



Eco-Logical in Practice

Implementing an Ecosystem-Based Approach, Streamlining Environmental Processes for Transportation Projects

JULIANNE SCHWARZER AND HALEY PECKETT

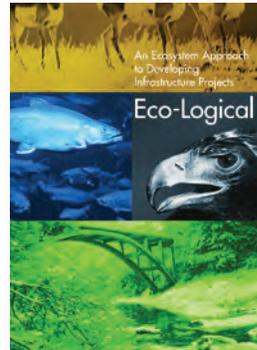
The authors are with the U.S. Department of Transportation's Volpe National Transportation Systems Center, Cambridge, Massachusetts. Schwarzer is Environmental Protection Specialist, and Peckett is Community Planner.

Developing and maintaining transportation infrastructure can have a negative impact on ecological resources. State departments of transportation (DOTs) historically have employed a variety of techniques to avoid, minimize, and mitigate these impacts on a project-by-project basis. The techniques may have satisfied regulatory requirements but did not always provide the greatest environmental benefits.

At the same time, the environmental review and permitting processes often raised issues that were perceived as major causes of project delay. Concern for ecosystem protection, along with legislative and policy initiatives to foster an ecosystem-based approach while streamlining environmental processes, led an interagency steering team to collaborate to write *Eco-Logical: An Ecosystem Approach to Developing Infrastructure Projects*.¹

The interagency team shared a vision that collaborative infrastructure development and delivery

¹www.environment.fhwa.dot.gov/ecological/ecological.pdf.



Eco-Logical: An Ecosystem Approach to Developing Infrastructure Projects was developed to facilitate collaboration between agencies in the environmental review process.

processes that are more sensitive to ecological resources could reduce the time frames for environmental review and permitting. Eco-Logical encourages all partners involved in infrastructure planning, design, review, and construction to use the flexibility in regulatory processes to achieve this vision. The Eco-Logical publication puts forth a framework for integrating plans across agency and political boundaries and endorses ecosystem-based mitigation—an innovative method of addressing infrastructure impacts.

Several current initiatives are institutionalizing or adapting the Eco-Logical approach, as states and regions seek technical assistance to streamline the transportation process and to achieve better environmental outcomes. The evolution of

the Eco-Logical approach and examples of its early successes provide background and insights.

How It Began

In the late 1990s, Montana DOT and the Montana Division Office of the Federal Highway Administration (FHWA), along with resource and regulatory agency partners, anticipated an increase in development throughout the state and were concerned about the vanishing opportunities to conserve natural resources.

Like many other states at that time, Montana primarily performed environmental mitigation for transportation projects on an individual project basis, generally at the permitting stage. This approach did not always yield the greatest environmental benefit and did not promote long-term ecosystem sustainability. To address these issues, agencies in Montana formed a partnership known as the Integrated Transportation and Ecological Enhancements for Montana (ITEEM), which sought to develop an ecosystem-scale approach to infrastructure development.

In 2002, in response to the work in Montana and to the release of Executive Order 13274, Environmental Stewardship and Transportation Infrastruc-

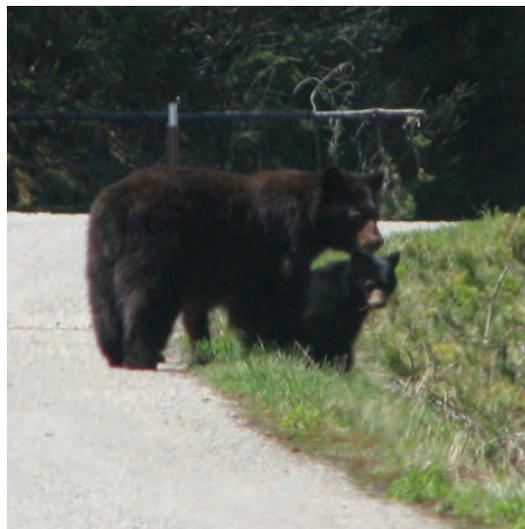


PHOTO: WASHINGTON STATE DOT

A bear and her cubs cross North Cascades Highway in Washington State. In 2002, an interagency team comprising state and federal representatives created a framework for infrastructure development that is sensitive to animal and other habitats.

