

Eco-Logical Webinar Series



Integrating Natural Resource, Transportation, and Land Use Plans

Presenters

Steve Walker,
Maine Department
of Inland Fisheries and Wildlife

Judy Gates,
Maine Department of Transportation

Moderated by

Mark Sarmiento, FHWA

Volpe The National Transportation Systems Center
Advancing transportation innovation for the public good



U.S. Department of Transportation
Federal Highway Administration



U.S. Department of Transportation
Research and Innovative Technology Administration
John A. Volpe National Transportation Systems Center

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/>

FHWA Research Program for Environment and Planning



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.

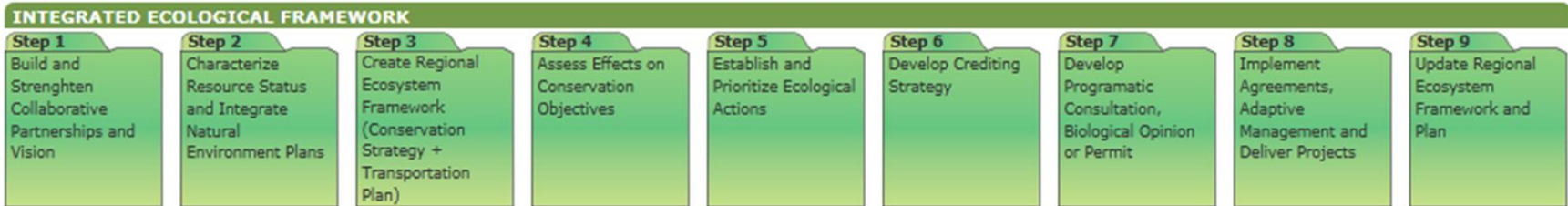
- What steps do you need to develop a comprehensive conservation strategy?
- How can agencies work together to create and share data for transportation and conservation planning?

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

📌 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.



If you like the IEF, you might also like:

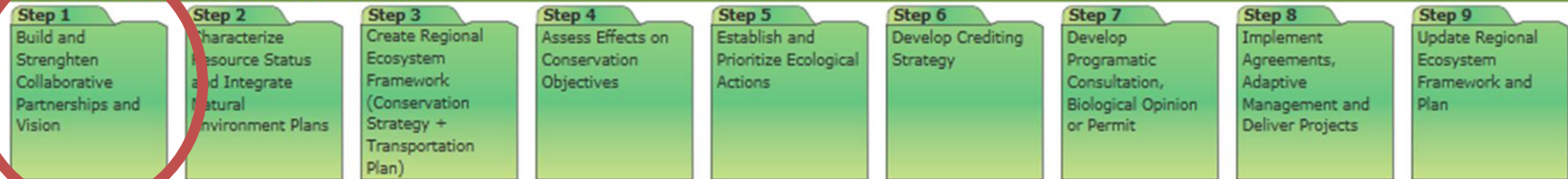
- [Eco-Logical: An Ecosystem Approach to Developing Infrastructure Projects](#) drafted and signed by eight federal agencies in 2006, put forth a conceptual groundwork for integrating transportation and conservation plans and endorsed ecosystem-based mitigation.

Previous webinar focused on Step 1:

9 Steps of the IEF

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



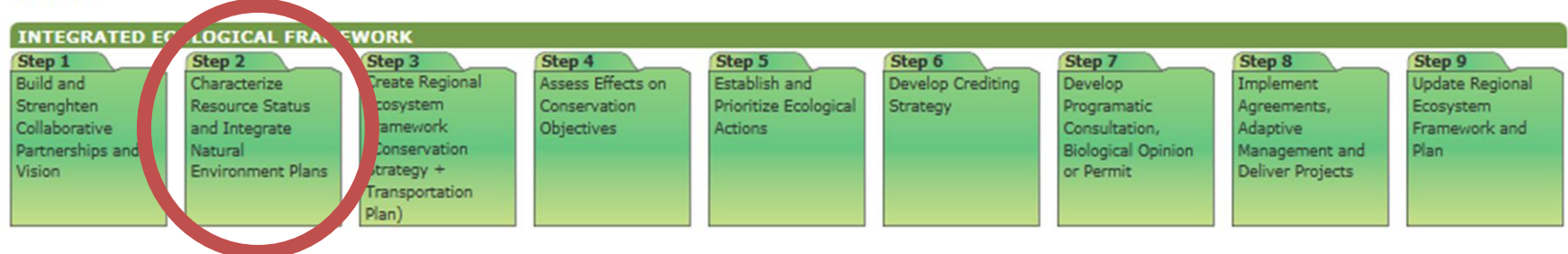
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- [Eco-Logical: An Ecosystem Approach to Developing Infrastructure Projects](#) drafted and signed by eight federal agencies in 2006, put forth a conceptual groundwork for integrating transportation and conservation plans and endorsed ecosystem-based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

Previous webinar focused on Step 1:
Build and Strengthen Collaborative Partnerships and Vision

9 Steps of the IEF

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.



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Step 2:

Characterize Resource Status and Integrate Natural Environment Plans

Purpose

- IEF Step 2 aims to:

Develop an overall conservation strategy that integrates restoration and conservation priorities, data, and plans

IEF Step 2

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.

IEF Step 2

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.

IEF Step 2

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.

IEF Step 2

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:

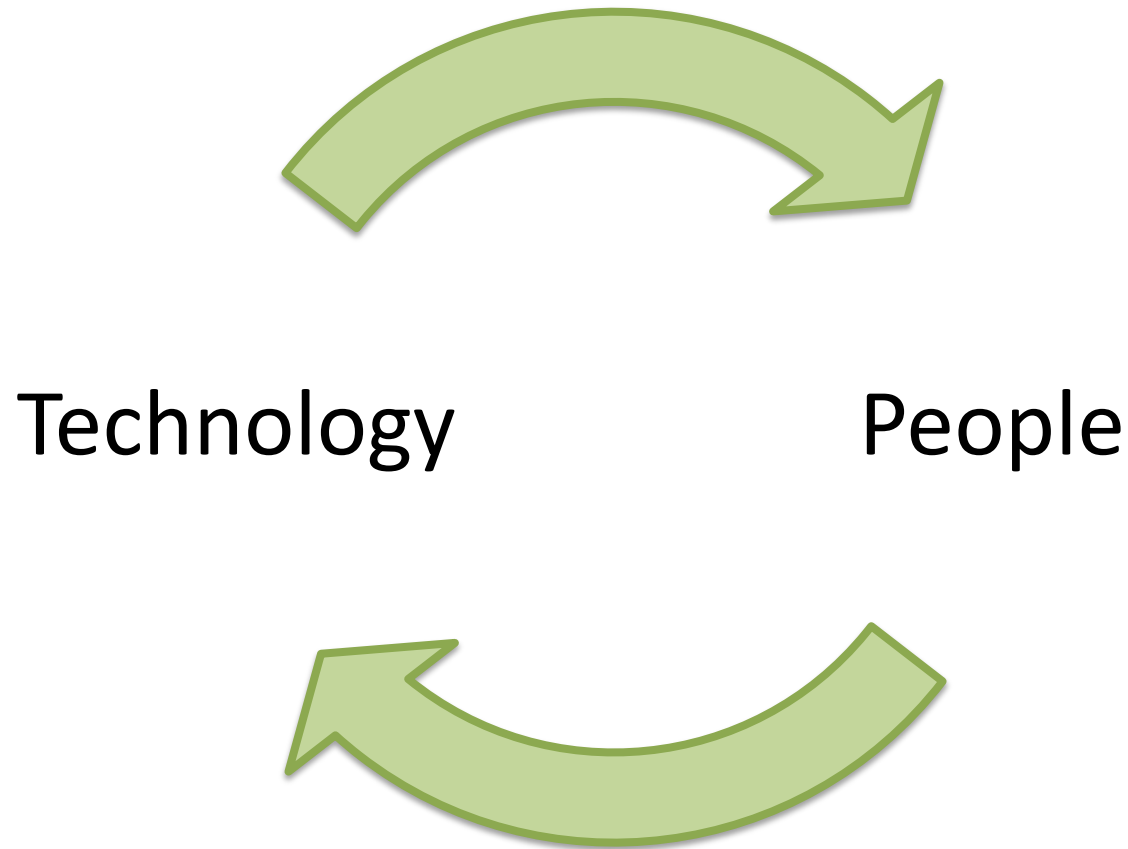
- What is the current situation?
- How do we understand the current situation?
- What is important?
- Do we have all the information we need?
- How do we get the information we need?

