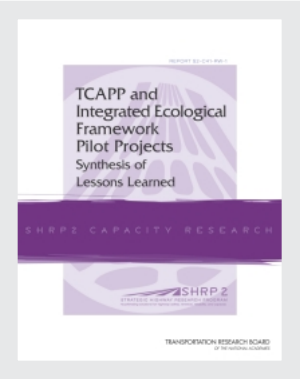

TCAPP and Integrated Ecological Framework Pilot Projects: Synthesis of Lessons Learned

DETAILS

0 pages | 8.5 x 11 | PAPERBACK
ISBN 978-0-309-43453-9 | DOI 10.17226/22613

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Cambridge Systematics, Inc.

The Second
STRATEGIC HIGHWAY RESEARCH PROGRAM

SHRP 2 REPORT S2-C41-RW-1

TCAPP and Integrated Ecological Framework Pilot Projects

Synthesis of Lessons Learned

CAMBRIDGE SYSTEMATICS, INC.

TRANSPORTATION RESEARCH BOARD

WASHINGTON, D.C.
2013
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SHRP 2 Report S2-C41-RW-1

ISBN: 978-0-309-27311-4

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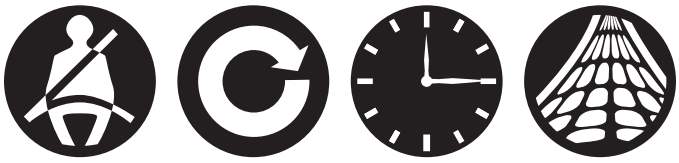

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ACKNOWLEDGMENTS

This work was sponsored by the Federal Highway Administration in cooperation with the American Association of State Highway and Transportation Officials. It was conducted in the second Strategic Highway Research Program (SHRP 2), which is administered by the Transportation Research Board of the National Academies. The project was managed by Jo Allen Gause, Senior Program Officer for SHRP 2 Capacity.

The summaries of the research and synthesized findings reported herein were conducted by Cambridge Systematics, Inc. The primary authors for this study were Elizabeth Sanford and Virginia Smith Reeder of Cambridge Systematics, Inc.

FOREWORD

Jo Allen Gause, *SHRP 2 Senior Program Officer, Capacity*

Transportation for Communities—Advancing Projects through Partnerships (TCAPP) is a web-based resource that offers guidance to agencies and practitioners on reaching collaborative decisions as they work through the transportation planning, programming, and permitting processes. TCAPP also serves as a portal to other tools, including the Integrated Ecological Framework (IEF), which is a step-by-step approach to reaching consensus on environmental goals and identifying and protecting conservation areas. To test the premises of both TCAPP and the IEF, SHRP 2 conducted four pilot tests of TCAPP in the C18 project and four of the IEF in C21. This report presents an overview of the pilot studies, and it highlights and synthesizes key findings of the research.

The main objective of the C18 series of pilot tests was to test TCAPP while it was still under development and to use feedback from the pilots to modify the product and enhance its usefulness to practitioners. The pilots tested TCAPP in four scenarios in Washington, Minnesota, and Colorado. The Washington State Department of Transportation (WSDOT) pilot used TCAPP to work collaboratively with stakeholders to successfully define Phase 1 of the I-5/SR 509 Corridor Completion and Freight Improvement Project. The Puget Sound Regional Council (PSRC) evaluated the ability of TCAPP to update the project prioritization criteria in its long-range transportation plan. The Minnesota DOT (MnDOT) used TCAPP to provide guidance on effective collaboration while developing a Complete Streets plan for the City of Grand Rapids. The Pikes Peak Council of Governments (PPACG) tested the applicability of the TCAPP process during its 2013 transportation planning update.

The C18 pilots showed that TCAPP was helpful in supporting collaborative decision making and getting to decisions that stick. The pilot tests also showed how TCAPP can be adapted to the different needs of practitioners.

To help transportation agencies with environmental mitigation, the SHRP 2 C06 projects—*An Ecological Approach to Integrating Conservation and Highway Planning, Volumes 1 and 2*—developed the IEF, a nine-step process designed to bring about efficient, integrated consultation on natural resources that can inform transportation mitigation decisions. The C06 *Guide to the Integrated Ecological Framework* supports transportation planners and resource specialists in the use of a standardized, science-based approach to identifying ecological priorities and their integration into transportation decision making. The C21 series of pilots tested the IEF in Colorado, Oregon, California, and West Virginia.

Each of the IEF pilots tested specific steps of the nine-step process. In the C21A pilot test of the IEF, Colorado DOT, Colorado State University, and numerous partners were able to bring conservation stakeholders and data together to generate a comprehensive vision for development. In the C21B pilot, the Rogue Valley Council of Governments used the IEF to identify high-priority national resource areas, to avoid impacts, and to select mitigation improvements for a section of US-20 in Oregon. The University of California, Davis, and the

California Department of Transportation teamed up to apply the IEF to a corridor planning study of Highway 37 in the San Francisco Bay Area in the C21C pilot. In the C21D pilot, the West Virginia Department of Highways and West Virginia University applied the IEF to two highways under construction in southern West Virginia.

The C21 pilots found that the IEF is a useful process for guiding agencies through a multi-agency ecology-oriented effort in a state or region, and the diverse scope of the four pilots indicates that the IEF is applicable across a variety of scenarios.

CONTENTS

CHAPTER 1

Introduction and Purpose of the Synthesis Report

Philosophy and Overview of the SHRP 2 Capacity Program

The overall goals for the SHRP 2 Capacity program are to develop approaches and tools for systematically integrating the environmental, economic, and community concerns into highway design and capacity. The objective is to expedite the provision of highway capacity while simultaneously addressing economic, community, and environmental objectives associated with new construction.

To this end, research has focused on development of tools, data, guidance, and other resources that support a collaborative model for making decisions for capacity projects. The central work of the SHRP 2 Capacity program is a web-based tool that provides extensive data and guidance on collaborative decision making in the development of new highway capacity. This web tool, Transportation for Communities—Advancing Projects through Partnerships (TCAPP), is designed to serve as the portal to many of the other SHRP 2 Capacity research products, including an Integrated Ecological Framework (IEF). The IEF was developed to serve as a primary resource for those seeking to balance transportation needs with environmental protection. Historically, transportation professionals have focused on avoiding and minimizing environmental impacts, but current thinking suggests that if mitigation is understood and approached from a perspective of integrated ecological systems, there may be a greater return for the environment. For example, the IEF would be helpful for agencies that wanted to advance conservation planning in concert with transportation planning.

TCAPP and IEF Pilot Projects

Introduction

Two SHRP 2 Capacity pilot-project requests for proposals (RFPs) were released in 2010 to test the premises of both TCAPP and the IEF. SHRP 2 Capacity Project C18 offered funds to state departments of transportation (DOTs) and metropolitan planning organizations (MPOs) that would be willing to test TCAPP. SHRP 2 Capacity Project C21 offered funding to transportation and environmental agencies to test the IEF. Pilot testing represents an early and important validity check for the tools and concepts that have been developed in the SHRP 2 research program prior to full rollout and implementation.

The objectives of the TCAPP pilot projects were to (a) test the content and functionality of TCAPP; (b) apply the collaborative decision-making principles and practices and assess how well they work; (c) test any of the attributes of other projects related to TCAPP alone and in combinations; and (d) provide an independent evaluation.

The objectives of the IEF pilot projects were to (a) apply some or all of the steps and tools within the integration framework with a focus on providing improvement to conservation and transportation planning for a project, set of projects, or a plan; (b) apply the collaboration guidance elements of TCAPP that would be useful to the proposed tests under item (a); (c) submit the results of analyses to regulatory agencies for review, thereby testing the acceptability of results; and (d) submit an independent evaluation of the effectiveness of IEF-related products and the collaboration tools in TCAPP.

The purpose of this report is to present an overview of the TCAPP and IEF pilot studies and to highlight and synthesize key findings of the research. There were four pilot studies selected to test TCAPP and four pilot studies selected to test the IEF.

The TCAPP pilot studies were awarded to

1. The Washington State DOT;
2. The Puget Sound Regional Council (PSRC) in Washington State;
3. The Pike's Peak Area Council of Governments (PPACG) in Colorado; and
4. The Minnesota DOT.

The IEF pilot studies were awarded to

1. Colorado State University;
2. The Rogue Valley Council of Governments in Oregon;
3. University of California, Davis, Road Ecology Center; and
4. West Virginia University Research Corporation.

Following award of the contracts, the selected TCAPP pilot-project recipients were invited to TRB to attend a kickoff meeting. At that meeting, an introductory tour of the TCAPP website was presented and objectives of the pilot projects were reviewed. A parallel kickoff meeting was held for IEF pilot-project awardees, with the focus being an overview of the IEF. Interim meetings (via webinar) also were held with both TCAPP and IEF pilot-project team members. During these interactive meetings, TRB staff and TCAPP/IEF contractors were present to record comments, and this feedback was immediately woven back into the work under way on the TCAPP and IEF web tools. A third opportunity for interaction occurred in concert with the SHRP 2 Capacity Transportation Coordinating Committee (TCC) meetings, where both sets of teams presented their interim comments and study findings. Finally, two wrap-up sessions were held at TRB to allow the pilot study teams to present their final comments and share their results. This interaction among the entities working on beta versions of TCAPP and the IEF and entities using TCAPP and the IEF resulted in a continuous stream of improvements for TCAPP and the IEF throughout the pilot study time frames.

From the kickoff meeting through the wrap-up sessions, some of the pilot teams interfaced with the TCAPP contractors via e-mail on an as-needed basis. This exchange provided input as well as progress updates. At the kickoff meeting, the need for interface between the individual teams during the course of the pilot tests was identified. The TCAPP forum was expanded and enhanced to meet this request for support.

Chapter 2 presents an overview of each pilot project, including a project summary, an overview of the tested elements of TCAPP, and highlights of outcomes and lessons learned. Chapter 3 addresses findings in a combined sense, with a synthesis discussion of factors for success, benefits of a collaborative approach, and lessons learned. Chapter 4 cites conclusions and gives an overview of recommended changes to TCAPP and the IEF. It also cites the process by which changes were and are being made.

Summaries of the Tested Elements

As of the time of this writing, both TCAPP and the IEF are still in beta version with a number of enhancements and improvements still under way. The elements tested for each product were refined even during the course of the pilot tests—for example, in response to a request for additional functional capability in some area.

