



***IDENTIFYING REGIONALLY CRITICAL
ROAD SEGMENTS AND
RESTORING/MAINTAINING CROSS-ROAD
PERMEABILITY IN VERMONT FOR WIDE
RANGING WILDLIFE***

PRESENTERS



■ **Paul Marangelo** *TNC-VT*

■ **Jens Hilke** *VT Department of Fish and Wildlife*

■ **James Brady** *Vermont Agency of Transportation*



OUTLINE

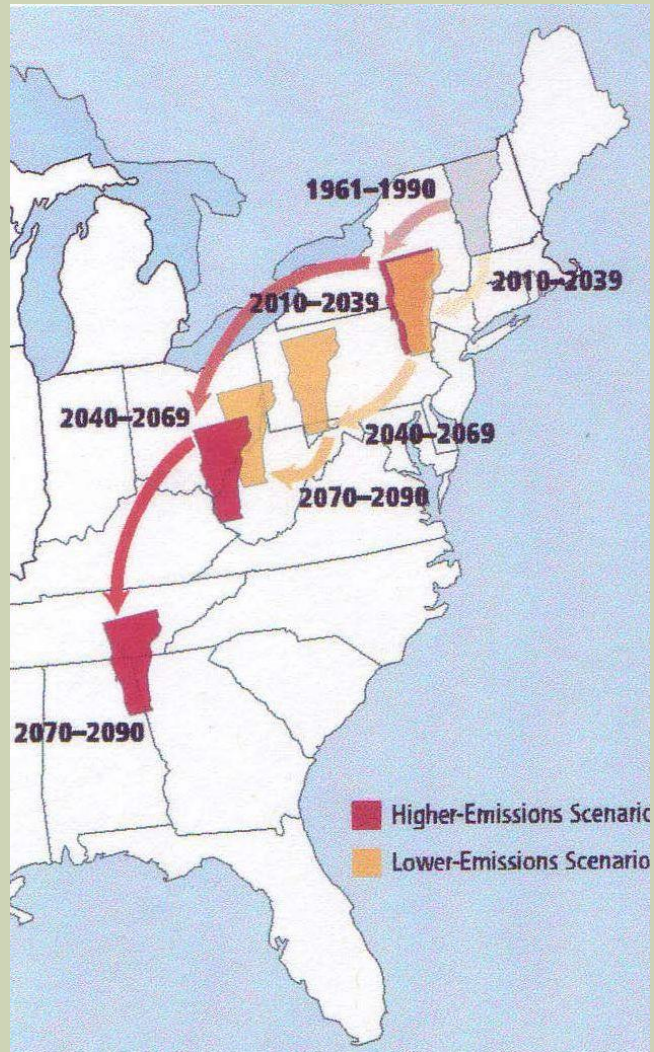
- **Staying Connected overview; and SCI's efforts to identify priority road corridors in Vermont**
- **Wildlife camera monitoring and other assessments of functional connectivity**
- **Tools for State Agency (VTRANS) management of road corridors for wildlife permeability**



Mission: Safeguard and repair habitat connectivity in the Northern Appalachian region for the benefit of wide-ranging, forest-dwelling wildlife – and people.



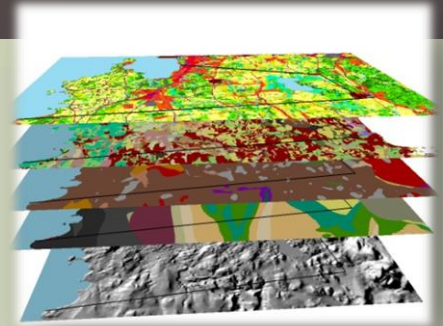
CLIMATE CHANGE FORECASTS



- ❑ **Current:** Temperatures have increased 1.8°F since 1970, with winter rising faster.
- ❑ **Projected:** Average temperatures are projected to rise 9°F to 13°F in winter by late-century.
- ❑ **Current:** Precipitation has increased 15-20% over the past 50 years with 67% of this falling in heavy precipitation events.
- ❑ **Projected:** Winter precipitation will increase on the order of 20-30% with less snow - more rain.
- ❑ **Projected:** Short-term summer droughts are projected to occur 2x as often

A MULTI-FACETED APPROACH

- Conservation science & planning
- Targeted land protection
- Making key roads more wildlife-friendly
- Technical assistance for land use planning
- Local outreach & engagement





A BIG CIRCLE OF PARTNERS

Maine Audubon

**Maine Department of Inland
Fisheries & Wildlife**

**Maine Department of
Transportation**

National Wildlife Federation

Nature Conservancy of Canada

New Hampshire Audubon

**New Hampshire Department
of Transportation**

**New Hampshire Fish & Game
Dept**

**New York Department of
Environmental Conservation**

**New York Department of
Transportation**

Northeast Wilderness Trust

**The Nature Conservancy
(ME, NH, NY/ADK, VT)**

Trust for Public Land

Tug Hill Commission

Tug Hill Tomorrow

Two Countries, One Forest

**Vermont Agency of
Transportation**

**Vermont Fish & Wildlife
Department**

Vermont Land Trust

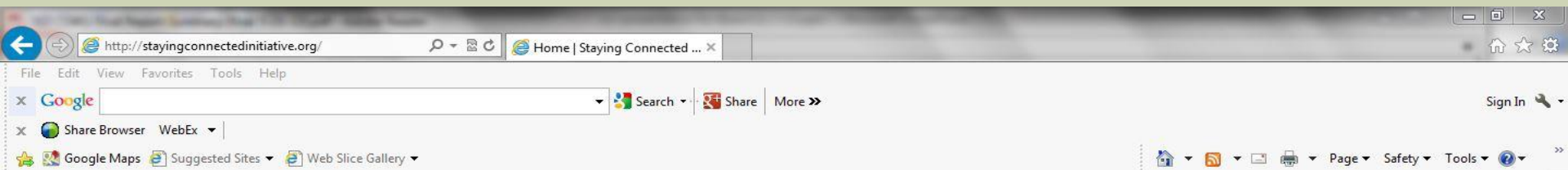
**Vermont Natural Resources
Council**

Wildlands Network

**Wildlife Conservation Society
(ADK & Canada)**



WEBSITE – WWW.STAYINGCONNECTEDINITIATIVE .ORG



People

Habitat

Wildlife

For the well-being of wildlife and human communities, connections matter.

The Staying Connected Initiative is a visionary partnership working to restore and enhance landscape connections for the benefit of people and wildlife across the Northern Appalachian/Acadian region of the eastern U.S. and Canada. Each step of the way, from the Tug Hill Plateau and Adirondack Mountains in New York across the forests of New England to the Canadian Maritimes, the actions we take in our own backyards and communities make a difference.



Where is habitat connectivity?

