Green Infrastructure and Transportation Planning to Improve Environmental Outcomes

July 24, 2012
1:30 - 3:00 p.m. Eastern

Presenters

- ***Jesse Elam***,
  Chicago Metropolitan Agency for Planning
- ***Linda Giltz***,
  Land-of-Sky Regional Council – Western North Carolina
- ***Ralph Spagnolo***,
  Environmental Protection Agency

Moderated by **Mike Ruth**,
FHWA Office of Project Development and Environmental Review

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
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Green Infrastructure

Green infrastructure (GI) is a strategic approach to planning and managing networks of land that conserve natural ecosystems for long-range transportation planning.

- ❑ Considers the benefits of both wildlife and human populations
- ❑ Exists at the statewide, regional, community, neighborhood, and site-based scale
- ❑ Requires collaboration among many agencies and organizations

GI Focus

- GI focuses on several elements:
  - Preserving habitat
  - Maintaining the connectivity of ecosystems
  - Minimizing the impacts of infrastructure on the ecosystem

- Identifies high-priority land areas and opportunities for ecosystem connectivity
- Incorporates GIS information, tools, and methodologies to collect information that will be helpful for future planners

Chicago Metropolitan Agency for Planning

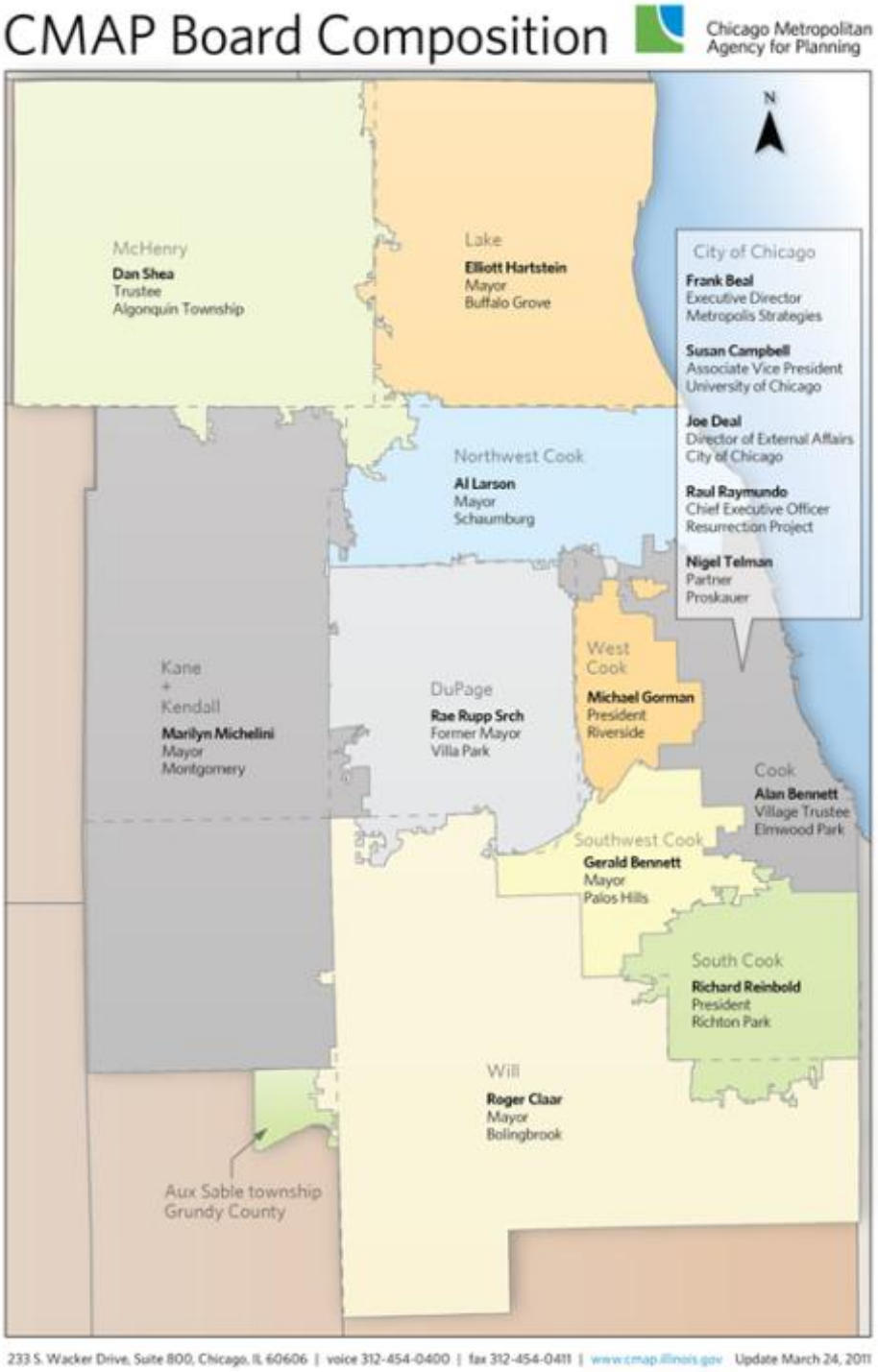
Regional Green Infrastructure in the Chicago Area

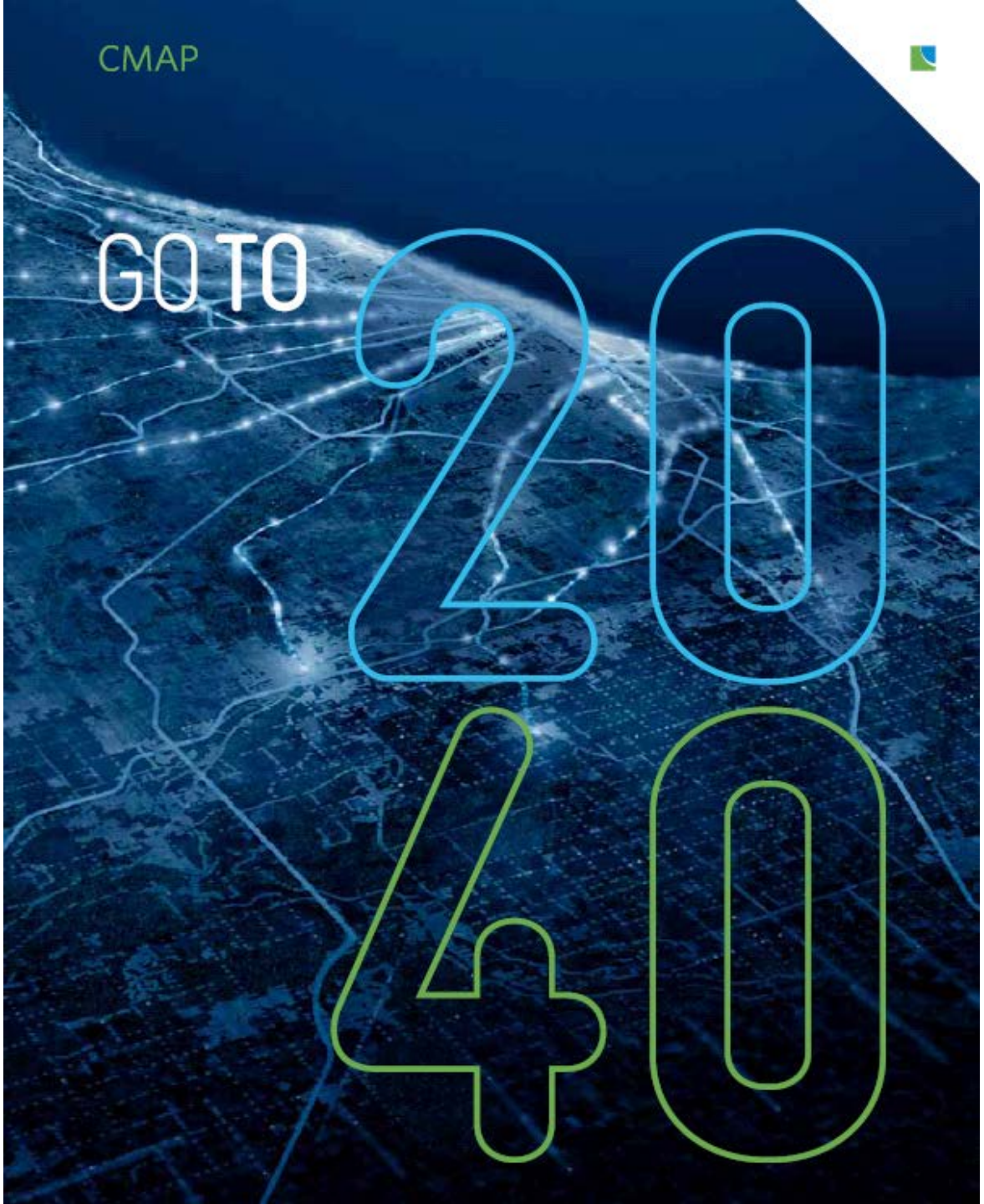
Jesse A. Elam, AICP

July 24, 2012

Who we are

- Established in 2005 by state legislation with support from the region's mayors.
- Central purpose is to better integrate planning for land use and transportation.
- Merged the Northeastern Illinois Planning Commission (NIPC) and Chicago Area Transportation Study (CATS).




CMAP
GO TO
2040

GO TO 2040: Key Recommendations

Livable Communities

1. Land Use and Housing
2. Water and Energy Conservation
3. Parks and Open Space
4. Local Food

Human Capital

5. Education and Workforce Development
6. Economic Innovation

Efficient Governance

7. Tax Policy
8. Access to Information
9. Coordinated Investments

Regional Mobility

10. Transportation Investments
    -- major capital projects
11. Public Transit
12. Freight

Chicago Wilderness Green Infrastructure Vision

Figure 33. Green Infrastructure Vision

This map shows the Resource Protection Areas in the Green Infrastructure Vision for northeastern Illinois. The inset map shows the full extent of the Chicago Wilderness GIV that extends outside the CMAP region. Sources: Chicago Wilderness and Northeastern Illinois Planning Commission

Chicago Wilderness

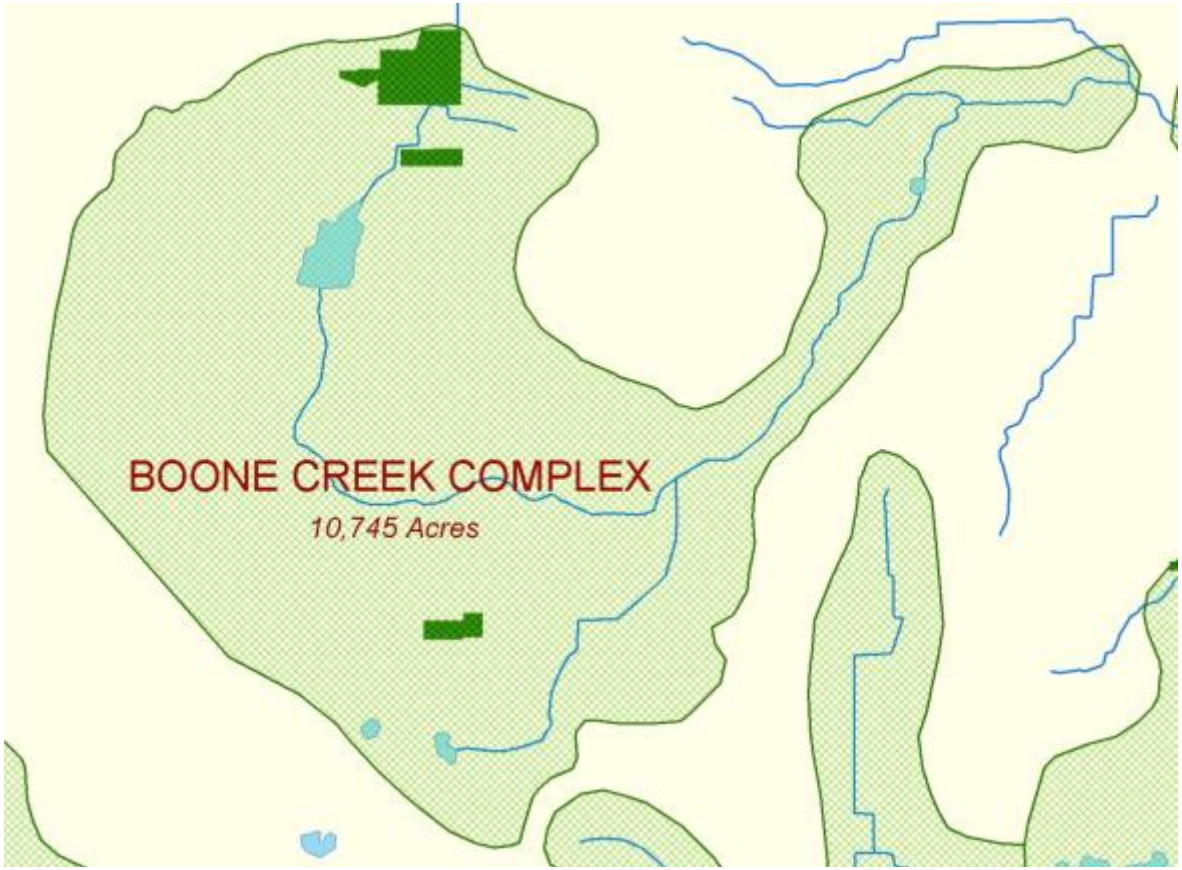
- Consortium of organizations interested in conservation, currently 262 members
- Organized to understand and help protect unique natural communities (biodiversity) around southern Lake Michigan
  - Biodiversity Recovery Plan
- Very diverse membership, from federal agencies to neighborhood groups

