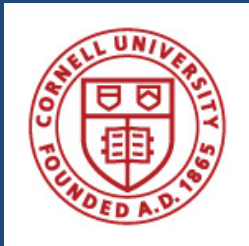


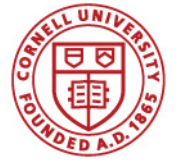
FINDING WAYS TO CONNECT

Linking habitat together to function as an ecological whole



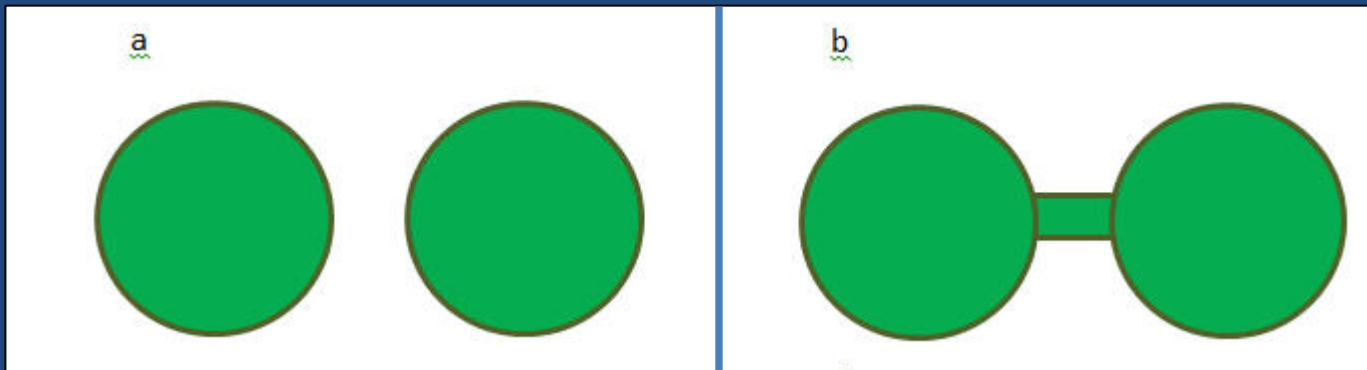
Suzanne Beyeler and Jason Martin
Department of Natural Resources
Cornell University

What is Habitat Connectivity?



Habitat Connectivity = Structural and Functional

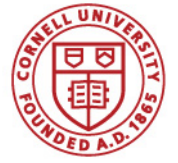
- Structural connectivity refers to the physical relationship between landscape elements.



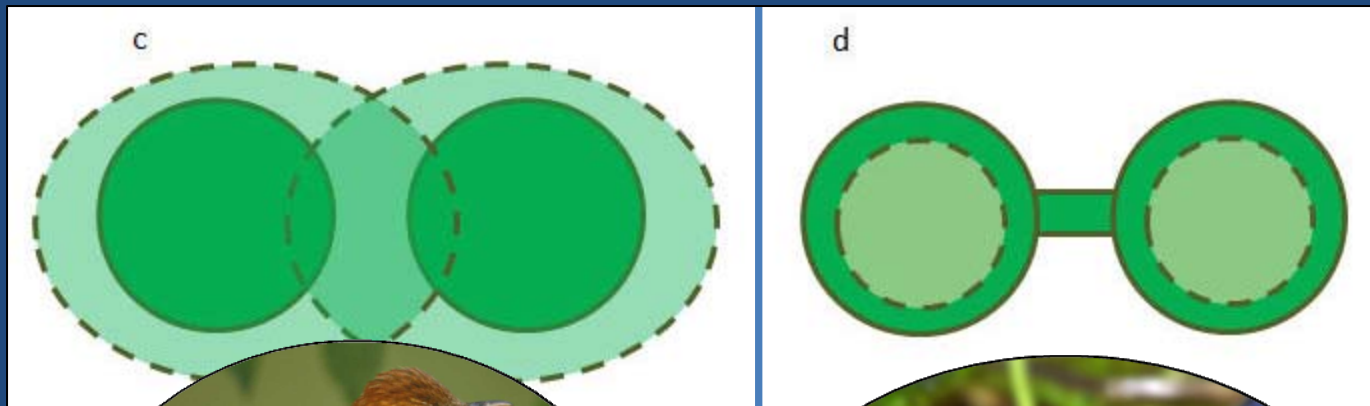
a. not connected

b. connected by corridor

What is Habitat Connectivity?



