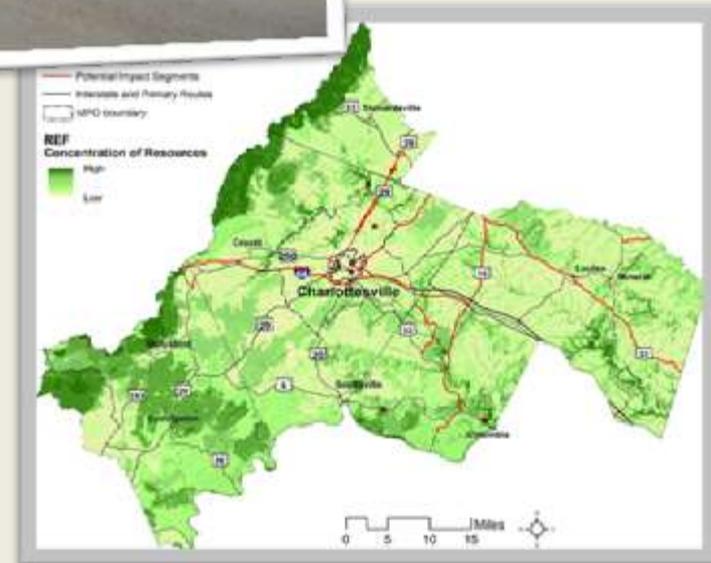


Free Bridge Congestion Relief Study: Overview of the Regional Eco-logical Framework (REF)

November 18, 2013

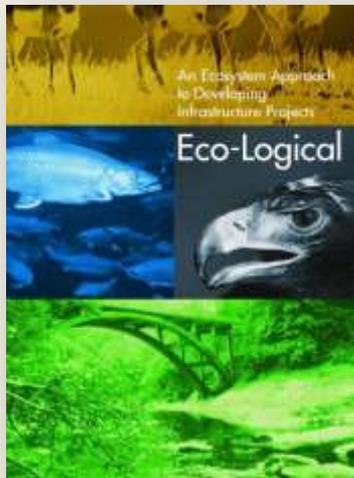
Charlottesville Albemarle Metropolitan
Planning Organization (CAMPO) and The Thomas
Jefferson Planning District Commission



Introduction:

History of Eco-Logical

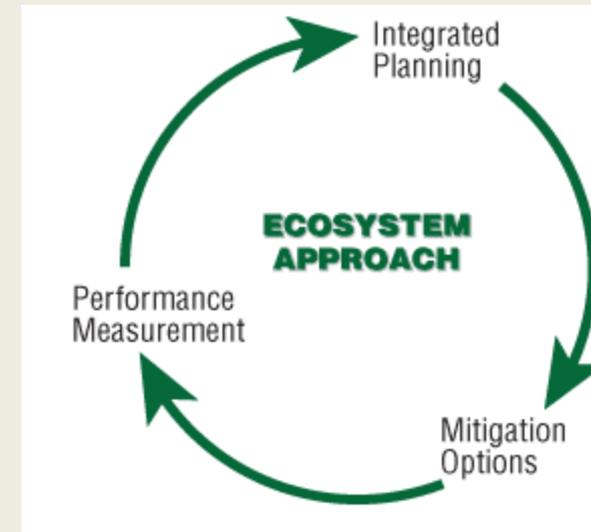
- Federal Highway Administration, in partnership with other Federal infrastructure and environmental agencies developed Eco-Logical in response to the 2002 Executive Order 13274 *Environmental Stewardship and Transportation Infrastructure Project Reviews*.
- The Eco-Logical approach relies on enhanced cooperation between transportation and regulatory agencies to more effectively link transportation system planning with natural and cultural resource concerns.



Introduction:

What is Eco-Logical: An Ecosystem Approach to Developing Infrastructure Projects?

- “Eco-Logical offers a non-prescriptive approach that enables Local, State, Tribal and Federal partners involved in infrastructure planning, design, review, and construction to work together to make infrastructure projects more sensitive to wildlife and their ecosystems.”
- The Eco-Logical approach is grounded in three defining principals.
 1. Integrate planning between natural resource and transportation agencies .
 2. Mitigation options that enhance the Regional Ecological Framework. (Mitigation in the context of regional habitats and ecology)
 3. Performance measures that balance predictability and adaptive management.