Circuitscape: Fisher

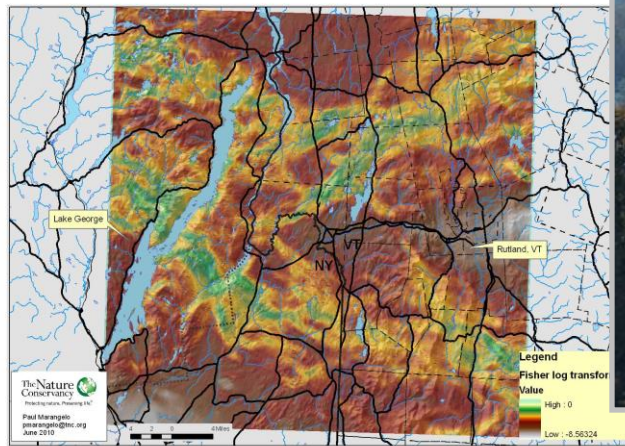
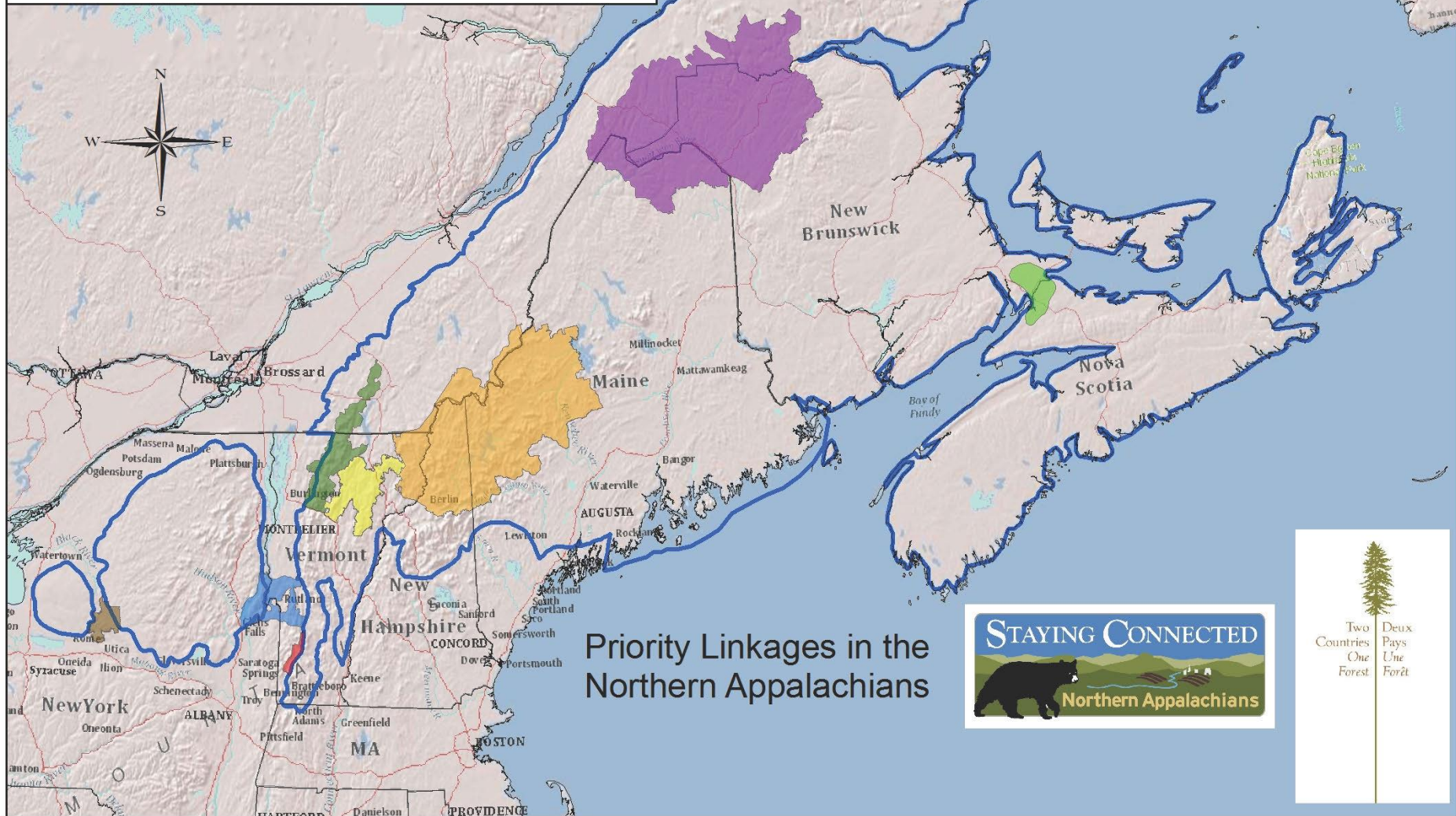


Photo by Amber Barger



- Tug Hill Plateau to Adirondack Mountains
- Adirondack Mountains to Green Mountains
- Taconic Mountains to Southern Green Mountains
- Northern Green Mountains
- Worcester Range to Northeast Kingdom
- Northeast Kingdom Vermont to Northern New Hampshire to Western Maine
- Three-Borders: Maine's North Woods to Quebec's Gaspé Peninsula
- Chignecto Isthmus
- Northern Appalachians Ecoregion



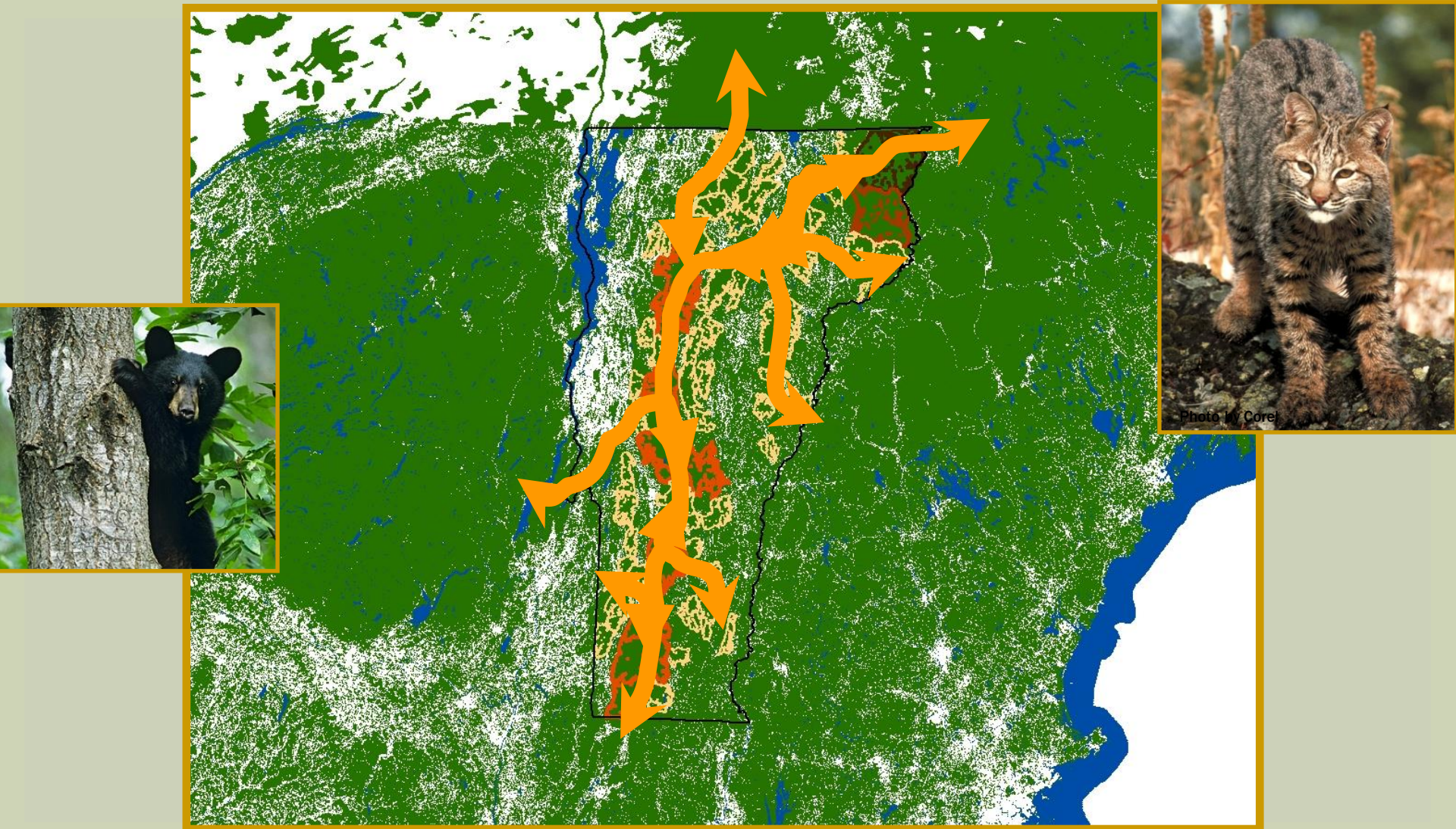
Priority Linkages in the Northern Appalachians



