The Eco-Logical Approach in Action:

Implementation Updates from Eco-Logical Grant Recipients

April 18, 2012
2:00 – 3:30 PM Eastern

Presenters

- *Michael Lamprecht*,
  Federal Highway Administration
- *Steve Williams*,
  Thomas Jefferson Planning District Council
- *David Leopold*,
  Chicago Department of Transportation

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

U.S. Department of Transportation
Federal Highway Administration

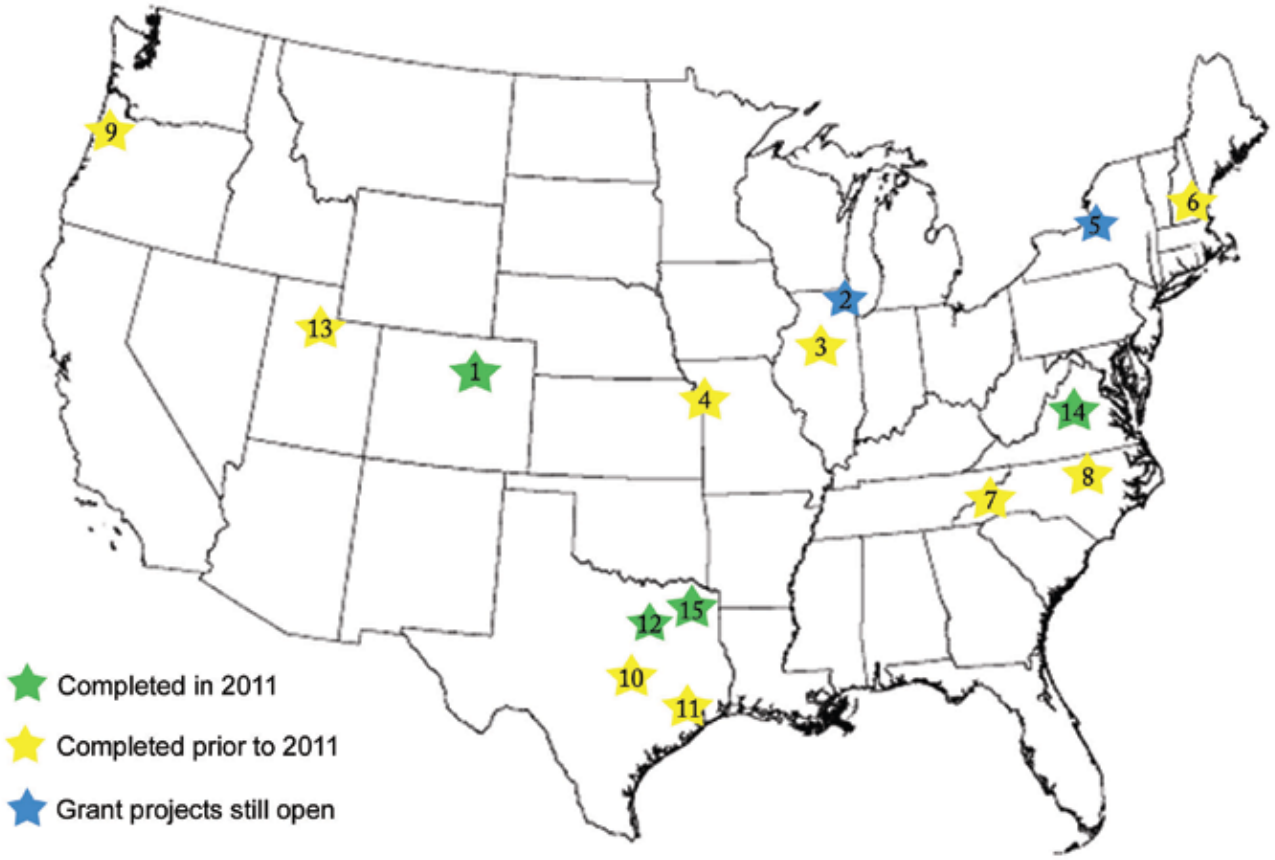
U.S. Department of Transportation
Research and Innovative Technology Administration
John A. Volpe National Transportation Systems Center

Eco-Logical Grant Program Overview

Purpose: To apply the goals and principles outlined in the 2006 multi-agency publication *Eco-Logical: An Ecosystem Approach to Developing Infrastructure Projects*

- A national solicitation for grant application occurred in 2007.
- Eligible applicants included:
  - Non-profits
  - All levels of government
  - Tribes
  - Colleges/universities
  - Private Entities
- 15 pilot projects received a total of $1.4 million in grant funding.
- The projects were required to identify local matching funds.

Range of Eco-Logical Grant Projects



* Alaska, Hawaii, and Puerto Rico are not included in this map because there are no current *Eco-Logical* projects in those locations.

Objectives of Eco-Logical Grant Projects

Projects test one or more aspects of the Eco-Logical approach:

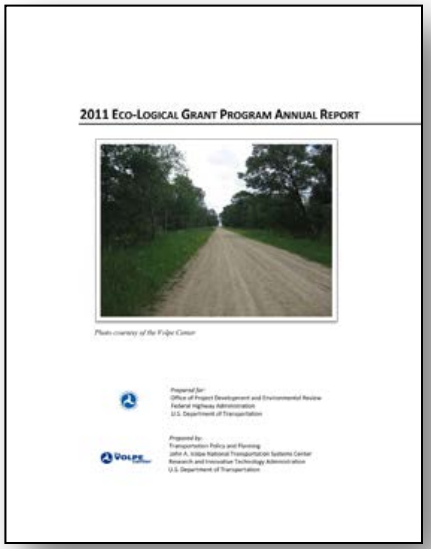
- Build and Strengthen Collaborative Partnerships
- Identify Management Plans
- Integrate Plans
- Assess Effects
- Establish and Prioritize Opportunities
- Document Agreements
- Design Projects Consistent with Regional Ecosystems
- Balance Predictability and Adaptive Management

Eco-Logical analysis of a road in Illinois; part of the Tri-County Regional Planning Commission's Regional Transportation, Ecosystem, and Land-Use Integration Plan

Reporting Project Findings and Success

FHWA regularly gathers information from grant recipients to document important lessons about the state of the practice for the Eco-Logical approach via:

- Interviews
- Progress reports
- Questionnaire responses
- Grant products



The 2010 Eco-Logical Grant Program Annual Report: http://environment.fhwa.dot.gov/ecological/grantProgram_rpt/report2011.asp

Eco-Logical Grant Project Findings

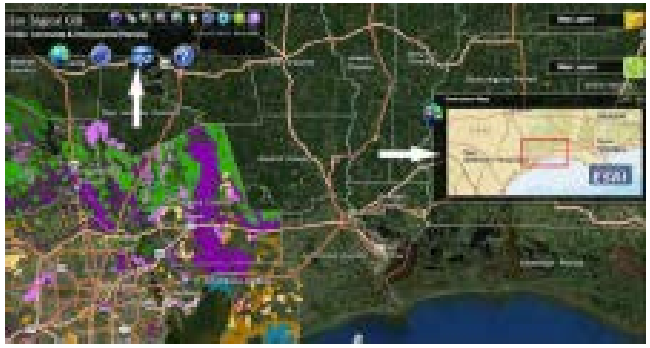
Findings from the grant recipients fall under four categories:

- Implementing Eco-Logical regionally and nationally
- Integrating Eco-Logical into organizational activities
- Partnering for interagency collaborations
- Using data and tools for Eco-Logical projects

Vision of a nature preserve and public trail from grant-recipient Envision Utah's Blueprint Jordan River plan

Regional and National Implementation

- Most grant recipients have adopted a Regional Ecosystem Framework (REF) and are integrating products into long-range transportation planning and project selection.
- Approximately half of the recipients have begun or plan to replicate components of their project regionally or nationally.
- Recipients find that documentation of data analysis processes allows other organizations to replicate at a national scale.