Transportation for Communities—Advancing Projects through Partnerships (TCAPP)

The main objective of the TCAPP pilot studies was to test TCAPP while it was still under development and to use feedback obtained to modify the product and enhance its usefulness to practitioners. In addition, the TCAPP pilot studies offered an opportunity to try the self-assessment tools and determine the effectiveness of the collaborative decision-making framework. The purpose of TCAPP is to provide access to the Decision Guide framework for collaborative decision making. The underlying premise is that collaboration is necessary to effectively and efficiently develop transportation capacity projects. The additional information in TCAPP on special topics, such as the IEF, provides users with support for a preferred planning process.

Tested elements included

- Self-assessment tools (collaboration assessment): Pilot tested to determine its ability to gauge strength of partner collaboration and stakeholder collaboration;
- User portal: Pilot tested to ascertain the pertinence of role definitions, partner and stakeholder interests, and framework for decision making;
- Decision Guide: Pilot tested as a means to apply collaborative Decision Guide framework to real-world projects and processes;
- Applications: Pilot tested to determine the usefulness of transportation phases and special topics chapter; and
- Library: Pilot tested to check applicability of case studies, reports, documents, and other linked sites.

The pilot studies tested different elements of the Decision Guide, depending on the transportation plan or project under way. To illustrate which key decisions were tested for each project, this report will highlight the key decisions by using the TCAPP Decision Guide framework shown in Figure 1.1.

Integrated Ecological Framework (IEF)

The IEF pilot studies were asked to test the IEF, which is contained on the TCAPP website. The purpose of the nine-step IEF is to bring natural resource data into transportation processes efficiently, thereby leading to more informed decisions. It was designed to help partner agencies identify potential impacts early in the planning process and ensure that mitigation is effective and measurable. Data, analysis, and key decisions from the IEF can then be integrated into the overall process laid out in the TCAPP Decision Guide.

Each IEF pilot project proposed testing specific steps of the IEF. To illustrate which steps were tested for each project, this report will highlight the steps by using the IEF shown in Figure 1.2.

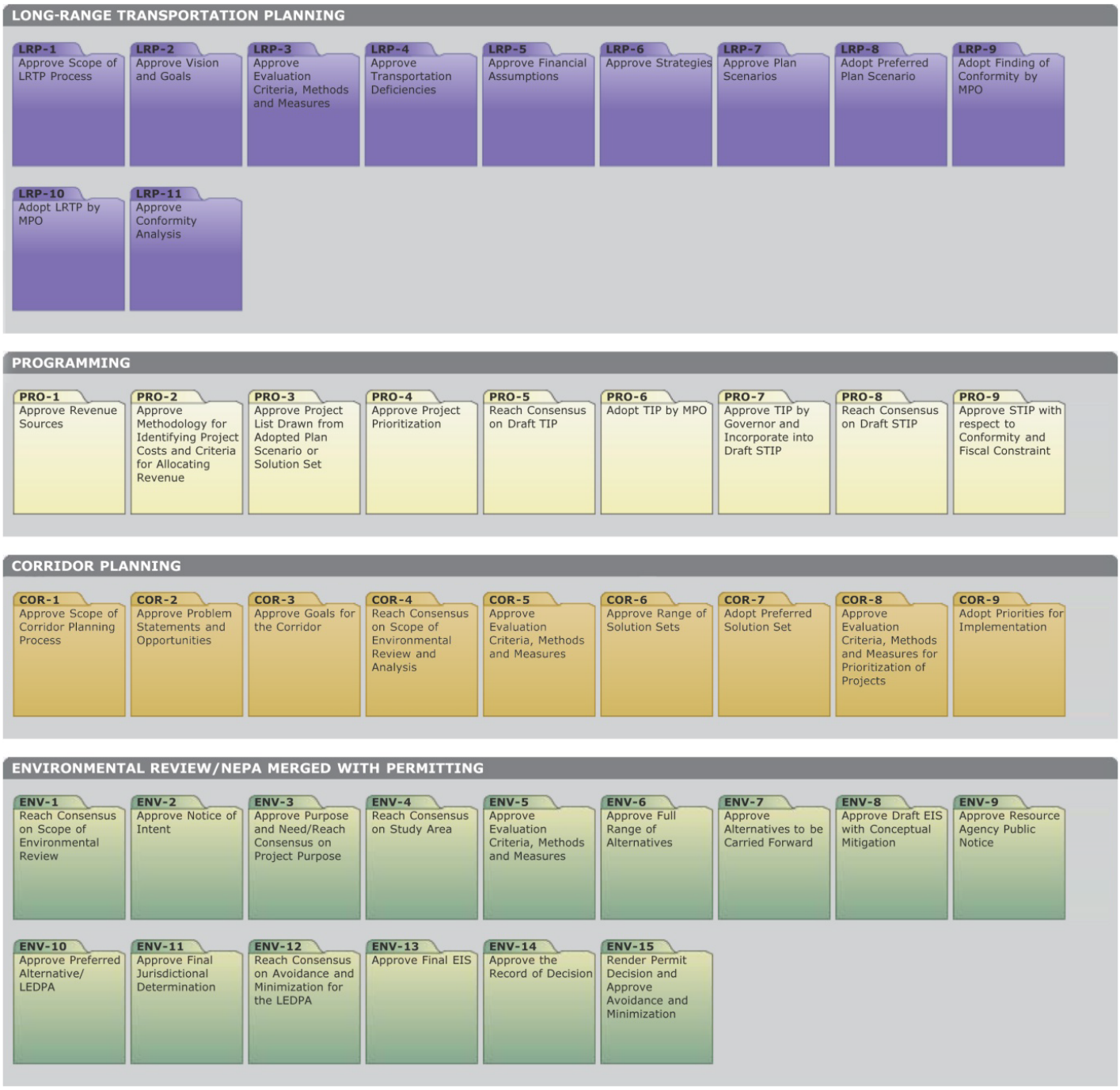

Figure 1.1. Decision Guide framework for TCAPP.

Figure 1.2. Integrated Ecological Framework (IEF).

CHAPTER 2

Pilot Project Summaries

TCAPP Pilot Project: Washington State DOT

Project Summary

The Washington State DOT's I-5/SR-509 Corridor Completion and Freight Improvement Project is a capacity expansion project that includes three lanes in two directions [two general-purpose lanes and one high-occupancy vehicle (HOV) lane], and then 6 miles of widening on Interstate 5 to mitigate the traffic brought on by the extension. The project, if constructed, will improve access to the Seattle-Tacoma International Airport and the Port of Seattle, alleviate congestion on local arterials, and stimulate economic development. At the start of the SHRP 2 pilot project, the preliminary design was complete, and a federal record of decision (ROD) had been issued in 2003. Since that time, several attempts at securing funding had failed, and legislatures and other local partners had determined that a toll road would be needed to fund the project. In 2009, the state legislature directed the Washington State DOT to conduct a toll feasibility study. The study found that tolling would provide revenue as well as control demand, thus allowing for a scaled-down version of the project.

Pilot-Tested Elements

The goal of the Washington State DOT pilot test was to use the TCAPP tools to facilitate the process of bringing the stakeholders together to define Phase 1 of the project, inclusive of the tolling element. The following tools and techniques were tested during the course of the pilot project.

Self-Assessment Tools

Funding to test TCAPP enabled the Washington State DOT project team to work with stakeholders collaboratively to advance the SR-509 project by developing phasing options under the tolled condition assumption. Partners were defined as entities that provided a funding contribution to the project or are responsible for implementing a portion of the project. Partners include the Port of Seattle and the cities of SeaTac and Des Moines.

As the TCAPP process steps were begun, the project team conducted an initial assessment to determine if the full range of stakeholder interests and perspectives were represented on the steering and executive committees. Based on the results of the assessment and ideas presented in one of TCAPP's case studies, membership on the steering and executive committees was expanded to include special interest groups and environmental resource agencies.

Stakeholder Collaboration Assessment

After every stakeholder meeting, the independent reviewer handed out a one-page paper survey modeled after the TCAPP partner collaboration.

User Portal (Decision-Making Authority Definition)

According to TCAPP, decision-making authority is the ability of stakeholders and the team as a whole to make key decisions regarding the project outcomes and to have those decisions respected and upheld by the agencies they represent and any other decision-making partners.

Washington state law gives decisions related to tolling authorization and project funding to the legislature, and the State Transportation Commission sets toll rates and exemptions. Therefore, there were some limits on the ability of the steering and executive committees to make decisions.

Decision Guide

This pilot focused on applying and testing the tools and protocols for six key decisions developed under the Corridor Planning Guide (Figure 2.1). Since the SR-509 project's

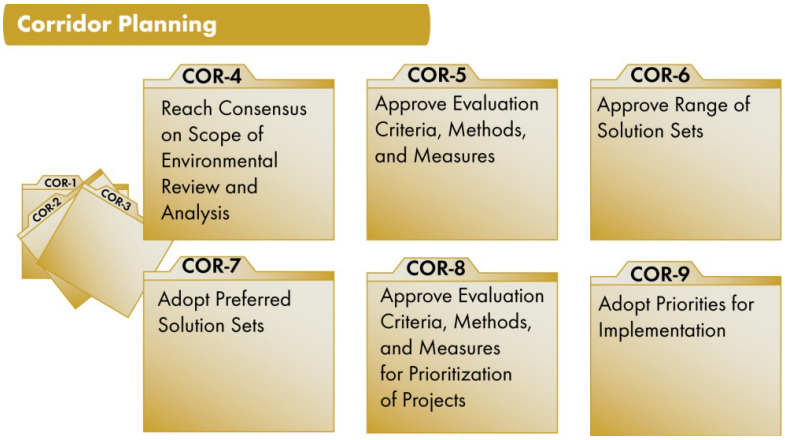

Figure 2.1. TCAPP Decision Guide elements tested by the Washington State DOT (COR-4 through COR-9).

environmental impact statement (EIS) and ROD were completed before this effort, some of the key decisions did not apply to this project. For those decisions that do apply, the project team modified them slightly to better suit the project.

Outcomes and Lessons Learned

The Washington State DOT project team found the tools and guidance in TCAPP helpful for identifying and bringing the right people to the table, focusing those people on thinking about the right issues at the right time with the necessary information on hand, and monitoring the effectiveness of the process along the way.