Two Countries
One Forest

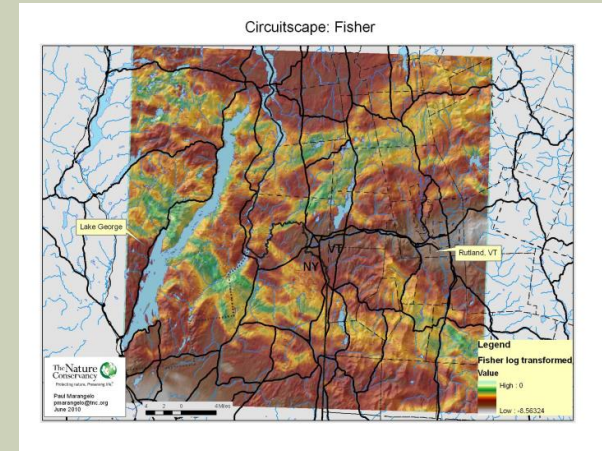
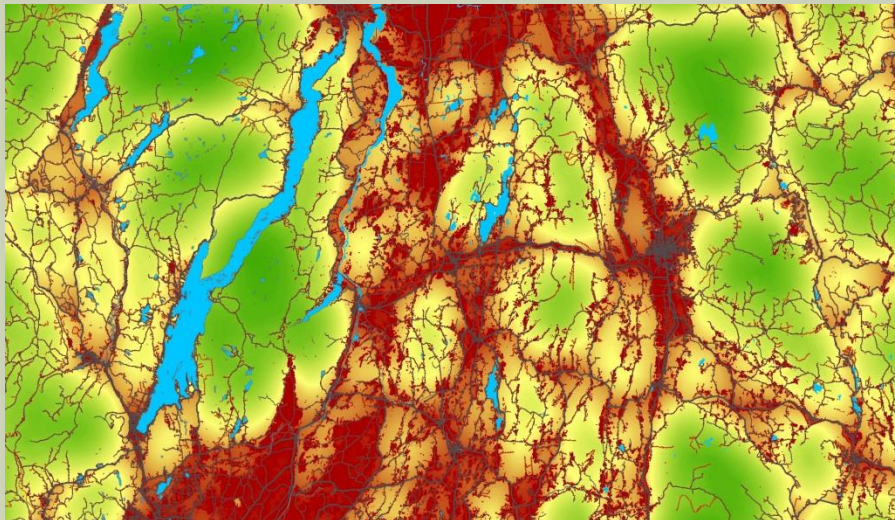
Deux Pays
Une Forêt

Vermont is the “Crossroads”



CONSERVATION SCIENCE

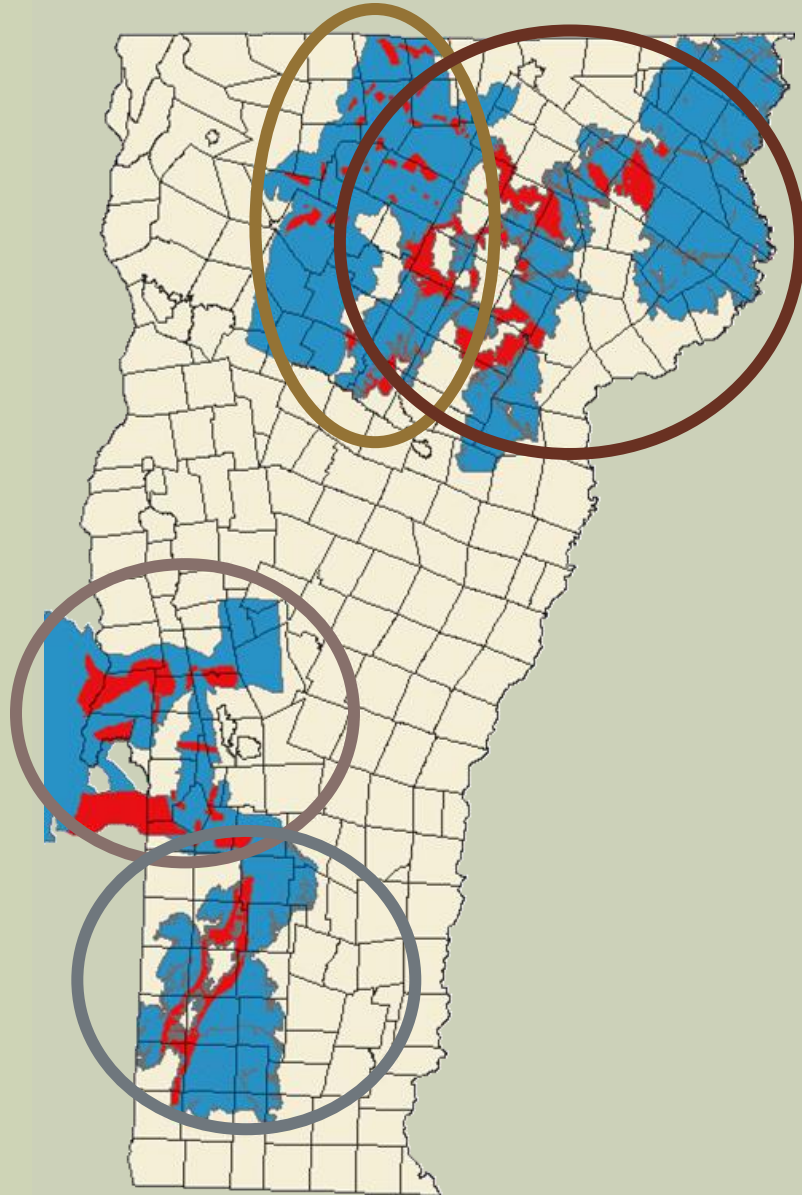
- GIS modeling
- Sharing information
- Interpreting results (unified data and results)



Partners:

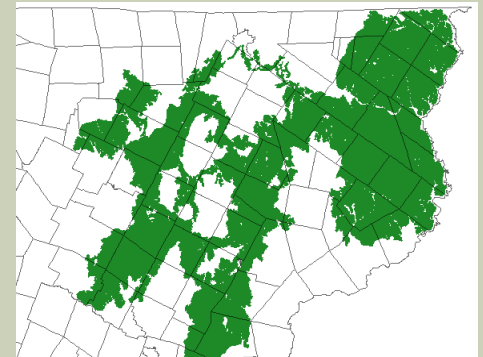
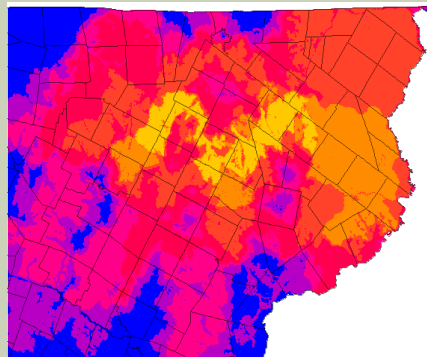
- Two Countries, One Forest
- The Nature Conservancy (VT, NY, NH) Nature Conservancy - Canada
- Vermont Fish & Wildlife Department
- Wildlands Network
- Green Mountain College
- Johnson State College