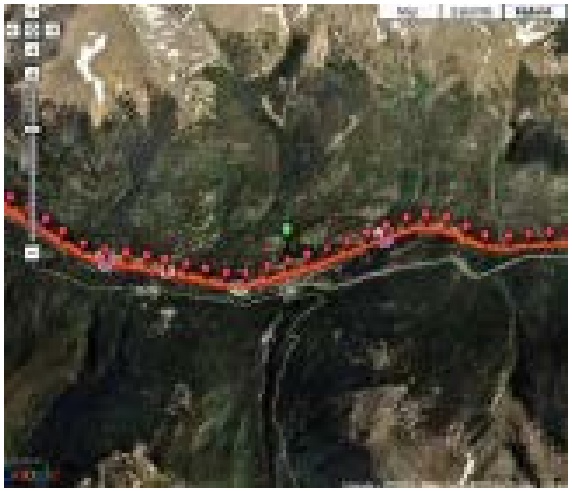


Screenshot of the online decisionmaking mapping tool from the Houston-Galveston Area Council's grant project.

Integrating into Organizational Activities

Key organizational factors that promote implementation include:

- Understanding and buy-in from senior-level management
- Effective demonstration of the quantifiable benefits of the Eco-Logical approach



Screenshot from a CDOT website CDOT's that allows the public to report wildlife sightings on I-70

Grant recipients that have integrated the Eco-Logical approach into the day-to-day operations of their organizations have been the most successful.

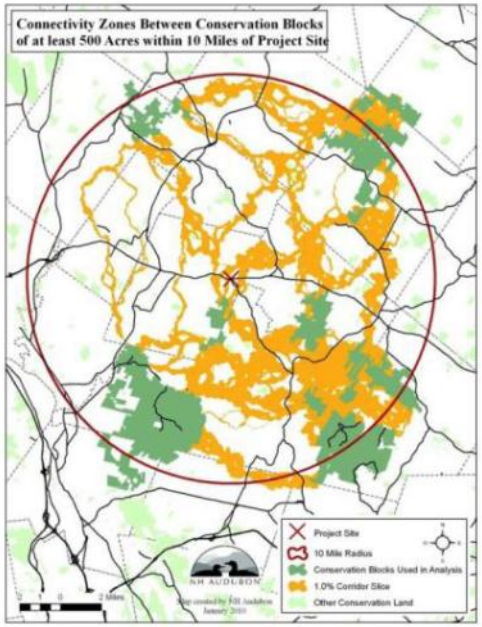
Interagency Collaborations

- Partnerships strengthen and promote implementation of Eco-Logical grant products.
- Partner adoption helps institutionalize the products and related Eco-Logical principles in the region.
- Memorandums of Understanding (MOUs) are valuable. The process has allowed grant recipients to to communicate priorities, strengthen relationships, and refine methodologies.

North Central Texas Council of Governments' recommended roadway projects for a Metropolitan Transit Plan.

Using Data and Tools

- Web-based data tools and maps reach a wider audience and help grant recipients connect with implementing agencies.
- Innovative and flexible methodologies can compensate for a lack of available data.
- National datasets, supplemented with local or regional data, integrated at a regional level help prioritize mitigation sites.



GIS-based wildlife-connectivity model with conservation lands and connectivity zones from New Hampshire Audubon's grant project.

Improving Implementation

Resources that promote further implementation:

- Additional funding
- Greater staff capacity/resources to work on Eco-Logical
- Incentives for partner organizations to implement Eco-Logical
- Improved understanding among partner organizations about Eco-Logical

Signs of Success

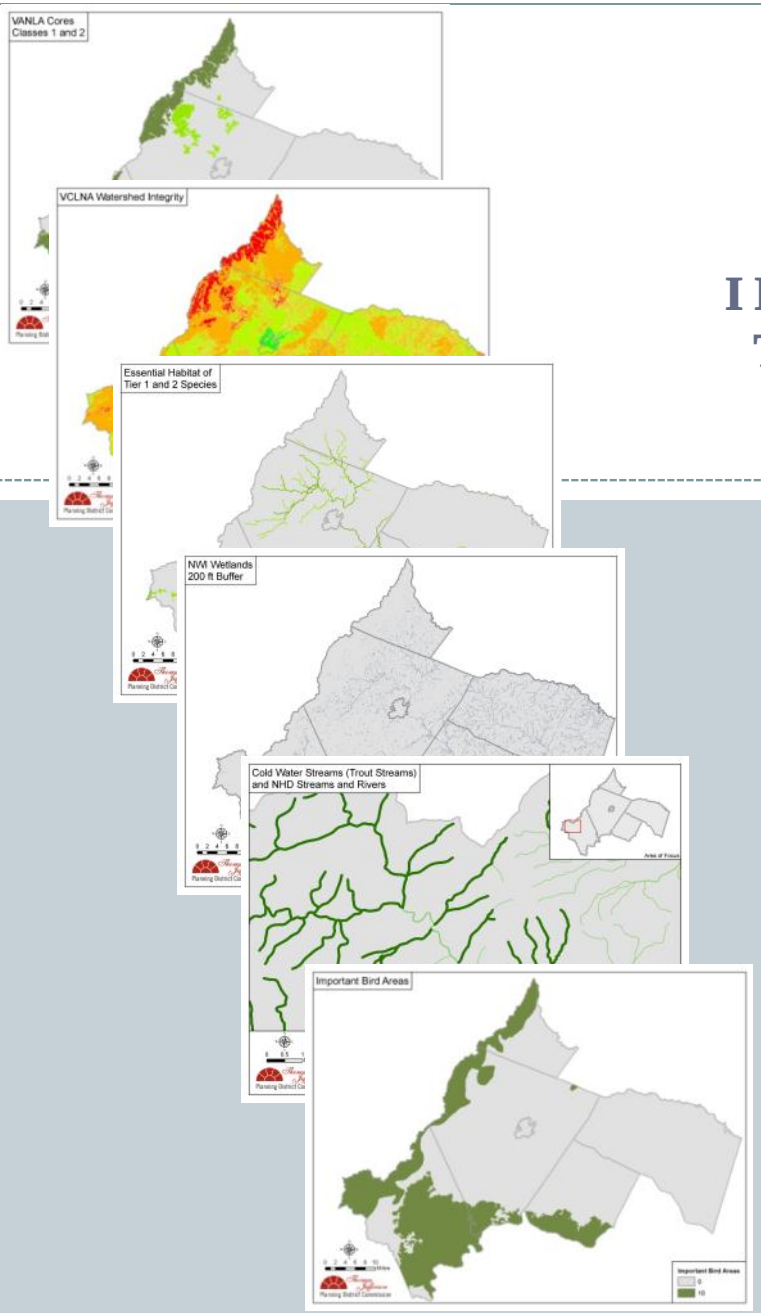
Examples of implementation measures include:

- Formal adoption of approach into transportation planning process
- Use of plan/products by partners
- Signed MOU or agreement/ interagency working group
- Publication/dissemination of:
  - Analytical tool
  - Data
  - Priority maps
  - Report or publication
- Use of project products or tool in project selection
- Receipt of additional grants

Resources

Eco-Logical Grant Program:
http://www.environment.fhwa.dot.gov/ecological/eco_grant_program.asp

The 2010 Eco-Logical Grant Program Annual Report:
http://environment.fhwa.dot.gov/ecological/grantProgram_rpt/report2011.asp



Eco-logical

INTEGRATING GREEN INFRASTRUCTURE & REGIONAL TRANSPORTATION PLANNING

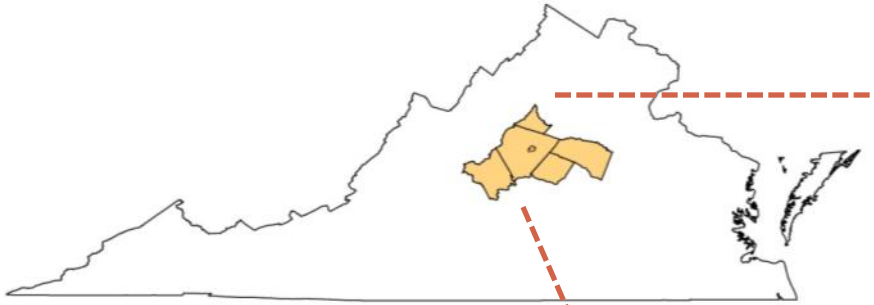
STEPHEN WILLIAMS

EXECUTIVE DIRECTOR

THOMAS JEFFERSON PLANNING DISTRICT COMMISSION

CHARLOTTESVILLE, VIRGINIA

Thomas Jefferson Region



- Central Virginia
- 50% Urban – 50% Rural
- Blue Ridge Mtns & Piedmont

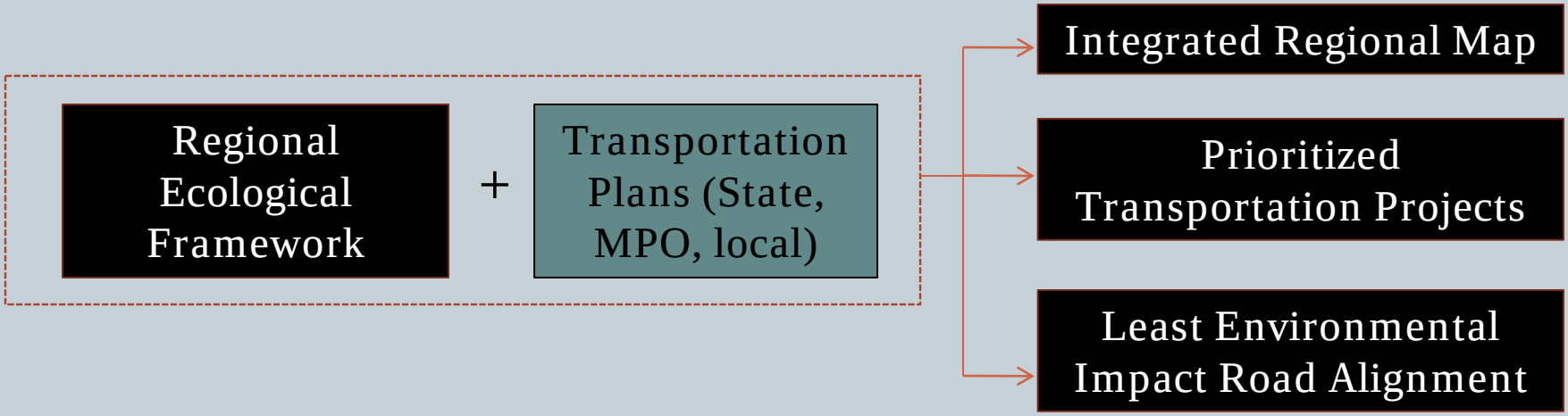
Project Purposes

Use FHWA Eco-Logical Model to develop reproducible model for small MPOs/regional governments to:

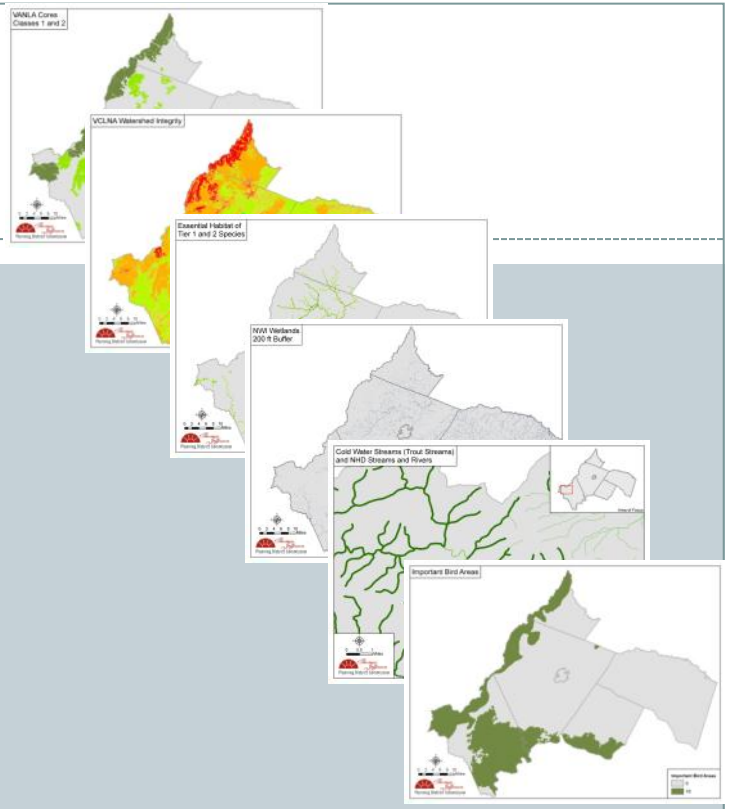
- Develop simple, transparent, collaborative approach to **analyzing ecosystem value**
- Integrate ecosystem value into **transportation project prioritization**
- Use ecosystem value to identify **lowest ecosystem impact road alignment**
- Integrate ecosystem value into **other planning activities**