Chicago Wilderness Green Infrastructure Vision

Figure 33. Green Infrastructure Vision

This map shows the Resource Protection Areas in the Green Infrastructure Vision for northeastern Illinois. The inset map shows the full extent of the Chicago Wilderness GIV that extends outside the CMAP region. Sources: Chicago Wilderness and Northeastern Illinois Planning Commission

Example Resource Protection Area



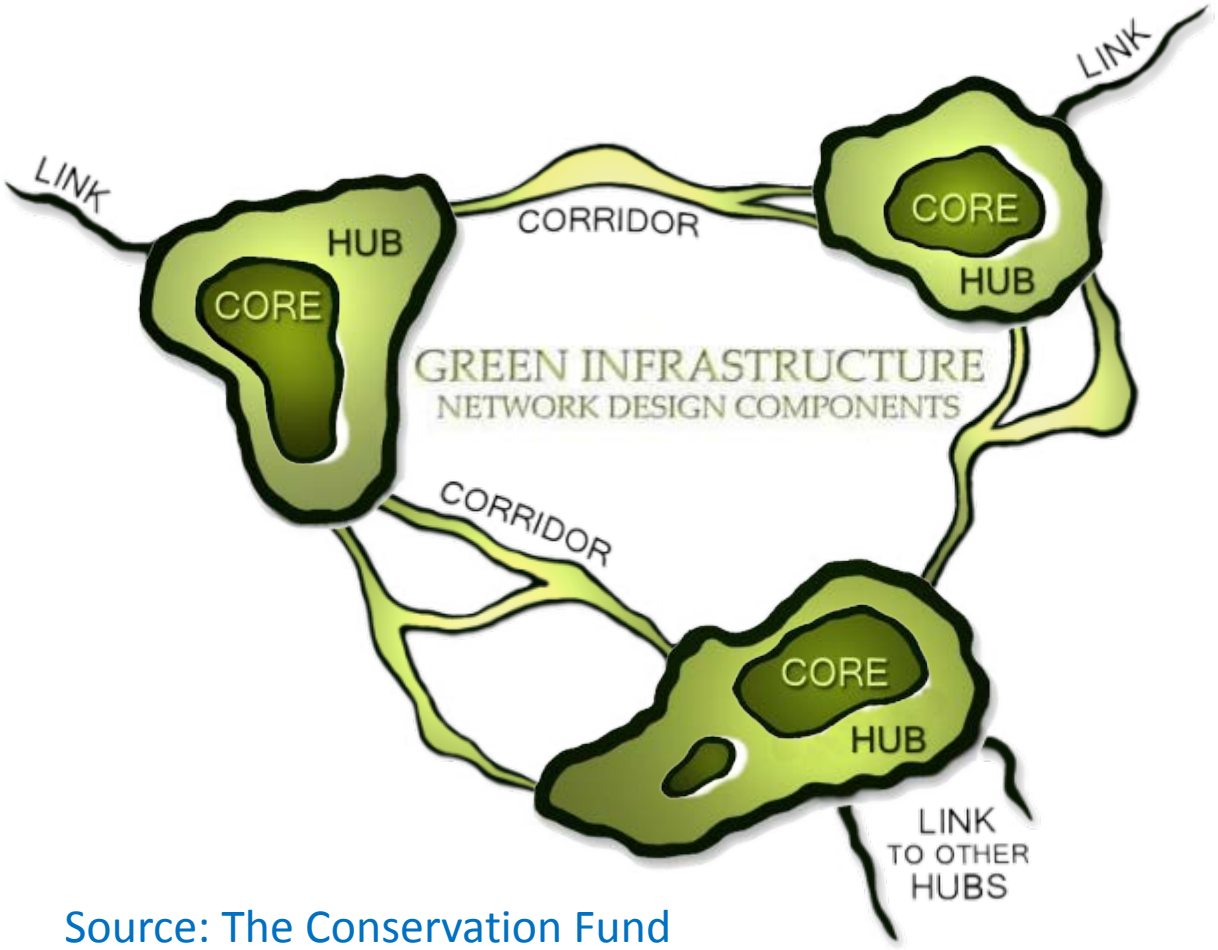
From the Final Report:

- Conservation value: Large woodlands; high quality fens; high quality, cold-water stream with silt intolerant fish. Large restorable wetlands on hydric soils.
- Target: 800 ac fee simple and easements. Protect and restore headwater streams. Identify and protect ground water recharge zones for fen wetlands.
- Development Strategies: Limit industrial development; Focus on mall scale, low-intensity conservation residential. Etc.

Why refine the GIV?

- Update with new information
- Provide more detail
- Strengthen analytical basis
- Promote consistency between sub-areas
- Concentrate on extending and improving existing planning work – make part of ongoing work program rather than ad hoc study
- Make sure GIV reflects a “common game plan” for conservation efforts by many organizations

Hub and corridor design



Source: The Conservation Fund

Core Areas:

- Contain fully functional natural ecosystems
- Provide high-quality habitat for native plants and animals

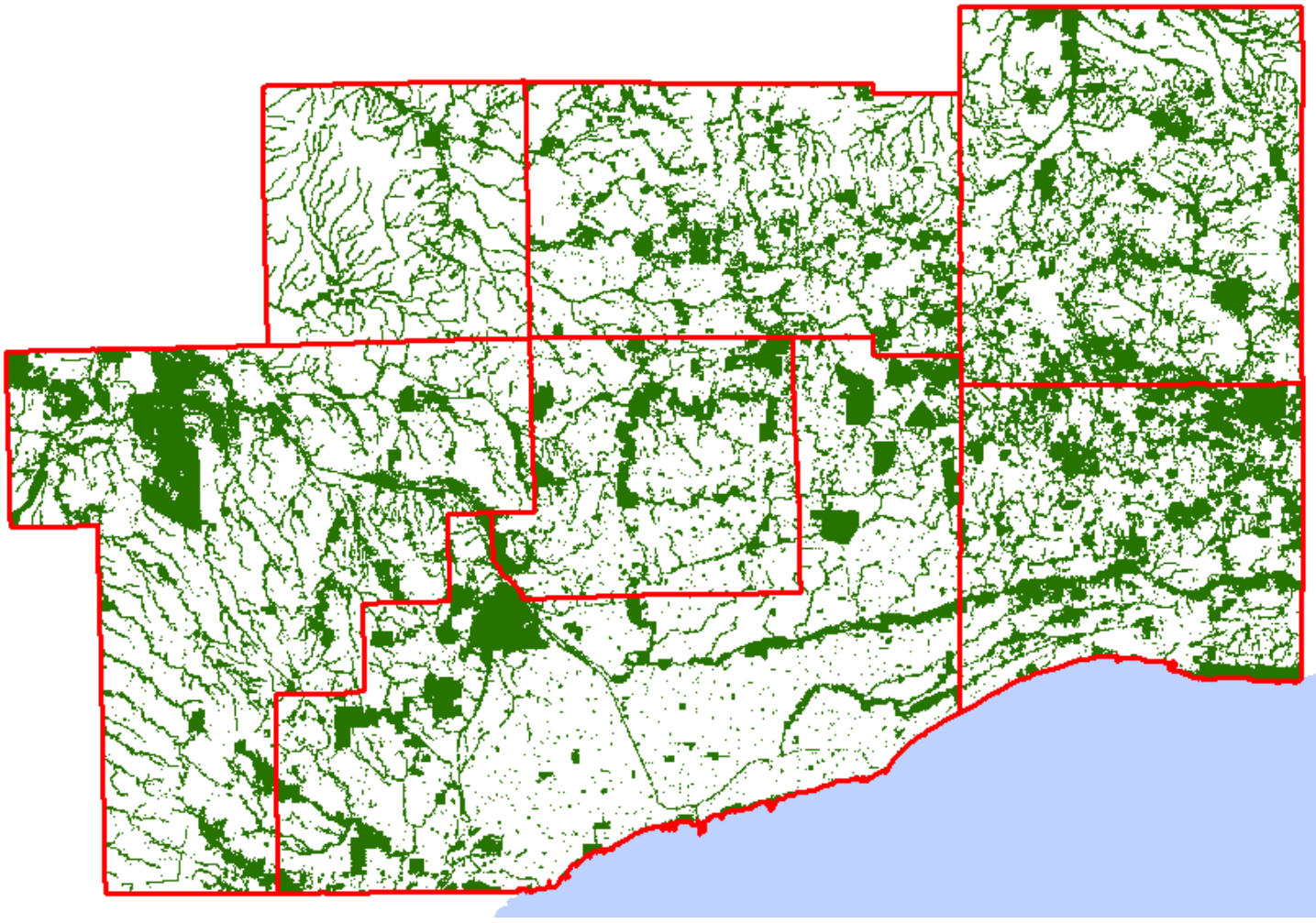
Hubs:

- Slightly fragmented aggregations of core areas, plus contiguous natural cover

Corridors:

- Link core areas together
- Allow animal movement and seed and pollen transfer between core areas

Chicago Wilderness Green Infrastructure Vision, v. 2.0



Source: The Conservation Fund

Potential applications

1. Guide conservation investments
2. Shape growth patterns

- Land conservation
- Municipal comprehensive plans
- Transportation project development

Potential applications

- Land conservation
  - Open space protection is undertaken by many entities with different funding and different priorities.
- Recommendation:
  - Encourage those involved in land protection to use the GI data to guide land conservation
    - Land trusts
    - DNR (direct and grant funded)
    - Local conservation agencies