Introduction:

Eco-Logical's Eight Step Framework for Integrated Planning

1. Build and Strengthen Collaborative Partnerships

- Local, Regional, State, and Federal

2. Identify Management Plans

- Local, State and Federal (Green Infrastructure Plan, VA Wildlife Action Plan, Chesapeake Bay Program, etc.)

3. Integration of Plans

- Plan priorities combined to create the 'Regional Ecosystem Framework' (REF)

4. Assess Effects

- Study how the proposed project could impact ecologically important areas

Introduction:

Eco-logical's Eight Step Framework Continued

5. Establish and Prioritize Opportunities

- Use the REF to establish priority conservation areas and priority mitigation areas.

6. Document Agreements

- Work with agencies and partners to reach a consensus and strive to develop agreements with resource agencies.

7. Design Projects Consistent With Regional Ecosystem Framework

- Ensure that the final project keeps within the scope of what was discussed in the context of the REF analysis.

8. Balance Predictability and Adaptive Management

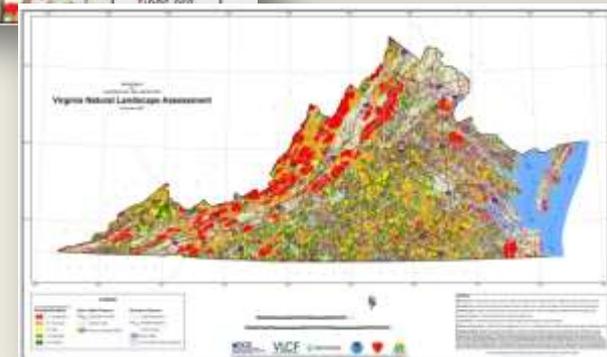
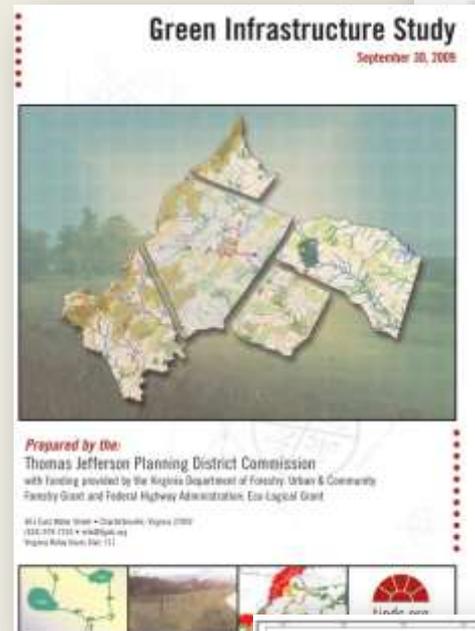
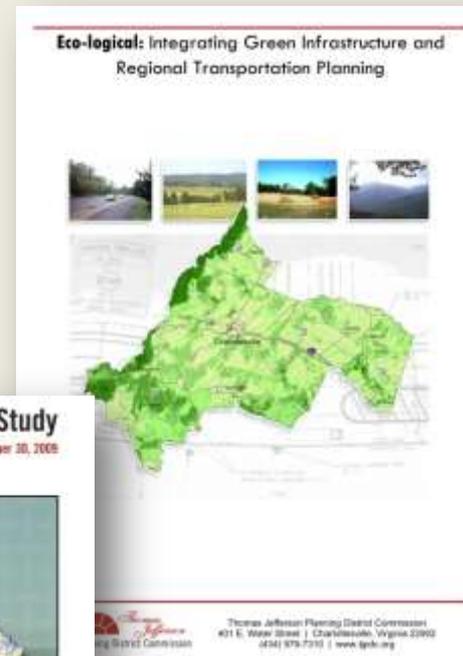
- Predictability in the process is fostered through open communication and understanding between parties.
- Adaptive management involves continuously learning from the results of previous decisions in order that these decisions can be adjusted to produce even better outcomes.

How Is Eco-Logical Approach Different?

