Federal Highway Administration
Surface Transportation Environment and Planning Cooperative Research Program

Success Story: Eco-Logical—An Ecosystem Approach to Developing Infrastructure Projects

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Hot Topic: Eco-Logical—An Ecosystem Approach to Developing Infrastructure Projects

The FHWA's Surface Transportation Environment and Planning Cooperative Research Program (STEP) funds cutting-edge research in several areas of interest to the transportation community and public at large. The FHWA is undertaking various activities and initiatives to conduct research, facilitate partnerships, and develop strategies to facilitate *Eco-Logical: An Ecosystem Approach to Developing Infrastructure Projects*. This edition highlights research underway within the STEP to address this National priority.

www.fhwa.dot.gov/HEP/STEP

Collaborative Partnerships Promote Ecosystem Sustainability in Infrastructure Development and Implementation

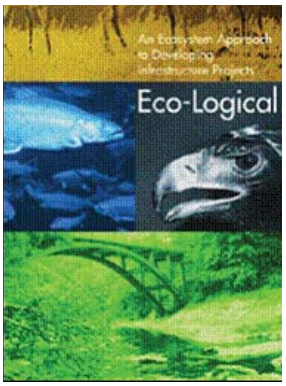
Many transportation, planning, and resource agency practioners recognize that development of infrastructure facilities can negatively impact critical habitat and essential ecosystems. Infrastructure includes the basic facilities needed for the functioning of society, (i.e. roads, highways, bridges, and public amenities such as water/sewer and electricity). Traditional project mitigation often focuses on replacing similar resources as close to the impact site as feasible to meet regulatory requirements. This approach generally satisfies regulatory requirements, but may not be serving the highest ecological needs in a given area.

Several guidance documents issued for resource and transportation agencies—including the United States Department of Transportation's (DOT) FHWA—explain how to work proactively, with the existing regulatory flexibility to develop and implement an ecosystem approach for mitigating the effects of infrastructure projects. FHWA, State DOTs, and resource agencies have had some challenges implementing the ecosystem approach to mitigation.

To help address these challenges, an Interagency Steering Team was established to suggest ways to overcome obstacles. Over a 3-year time period, the Interagency Steering Team including representatives from eight Federal agencies (including FHWA) and four State Departments of Transportation collaborated and developed the document called *Eco-Logical: An Ecosystem Approach to Developing Infrastructure Projects* (http://environment.fhwa.dot.gov/ecological/eco_entry.asp).

This collaborative effort was prompted by a heightened concern that current avoidance, minimization, and mitigation efforts may not always provide the greatest environmental benefit, or may do very little to promote ecosystem sustainability. As America's infrastructure needs continue to grow, so does the need to demonstrate the ability to implement and replicate the recommendations presented in *Eco-Logical*. *Eco-Logical's* framework addresses interagency communication, data gathering and sharing, permitting, and mitigation challenges associated with executing infrastructure planning and construction in an environmentally and time sensitive manner.

The Eco-Logical Vision



Eco-Logical articulates a vision for infrastructure development and ecosystem conservation to harmonize economic, environmental, and social needs and objectives. Together, partners can work to implement an ecosystem approach to infrastructure projects. In doing so, substantive contributions to species, watershed, and ecosystem health and recovery can be made.

Benefits of an ecosystem approach to infrastructure projects include:

- **Safer, improved infrastructure –** All agencies and stakeholders contribute to the delivery of infrastructure. The collective abilities and knowledge shared within an ecosystem approach can allow a more balanced understanding of ecological and social concerns.
- **Improved watershed and ecosystem health –** A systematic approach to the preventive, diagnostic, and prognostic aspects of ecosystem management and to the understanding of relationships between ecological issues and human activities can improve watershed and ecosystem health.
- **Increased connectivity and conservation –** Since an ecosystem approach to infrastructure projects takes a

broad view of interacting human and natural systems, it can help agencies plan and design infrastructure in ways that minimize habitat fragmentation and protect larger scale, multi-resource ecosystems.

- **Cost-effective project development** – Uncertainty during project development imposes a high cost on agencies and partners, in both time and money. An ecosystem approach can foster cost-effective environmental solutions that can be incorporated early in the planning and design of infrastructure projects.

- **Increased transparency** – Infrastructure projects developed with an ecosystem approach provide opportunities and encouragement for public and stakeholder involvement at all key stages of planning and development.

Implementing the Eco-Logical Approach

Eco-logical approach is a valuable tool to use when planning and implementing infrastructures; and when determining appropriate mitigation packages. A number of projects across the Nation have already benefited from using this approach. It helps improve communication between the public and resource agencies as well as preserve and enhance environmentally sensitive habitats. While the *Eco-logical* approach has already been successfully implemented in various parts of the Nation, the development of additional projects would do much to increase the state-of-practice.