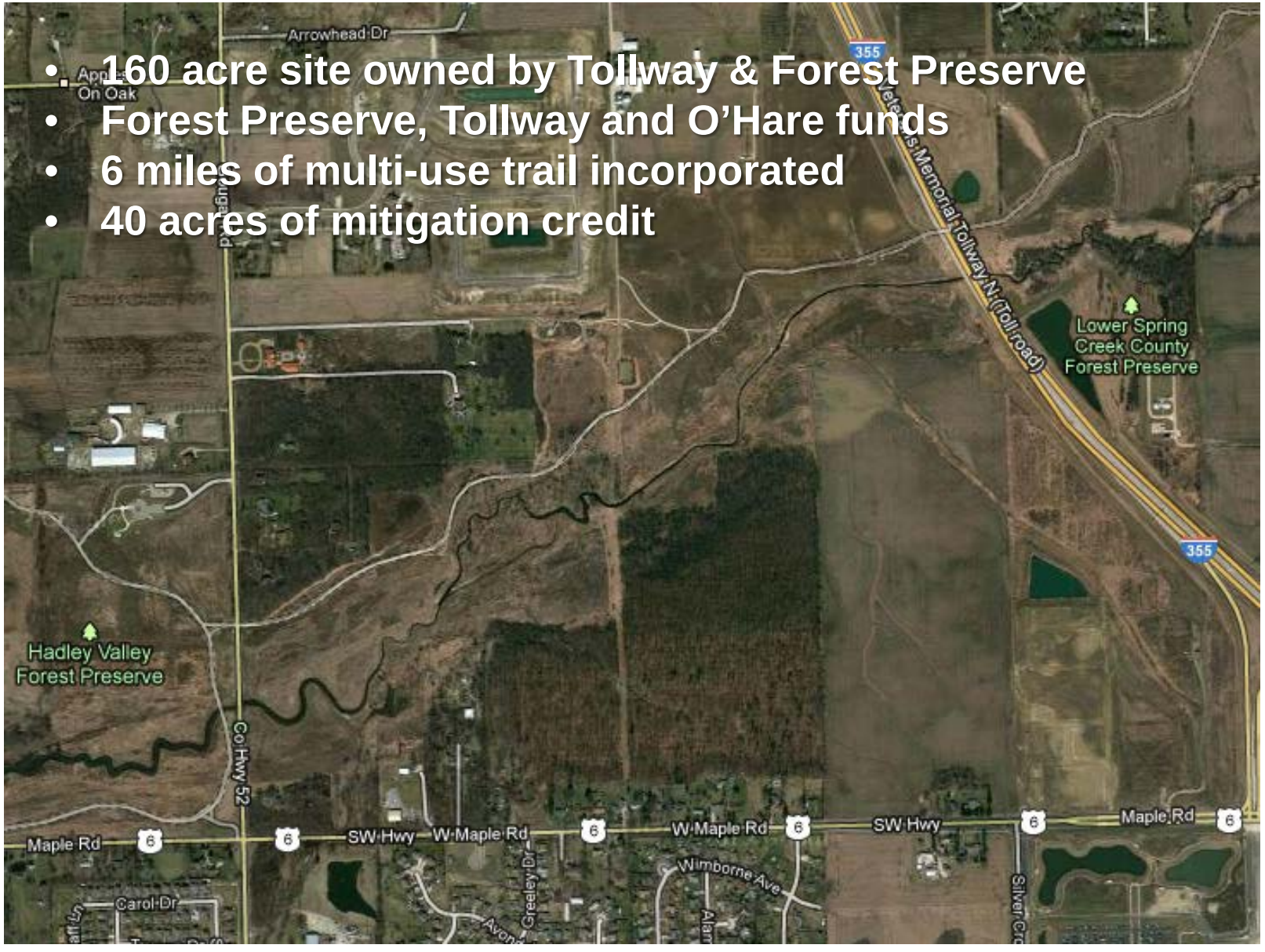
Potential applications

- Municipal comprehensive plans
  - Municipalities are now undertaking GI mapping projects; often become mired in questions about data availability, definitions, etc.
- Recommendation:
  - Treat the green infrastructure data as a minimum network of green infrastructure, supplement with local information
  - Comprehensive plans undertaken with CMAP assistance should use the GIV data.

Potential applications

- Transportation project development
  - Transportation projects can work against the preservation of the green infrastructure network
- Recommendation:
  - Consider effects on the green infrastructure network as part of normal environmental review.
  - Use to help indicate priority areas for compensatory mitigation

Example: Spring Creek Greenway and I-355 S extension



- 160 acre site owned by Tollway & Forest Preserve
- Forest Preserve, Tollway and O'Hare funds
- 6 miles of multi-use trail incorporated
- 40 acres of mitigation credit

Example: Fox River bridges, Kane County DOT

Questions?

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Linking Lands and Communities in the Land-of-Sky Region

Eco-Logical Webinar –

"Green Infrastructure and Transportation Planning to Improve Environmental Outcomes"

July 24, 2012

www.linkinglands.org

Linda Giltz, AICP, Senior Planner

828-251-6622 *lindag@landofsky.org*

Land-of-Sky Regional Council

Land-of-Sky Region

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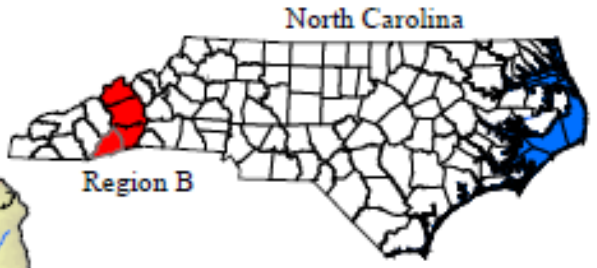
Western North Carolina

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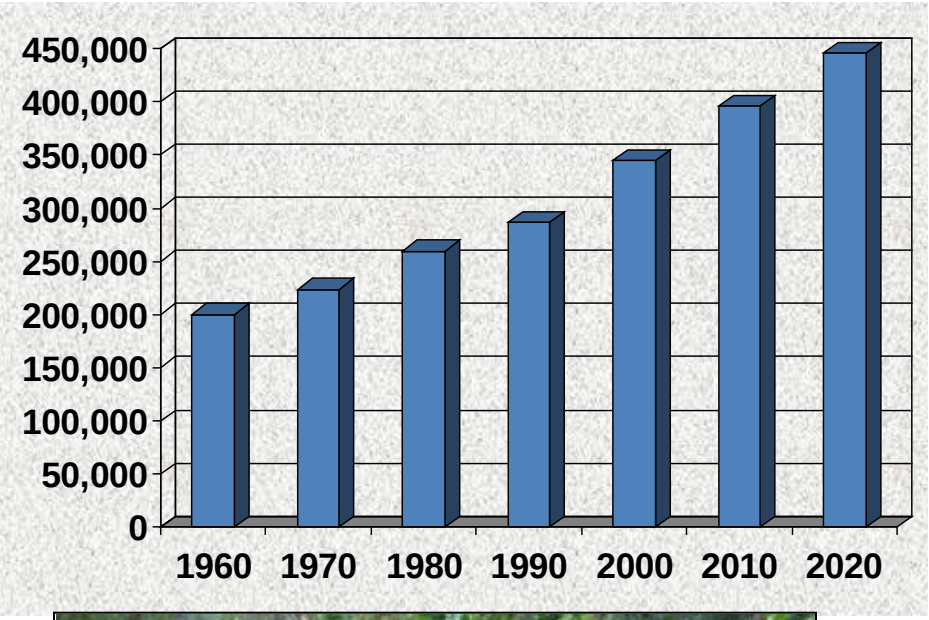
Challenges Related to Growth/Development



- **Fragmentation of large parcels and habitat – affecting farms, forests, business/industrial sites**
- **Loss of scenic quality**
- **Sedimentation; water quality issues**

Linking Lands and Communities – *Project Goals*

- Bring together a diverse group of people to explore common values and identify opportunities to work together to maintain our valued resources;
- Identify where the most valuable natural resources are located and how they might be interconnected;
- Produce a set of tools and resources for a variety of users, to make more informed land use and development decisions.

Project Partners

Appalachian Sustainable Agriculture Project (ASAP)
Appalachian Trail Conservancy
Friends of DuPont State Forest
NC Wildlife Federation
Open Space Institute
RiverLink
Southern Appalachian Forest Coalition
Southern Environmental Law Center
Sustainable Big Ivy
WNC Green Building Council
Western North Carolina Alliance

Buncombe County
Buncombe County Greenways and Trails Commission
Buncombe County Soil & Water Conservation District
City of Asheville
City of Hendersonville
Transylvania County

Blue Ridge Forever
Carolina Mountain Land Conservancy
Southern Appalachian Highlands Conservancy

Asheville Convention and Visitors Bureau
The Biltmore Estate
Mountain Council for Accountable Development
Self Help Credit Union/Self Help Ventures Fund
Sustainability Strategies, LLC

Blue Ridge National Heritage Area
Blue Ridge Parkway
Natural Resources Conservation Service
U.S.D.A. Forest Service Southern Research Station
U.S. Fish & Wildlife Service

NC Cooperative Extension – County Offices
NC Department of Agriculture
NC Department of Environment and Natural Resources
NC Division of Community Assistance
NC Division of Forest Resources
NC Farm Bureau
NCSU Mountain Horticultural Crops Research & Ext Center
NC Wildlife Resources Commission

Mars Hill College
RENCI @ UNC Asheville
UNC Asheville
Warren Wilson College

Funding Partners

The Community Foundation of Western North Carolina

Blue Ridge National Heritage Area

Federal Highway Administration

RENCI at UNC Asheville

Z. Smith Reynolds Foundation

Lyndhurst Foundation

Wildlife Conservation Society

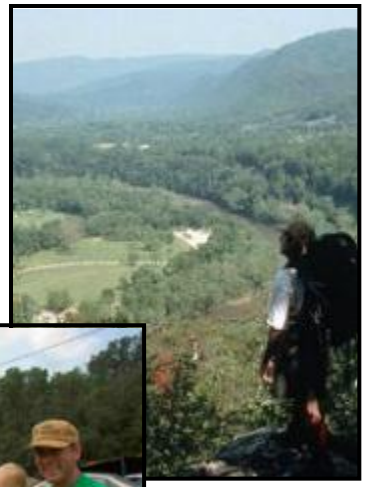
National Association of Regional Councils (NARC)

Green Infrastructure Planning Approach

- *Nationally recognized collaborative method for land use planning*
- *Community- and science-based approach*
- *Focus on systems and networks*
- *Need for planning, design, investment, maintenance, management*

Our Economy needs Healthy Natural Systems

- Sustain lands for forestry & agriculture
- Provide scenic views, trails, parks, and cultural areas that attract residents and visitors
- Offer natural and restored green settings for growth and development
- Attract and retain businesses and jobs, provide entrepreneurial opportunities



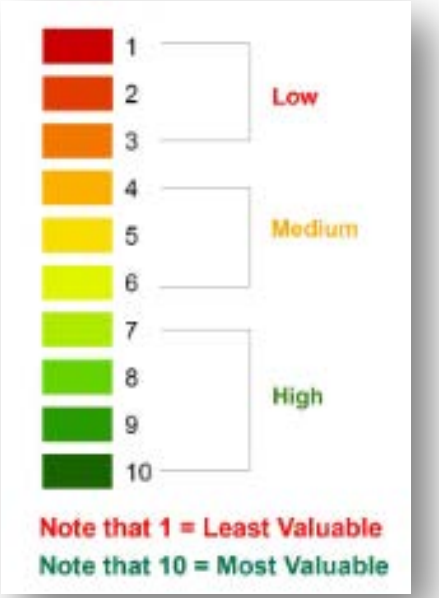
What are the most important natural and land-based resources in the region?

