of the project's on-going efforts at resource avoidance and impact minimization. Discussion of resource needs in order to maintain its sustainability or reach its goals should begin in the analysis phase. The agencies should collaborate on potential project modifications, resource improvement activities or conservation measures to achieve resource goals, so that these opportunities can be evaluated against the impacts in the decision stage.

- What other actions is each agency aware of that may affect the resource in the spatial or temporal boundaries?
- What are reasonable project alternatives for avoidance and minimization of impacts to important resources?
- What actions are needed to achieve the goals for important resource protection, management or enhancement?
- What are the cause and effect relationships?
- What is the significance of the resource impacts?
- What resource needs and opportunities are appropriate to address in the context of the project's scope and significance of impacts?

Clear documentation should consist of the answers to these questions, including any assumptions and inherent uncertainties, and any involvement or agreements with other agencies.

The methods of analysis, evaluation of impacts and resulting project decisions will vary based on the project as well as on the resource under consideration. The focus on resources component of the framework goes into more detail on these issues.

³ Some interviewees noted that agency staff turnover can raise concerns on lengthy projects where decisions made by previous staff may be questioned later by new staff. Clear documentation of coordination conducted and agreements reached should help alleviate this concern.

B. Focus on Resources

Environmental impacts are often evaluated from the perspective of the proposed action, but analyzing indirect and cumulative impacts require focusing on the resource, ecosystem, and human community that may be affected and developing an adequate understanding of how the resources are susceptible to potential impacts.⁴ The compatible approach framework maintains a focus on resources in coordination with the agencies that have expertise or regulatory responsibility related to those resources. At each step of the model, it is necessary to consider each resource individually and to coordinate with interested agencies in the collaborative process to ensure that adequate analysis is being conducted.

The various environmental laws affecting transportation projects establish goals and policies for environmental protection, but there is very little in terms of strict requirements in law or policy on how to meet environmental standards, particularly in regard to indirect and cumulative impacts. Much of the analysis and outcome will depend on agency discretion to determine, on a case-by-case basis what is appropriate or reasonable for indirect and cumulative impact analysis and mitigation.

The following steps of the coordinated approach framework correspond to the flowchart contained in Appendix B.⁵

Significantly Affected Resources

The first step is to determine the potentially significant resource issues. For each category of resources that could be affected, the purpose of this step is to determine whether the project could have direct, indirect or cumulative impacts that could significantly affect those resources, taking into account the nature of the proposed action and knowledge about the resources. It is not necessary under NEPA or other laws to collect or discuss data on improbable resource impacts, or on resource impacts that may be irrelevant, negligible, or may not be observable without large cost. Each affected resource should be examined with input from the relevant resource agency and with the relevant environmental protection standard in mind.

Once the resources under consideration are identified, the affected resource context should be determined by considering the characteristics, function, and importance of each affected resource. The characteristic of a resource relates to its current health and sustainability. The function of a resource relates to its quality and purpose. The importance of a resource may be defined by recognition of any one or all three criteria of institutional, public or technical recognition.⁶ Institutional recognition means that the resource is acknowledged by laws, adopted

⁴ CEQ Handbook on Considering Cumulative Effects under NEPA, Table 1-2.

⁵ These steps are similar to those contained in California's "Guidance for Preparers of Cumulative Impact Analysis: Approach and Guidance" (June 30, 2005). Available at http://www.dot.ca.gov/ser/cumulative_guidance/approach.htm

⁶ See Smally and Mueller, Water Resources Development Under the Fish and Wildlife Coordination Act, p. v-6.

plans or other policy statements. Public recognition means that some segment of the general public recognizes the importance of the resource. Technical recognition means that the importance is based on scientific or technical knowledge or judgment.

This step allows the practitioner to determine the context component of significance, which will guide the level of detail for examining the project's direct, indirect, or cumulative impacts. This step fulfills the NEPA process purpose of "identifying at an early stage the significant environmental issues deserving of study and deemphasizing insignificant issues, narrowing the scope of the environmental impact statement accordingly."⁷

Analysis Limits by Resource

The next step in the flow chart is to determine temporal and spatial limits for the indirect and cumulative impact analysis. For the transportation project NEPA analysis, indirect and cumulative impacts related to traffic, socio-economic effects, and growth will generally be contained by the project study area. However, indirect and cumulative impacts on environmental resources may have larger or smaller boundaries than the study area, such as a watershed for aquatic resources that goes beyond the study area boundaries, or a species habitat that may be limited to a smaller area.⁸ The flow chart lists common considerations in determining spatial limits, and these should be determined in coordination with the resource agencies.

