Annotated Bibliography of Planning and Environmental Linkages Resources

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List of Acronyms

CDOT—Colorado Department of Transportation
CETAS—Collaborative Environmental and Transportation Agreement for Streamlining
CTP—Comprehensive Transportation Plan
EcoCAT—Ecological Compliance Assessment Tool
EIMS—Environmental Information Management System
EST—Environmental Screening Tool
ETDM—Efficient Transportation Decision Making
FDOT—Florida Department of Transportation
FHWA—Federal Highway Administration
FTA—Federal Transit Administration
IAAT—Interagency Advisory and Assessment Team
ITD—Idaho Transportation Department
MOU—Memorandum of Understanding
MDT—Montana Department of Transportation
MEPA—Montana Environmental Policy Act
MPO—Metropolitan Planning Organization
NCHRP—National Cooperative Highway Research Program
NCTCOG—North Central Texas Council of Governments
NEPA—National Environmental Policy Act
NCDOT—North Carolina Department of Transportation
NMDOT—New Mexico Department of Transportation
REF—Regional Ecosystem Framework
SAFETEA-LU—Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
List of Acronyms

SEPA—State Environmental Policy Act
STIP—State Transportation Improvement Program
TEAP—Texas Ecological Assessment Protocol

The objective of this research was to develop procedures and methods for integrating environmental factors into transportation systems planning and decision making. It compares traditional planning processes to planning processes oriented toward environmentally sustainable development. Research consisted of an extensive literature review; surveys of procedures and methods currently in use; a review of federal and State policies, regulations, and guidelines; and a review of successful case studies. This research lead to the development of a planning process approach that addresses decision-making relationships; technical requirements (e.g., data and analytical methods); staffing capabilities; public involvement; interagency coordination; financial commitments; and methods for tying the systems planning considerations to more detailed processes, such as corridor planning, subarea planning, modal development planning, priority programming, and project development. The approach is compatible with existing planning techniques, procedures, and institutional arrangements; however, is flexible enough to take advantage of changes in planning regulations, institutional relationships, and emerging technologies.

This document explores the evolutionary context and key characteristics of environmental stewardship in transportation planning; how environmental factors can be integrated throughout systems planning and project development, particularly where such factors can be considered early in the process; analysis methods and tools for integrating environmental considerations into transportation systems planning; and institutional strategies used to implement change in transportation agencies.


This handbook was written to help transportation planners incorporate environmental issues into the planning process in compliance with federal regulations. The handbook provides a background section that summarizes the key requirements related to linking transportation planning and the NEPA process, including recent changes to federal legislation (23 U.S.C. 134 and 23 U.S.C. 135) and recent changes to statewide and metropolitan planning regulations (23 CFR 450). It also summarizes key points from the FHWA and FTA. Guidance is provided to help justify and document eliminating unreasonable alternatives, identify affected resources and potential impacts, and evaluate potential environmental mitigation opportunities.
Issues covered include establishing organizational linkages; establishing a vision for the state’s or region’s transportation system; defining corridor-level goals and the purpose and need; eliminating alternatives; identifying the affected environment and potential environmental impacts; and considering environmental mitigation activities.

23 CFR 450: Section 212, Section 318, Appendix A.

This reference includes three separate links. Sections 212 and 318 allow for information and results produced by or in support of the transportation planning process to be incorporated into environmental review documents. Appendix A provides additional detail on how information, analysis, and products from transportation planning can be incorporated into NEPA documents under existing laws. It is intended to be non-binding and voluntary.

Colorado Department of Transportation (CDOT). Planning and Environmental Linkages Program. CDOT, Denver, CO. Available at: http://www.coloradodot.info/programs/environmental/planning-env-link-program.

This website provides training and guidance to CDOT and its regional transportation planning partners and addresses integrating NEPA information into statewide and regional transportation planning processes. The training explains how data, analyses, and products gathered during the transportation planning process can be incorporated into the project-level environmental review processes. This training is intended to incorporate the requirements of SAFETEA-LU, particularly the new environmental consultation and mitigation requirements. Links to guidance documents, background information, case studies, training opportunities, and applications are included on this website. The CDOT provides a useful planning and environmental linkage decision tool that leads the user through a series of questions about an identified transportation need. Answers to questions result in a report recommending voluntary tasks as part of a PEL study consistent with CDOT’s adopted planning and environmental linkages process.