Project Deliverables

1. **Regional Ecological Framework** – combines diverse ecosystem data
2. **Integrated Regional Map** – integrates ecosystem data with transportation projects
3. **Prioritized Transportation Projects -** based on Integrated Regional Map
4. **Least Environmental Impact Road Alignment**



Regional Ecological Framework



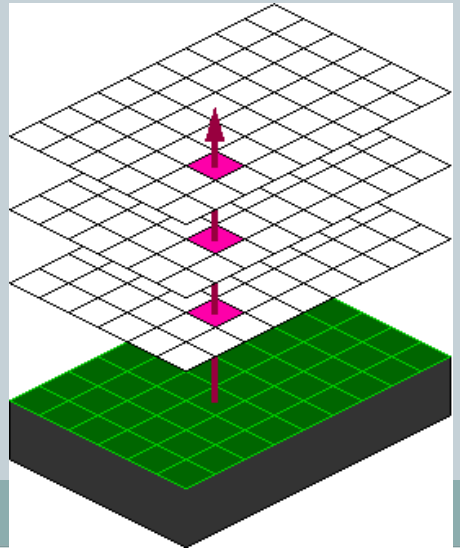
Integrate Ecosystem Data:

A. Convert Ecosystem Data to Raster Format (Spatial Analyst)

B. Steering Committee Established Ranking System

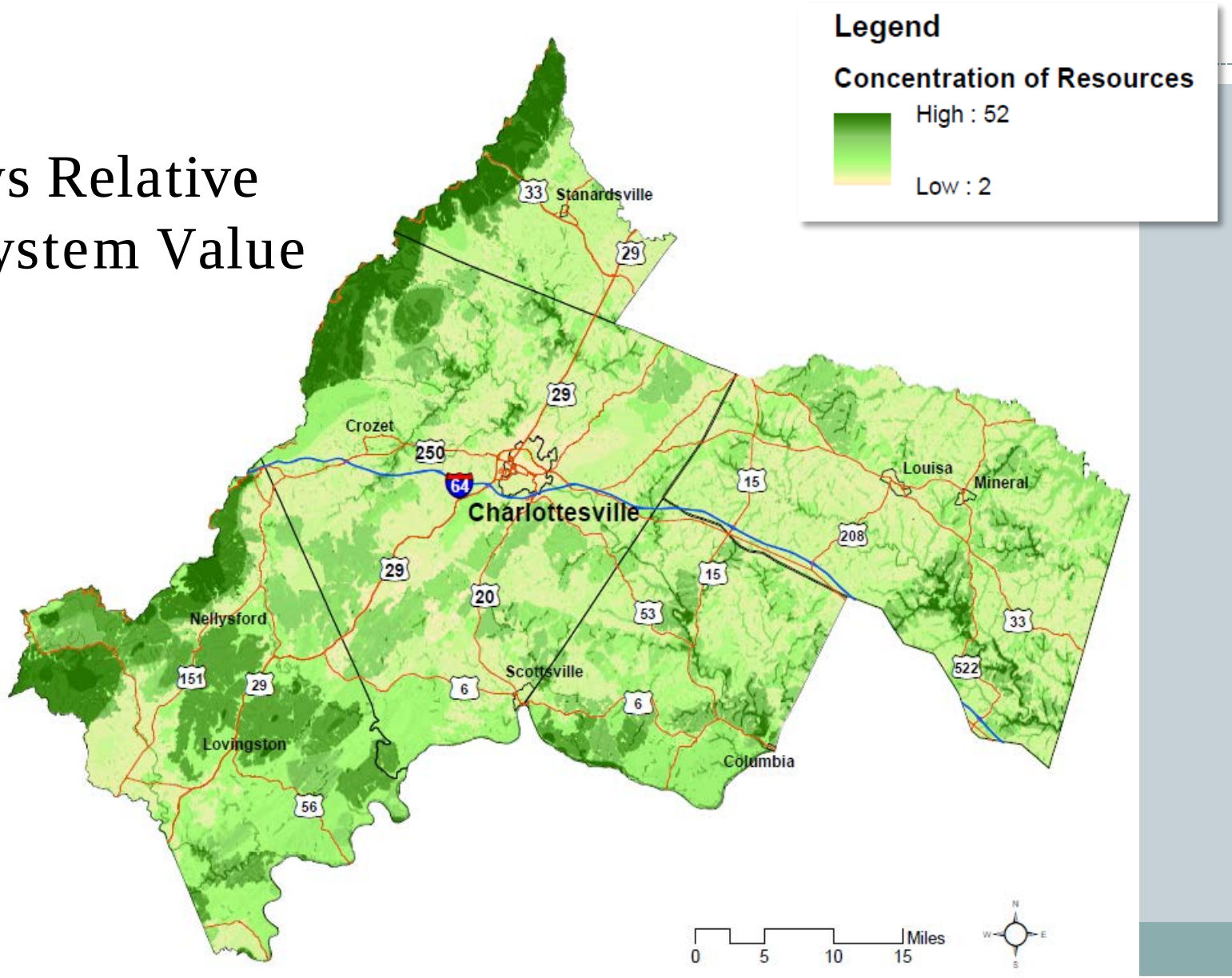
C. “Score” Rasters Using Ranks Established in Previous Step