In considering temporal limits, agencies should keep in mind that NEPA is forward-looking, in that it focuses on the potential impacts of the proposed action. The ESA concept of an environmental baseline is a useful notion, because instead of looking back at what occurred to result in a species being endangered, the ESA environmental baseline establishes the current status of the species in order to predict its future sustainability. The USACE takes a similar approach to aquatic resource considerations under the Section 404(b)(1) Guidelines. Therefore, the beginning point of analysis is the present state of the resource. CEQ guidance addresses the issue as follows:

With respect to past actions, during the scoping process and subsequent preparation of the analysis, the agency must determine what information regarding past actions is useful and relevant to the required analysis of cumulative effects. Cataloging past actions and specific information about the direct and indirect effects of their design and implementation could in some contexts be useful to predict the cumulative effects of the proposal. The CEQ regulations, however, do not require agencies to catalogue or exhaustively list and analyze all individual past actions. Simply because information about past actions may be

⁷ 40 CFR 1501.1(d)

⁸ See CEQ Handbook on Considering Cumulative Effects under NEPA, Table 2-2, p. 15, for possible geographic area boundaries for various environmental resources.

available or obtained with reasonable effort does not mean that it is relevant and necessary to informed decision-making.⁹

This important guidance makes clear that the starting point of analysis is the present, with past actions examined only if it informs the current state of the resource or helps to predict the direct or indirect effects of a proposed action. The present state of the resource includes the aggregate effects of past actions and while the past effects are necessary to establish the resource health and sustainability, the past actions that caused those effects is not a necessary part of the analysis.

The end point of the temporal boundary may vary by resource, such as when the transportation planning horizon is the temporal limit for traffic impacts, but a much shorter time frame would normally be applied to environmental resource impacts. The temporal boundaries may also be related to the time frame of future actions that may cause significant cumulative resource affects. Transportation agencies should discuss the appropriate temporal boundary for a particular resource with the agency responsible for the resource protection.

This step is also the time to consider methods of analysis. The level of detail and methods of analysis should be guided by the characteristics, function and importance of the resource determined in the previous step, the affected resource analysis area boundaries determined in this step, and the project scope.¹⁰

Resource Trends and Goals

The next step is to determine resource trends and goals. This step builds the bridge between scoping, when effects that are likely to be important are identified, and the detailed analysis to determine the magnitude and intensity of the potential effects.¹¹ Coordination with local, state and Federal agencies with a focus on individual resources is extremely important to gathering data and drawing conclusions on the following information:

- Past trends (development, infrastructure, travel, natural resource use and protection, and changes in environmental quality and quality of life)
- Goals (plans, growth management strategies, environmental protection laws, community consensus, and citizen desires, as well as the relationship between these goals, existence of conflicting goals, and implementation and enforcement records)
- Potential for change (land availability, ongoing natural processes, market demand and other economic forces, and activism)

⁹ Memorandum from James L. Connaughton to Heads of Federal Agencies, “Guidance on the Consideration of Past Actions in Cumulative Effects Analysis,” June 24, 2005, p. 3.

¹⁰ See NCHRP Report 466, Figure 3-1, p. 27, for a list of factors relative to the scope (size, location and characteristics) of transportation projects that could influence the level of effort and methods of analysis.

¹¹ CEQ Handbook on Considering Cumulative Effects under NEPA, p. 23.

The resource trends will determine the relative health of the environmental resource which is its baseline present condition. The consideration of development and environmental resource goals further defines the context of the resource against which future potential impacts as well as improvement needs and opportunities can be examined.

Potential Types of Actions

This step determines the actions that will be included in the resource analysis, including the proposed activity and its alternatives, other reasonably foreseeable actions, and resource improvement needs and opportunities. The resource needs and opportunities will inform avoidance and minimization actions for project alternatives and may identify any other actions that could reduce the significance of potential indirect or cumulative impacts.

