Ecosystem Services in Transportation: FHWA Resources

Restore America’s Estuaries Summit 2016

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(Standing in for Marcel Tchaou)
Federal Highway Administration (FHWA)
• Eco-Logical Approach – 10 year Re-affirmation
• Watershed banking research
• SELDM – water quality model
• INVEST – Sustainability self-assessment tool for highways
• Green infrastructure and climate resilience
ECO-LOGICAL

- **Eco-Logical Is**: A landscape scale approach for planning and developing infrastructure.

- **The Eco-Logical Approach:**
  - Draws on collaboration
  - Creates a Regional Ecosystem Framework
  - Establishes and prioritizes ecological actions
The Regional Ecosystem Framework: VEIL Composite score represents the combined score of all 10 VEIL layers. A higher score indicates that resources of relatively high concern may be present and that additional review, documentation, and consultation with the applicable agency may be needed. Subwatersheds outlined in red are designated as areas that should be a 'Priority to Enhance' in terms of ecosystem value, green infrastructure, or water considerations. These designations are intended to help prioritize regional conservation and mitigation. This information has been developed for the Dallas-Fort Worth MPA for use in long-range planning. For more information on the calculations for this layer, please visit www.nctcog.org/REF.
2016: 8 Federal Agencies reaffirmed commitment

Benefits:

• Improved data sharing and interagency coordination
• Programmatic agreements on advance mitigation
• Time savings through accelerated project delivery
• Improved water quality and wildlife movement
• Improved agency relationships
• Reduces redundancy and increases efficiency, transparency, predictability of the infrastructure delivery process.

More than 35 transportation agencies are using Eco-Logical approach to guide transportation plans or projects
ECO-LOGICAL EXAMPLE
Feasibility Study For A Framework For An Effective Stormwater Quality Credit/Banking/Trading System

• Provided a synthesis of water quality crediting program components

• Assessed the state of the practice for stormwater quality banking and credit systems currently being used at national, state, and local levels

• Provided practical recommendations for DOTs on use and implementation of water quality crediting to meet regulatory requirements for stormwater quality
DOT Project Based Drivers

Traditional compliance mechanisms of source control and BMP treatment are not adequate to meet permit compliance in all instances.

- Transportation right-of-way space constraints and utility conflicts limits choices and increase cost
- Water treatment infrastructure in ROW can be difficult to access, maintain, and fund and staff maintenance over decades
- The cost-effectiveness for treatment objectives could be greater for BMP implementation elsewhere within the watershed or defined trading area.
- Stakeholders identified that increased environmental benefit could be achieved for BMP implementation elsewhere within the watershed or defined trading area.
- Potential decrease in project-based staff workloads and maintenance costs
Summary of Trading Approaches for DOTs
Three primary stormwater trading approaches for DOTs to obtain permit compliance:

1. Annual funding of an In-Lieu-Fee type program or Alternative Compliance Approach (e.g., Caltrans and CDOT)

2. Sole Source Offsets with Banking and Fee-In-Lieu (e.g., DelDOT)

3. Third-party water quality trading programs established by state regulatory agency (e.g., VDOT)
**Stochastic**—Uses Monte Carlo methods

**Empirical**—Based on data and statistics rather than pure theory

**Loading**—Provides storm and annual loads

**Dilution**—Mixing of upstream and highway indicates chance of exceeding a target value
• Mass Balance Approach
INVEST – SUSTAINABILITY TOOL

- Web-based self-assessment tool
- Helps agencies assess and improve sustainability of transportation (economic, social, environmental outcomes)
- Voluntary
- Free, easy to use
- Practical
- 3 modules: systems planning, project development, operations & maintenance
PD-7: Habitat Restoration

**Goal:** Avoid, minimize, and compensate the loss and alteration of natural (stream and terrestrial) habitat caused by project construction and/or restore, preserve, and protect natural habitat beyond regulatory requirements.

**Scoring:**
- 1 pt. Minimize impacts.
- 2 pts. Avoid impacts.
- 3 pts. Enhance Features:
  1. restore and/or preserve an upland buffer surrounding stream/wetland
  2. mitigate for habitat of non-listed species under Endangered Species Act

**Example:**
- Halstead Meadow Bridge, Sequoia and Kings Canyon National Parks: Replacing roadway fill with a new bridge restored the ecology of the surrounding meadow by allowing natural water flow to resume. Also scored well on criterion PD-9 Ecological Connectivity
PD-8 Stormwater Quality

Goal: Improve stormwater quality from the impacts of the project and control flow to minimize their erosive effects on receiving water bodies and related water resources, using management methods and practices that reduce the impacts associated with development and redevelopment.

Scoring:
1-3 pts. Water quality treatment
1-3 pts. Flow Control

Example: George V. Voinovich Bridge, Cleveland, OH
- Treats >90% of runoff volume
- Separates stormwater from combined sewer areas
- Manages up to 25 yr flow
• Must protect public safety, federal infrastructure investment, and economy
• FHWA Order 5520 commits agency to integrating climate change adaptation into programs and policies.
• Climate risk now included in FHWA requirements for asset management, transportation planning, and emergency relief.

http://www.fhwa.dot.gov/environment/climate_change/adaptation/
FHWA & CLIMATE RESILIENCE

Research
- Gulf Coast 2 Study
- Vulnerability Pilots
- Hurricane Sandy Project
- Engineering Assessments Study
- Green Infrastructure Pilots

Resources
- Vulnerability Assessment Framework
- Guidance (HEC-25 & 17)
- Synthesis Document
- Green Infrastructure Techniques for Coastal Highway Resilience
- Project Development Approaches for Climate and Extreme Weather Resilience (2016)
Nature-based solutions can help protect coastal highways from storm surge and sea level rise.

Examples: dunes, wetlands, living shorelines, oyster reefs, beaches

5 pilot projects underway
- MS DOT
- DE DOT
- OR DOT
- ME and NH DOT jointly,
- USACE in NJ

Implementation guide and peer exchanges
Oregon DOT Pilot Project

The Oregon DOT will look at the ability of cobble beaches and berms to project erosion hot spots located along highway US 101 in Lincoln County, Oregon.

Photos: Examples of natural cobble beaches along the central Oregon coast.
MEDOT and NHDOT are jointly studying current and future impacts of sea level rise and storm surge on vulnerable assets in their respective states (Route 209 in Maine and Route 1B in New Hampshire). Possible nature-based alternatives include gabions with shells, living shorelines, enhanced fringe marshes, and others.
THANK YOU!

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www.fhwa.dot.gov/environment/climate_change

https://www.environment.fhwa.dot.gov/ecosystems/wet_storm.asp