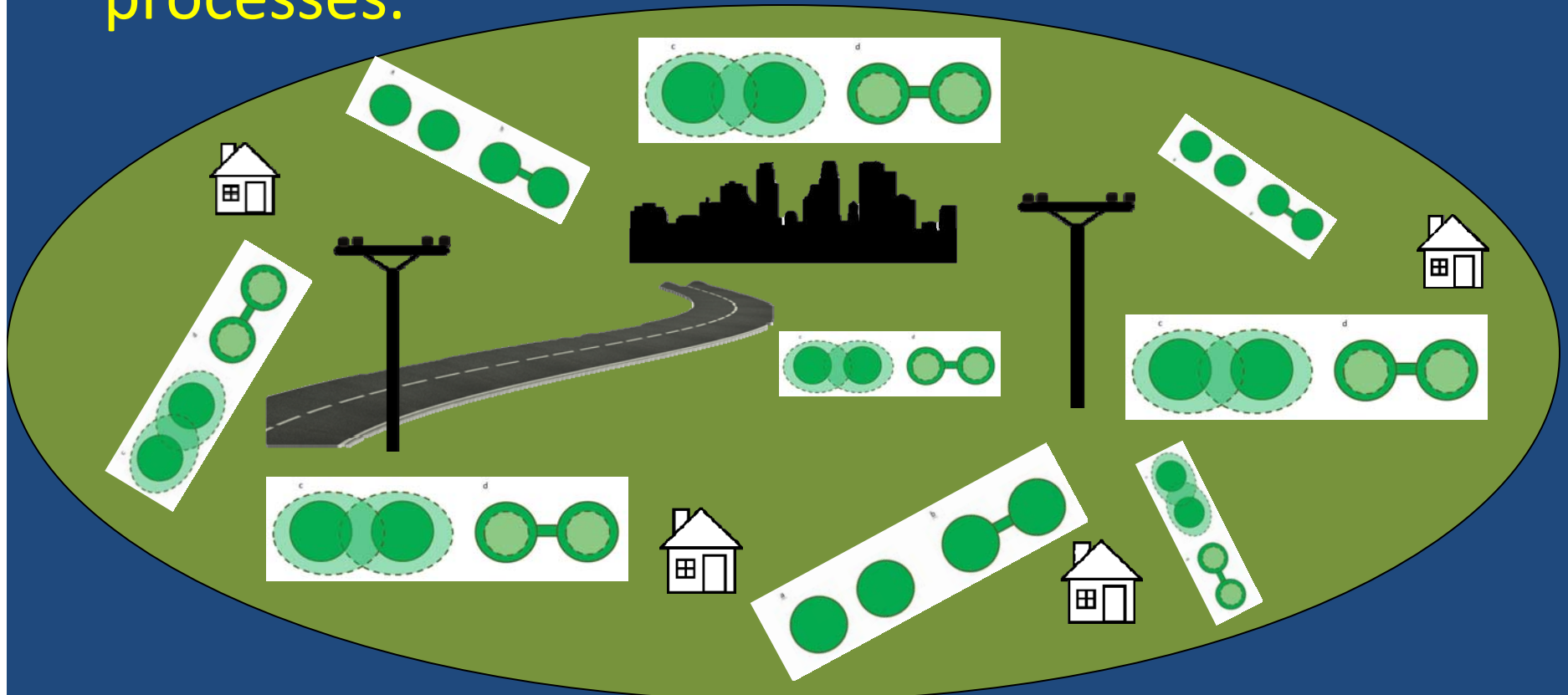
- Functional connectivity describes the degree to which landscapes actually facilitate or impede the movement of species and ecological processes.



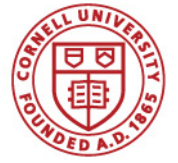
What is Habitat Connectivity?



Habitat Linkages - broad regions of connectivity that facilitate the movement of multiple species and/or maintain a wide range of ecological processes.

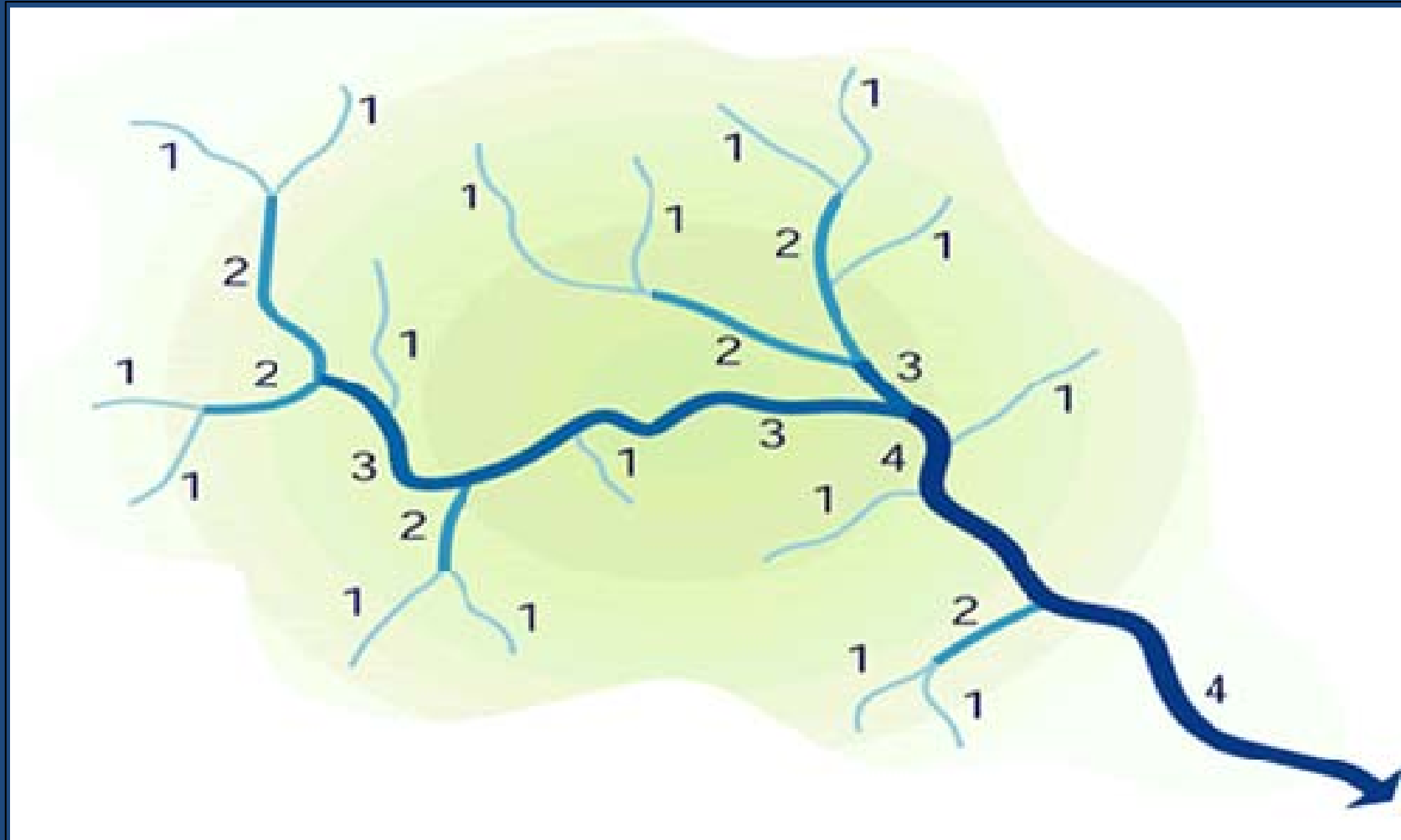
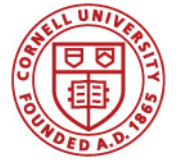