In terms of the cumulative impact analysis, other reasonably foreseeable actions are actions that are:

- Within the geographic and temporal boundaries of analysis,
- Probable or reasonably certain to occur,
- Likely to pose a threat to the resources under consideration, and
- Useful to the transportation decision.

Methods for gathering information and conducting analysis on reasonably foreseeable actions and their effects on resources are contained in the CEQ Handbook on Considering Cumulative Effects Under NEPA, and NCHRP Report 466 Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects. The analysis methods should be determined based on the needs apparent from the previous steps and in coordination with other agencies to meet their requirements.

Evaluate Impacts and Consider Mitigation Strategies

This step determines the direct, indirect and cumulative impacts, and their significance to each affected resource. Each affected resource, ecosystem and human community should be analyzed in terms of its capacity to accommodate additional impacts, based on its own function and characteristics. The consideration of mitigation strategies is iterative throughout the evaluation of impacts, in order to determine what is needed to ensure long-term sustainability of the resource. The following outlines shows what should be considered in the evaluation of impacts to each affected resource¹²:

¹² Page, John and Lorna Parkins. "Cumulative Impact Assessment and Its Application to a Transportation Project," *Transportation Research Record* No. 1670 (1999); Page, John. "Cumulative Impact Assessment: A Graphical Summary," *Environmental Analysis in Transportation*, the newsletter of Transportation Research Board Committee A1F02, Vol. XVIII, No. 1 (June, 2001).

- Type of effects
 - Direct, indirect or cumulative
 - Goal compatibility (is the meeting of area goals supported or inhibited)
 - Loss or enhancement of notable features
 - Sustainable or consumptive resource use
 - Change in environmental quality or quality of life
- Nature of effects
 - Short-term and long-term
 - New or on-going
 - Immediate or evolving
 - Reversible, reversible with difficulty, or irreversible
 - Discreet, overlapping ,or interactive
 - Additive or compounding
- Significance of effects
 - Magnitude
 - Frequency and duration
 - Affect on public health and safety
 - Exceed environmental or societal carrying capacity
 - Controversy
 - Violation of law or regulation

An important part of this step is the identification of the cause and effect relationships between the various actions and the affected resources. Again, the focus is on the resource and how the project action contributes to the affects on the resource. Coordination with resource agencies should be on-going to clarify the cause and effect relationships, to evaluate impact significance and to discuss required and discretionary mitigation strategies.

C. Consider Mitigation Strategies to Achieve Resource Goals

The resource focus and collaborative process elements of a coordinated approach to indirect and cumulative impact analysis allow for a more holistic view of mitigation strategies for direct impacts. Taking a more holistic approach to direct impact mitigation may alleviate concerns over whether to consider mitigation for indirect or cumulative impacts. Early agency coordination about resource management, protection or enhancement goals leads to a broad view of resource needs and opportunities before project impacts are determined. At this early step, transportation agencies can consider the project scope and context in determining the appropriate types of direct impact mitigation strategies that could be part of the project. In this way, the nature of the proposed action and the affected resources will determine the appropriate types of mitigation strategies, before direct or indirect impacts are delineated.

This research has shown that agency authority to require mitigation for indirect or cumulative impacts does not explicitly exist, and that any mitigation requirements must be directly related to

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the proposed action, justified by the project scope and degree of impacts, and reasonable. The reach and scope of mitigation for transportation project impacts will primarily be at the discretion of the transportation agency. As FHWA guidance encourages, transportation agencies should seek opportunities to implement innovative measures to help projects fit within the community and natural environment in which they are located.¹³

Strategies to achieve resource goals, as defined by the resource agencies, may by circumstance or by design address potential indirect or cumulative impacts. Such strategies can be incorporated into a transportation project as avoidance, minimization or compensation for direct impacts. This approach would satisfy Federal agency interests in resource protection and enhancement while maintaining the regulatory limits on agency authorities.

¹³ FHWA Questions and Answers, 2003, p. 13.

