Integrating Natural Resource, Transportation, and Land Use Plans

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Volpe The National Transportation Systems Center
Advancing transportation innovation for the public good
FHWA Research Program for Environment and Planning

Under SAFETEA-LU, the Surface Transportation Environment and Planning Cooperative Research Program (STEP) sought to:

- Improve understanding of the complex relationship between surface transportation, planning and the environment.
- Refine the scope of transportation research through outreach and in consultation with stakeholders.
- Develop more accurate models for evaluating transportation control measures and system designs for use by State and local governments.
- Improve the understanding of transportation demand factors.
- Develop indicators of economic, social, and environmental performance of transportation systems to facilitate alternatives analysis.

http://www.fhwa.dot.gov/hep/step/
Under MAP-21, FHWA will:

- Develop a Performance Management approach to transportation investments.
- Minimize the costs of transportation planning and environmental decisionmaking processes, highway infrastructure, and operations.
- Improve transportation planning and environmental decisionmaking coordination and processes.
- Minimize and reduce the potential impact of highway infrastructure, operations, and surface transportation on the environment.
- Improve construction techniques and their related emissions.
- Reduce the impact of highway runoff on the environment.
- Improving the modeling of factors that contribute to the demand for transportation.

Transportation ↔ Environment

Improve transportation planning and environmental decision making coordination and processes.

• What steps do you need to develop a comprehensive conservation strategy?

• How can agencies work together to create and share data for transportation and conservation planning?
Integrated Eco-Logical Framework (IEF)

- Process to guide transportation and resource specialists in the integration of transportation and ecological decisionmaking

- Helps identify potential impacts to environmental resources very early in the planning process
9 Steps of the IEF

Previous webinar focused on Step 1:
9 Steps of the IEF

Previous webinar focused on Step 1: **Build and Strengthen Collaborative Partnerships and Vision**
9 Steps of the IEF

Step 2:

*Characterize Resource Status and Integrate Natural Environment Plans*
IEF Step 2 aims to:

*Develop an overall conservation strategy that integrates restoration and conservation priorities, data, and plans*
1. **Identify** the spatial data needed to create an understanding of current (baseline) conditions that are a by-product of past actions and to understand potential effects from future actions.

2. **Prioritize** the specific list of ecological resources and issues that should be further addressed in the REF or other assessment and planning.
3. Develop the necessary **agreements** with agencies and NGOs to provide plans and data that agencies use in their own decision-making processes. Agreements should allow data to be used to avoid, minimize, and advance mitigation, especially for CWA Section 404 and ESA Section 7.

4. Identify **data gaps** and how they will be addressed in the combined conservation/restoration plan. Reach consensus on an efficient process for filling any remaining gaps.
5. Produce **geospatial overlays** of data, plans and supporting priorities, to guide the development of an overall conservation strategy for the planning region that identifies conservation priorities and opportunities, and evaluates stressors and opportunities for mitigation and restoration.

6. Convene a team of stakeholders to **review** the geospatial overlay and associated goals/priorities, and identify actions to support them.
7. **Record** methods, concurrence and rationales of this step based on stakeholder input (e.g., how the identified areas address the conservation/preservation, or restoration needs and goals identified for the area).

8. **Distribute** the combined map of conservation and restoration priorities to stakeholders for review and adoption.
Outcomes of IEF Step 2

Answer these questions:

• What is the current situation?
• How do we understand the current situation?
• What is important?
• Do we have all the information we need?
• How do we get the information we need?
Outcomes of IEF Step 2

What do we get?

- Holistic view of significant ecological resources
- Agreements on the data used and the processes developed to produce information
  - Address any data gaps
- A common picture of what the priorities are
Challenges

Technology  People
How do we do this?

• Technology
  – Collection – Remote sensing, LiDAR, GPS
  – Storage – IT/Server technology
  – Analyze – IT Hardware
  – Presentation – IT Hardware & Software, Web/Internet-based software
How do we do this?

- Technology
  - Geographic Information Systems

  - Cloud-based/Internet
  - Client-Server/Internet
  - Client-Server/Local Network
  - Desktop

Accessibility
How do we do this?

- People
  - Change the way we do things
  - Right people at the table

Agreements, MOUs, Documented Processes

More difficult?
How do we do this?

• People:

The nine steps in the IEF are depicted below. Roll-over each step to discover the purpose. Click on a step to access detailed information about implementation, including: anticipated outcomes; sub-steps; technical guidance; and supporting tools, decision-making questions, data and case studies.

**INTEGRATED ECOLOGICAL FRAMEWORK**

1. Build and Strengthen Collaborative Partnerships and Vision
2. Characterize Resource Status and Integrate Natural Environment Plans
3. Create Regional Ecosystem Framework (Conservation Strategy + Transportation Plan)
4. Assess Effects on Conservation Objectives
5. Establish and Prioritize Ecological Actions
6. Develop Crediting Strategy
7. Develop Programmatic Consultation, Biological Opinion or Permit
8. Implement Agreements, Adaptive Management and Deliver Projects
9. Update Regional Ecosystem Framework and Plan

If you like the IEF, you might also like:

- Eco-Logical: An Ecosystem Approach to Developing Infrastructure Projects drafted and signed by eight federal agencies in 2006, put forth a conceptual groundwork for integrating transportation and conservation plans and endorsed ecosystem-based mitigation.
Connecting Transportation and the Environment

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Department of Transportation
State Planning Office
The Nature Conservancy
US Fish and Wildlife Service
Maine Coast Heritage Trust
Small Woodlot Owners Association of ME

Funded by Environmental Protection Agency, Maine Outdoor Heritage Fund, Wildlife Restoration Funds, Maine Department of Conservation, Maine Loon Plate Fund, Betterment Foundation, Maine Community Foundation
What is Beginning with Habitat (BwH)?