Specifically, the TCAPP program was useful in helping identify and involve the right stakeholders early in the process. Even though this process had been previously established and begun, the guidance allowed the project team to revisit the composition of their executive and steering committees and to refine participation based on the new project context (i.e., the results of the project would be turned over to the state legislature for a decision about whether to advance the project as a tolled facility). The TCAPP guidance also helped the project team communicate with all partners regarding their decision-making roles and authority. These initial conversations helped avoid confusion and reduced the likelihood that partners had unrealistic expectations of their own roles, as well as those of others.

Ten key decisions were adapted to help the Washington State DOT team frame its process around the right set of stakeholder roles, decision-making questions, and data needs. They also found success by using the stakeholder collaboration assessment survey to monitor the effectiveness of their collaboration process.

While this project did not experience open conflict among the stakeholders, it did have the potential to become a contentious project given the need to develop a plan for phased implementation of the originally adopted SR-509 project and different agenda of various interest groups. In addition, the lack of funding for the detailed analytical tasks that would normally have taken place for a project of this magnitude left the project team very resource-constrained and not always able to supply answers to stakeholder questions about the impacts of different design decisions on their specific interests.

TCAPP provided a good framework for working within this project context. Using the TCAPP structure helped keep the project team on track. The collaboration assessments supported the project timeline because they allowed the project team to quickly identify weak spots in their technical and political approach to the project. Performing the routine collaboration assessments actually provided several benefits, some of them unintentional. One of the unintentional benefits was that the survey and response process helped build trust between the stakeholders and the project team. The questions asked and the responses of the project team to those questions reassured the stakeholders that their issues were being taken seriously. The project team also was forthright in their delivery of information and relied heavily on stakeholder input to direct where the limited analysis budget was spent. When taken together, this approach gave the stakeholders belief that they had a significant say in getting the most important issues identified and answered to the best of the project team's ability.

At one point, it became apparent that the executive committee and the steering committee had different perceptions of the project. The openness of information sharing under the TCAPP process was instrumental in helping identify these differences and encouraging the steering committee members to learn more about the issues and perceptions of their executive committee counterparts. This information sharing led to the development of additional project information (a public survey questionnaire), which responded to those key executive

committee concerns. The result was a considerably easier and more effective transition from the technical project analyses to communications needed at decision-maker levels—in this case, the legislature.

TCAPP Pilot Project: Puget Sound Regional Council

Project Summary

Transportation 2040, the Puget Sound region's long-range transportation plan (LRTP), was adopted in May 2010. The plan was approved by a large majority of the MPO board; however, some stakeholders were concerned about the plan content and approach. There also were concerns that local agency staff did not have sufficient time to brief their elected representatives before policy decisions were finalized. Based in part on these concerns, the Puget Sound Regional Council (PSRC) was directed, as a first step in the T2040 Implementation, to revisit the methodology for prioritizing projects and programs within the long-range plan.

The PSRC designed its SHRP 2 C18 pilot test to demonstrate the utility of the TCAPP tool in facilitating consensus-building among PSRC stakeholders on key decisions during the development of this new process for evaluating and prioritizing projects in the long-range plan.

Pilot-Tested Elements

The TCAPP pilot test was designed to test the self-assessment (stakeholder collaboration) tools and to use resources associated with one key decision in the Decision Guide.

The pilot test was initiated, in part, to demonstrate to stakeholders a commitment to collaboration. The PSRC staff was able to share the tenets of TCAPP with diverse stakeholders and introduce them to the collaborative underpinnings of the approach.

To help determine the potential for successfully pursuing this collaboration, PSRC also employed the TCAPP Stakeholders Collaborative Assessment Tool as a means to gauge readiness to work through differences to achieve consensus and progress. PSRC staff administered the assessment tool to the Regional Staff Committee (RSC) at the beginning of the prioritization update process and after the process was completed.

In addition to using TCAPP to demonstrate that an open and transparent process would be used, the PSRC project used the tools contained within Long-Range Planning Key Decision 3 (LRP-3) to facilitate enhanced collaboration among members of PSRC advisory and elected committees in policy making, establishing goals, values and performance measures, and implementation (Figure 2.2). Pilot testing the TCAPP framework presented an opportunity to broaden stakeholder involvement during this process.

Figure 2.2. TCAPP Decision Guide elements tested by PSRC (LRP-3).

Outcomes and Lessons Learned

One important and enduring achievement of the Transportation 2040 Prioritization Process pilot study was facilitating the stakeholders' understanding that the process did not have a predetermined approach and that the MPO staff was making an honest and transparent effort to engage with stakeholders, incorporate their feedback and, if needed, change direction on the basis of their input. In addition, the collaboration assessment tool helped PSRC staff, as well as the RSC, achieve a greater understanding of the necessary underpinnings of an effective collaboration process. Use of the tool helped set a tone and atmosphere within which stakeholders felt comfortable in providing frank and useful input and feedback during the course of the prioritization process update.

TCAPP Pilot Project: Pike's Peak Area Council of Governments

Project Summary

The Pike's Peak Area Council of Governments (PPACG), which serves a metropolitan region of more than 600,000 people, is noted for its traditionally conservative views, which have heavily influenced transportation planning considerations. As the designated MPO for the Colorado Springs Urbanized Area, PPACG applied for this pilot study with the objective of testing the applicability of the TCAPP process in the development of the Regional Transportation Plan (RTP) and integrating several tools to provide rigorous, defensible analyses to broaden the plan inputs to include other considerations, such as environmental context and land use.

Pilot-Tested Elements

Self-assessment tools were central to the PPACG pilot test. Participants in the process took the collaboration self-assessment before beginning plan development.

PPACG put considerable effort into recruiting nontransportation agency stakeholders. This recruitment included writing formal invitation letters to the agencies to help support

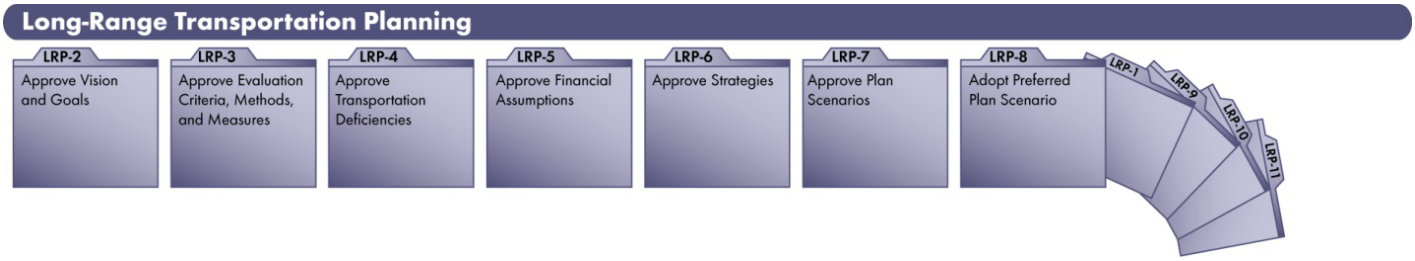

Figure 2.3. TCAPP Decision Guide elements tested by PPACG (LRP-2–LRP-8).

and justify their participation within their agency. Everyone interviewed for this evaluation commented that the IEF/Eco-Logical concept helped bring the environmental staff into the process. For instance, the U.S. Fish and Wildlife Service (USFWS) participated in the PPACG planning process this year for the first time ever. That kind of participation by natural resource agencies was the first that one USFWS employee had seen in his 30-year career.

Similarly, the PPACG team tested the capability for interagency collaboration in transportation planning within the MPO. During the course of the project, some agencies revealed that they were involved not only in doing a "test" of the TCAPP website but also in some TCAPP-sponsored "collaboration training."

The project team then tested Decision Guide elements for long-range planning, including development of a timeline that embedded within it all the TCAPP Decision Guide steps that were used to monitor progress and evaluate success (Figure 2.3). In addition, PPACG used the IEF to assist in a general way with integration of ecological considerations into the PPACG transportation planning effort.

Outcomes and Lessons Learned

Since PPACG's transportation planning process is trying to better account for the needs and desires of agencies that affect, or are affected by, transportation investments, PPACG formally requested and received participation in the TCAPP-supported process from local, state, and federal agencies that have not traditionally participated in regional transportation planning. It is hoped that this will create a paradigm shift because the process used to plan for transportation has traditionally been driven by limited perspectives derived exclusively from within the transportation industry.

However, the self-assessment tools were not as helpful as PPACG staff had hoped. It was difficult for the planning team to analyze the results of this assessment as it required fairly difficult processing by interviewees. It also became apparent during the self-assessment that the decision-making authority and role identified for local municipalities were problematic. While the staff is generally covered under the MPO role, most of the local staff in the PPACG region felt some level of insult at not having a differentiated role. They pointed out that there is no way that the MPO board would force a project on the staff that they have not asked for.

From the initial use of the stakeholder self-assessment tools, there was difficulty getting local entities engaged and interested in collaboration. Local planning staff communicated that they are significant decision makers in the transportation planning process and did not believe that this fact was reflected on the website descriptions. A general consensus of people involved in the project was that the TCAPP "materials were good" and that it was a "very good process" but that "some people are obviously not ready for it yet." These comments came in response to stakeholder feedback and refusal to follow some of the steps suggested, preferring instead to follow the traditional approach that let local municipalities set the transportation project priorities.

TCAPP Pilot Project: Minnesota DOT

Project Summary

The Minnesota DOT pilot project used TCAPP to guide collaborative planning activities in the development of a Complete Streets plan for the city of Grand Rapids, Minnesota. The objective of the planning process was stakeholder consensus on the plan outcomes and financial feasibility. The goals of the project were to plan for a more balanced transportation system that integrates all modes (i.e., transit, freight, automobile, bicycle, and pedestrian); to address the specific needs of system users of all types, ages, and abilities; and to promote broad public benefits, including physical activity, environmental quality, and quality of life for citizens and visitors.

TCAPP identifies partners as those parties with a decision-making role at one or more points in the transportation planning process. These decisions are fiscal or legal, or both, in nature. Partners for the Complete Streets planning process were the city of Grand Rapids, Itasca County, the Minnesota DOT, and the Federal Highway Administration.

The Minnesota DOT pilot project was helped by the fact that partners shared many of the same values and a common

vision of their city. The project team was confident that an innovative application of the TCAPP planning process would ultimately result in an agreed-upon plan. This starting point of shared vision allowed the team to focus primarily on the value and effectiveness of TCAPP in a context in which participants have different specific interests, but mostly are inclined to want to work together to achieve a common objective.