D. Aggregate All Datasets to Create a Weighted Raster of Ecosystem Value



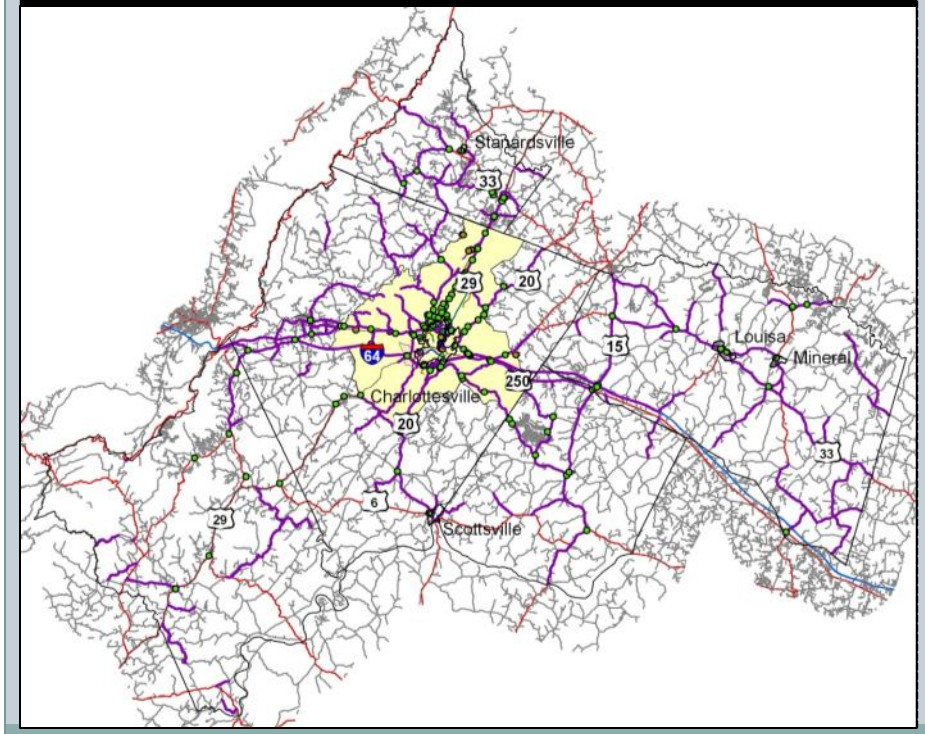
Regional Ecological Framework

Shows Relative Ecosystem Value

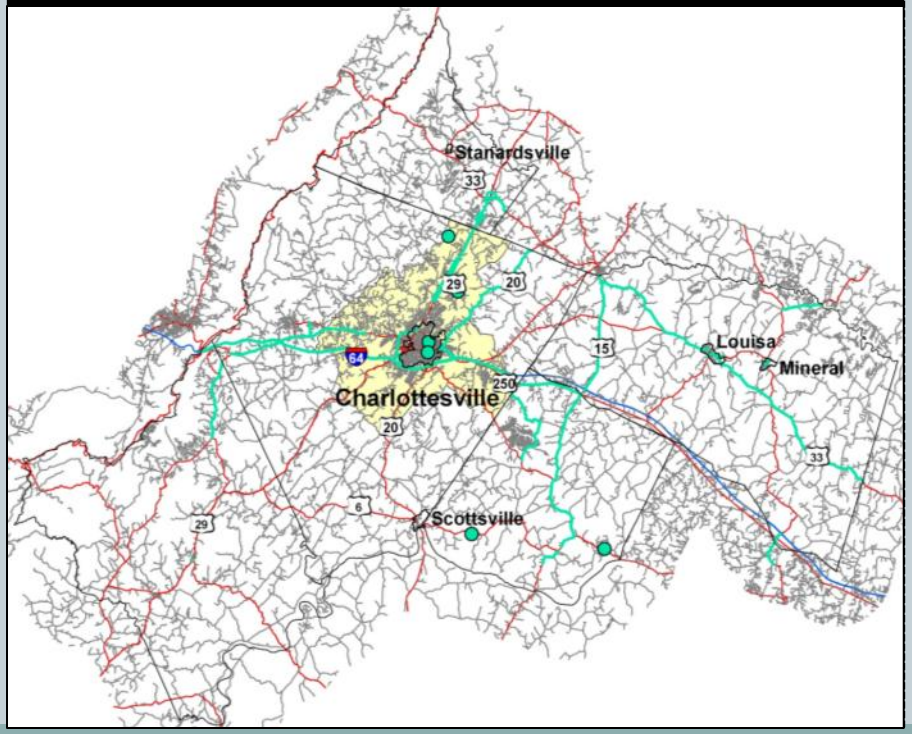


Overlay Transportation Plans with Regional Ecosystem Framework

A. All Recommended Projects for TJPD (**400+**)

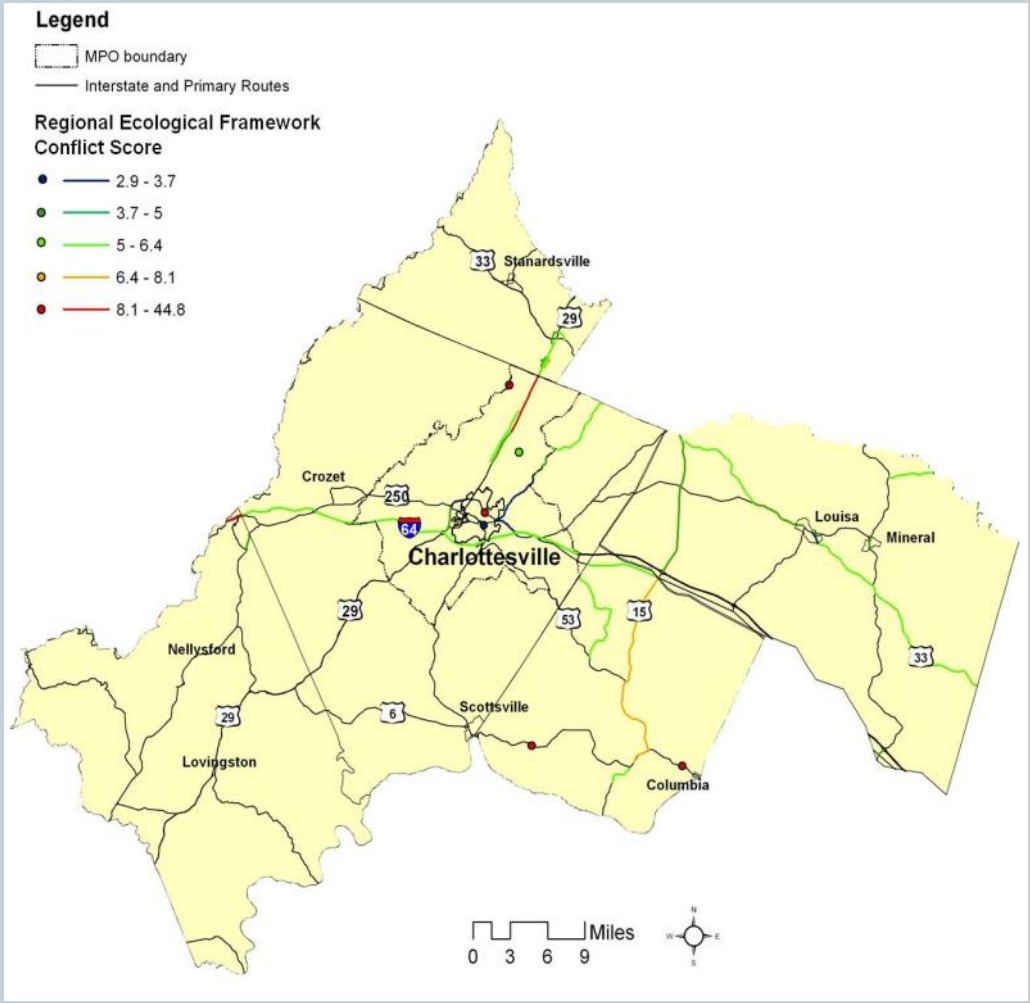


B. Projects with Potential to Cause Environmental Impacts (**60**)



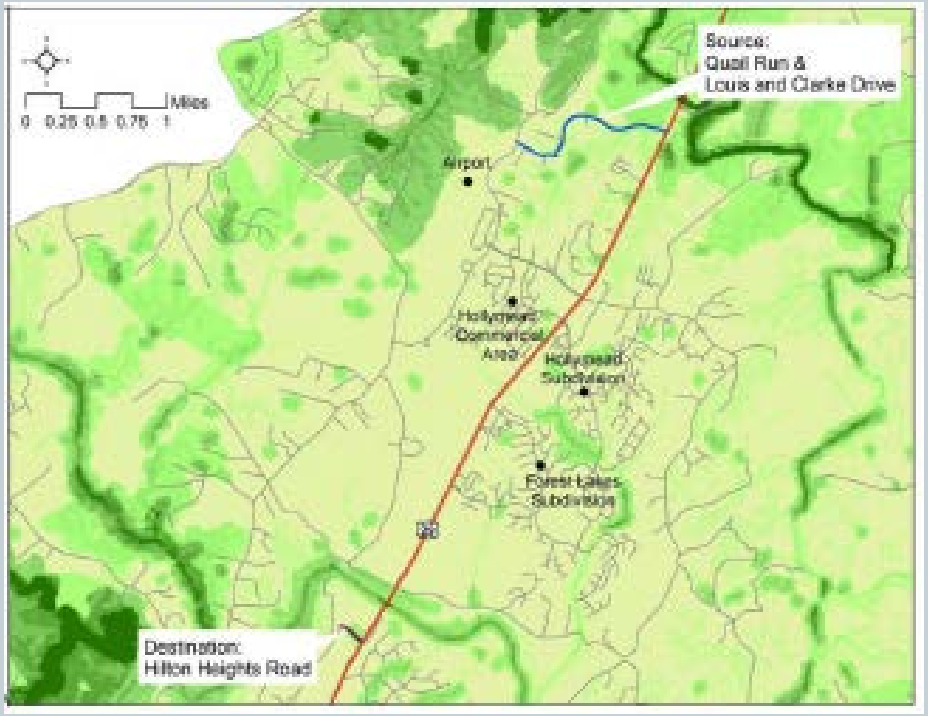
Prioritize Transportation Project with Least Ecosystem Impacts

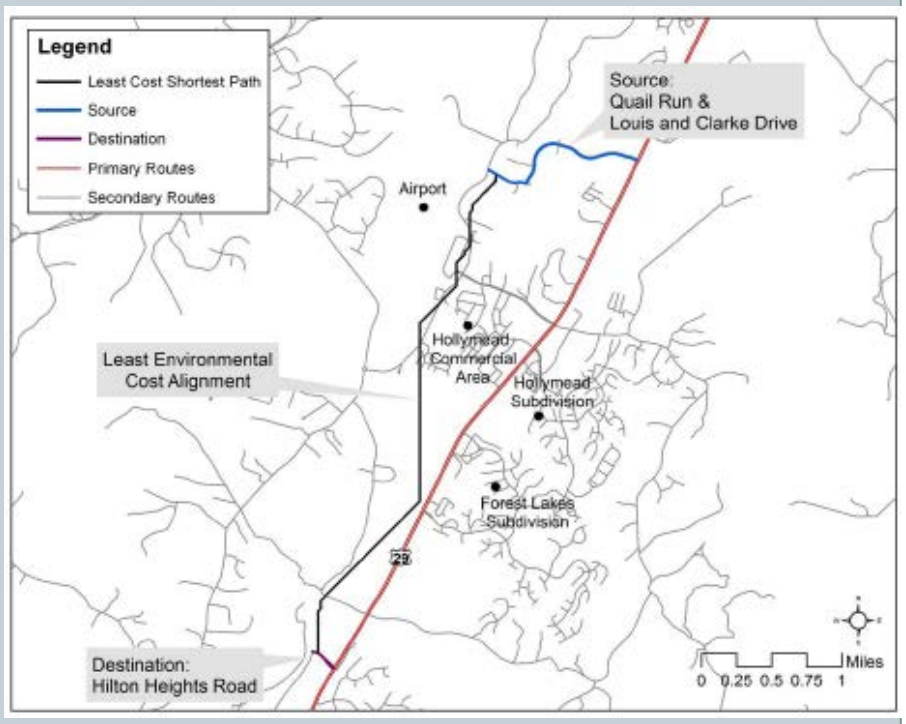
1. **Buffer projects** to create impact zone
2. **Aggregate values** within impact zone to identify ecosystem impact
3. **Normalize values** to allow comparison of transportation projects
4. **Prioritize projects** based on lowest ecosystem impact



Lowest Ecosystem Impact Road Alignment