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

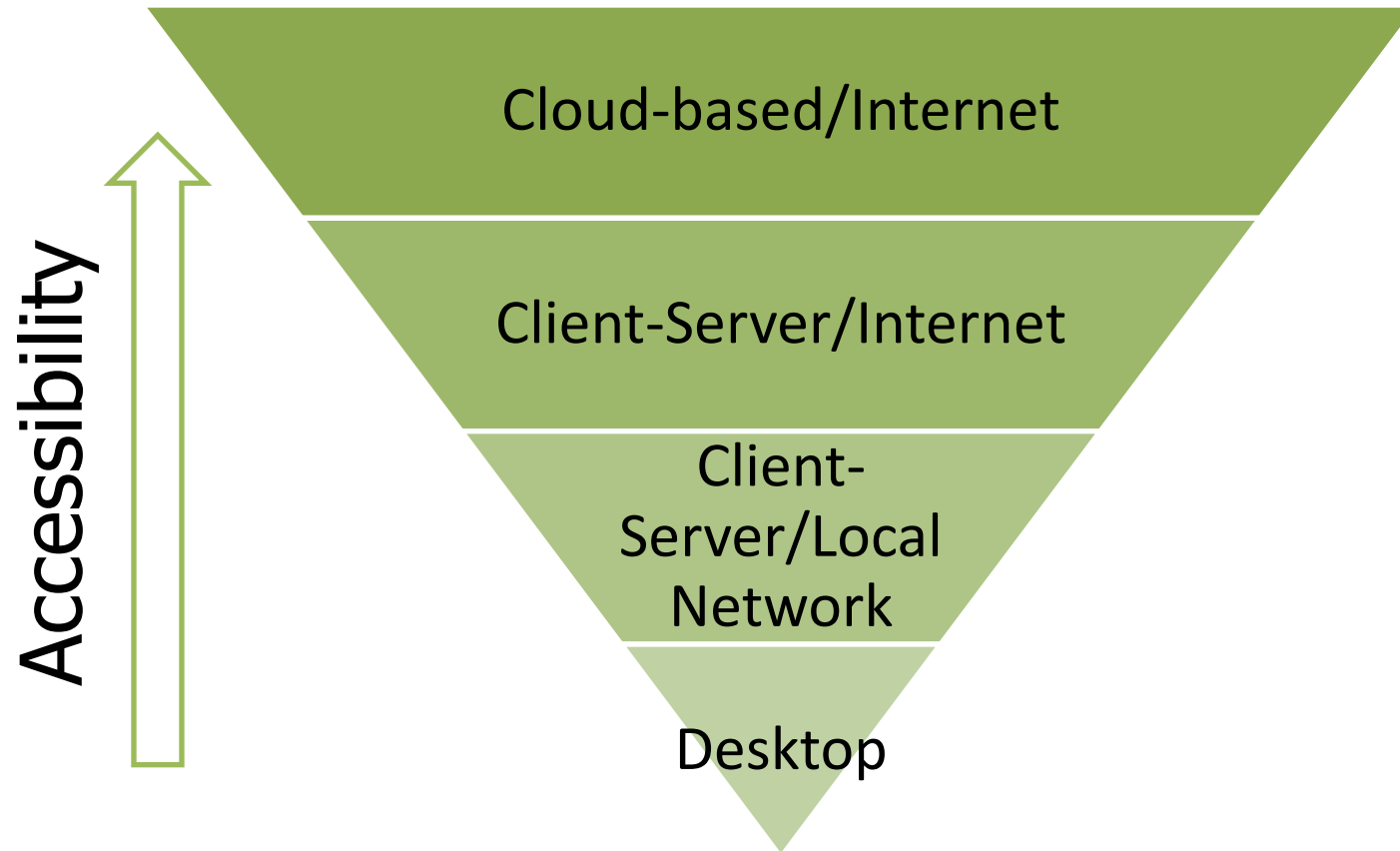


How do we do this?

- 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



How do we do this?

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

Agreements, MOUs, Documented Processes

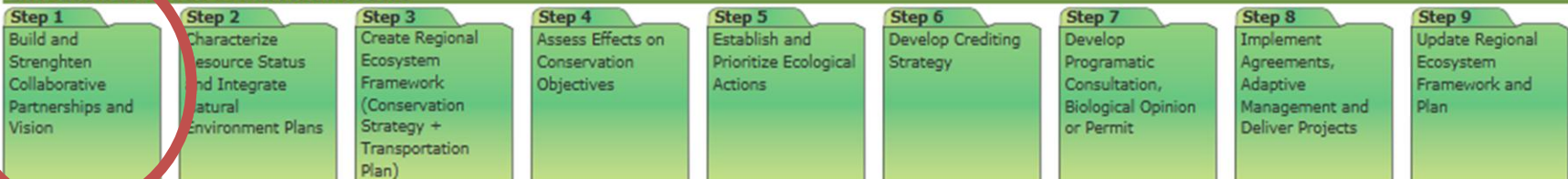
More difficult?

How do we do this?

- People:

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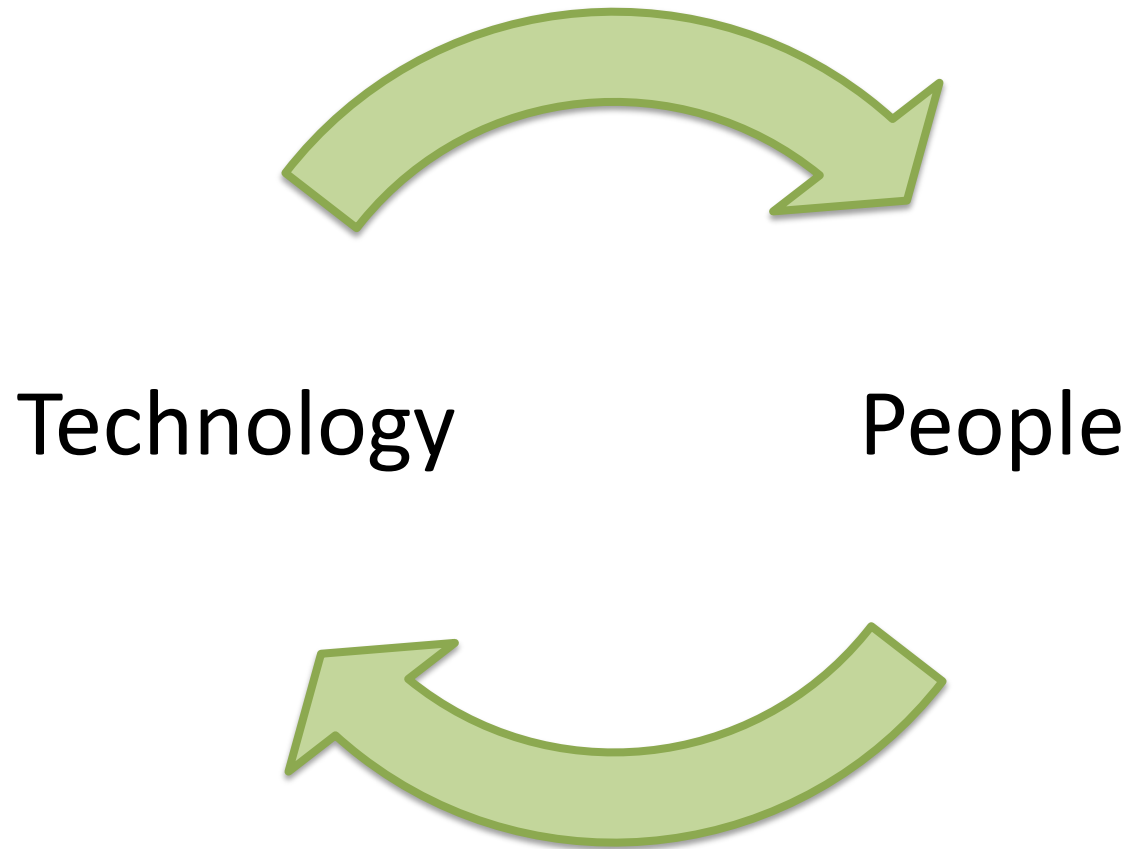
INTEGRATED ECOLOGICAL FRAMEWORK