ture Project Reviews,² an interagency steering team from eight federal agencies and several state DOTs convened to create a framework for ecosystem-scale infrastructure development.³ The group sought “an enhanced and sustainable natural environment,” and maintained that “necessary infrastructure can be developed in ways that are more sensitive to terrestrial and aquatic habitats.”⁴

The team also believed that the transportation project development and delivery processes could be streamlined, saving time and resources. As a result, the team developed an approach that promoted early coordination to establish environmental commitments and to apply the flexibilities allowed under the regulations.

In April 2006, leadership from the federal steering team agencies signed the resulting document,

²<http://ceq.hss.doe.gov/nepa/regs/eos/eo13274.pdf>.

³The team consisted of representatives from the U.S. Army Corps of Engineers, the Bureau of Land Management, the Environmental Protection Agency, FHWA, the Fish and Wildlife Service, the Forest Service, the National Oceanic and Atmospheric Administration, the National Park Service, Volpe National Transportation Systems Center, Knik Arm Bridge and Toll Authority, North Carolina DOT, Vermont Agency of Transportation, and Washington State DOT.

⁴From *Eco-Logical: An Ecosystem Approach to Developing Infrastructure Projects*, 2006.

Success in Montana

ITEEM yielded new and important positive relationships among agencies in Montana. Participants have contacted each other to discuss environmental issues and mitigation opportunities for ITEEM and non-ITEEM projects. These personal relationships have helped to erase historical biases or misconceptions that some agency staff held about other agencies.

Staff in participating ITEEM agencies have begun to appreciate each other’s missions and core responsibilities. According to one participant, “ITEEM helped build more trust and credibility; it erased misconceptions.” Another participant noted, “Relationships are built between people, not between agencies. ITEEM opened our eyes to what was possible and took away assumptions about agencies.” Some participants anticipated the relationships would make future interagency collaboration “more effective and efficient.”^a

^awww.environment.fhwa.dot.gov/ecological/ITEEM/study.asp.

Mitigation projects along the Jordan River in Utah were based on Eco-Logical.

PHOTO: CORY MAXLETT



Eco-Logical: An Ecosystem Approach to Developing Infrastructure Projects. The recognition by agency leaders signified a joint commitment to promote and support Eco-Logical.

What Is Eco-Logical?

The Eco-Logical approach calls for early collaboration among transportation, resource, and regulatory agencies to establish joint environmental priorities and identify critical resources. After establishing priorities, federal, state, tribal, and local partners can work to sustain or restore ecological resources on an ecosystem scale in developing infrastructure projects, using the flexibility within regulatory processes.

To help agencies tap this flexibility, Eco-Logical sets forth a framework for integrating plans and data across agency and political boundaries and for iden-

tifying a region's ecological priorities. The framework proposes that infrastructure and resource agencies collaborate before transportation planning to incorporate data at the ecosystem scale, identify critical ecological resources, and establish joint environmental priorities.

Transportation agencies then can use jointly established priorities in planning and decision making to avoid negative environmental impacts and to undertake mitigation when impacts are unavoidable. During the transportation design and permitting phases, early decisions and commitments should ensure faster permitting times and better environmental outcomes.

Signatory Agency Programs

Since 2006, representatives from each of the federal steering team, or signatory, agencies have held meetings to identify opportunities to support each other, as well as state and local entities, in implementing the Eco-Logical approach.

In 2011, the signatory agencies undertook an effort to identify the programs within each agency that closely related to Eco-Logical. Each agency noted that although its leadership supported the concept of Eco-Logical, in many cases the approach had been modified to meet agency needs. Each agency was able to identify at least one program that shared the same founding principles as Eco-Logical.