You Must Consider the Larger Scale

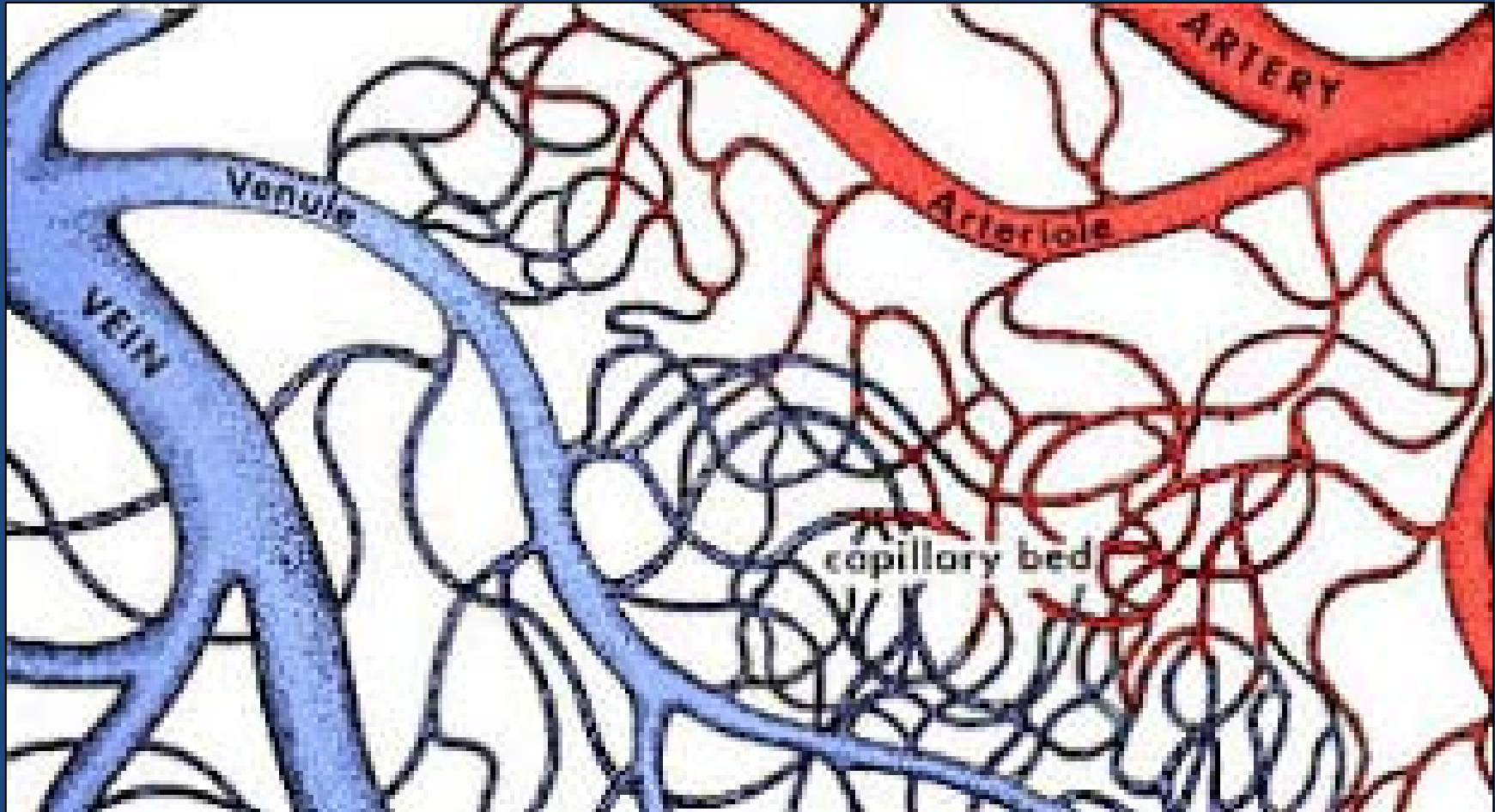


- Local Linkages do not exist in isolation...they need to connect to larger landscape in order to be functional.
- Towns and local planners should work together to align conservation actions if they want to maintain ecological function
 - The sum of the parts determine the functionality of the habitat as a whole.