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Challenges





STATE OF
MAINE
Department of Inland
Fisheries and Wildlife



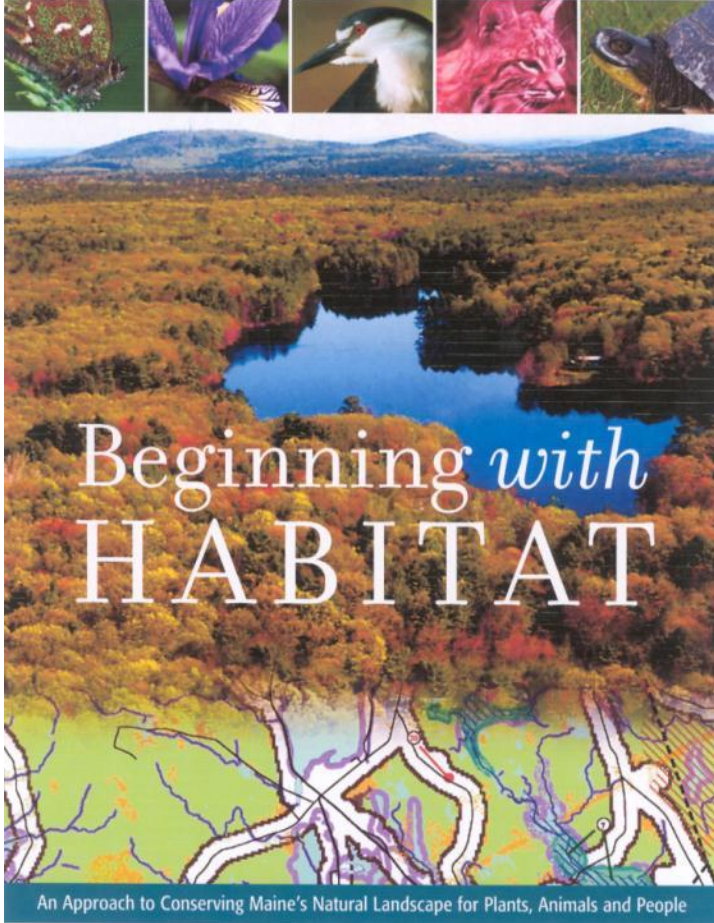
Connecting Transportation and the Environment

Steve Walker,
**Maine Department of Inland Fisheries &
Wildlife**



Judy C. Gates, Director
MaineDOT Environmental Office

MaineDOT



Department of Inland Fisheries and Wildlife
Maine Natural Areas Program
Maine Audubon Society
Department of Transportation
State Planning Office
The Nature Conservancy
US Fish and Wildlife Service
Maine Coast Heritage Trust
Small Woodlot Owners Association of ME

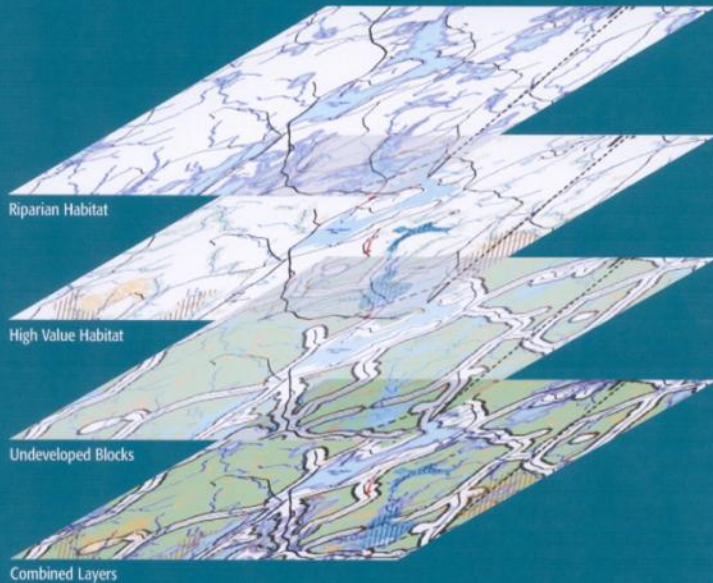
Funded by Environmental Protection Agency, Maine Outdoor Heritage Fund, Wildlife Restoration Funds, Maine Department of Conservation, Maine Loon Plate Fund, Betterment Foundation, Maine Community Foundation

What is Beginning with Habitat (BwH)?



What do you want your town to look like in 50 years?

To ensure a rich complement of plants and animals, which are so important to many Maine communities, we must find ways to conserve wetland and riparian areas, plant and animal habitats, and large habitat blocks, weaving them together in a landscape tapestry. **There are many ways your town can use the plant and wildlife habitat data on these maps:** You can use it for land-use planning; to inform and direct land protection initiatives; to develop joint conservation strategies with neighboring towns; and for outreach and education.



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.

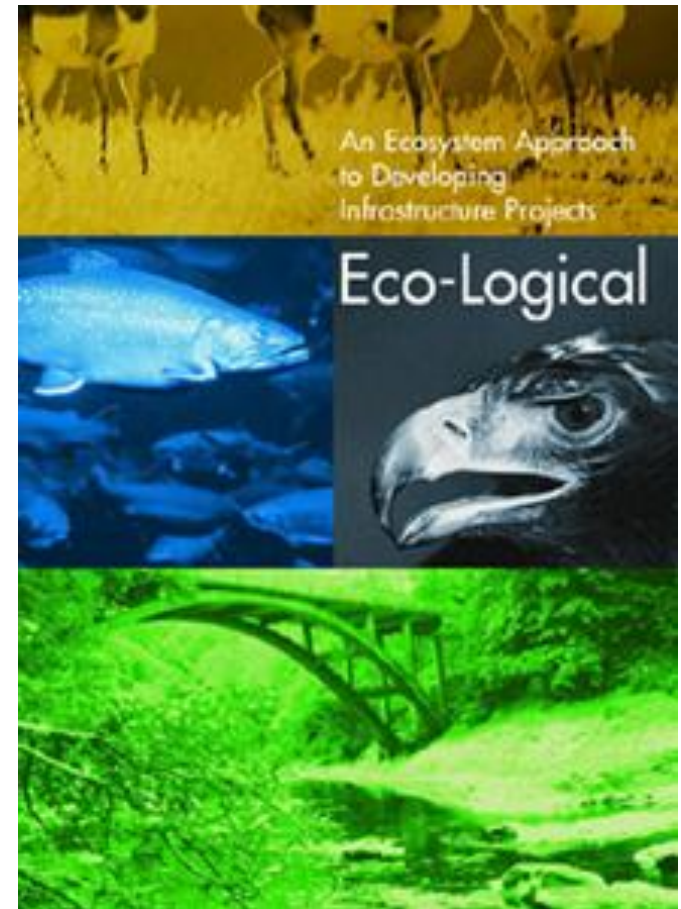
Beginning with
HABITAT

Beginning with HABITAT



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*



Beginning with HABITAT



A Response To Sprawl:
Designing Communities
to
Protect Wildlife Habitat
and
Accommodate Development

Protection
of wildlife habitat
is one of a variety of values
that depend on larger areas of open space
and undeveloped land, values which have been
traditionally embraced by Maine citizens.
These include the appreciation of scenic vistas,
farms, woodlots, clean water, hunting and fishing,
hiking, snowmobiling and many others.
With their common requirements for a relatively
undisturbed landscape, it makes sense
to integrate the protection of wildlife
with other objectives of municipal
and regional planning.