- Water and water quality
- Farming and forestry
- Cultural heritage
- Scenic views
- Recreation
- Wildlife habitat and biodiversity

Resource Assessments

Purpose: To identify lands in the of-Sky (LOS) region valued for their contribution to:

- Water quality
- Agriculture
- Wildlife habitat & biodiversity



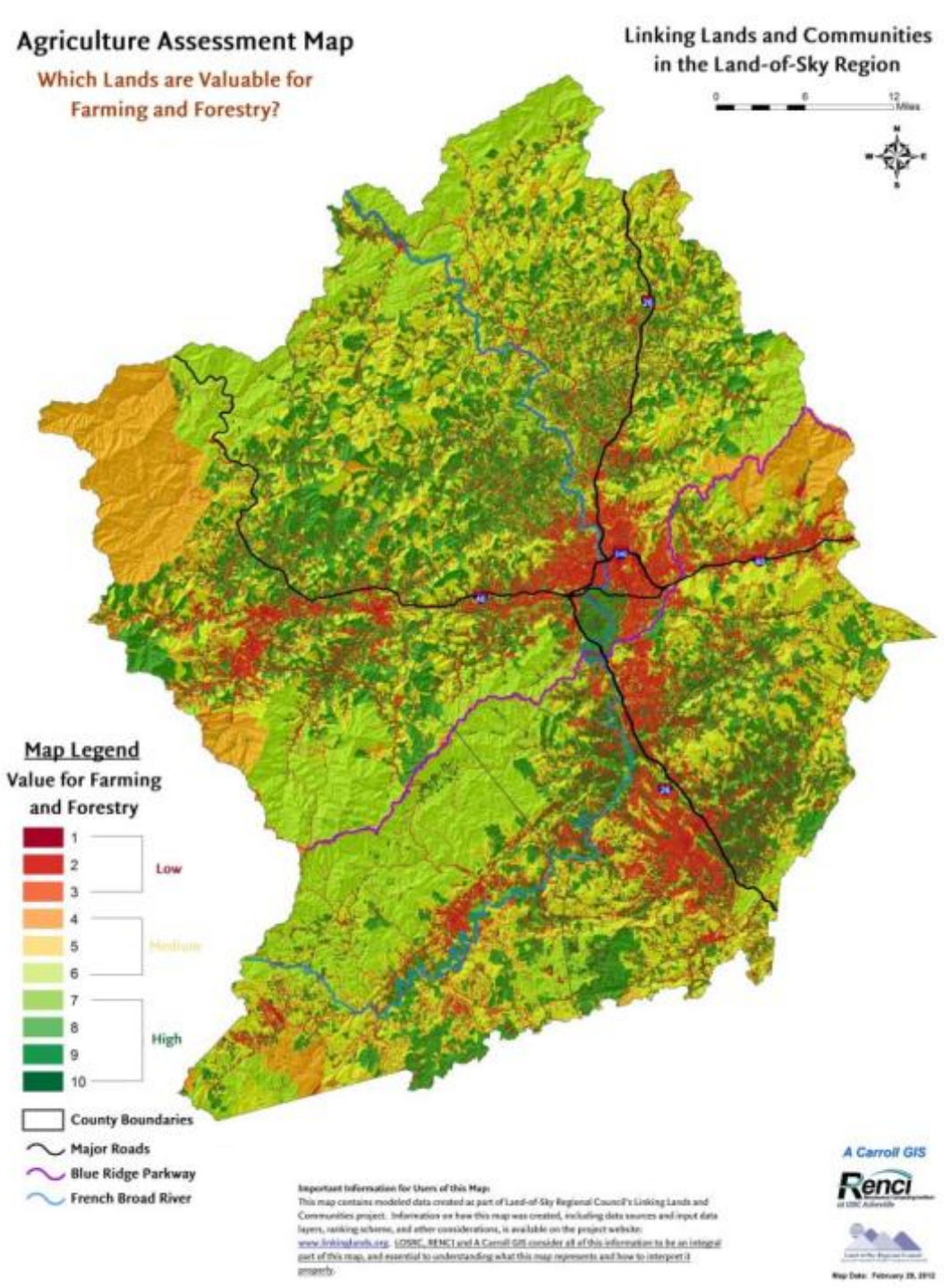
Developed by: Working groups of partners from around the region and facilitated by LOS staff.

- Raster based modeling (30-meter pixels)
- Most current data available
- Region-wide data

High Value Indicators:

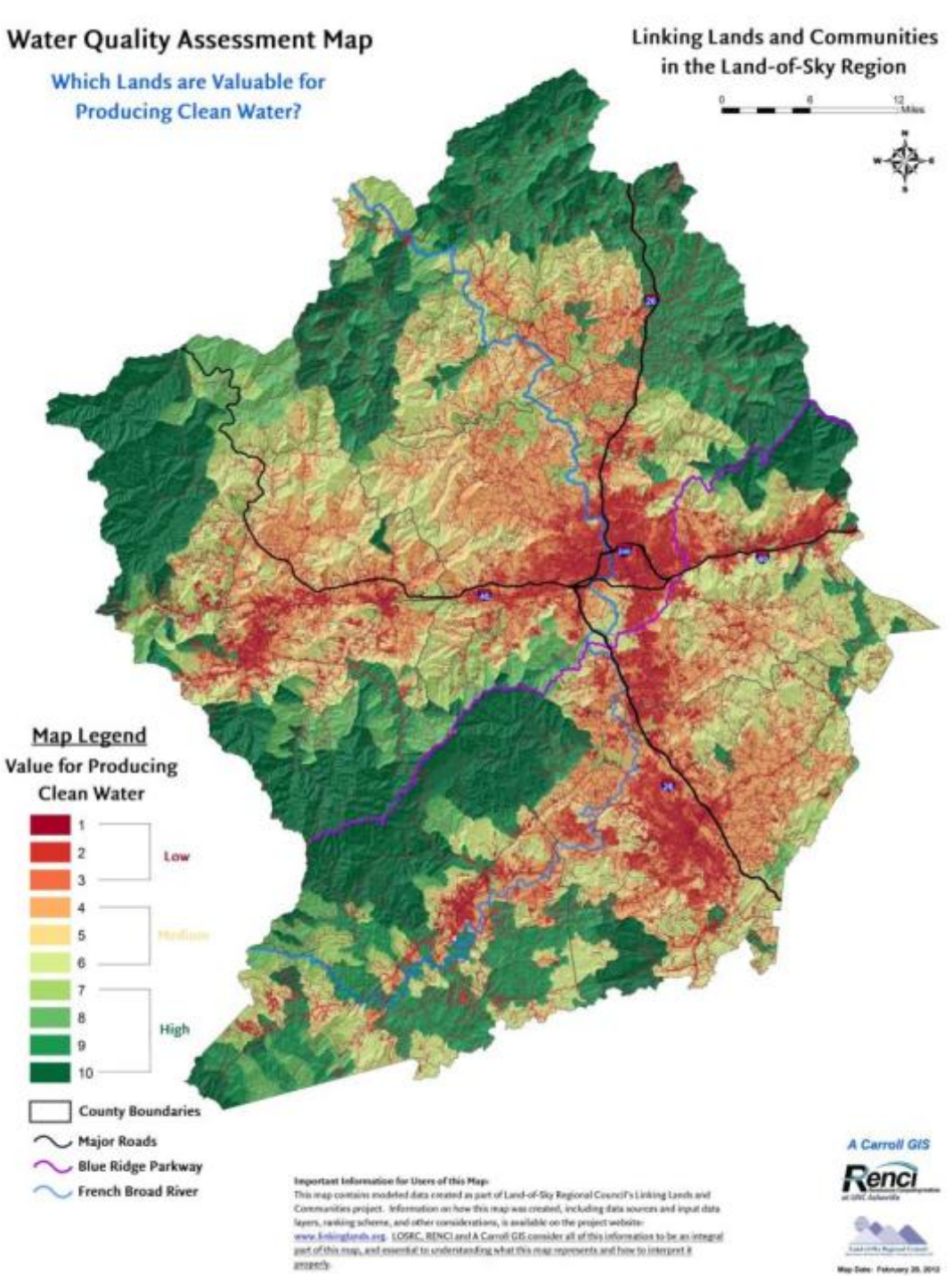
- Land Cover – Vegetation Type
- Most productive soils
- Presence of an existing farm/forest operation

Highest ranking lands (10) have productive soils AND forest or cropland vegetation



The region was divided into 3,525 sub-watersheds; each assessed on:

- Land use / land cover
- Stream quality
- Elevation
- Level of protection



Wildlife habitat patches

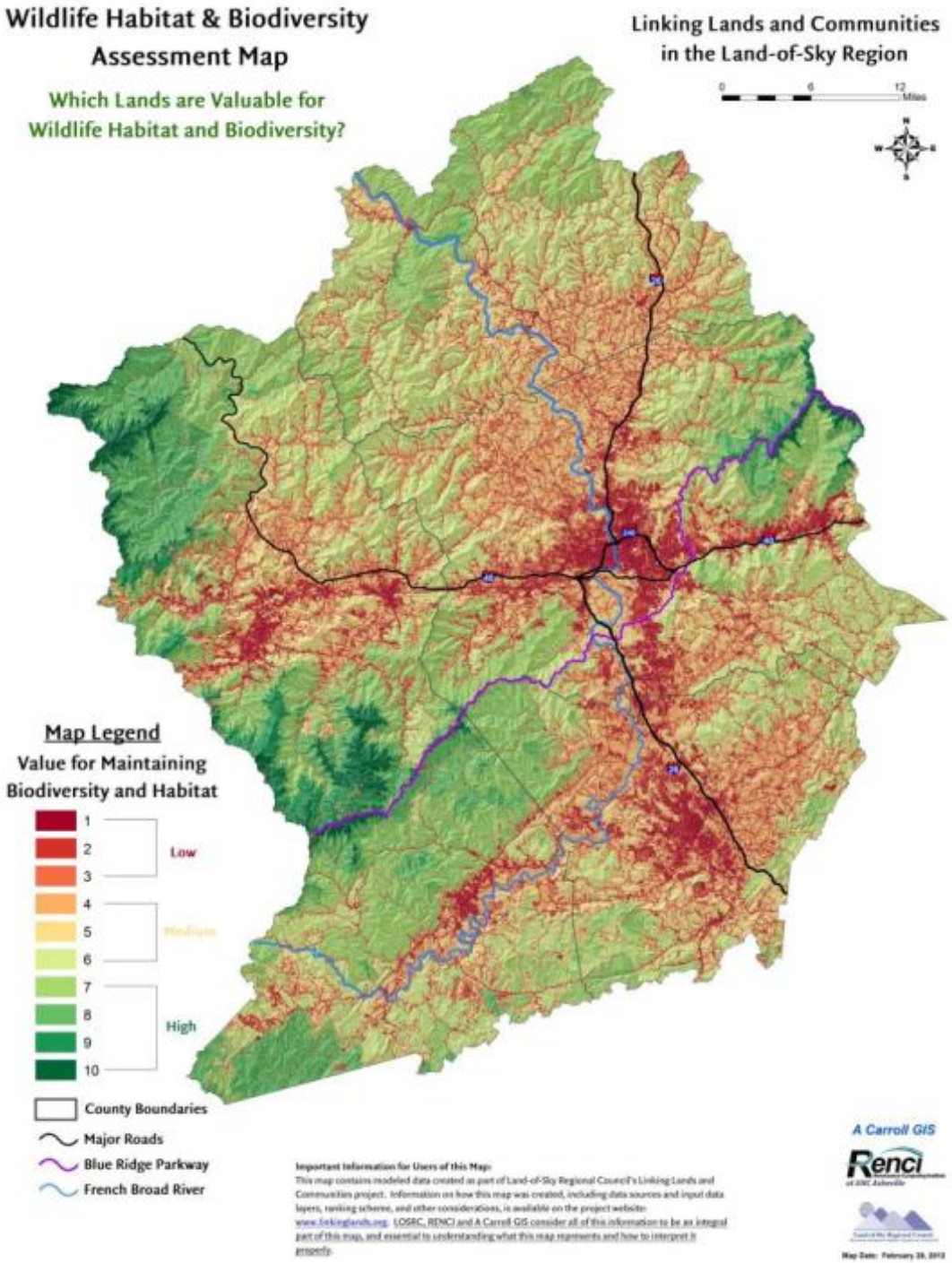
- Large core area; compact and tightly clustered patches

Priority habitat types:

- > 4,000 feet
- Floodplain Forests, Riverine and Aquatic Communities

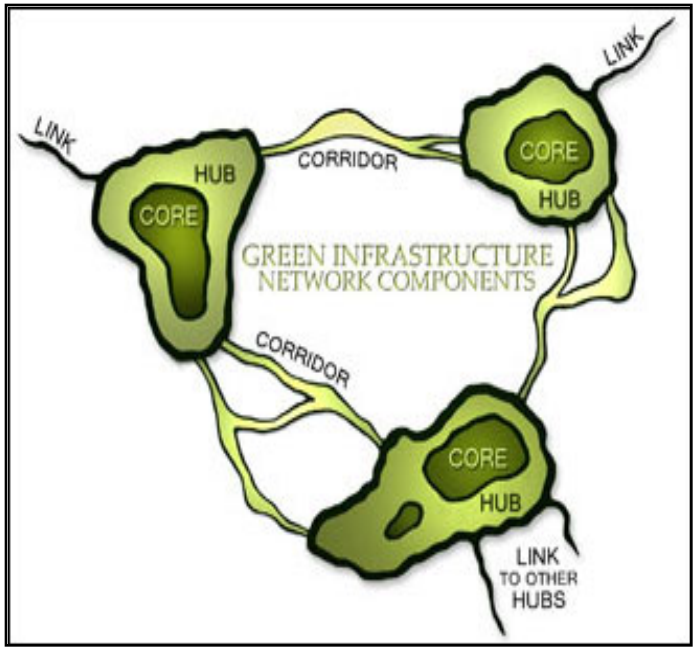
Biodiversity Sites:

- Significant Natural Heritage Areas (aquatic and terrestrial)
- Native Brook Trout streams; Outstanding Resource Waters
- Streams with Excellent bioclass ratings



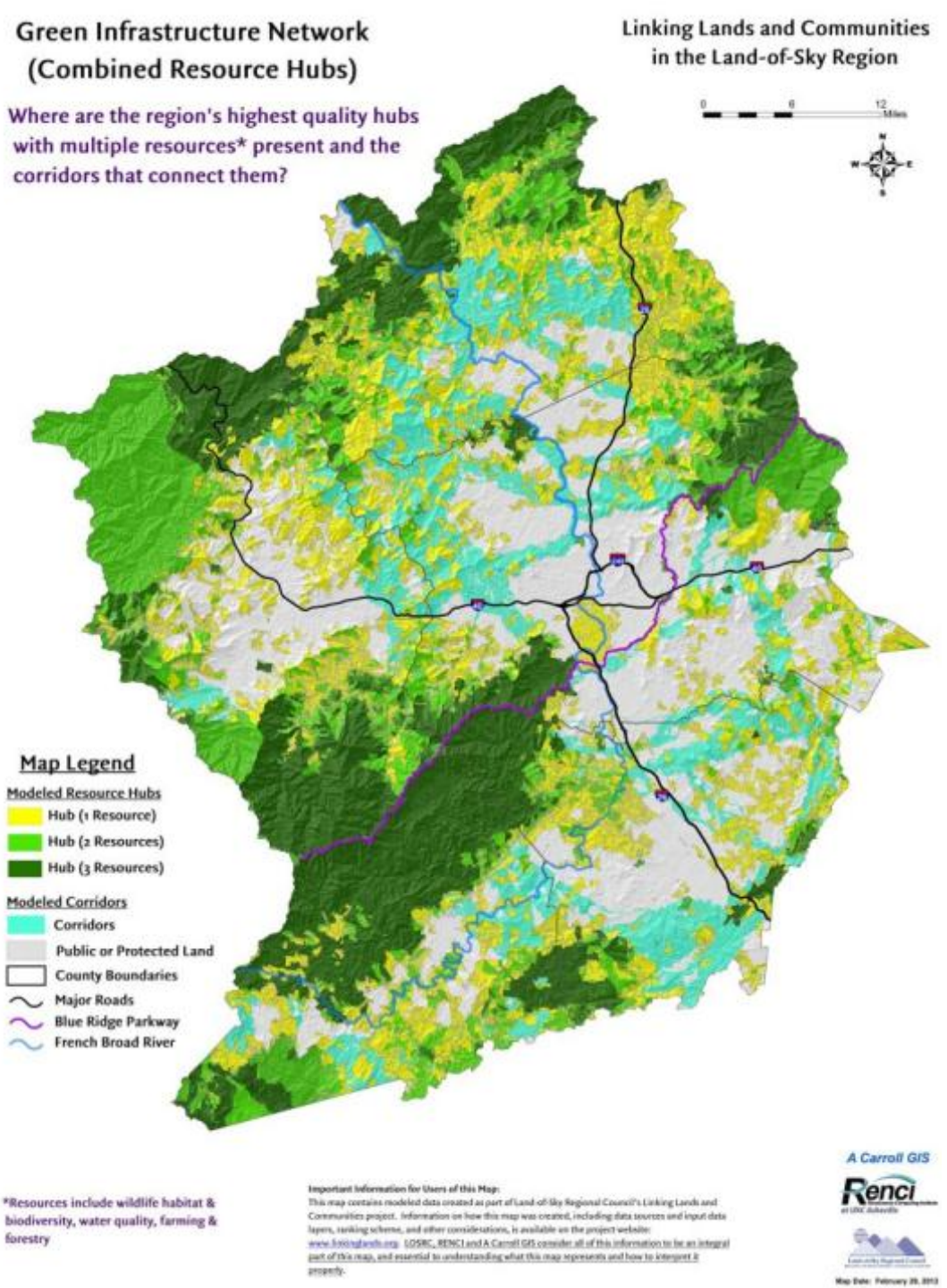
Developing the Regional Green Infrastructure Network

- **Identifying the hubs** – highest valued lands from each assessment
- **Combining the assessments**
- **Identifying the corridors –** connect ecosystems and habitats to enable plants, animals, and ecological processes to move between hubs

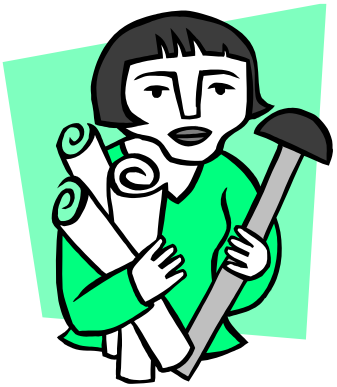


Final Green Infrastructure Network

Combined Resource Hubs + Wildlife Habitat & Biodiversity Corridors



Outcomes from the Linking Lands Project



- **Maps** that identify lands that most contribute to important ecosystem services
- **A new set of tools and resources** that can inform land use planning at multiple scales
- **Relationships** amongst a diverse group of regional leaders
- **Increased awareness** of the link between healthy communities and healthy ecosystems