Use “Least Cost” Tool in ESRI Spatial Analyst





Other Opportunities for Integrated Planning

- **Identifying Mitigation Priorities**
- **Comprehensive Plans**
  - Let REF inform land use decisions, conservation planning
- **Meeting Chesapeake Bay Total Maximum Daily Load requirements**
  - Restoration focuses on impaired streams
  - Take credit for transportation mitigation projects at no cost to the locality
- **Nutrient Trading** – identify potential stormwater impact mitigation sites

Contact Information:

Stephen Williams, Executive Director
Thomas Jefferson Planning District Commission
swilliams@tjpdc.org
Phone: 434.979-7310 x110

CHICAGO DEPARTMENT OF TRANSPORTATION

The Cermak/ Blue Island Sustainable Streetscape

FHWA Ecological Webinar

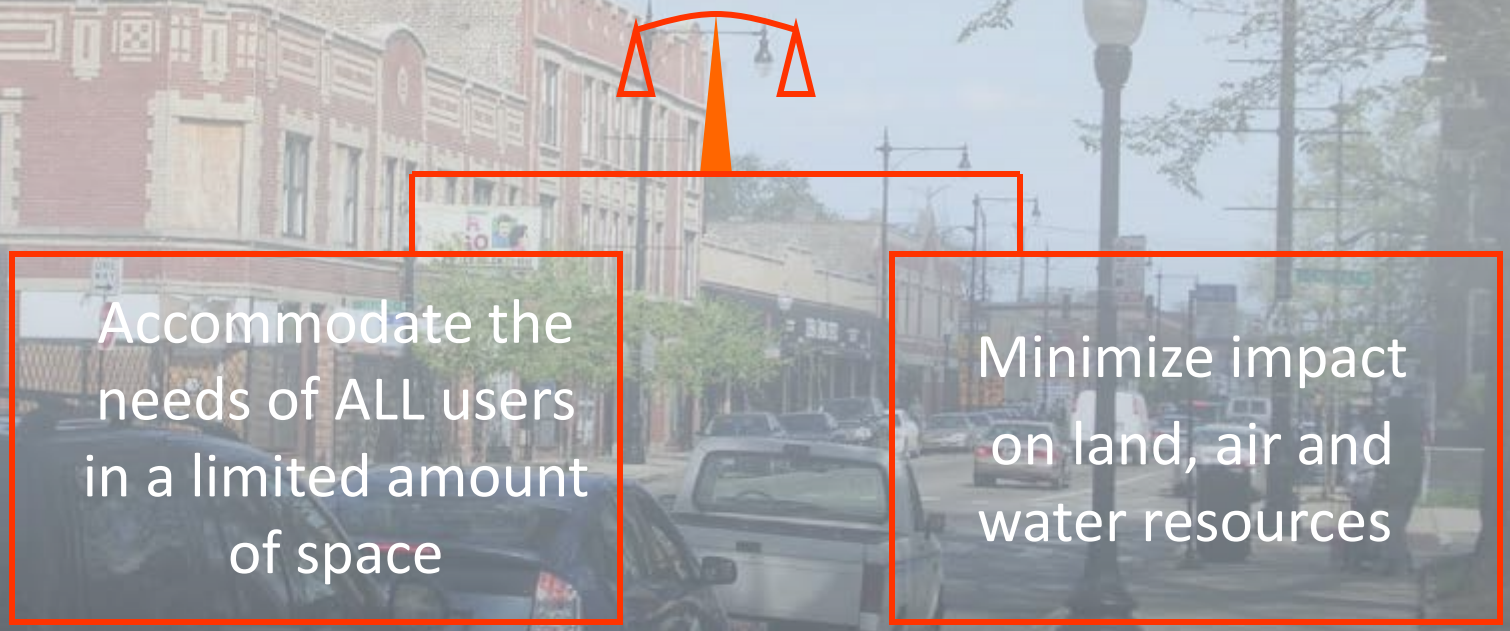
David Leopold, Program Manager
CDOT Streetscape and Sustainable Design Program