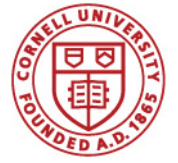
Small to Large are Entwined



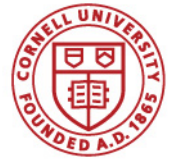
Small to Large are Entwined



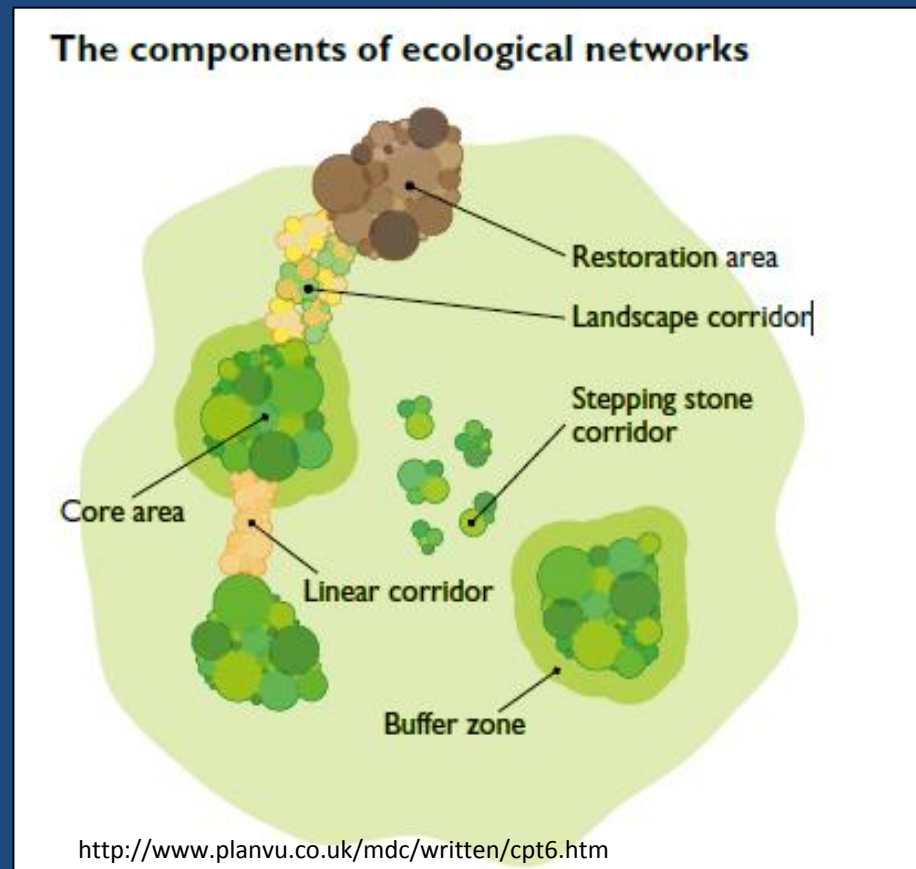
Small to Large are Entwined



What Makes a Habitat Linkage?



- **Interconnected networks of multiple habitats**
 - Wetlands
 - Forests
 - Steams
 - Greenways
 - Conserved Lands
 - Open Space



What **Obstructs** a Habitat Linkage?



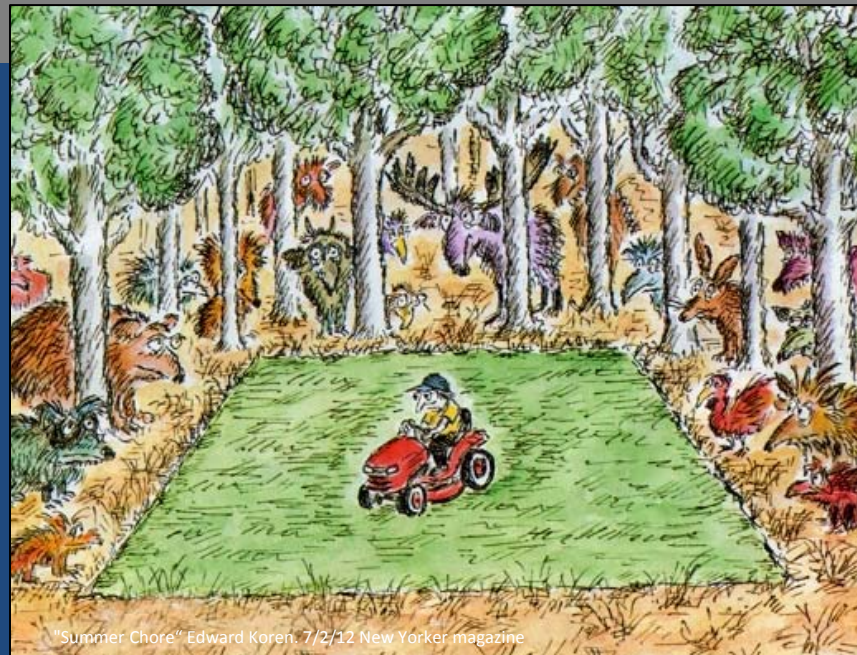
- The ecological integrity of natural areas are directly and indirectly impacted by gray infrastructure.