- **Stakeholder based approach**
 - The stakeholder group will be taking the lead on proposing solutions, alternatives, and resources
- **Consensus building**
 - The project will ensure all voices are heard and all ideas are considered and evaluated
 - No project will move forward without consensus from the Steering Committee
- **Open to the public**
 - Public are welcome to attend meetings and are encouraged to participate in the process through four public events and open houses
- **Solution based**
 - Goal of the project is to evaluate the methodology and develop a solution to Free Bridge Congestion
 - No build is a viable option
- **Environmental and social considerations included as part of the planning process**
 - By design environmental, historic, and cultural resources will be evaluated along with transportation needs

How did we Get Here:

- 2009 TJPDC Green Infrastructure Study
- 2011 Eco-Logical: Integrating Green Infrastructure and Regional Transportation Planning Report



The Regional Ecosystem Framework (REF):

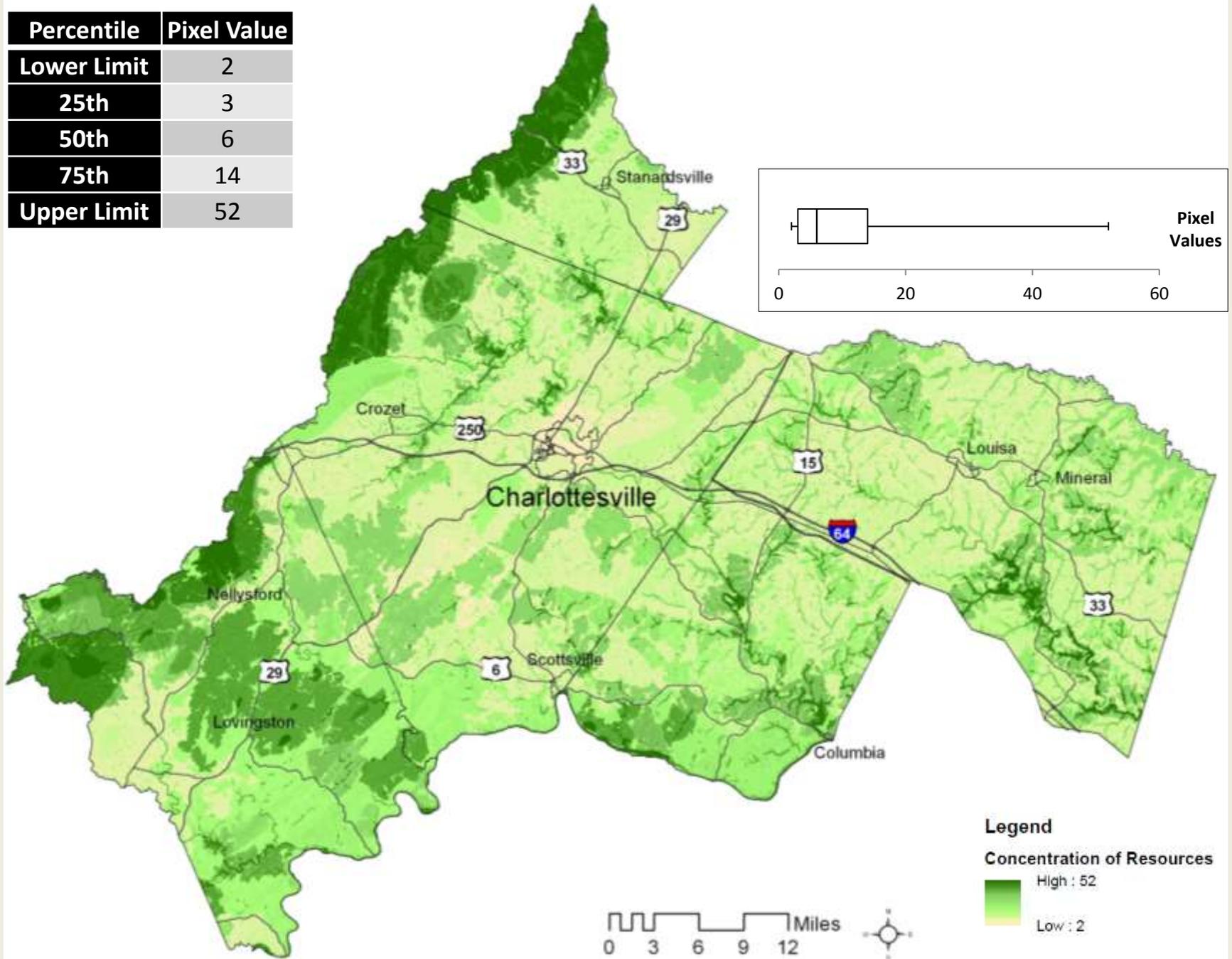
- Main Deliverable of the 2011 Ecological Project
- The REF is an inventory of significant natural resources in the TJPDC that are important to the region's ecological health.
- Establishes an ecological blueprint that can be used for future planning activities.
- It is a raster base-map that contains 8 environmental resource datasets.
- Datasets and attributes ranked by Advisory Committee of State Agencies and Local Governments.
- Opportunity to enhance map and add additional datasets