In 2007, FHWA's Office of Planning, Environment, and Realty (HEP) used STEP funds for 14 cooperative agreements and one interagency agreement, totaling approximately $1.4 million to test the *Eco-Logical* framework. This large number of applications for these funds and the wide range of issues presented illustrated a dire need for ecologically sensitive planning. Funding recipients included State and local departments of transportation, Federal and State resource agencies, Metropolitan Planning Organizations (MPOs), local governments, Non-Governmental Organizations (NGOs), and one university.

Collaborating with stakeholders is critical in leveraging STEP funds to implement the *Eco-Logical* approach. FHWA continues to work with its partners to promote *Eco-Logical* solutions on a local, State, and National level.

The three research projects developed by the North Central Texas Council of Governments (NCTCOG), North Carolina Department of Environment and Natural Resources (NCDENR), and Envision Utah (an NGO) provide more insight and examples of how *Eco-Logical* can be applied in different locations and situations.

Implementation of a Regional Ecosystem Framework (REF) for the Dallas-Fort Worth Region

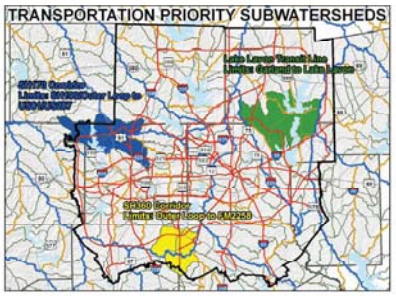
Members of the NCTCOG, the MPO for the 16-county North Central Texas region centered around Dallas and Fort Worth, recognized a need in their region to integrate the environmental analyses produced to meet NEPA requirements at the project level and those produced to develop "long-range transportation plans, Statewide and metropolitan Transportation Improvement Programs, planning-level corridor/subarea/feasibility studies, and the Federal Transit Administration's planning alternatives analyses" (NCTCOG 2007). NCTCOG also wanted to enhance the coordination and consultation with relevant agencies during the transportation planning and implementation processes to develop a transportation plan that integrates environmental conservation planning resources and strategies.

To encourage stronger consideration of environmental impacts and mitigation strategies during the long-range transportation planning process, NCTCOG recognized the need to work collaboratively with State transportation and environmental resource agencies. As a result, NCTCOG is developing a Regional Ecosystem Framework (REF) for the Dallas-Fort Worth region that will:

- Allow agencies to better assess the potential cumulative impacts of proposed infrastructure developments at a subwatershed scale.

- Provide agencies with a joint understanding of the areas most in need of preservation.

- Help agencies identify opportunities for adaptive management and ecosystem enhancements to help agencies reach their conservation goals.



NCTCOG selected three transportation corridors (two highways and one transit) to serve as pilot studies to practice the *Eco-Logical* approach and a REF. The three pilot corridors include: State Highway 170 Outer Loop Interim Corridor, State Highway 360 Southern Extension, and the Lake Lavon Transit Line to determine the cumulative effects at a subwatershed level rather than at the traditional project level.

FHWA STEP funding supports NCTCOG efforts to achieve its final objective: Executive Board approval of the Regional Ecosystem Framework. The MPO also made significant strides in interagency communication by establishing new connections and creating an enhanced dialogue between transportation and resource agencies on transportation and conservation planning.

Conservation of North Carolina Resources While Planning For Improved Infrastructure

The State of North Carolina is currently experiencing unprecedented population growth, with an anticipated 50 percent jump by 2030. This increase will require significant improvements to the State's infrastructure, and if planned poorly, it will fragment critical habitat and endanger sensitive ecosystems. In response, the North Carolina Department of Environment and Natural Resources (NCDENR) *Eco-Logical* approach used STEP funds to form the North Carolina Interagency Leadership Team (ILT) to address data gaps and foster collaboration and outreach. The ILT also enhances and furthers existing work to help conserve natural and cultural resources.

The ILT, formed in 2004, includes five State agencies and five Federal agencies. State agencies are: North Carolina Departments of Transportation (NCDOT), Environmental and Natural Resources, Cultural Resources, Commerce, and the Wildlife Resources Commission. The Federal agencies are: USACE, USFWS, EPA, the National Marine Fisheries Service (NMFS), and FHWA. The ILT established two goals to meet the State's conservation needs:

- Develop a comprehensive shared GIS database.
- Develop local land use patterns and long-range transportation planning.

Through FHWA's STEP funded *Eco-Logical* project, the ILT enhanced its GIS database of natural and cultural resources. The ILT chose Brunswick County as the test area for these principles because of its explosive growth and need for major infrastructure improvement.