VT LINKAGE AREAS



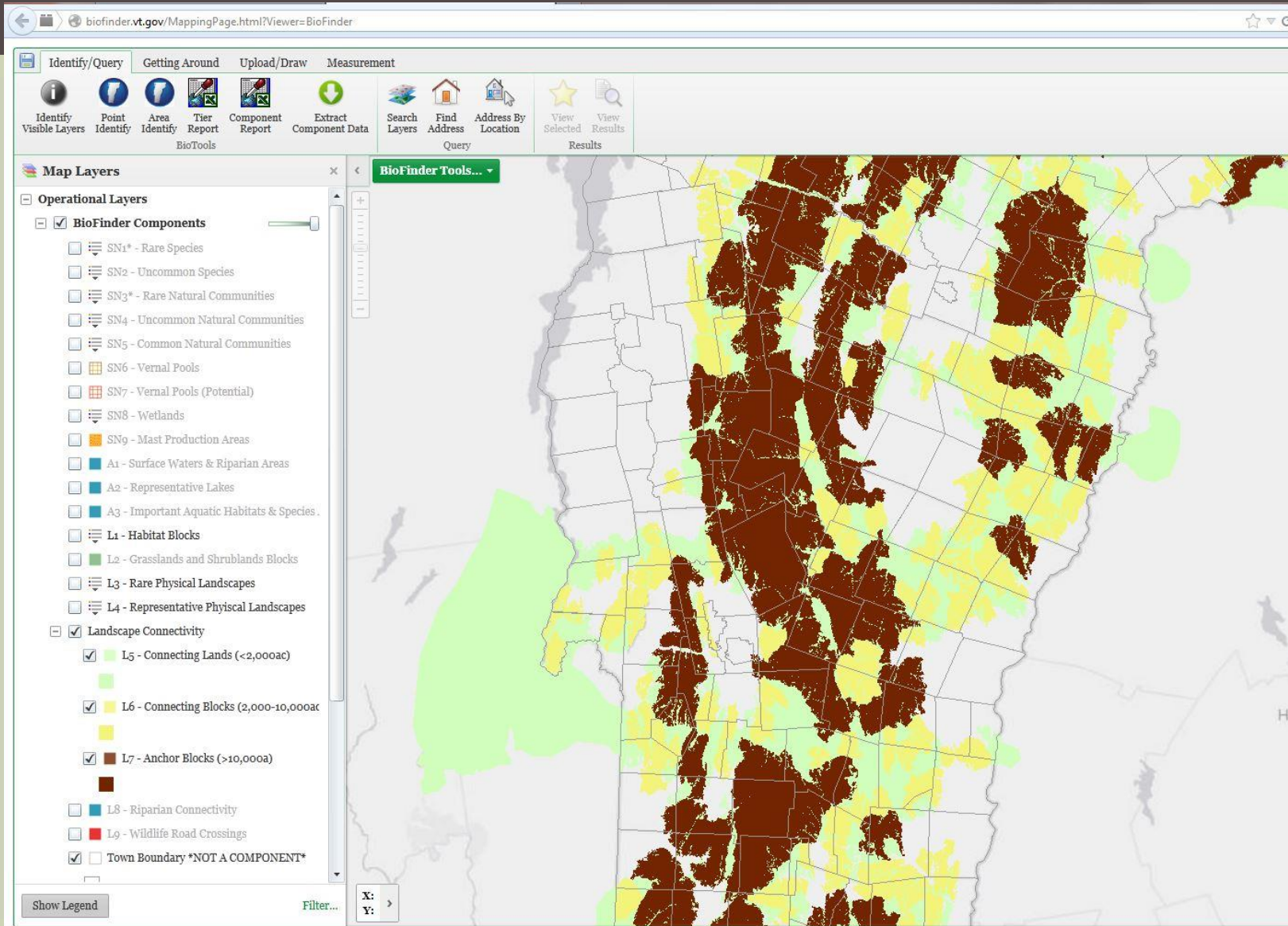
- Greens to Adirondacks
- Greens to Taconics
- Northern Greens
- Worcesters to NE Kingdom