Appendix A – Laws and Regulations Matrix

Appendix B – Description of USACE Regulatory Program and Section 404(b)(1) Guidelines

General Requirements

General Permit Standards

The USACE general policies for evaluating permit applications are applicable to the review of all permit applications, regardless of the activity being regulated.¹ These policies refer in several places to the importance of evaluating a proposed activity's cumulative impacts but do not include a specific reference to indirect impacts (although these are a component of cumulative impacts). In general, the decision of whether to issue a permit is based on an evaluation of the public interest in a proposed activity against the probable impacts to the human and natural environment.

The public interest review is a framework for balancing interests in the decision-making process.² The USACE is to pay particular attention to the cumulative impacts of numerous piecemeal changes to wetlands which can result in a major impairment of wetland resources³, and to the cumulative impact of changes to a floodplain that may result in a significant degradation of floodplain values and functions and in increased potential for harm to upstream and downstream activities.⁴ In terms of wetlands, the USACE must determine that the benefits of the proposal outweigh the damage to the wetland resource, and must apply the Section 404(b)(1) Guidelines.⁵ In terms of floodplain management, the USACE must ensure that floodplain impacts are minimized and whenever practicable the natural and beneficial values served by floodplains are restored and preserved.⁶

The EPA has authority under the Clean Water Act Section 404 to:⁷

- Review and comment on individual permit applications.

¹ 33 CFR 320.4

² 33 CFR 320.4(a). See 33 CFR 320.1 for the purpose and scope of the USACE general regulatory policies.

³ 33 CFR 320.4(b)(3)

⁴ 33 CFR 320.4(1)(2)

⁵ 33 CFR 320.(b)(4)

⁶ 33 CFR 320.4(1)(2)

⁷ US Environmental Protection Agency and Department of the Army. Clean Water Act Section 404(q): Memorandum of Agreement (August 11, 1992). Available at <http://www.epa.gov/owow/wetlands/regs/dispmoa.html>.

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- Veto USACE permit decisions having unacceptable adverse effect on municipal water supplies, shellfish beds and fishery areas (including spawning and breeding areas), wildlife, or recreational areas. (Section 404(c)).
- Elevate specific cases limited to those cases that involve aquatic resources of national importance. For example, cases that do not meet this resource value threshold cannot be elevated over a dispute concerning practicable alternatives. More specifically, the elevation of individual permit cases should be limited to those cases where the net loss (i.e., after considering mitigation) from the project (i.e., within the scope of impacts being evaluated by the USACE), will result in unacceptable adverse effects to aquatic resources of national importance. (Section 404(q)).
- Enforce Section 404 provisions.

Section 404(b)(1) Guidelines

The most important concept to note about the Section 404(b)(1) Guidelines is that they are primarily focused on the discharge of dredge or fill materials and the related effects on the aquatic ecosystem. This focus is a necessary context for understanding compliance requirements in regard to indirect and cumulative impacts.

The Section 404(b)(1) Guidelines require the USACE to determine in writing the potential short-term or long-term effects of a proposed discharge on the physical, chemical, and biological components of the aquatic environment before issuing a permit.⁸ The environmental protection standard to be met is that "no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences."⁹ If the factual determination shows that a discharge will result in significant degradation to the aquatic ecosystem, the applicant cannot receive a permit.¹⁰ The factual determination considers: major potential impacts on threatened or endangered species¹¹; loss or change of breeding or nesting areas, escape cover, travel corridors, and preferred food sources for resident and transient wildlife species associated with the aquatic ecosystem¹²; impacts to sanctuaries and refuges which disrupt breeding, spawning, migratory movements or other critical life requirements of resident or transient fish and wildlife resources¹³; impacts to

⁸ 40 C.F.R. 230.11, 230.12.

⁹ 40 CFR 230.10

¹⁰ 40 CFR 230.12

¹¹ 40 C.F.R. 230.30(b)

¹² 40 C.F.R. 230.32(b)

¹³ 40 C.F.R. 230.40(b)(1)

wetlands that are likely to damage or destroy habitat and adversely affect the biological productivity of the wetlands' ecosystem.¹⁴

Outline of a Cumulative Impact Analysis

The USACE approach to cumulative impact analysis can be discerned from the following outline: (1) Identify the Baseline, (2) Context, and (3) Mitigation and Monitoring:¹⁵

(1) Identify the Baseline

- Describe the factors under consideration
 - Include available information on historic loss of wetlands.
 - Consider the historic loss (National/State statistics available from NWI reports, then make calculated assumptions).
 - Supplement trend data with local knowledge when possible.
- Describe the relative amount of recent aquatic resource loss (3 to 10 years depending on data available)
 - Include impact numbers and type of permits issued in the past, including any offsetting mitigation data
- Projection of resource trend into the future using known, reasonably foreseeable projects (not just contemplated actions) in the assessment area.