Transportation planning and NEPA are viewed by the authors as linked through a single, continuous, and systematic process with an emphasis on cooperation and participation through a mutual definition of roles, responsibilities, and expectations. Linking planning and NEPA often involves making changes in decision-making processes, analytical approaches, and institutional relationships. This document provides a comprehensive summary of tools and guidelines for maintaining these relationships and improving communication, data sharing, and collaboration useful to streamlining integration. This report was prepared as requested by AASHTO.
The following three strategies that lay a foundation for NEPA processes are outlined: 
(1) how to integrate environmental factors into systems planning and decision making, 
(2) how to determine the appropriate level of detail, and (3) ways to keep environmental 
resource/regulatory agencies in the planning process. The authors provide guidance for 
planning-level analyses and products that can transition into the NEPA process, including 
problem statement development, alternative selection, cumulative effects analyses, public 
involvement strategies, tiering strategies, and administrative record development.

Appendices include Sections 6001 and 6002 of the SAFETEA; FHWA/FTA Program 
Guidance on Linking the Transportation Planning and NEPA Processes, dated 
February 2005; FHWA/FTA legal guidance; and FHWA/FTA Guidance on Myths and 
Misperceptions.

Federal Highway Administration (FHWA). Planning and Environmental Linkages Program 
Overview. U.S. Department of Transportation, FHWA, Washington, DC. Available at: 

State and local agencies can achieve significant benefits by incorporating environmental 
and community values into transportation decisions early during planning and carrying 
these considerations through project development and delivery. Benefits include 
relationship building, process efficiency, and on-the-ground outcome benefits.

This website offers information developed and compiled by the FHWA and its partners to 
assist in strengthening planning and environment linkages, including benefits of using a 
planning and environmental linkages approach; tools and examples; defective practices, 
including case studies on activities that encourage integration; publications; training and 
workshop opportunities; data and analysis resources; and legislation, regulation, and 
guidance.

Federal Highway Administration (FHWA). 2006. Eco-Logical: An Ecosystem Approach to 
Developing Infrastructure Projects. U.S. Department of Transportation, FHWA, 

Eco-Logical was developed by a team of representatives from eight federal agencies and 
the DOT for four states in an attempt to advance approval for infrastructure projects 
while satisfying regulatory requirements and environmental needs. The Eco-Logical 
approach works toward integrating plans across agency boundaries and endorses 
ecosystem-based mitigation. Mitigation traditionally focuses on replacing similar 
resources as close to the impact site as feasible to satisfy regulatory requirements. The 
ecosystem-based approach moves agencies from being confined to project boundaries 
and addresses habitat conservation on a broader ecosystem scale to provide greater 
environmental benefit. Mitigation options discussed include project-specific mitigation,
multiple-project mitigation, mitigation banking, in-lieu fee mitigation, conservation mitigation, and ecosystem-based mitigation agreements.

Eco-Logical outlines an eight-step, non-prescriptive process, which serves as a starting point for ecosystem-based mitigation decisions within a REF. REFs consist of a map of agency environmental plans and conservation goals. Project development can be streamlined by using REFs to identify ecologically significant areas, potentially impacted resources, and regions to avoid. The Eco-Logical approach includes follow-up performance measures to provide a quantitative basis for evaluating how well actions under the REF met objectives. The document includes examples of planning efforts using the Eco-Logical approach.

The following appendices are also included: (1) an MOU to foster the ecosystem approach, (2) information on funding and partnerships for integrated planning, (3) a bibliography, and (3) a discussion of federal laws and requirements relevant to implementing the ecosystem approach.


This report is a summary of a Peer Exchange Workshop focused on using corridor planning studies as a foundation for NEPA decision making. Five case studies were presented and discussed at the workshop. Participants—reflecting transportation planners, resource, agency representatives, and NEPA practitioners—were selected to provide a balanced exchange. Goals for the peer exchange were to learn how planning studies are used today, document lessons learned and make recommendations for future activities, and inform the FHWA on updated guidelines that could better link planning and NEPA.