Urban Areas

Roads

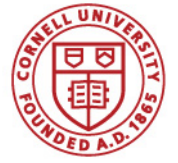
Utilities and Communications Lines

Water/Sewage Treatment

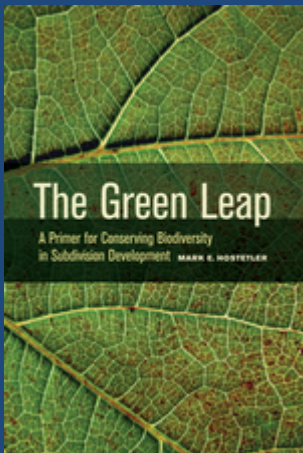


"Summer Chore" Edward Koren. 7/2/12 New Yorker magazine

Why Preserve Linkages?



- The construction and maintenance of urban areas is dependent upon local, regional and global resources... in the U.S., our ecological footprint is greater than the resources available to support it. This is not sustainable....
 - ecosystem services (i.e., natural resources that we economically benefit from) can be lost if we do not plan to conserve them.

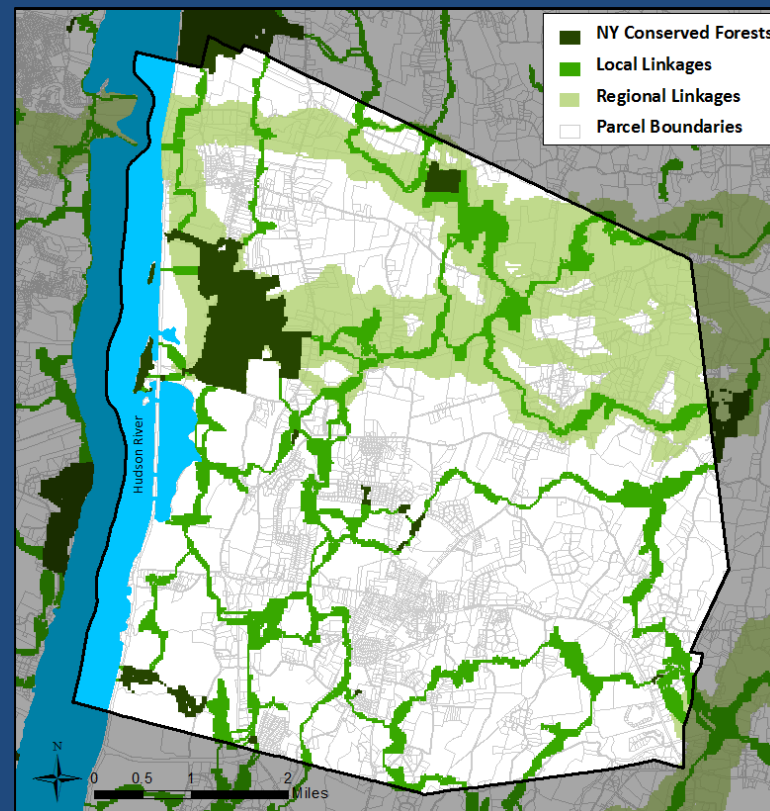


The Green Leap: A Primer for Conserving Biodiversity in Subdivision Development. Mark E. Hostetler. University of California Press (January 2012)

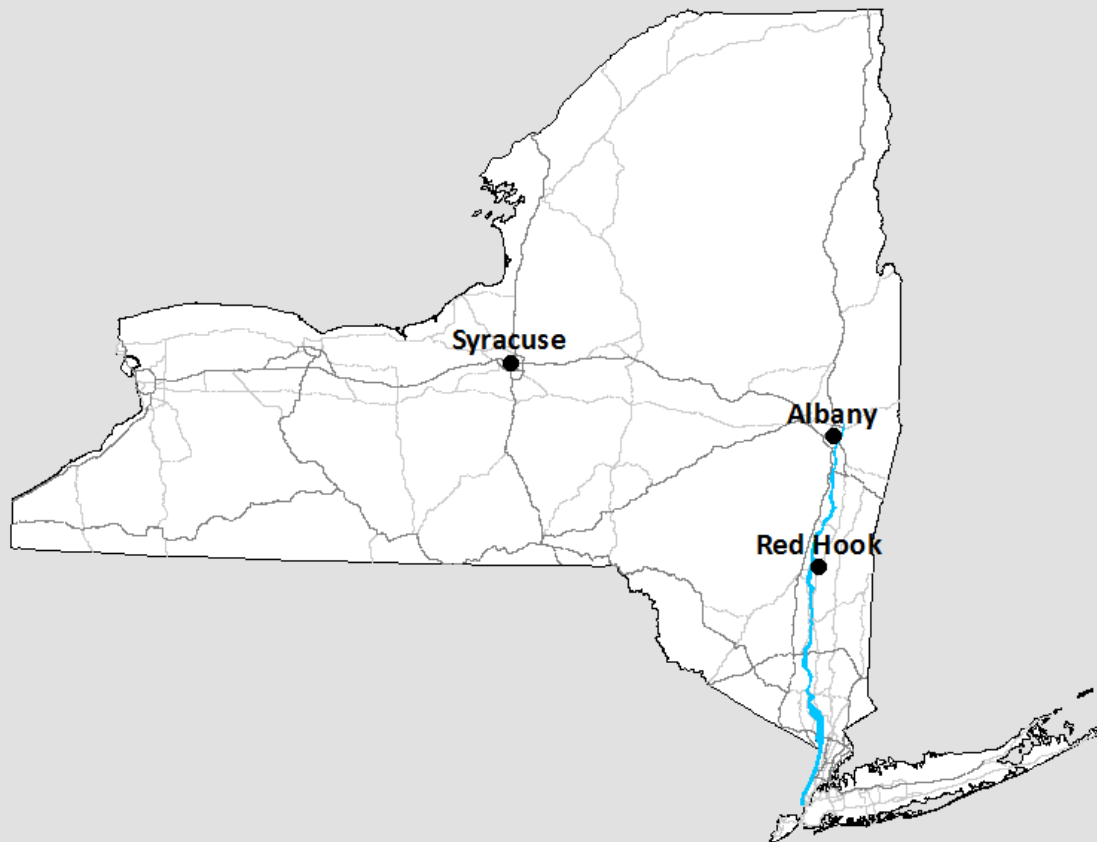
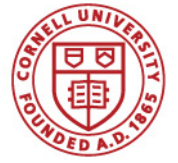
Real World Applications