(2) Context

- Understanding your project's place and role in the matrix of activities in the assessment area.
 - Identify/describe other activities within the assessment area in a general way
 - Many local/regional/county/transportation plans can help in establishing the "big picture" in the assessment area.
 - Allows the assessment of the effects of your project in light of other projects in the assessment area with consideration for precedent setting decisions.
- Describe the effects anticipated to the aquatic environment from activities that would occur absent USACE action.
 - Focus on activities that may have an indirect effect on the aquatic environment (e.g. logging, agriculture, upland development)
 - Focus on the potential effects to the aquatic environment not the direct impacts to upland resources
 - Enables a holistic view towards mitigation strategy
- Describe the activities that are subject to USACE regulatory control.
 - Focus on the physical aquatic environment--USACE authorized fill and impact in the area, past and future.

¹⁴ 40 C.F.R. 230.41(b)(3)

¹⁵ This information is taken from a presentation by Jennifer Moyer on *Indirect and Cumulative Effects Assessment*. Washington, DC. February, 2004. (presentation available at http://environment.transportation.org/documents/workshop/Moyer_files/frame.htm).

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- Do NOT get stuck on evaluating changes to socioeconomics, safety, traffic, etc.
- Retain focus on effects to the aquatic environment and on determining and evaluating the effects of various other sources of impact that may contribute to the overall degradation of resources of concern to the USACE.
- Continue to view your project in context with other activities.

(3) Mitigation and Monitoring

- Determine the appropriate mitigation to offset activities within USACE scope of control within the assessment area.
 - Think holistically: What is best for the aquatic environment?
 - Use the information from Element #2 (Context) to appropriately tailor the mitigation package to the assessment area.
 - Consider all aspects of mitigation for direct and indirect effects: in-kind, out-of-kind, on-site, off-site.
- Encourage looking within the assessment area for opportunities for mitigating effects to the aquatic environment, even those effects not generated by the regulated activity. Some ideas include:
 - On-site opportunities: Riparian buffers, stormwater management, etc.
 - Off-site opportunities: Consolidated sites providing multiple benefits not achievable by an on-site/in-kind plan.
 - Out-of-kind opportunities: Retrofits of stormwater management facilities to reduce turbidity, restoration of fish passage to offset direct impacts to habitat.
- Encourage Monitoring
 - Critical to provide assurance of the completion and success of offsetting actions on which permit decisions are based.
 - Over time, gathered information on indirect and cumulative effects will add to our overall understanding.
 - With increased GIS capability, our ability to understand how actions interrelate will improve.
 - Case-by-case monitoring and after-the-fact assessment of cumulative effects is done on a programmatic level.

Appendix C – Description of ESA General Requirements

Section 7(a)(1) – Conservation Programs

The ESA Section 7(a)(1) provides that all Federal agencies shall, in consultation with and with the assistance of the Services carry out programs for the conservation of endangered and threatened species. There is no minimum requirement for complying with this provision but conservation measures employed as part of transportation projects or programs can be a means for compliance with Section 7(a)(1). Conservation programs developed and implemented by transportation agencies can be based on cumulative impacts. The Service does not have the authority to mandate how other agencies are to implement their responsibilities under Section 7(a)(1). This section has a limited purpose under the ESA: to authorize Federal agencies to factor endangered species conservation into their planning processes.¹

As discussed below, the ESA does not require mitigation for impacts to listed species or their habitat as a result of a Federal project. Therefore, habitat protection or replacement activities by a transportation agency are a function of these species conservation programs, rather than a necessary mitigation measures related to a project's impacts.