REF Datasets:

Dataset	Description	Agency/Source
Tiered Species Habitat	Wildlife habitat conservation opportunities in VA	Dept. of Game and Inland Fisheries (DGIF)
Threatened & Endangered Species Waters	Streams and rivers with documented occurrences of State or Federal listed threatened or endangered species	DGIF
Species Observations	Species observations from various sources	DGIF
Virginia Natural Landscape Assessment	Landscape-scale geospatial analysis for identifying, prioritizing, and linking natural lands in VA	Dept. of Conservation and Recreation (DCR)
Priority Conservation Sites	Conservation sites are a tool for representing key areas of the landscape worthy of protection	DCR
Important Bird Areas	Identifies vital areas to birds and other biodiversity	National Audubon Society
National Wetlands Inventory	Provides information on the location and type of wetlands	U.S. Fish and Wildlife Service
VCLNA Watershed Integrity Model	Model developed to show the relative value of land as it contributes to watershed or water quality integrity	DCR

Percentile	Pixel Value
Lower Limit	2
25th	3
50th	6
75th	14
Upper Limit	52



What is GIS?

- “A geographic information system, or GIS is a set of software tools that let users visualize, question, analyze, interpret, and understand data to reveal relationships, patterns and trends in the form of maps, globes, reports and charts.” (Source: ESRI.com)
- Key components of GIS:
 - **Spatially addressed data**
 - Data is referenced with a unique address (Latitude and Longitude)
 - **Data types**
 - Raster Data (square cells, each with a unique value)
 - Vector Data (points, lines and polygon “shapes”)
 - **Data is stored in layers**
 - Roads, buildings, land cover, Land use
 - **Layers containing multiple features**
 - Land use types, road classifications or land cover classes
 - **Features linked to information**
 - Number of residents in a census tract, stream names, etc.
 - **Ability to analyze and query data**
 - Number of homes within 1 mile of Free Bridge

General Area Map.mxd - ArcMap

File Edit View Bookmarks Insert Selection Geoprocessing Customize Windows Help

Table Of Contents

- Layers
 - Project Area
 - Project Area
 - Project Area Blocks
 - Transportation
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 - trai_line_06_21_2012
 - Trails
 - Char_VGNH_2011
 - Alex_VGNH2011
 - road_area_02_06_2013
 - road_bridg_area_11_03_2011
 - Political Units
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 - Buildings
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 - City Parcels
 - Parcels
 - Landscape Features
 - 100 Year Floodplains
 - Rivers
 - NHCFloodway_TSPDC
 - Parks
 - 4th Topo
 - R-F Value Range
 - Value
 - Higher Habitat Value (S)
 - Low Habitat Value (L)

Layers

Char_VGNH_2011

V_POSEH	V_ORGMAM	ROUTEMRSE	V_FRADDL	V_TONDDL	V_TRAERD	V_TOAERD	V_UCNGEY	V_UCRGOT	V_UCODE	VDOF_DISTB
Zen Rd		0	191	198	100	189	KRR	11292816	195	1
Zen Rd		0	0	0	100	182	KRR	11292816	195	1
Colde-HR Rd		0	1781	1711	1100	1170	KRR	02720919	195	1
Argus Rd		3419	2160	2202	0	0	KRR	02720919	195	1
Argus Rd		3419	2280	2308	2289	2589	KRR	02720919	195	1
Water Dr		0	2181	2113	0	0	KRR	02820919	193	1
Hydrant Rd		3439	0	0	1000	1095	KRR	02520919	192	1
Swanson Dr		0	0	0	0	0	KRR	02420919	191	0
Polkville Rd		0	1804	1808	0	0	KRR	02420919	191	0
Hydrant Rd		0	1800	1802	0	0	KRR	02420919	191	0
Water Dr		0	181	202	100	180	KRR	02420919	191	1

14 1 (0 out of 295 Selected)

Char_VGNH_2011

Drawing 11488181.708 3804935.794 Feet

GIS Layout View

General Area Map.mxd - ArcMap

File Edit View Bookmarks Insert Selection Geoprocessing Customize Windows Help

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 - Low Habitat Value (L)
 - Basemap
 - Wood_Proxy
 - Basemap
 - OpenStreetMap