Pilot-Tested Elements

The self-assessment tools were used by the Minnesota DOT pilot project, specifically two applications of the TCAPP Collaboration Assessment.

The pilot project more broadly focused on the Decision Guide, including eight "key decision files" of the TCAPP decision tool, mostly from the corridor planning (COR) phase, but also from the long-range planning (LRP) phase, as detailed in Figure 2.4.

Outcomes and Lessons Learned

The greatest and most lasting outcome from applying the TCAPP model is the creation of a venue for continued dialogue and collaboration, which revealed new and creative solutions to the partners and stakeholders in the project. The TCAPP tools provided valuable guidance on effective collaboration techniques with the community that was instrumental in developing alternatives beyond traditional highway improvements. Applying the TCAPP tools helped identify multimodal options, additional enhancement features, and innovative solutions that were critical to developing a successful Complete Streets plan for the city of Grand Rapids.

One of the more enlightening and unanticipated insights that the team discovered by using the TCAPP model was the recognition that collaboration and partnerships are not only needed among organizations, but within them as well. The large, decentralized nature of the Minnesota DOT, which led to decision-making authority being placed in multiple offices at multiple locations, created a new opportunity for the project team to apply steps from the Decision Guide to intradepartmental decisions.

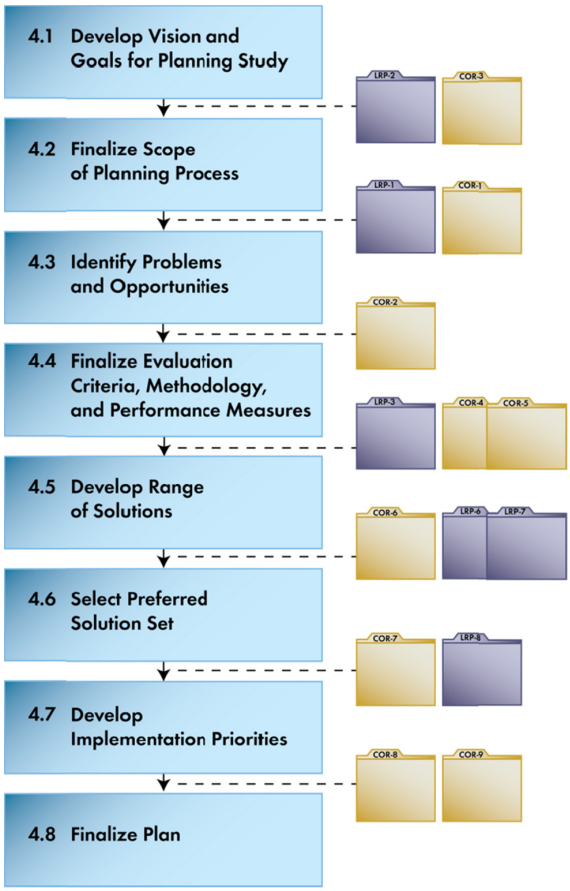

Figure 2.4. TCAPP Decision Guide elements tested by the Minnesota DOT (LRP and COR).

IEF Pilot Project: Colorado State University

Project Summary

The Colorado DOT has been proactive in the development and adoption of innovative strategies to bring together natural resource preservation and transportation infrastructure development. However, as currently implemented, environmental considerations are not included directly in regional planning and are only starting to be considered at the corridor level.

The Colorado State University (CSU) pilot project used the IEF to advance the practice of integrated planning by bringing ecological considerations into focus earlier in the planning process. The objectives of this project were to

- Evaluate the operational feasibility of implementing these framework steps;
- Deliver a set of products that can be used to support landscape-scale analysis of priority natural resources and mitigation options; and
- Provide value-added data that Region 1 personnel can put to immediate use in project evaluations and other work.

The Colorado DOT, supported by CSU, set out to answer the following questions with respect to the IEF:

- How do we integrate these practices into current transportation planning?
- How can these practices lead to a better range of outcomes and mitigation options?
- How can areas be identified that represent the optimal priorities for conservation and mitigation?
- How can we use species models and improved wetland map resources to get better conservation outcomes?

- How might credit markets be employed to achieve conservation objectives?
- How do travelers within project areas perceive natural resource values, credit markets, mitigation opportunities, and ecosystem services?
- What is the operational feasibility of this process?

For the study area, the project team selected the western portion of the Colorado DOT Region 1, encompassing the majority of Park County, west of Denver and Colorado Springs. This part of the state is home to highly traveled roadways, popular tourist and recreation destinations, and areas that are experiencing rapid development pressures. The area also has a number of environmentally sensitive areas, including irreplaceable wetland resources, federally listed threatened and endangered species, and key wildlife corridors. It contains many areas that have been identified as having high conservation values by the Nature Conservancy, Colorado Parks and Wildlife, Colorado Natural Heritage Program, Keep it Colorado, and others. The majority of transportation improvement projects planned and scheduled for the study area fall under the National Environmental Policy Act of 1969 (NEPA) categorical exclusion process.

The initial intent of the pilot was to use the data to evaluate programmed projects in the study area. However, the project team found that there were limited projects that were suitable for consideration in the study area. Instead, the team focused on looking for mitigation opportunities that could be used by the Colorado DOT as it proceeds with its transportation planning and project development.

Pilot-Tested Elements

This research was designed to test selected elements of the IEF Steps 2 through 6 (Figure 2.5).

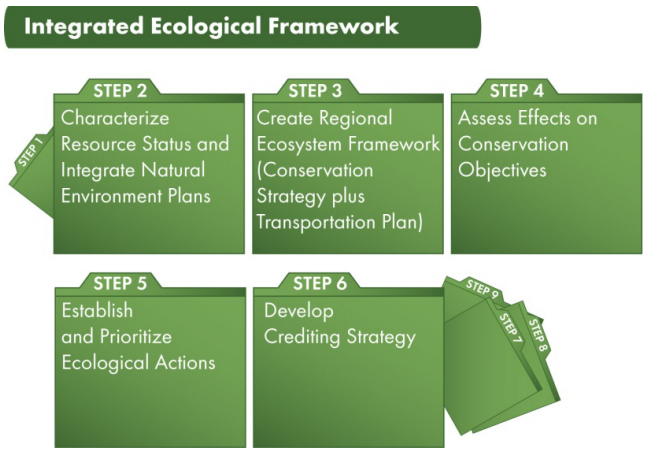

Figure 2.5. IEF steps tested by Colorado State University (Steps 2 through 6).

IEF Step 2: Characterize Resources

The resource characterization focused on collecting and summarizing available spatial data pertaining to natural resources in the study area. The focus of this effort was on the development of new data, with the intention to greatly expand the level of distribution of species data. The final product is a composite map that highlights the highest priority locations.

IEF Step 3: Create Regional Ecosystem Framework

The project team began creating the Regional Ecosystem Framework by constructing a biological Conservation Value Summary (CVS) using the species distribution models and wetland map created in Step 2. The CVS presents resource values and provides a summary of priority conservation opportunities. The project team then overlaid the infrastructure information to view the current conditions.

IEF Step 4: Assess Land Use and Transportation Effects on Conservation Objectives

In Step 4, the project team developed methods to evaluate the impacts of various types of land use (including transportation effects) on resource conservation objectives identified in the CVS. This work involved the construction of a landscape integrity map representing cumulative impacts to the natural landscape resulting from anthropogenic activities. This model also served as one of two alternative cost layer inputs for the optimization analysis discussed under IEF Step 5.

IEF Step 5: Establish and Prioritize Options for Offsetting Impacts

For Step 5, the project team considered three methods for conducting the analysis:

1. The Colorado DOT Shortgrass Prairie Initiative approach;
2. An alternative scenario analysis based on State Transportation Improvement Program (STIP) project areas; and
3. A conservation network optimization model.

The optimization model proved to be the most robust analysis, with the greatest potential for meeting project goals. Therefore, CSU decided to use the software tool Marxan (version 2.43) to create a conservation network optimization model. Through this analysis, CSU identified trade-offs between resource conservation and transportation objectives and displayed results with the least amount of land value and landscape degradation cost.

IEF Step 6: Develop Crediting Strategies

To develop a crediting strategy for conservation targets and address Framework Step 6, CSU first conducted an ecosystem services assessment to answer descriptively the following three questions:

1. Which ecosystem services of interest are most likely to be impacted, positively or negatively, by transportation projects?
2. Do wetland mitigation banks, conservation banks, or other markets already exist for ecosystem services likely to be affected?
3. In cases where markets for affected ecosystem services do not exist, what approaches are available from projects in other regions that could inform the development of markets to serve the needs of the Colorado DOT Region 1?

In consultation with the Colorado DOT personnel, it was determined that the project would apply the IEF steps in the context of current and projected future projects, but not to one specific project. As such, CSU was able to identify the general types of ecosystem services that would be affected by projects in this region, though an individual project may only affect a subset of these services. This step was challenging, since there were not enough tangible projects to use as test cases for the credit strategies.

Outcomes and Lessons Learned

CSU faced a number of challenges in the completion of this project, including

- Difficulty collaborating with the regulatory agencies, which are often focused solely on permitting;
- Maintaining relationships and institutional knowledge with partner agencies as people move on;
- Planning fatigue among partner agencies; and
- Identifying appropriate partners.

The project team identified the following challenges and needs specific to the IEF:

- A simple way to explain the IEF is lacking.
- There is a need for a standard agreement guide on how to implement the process.
- Without one main project to evaluate, the IEF was limited in application. Smaller projects are the bulk of the Colorado DOT's work these days, so this application is important.
- Success is dependent on the data, and good data are not always available.
- The high-level analyses that the IEF provides are useful, but will never provide the detail needed for permitting purposes.
- The IEF is well suited for higher-level planning exercises, but to be fully integrated it also must work well at all levels of the Colorado DOT activities. The natural resource agencies will have to shift their focus away from solely permitting. More information about how to do this would be welcome.

Despite these challenges, the project team felt that the outcomes of this process do add tremendous value for their state. The following were identified as possible next steps for the Colorado DOT, building on the work completed:

- Completing a similar project on a larger scale to realize an even greater value-to-effort ratio;
- Clarifying the relationship between the IEF and other Colorado DOT agency initiatives;
- Straightforward application of the IEF in a Colorado DOT corridor-planning context; and
- Addressing the obstacles to collaboration among partner agencies (e.g., different geographic boundaries and planning schedules).