- Case study: Taking the concept of habitat connectivity and translating it into something that can inform municipal planning.

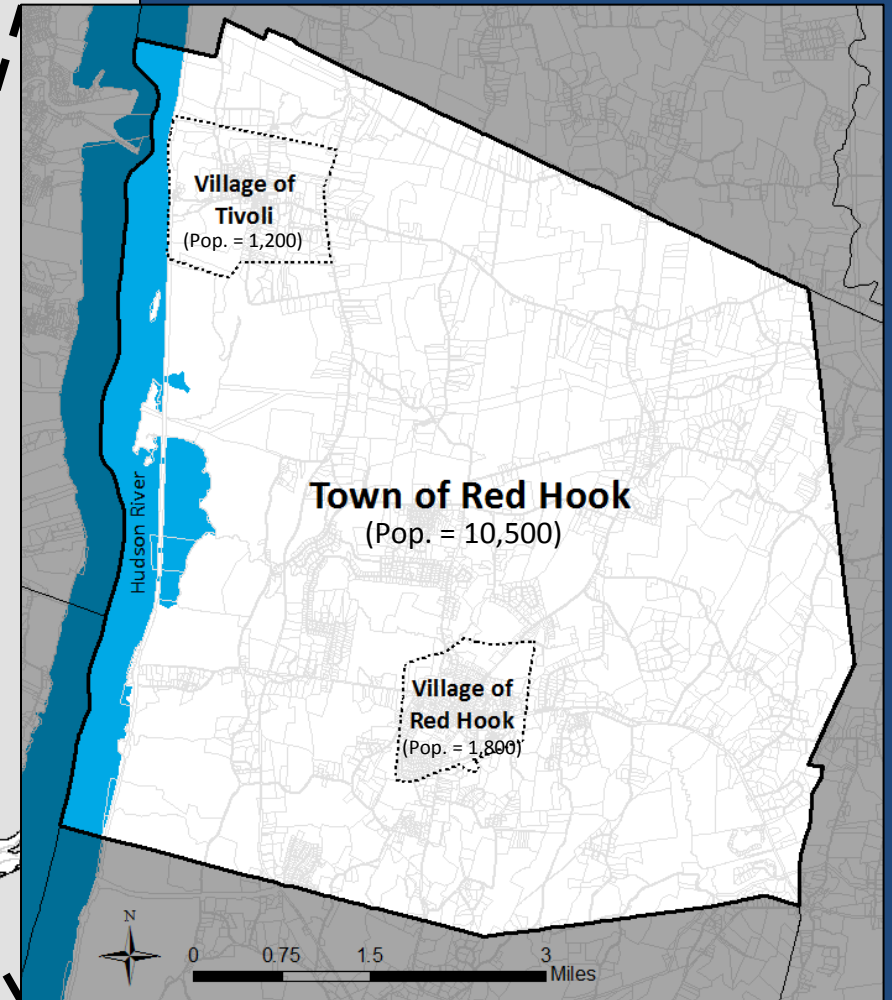
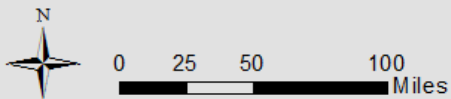
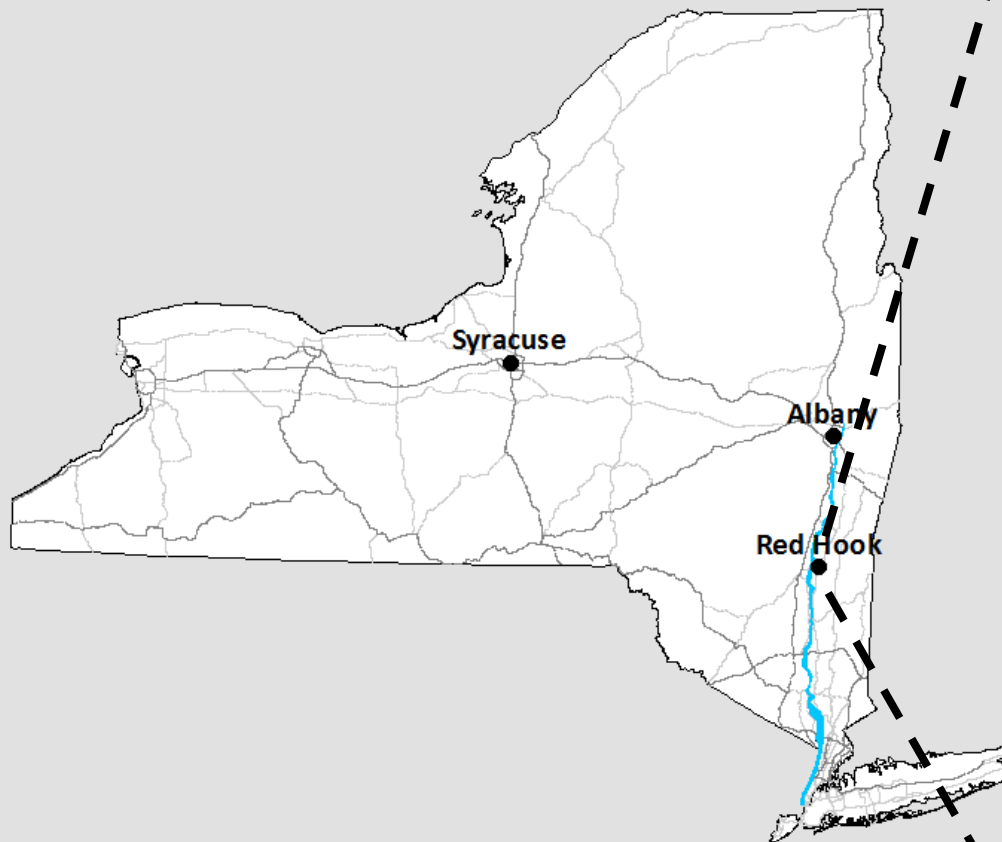
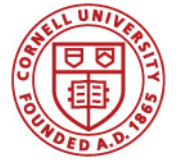