TJPCD Free Bridge Congestion Relief Study

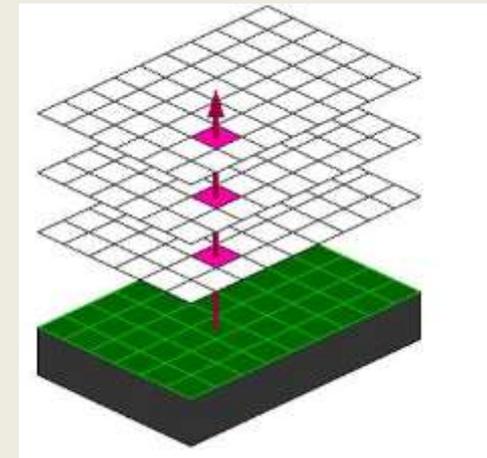
Drawing -1.78 11.06 Inches

GIS Data View

How Does the REF Work:

Geospatial Analysis

- “Geospatial analysis is an approach to applying statistical analysis and other information techniques to data which has been geospatially linked or referenced.”
- The REF provides the base for the analysis
- Project alignments or areas act as zones
- GIS is used to analyze and score project alignments for REF areas within the zones
- Results take the form of statistics for each zone
 - Average REF score
 - REF score per mile of project length
 - Total REF score of the project



How Does the REF Work:

Scoring of Project Alternatives

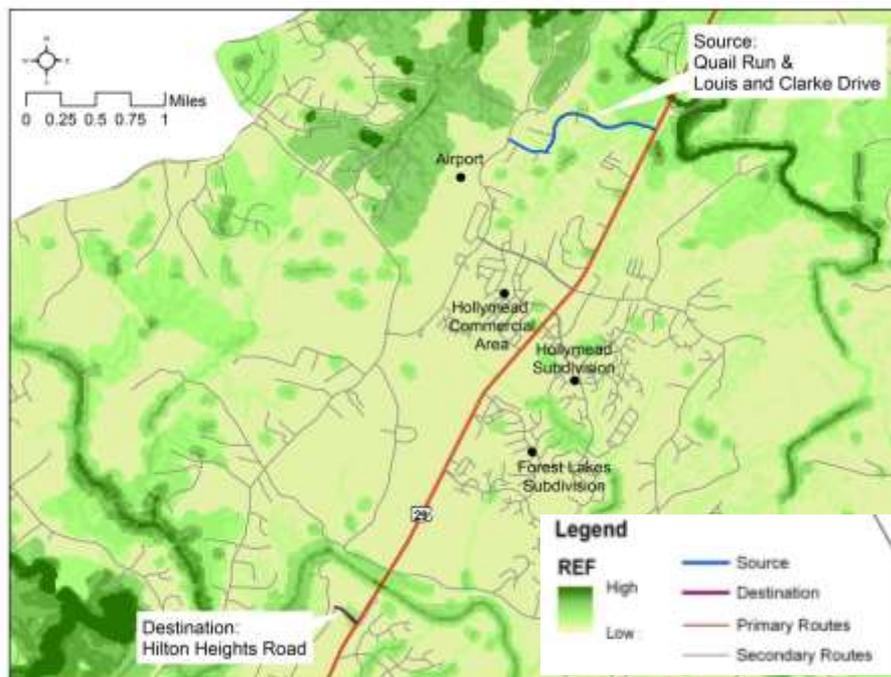
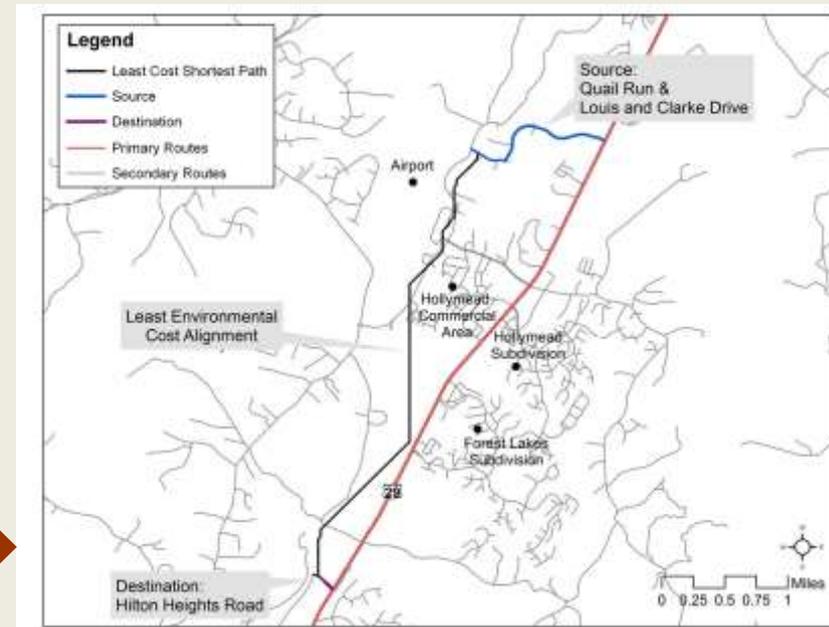
- Project footprint
- Area of potential disturbance (buffer around the project footprint)
- Project footprint and buffer used as zones
- Zonal statistics tool is used to compute REF values inside the 'zones'
- Allows for comparison between various project alternatives