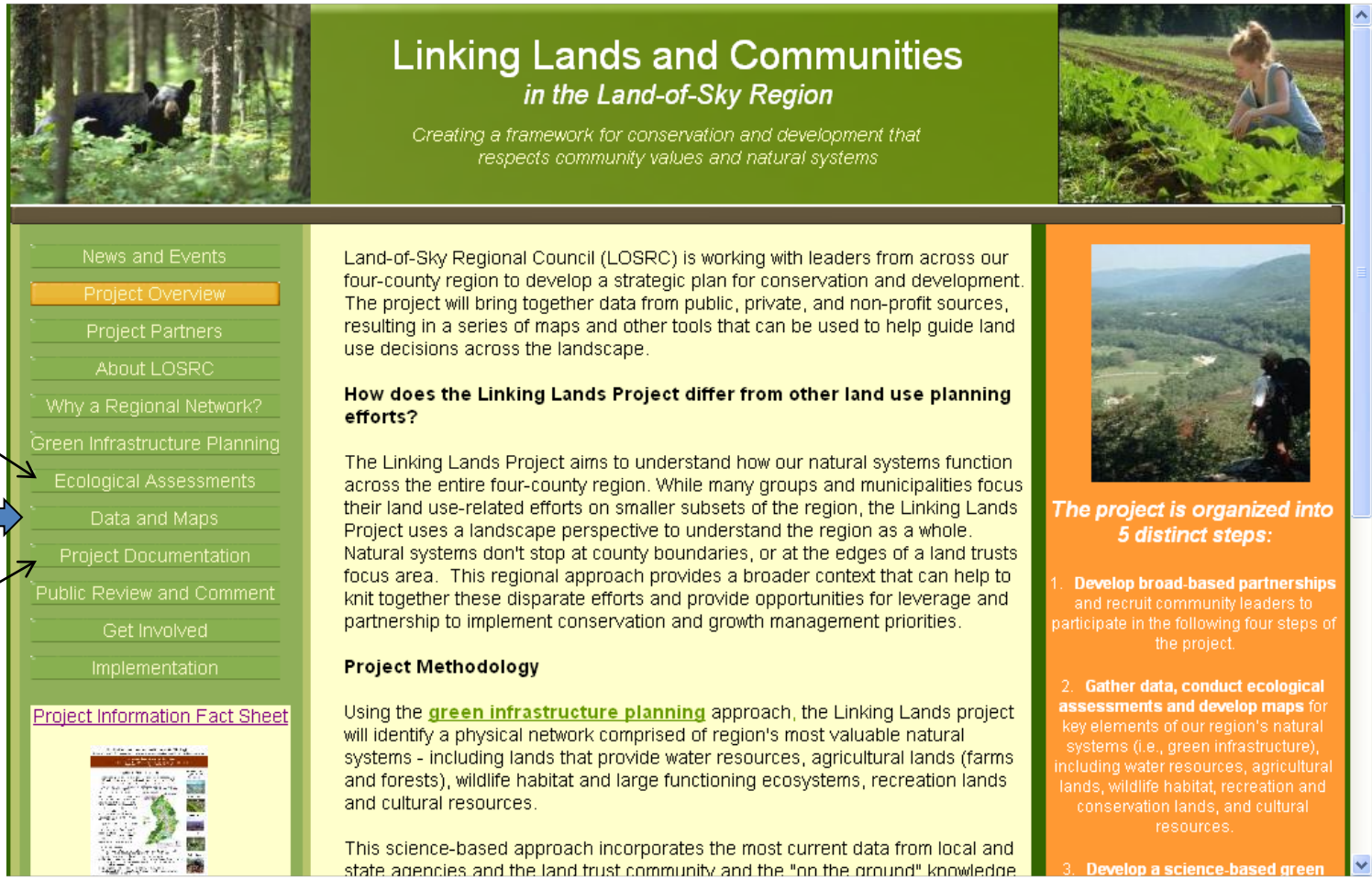
Project website: *www.linkinglands.org*

Assessments

Maps

Documentation

Webpage Screenshot

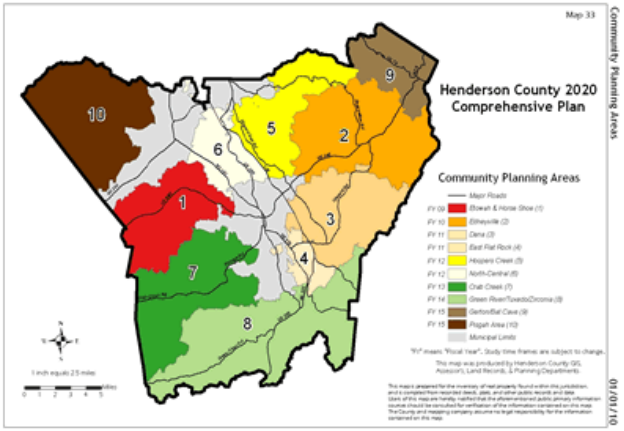


On-line, easy-to use tool - http://gis.buncombecounty.org/LinkingLands/

Many Uses for Many People

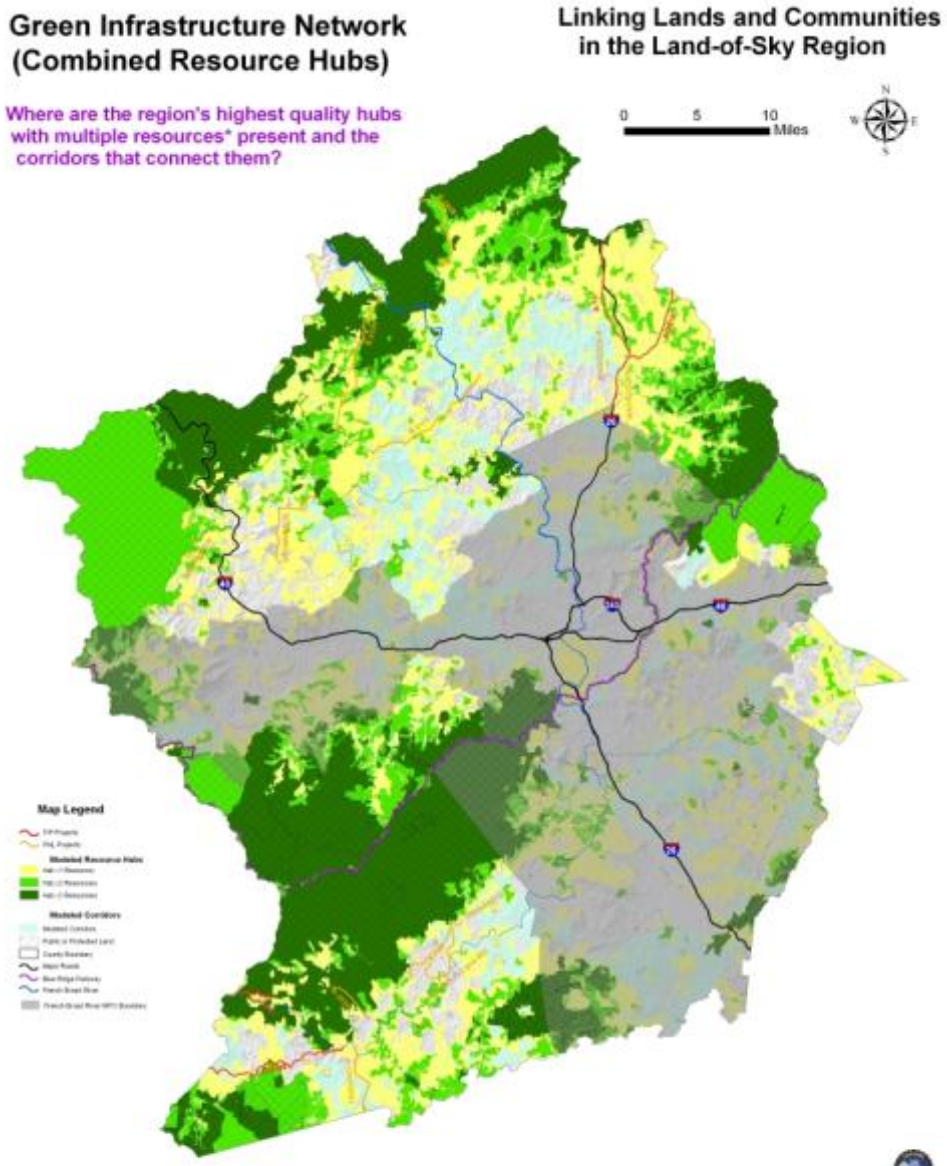
- **Land Owners and Developers**
  - Site planning and design
  - Land stewardship
- **Land Trusts and other Non-profits**
  - Prioritizing conservation projects
  - Farmland Preservation
- **Students**
  - Place-based learning
  - Hands-on projects

Governmental Uses of Tools

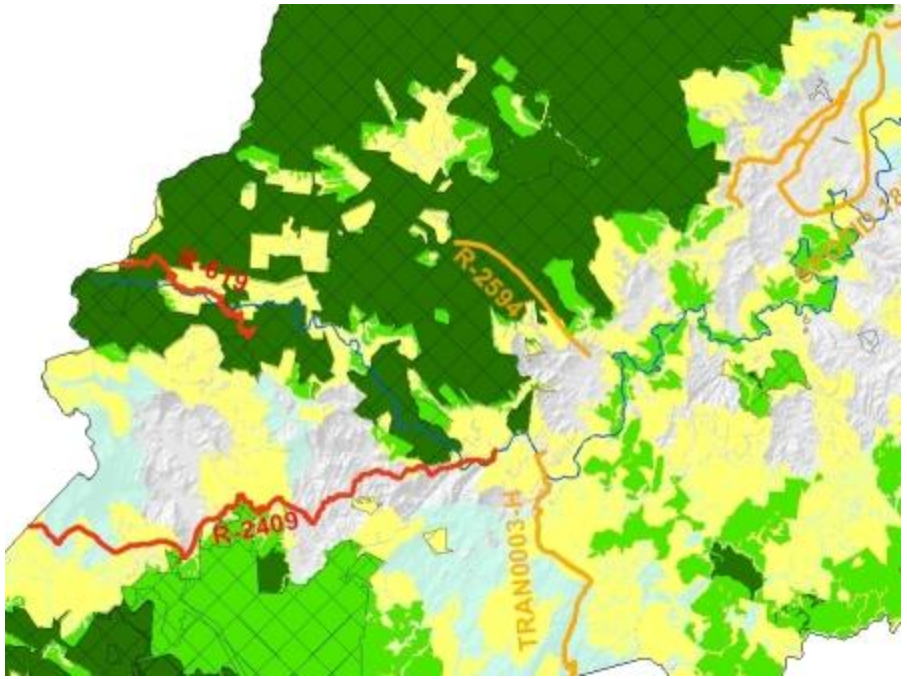


- **Local Governments**
  - Development review and site design
  - Enhance/support city/county planning
  - Identify opportunities for parks, greenways

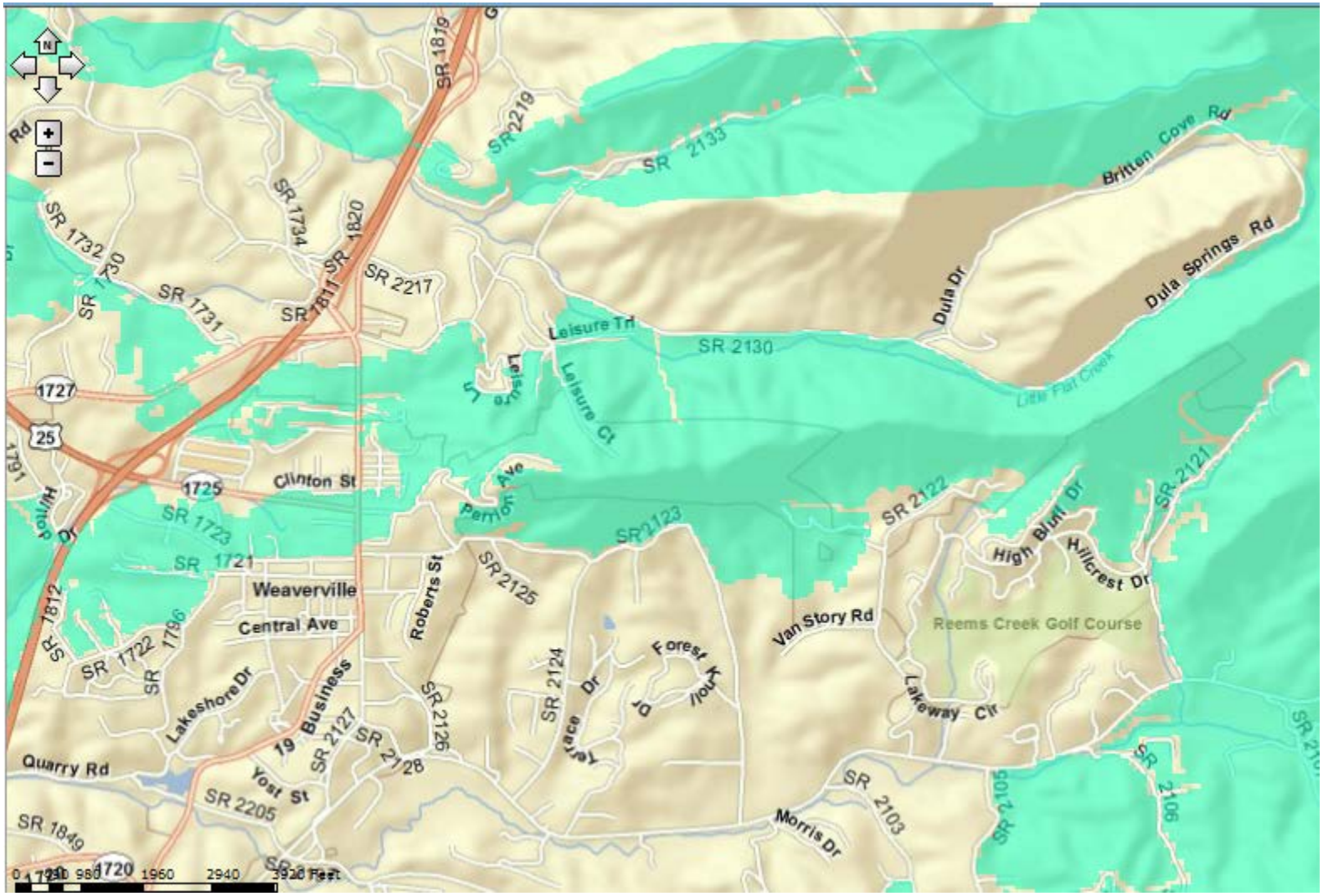
- **State and Federal Agencies**
  - Transportation planning and mitigation
  - Justify funding for conservation or management
  - Identifying areas for conservation and assisting with community planning along the Blue Ridge Parkway
  - Connecting state and national parks to other lands with valuable natural resources



Priority Transportation Projects with Green Infrastructure Network – for Land-of-Sky RPO



Development Review & Site/Project Design



Green Infrastructure corridors around Weaverville

Other Uses and Future Plans

- Data and maps being used in current project that is looking at and planning for growth and development – GroWNC (www.gro-wnc.org)

- Sharing methodology with adjacent regions to hopefully expand GI network
- Continue to share information and benefits – locally, regionally and nationally – APA, NADO-sponsored webinar, NARC conference

Linking Lands and Communities in the Land-of-Sky Region

Project website: www.linkinglands.org

Online map tool: gis.buncombecounty.org/LinkingLands/

Land-of-Sky website: www.landofsky.org

The Watershed Resources Registry (WRR)

A National Pilot To Integrate Land-use Planning, Regulatory, and Non-regulatory Decision Making Using the Watershed Approach

History

A pilot Registry grew out of the **Green Highways Partnership** and the Maryland State Highway The initial Project Coordination Meeting took place in March 2009 and was attended by the partner agencies

A follow-up Managers Meeting was held at the Engineers Club of Baltimore in October 2009

What is the WRR?

- It is a comprehensive replicable framework and GIS-based targeting tool that:
  - Integrates and streamlines regulatory programs
  - Guides resource planners
  - Saves time and $, and increases program efficiencies
  - Screens for preferred actions and maximizes watershed benefits
  - Is transparent, predictable and reliable
  - Facilitates multiagency input and coordination

Why is the WRR unique?

Unlike many mapping and targeting tools…

- There is agency collaboration and program integration between:
  - CWA 319, 401,402,404, 303(d)
    - Watershed planning, permit review, mitigation assessments
    - TMDL and WIP applications
    - Stormwater management
  - Resource conservation/ environmental resource planning
  - Green Print and Rural Legacy priorities
  - Section 7 (Threatened and Endangered Species)
  - Transportation and land use planning
  - NEPA review

… and more!

The Formation Process

- A Technical Advisory Committee (TAC) was formed, consisting of stakeholders from local, state and federal agencies, to ensure that the end-products would have comprehensive programmatic coverage and integration

- The TAC assembled a wide variety of information and geospatial data sets, and identified and addressed data gaps, to meet the needs of programs and watersheds

- Datasets and factors were agreed upon in a systematic process in order to develop eight Suitability Analysis (SA)

The Suitability Analyses (SA)

- Upland Preservation
- Upland Restoration
- Wetland Preservation
- Wetland Restoration
- Riparian Zone Preservation
- Riparian Zone Restoration
- Preserving Natural Hydrology for Stormwater
- Restoring Natural Hydrology for Stormwater

The Factors: An Example

Restore Wetlands

Map and score areas that are not currently wetlands but which have site conditions that would support wetland creation. Restore the site to a healthy wetland.

Required factors

The area cannot be:

- a wetland
- forested (land cover)

The area must be:

- On a poorly drained soil (somewhat, poorly or very poorly)

Enhancing factors*

1. Is near (200 feet) but not in a stream or waterbody (1 pt)
2. Is in a 100-year (1 pt) or 500-year (½ pt) floodplain
3. Is within a 303-D listed stream watershed (1pt)
4. Is within 200 feet (1pt) or 600 feet (1/2 pt) of an area that drains to a Stream Classification Use II, III or IV
5. Is in a Biological Restoration Initiative watershed (1 pt)
6. Is in a Blue Infrastructure priority watershed (1 pt)
7. Is in a Stronghold Watershed, "1" (1 pt) or "2" (½ pt)
8. Is in a Tier II "watershed" (1 pt)
9. Is within a High Priority (1 pt) or Medium Priority (½) Trust Fund Watershed
10. Is in Chesapeake Bay Commission Critical Area (LDA or RCA only) (1 pt)
11. Is in or near (200 feet) a Green Infrastructure hub or corridor (1 pt)
12. Is in a Green Infrastructure gap (1 pt)
13. Is near (200 feet) but not in a Sensitive Species Project Review Area (1 pt)
14. Is near (200 feet) but not in a Wetland of Special State Concern (1 pt)
15. Is near (200 feet) but not in protected lands (including any GreenPrint Targeted Ecologic Areas) (1 pt)
16. Is near or in (200 feet) a Targeted Ecologic Area (GreenPrint) (whether protected or not) (1 pt)

*A combination of scientific indicators and socio-political factors.