IEF Pilot Project: Rogue Valley Council of Governments

Project Summary

The Rogue Valley Council of Governments (RVCOG) engaged in the C21 pilot project with the goal of improving the environmental and ecological data available to inform long-range transportation planning in the Rogue Valley, Oregon. The intent was to employ these data in the early stages of transportation project planning, as well as other related planning efforts (such as urban growth boundary reserve planning).

The Oregon DOT is working to integrate environmental considerations more effectively into planning. With this project, the Oregon DOT is looking beyond environmental regulations and is taking a proactive approach to natural resource consideration and protection.

The project study area included the Rogue Valley MPO, the Bear Creek Watershed, and the 2-mile buffer around the watershed boundary. This region is a floodplain valley surrounded by the Cascade Range plateau to the north and east, and the Siskiyou Mountains to the south and west. The environmentally sensitive areas have been fragmented by uncoordinated transportation and land use planning. More than 200,000 people call this area home, and the area is expected to increase its population by 30% over the next 30 years.

Efforts to use biological and ecological data are challenged by the fact that local agencies are short on resources, but continue to handle their own data libraries and geographic information system (GIS) departments. Each department uses a

different platform and map projections, making it impossible to create a "big picture of the area."

To guide the work, the project team established four objectives:

1. Gather and integrate all extant ecological and archeological data and create a data library available to all;
2. Analyze said ecological data to determine ecologically important areas (nodes) and link these nodes within and outside the valley;
3. Create a repeatable process; and
4. Evaluate SHRP 2 program tools.

The project was guided by a stakeholder committee representing diverse interests and a technical committee of local resource experts. The final maps were created by using a simple raster calculator approach from Corridor Design. All data layers were weighted evenly, providing an output of cells that indicates the relative ecological importance of that area. Linkages between the areas of particular ecological importance were added. The existing transportation network and planned projects were overlaid to identify areas of potential conflict or concern. An original concern by the project team that the methodology would be too simple to be useful proved to be unfounded. Stakeholders have responded enthusiastically and have noted that the methodology provides a great value, while still being understandable to the public.

The project deliverables included the data library of GIS shape files, the final report, maps, and a website.

Pilot-Tested Elements

The RVCOG team tested the first three steps of the IEF (Figure 2.6).

Step 1: Build and Strengthen Collaborative Partnerships and Create the Vision

The project team revised this step because many within the stakeholder group already had relationships from working on other projects, a situation that lent itself to the success of this project. In addition, the team noted that this process needs to happen naturally, through working together on something (and should not be set apart as a separate step). Finally, the memorandum of understanding step seemed to come too early in the process, before the partners were comfortable with the scope of the project.

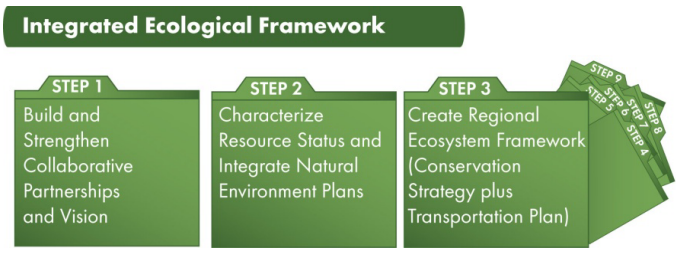

Figure 2.6. IEF steps tested by Rogue Valley COG (Steps 1 through 3).

Step 2: Characterize Resource Status, Integrate Conservation, Natural Resource, Watershed, and Species Recovery and State Wildlife Action Plans

During the course of this step, the project team reordered the substeps a bit to fit their needs. This step also involved more data organization than was originally anticipated, requiring extensive stakeholder involvement and collaboration.

Step 3: Create Regional Ecosystem Framework

During this step, the project team used the data layer to locate sensitive areas (e.g., archeology, historic preservation, ecological), and this data layer was incorporated into a transportation plan. Having this data tool together already is helping agencies pair projects (e.g., new road construction with wildlife crossings) and bring all stakeholder agencies with disparate missions to see the bigger picture as they relate to goals and objectives.

In addition, the project team reviewed TCAPP and its self-assessment tools in a general way. The team noted that while the TCAPP website included much information, it also contained a great deal of jargon with which resource agency staff members are not necessarily familiar. The self-assessment tools were helpful. The project team administered the stakeholder survey at both the beginning and end of the study period. The survey was not directly applicable to this particular stakeholder group, so some of the questions were not answered. However, the survey findings revealed that throughout the process the stakeholders became more comfortable with their role and with the level of communications. The results also indicated that stakeholders were finding value in the TCAPP website.

Outcomes and Lessons Learned

The RVCOG project team provided the following insights based on their experience:

- Integration of this tool into the Oregon DOT practices was relatively simple due to the fact that the agency already is doing many related aspects. Assessing this situation before beginning a project is helpful in managing expectations and assigning resources. Adopting a completely new tool or process will always be met with a great deal of resistance.

- It is best to keep things simple. The original concern that the tool would not be sophisticated enough was alleviated because it is especially useful and a wide audience can understand it.
- Flexibility is important. Each project is going to be different, so it is critical that the tools can apply across a range of applications. Potential users need to know this to understand that there are many possible uses for the IEF and TCAPP.
- Data maintenance and ownership are ongoing issues, and guidelines for how to deal with these issues would be valuable. Personal relationships can go a long way in facilitating successful access to data.

IEF Pilot Project: University of California, Davis, Road Ecology Center

Project Summary

This project tested the IEF in the context of an environmentally sensitive corridor. The effort was completed through a partnership between the California Department of Transportation (Caltrans), academics, nongovernmental organizations (NGOs), and resource conservation districts.

The study area was defined as the Highway 37 Corridor, which traverses Sonoma County, between Solano and Marin Counties in Northern California. The corridor links the East and West San Francisco Bay regions and is heavily traveled by commuters, tourists, and truckers. The road passes through cities, areas with endangered species habitats, marshlands, and farmland. Flooding is a critical concern, particularly in the context of increasing sea-level rise. Caltrans is interested in working with partners to create a vision for this corridor that considers

- Endangered species and their habitats;
- Agriculture;
- Increasing traffic;
- Sea-level rise;
- Increased transportation choices; and
- Enhanced public access.

To date, planning for this corridor has prioritized capacity expansion. The focus of this project was to broaden this thinking by the development and use of the IEF. The project team renamed the IEF the "Route 37 Corridor Context," with the intent of including data inclusive of environmental, transportation, agricultural, community, and economic considerations.

The purpose of the Corridor Context is to foster among stakeholders a common understanding of and way of sharing the data regarding the complex issues in the region. The Corridor Context will include data on current conditions and on likely or desired future conditions. While there are no current projects proposed for this corridor, it seemed pertinent to begin understanding the complex set of issues now to be able to select the best alternatives during the project development and programming stages.

The study was guided by input from a core team of partners. This group included members from several Caltrans offices (system planning, environmental, and maintenance), the Napa County Conservation District, the Southern Sonoma County Conservation District, the Sonoma Land Trust, and the Sonoma Ecology Center. This group was established through a formal, structured partnering agreement. Throughout the duration of the project, this core team engaged and received input from more than 100 individuals and organizations. To support this engagement, the core team created a project website to house project-related resources and other news.

Pilot-Tested Elements

Throughout the course of this pilot project, the team tested Steps 1 through 6 of the IEF (which the team renamed the "Corridor Context") and general aspects of the TCAPP corridor framework (Figure 2.7).

Step 1: Build Relationships

The project team found that this step served as an effective way of bringing partners together and having them voice their perspectives. The step brought this important group together and established the fact that there is a shared view that sea-level rise threatens the corridor. And, as the project team noted, this activity in reality continued well beyond this step and throughout the entire process.

The greatest hurdle in pulling the stakeholders together was a difference regarding the time frame of projects. While transportation planners are used to thinking on a 30-year project horizon, other partners were concerned that if actions are not taken within the next 10 years, that there could be serious consequences.

Step 2: Characterize Resource Status

The project team used this step to consolidate the existing data and educate stakeholders about what is available. Data gaps (e.g., plans for sustaining local agriculture) were identified.

Step 3: Create Regional Ecosystem Framework

Through the course of this step, the project team adopted the term "Corridor Context." This concept values consideration

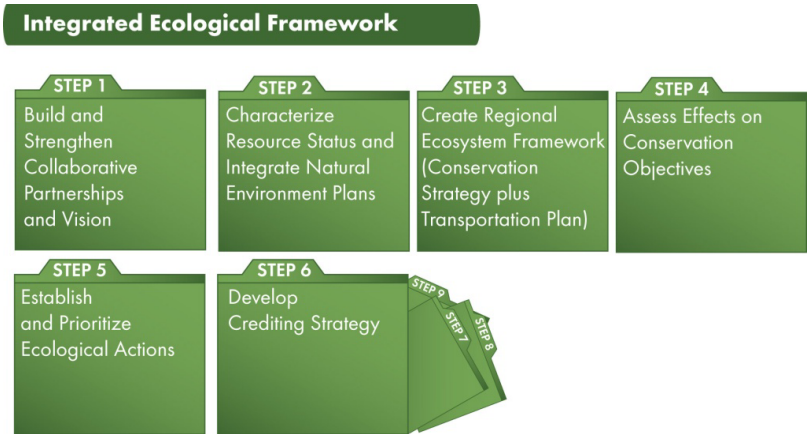

Figure 2.7. IEF steps tested by the University of California, Davis, Road Ecology Center (Steps 1 through 6).

of community, transportation, environmental, and economic systems.

The project team noted that the IEF as established is limited in the topics that can be considered. For example, farmland sustainability is of critical concern in this corridor, but is not part of the IEF.

Step 4: Assess Land Use and Transportation Effects

Through this step, the project team worked with stakeholders to identify a range of possible scenarios to support objectives. The process identified the trade-offs of each scenario, both positive and negative (e.g., noise).

It was challenging to have this conversation in the absence of any real project proposals, but was instructive for the transportation planners to listen to the issues about which stakeholders are concerned.

Regulatory agencies had a difficult time engaging in this dialogue, as they are only able to provide feedback in the context of a regulatory review.

Step 5: Establish and Prioritize Ecological Actions

The project team looked at the combined ecological effects with transportation benefits and did determine that an elevated causeway would be the environmentally preferred alternative. However, in the absence of a real planning process, it was difficult to define an alternative. It is hoped that these findings can provide a blueprint for stakeholders when the time comes to select a project alternative.

Step 6: Develop Crediting Strategy

A similar strategy that had been previously developed by the University of California, Davis, was adapted to measure ecological benefits.