The initial outcome of this effort was a document titled *Eco-Logical Successes*.⁵ After its publication, the signatory agencies decided to assemble more in-depth descriptions of key agency programs, including on-the-ground applications. Since 2011, FHWA, in collaboration with the signatory agencies, has developed three additional volumes of *Eco-Logical Successes*, all available on the FHWA Eco-Logical website.⁶

Eco-Logical Grants and Resources

The FHWA Office of Planning, Environment, and Realty established the Eco-Logical grant program in 2007, providing approximately \$1.4 million to 15 projects selected to test an ecosystem-scale approach to infrastructure development.⁷ Project activities included transportation and environmental planning, data collection and analysis, environmental mitigation, public education, and prioritization of natural and cultural resources.

⁵www.environment.fhwa.dot.gov/ecological/successes/index.asp.

⁶www.environment.fhwa.dot.gov/ecological/eco_entry.asp.

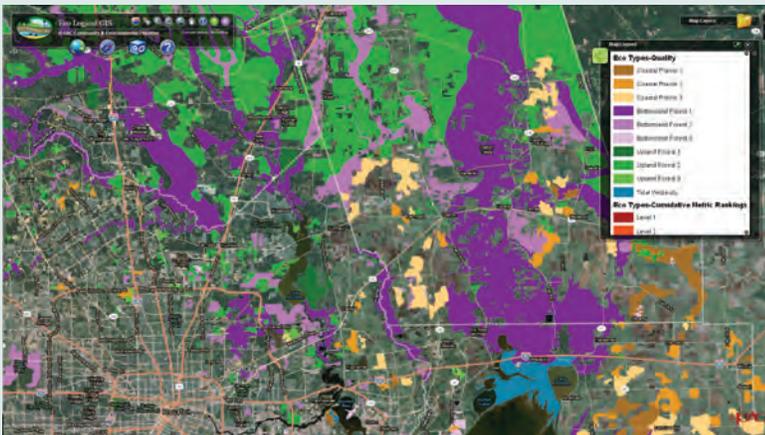
⁷The grant program was funded by the Surface Transportation Environment and Planning Cooperative Research Program, FHWA Office of Planning, Environment, and Realty.

Applying Eco-Logical

Through an FHWA Eco-Logical grant project, the Houston–Galveston Area Council (H-GAC) created a geographic information system (GIS) tool to identify areas for environmental resource priority. H-GAC is a regionwide voluntary association of local governments in the 13-county Gulf Coast Planning region of Texas.

Since the completion of the tool, which comprises more than 12,000 mapped features covering six ecotypes, staffers have been drafting recommendations for inclusion in the 2040 Regional Transportation Plan. The recommendations are developed in coordination with the Transportation Policy Council, which provides policy guidance and coordination of transportation planning within the region.

The Conservation Fund, a not-for-profit organization active in land conservation across United States, is applying a similar methodology to expand the tool's functions in five counties outside of H-GAC's regional boundaries. Local and regional foundations are funding the project. H-GAC plans to integrate the Conservation Fund's work into the online tool, including a methodology that will show the monetary benefits of ecological services.



Environmental resource priority areas can be identified with the Houston–Galveston GIS tool.



A 2012 U.S. Army Corps of Engineers (USACE) Nashville District project diverted water from entering Greenbelt Lake to remove sediment. USACE's Aquatic Ecosystem Restoration Program uses Eco-Logical.

Since 2007, FHWA has tracked the progress of the grants, developed annual reports summarizing findings, and provided recommendations.⁸ This year, FHWA worked with the grant recipients to identify the key requirements to achieve success in implementing Eco-Logical. The grant recipients agreed that the following four characteristics were most important:

- ◆ Access to tools to advance Eco-Logical,
- ◆ Adaptable organizational structure and flexible staff capacity,
- ◆ Strong interagency partnerships, and
- ◆ Technical and financial support for Eco-Logical projects.