Section 7(a)(2) – Interagency Consultation

The Section 7 interagency consultation process is guided by implementing regulations in 50 CFR Part 402 and by a comprehensive guidance document, the ESA Section 7 Consultation Handbook.² “The Service performs strictly an advisory function under Section 7 by consulting with other Federal agencies to identify and help resolve conflicts between listed species and their critical habitat and proposed actions.”³ The consultation process under Section 7 is not intended to establish or impose substantive policy for Federal agencies.⁴ The Federal action agency makes the ultimate decision as to whether its proposed action will satisfy the substantive requirements of Section 7(a)(2). The FHWA and US Fish and Wildlife Service recently issued a

¹ Preamble to 50 CFR Part 402 Final Rule, 51 FR 19926 (June 3, 1986).

² US Fish and Wildlife Service and National Marine Fisheries Service, Endangered Species Consultation Handbook Procedures for Conducting Consultation and conference Activities Under Section 7 of the Endangered Species Act (March, 1998), available at <http://www.fws.gov/endangered/consultations/s7hndbk/s7hndbk.htm>. (Hereinafter, “ESA Section 7 Handbook”).

³ Preamble to 50 CFR Part 402 Final Rule, 51 FR 19926 (June 3, 1986).

⁴ Ibid.

joint agency agreement that reiterates the minimum legal requirements and agency responsibilities under the Section 7 consultation process.⁵

Section 7(a)(2) of the ESA requires every Federal agency, in consultation with and with the assistance of the Secretary, to insure that its action is not likely to jeopardize the continued existence of any listed species or results in the destruction or adverse modification of critical habitat. In meeting this requirement, each agency must use the “best scientific and commercial data available.”⁶

Section 7(a)(3) of the ESA authorizes a Federal agency to enter into early consultation with the Service on a proposed action to determine whether such action is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. Section 7(a)(4) of the ESA requires Federal agencies to confer with the Services on any action that is likely to jeopardize the continued existence of proposed species or result in the destruction or adverse modification of proposed critical habitat. Section 7(b) of the ESA requires the Services, after the conclusion of early or formal consultation, to issue a written statement setting forth an opinion detailing how the agency action affects listed species or critical habitat. Biological assessments are required under section 7(c) of the ESA if listed species or critical habitat may be present in the area affected by any major construction activity.⁷

Adequate Analysis

Conducting an adequate analysis of indirect and cumulative impacts to listed species in satisfaction of the Endangered Species Act has both procedural and substantive components. The procedural component requires consultation with the Service, which consists of a structured process with certain regulatory timeframes. The substantive component places a duty on the transportation agency to insure their actions do not jeopardize the continued existence of an endangered species or result in the destruction or adverse modification of designated critical habitat. The intent of the ESA is that the Service provides assistance and consultation to further the Federal action agency’s duty and findings. The Service has no veto power over a project.⁸ The ESA analysis of effects is different from NEPA in its structure, focus and application of an environmental standard to measure against.

⁵ Federal Highway Administration and Fish and Wildlife Service Memorandum, Endangered Species Act Legal Analysis and Joint Agency Agreement on ESA’s Formal Consultation Process (February 18, 2005). (Hereinafter, “Joint Agency Agreement”).

⁶ ESA Section 7(a)(2); 16 USC 1536(a)(2). See the Joint Agency Agreement for an analysis of the term “best scientific and commercial data available: “The duty to use *best scientific and commercial data available* does not mean doing new research, nor reaching scientific certainty. Even if there is only limited or weak data available, an action agency can still proceed to use it if it is the ‘*best scientific and commercial data available*’” (emphasis in original).

⁷ 50 CFR 402.01

⁸ Joint Agency Agreement, p. 11.

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Indirect and cumulative impacts of transportation projects on listed species or critical habitat are considered somewhat differently during informal and formal consultation. The objective of informal consultation is to determine whether the project is likely to cause adverse effects. The objective of formal consultation is to determine whether the project will jeopardize the continued existence of an endangered species or result in the destruction or adverse modification of designated critical habitat. Under the ESA, following consultation Congress intended for Federal actions that do not violate the jeopardy standard to proceed. Transportation projects are routinely subject to informal and formal consultations, although a finding of jeopardy is quite rare. Understanding the purposes and requirements of the informal and formal consultation processes are important to meeting the Service's expectations for an adequate indirect and cumulative impacts analysis.