The Cermak/ Blue Island Streetscape

Ecological Approach: A project-specific mitigation effort to demonstrate how sustainable infrastructure can support the urban ecosystem

CDOT
CHICAGO DEPARTMENT OF TRANSPORTATION

Old Fashioned and New Fashioned Sustainability



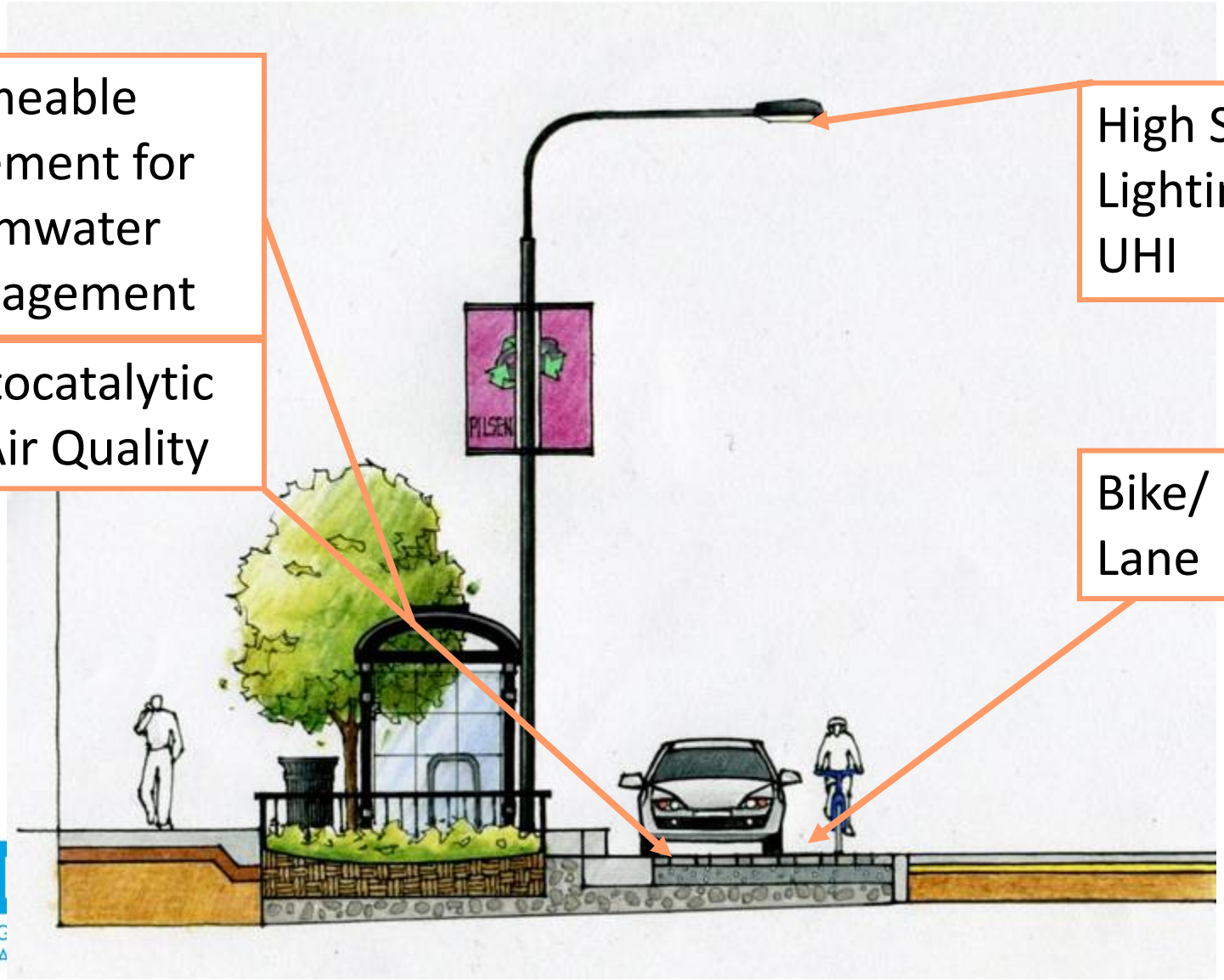
CDOT
CHICAGO DEPARTMENT OF TRANSPORTATION

2009.04.16 03:29

Project Sustainable Goals

Stormwater Management	Divert 80% of the typical average annual rainfall and at least 2/3 of rainwater falling within catchment area into stormwater best management practices.
Water Efficiency	Eliminate use of potable water for irrigation, specify native or climate adapted, drought tolerant plants for all landscape material.
Transportation	Improve bus stops with signage, shelters and lighting where possible, promote cycling with new bike lanes, improve pedestrian mobility with accessible sidewalks.
Energy Efficiency	Reduce energy use by min. 40% below a typical streetscape baseline, use reflective surfaces on roads/sidewalks, use dark sky-friendly fixtures. Min. 40% of total materials will be extracted, harvested, recovered, and/or manufactured within 500 miles of the project site.
Recycling	Recycle at least 90% of construction waste based on LEED NC criteria, Post/Pre-Consumer recycled content must be min. 10% of total materials value.
Urban Heat Island, Air Quality	Reduce ambient summer temperatures on streets and sidewalks through use of high albedo pavements, roadway coatings, landscaping, and permeable pavements. Require ultra low sulfur diesel and anti-idling.
Education, Beauty & Community	Provide public outreach materials/self-guided tour brochure to highlight innovative, sustainable design features of streetscape. Create places that celebrate community, provide gathering space, allow for interaction and observation of people and the natural world.
Commissioning	Model Stormwater BMP's in Infoworks to analyze and refine design. Monitor stormwater BMP's to ensure predicted performance and determine maintenance practices.