To provide additional resources for stakeholders implementing Eco-Logical, FHWA initiated several additional communications, outreach, and research projects. Past projects have included research on the origins of the Eco-Logical approach in Montana and a peer exchange for the early implementers.

Other ongoing activities that demonstrate FHWA's commitment to assisting its stakeholders in putting

⁸Eco-Logical grant program annual reports are available at www.environment.fhwa.dot.gov/ecological/eco_grant_program.asp.

Eco-Logical into practice include producing a monthly webinar series, developing and implementing a training strategy, and creating a benefit assessment framework to assist FHWA in determining the economic benefit of applying the Eco-Logical approach.

Eco-Logical and SHRP 2

The Transportation Research Board's second Strategic Highway Research Program (SHRP 2)⁹ has included two projects to develop the institutional and technical processes needed to put the Eco-Logical approach into practice. The projects address a charge from Congress to develop methods that systematically integrate environmental requirements into the planning and design of new highway capacity.

The SHRP 2 efforts produced a nine-step integrated Eco-Logical framework, along with the supporting scientific and technical processes and tools. The tools and processes are being introduced to the transportation and environmental communities as

⁹SHRP 2 was authorized by Congress to address some of the most pressing needs related to the nation's highway system. The Transportation Research Board administers the program under a memorandum of understanding with FHWA and the American Association of State Highway and Transportation Officials. For more information, visit www.trb.org/StrategicHighwayResearchProgram2SHRP2/Blank2.aspx.



The Rivanna Trail in Charlottesville, Virginia. Existing and planned trails are among the cornerstones of the Thomas Jefferson Planning District Commission's green infrastructure plan.

Eco-Logical in Action

Through an FHWA Eco-Logical grant project, the Thomas Jefferson Planning District Commission (TJPDC) in Charlottesville, Virginia, developed a green infrastructure plan for the central Virginia metropolitan planning organization and local governments. The TJPDC staff finalized a set of GIS maps ranking mitigation sites around the region on a detailed scale appropriate for project-level planning. Staff also created a "least environmental cost analysis" framework for developing alternatives in construction projects. The input assisted in prioritizing transportation projects on the basis of potential environmental impacts during the long-range transportation planning process.

TJPDC has integrated the methodologies and maps from its Eco-Logical product into the region's long-range transportation plan, which is expected to be adopted in 2014. TJPDC continues to promote its Eco-Logical project among stakeholders, such as the Virginia Departments of Environmental Quality, Forestry, and Transportation, and hopes to work with these agencies to use an ecosystem-scale approach in selecting mitigation sites.

Implementing Eco-Logical and will become a part of the ongoing activities, initiatives, and research associated with FHWA's ongoing Eco-Logical program.

In September 2012, FHWA and the American Association of State Highway and Transportation Officials (AASHTO) met with a panel of stakeholders and experts and developed a plan to implement the Eco-Logical approach and the new SHRP 2 research through an implementation planning workshop. The final version of the implementation plan recommends six strategies to promote the adoption of the Eco-Logical approach as part of routine business practices at state DOTs, metropolitan planning organizations, and federal and state resource and regulatory agencies:

- ◆ Educate agency leadership about the value and benefits of the ecosystem-scale approach;
- ◆ Develop incentives or support for state and regional transportation agencies to adopt the Eco-Logical approach;
- ◆ Provide technical assistance and peer learning opportunities to educate staff-level practitioners

about Eco-Logical;

- ◆ Develop a business case highlighting the time and cost savings associated with Implementing Eco-Logical;
- ◆ Develop new tools and technologies that increase or enhance access to available data and support interagency collaboration; and
- ◆ Develop communications and outreach materials to increase awareness about Implementing Eco-Logical and to facilitate information sharing among potential users.

These strategies form the basis for the implementation activities to be overseen and managed by FHWA and AASHTO. As a first step, FHWA and AASHTO initiated a selection process for funding through the first round of the SHRP 2 Implementation Assistance Program. In May 2013, FHWA offered six lead adopter incentives of \$200,000 to \$250,000, for applicants already working to adopt Eco-Logical principles, and seven user incentives of approximately \$25,000 each, for applicants to begin adopting Eco-Logical or to address a challenge in adopting the approach.