How Does the REF Work:

Identifying the Path of Least Impact

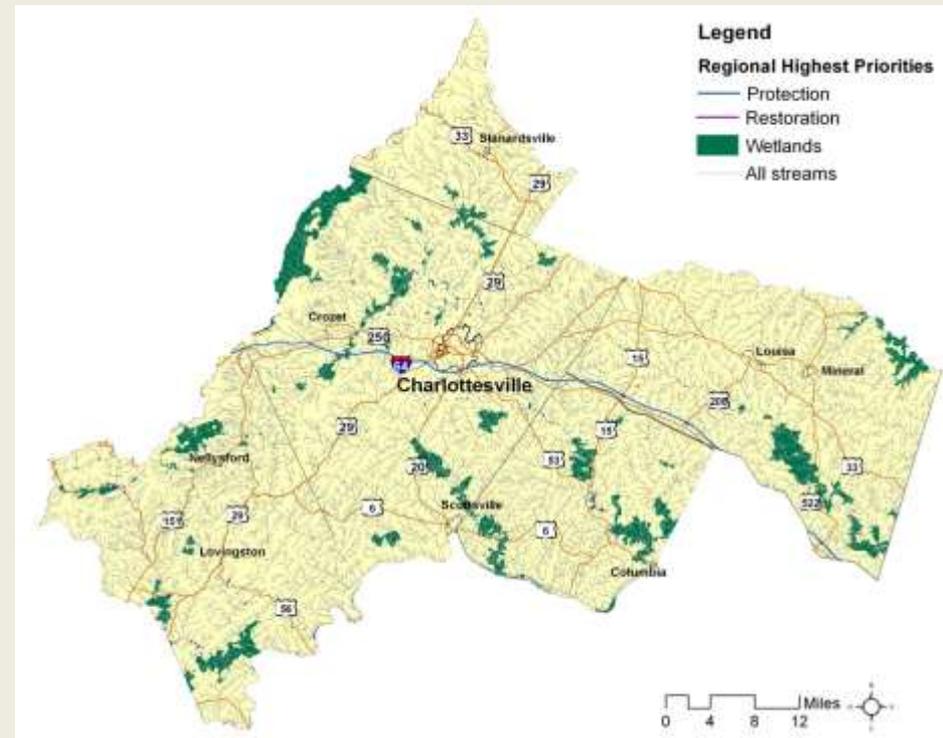
- This function allows planners and designers to identify the alignment with the least damage to the Regional Ecological Framework.
- It can be used during the NEPA process to identify the alternative that most effectively avoids and minimizes impacts to critical resources



How Does the REF Work:

Identifying Regional Environmental Mitigation Options

- The REF provided a foundation for identifying regional mitigation priorities and opportunities. Analysis was done on a regional scale to identify regional mitigation priorities.
- Mitigation sites that enhance the Regional Ecological Framework were strategically identified.
 - Stream mitigation
 - Wetland mitigation
- Provides opportunity for partnership



Process and Tools:

Application of Eco-Logical and the REF to the Free Bridge Congestion Relief Project

- Analysis of project alternatives developed by stakeholder group
- Evaluation of existing REF datasets
- What additional environmental data would increase the robustness of the tool?
- Additional Module for social and cultural resources