Informal Consultation

“Informal consultation determines the likelihood of adverse effects on a listed species or critical habitat. Informal consultations

- (1) identify adverse effects and suggest ways to avoid them,
- (2) resolve project conflicts or differences of opinion between the Services and the action agency or applicant as to the nature and extent of adverse effects,
- (3) provide the action agency with opportunities for carrying out conservation activities pursuant to section 7(a)(1), and
- (4) help monitor cumulative effects on a species or ecosystem.”⁹

The Services do not offer "not likely to adversely affect" concurrences unless the project's dimensions are defined clearly at the informal stage. Informal consultation may suggest changes in construction scheduling, engineering design, pesticide formulation or application method, location, emission or discharge levels, and all possible options to eliminate adverse effects should be discussed freely. The Services will concur in a not likely to adversely affect finding “only if ALL of the reasonably expected effects of the proposed action will be beneficial, insignificant, or discountable,”¹⁰ meaning that the action will not or is extremely unlikely to take any listed species. If there may be any listed species present in the study area of a transportation project where indirect and cumulative impacts are an issue, it may be difficult to establish a finding of not likely to adversely affect.

In cases where listed species may be present, a biological assessment is required to be prepared, and informal consultation will help to determine what information will be needed to conduct an adequate evaluation of the potential direct, indirect and cumulative impacts on the listed species and critical habitat. The contents of a biological assessment are at the discretion of the Federal

⁹ ESA Section 7 Handbook, p. 3-5, 3-6.

¹⁰ Ibid, p. 4-1.

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action agency, and will depend on the nature of the Federal action.¹¹ There is no mandate about what goes into a biological assessment or its structure, and the action agency may use a draft EIS to document its biological assessment.¹² Nonetheless, “the biological assessments and other information submitted by the action agency must contain sufficient detail so as to allow the Services to accurately and fully evaluate the direct, indirect and cumulative effects of their proposed actions and form their biological opinions.”¹³

The Services may suggest conservation measures during informal consultation to reach a finding of not likely to adversely affect, thus allowing for consultation to be completed quickly.¹⁴ Conservation measures that may be proposed during informal or formal consultations “are suggestions of the Service regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat” and thus are voluntary measures that an agency may or may not elect to implement in its proposed action.¹⁵ Recovery plans often identify tasks benefiting listed species that may be carried out on or near the project site. Examples include habitat protection, modification or improvement; predator control; and survey work.

When a transportation project’s direct, indirect or cumulative impacts may still adversely affect a listed species, it is more desirable to move directly into formal consultation process which has specific time requirements that add more certainty.¹⁶ Unlike the Section 404(b)(1) Guidelines, the ESA does not require that steps be taken to avoid or minimize adverse impacts. Under the ESA, “a showing of ‘adverse affect’ does not necessarily violate section 7(a)(2), because the jeopardy standard is the ultimate barrier through which Federal agencies may not pass in conducting their actions.”¹⁷

Formal Consultation

“Formal consultations determine whether a proposed agency action(s) is likely to jeopardize the continued existence of a listed species (jeopardy) or destroy or adversely modify critical habitat (adverse modification). They also determine the amount or extent of anticipated incidental take in an incidental take statement. Formal consultations perform several other functions:

- (1) identify the nature and extent of the effects of Federal (agency) actions on listed species and critical habitat;

¹¹ 50 CFR 402.12(f).

¹² Joint Agency Agreement, p. 4, citing *City of Sausalito v. O’Neill*, 211 F.Supp.2d at 1204.

¹³ *Ibid*, p. 2.

¹⁴ *Ibid*, p. 5.

¹⁵ 50 CFR 402.02; 51 FR 19926.

¹⁶ *Ibid*.

¹⁷ 51 FR 19926.

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- (2) identify reasonable and prudent alternatives, if any, when an action is likely to result in jeopardy or adverse modification;
- (3) provide an exception for specified levels of "incidental take" otherwise prohibited under section 9 of the Act;
- (4) provide mandatory reasonable and prudent measures to minimize the impacts of incidental take to listed species;
- (5) identify ways the action agencies can help conserve listed species or critical habitat when they undertake an action; and
- (6) provide an administrative record of effects on species that can help establish the species' environmental baseline in future biological opinions.”¹⁸

Rather than review the procedural consultation requirements and associated timeframes, this discussion will focus on the Service’s substantive requirements for an adequate analysis for indirect and cumulative impact analysis in a biological opinion. Just like the USACE Statement of Findings for compliance with the Section 404(b)(1) Guidelines, the Services biological opinion is a separate regulatory responsibility of the resource agency that is often based on the information provided by the transportation agency. Therefore, the Services regulations and guidelines determine what it considers to be an adequate analysis for listed species and critical habitat.