Outcomes and Lessons Learned

The following provides an overview of the insight gained by this project team through their experience with this pilot.

- This effort provided funds to bring many partners together, including NGOs and resource conservation districts (who were compensated for their time). Without this funding, it is unclear whether these partners would have been willing to come to the table (as is typical with the Caltrans planning processes), thus compromising the collaboration and losing out on opportunities that were discovered.
- District environmental and regulatory agencies are project-focused, so it was difficult to engage these partners when they were not looking at a specific project.
- The pilot project provided the partners the time they needed to look at big-picture planning issues in more depth, with a greater range of stakeholders. Hopefully, this in-depth look will set the partners up well for better planning processes in the future, but it will be a challenge to repeat this level of effort due to lack of funding.
- TCAPP provided a great planning resource, but was difficult to use for those who were new to it and trying to understand it quickly.
- In the case of this project, the time frame was quite far out in the future. There was no discussion in the tools about how to handle this time frame.

IEF Pilot Project: West Virginia University Research Corporation

Project Summary

The West Virginia Department of Highways (DOH) is responsible for the maintenance and construction of more than 36,000 miles of roadway, which includes more than 6,000 bridges

and culverts. The associated water resources are an integral part of the state's ecology and need to be considered appropriately in route selection. Traditionally, water resource impacts have been identified and dealt with after route selection and have not played a part in alternatives analysis.

This pilot project is designed to assist with the West Virginia DOH's desire to create a systematic approach to waterway mitigation, one that will lead to compensatory mitigation projects while meeting the needs of the regulatory agencies and their planning and permitting processes.

The pilot project followed the guidelines established in the IEF to analyze these existing methodologies and to develop new ones as necessary. The project objectives were to

- Assess the efficacy and cost-effectiveness of these tools as feasible proactive mitigation, conservation, and planning steps;
- Work with the mitigation Interagency Review Team (IRT) and partners to modify and adopt tools suited for West Virginia and implement a plan to incorporate these tools into new streamlined regulatory guidance; and
- Provide detailed guidance and review, so that other states can efficiently adopt appropriate SHRP 2 tools.

As study areas, the project team selected two highways currently planned and under construction: the Coalfields Expressway (CFX) and King Coal Highway (KCH). They both traverse challenging topography and will replace state roadways. The alignment for both roadways already has been selected, but the project team used alternatives identified in the EIS documents to backcast and test their tool to determine whether, if used, the tool would have led to a more informed roadway selection.

In the process of testing the planning tools, the project team realized that the West Virginia DOH does, in fact, have some advanced planning tools. However, the DOH lacks the ability to aggregate and analyze uniform information to frame a watershed approach. For example, impacts on a poor quality stream should logically lead to a lower mitigation cost (and, therefore, be prioritized over streams with higher quality). But until now, the agency has not evaluated stream quality.

The final output of the project is a regulatory-approved "recipe" that will allow the West Virginia DOH to forecast ecological impacts, avoid and minimize the most sensitive environmental resources, and achieve meaningful ecological lift in its required compensatory mitigation activities.

Pilot-Tested Elements

Through the course of the pilot project, the project team considered both the IEF and the TCAPP website for use in assisting the team in their process. However, perhaps the most valuable outcome was that this pilot-project funding brought together stakeholders with different resource expertise (e.g., wetlands, endangered species, watershed mitigation). This allowed the West Virginia DOH to weave together the existing tools to create a multilayered approach that works across disciplines.

Integrated Ecological Framework

The project team used the first five steps of the IEF to frame the approach to watershed mitigation (Figure 2.8). While the project team found the steps to be clearly defined and well organized, the team found that when engaging with stakeholders, it was very challenging to adopt a new and unfamiliar process. In addition, it was determined that the other SHRP 2 research tools were not a good fit for the effort; it made more sense to adopt tools that had been developed locally for the specific geographic region, or to work with the existing data platforms. Therefore, the team provided no commentary on the specific work they conducted in Steps 1 through 5 of the IEF.

Outcomes and Lessons Learned

The process undertaken by this pilot-project team led to the conclusion that while the IEF steps began to define a process, this was not the best course of action to follow. For the West Virginia DOH, it made more sense to work within existing channels and use existing tools to arrive at a solution to the established problem. However, through this process, the project team did identify ways in which the TCAPP website could better support agencies with this particular need: as a repository for preferred regional tools.

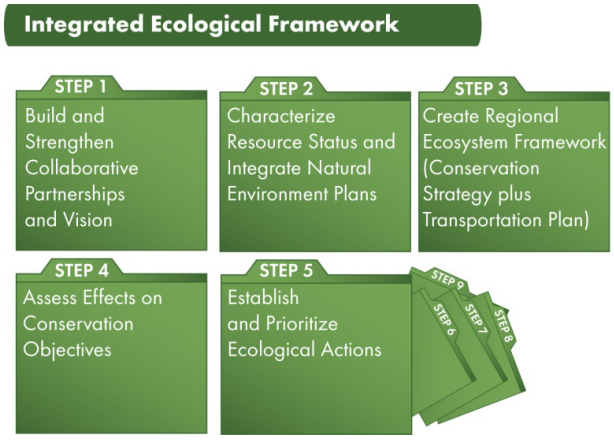

Figure 2.8. IEF steps tested by West Virginia University Research Corporation (Steps 1 through 5).

The following is a list of lessons learned related to these findings:

- In many instances, it is critical to work within existing channels and to leverage that knowledge and processing. This approach can be more effective and can lead to a higher probability of acceptance and success than trying to bring a new process and achieve multiagency buy-in (even if the process is an improvement). Just saying "we have a new tool" can make people run the other way.
- Leveraging agency cooperation is the best way forward. For example, the West Virginia DOH has an existing memorandum of understanding with USFWS to share the state's natural resource agency data. This partnership has saved both agencies significant money.
- Working with a neutral agency (in this case, a university) provided a good forum for bringing the DOH and the natural resource agencies together.
- There is a need for
  - Regional tools;
  - Consistent data sources;
  - Consistent best management practices; and
  - Consistent environmental training for contractors and employees.

CHAPTER 3

Findings

Context for Success

The TCAPP and IEF pilot studies offered a view of some of the critical elements necessary for successful application of TCAPP and the IEF. These are elemental factors that can drive the pilot study forward; they can make or break the ability of the pilot study to achieve its objectives.

Contextual success factors were culled from the pilot-project stories and are noted here to provide a basis for comparing and contrasting the results of the pilot studies.

TCAPP Success Factors

The TCAPP pilot projects identified three critical factors that influence success.

Importance of Relationships

First, when beginning a project, there needs to be at least a foundation for trust and collaboration and a willingness to work together toward new outcomes. In the case of the Pike's Peak Area Council of Governments (PPACG), there seemed to be a sense of wariness, a lack of trust, and a strong investment in the way the plan had been developed in the past. The use of TCAPP tools and guidance was unable to penetrate this stalemate, despite early training for project stakeholders in environmental conflict resolution, ongoing dialogue and self-assessment, and structured exposure to the consensus-building principles of TCAPP collaboration.

By contrast, the Minnesota DOT project team had strong working relationships at the beginning of the project that just got stronger as the TCAPP planning process unfolded. Similarly, the Washington State DOT team had worked together in the past, was enthusiastic about working together again, and was open to adding new perspectives that could help advance the project toward its next milestone goal.

Need for Shared Goals

A related factor for success is a common goal. This includes an understanding of the benefits of a collaborative process and an appreciation for the need to work together in partnerships to achieve a broad goal. At least two people interviewed about the PPACG Regional Transportation Plan (RTP) commented that, at the outset, there was universal approval of a collaborative approach to planning, but over time, it became apparent that a growing number of the local entities did not actually like the results from the changes in the planning process. The entities made statements that they did not "understand the point" and did not see any potential benefits to transportation projects. The entities also commented that they were not comfortable with federal resource and regulatory agencies being involved in the long-range planning process, since the vast majority of the project funding was anticipated to be local sales tax initiative and, therefore, have no state or federal action. In hindsight, it seems that the local perspective remained focused solely on transportation projects that could benefit locally driven land use, while the federal, state, and PPACG perspective sought to broaden the goal to include conservation of sensitive habitat and a broader lens for economic and social considerations.

By contrast, the Minnesota DOT project team had a shared vision for the city of Grand Rapids and this starting point allowed for focus and intention as they moved toward the goal of developing a fiscally constrained Complete Streets plan. Washington State DOT stakeholders shared the goal of advancing the project to the legislature and agreed on the need for improvements to SR-509, even while possibly having different goals of what ultimately would be constructed. This shared goal of collaboration can even be enough to advance.

Political Stability

A third factor needed for success, notable in the PPACG pilot study, is political stability. Local elections brought in new

council members just before the start of the C18 pilot study, and many of these elections were won on the rallying cry of "local control." With new leadership and direction and a lack of continuity or understanding of the potential benefits of collaboration, it was difficult to keep the RTP process focused on the benefits of expanding the planning process beyond solely transportation concerns.

By contrast, the presence of political stability served the PSRC pilot project. While initial controversy about the RTP prioritization process spurred the application to conduct a TCAPP pilot study, the use of a transparent and structured process for collaboration assuaged fears and led to a successful outcome.

Integrated Ecological Framework

Synthesis of the findings from the IEF pilot projects reveals an additional three factors for success. The IEF projects were more similar in scope, and three out of four of them focused on the development of a new tool for the use in analysis within their own state.

Need to Leverage Existing Tools and Processes

First, the IEF pilot projects all revealed the importance of leveraging existing tools and processes. In the case of West Virginia, the process of the pilot project helped the West Virginia DOH identify the fact that the DOH did have relevant tools in house that could be adopted to achieve their goals. It was much easier to engage agencies by showing them a new way to use a trusted tool, rather than convincing them to understand and adopt a whole new tool.

The RVCOG project team expressed that their project was supported by and tied into many of the efforts under way at the Oregon DOT. This meant that the project went smoothly, and it is hoped that it will translate into similar efforts on a larger scale.

Project Focus

A second factor for success was the existence of an actual project to focus on. In the case of the Colorado pilot project, the team did not have a specific project that was large enough to test its crediting strategy. The team pointed out that the IEF tool was difficult to use in the absence of one large project, but that the Colorado DOT is often engaged in these smaller-scale efforts. For the California pilot project, the team explored alternatives for a corridor that were far in the future (and were not officially on the Caltrans list for consideration). This made it difficult to engage some of the partners, particularly the regulatory agencies that were focused on permitting processes and not necessarily interested in an exercise for only academic purposes. While use of the IEF tool is not impossible, it was advised that the IEF tool is better suited to situations with a specific project to analyze.