BwH is...
A landscape based approach to achieve meaningful conservation of all native species on a developing landscape.

Purpose:
To provide the most up-to-date wildlife and plant habitat information available for use in Comprehensive, Open Space and Conservation Planning.
A Framework for Integrated Planning

1. **Build and Strengthen Collaborative Partnerships**
2. **Identify Management Plans**
3. **Integrate Plans**
4. **Assess Effects**
5. **Establish and Prioritize Opportunities**
6. **Document Agreements**
7. **Design Projects Consistent with Regional Ecosystem Framework**
8. **Balance Predictability and Adaptive Management**
The vision is to create a landscape with a series of large, open-space blocks, connected by corridors linking Shoreland Zones and Important Habitats, that then function as a continuous landscape for wildlife.”

Krohn & Hepinstall 2000 (Habitat-based approach for identifying open space conservation needs)
1. **Build and Strengthen Collaborative Partnerships**

6. **Document Agreements**

Table of Contents

- Introduction  
- Underlying Principles  
- Overview – 5 Year Work Plan Goals  
- Steering Committee Structure  
- Sub-committee Structure  
- New Initiatives Protocol
2. **Identify Management Plans**
3. **Integrate Plans**
4. **Assess Effects**
5. **Establish and Prioritize Opportunities**
Assessing Vulnerabilities

Climate Change Species Vulnerability Assessment

Criteria for Assessing Species

- Habitat specificity
- Edge of Range
- Environmental or Physiological Tolerance: (temperature, hydrology)
- Interspecific Dependencies (e.g., predator/prey)
- Mobility & Dispersal
- Pathogens or Invasive Species

4. **Assess Effects**
5. **Establish and Prioritize Opportunities**
Prioritizing Opportunities

4. **Assess Effects**
5. **Establish and Prioritize Opportunities**

**Focal Species**
- Forest Generalist
- Wide Ranging
- Road Kill a major mortality factor
- Early Successional
- Wide Ranging
- State Endangered
- Vulnerable to Road mortality
- Wetlands and terrestrial
  - Wide ranging
  - Highly sensitive to road mortality
- Wetlands - Open Habitats
  - Wide ranging (disperse > 2km)
  - High levels of road mortality
- Riparian
  - Wide Ranging
  - Some Road Avoidance Behavior
- Wetlands and forest
  - Edge sensitive
  - Disperse over 1000 m
- Wide ranging
  - Generalist
  - Road Avoidance Behavior
- Early Successional
  - State Endangered
  - Candidate for Federal listing
- Riparian and terrestrial
  - Wide ranging
  - Highly sensitive to road mortality
- Wetlands and forest
  - Wide ranging
  - Disperse over 800 m
  - Vulnerable to road mortality

*Priority habitat connector between undeveloped blocks*
4. **Assess Effects**
5. **Establish and Prioritize Opportunities**

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**Establishing Priorities**

**Focus Areas of Statewide Ecological Significance**

**Mt. Agamenticus**

**WHY IS THIS AREA SIGNIFICANT?**

The Mt. Agamenticus Focus Area comprises and is one of the largest remaining expanses of undeveloped forests in coastal New England. The uplands and wetlands around Mt. Agamenticus are inhabited by 12 animal species and 21 plant species that are considered rare in Maine. Many of these rare species are at the northern limit of their distribution range and are more abundant south of the Maine border. Similarly, some natural communities that occur in the Focus Area are restricted primarily to southern New England. The forest that extends northward from Mt. Agamenticus features Maine’s only chestnut-oak woodland.
Establishing Priorities

4. Assess Effects
5. Establish and Prioritize Opportunities

Aquatic Resource Management Strategy (ARMS)
An Approach to Conserving & Restoring Maine’s Aquatic Habitats

- Statewide consistent approach to aquatic conservation and restoration
- Contribute to recovery of ESA-listed fish, particularly anadromous Atlantic salmon, by increasing quantity and quality of freshwater habitat.
- Contribute to conservation and recovery of stream-associated species native to Maine
- Unified data repository
- Easily accessible guidance aimed at resolving existing barriers to aquatic movements
- Coordination of state-wide conservation and restoration priorities with MaineDOT’s biennial work plan
- Improvements to state and federal regulations to further ARMS objectives
Acting on Priorities
Impact of Roads and Traffic

Habitat Loss → Traffic Mortality → Reduced Animal Movement → Road/Traffic Avoidance

Traffic Mortality → Population Fragmentation

Population Fragmentation → Reduced Population Size

Reduced Population Size → Reduced Population Persistence

(Adapted from Jaeger et al. 2005)
Roads As Barriers -- Direct Mortality
Roads As Barriers -- Direct Mortality
The Policy and Design Guide

► Credibility
► Predictability
Exhibit 3.16 – Significant Habitat

- Study Area
- County Boundary
- Town Boundary
- Parcel Boundary
- Highway
- Roads
- Railroad
- Utility Line
- Streams
- Deer-Wintering Areas
- Inland Waterfowl and Wading-Bird habitat
- Eagle-Nesting Sites
- Vernal Pools
- Significant Vernal Pools

Note: Only vernal pools near the corridors for alternatives were identified.

Revised March 17, 2010
Some Lessons Learned

- Critical to open process to all stakeholders including especially those representing landowner interests;

- Strong partnership results in many hands able to navigate varying political and funding realities;

- Don’t expect meaningful results in the short-term (influencing behavioral change takes time);

- Keep vision front and center (easy to get lost in detail and data);

- Implementation requires commitment to funding, incentives, and moral support directed to the local level;

- Partners at the local level are constantly changing and institutional knowledge doesn’t last long. Effective communication requires a long-term relationship.