The ESA Section 7 Handbook specifies that a biological opinion contains that following elements (reference to the ESA Section 7 Handbook discussion pages in brackets)¹⁹:

- (1) Description of proposed action [page 4-15]
- (2) Status of the species/critical habitat [page 4-19]
 - A. Species/critical habitat description
 - B. Life history
 - C. Population dynamics
 - D. Status and distribution
 - E. Analysis of the species/critical habitat likely to be affected
- (3) Environmental baseline [page 4-22]
 - A. Status of the species within the action area
 - B. Factors affecting species environment within the action area
- (4) Effects of the action [page 4-23]
 - A. Factors to be considered
 - B. Analyses for effects of the action
 - C. Species' response to a proposed action
- (5) Cumulative effects [page 4-30]

¹⁸ ESA Section 7 Handbook, p. 4-1.

¹⁹ ESA Section 7 Handbook, p. 4-13.

(6) Conclusion [page 4-31]

(7) Reasonable and prudent alternatives (as appropriate) [page 4-41]

Mitigation

Section 7 of the ESA does not use the term mitigation. In the ESA regulations, there are three concepts that are related to the NEPA definition of mitigation: conservation recommendations, reasonable and prudent alternatives, and reasonable and prudent measures.

Conservation recommendations are discretionary recommendations that are to be provided separately from biological opinions and are advisory only.²⁰ These recommendations are not related to compliance with either Section 7(a)(2) or Section 7(a)(1), since development of conservation programs under Section 7(a)(1) is not necessary to avoid a violation of Section 7(a)(2). Conservation measures include actions to reduce or mitigate adverse effects of an action on the species or its habitat, and therefore may address indirect or cumulative impacts. As discretionary actions, conservation measures should not be confused with the ESA requirements which are directed at affected individuals of an adversely affected species.

Reasonable and prudent alternatives are actions identified during formal consultation that could avoid the likelihood of jeopardy to the species or adverse modification of critical habitat.²¹ Reasonable and prudent alternatives are defined as actions that can be implemented in a manner consistent with the intended purpose of the action, consistent with the scope of the Federal agency's legal authority and jurisdiction, are economically and technologically feasible.²² These are more like avoidance and minimization actions under NEPA that are considered early and throughout the project development process to avoid violating the ESA jeopardy standard, and would be applied to indirect and cumulative impacts to the extent that the jeopardy standard might be exceeded by such impacts. Reasonable and prudent alternatives do not encompass mitigation measures which would be designed to reduce adverse effects on a species, as these would be conservation recommendations.²³

Reasonable and prudent measures are actions necessary or appropriate to minimize the amount or extent of incidental take, and are thus directed at affected individuals. "Section 7 requires minimization of the level of take. It is not appropriate to require mitigation for the impacts of incidental take. Reasonable and prudent measures can include only actions that occur within the action area, involve only minor changes to the project, and reduce the level of take associated with project activities. These measures should minimize the impacts of incidental take to the extent reasonable and prudent. For example, a measure may call for actions like education of employees about the species, reduction of predation, removal or avoidance of the species, or

²⁰ 50 CFR 402.14(h)

²¹ 50 CFR 402.02

²² Ibid.

²³ 51 FR 19926

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monitoring. Measures are considered reasonable and prudent when they are consistent with the proposed action's basic design (e.g., narrowing of disturbed right-of-way at known species locations), location (e.g., temporary storage of equipment or other materials), scope, duration, and timing. The test for reasonableness is whether the proposed measure would cause more than a minor change to the project.”²⁴ These measures are narrowly focused on minimizing the physical injuries to affected species, and again do not include compensation for adverse impacts. Reasonable and prudent measures to reduce incidental take by definition do not apply to indirect or cumulative impacts.

²⁴ ESA Section 7 Handbook, p. 4-50 (emphasis in original).

Appendix D – Compatible Approach Flowchart