Blue = SCI Linkage Area Boundaries
Red = Structural Pathways

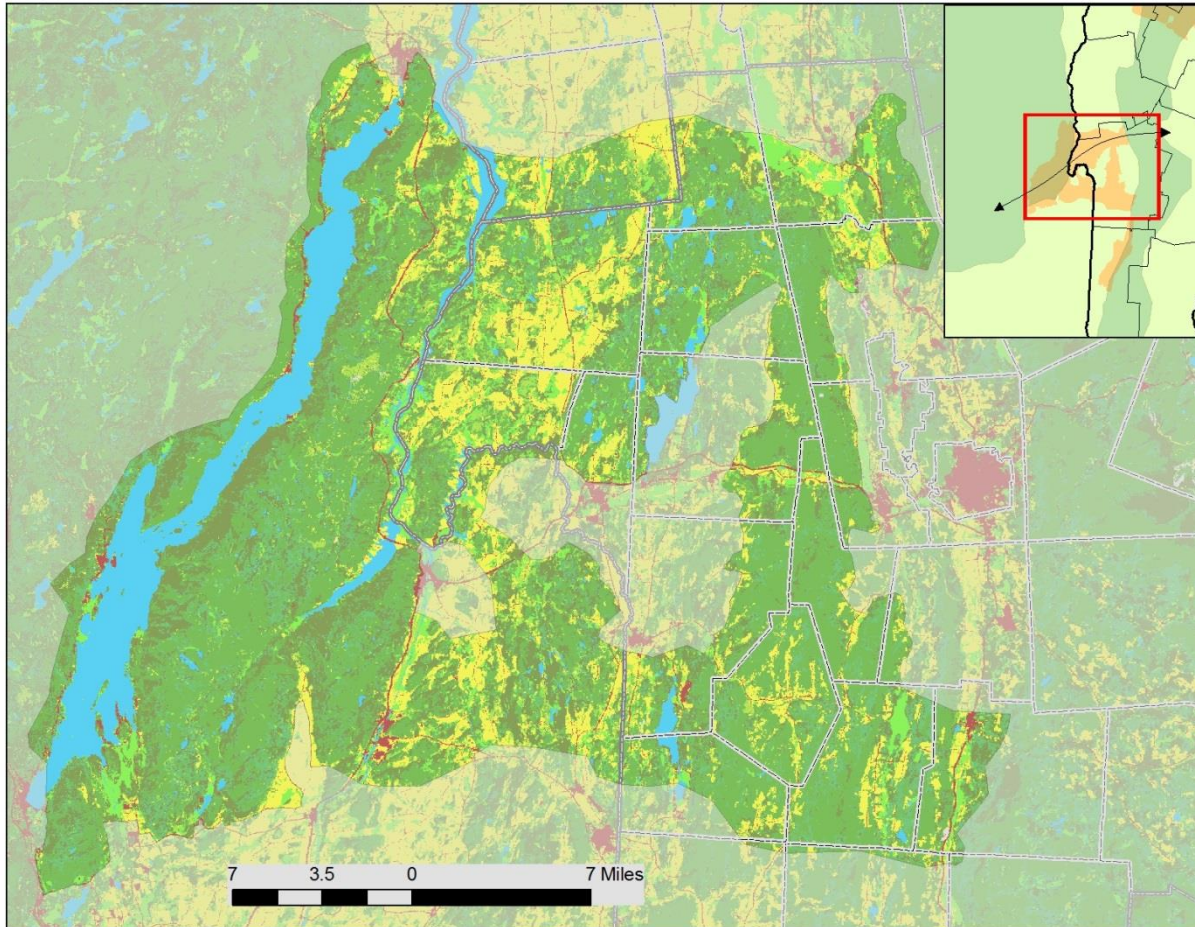


Vermont ANR Biofinder

<http://biofinder.vt.gov/>

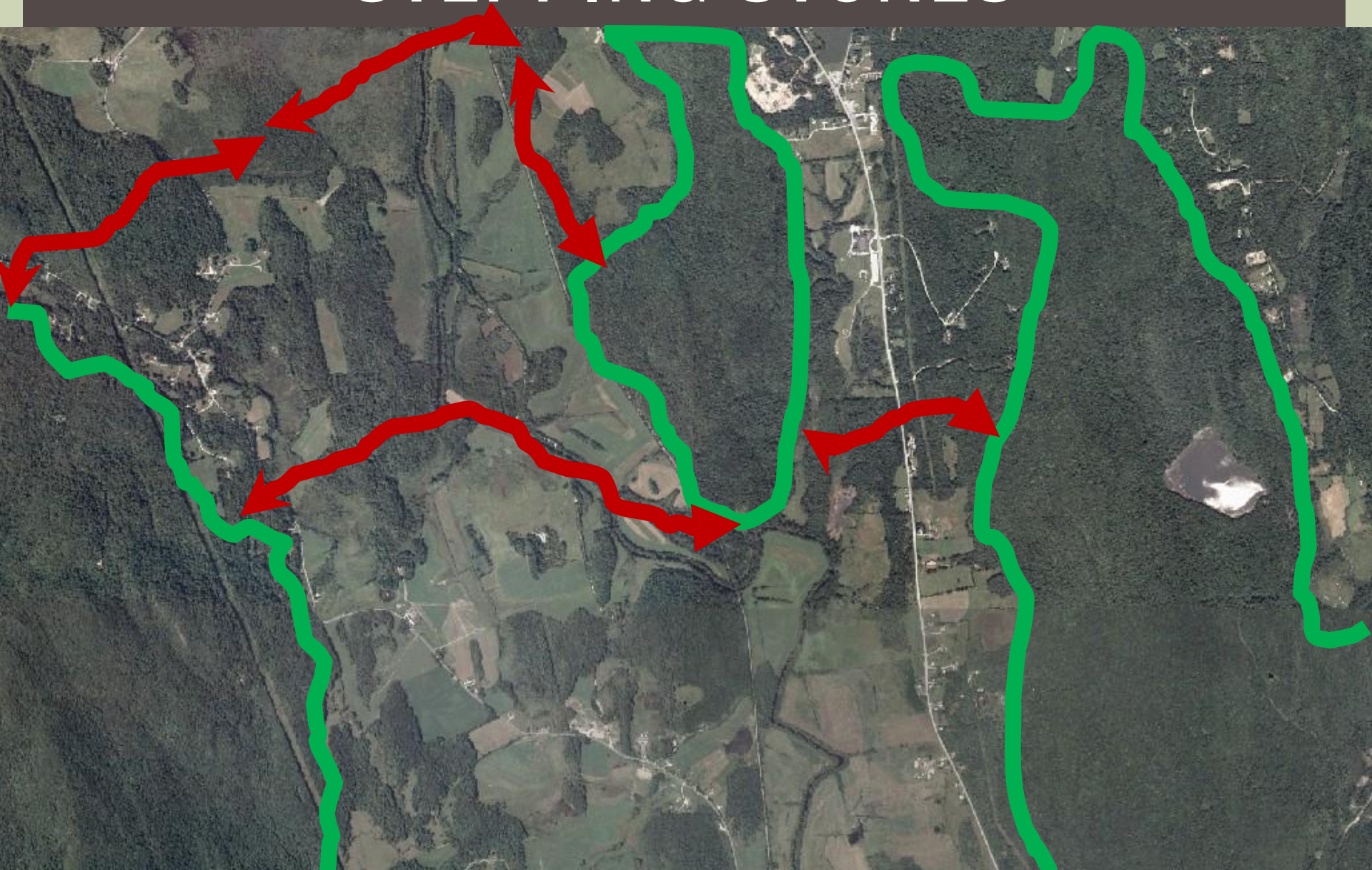


GREENS ↔ ADIRONDACKS

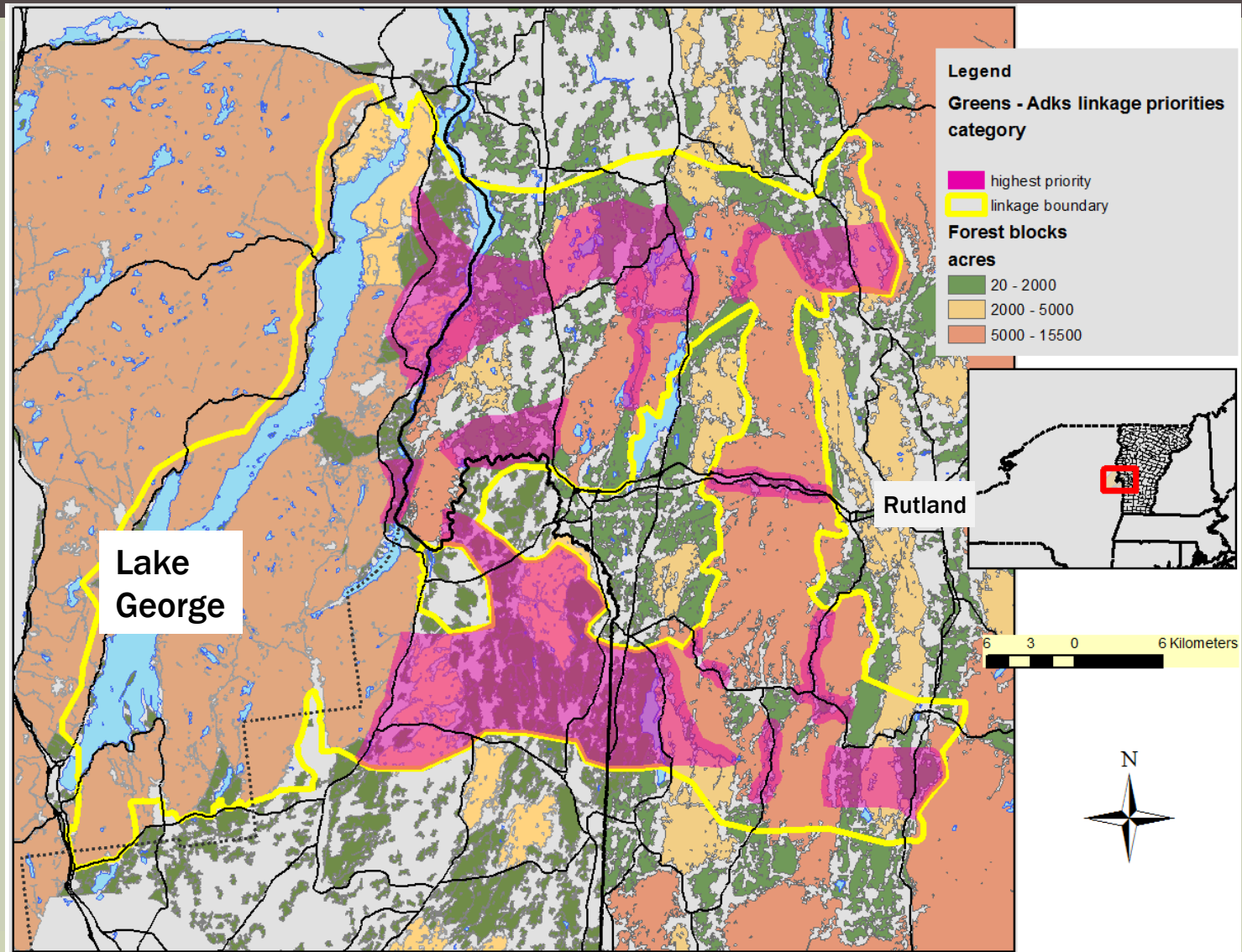


- Links habitat in Adirondacks to the Green Mountains
- Critical habitat bottleneck that links NY to Maine to Gaspe