Report
of the
Patterns of Development Task Force
Maine Environmental Priorities Project
July 1997

*“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)*

Beginning with HABITAT



1. Build and Strengthen Collaborative Partnerships

6. Document Agreements



Beginning with HABITAT

Program Guidance Document



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Steering Committee Structure	pg. 5
Sub-committee Structure	pg. 7
New Initiatives Protocol	pg. 9

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Steering Committee



MaineDOT



MAINE
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Maine Coast Heritage Trust

*The
Nature
Conservancy*

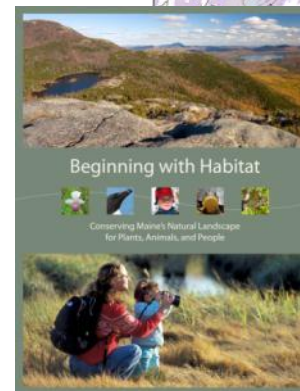
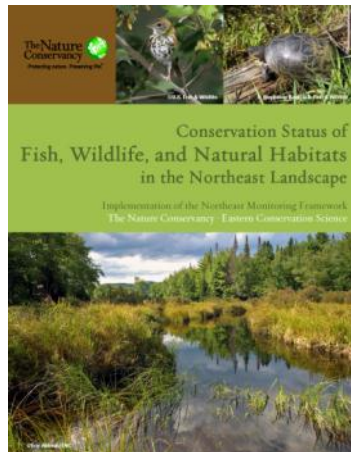
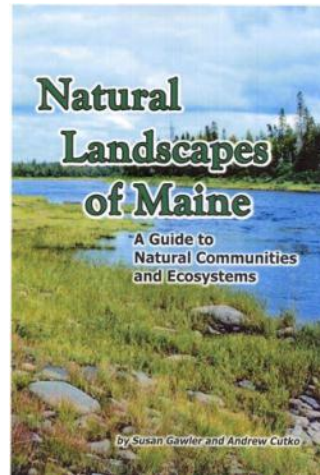
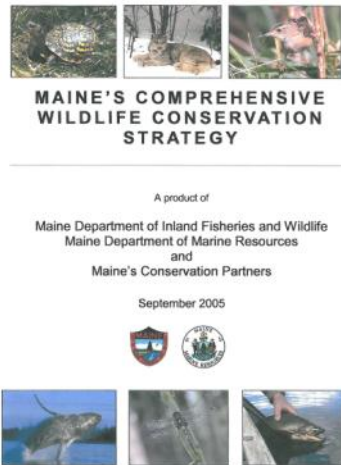


Beginning with HABITAT



2. Identify Management Plans

3. Integrate Plans



About the Toolbox

What is the Toolbox?

The Beginning with Habitat (BwH) Toolbox is a guide to help towns develop and implement a "conservation blueprint", or suite of local actions that will achieve a municipality's land conservation goals. The purpose of this toolbox is to assist you, as a concerned citizen, municipal committee member, elected official or land trust member, achieve your land conservation goals by providing you with a series of tools that can be used to address common conservation issues that arise in many Maine towns. The toolbox includes an introduction to using BwH data and principles in municipal comprehensive planning and open space planning and provides tools, including example ordinance language, which can be used to address conservation concerns. We have attempted to include local lessons learned and the advantages and disadvantages of each tool to help you evaluate which approach will best fit your local needs.



Search BwH:

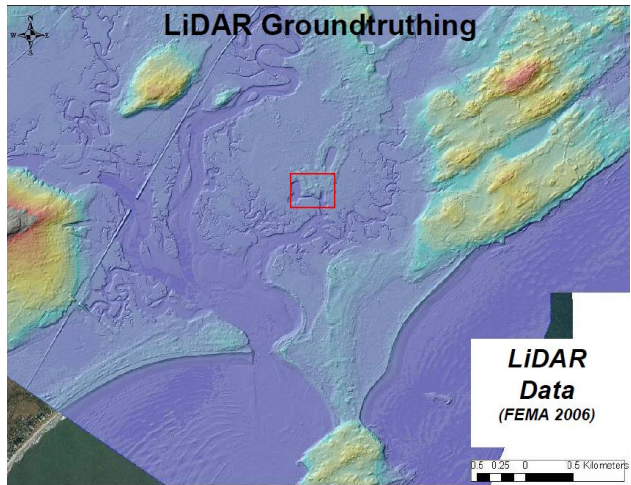
BwH Toolbox

About the Toolbox
Table of Contents
Comprehensive Planning
Open Space Planning
Developing a Conservation Commission
Tools
Land Use Ordinance Tools
Wetland/Shoreland Zoning Tools
Performance Standards
Financing Habitat Protection



4. Assess Effects

5. Establish and Prioritize Opportunities



Assessing Vulnerabilities



- 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

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Arabis laevigata - Smooth Rockcress

Overall Score

Before completing this section, check at least one option for all the above criteria.

As you consider this species experiencing climate change impacts as described in the [exposure assessment](#) over the next 50 years, this species is likely to have low, moderate, or high vulnerability (select one)

	1 Low	2 Moderate	3 High	Instructions
Calculated	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	The criteria scores and overall scores are calculated automatically.
✓ Your Score	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	Please also make your own determination of overall score. If you disagree with the calculated explain briefly.

Habitat is extremely limited, rare in adjacent states so unlikely to disperse here

- 1 Low Vulnerability:** Climate change is likely to have little negative impact (<33% loss) or positive impact on this species' range area and/or population size in Maine within **50 to 100 years**. This is the auto-calculated score when there are no High and at most one Moderate score for the above criteria.
- 2 Medium Vulnerability:** Climate change is likely to have intermediate negative impact (33% to 66% loss) in range and/or population size in Maine within **50 to 100 years**. This is the auto-calculated score when there are no more than one High or two Moderate scores for the criteria above.
- 3 High Vulnerability:** Climate change is likely to have large negative impact (>66% loss) on this species' range area and/or population size in Maine, including potential state level extirpation within **50 to 100 years**. This is the auto-calculated score when there are two or more High, or three or more Moderate scores for the criteria above.