Integrated Design: Blue Island Cross Section



Permeable Pavement for Stormwater Management

Photocatalytic for Air Quality

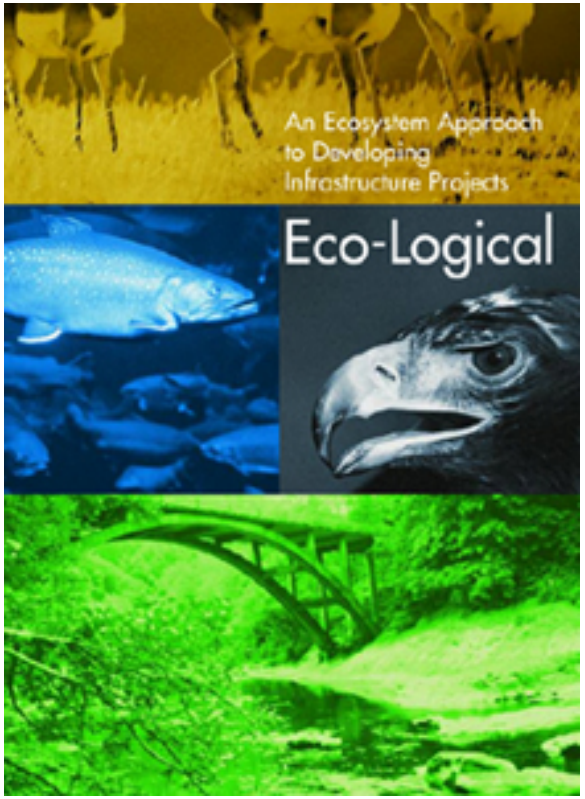
High SRI for Lighting and UHI

Bike/ Parking Lane

CHICAG
OF TRA

Integrated Design: Cermak Road

Ecological Process and Grant Scope



Sustainable
Streetscape
Education
Materials

Sustainable
Streetscape
Design Manual

CDOT
CHICAGO DEPARTMENT
OF TRANSPORTATION

Education: Informational Kiosks with Interpretive Graphics, Lightpole Identifiers, and Walking Tour

Commissioning- Sustainable Design Manual

- Design, Construction, and Commissioning Performance Report
- Details the Implementation of Sustainable Goals, Including Ideas Not Selected.
- Living Document to Include Construction and Commissioning Reports

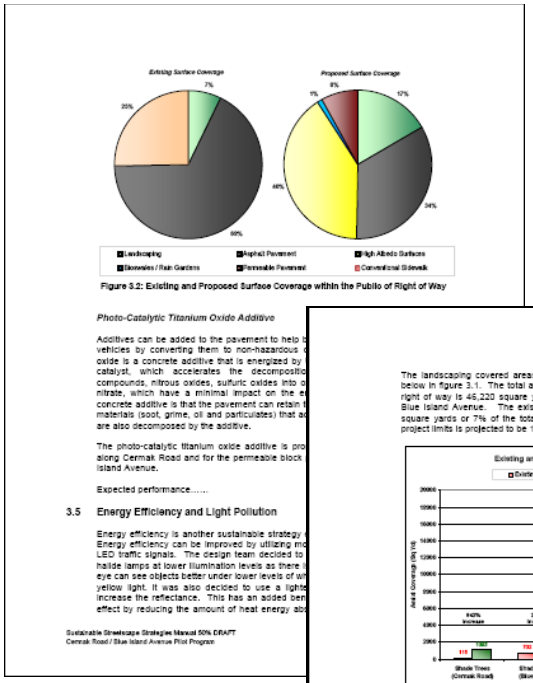


Figure 3.2: Existing and Proposed Surface Coverage within the Public of Right of Way

Photo-Catalytic Titanium Oxide Additive

Additives can be added to the pavement to help b
vehicles by converting them to non-hazardous
oxide is a concrete additive that is energized by
catalyst, which accelerates the decompositio
compounds, nitrous oxides, sulfuric oxides into
nitrate, which have a minimal impact on the e
concrete additive is that the pavement can retain
materials (soot, grime, oil and particulates) that a
are also decomposed by the additive.

The photo-catalytic titanium oxide additive is pro
along Cermak Road and for the permeable block
Island Avenue.

Expected performance.....

3.5 Energy Efficiency and Light Pollution

Energy efficiency is another sustainable strategy
Energy efficiency can be improved by utilizing mo
LED traffic signals. The design team decided to
halide lamps at lower illumination levels as there
eye can see objects better under lower levels of wh
yellow light. It was also decided to use a lighte
increase the reflectance. This has an added ben
effect by reducing the amount of heat energy abs

The landscaping covered areas prior to and after project completion are summarized below in figure 3.1. The total area of the streetscape project within the City of Chicago right of way is 46,220 square yards on Cermak Road and is 64,000 square yards on Blue Island Avenue. The existing landscaping cover within the project limits is 7,745 square yards or 7% of the total area, and the proposed landscaping cover within the project limits is projected to be 17,925 square yards or 16% of the total area.

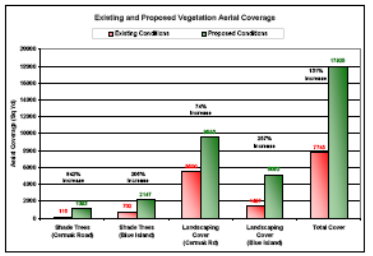


Figure 3.1: Existing and Proposed Vegetation Aerial Coverage within Public Right of Way

Figure 3.2 shows the distribution of land surface area within the public right of way for both the existing and proposed conditions along Cermak Avenue and Blue Island Avenue. High albedo surfaces of the new streetscape comprise 40% of the total public right of way, and the area of dark asphalt has been significantly reduced from 68% to 34% of the total public right of way. A high albedo surface is defined according to LEED as one that has a minimum 29 SRI index.

Vegetation offers additional cooling benefits than high albedo pavement or roof surfaces. Maximizing the vegetation area has a greater positive benefit when compared with high albedo surfaces in reducing the urban heat island effect. The proposed streetscape project has significantly increased the area of vegetated surfaces from 7% to 17%. The proposed streetscape project adds bioswales and rain gardens with them now encompassing 1% of the total area within the public right of way.

CDOT
CHICAGO DEPARTMENT OF TRANSPORTATION

Stay In Touch

Website

www.chicagodot.org

Twitter

@CDOTNews

Facebook

facebook.com/CDOTNews

CDOT
CHICAGO DEPARTMENT
OF TRANSPORTATION

Questions?

Thomas Jefferson Planning District Commission:
http://www.tjpdc.org

Chicago Department of Transportation:
http://www.chicagodot.org

Eco-Logical Grant Program:
http://www.environment.fhwa.dot.gov/ecological/eco_grant_program.asp

The 2010 Eco-Logical Grant Program Annual Report:
http://environment.fhwa.dot.gov/ecological/grantProgram_rpt/report2011.asp

Upcoming Eco-Logical Webinar Topics

May 2012: The Use of Regional Ecosystem Frameworks (REFs) for Transportation Planning at Regional, State, and National Scales

Future topics:

- ❑ Wetland Planning and Assessments: Applications for Transportation Siting and Mitigation
- ❑ Linking Transportation and Ecosystems in an Urban Environment: Stormwater Developments and Case Studies
- ❑ Green Infrastructure: Eco-Logical Concepts in Infrastructure Planning
- ❑ Technical Assistance to Connect Eco-Logical Knowledge with Transportation Plans and Projects
- ❑ Land Trusts as Mitigation Partnership Opportunities

Eco-Logical Webinar Series:
http://www.environment.fhwa.dot.gov/ecological/eco_webinar_series.asp