Access to Data

The final success factor revealed through the IEF projects was the access to good data. Both the Colorado DOT and the RVCOG found that they could only go as far as the data would take them and that the availability of good data will always be a limitation. It was noted that often access to good data is highly dependent on strong relationships with staff at the partner agencies.

Benefits of a Collaborative Approach

Refining and Expanding the List of Stakeholders

For the Washington State DOT TCAPP project, an early achievement of the project team was recognition that additional partners and stakeholders needed to be brought into the planning process if it were to adequately support consensus-building efforts. This stakeholder expansion was built atop an already collaborative group of partners.

A similar benefit of stakeholder involvement was noted with the PPACG project. Despite the fact that expanded stakeholder involvement exacerbated some existing conflict, stakeholder input was taken and integrated into the planning process at several points, which resulted in the stakeholders being more confident that their input was being used at the regional level. In addition, when the selection of the preferred scenario was completed, most stakeholders felt comfortable with the decision, even though there were shortcomings to the final scenario, because they understood why and how this scenario was selected.

The Minnesota DOT pilot study put it a little differently: "The greatest and most lasting contribution of applying the TCAPP model is likely that bringing the stakeholders and partners together in a long-term, iterative process created a venue for continued dialogue and collaboration out of which new and creative solutions were found. The TCAPP tools provided valuable guidance on effective collaboration techniques with the community that was instrumental in developing alternatives beyond 'traditional' highway improvements. Applying the TCAPP tools helped identify multimodal options, additional enhancement features, and innovative solutions that were critical to developing a successful Complete Streets plan for the City of Grand Rapids."

For PPACG, better collaboration, improved understanding and buy-in, and increased trust were seen as benefits of TCAPP. One point of contention was establishing and agreeing on the level of definition of collaboration for all participants. Several entities retreated from their earlier position of strong supporter of collaboration when the process began to have a noticeable impact on which projects were "good" and which ones were not. Their position was they agreed to share information with other nontransportation agencies but not have their views change which projects should be implemented.

In the California IEF pilot, the project team noted the importance of and value realized by bringing NGOs and other nonregulatory agencies to the table. Through this process, they were able to realize new strategies and form new relationships that would otherwise never have existed.

Clarification of Decision-Making Authority

One of the key takeaways of the TCAPP pilots was a strong understanding of the importance of clarity around roles and responsibilities. For the Washington State DOT team, which had to modify the roles to acknowledge the fact that ultimate decision-making authority rested with the state legislature, the fact that everyone understood their role helped promote consensus-building and focused the team's efforts. The clarification offered gave the Minnesota DOT team an ability to forge new and innovative ideas and policies.

In the case of PPACG, the discussion of decision-making authority provided a first clue about underlying conflicts and concerns. In hindsight, there may have been a need for additional clarification of decision-making authority that acknowledged the predominance of local funding.

Focus on Key Decisions Provides Needed Structure

The transparent and structured key decisions supported PSRC in its efforts to rebuild trust and develop an agreed-upon prioritization process for LRTP project selection. The PSRC pilot study also illustrated that, while the key decisions were excellent guideposts for a macro-level process, such as development of an LRTP, the decisions were not particularly helpful for a micro-level process that honed in on the specifics of one key decision (LRP-3).

By contrast, the Minnesota DOT team found that the Decision Guide steps could be applied effectively at the micro (project-level) scale while continuing to make progress at the macro (plan-level) scale. In other words, the Decision Guide could be used to assist decision making regardless of scale. The Complete Streets plan provided the impetus and "road map" for making progress across the city. Developing the plan also created opportunities to bring different subsets of stakeholders and partners together to address individual projects whose successful completion would greatly enhance the success of the overall Complete Streets effort.

In the cases of the Minnesota DOT, the Washington State DOT, and, to some degree, PPACG, the key decisions served as punctuation marks for their project schedules and served as milestones that provided structure and transparency to the project processes. PPACG staff stated that interactive tools and scenario modeling supported collaboration and more informed decision making. The tools were exceptionally useful, especially in creating and evaluating scenarios for development and mitigation of impacts.

Ongoing Assessment of Collaborative Approach

Of the four TCAPP pilot studies, three reported that the ongoing assessment of collaborative approach was very helpful. In the case of the Washington State DOT, responses from the first survey indicated that the vast majority of participants were comfortable with the process being followed, understood their role in that process, had confidence in their ability to both participate and represent their agency, jurisdiction, or organization, felt that their concerns would be heard and considered, and felt that they could thus influence the project's development.

This beneficial feedback countered the few respondents who did not agree with a survey statement and indicated that they were not certain that they understood the process by which they could influence the decision-making process. The project team took these results to mean that the majority of the participants were happy with both the execution of the TCAPP process and the information being provided to the project participants, but that there were at least a few areas where improvements could be made in the project team's approach. The project team understood that unless these issues were addressed, they would become detrimental to the project's success.

The results of the second and third surveys indicated that the committees agreed with the direction of the project team and the proposed future direction of the work to be performed. At the third steering committee meeting, the project team added a question to gauge the stakeholders' willingness to compromise in reaching consensus if there is disagreement among different jurisdictions. It was interesting to note that one of the committee members indicated that the member's agency would not compromise. Upon a closer examination, the team found that this member was representing FHWA and that the reason for the survey response was that FHWA maintained a very keen interest in making sure that design standards are followed. This response is what the project team expects from FHWA, so this particular negative survey response turned out to be of no major significance to the project.

PSRC also lauded the collaboration assessment tool, stating that the collaboration assessment tool helped staff achieve a greater understanding of the necessary underpinnings of an effective collaboration process. Furthermore, the use of the tool helped set a tone and atmosphere within which stakeholders felt comfortable in providing frank and useful input and feedback during the course of the prioritization process update. It was only through a truly collaborative process that a consensus was reached among the varied perspectives on the updated Transportation 2040 prioritization scheme. Ultimately, the success of this process will facilitate future transportation planning processes in the Puget Sound region, particularly the development of LRTP updates.

Paving the Way

Creating and pursuing a collaborative approach takes time and a great deal of effort. The IEF pilot-project teams all experienced challenges along the way, but realized success at the end. As a result, the teams felt that this experience would only make it easier during the next process to get the necessary support and participation for such an effort. In the case of Colorado, the project team recommended completing the process to create a similar tool on a larger scale (which would realize an even higher value-to-effort ratio). West Virginia's experience showed the team that bringing partners together can help the partners realize that they have useful and necessary tools in hand; the tools just need to be looked at creatively to find new applications for them. The more agencies adopting collaborative approaches to address their issues, the easier it will be the next time to follow the same approach.

Lessons Learned

Flexibility

Flexibility Is Critical to Successful Application of TCAPP and the IEF

Two of the TCAPP pilot studies and one of the IEF studies recommended that greater flexibility be incorporated into TCAPP and the IEF, because practitioners will want to try it for a variety of types of projects, some new start projects, but also updates, redo loops, or a continuation of a planning process. Not only does the tool need to be flexible, but the Rogue Valley COG also expressed the importance of marketing it this way. Otherwise, potential users get one impression about its function and may not understand how it could creatively be applied to their particular needs. In the case of the Minnesota DOT, flexibility was required to ensure use of TCAPP for an innovative application for the development of a Complete Streets plan.

One Area Requiring Greater Flexibility Is the Establishment of Decision-Making Authority

In the case of the Washington State DOT, decision-making authority was ultimately held by the state legislature so definitions of partners and stakeholders required some refinement. In the case of PPACG, local governments were accustomed to primary decision-making authority given the prominence of local funding sources.

Another Area Requiring More Modular Interpretation Is the Decision Guide

The Minnesota DOT noted that it had some confusion about the TCAPP Decision Guide as a way to illustrate the planning decision process (44 boxes). Specifically, the process appeared linear upon first viewing. The Minnesota DOT suggested a conspicuous statement encouraging users to organize in a more modular fashion and showing practitioners a hypothetical planning process to illustrate how various key decisions along multiple lines could be applied to assist in the collaborative decision-making process.

Third Area Requiring Flexibility Is Stakeholder Involvement

In the case of the Washington State DOT, the DOT augmented the stakeholder collaboration of its committees with a public opinion survey to support its project findings.

Offering Flexible Approaches to Customize How Users Can Access and Use Materials also Was Recommended

In the PPACG pilot study, the project team wanted a different way to transmit TCAPP materials (via e-mail) and found that its stakeholder group resisted all the "click down" required to get to material. The group wanted the material to be more nimble and customizable.

Convenience and Simplicity

Users of TCAPP Expect Convenience and Easy Customization

PPACG found that stakeholders complained incessantly about the inability to download items and to have self-assessments easily e-mailed, among other things.

PSRC staff and stakeholders wanted the ability to customize the standard TCAPP materials to make them their own. They also were disappointed in the lack of pathways for drilling down deeper into one key decision.

The Washington State DOT offered some suggestions to make the TCAPP corridor-planning tools more useful in this regard:

- Downloadable web content by key subject areas that can be used as handouts;
- In-depth discussion, perhaps through case studies, on how performance measures, including quantitative and qualitative measures, are integrated to help reach consensus and decisions; and
- More real-world examples, perhaps by commonly encountered corridor study types on key subjects (e.g., problem statements, goals and objectives, performance measures, and analysis methodologies).

Keeping Things Simple Ensures Wide Acceptance

In Rogue Valley, the concern that the raster analysis was going to be too simplistic proved to be unfounded. Instead, the fact that the analysis was simple made the tool more accessible to a wider audience and, therefore, more widely used and understood. In addition, all IEF teams felt that simplicity could be key to facilitating quick guidance for users with time constraints. If the information in TCAPP/IEF is complicated and difficult, it will present a barrier for the resource agencies. Therefore, there is a need to guide people quickly to the specific information they need.

Challenges and Strategies

Data Maintenance and Ownership Will Be an Ongoing Challenge

The IEF pilot-project team in Colorado expressed challenges regarding this issue. Any data-driven tool that brings data together from different sources will be continually burdened with an ongoing need for updates and maintenance. One agency will have to take ownership, to keep the tool relevant and usable.