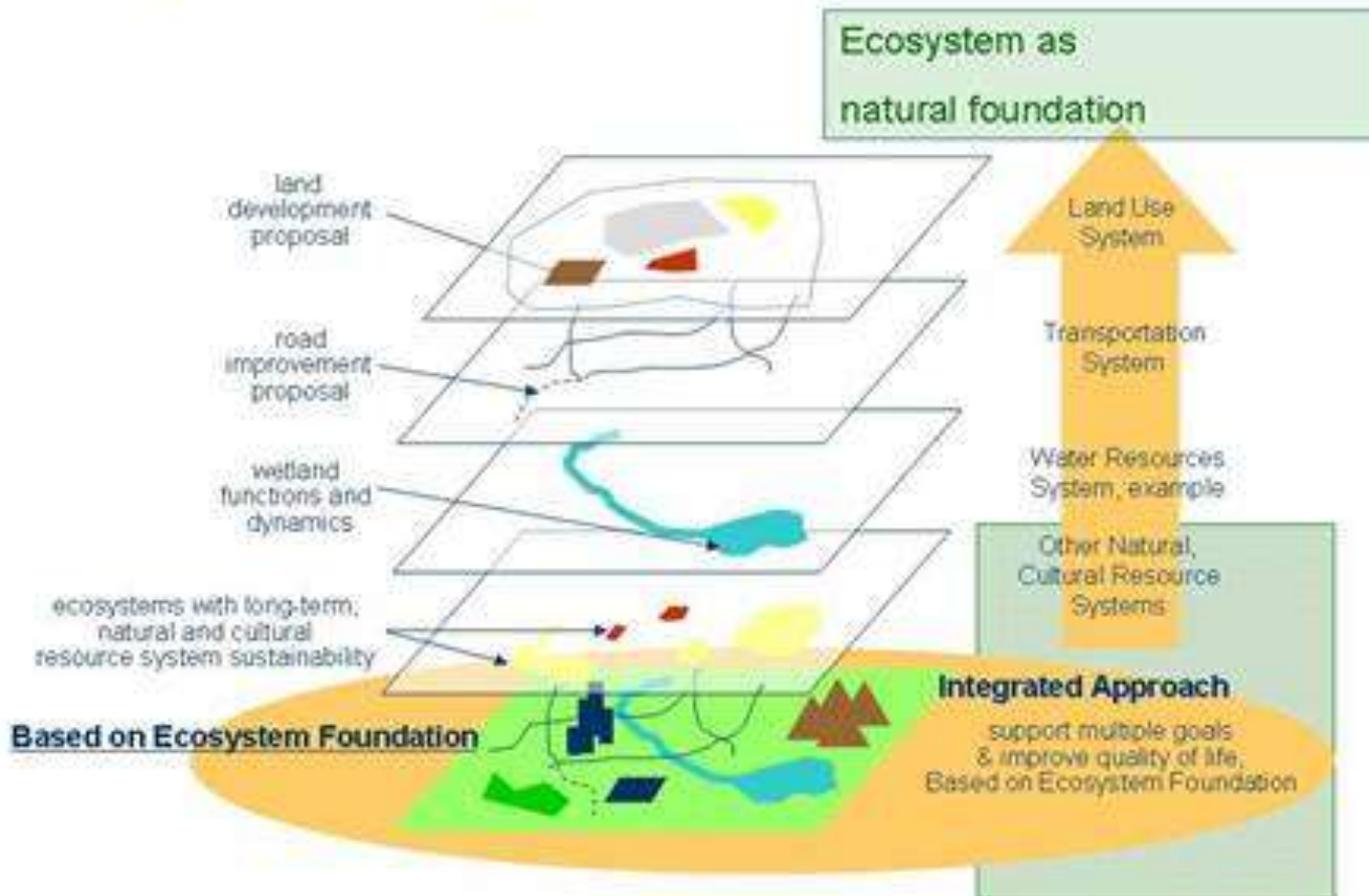
Objectives for REF

Below is a list of objectives for how the REF will be used in the context of this project

- Enhance and improve the existing REF environmental dataset
- Build additional module that incorporates social, cultural and economic interests
- Increase awareness and understanding of Eco-Logical among local governments, state agencies and the public
- Apply the tool and processes to the Free Bridge Congestion Relief Study



Integrated Ecosystem Approach: A Systems Perspective



Questions?



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