The report provides a good history of regulations leading to the integration of planning and NEPA, including discussions on the legal perspective of using corridor planning to inform NEPA and what resource agencies would like to see included in corridor plans. Benefits of corridor plans and potential challenges are outlined and approaches for meeting those challenges are discussed. Benefits include better environmental outcomes, cost and time savings, establishment of long-term relationships, stakeholder buy-in, increased planning flexibility, and overall efficiency. Potential challenges discussed at the workshop included difficulty determining the level of analysis detail necessary, a lack of confidence that using corridor planning to inform NEPA is supported at the federal level, the problems associated with poor documentation during planning, and a lack of understanding and communication between transportation planners and NEPA practitioners.

Metrics can be used to track progress toward defined goals and can provide impartial data that can be used to identify challenges or obstacles or support a need for policy change. This guide provides a starting point to help agencies create their own metrics related to progress in linking transportation planning and environmental analysis. The guide introduces a framework for developing metrics that includes four primary tasks: (1) define specific program goals and objectives; (2) develop a set of metrics to demonstrate results towards reaching the defined goals and objectives; (3) assess baseline and develop targets; and (4) measure and report results.

This guide is intended to serve as a resource for transportation agencies interested in measuring their successes in integrating transportation planning and environmental analysis. The guide provides a series of examples using sample objectives. Each example outlines the objective purpose, suggests ways to develop strategies and set targets, provides example measures, and references examples in practice. Tables are included that recommend data sources and suggest ways to measure both outputs and outcomes. While the guide provides many example measures that can be used in integration efforts, the list is not exhaustive. Several key points are outlined to help keep the user on track when beginning a measurement program.

Appendices include a summary table of measures and references to examples in practice.


Corridor and subarea studies can help agencies identify issues that can be carried over to NEPA; they enhance flexibility, build understanding between agencies, and respond to fiscal challenges. This guide is intended for transportation planners and NEPA practitioners to inform and provide practical advice for developing and utilizing corridor and subarea planning studies during the transportation planning process. The guide outlines five products that transportation planning regulations identified to improve integration with NEPA. The guide stresses that early and continuing engagement with a broad range of partners—resource and regulatory agencies, transportation NEPA practitioners, planning and development partners, legal counsel, and the public—leads to better information and ultimately improved transportation decision making.

This guide does a good job of addressing NEPA perspective and includes information on the use of tiering to connect planning with NEPA. Project examples, additional resources, and links to other information sources are provided. The guide also includes the
FHWA/Environmental Linkages Questionnaire, a project checklist, and a methodology for concern tracking and response. Appendices include legal, policy, and guidance framework (e.g., FHWA/FTA regulatory language; a summary of laws, regulations, and orders governing environmental decision–making; and current policy); several case studies; and other resources available.

**Florida Department of Transportation (FDOT). Efficient Transportation Decision Making (ETDM).** FDOT, Tallahassee, FL. Available at: https://www.fdot.gov/environment/etdm.shtm

The FDOT uses the ETDM process to provide environmental agencies and the public the opportunity to participate in the early stages of transportation projects to determine potential environmental effects. The ETDM process is composed of three steps: (1) Planning Screen, (2) Programming Screen, and (3) Project Development and Environment (PD&E) Study. The ETDM process is carried out through the use of the Environmental Screening Tool (EST), an Internet-accessible interactive database and mapping application that integrates a geo-relational database of ETDM projects; over 550 environmental resource GIS data layers; an automated and standardized GIS-based environmental screening analysis application; and tools for data entry, review, and reporting. The EST is maintained by the FDOT Environmental Management Office.

**Idaho Transportation Department (ITD). 2004. Idaho Corridor Planning and National Environmental Policy Act Integration Guide.** ITD, Boise, ID.

This guide covers a range of options for NEPA involvement during corridor planning through scoping, project and cumulative assessments, and alternatives analysis, including documentation of alternatives considered. The guide identifies procedural options for local agency and district office consideration and application.

The guide outlines three components of the NEPA integration in corridor planning. The first action is to form an IAAT to compile and assess information about known issues and needs. Examples of corridor-level issues to consider are provided in the guide. The IAAT then reviews and recommends the best approach from the five matrix options in the corridor planning/NEPA decision matrix. Finally, post-plan evaluation and recommendations are documented.
Idaho Transportation Department (ITD). 2006. *Idaho Corridor Planning Guidebook*. ITD, Division of Transportation Planning, Boise, ID.