Start with What You Have and Add on as Necessary

In the case of West Virginia, the project team found that sticking with tools that everyone was comfortable with (instead of imposing something new) was the most effective strategy for ensuring a useful product. If the existing tools can be augmented or improved on, at least partner agencies are familiar with the basic premise and structure.

Self-Assessment Tools Are an Excellent Mechanism for Engagement and Constructive Feedback

Despite some functional issues with the TCAPP tools, all of the pilot projects that tested the tools cited the benefits of the self-assessment tools.

CHAPTER 4

Conclusions

Numerous suggestions and comments were offered to the TCAPP and the IEF development teams in an iterative process during the course of these pilot projects. Face-to-face meetings and conference calls facilitated this interaction. As suggestions and comments were received, the contractors in charge of TCAPP and the IEF responded immediately, either by factoring refinements into ongoing upgrade work or by further discussing the recommendations with SHRP 2 staff and Technical Expert Task Groups. All comments have been and will be considered as future enhancements are made.

TCAPP Conclusions

The stratified structure of TCAPP provided easy and quick access to the information needed at different stages of planning and project development for the pilot studies. TCAPP helped in generating the right information at the right time by showing a sequence of key decisions and the information needed for each step. Every key decision in TCAPP provides a comprehensive list of policy issues and questions. These policy issues and questions help researchers think about and prepare data to address these issues. Key decisions in TCAPP also were helpful in developing project and meeting schedules.

For some pilot studies (Minnesota DOT), using the TCAPP Decision Guide is helping develop a new and replicable planning process that will benefit other, similarly situated communities in Minnesota and across the country. The TCAPP tool provides step-by-step guidance on reaching decisions collaboratively. This process requires the commitment of both stakeholders and professionals to stay engaged and consider the interests of all participants. TCAPP tools provided valuable guidance on effective collaboration techniques with the community.

For others (Washington State DOT), the stakeholder collaboration techniques provided under the Collaboration Assessment tab of the initial TCAPP website were found to be very helpful. Specifically, the information in the Decision Guide, located in each key decision of TCAPP, helps users understand who needs what information at what point to provide appropriate support for making collaborative decisions. Furthermore, TCAPP provides guidance on how to form a well-represented stakeholders committee for effective and collaborative decision making throughout the planning process.

The TCAPP tool comes with a list of survey questions that helps save time since many questions are already there to pick from while developing stakeholders' opinion surveys. The questions included in the current collaboration assessment survey in TCAPP are quite useful for monitoring the effectiveness of the project team. The survey questionnaire in TCAPP provides insights into how to refine, address, and include various issues in the study process.

The results help identify areas that represent the greatest challenge to collaboration. In addition, the TCAPP tool provides recommendations that a project team may use to identify changes resulting in potentially greater collaboration.

Case study examples provided in TCAPP are helpful to understand various issues and how those issues were applied or addressed in successful studies around the nation. This understanding helps in identifying potential problems and issues that might hinder the project decisions later in the process and in taking the necessary steps to avoid those problems.

Overall, the SHRP 2 C18 pilot studies concluded that the TCAPP modules were helpful in supporting collaborative decision making. Team members stated that the tool was an effective resource for helping transportation planners to "get the right people at the table, at the right time, with the right information" to lead to decisions that stick.

IEF Conclusions

The IEF proved itself to be a useful process guide for agencies working through multiagency, ecology-oriented endeavors in their states or regions. The diverse scope of the four agencies' pilot projects indicates the IEF's range of utility across an array

of applications. Providing the specific process steps with accompanying elements for consideration allowed the agencies to engage more effectively throughout their processes. In each case, the project teams learned that the most successful projects were those that remained simple and regarded the IEF as a flexible tool. Three of the four pilot projects amended the IEF in some form (e.g., using more appropriate terminology, reordering the steps), and the fourth (West Virginia) used it as a general concept to then leverage the use of existing tools for a new purpose.

The pilot projects illuminated a few key areas that could be the source of future research or development:

- Guidance on methods to link the IEF with existing DOT initiatives. Many agencies have current initiatives that are related to the IEF. Staff and leadership will be wary to adopt a new strategy or tool, unless the IEF can be linked and supportive of an existing program.
- Flexibility to apply the IEF to smaller project efforts, or long-range project planning. Three of the four pilot agencies noted difficulties in applying the IEF under these conditions. However, they also noted that many DOTs are no longer programming many large infrastructure projects. The agencies also noted that when they do program projects, very long-term planning is crucial. If the IEF could be more applicable in these situations, that would enhance its utility.
- Guidance on data ownership and management. Data ownership and management will be an ongoing challenge. Offering guidance on how to establish productive relationships to facilitate data sharing, followed by strategies to collaboratively manage and maintain the data, would help agencies across many applications struggling with these issues.

Specific Comments about TCAPP and IEF

Numerous suggestions and comments were offered to the TCAPP and IEF development teams during the course of these pilot projects. This feedback can be categorized into comments about functional aspects of TCAPP and the IEF and comments about their content or process, or both.

All comments have been transmitted to TCAPP and IEF contractors. Recommendations made by the pilot teams for TCAPP improvement were handled in one of two ways. First, immediate needs and those recommendations that easily meshed with ongoing work were put into the schedule of regular TCAPP updates. Second, those needs and recommendations that were more consequential were added to the running list of identified improvements to be considered as future enhancements are made.

Functional Comments

Functionality issues relate to site navigation and access to the important data. Specific functional comments were often focused on easy and convenient availability of information and a need for hyperlinks to get to detailed materials quickly. Other functional comments requested a way for the user to modify the questions and save their customized format. This change would allow practitioners to customize the tool to their needs. It is also important to be able to save or download the responses for analysis and reporting. In addition, the web tool should be further developed to recognize input from multiple users in a group so that the joint results can be tallied and shared electronically with all.

Another facet of this request to customize materials relates to flexibility. One pilot-project team requested that an MPO or DOT's unique characteristics related to experience, expertise, and technical sophistication be accommodated. Specifically, the team suggested that TCAPP would be more useful to a variety of users if it provided additional guidance on the TCAPP home page that clarifies (a) the range of user situations for which the tool could be applied and (b) how one can "disaggregate" or refine elements of TCAPP to be applicable to their situation.

Additional comments, many of which already have been addressed, related to a desire for downloadable web contents. The TCAPP website contains a large amount of information organized by subject area. However, the initial version of the TCAPP tool did not allow the downloading of directly usable forms and contents without reformatting. This was particularly relevant to TCAPP's usefulness in a group setting where many participants did not have access to a computer. It was also pertinent to the usefulness of self-assessment tools. Pilot-project teams requested that all questionnaires allow for online compilation, analysis, and assessment of group results. To support collaborative approaches, saving materials and having the ability to electronically share them with others are important. As a result of this interest, the assessments were made available in print format to allow completion by a group outside the tool functionality.

Major functional improvements were made to the TCAPP home page and to the Decision Guide during the pilot tests. Pilot teams and contractors agreed that the existing home page design was insufficient to engage and assist users in their search for support. A redesign of the home page was accomplished to include quick access to content areas as well as an introductory video. In addition, the Decision Guide graphic was reformatted to illustrate the "file folder" aspect of each key decision as a repository of supporting information for commonly understood steps within transportation decision making.

Content Comments

Content improvements were both general and specific, but most often related to the application of TCAPP principles and definitions to individual regions or states. The two content areas that were of primary importance were the assessments and the partner-stakeholder information in the User Portal. Some teams adjusted the assessment statements "offline" to provide a more direct relationship to the local context. Teams suggested that the assessment statements be expanded to address the risks of the lack of collaboration and the perspectives that participants brought into the process based on prior experience. These and many other individual changes have been added to the list of future improvements.

One recommendation concerning the Decision Guide was to clarify functions of subtabs by renaming them to reflect the function of each subtab more clearly. For example, the tab "special topics" is about how a key decision relates to "other topics," but the team concluded that there is no "list" of what those "other topics" are. So perhaps the tab should be renamed to something like "Other important factors related to this key decision" or something similar. Also, perhaps some of the materials in multiple tabs could be combined to make the materials simpler and more intuitive. For example, does the "integration" tab contain some of the same information as shown in the "special topics" tab? Perhaps a reconfiguration of the supporting tabs could be considered.

Similarly, organization of information was called out as needing improvement. While the Decision Guide is organized within 44 key decisions, sometimes not all of the information contained within the links on a specific key decision seems to be directly associated with that particular key decision, but perhaps to another key decision elsewhere or to multiple key decisions. To ensure that practitioners understand TCAPP's versatility, the team recommended that TCAPP provide a clearer, more conspicuous statement that consideration should be given to the "integration" tab and, more specifically, the "linkages to other phases" table for useful suggestions found in other modules.

Each of the pilot-test projects contained a strong stakeholder component. Content issues identified include the role definitions and decision-making authority, particularly when being applied by an MPO. One pilot-project team suggested that TCAPP expand on the identified set of roles to explain TCAPP philosophy at the local level as well as the higher federal decision level to better support participation at the local and regional levels. Specifically, the TCAPP definitions of partner and stakeholder were considered problematic by some of the teams. Content was added to the Partner Portal area to provide instruction on how to elevate a stakeholder to a partner and remain consistent with the Decision Guide roles.

Next Steps

Continued pilot tests are planned for both TCAPP and the IEF prior to full-scale implementation. Further improvement and refinement are also planned, in part to respond to comments and suggestions heard during the pilot studies reported on here. SHRP 2 staff and contractors will work closely with AASHTO and FHWA to prepare for implementation of all SHRP 2 Capacity products.

Related SHRP 2 Research

A Framework for Collaborative Decision Making on Additions to Highway Capacity (C01)

Performance Measurement Framework for Highway Capacity Decision Making (C02)

Interactions Between Transportation Capacity, Economic Systems, and Land Use (C03)

An Ecological Approach to Integrating Conservation and Highway Planning (C06)

Linking Community Visioning and Highway Capacity Planning (C08)

Incorporating Greenhouse Gas Emissions into the Collaborative Decision-Making Process (C09)

Effect of Public–Private Partnerships and Nontraditional Procurement Processes on Highway Planning, Environmental Review, and Collaborative Decision Making (C12)

Integrating Freight Considerations into the Highway Capacity Planning Process (C15)

Effect of Smart Growth Policies on Travel Demand (C16)

Expedited Planning and Environmental Review of Highway Projects (C19)

Incorporating Reliability Performance Measures into the Transportation Planning and Programming Processes (L05)