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



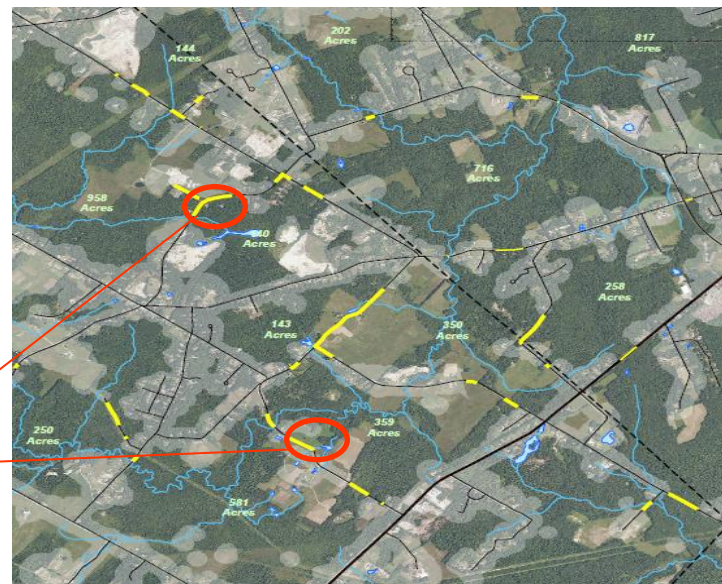
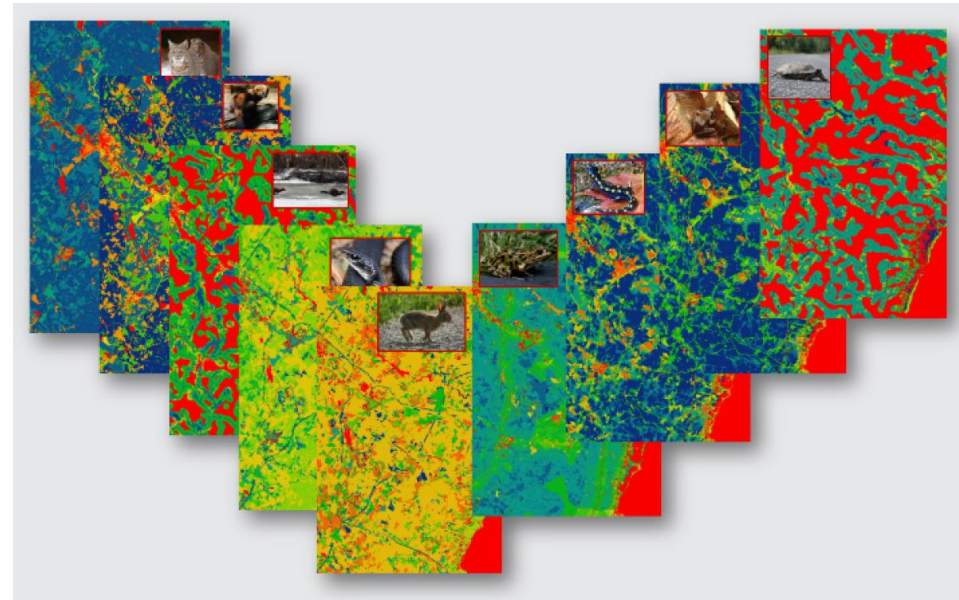
Early Successional
State Endangered
Candidate for Federal listing



Riparian and terrestrial
Wide ranging
Highly sensitive to road mortality



Wetlands and forest
Wide ranging
Disperse over 800m
Vulnerable to road mortality



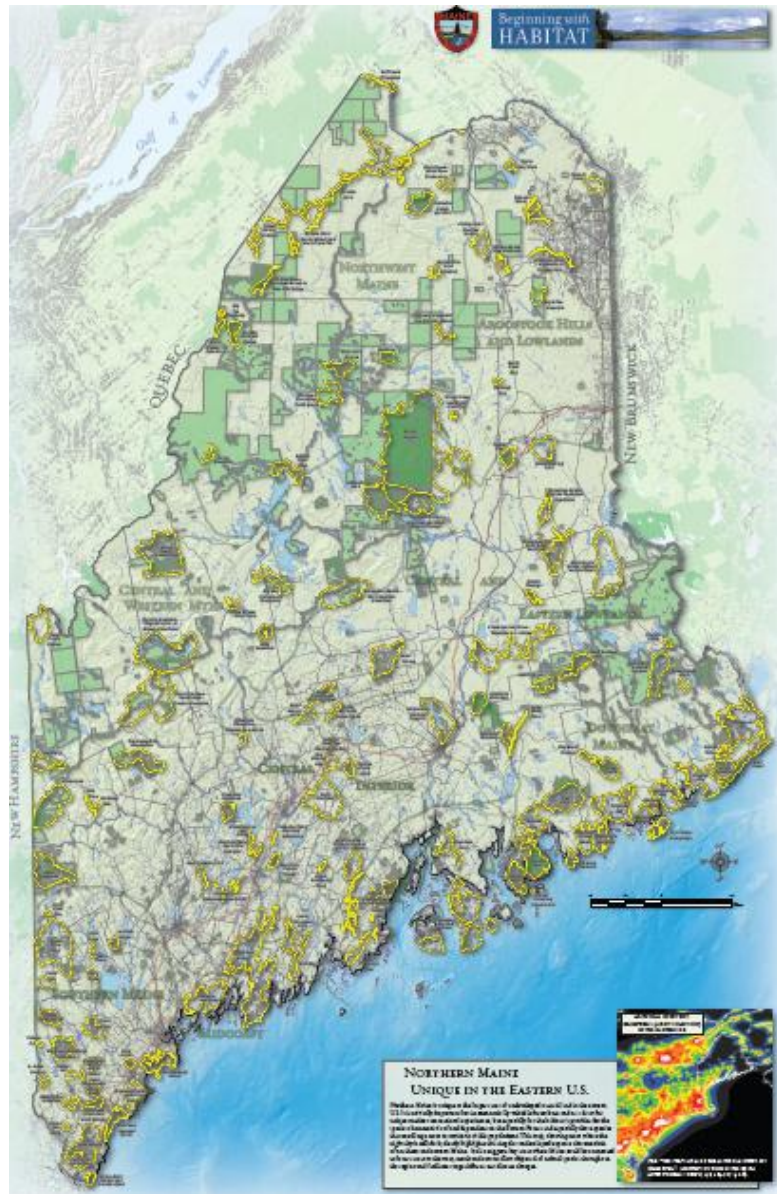
*Priority habitat connector
between undeveloped
blocks*

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Establishing Priorities

4. Assess Effects

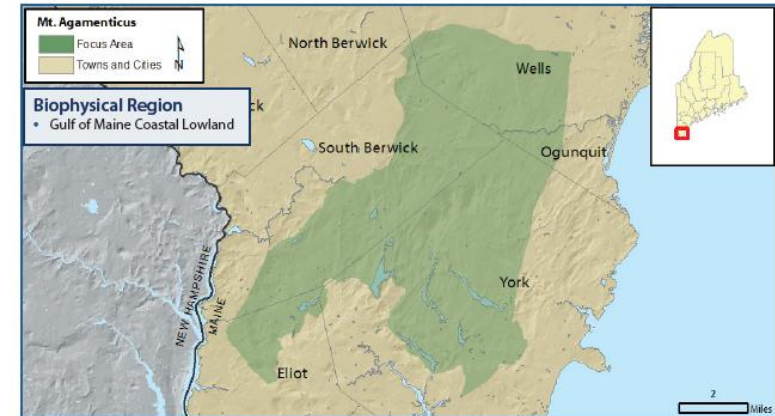
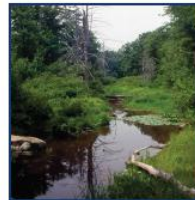
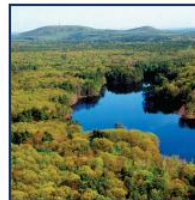
5. Establish and Prioritize Opportunities



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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.

Rare Animals

Spotted Turtle
Wood Turtle
Blanding's Turtle
Brown Snake
Ribbon Snake
Northern Black
Racer

Spring Salamander
New England Cottontail
New England Blue
Ringed Boghaunter
Dragonfly
Swamp Darter
Scarlet Bluet

Rare Plants

Wild Leek
Slender Blue Flag
Mountain Laurel
Snarhuich

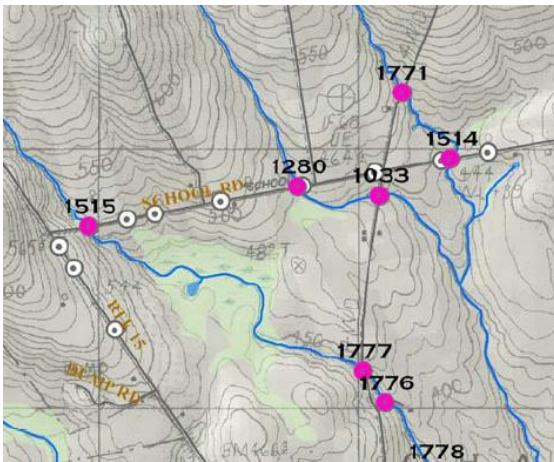
White Wood Aster
Upright Bindweed
Atlantic White-cedar
Scotted Wintergreen