This guide is designed to help ITD staff, in cooperation with local governments, develop transportation corridor plans. It supports integrating transportation planning with land-use planning, coordinating local and State transportation planning efforts to facilitate the development of context sensitive solutions, and providing a uniform format for corridor plans. The guide provides a comprehensive description of the Corridor Planning Process with step-by-step explanations and guidelines for completing nine interrelated steps in corridor planning. Multimodal transportation concepts are considered.

Key concepts addressed are the role that corridor planning plays in assisting project prioritization and preserving public right-of-way, comprehensively addressing future needs and developing management strategies, and fostering cooperative State and local transportation planning efforts in the development of context sensitive solutions. The guide stresses that all corridor planning activities require a statement of Purpose and Need, and that active public participation is essential. Included in the guide is a table of points within corridor planning where public participation can be addressed.

Appendix A provides a tool box of public participation information to assist in finding the right mix of techniques. Public participation techniques should be tailored to each specific area. Appendices B–F detail specific requirements and additional reference materials.


The Montana Corridor Planning Process was developed to improve coordination between the public, transportation planners, and environmental agencies in support of NEPA and MEPA. This process allows for earlier planning-level coordination to develop specific products for use in the review process. The MDT and State and federal transportation and environmental agencies entered into an MOU where parties agree to actively work together, include senior-level management at appropriate planning-level stages, and meet on a semiannual basis to discuss transportation and environmental issues. This document describes the regulations, requirements, and key elements used by the MDOT to link planning and NEPA.

Appendices include a tabular description of Montana’s corridor planning process, glossary of key terms, a MDT planning checklist, and a sample MOU between State and federal transportation and environmental agencies.

The EIMS is a web-based user interface, relational database, and map interface designed to support agencies during environmental decision making throughout the transportation process, from long-range planning through project development, construction, operations, and maintenance. EIMS is intended to serve as one component of a broader Environmental Management System. EIMS supports asset definition, commitment tracking, environmental management requirements, and best practices.

This report provides an overview of the main components of EIMS, including database design, additional spatial data, application server, user interface, and map interface. The user manual for EIMS is provided in this report in the appendices.


This report presents results of a survey of transportation and conservation practitioners. The survey findings are supplemented by a literature review and follow-up interviews. Several key themes in the evolving practice of collaborative decision making are discussed, and profiles of successful collaborative processes are included to illustrate the range of approaches. The survey focused on answering the following six questions:

1. How well do transportation and environmental communities understand the need for and purposes of integrated planning?
2. What degrees of success are agencies experiencing?
3. How is each community incorporating plans and data from the other in their specific planning and project activities?
4. What tools and expertise are useful in supporting these efforts?
5. What barriers and potential solutions are being identified?
6. What examples of innovation are available that may be useful to other agencies?

The report provides a literature review and annotated bibliography that focuses on recent approaches to systems-level integrated planning, initiating changes, tools and data, and state of the practice.


This document is a description of processes developed by the NMDOT to provide general guidance for project development as it pertains to STIP. The processes described are limited to the steps beginning with preliminary project definition and STIP development and extending through environmental certifications and preliminary design. The process
applies to projects developed by the NMDOT and is not intended for use by regional or metropolitan planning organizations.

The document provides a description of activities, roles and responsibilities, primary objectives, documentation, and products for each stage of project development. Also included in the document is a list of information required for STIP projects, a brief outline of the regulatory basis, and a flow chart of the project development process.

North Carolina Department of Transportation (NCDOT). *Linking Long Range Transportation Planning and Project Development.* NCDOT, Raleigh, NC.

The NCDOT has begun integrating long-range transportation planning and project development. In North Carolina, the long-range transportation planning process is called Comprehensive Transportation Planning and leads to the development of CTPs. Eight linkages have been identified between long-range planning and project development where products from the CTP process could inform or serve as the starting point for NEPA/SEPA.

This website is designed to provide updated information on process linkages and integration. It includes links to a project overview that describes the eight linkages, an outline of management structure and roles, and the integration team governance. Additional links include problem statement guidance and a slide presentation for developing Purpose and Need statements.