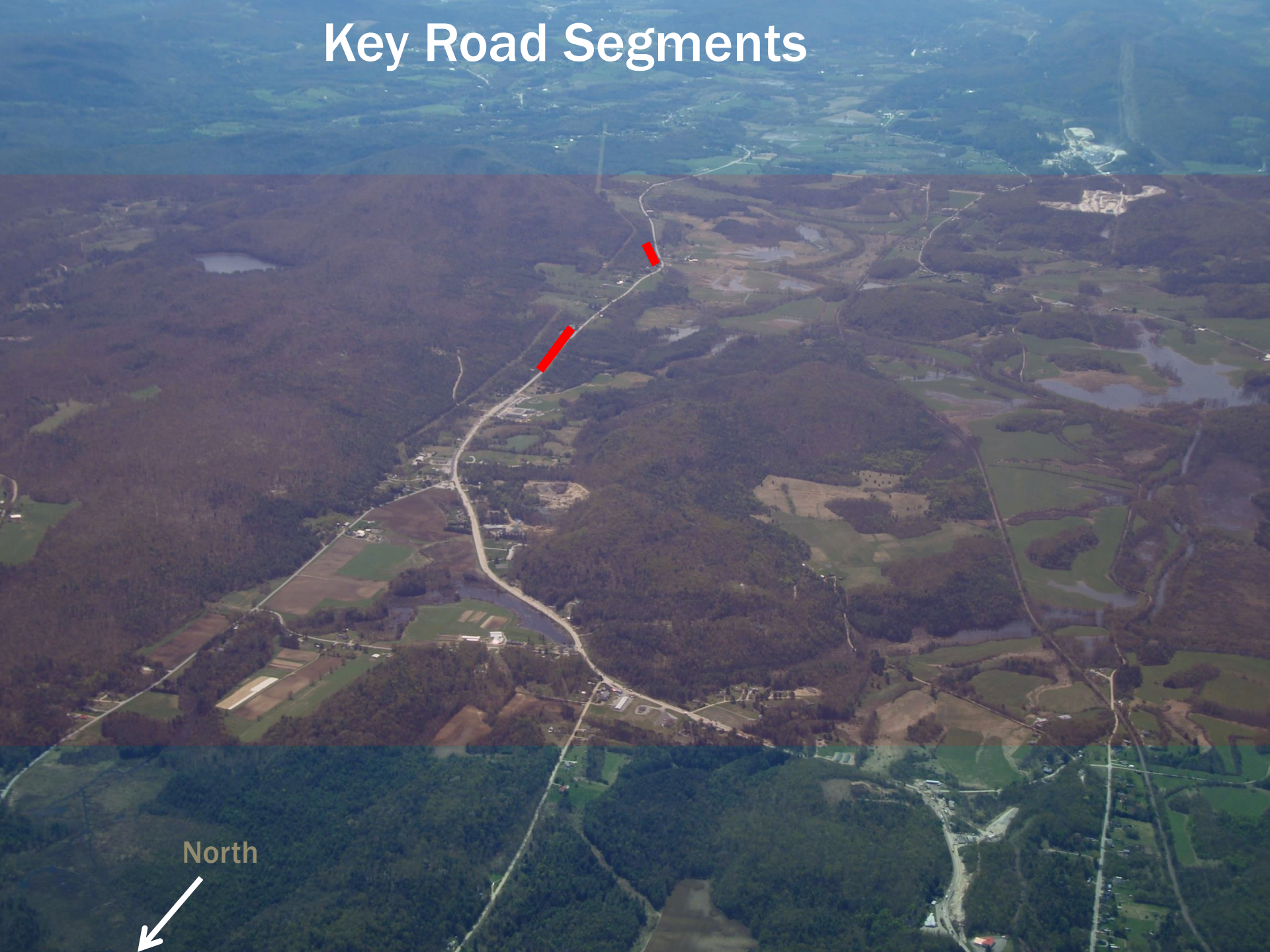
STEPPING STONES



LINKING LARGE FOREST BLOCKS



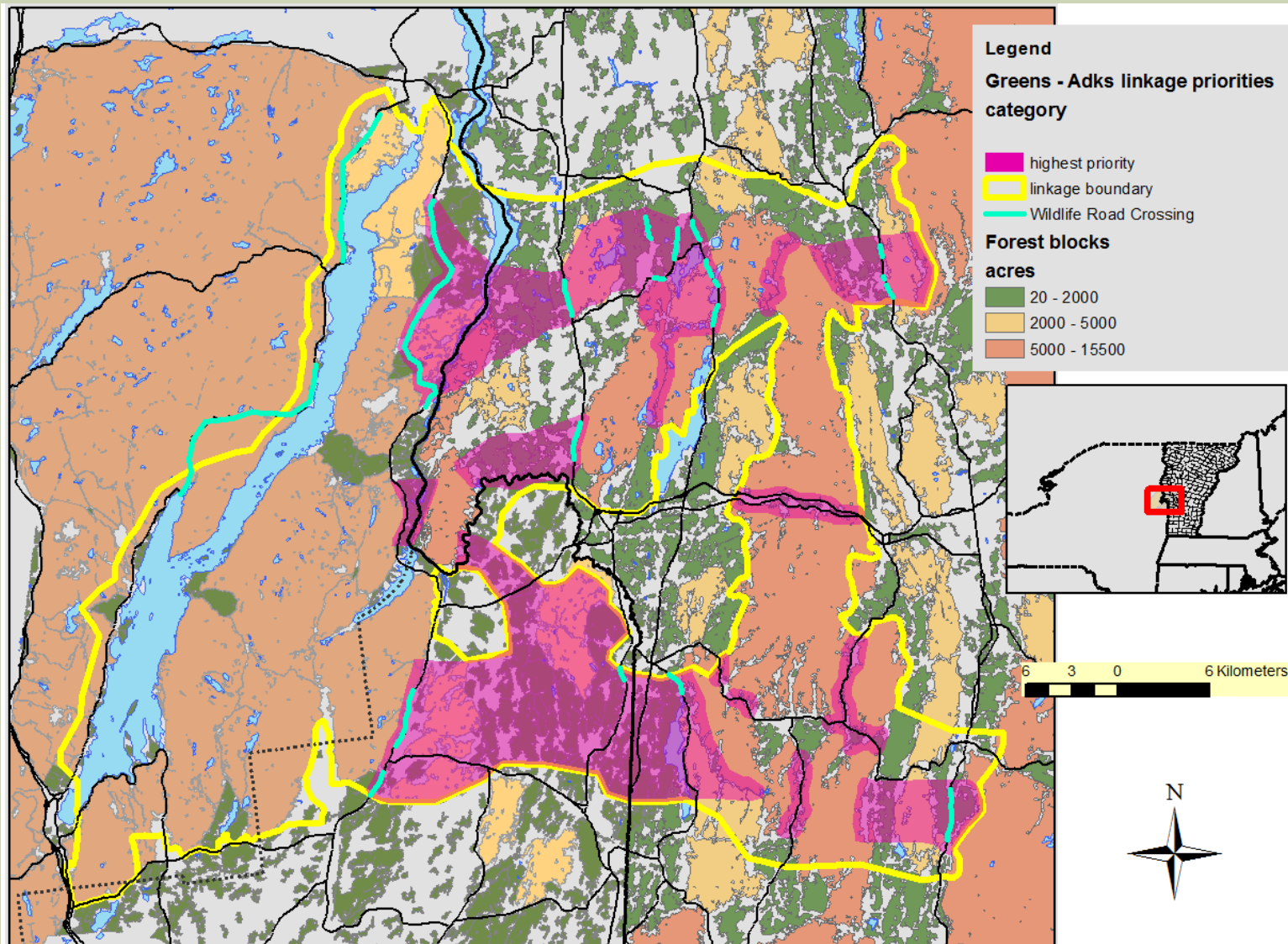
Key Road Segments



North

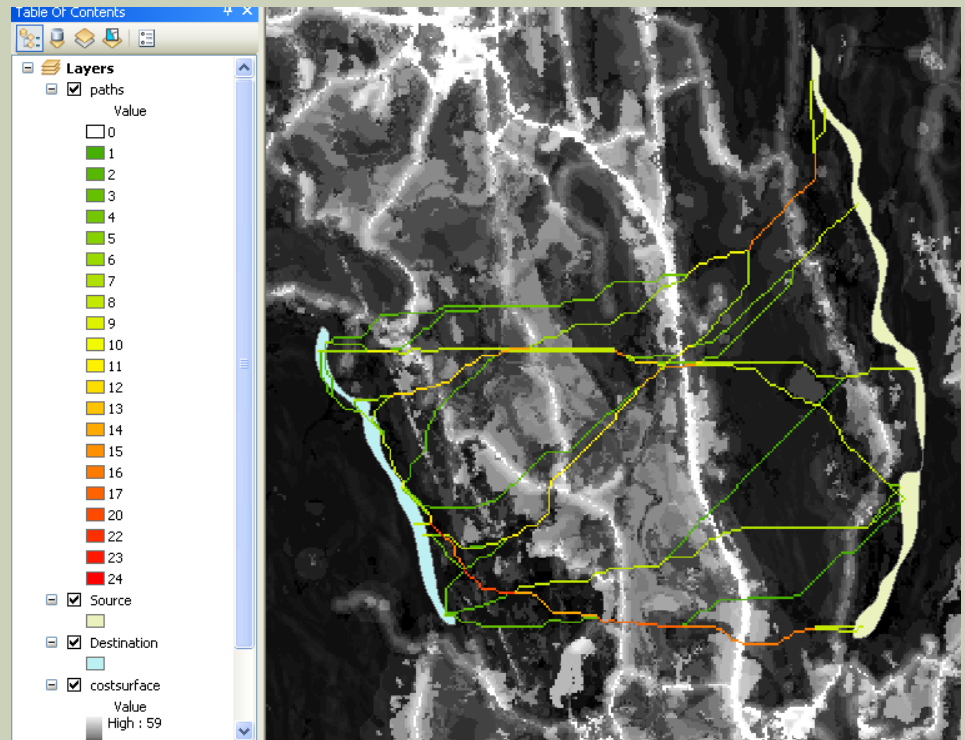


KEY ROAD SEGMENTS



CONFIDENCE IN BEST AVAILABLE SCIENCE

- Continual refinement of our modeling work
- Assistance from Kevin Johnston
 - Johnson State College
 - ESRI modeling tool development

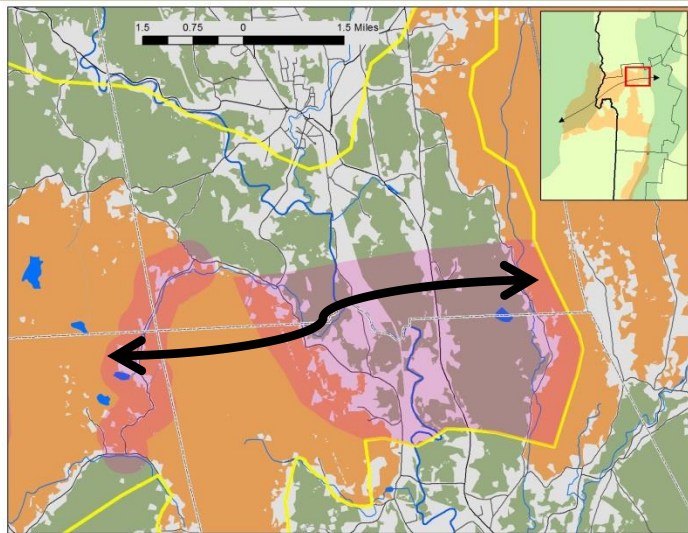


WHERE TO RESTORE/ENHANCE ROAD PERMEABILITY?