SHA's Mission Statement:

"*Efficiently provide mobility for our customers through a safe, well-maintained and attractive highway system that enhances Maryland's communities, economy and environment.*"

Current and Ongoing Initiatives

- Capital Program
- Roadway Maintenance
- Bay TMDL

Capital Program

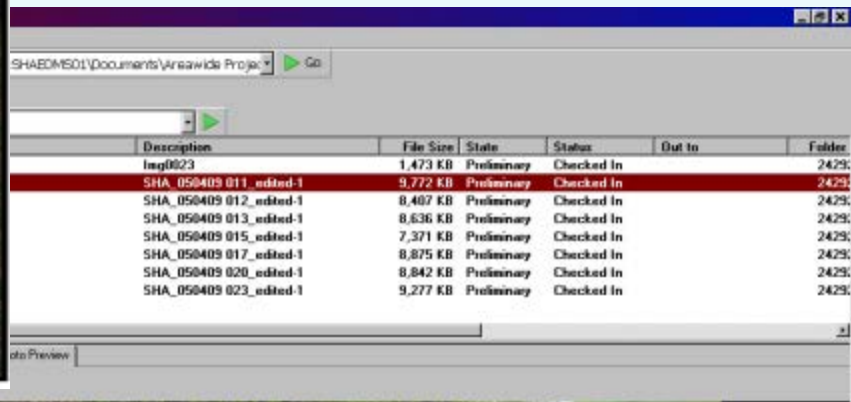
	Costs	Time	Cost Savings w/WRR	Time Savings w/WRR
Site Search	$50,000	4 months	$37,500	3 months
Design	$210,000	18 months	$70,000	6 months
Agency Coordination/MDE Consultant Review	$10,000	12 months	$2,500	3 months
Total	$365,000	2.5 years	**$110,000**	**1 year**

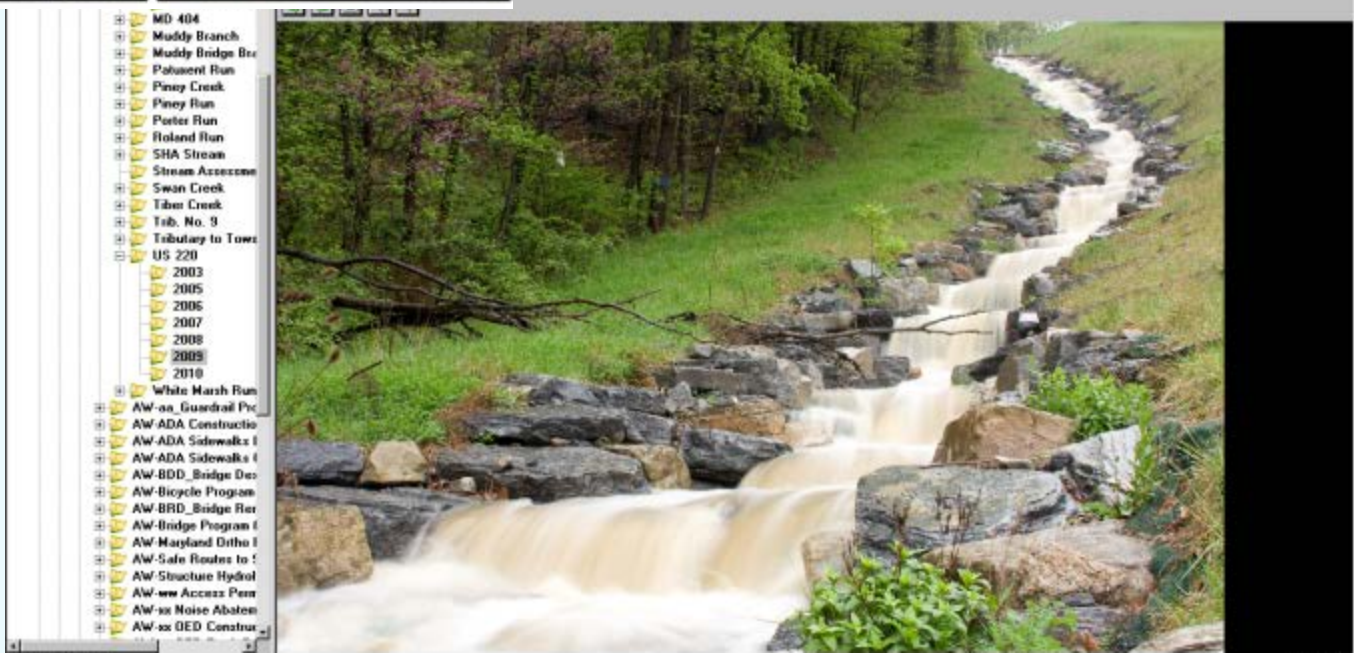
SHA Treatment Strategy – Land Use Changes

Tree Plantings (Grass to Forest)

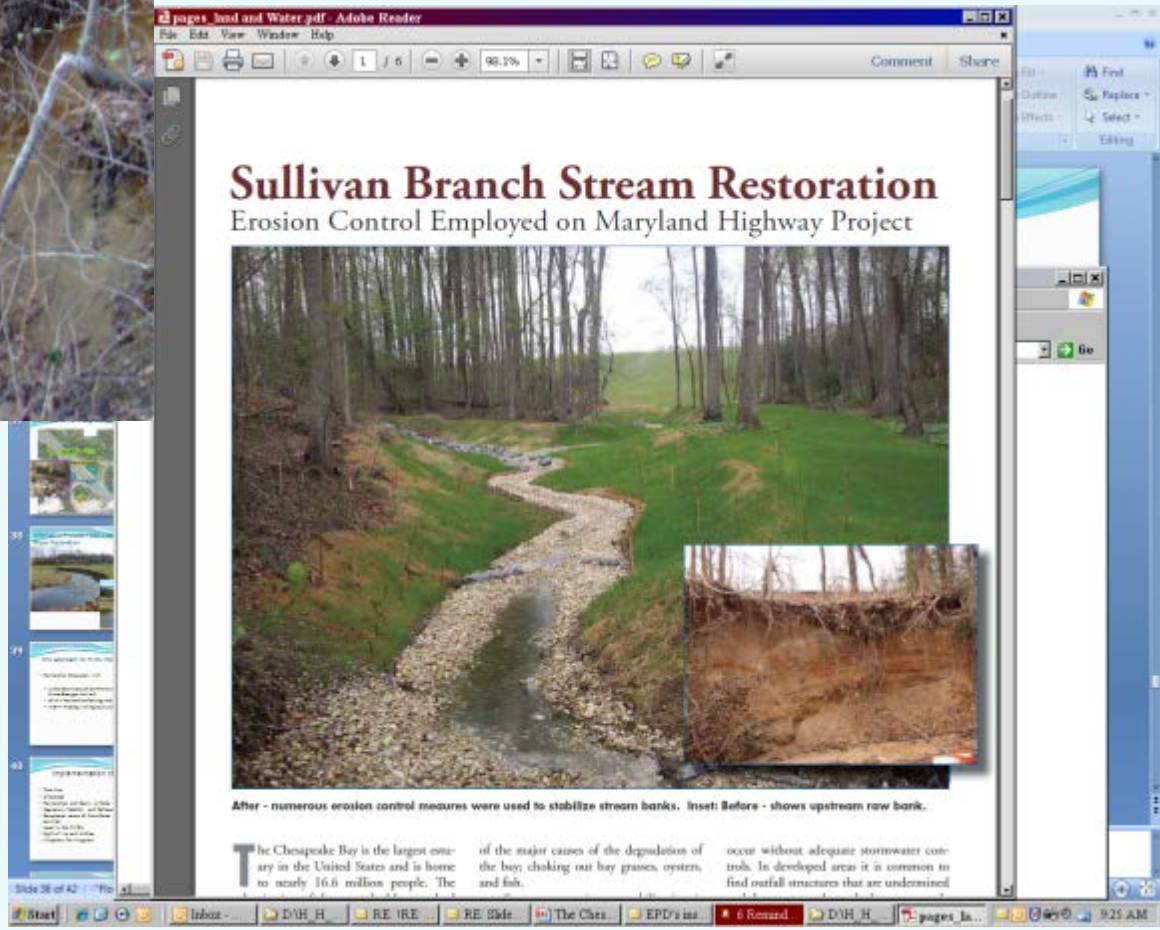
Impervious to Grass/Meadow

SHA Treatment Strategy – Stream Bank & Channel Stabilization





SHA Treatment Strategy – Stream Bank & Channel Stabilization



Using the Watershed Resource Registry (WRR) to Evaluate Proposed Wetland and Waterway Impacts and Mitigation

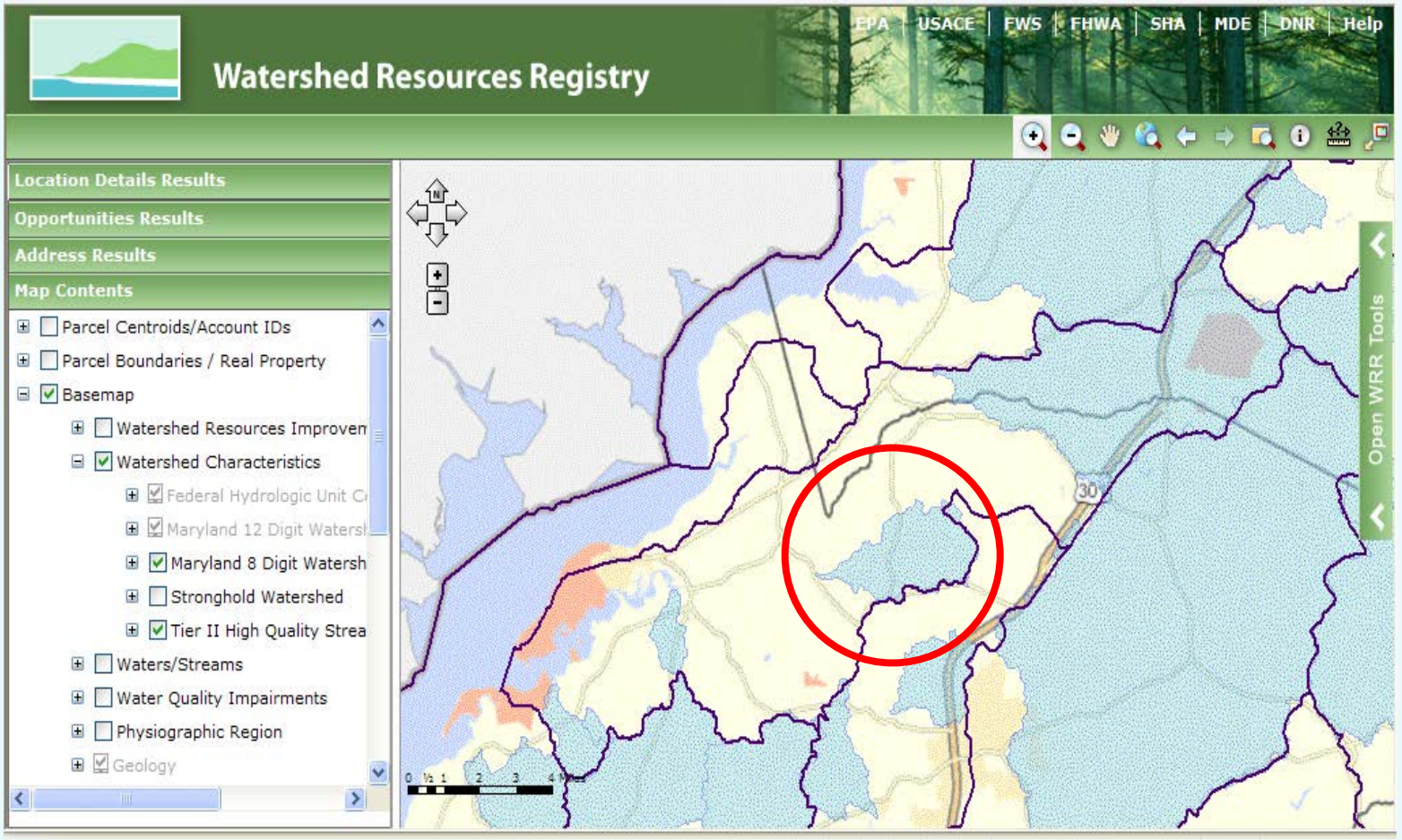
The WRR can be used by regulatory agencies and applicants to evaluate mitigation . . .