This document is intended to be used as a guide for transportation agency staff. It may also be used as an educational tool to increase agency awareness about the importance of integration. The document contains background and context for how SAFETEA-LU fits into the overall process and provides strategies for working with local government and land use and natural resource agencies to avoid unnecessary duplication of effort. Key considerations covered in this guide are partnership development, public outreach, data and tools, planning and project development, mitigation, funding, and agency culture. Strategies include early public outreach, data sharing, the use of natural resource inventories, GIS analysis, and the use of design–build standards and context sensitive solutions.
Appendices include a bibliography and a comprehensive collection of case studies. Included in the case studies are discussions of specific tools developed to address environmental issues during planning, including the CETAS process from ODOT; Texas Ecological Assessment Protocol that uses GIS and electronic data to identify ecologically important areas; North Central Texas Council of Governments’ planning and environmental linkages program (TRACES); and Illinois Department of Natural Resources Ecological Compliance Assessment Tool, which is used as to determine potential environmental impacts of proposed projects using databases, GIS mapping, and a set of programmed decision rules to determine if proposed projects may be in the vicinity of protected natural resources.


This paper presents a summary of findings from a meeting of state DOT officials from seven states. The purpose of the meeting was to share information about strategies for linking planning and project development processes in order to improve decision making. Several brief case studies are presented, which outline different approaches to linking planning and NEPA processes. Also included are discussions of lessons learned, challenges to improving the decision-making process, and opportunities for improvement. At the conclusion of the two-day meeting, the group proposed a series of next steps to further educate each other about ongoing efforts to improve the transportation decision-making process.


This memorandum was written in response to a request for guidance regarding the extent to which the results of the transportation planning process can be used in and relied upon during the NEPA process. The memorandum outlines the current law, describes transportation planning products that can be used during the NEPA process and under what conditions, and explains the roles of federal agencies and the public in reviewing transportation planning products used in NEPA analyses and documents.

The purpose of this study was to determine the extent to which transportation planners consider ecosystem conservation in planning, the effects of such considerations and the factors that encourage or discourage such consideration. This document reports on results of telephone interviews of transportation planning and resource agencies. The majority of the planners contacted reported considering ecosystem conservation in transportation planning. Planners in 31 of the 36 agencies (86 percent) described considering ecosystem conservation at varying points during transportation planning using a variety of methods. Twenty-two of the 31 (71 percent) said they conduct corridor studies or use project screening, among other methods, to consider ecosystem conservation. Appendix IV provides a table of methods used by the 22 agencies that consider ecosystem conservation. Factors that discourage consideration of ecosystem conservation are also included in the report.


The purpose of this study was to evaluate progress made in implementing changes called for by SAFETEA-LU in transportation planning and environmental review of highway projects. The document provides a review of SAFETEA-LU and its legislative history and FHWA regulations, guidance, and documentation. Findings are reported from a survey of transportation agency and environmental agency officials designed to determine the progress that selected state departments of transportation, MPOs, and FHWA have made in incorporating environmental considerations in transportation planning and the progress that selected states and the FHWA have made in implementing changes in the environmental review of highway projects. The study focused on six states, chosen because of geographic diversity and variety of experience with implementing the new transportation planning and environmental review requirements.

All respondents reported taking or considering initial steps to incorporate environmental considerations into long-range transportation planning. Several respondents supported early consultation and identification of mitigation options. Challenges reported by respondents included the limited availability of funding and staff at resource agencies; limited incentives for resource agencies to contribute during planning since early involvement is not part of these agencies’ missions or experience; and unfamiliarity on the part of resource agencies and planners with each other’s roles and processes.

SAFETEA-LU Section 6001’s nonprescriptive nature regarding how requirements should be met has led to a variety of innovative practices. With the new attention given to environmental factors, partnerships and cooperation are necessary at earlier and broader scales than before. This report presents the findings from examining nine case studies to identify environmental mitigation strategies, policies, and activities being used to meet these new requirements. The report presents success factors, lessons learned, common challenges, and data gaps.

Discussion includes consideration of a project’s initial steps, approaches to environmental mitigation, information sharing across disciplines and organizational boundaries, and mapping tools. Challenges identified fell into the following common themes: concerns that resource agencies don’t have sufficient resources to participate in planning-level mitigation discussions (i.e., it is difficult to conceptualize regional-level mitigation); that geospatial data are not always easily accessible or complete; and it is difficult to achieve consensus on definition, scale, and level of detail.

Case study participants recommended the following ways FHWA could support environmental mitigation in transportation planning: research effective mitigation practices; help identify regional avoidance and minimization opportunities; research connections between regional environmental mitigation and programs that link planning and NEPA; support collaboration to identify the relative importance of environmental resource issues; provide support in developing mitigation performance measures; and address fiscal planning for mitigation.