Case study



0 25 50 100
Miles

Case study



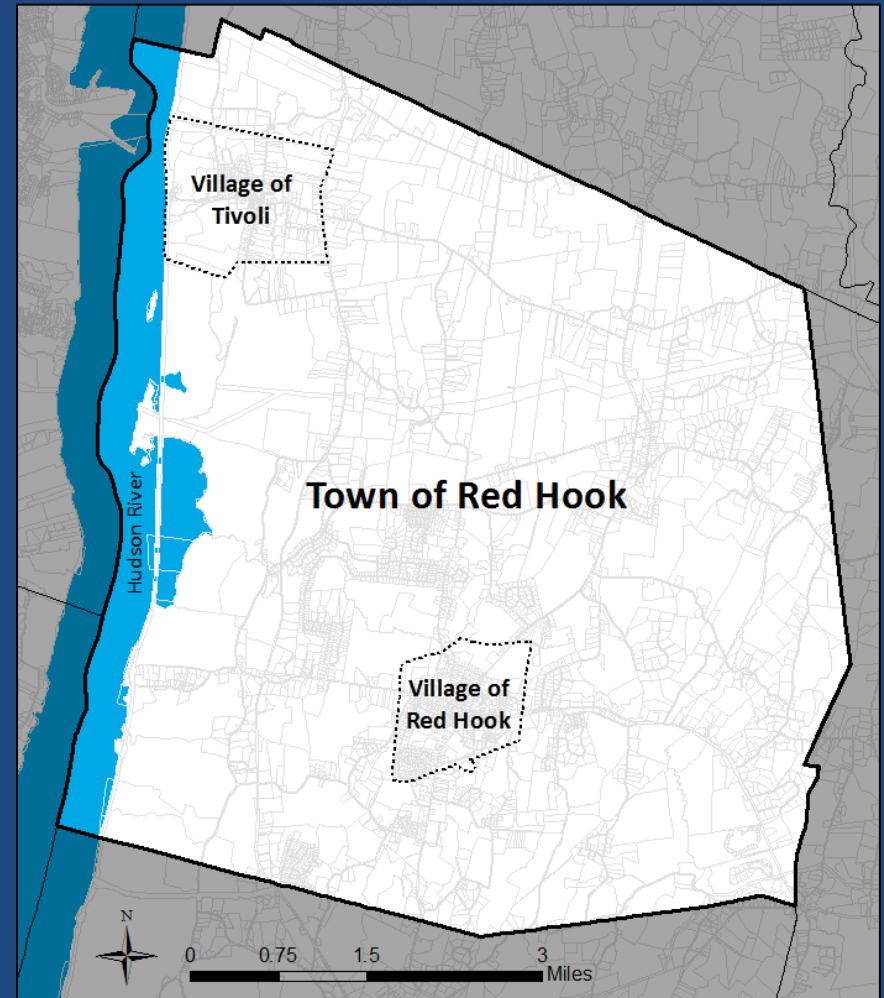
Case study



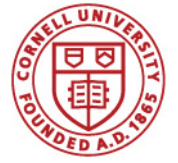
Context

30 years of planning tools and programs for natural resource preservation:

- *Open Space Plan*
- *Centers and Greenspaces Plan*
- *Partnerships with land trusts*
- *Amendments to zoning laws and subdivision regulations*
- *Etc... redhook.org*