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

MINRCP

Maine Natural Resources Conservation Program

Acting on Priorities



US Army Corps
of Engineers®



The Nature
Conservancy

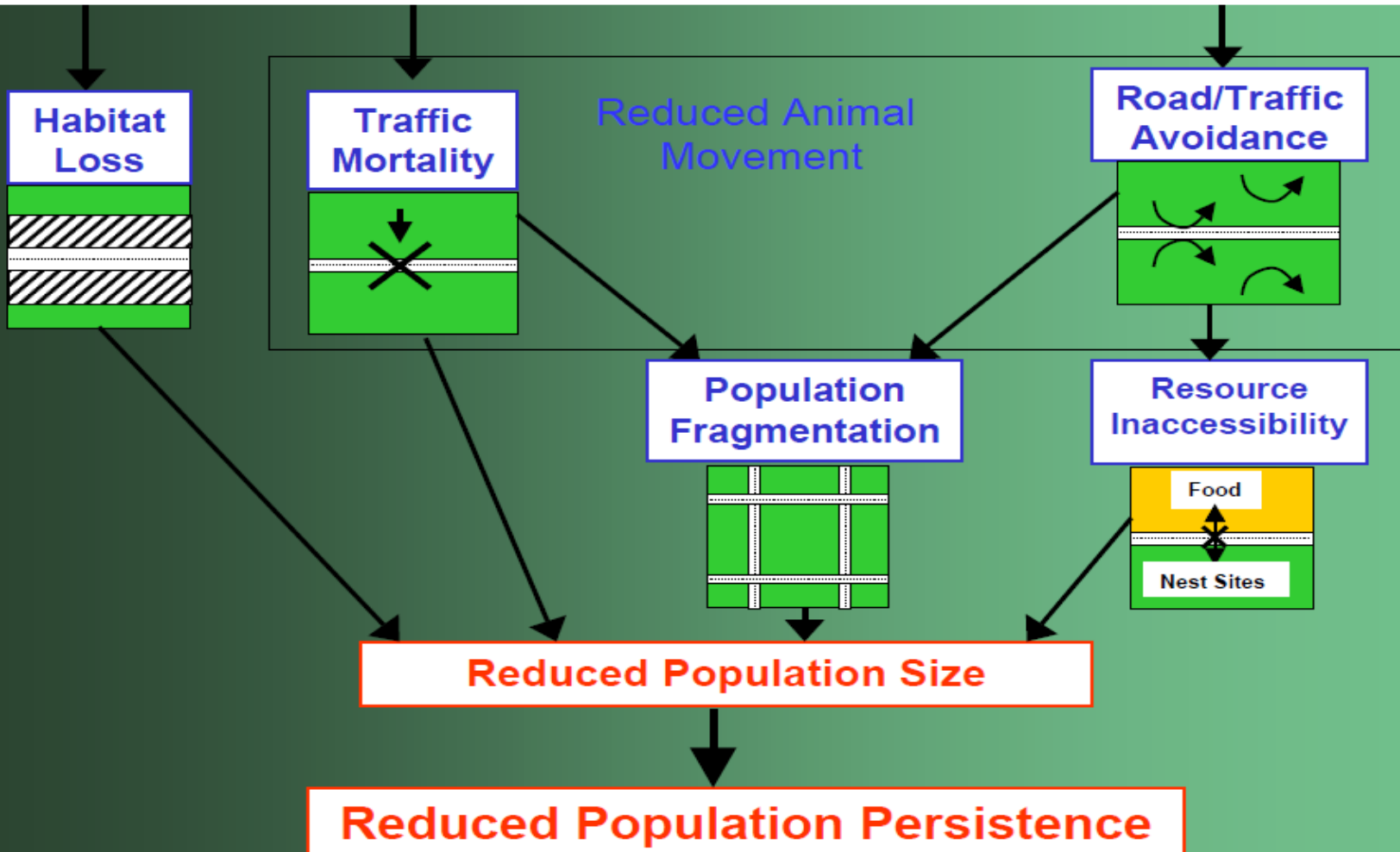


MAINE
AUDUBON



MaineDOT

Impact of Roads and Traffic

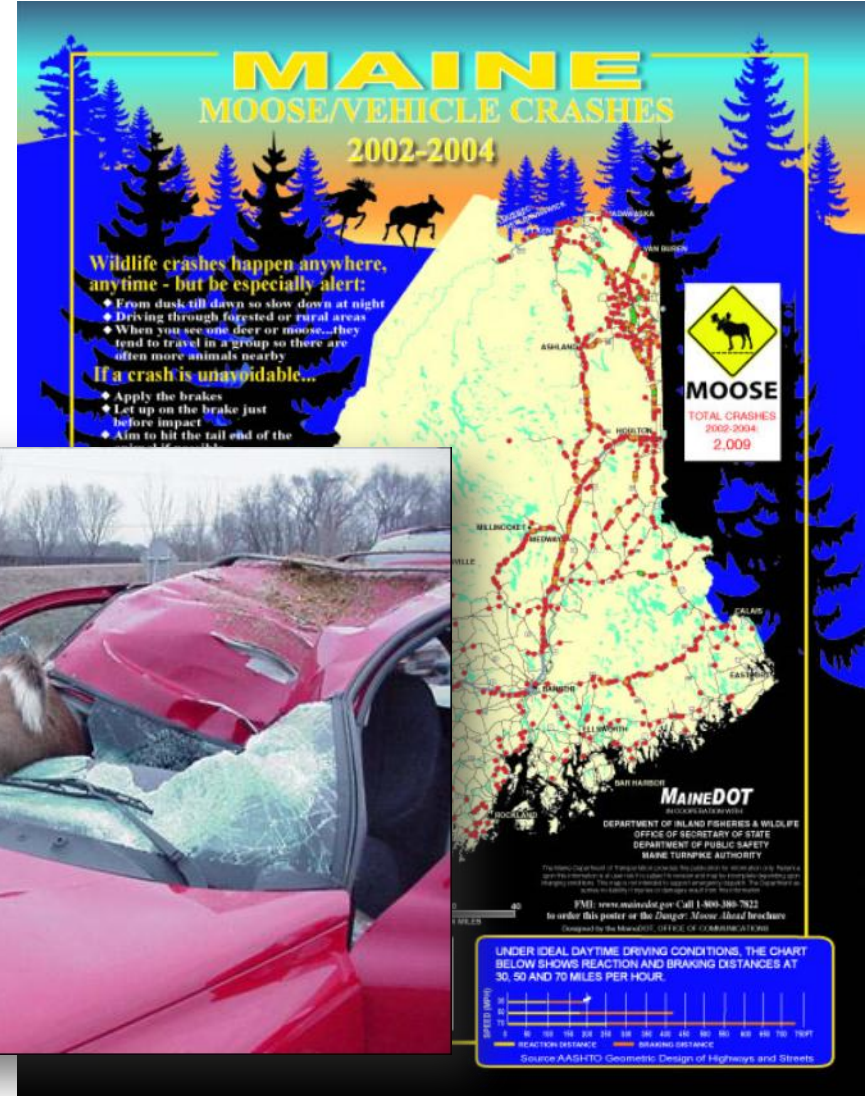


(Adapted from Jaeger et al. 2005)

Roads As Barriers -- Direct Mortality



Roads As Barriers -- Direct Mortality



The Policy and Design Guide

- ▶ **Credibility**
- ▶ **Predictability**



WATERWAY and WILDLIFE CROSSING POLICY and DESIGN GUIDE

For Aquatic Organism, Wildlife Habitat, and Hydrologic Connectivity

3rd Edition, July 2008



In Cooperation With:

Maine Atlantic Salmon Commission
Maine Department of Environmental Protection
Maine Department of Inland Fisheries and Wildlife
Maine Department of Marine Resources
Maine Land Use Regulation Commission