Identifying places:

- Modeling (multiple scales)
- Connecting forest blocks
- Local habitat characteristics along road corridors that bisect forest blocks



Assessing functional connectivity:

- Radio Collar/genetic studies
- Tracking
- Camera monitoring

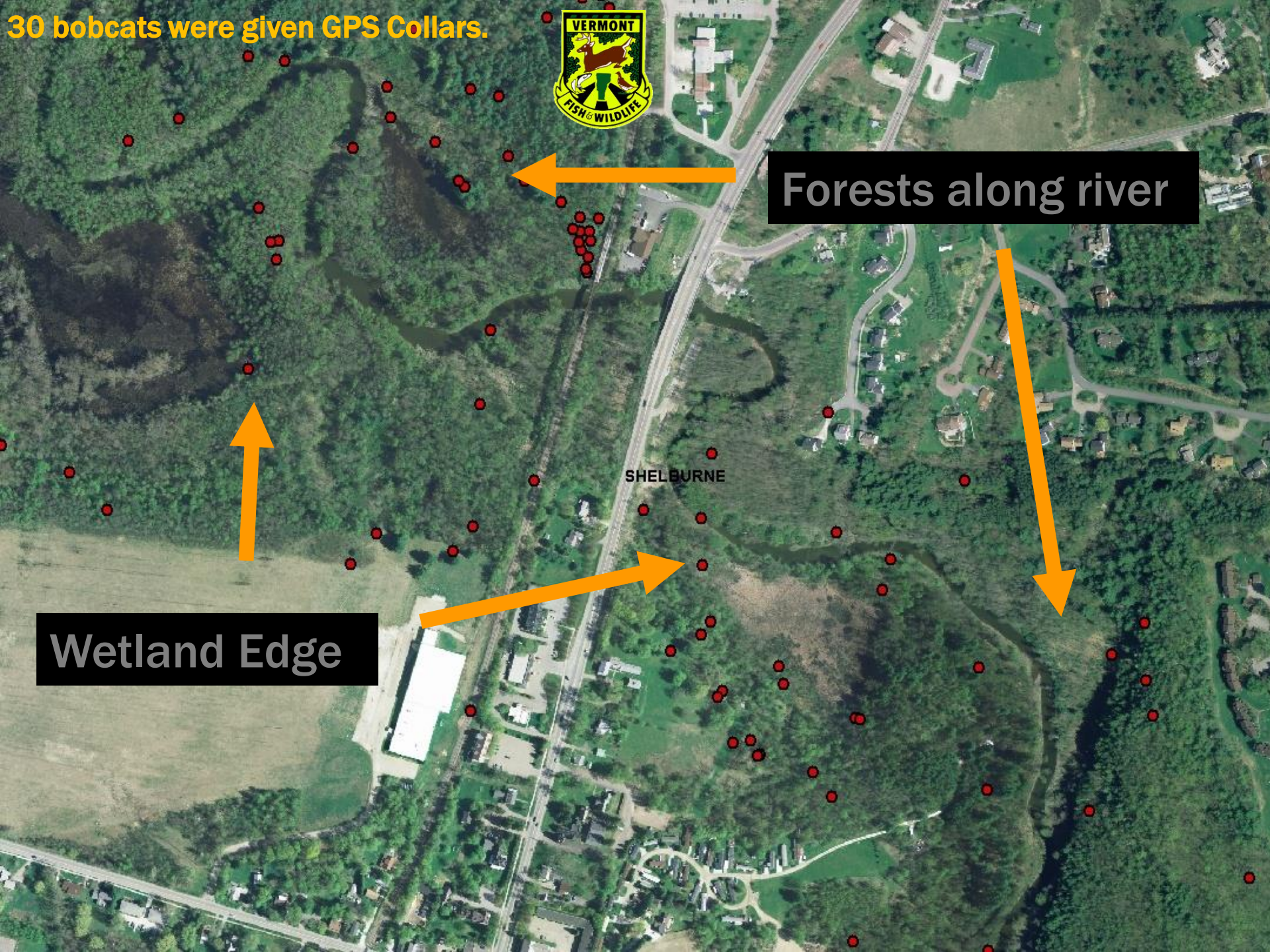
30 bobcats were given GPS Collars.