To better reach its identified goals, the ILT developed an REF known as the Conservation Planning Tool (CPT). The CPT is an online resource that contains all available information about North Carolina's most ecologically significant resources and integrates the resource information into a GIS dataset. In order to ensure that the CPT is complete and correct, NCDENR has divided the most important tasks into three major work areas: development of habitat maps, integration of the CPT into the transportation planning process, and digitizing cultural resource data.

NCDENR's promotion of the CPT has been quite effective; to date, at least eight planning groups—including MPOs, regional planning organizations, and local governments—have fully adopted the tool and committed to using it in upcoming plans. Through emphasizing voluntary utilization of the CPT, NCDENR is finding that communities and agencies are willing to consider and adopt the tool. Strategic partnerships between FHWA, NCDENR, NCDOT, and the Natural Heritage Program were key to the project's early successes. With these four agencies endorsing the CPT and its integrated approach, NCDENR gained stakeholder buy-in and plans to continue to develop the CPT throughout the life of the STEP effort.

Study and Prioritization of Strategies to Preserve Jordan River Resources in Utah

The Jordan River is 50 miles long and flows from Utah Lake north to the Great Salt Lake wetlands. The river flows through three counties and 15 cities, each of which holds a major stake in the future of the river. Population growth throughout Utah demanded more of the river and depleted much of the natural environment surrounding it, displacing wetlands and native species. This lowland environment is of critical importance in the region and is Utah's single most important type of habitat for birds.

The NGO Envision Utah initiated a "Blueprint" process through FHWA's STEP funded *Eco-Logical* program. This involved developing a media campaign to educate the broader community about river issues, leading committee meetings, running workshops, conducting technical analysis and drafting a Blueprint report. Envision Utah assembled a steering committee made up of government and community leaders from all the cities and counties affected by changes to the river to make sure that all of the critical stakeholders were represented in the Blueprint process. Envision Utah also formed a Technical Advisory Committee to ensure that its recommendations were feasible.

Between May and June 2008, Envision Utah conducted workshops, focus groups, and an online survey to understand the public's preferences for the future of the river corridor. Overall, participants indicated that natural habitat, wildlife habitat, river health, and environmental protection along the corridor were the most important subjects. Participants also shared an interest in recreational opportunities and river-sensitive development in blighted areas that would attract people to the river and create a constituency for its revival.

The Blueprint Jordan River developed a strong action plan aimed at rehabilitating a river that has great potential to improve the lives of those who live around it. The plan established goals and a vision shared by all stakeholders. The project allowed Envision Utah to determine what the region could be like if changes were made with conservation in mind. In the fall of 2008, an implementation committee explored methods to put the Blueprint into action. The committee balanced environmental, recreational, and development interests to identify feasible projects along the river in short and long terms.

Since completion of the *Eco-Logical* project, Envision Utah assembled an implementation committee made up of representatives from the Utah Department of Transportation, the FHWA Utah Division Office, elected officials, and representatives of other local interests. This group plans to create a governance structure that will include a legal mechanism to allow these entities to work together and a funding mechanism to realize the public vision.

By implementing its plan, Envision Utah hopes to protect many acres of natural resources and make miles of recreational resources available to local users.

The Future of Ecosystems and Infrastructure

Through the *Eco-logical* process, agencies and their partners can improve interagency collaboration, enrich public involvement, and consider ecosystem-based mitigation possibilities in advance of individual infrastructure projects. By working to ensure that acknowledged priorities are maximized, tax dollars are effectively spent, public safety is improved, and infrastructure development is streamlined.

The first cycle of the FHWA's STEP *Eco-Logical* Grant Program has proved to be mutually beneficial to the grant recipients and FHWA in conserving natural resources. For FHWA, the grant program has brought new visibility to the Agency's environmental role and helped the Agency meet legal precedents set in legislation. The benefits experienced by both groups can be measured through a series of factors that will surely contribute to future environmental benefit.

The ultimate goal of the FHWA's STEP *Eco-Logical* Grant Program is to demonstrate that protecting and enhancing the natural environment while performing necessary infrastructure expansion and improvement projects is possible. The environmental benefits of the *Eco-Logical* approach have already been demonstrated. The grants have been effective in implementing and spreading the word about the *Eco-Logical* approach. Future funding efforts will be focused on transferring the implementation knowledge and advancing the approach into a regular standard-of-practice.

For additional information on FHWA's *Eco-Logical* research initiatives, please visit:
http://environment.fhwa.dot.gov/ecological/eco_entry.asp

"STEP: A Federal Research Program – Conducting Research That Links to Practice"
www.fhwa.dot.gov/hep/step

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