National Marine Fisheries Service
Natural Resources Conservation Service
U.S. Army Corps of Engineers
U.S. Fish and Wildlife Service
U.S. Environmental Protection Agency

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I-395 Connector

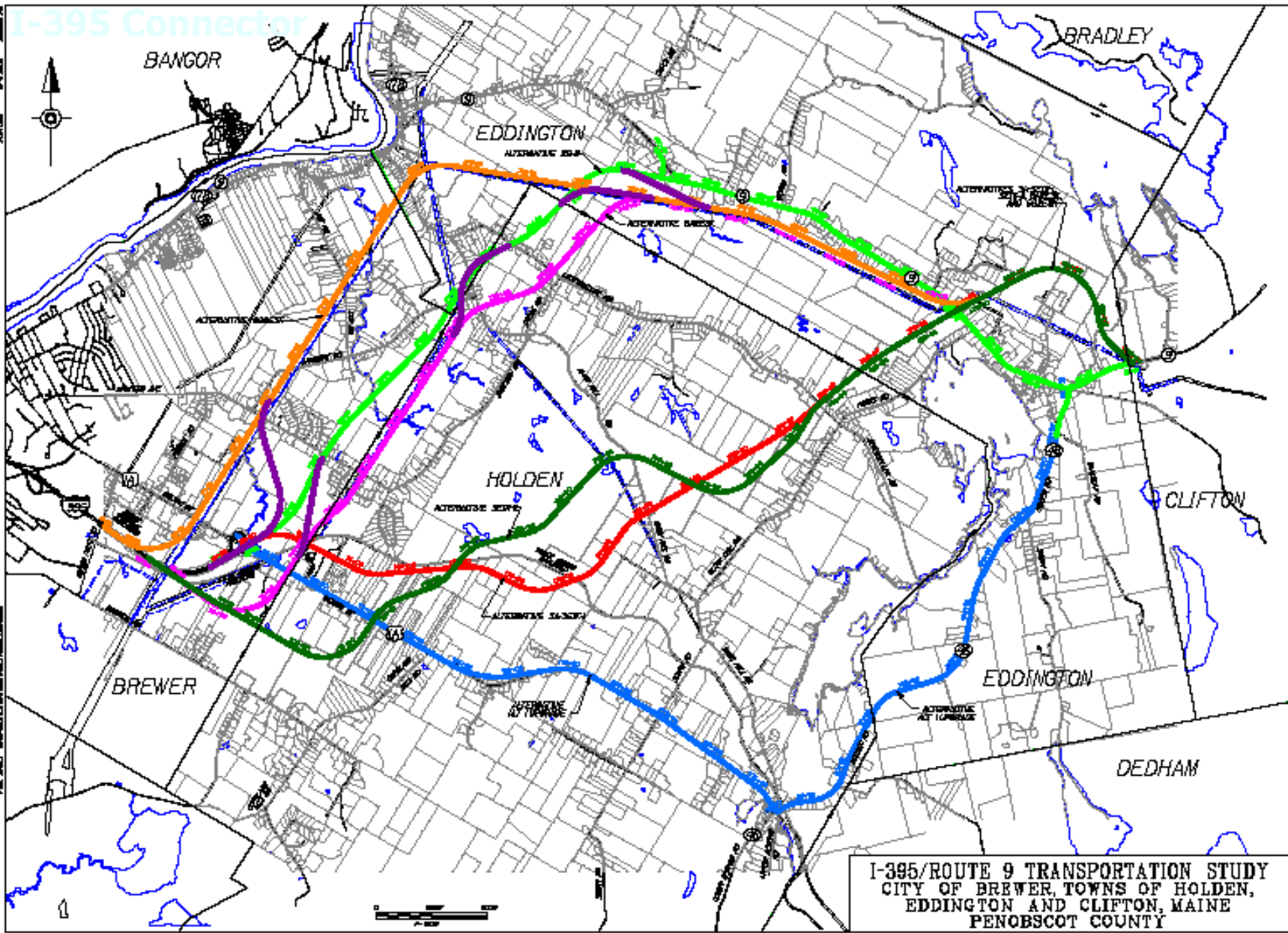
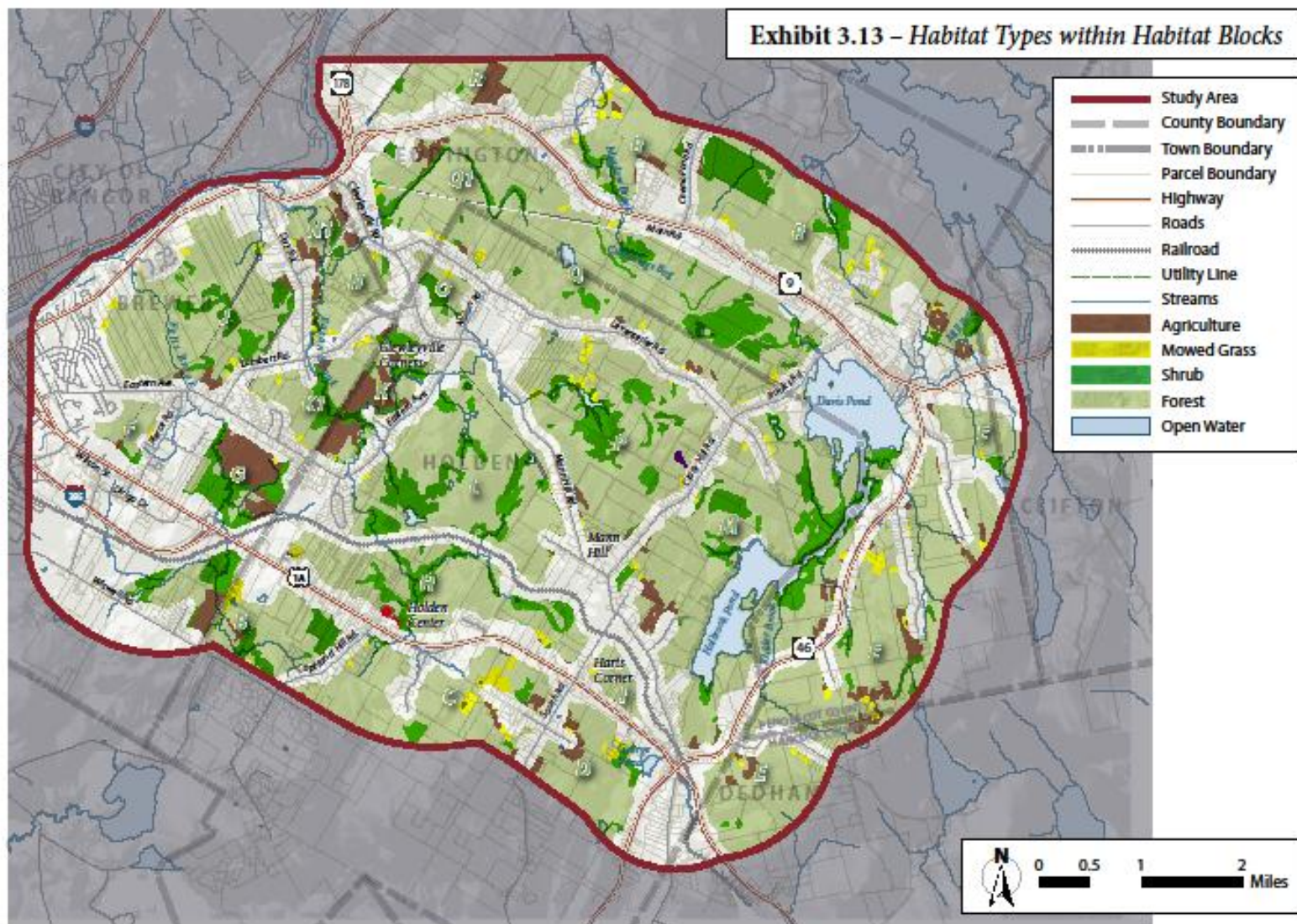
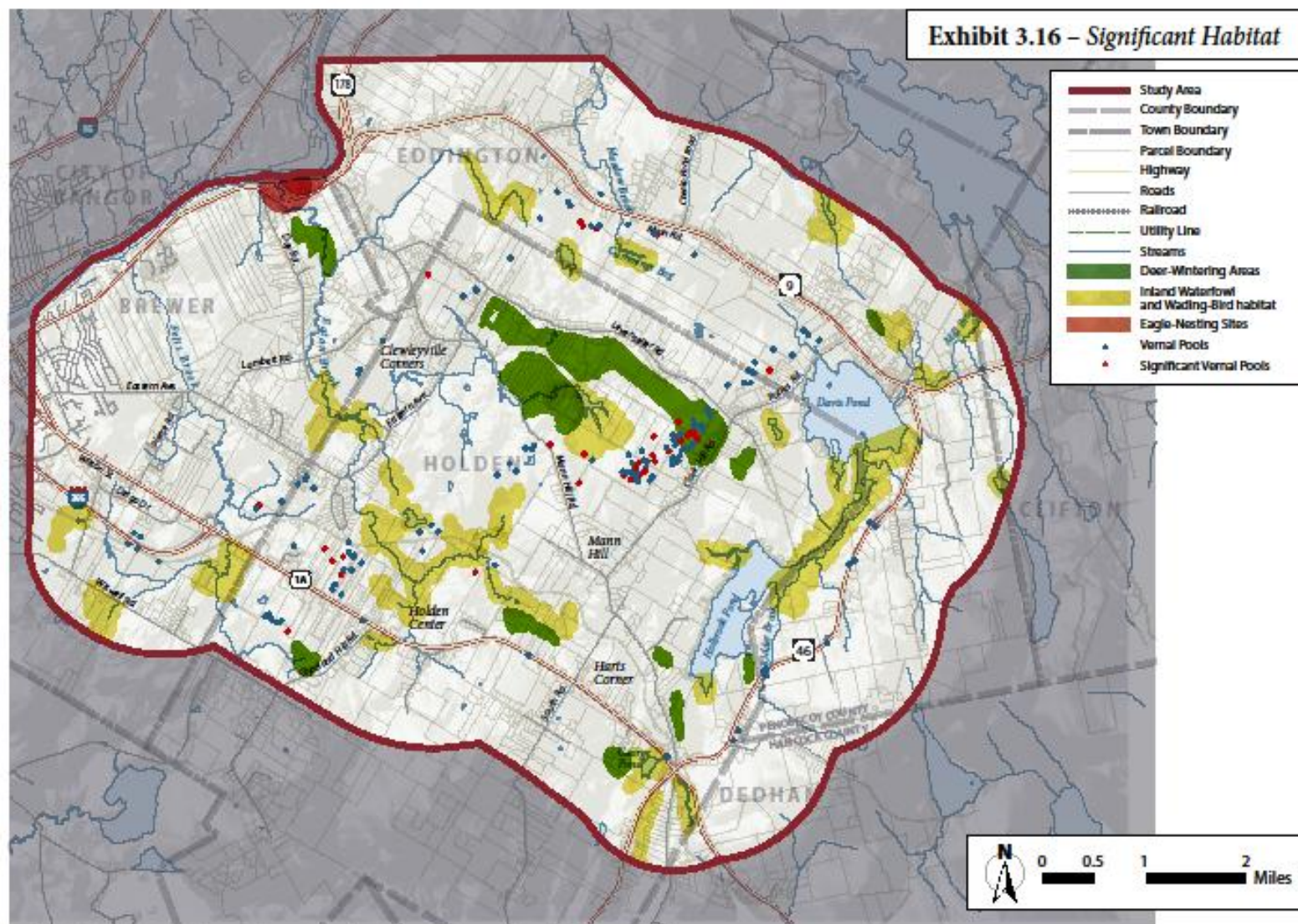