Forests along river

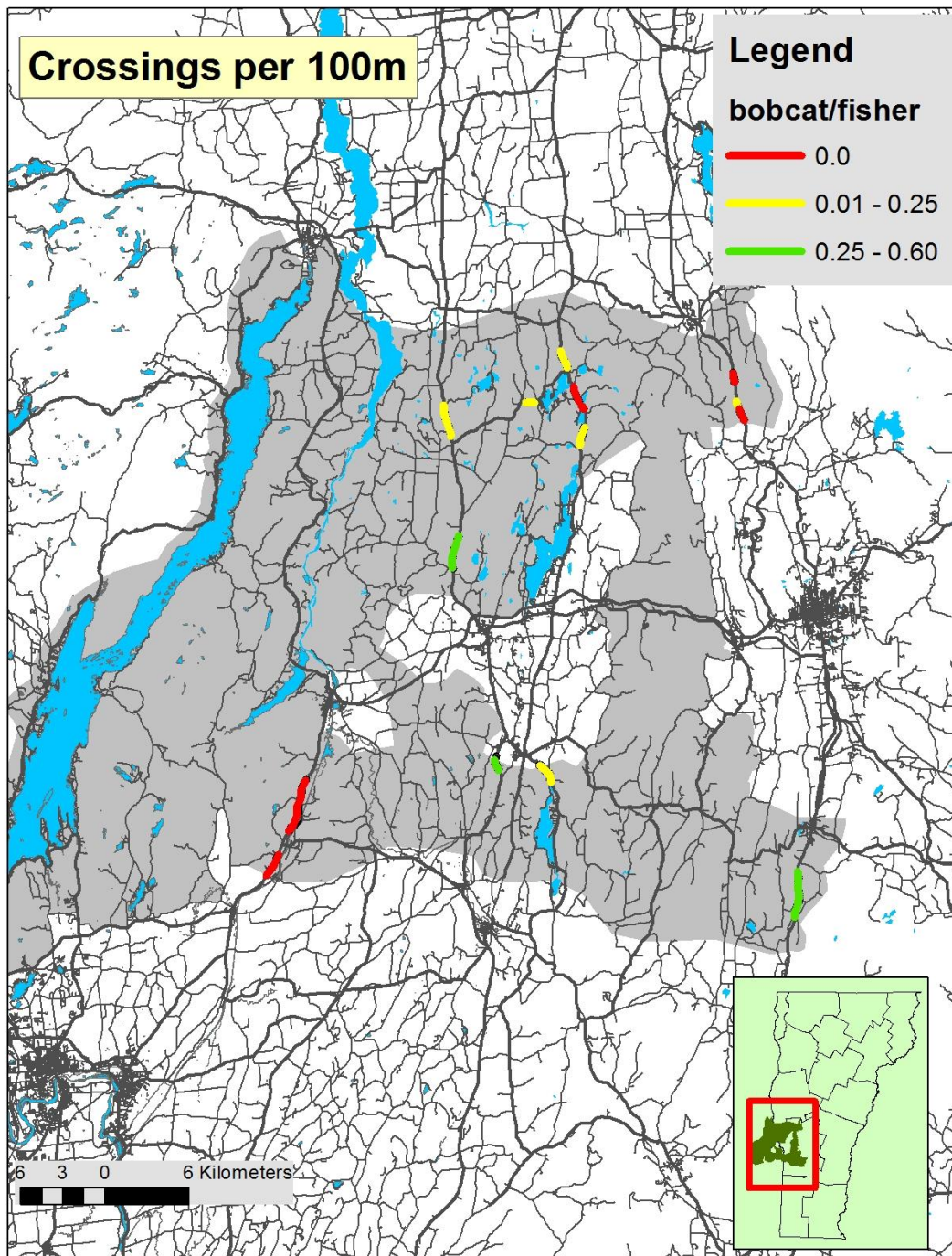
SHELBURNE

Wetland Edge





Crossing road under bridge



2010 WINTER TRACKING: HINTS AT FUNCTIONAL CONNECTIVITY

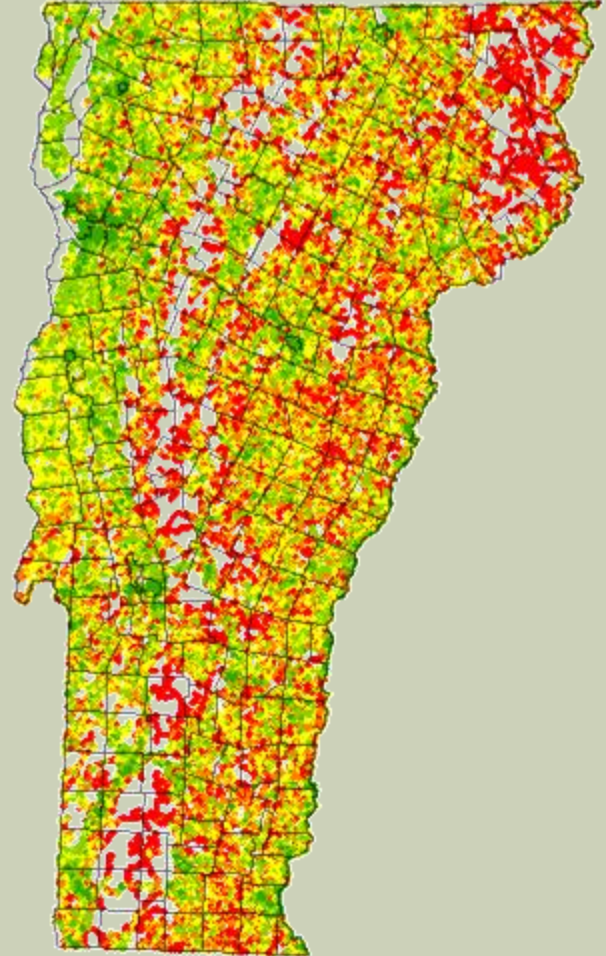
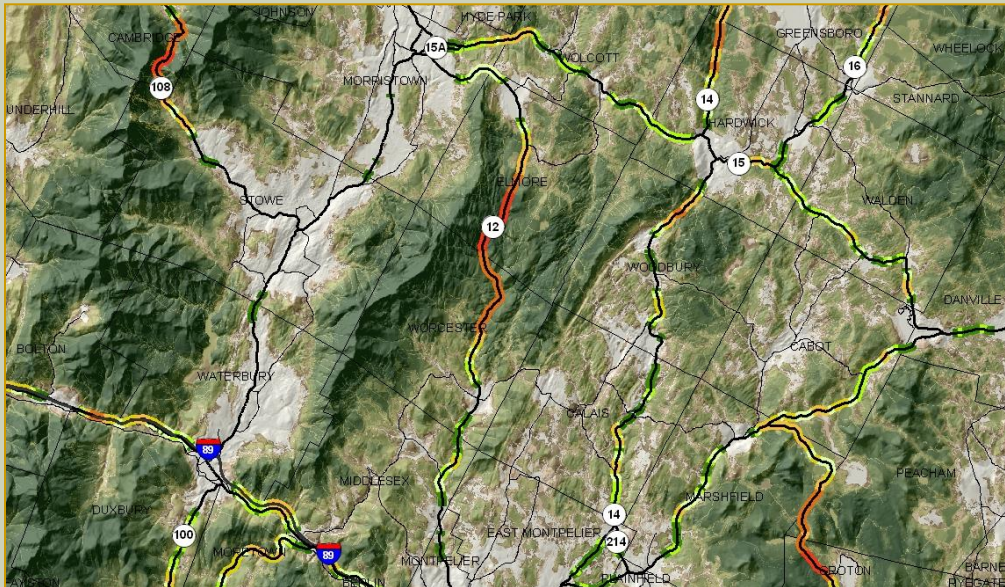
VOLUNTEER TRACKING PROGRAMS



Game cameras, transportation structures, and tracking work



STRUCTURAL TO FUNCTIONAL



WILDLIFE CONNECTIVITY STUDY



Mitigation Project

- Is 89 a barrier to wildlife movement?
- Are any transportation structures helping to move wildlife?
- If improved, which structures could move wildlife?

STRUCTURES COMPARISON



- **30 Cameras in Worcesters to Kingdom**
- **30 Cameras in Greens to ADKs**
- **Comparing 4 structure classes**

THE CAMERAS



Reconyx PC 900

- ❑ Infrared Trigger
- ❑ 3 pics on trigger
- ❑ 60' area
- ❑ Security Code (makes camera unusable if stolen)
- ❑ Double locks

THE CAMERAS

	HC500	HC600	PC800	PC900
Illumination Range at night	Lo-glow Infrared up to 50 feet	No-glow Covert Infrared up to 50 feet	Lo-glow Infrared up to 70 feet	No-glow Covert Infrared up to 50 feet
Images	1080P HD or 3.1 MP color images by day; monochrome by night			
InstaOn™ Trigger Speed	1/5 second			
RapidFire™ NearVideo™	Up to 2 frames per second			
SD Card Capacity	Up to 32GB: (4GB = approx 10,000 pictures) NOTE: under normal use 2GB or 4GB cards are adequate.			
Software Included	BuckView™ Advanced		MapView™ Professional	
Moisture Absorbing Desiccant System	Available for purchase		Included	
Time-Lapse Surveillance	1, 5, 15, 30, or 60 minute intervals		Virtually any number of seconds, minutes, or hours	
Motion Sensor Scheduling	ON or OFF		15 minute increments within all 24 hour periods	
Start Delay	n/a		Up to 12 weeks	
Conformal Coated Electronics	n/a		Included	
Customization Options (additional charges may apply)	n/a		Wireless Trigger and IR Illumination Extender, External Power and Trigger Jacks, Focal Distance, Telephoto lens, Custom Motion Detector Lens, Custom Colors, other modifications available	

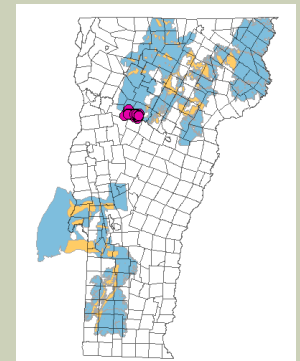
CAMERA PLACEMENT



STUDY AREA



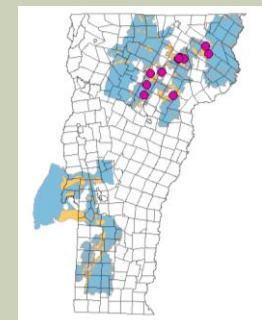
- 40 Cameras
- 6 transects
- 2 Interstate surveys
- Two Year Study



STUDY AREA



- 30 Cameras
- 3 culvert class sizes
- Two Year Study



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48°F



PC800 PROFESSIONAL

RECONYX

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0 36°F



PC800 PROFESSIONAL

RECONYX

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58°F



PC800 PROFESSIONAL

RECONYX

FIELD CHECK





03/09/2014 03:23:36

18°F



LIVE3G

SPYPOINT  **LIVE**3G

VTrans and functional connectivity in road corridor management

- Planning
- Project Development and Delivery
 - Operations