After selecting the projects to be funded through the Implementation Assistance Program, FHWA and AASHTO began to pursue the other actions in the plan. FHWA will fold the implementation procedures into the Eco-Logical program as one of a suite of tools and efforts to ensure the nationwide adoption of the approach.

National Initiatives

The Eco-Logical approach has gained traction through major national policy and agency initiatives, including the Moving Ahead for Progress in the 21st Century Act (MAP-21) and Executive Order 13604: Improving Performance of Federal Permitting and Review of Infrastructure Projects. The inclusion of Eco-Logical in these initiatives is critical to mainstreaming the approach nationwide.

MAP-21

President Barack Obama signed MAP-21 into law on July 6, 2012. Many sections of the bill aim to streamline elements of the surface transportation program consistent with the Eco-Logical approach. By applying Eco-Logical, agencies will establish joint conservation priorities and mitigation opportunities well before project development, streamlining the environmental review and permitting processes.

MAP-21 emphasizes early interagency coordination and collaboration in the planning and environmental processes. Developing agency agreements for early coordination, as outlined in Section 1320, will

provide a framework for partner agencies to set joint priorities and understandings for the expedient delivery of transportation and mitigation projects. The emphasis in MAP-21 on integrating information developed in planning into the environmental review process will ensure that these joint priorities are reflected in transportation project decisions.

Eco-Logical supported the concept of “out of kind mitigation” or “mitigation–conservation banking,” so that impacts to a wetland, stream, or habitat can be mitigated through the creation, restoration, or enhancement of similar wetlands, streams, or habitat within the same ecosystem. MAP-21 reemphasizes a preference for this type of mitigation, as established under the 2008 Mitigation Rule. MAP-21 also encourages programmatic mitigation plans; when agencies establish these plans at an ecosystem or watershed scale, they achieve the Eco-Logical principles of early coordination and out-of-kind mitigation.

In the past, Eco-Logical was presented as a best practice that acted on flexibilities within regulations. The formal establishment of this approach through MAP-21 provides additional leverage and opportunities for state, regional, and local governments to adopt Eco-Logical.

Executive Order 13604

Issued on March 22, 2012, Executive Order 13604 stated that federal permitting and review processes must be transparent, consistent, and predictable. The order aimed to hold agencies to performance goals by measuring the timelines for permitting and emphasized the use of cost-effective review methods. The executive order advocated early interagency collaboration, early consultation, and establishing shared agency priorities—concepts closely aligned with Eco-Logical.

To ensure implementation of Executive Order 13604, federal agencies were required to develop a federal plan and agency plans that committed to specific actions to improve the infrastructure permitting and review process. Recognizing the similarities between the executive order and the Eco-Logical approach, FHWA and the other signatory agency partners sought to incorporate Eco-Logical into the federal plan and the agency plans. As a result, the federal plan directly references Eco-Logical, and the U.S. DOT plan includes many FHWA initiatives related to Eco-Logical, including Every Day Counts, an initiative to expedite project delivery.

Next Steps

Eco-Logical began as a concept developed by a state, was cultivated at the federal level, and is now being

PHOTO: WASHINGTON STATE DOT



packaged and delivered to all states, with financial incentives and technical support. The Eco-Logical approach stretches beyond a best practice and proposes a new way of doing business that will streamline the transportation process and improve environmental outcomes.

As the Eco-Logical approach matures, FHWA and its partners are working to provide support for states and regions that have adopted or are interested in adopting Eco-Logical. These opportunities are available through the implementation of SHRP 2 and through the FHWA Office of Planning, Environment, and Realty. For more information, visit FHWA's Eco-Logical website, www.environment.fhwa.dot.gov/ecological/eco_entry.asp/.

Children install native plants as part of a Washington State DOT mitigation banking project in Renton.