Exhibit 3.9 – Undeveloped Habitat



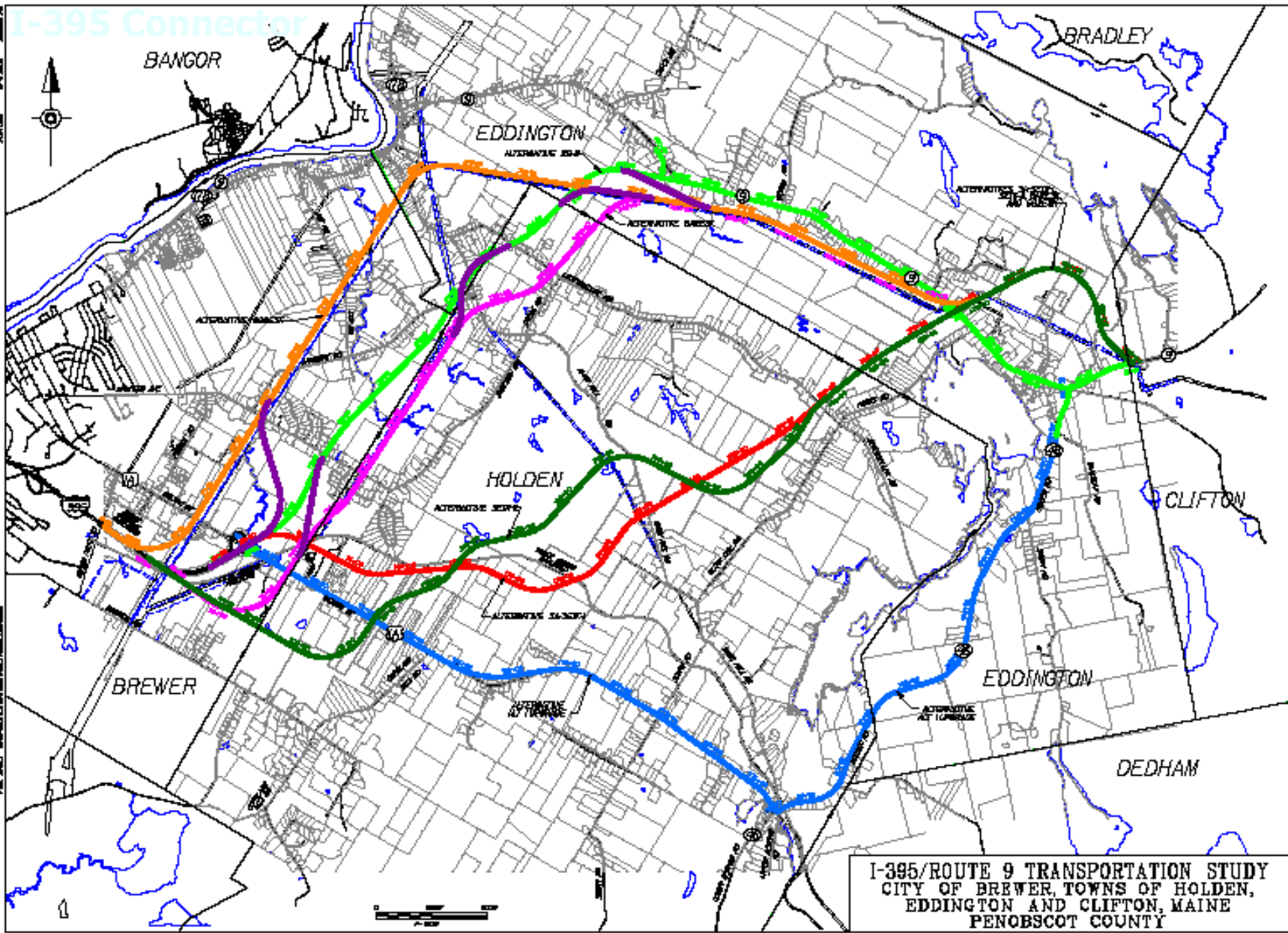


Source: *Beginning with Habitat*, 2010



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

I-395 Connector





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.