- Assist in finding a mitigation site
- Evaluate ecological benefits of a proposed mitigation site (permittee, bank, or ILF)
- Compare different proposed mitigation sites

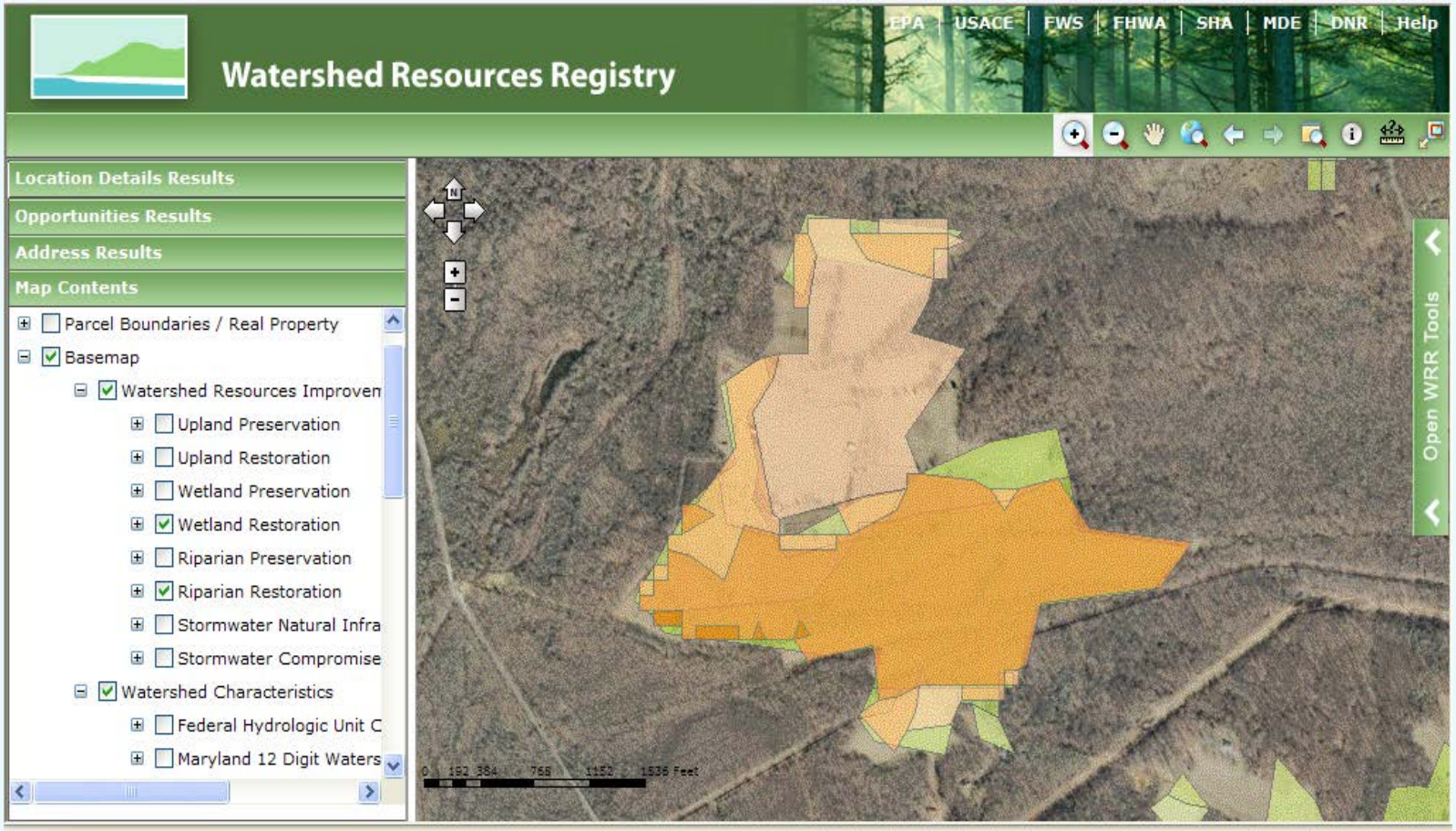
Mitigation Example

- Linear project with large impacts
- Large portion of impacts (76 acres) within Mattawoman wetland
- Tier II watershed
- Difficult to find enough wetland mitigation

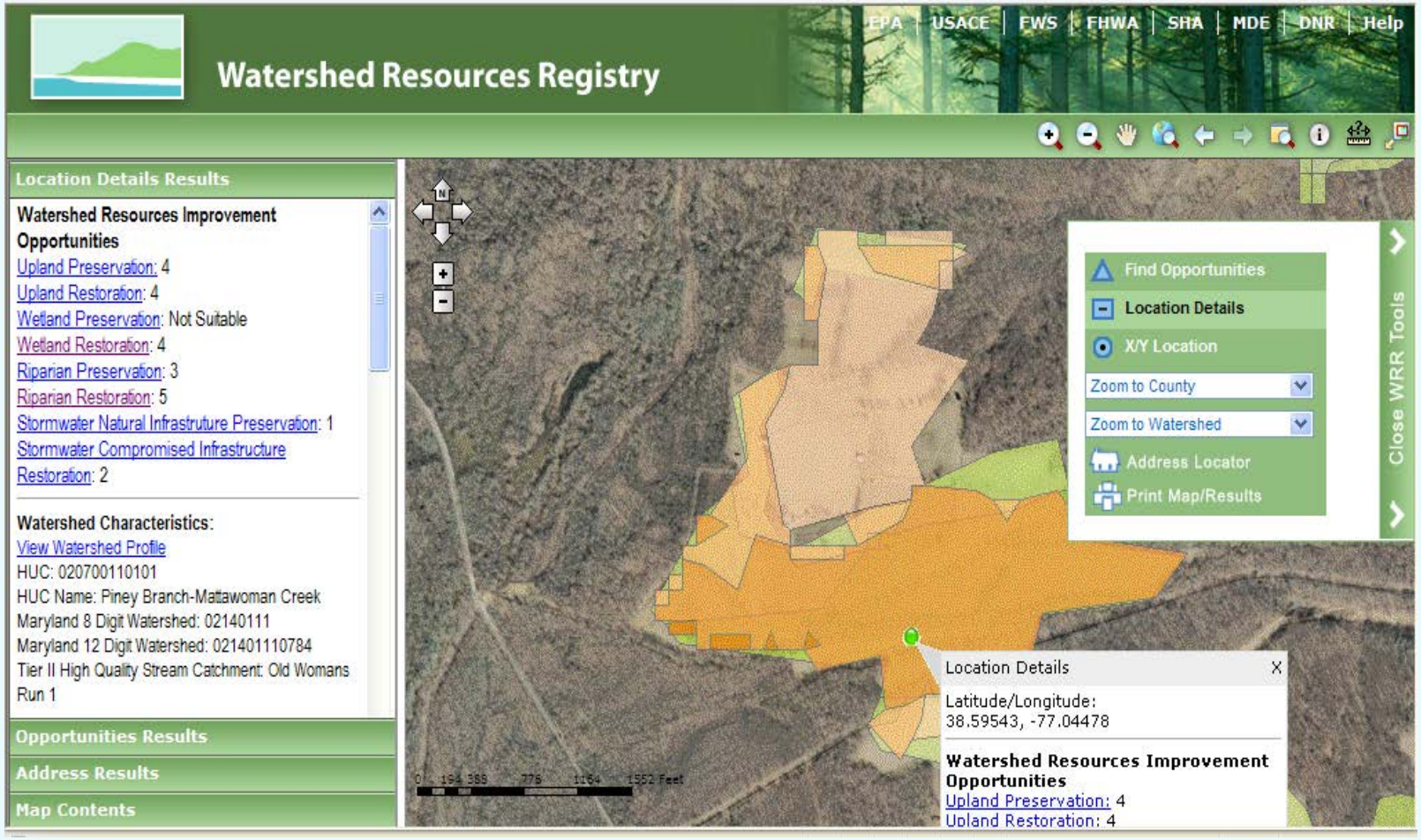
Search for . . . Tier II watersheds within Mattawoman watershed



Largest potential wetland restoration in this Tier II watershed



Location Details shows important surrounding resources

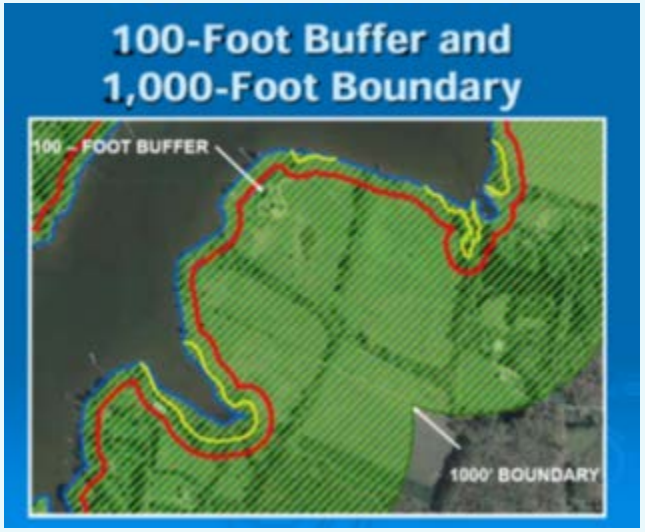


Identifying WRR Opportunities on Private Land

- Maryland's Forest Conservation Act
  - Requires forest restoration and retention for development projects
  - Counties administer program
  - WRR could assist in identification, review and approval of FCA mitigation sites and banks

Identifying WRR Opportunities on Private Land

- Maryland's Critical Area Program
  - Regulates development in MD's critical area
    - all land within 1,000 feet of Maryland's tidal waters and tidal wetlands.
  - Requires mitigation for
    - forest loss,
    - FIDS habitat loss,
    - forest buffer loss and
    - stormwater impacts
  - Counties administer programs with State oversight
  - WRR could assist in identification, review and approval of CAC mitigation sites and banks



Manager's Meeting

- On June 12, 2012, the interagency WRR TAC briefed managers from the US Fish and Wildlife Service, MD Department of Natural Resources, MD State Highway Administration, MD Department of the Environment, US Army Corps of Engineers, and the Federal Highway Administration on:
  - the current status of the WRR, relative to the needs and goals identified and established during the previous interagency Managers' Meeting in October 2009

Next Steps

- Release website
- Agency testing
- Training and outreach – workshops, webinars, & handbooks
- Establish a user feedback loop regarding sites and data
- Develop a registration process for sites used
- Monitor registry projects
- Data lifecycle – update data on an agreed upon schedule

WRR Application

- GIS Application:
  - http://watershedresourcesregistry.org (.com & .net)
- Outreach Website (Work Ongoing):
  - http://watershedresourcesregistry.com/outreach/outreach/home.html

Thank You

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Questions?

Exciting Changes Ahead for the Eco-Logical Webinar Series!

- Special focus on each step in the Eco-Logical framework
- Streamlined hour-long format
- Featured partners providing multiple perspectives on joint projects
- More Q&A opportunities

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