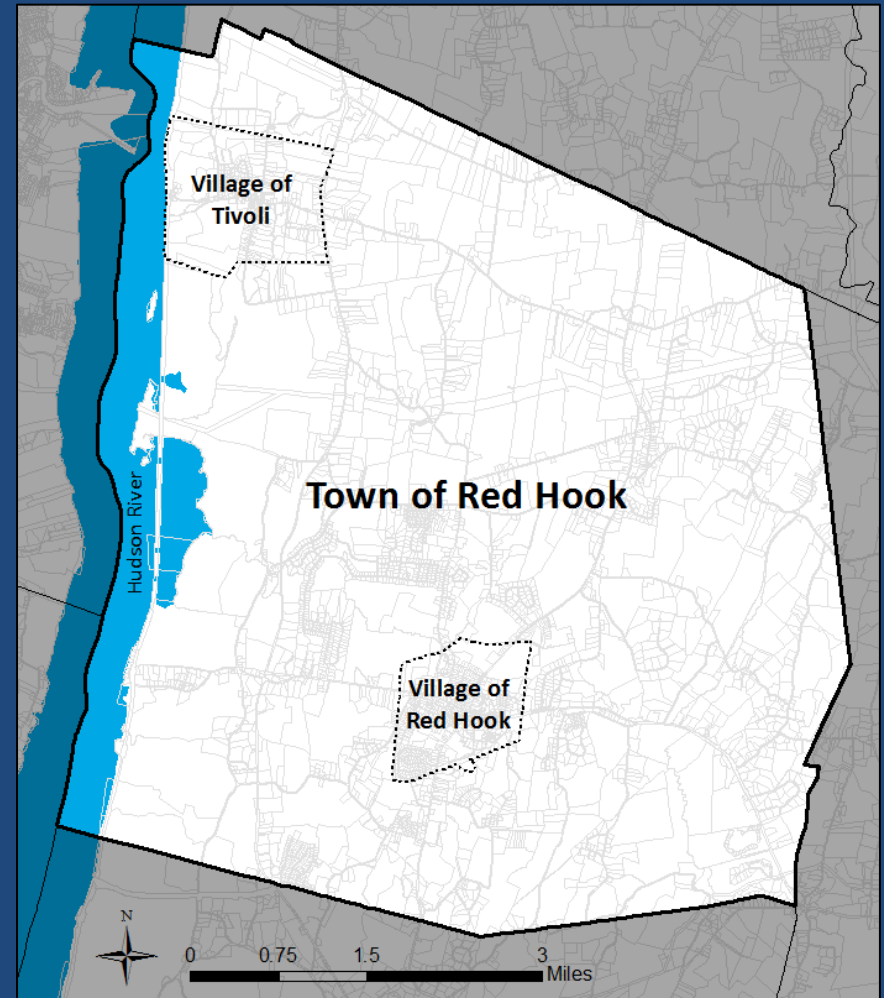


Case study

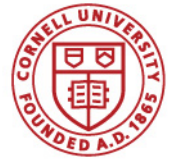


Red Hook's Priorities

- Rural quality
- Agricultural character
- Natural environments (forests & wetlands)
- Scenic vistas
- Groundwater resources

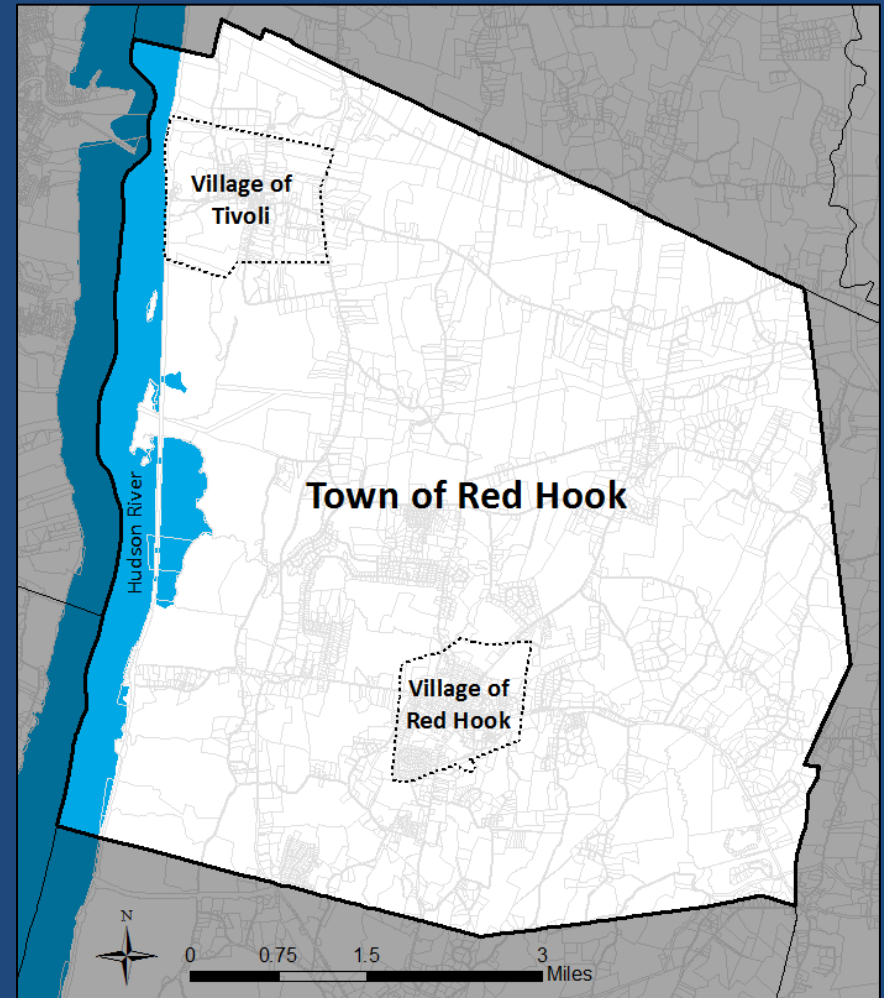


Case study

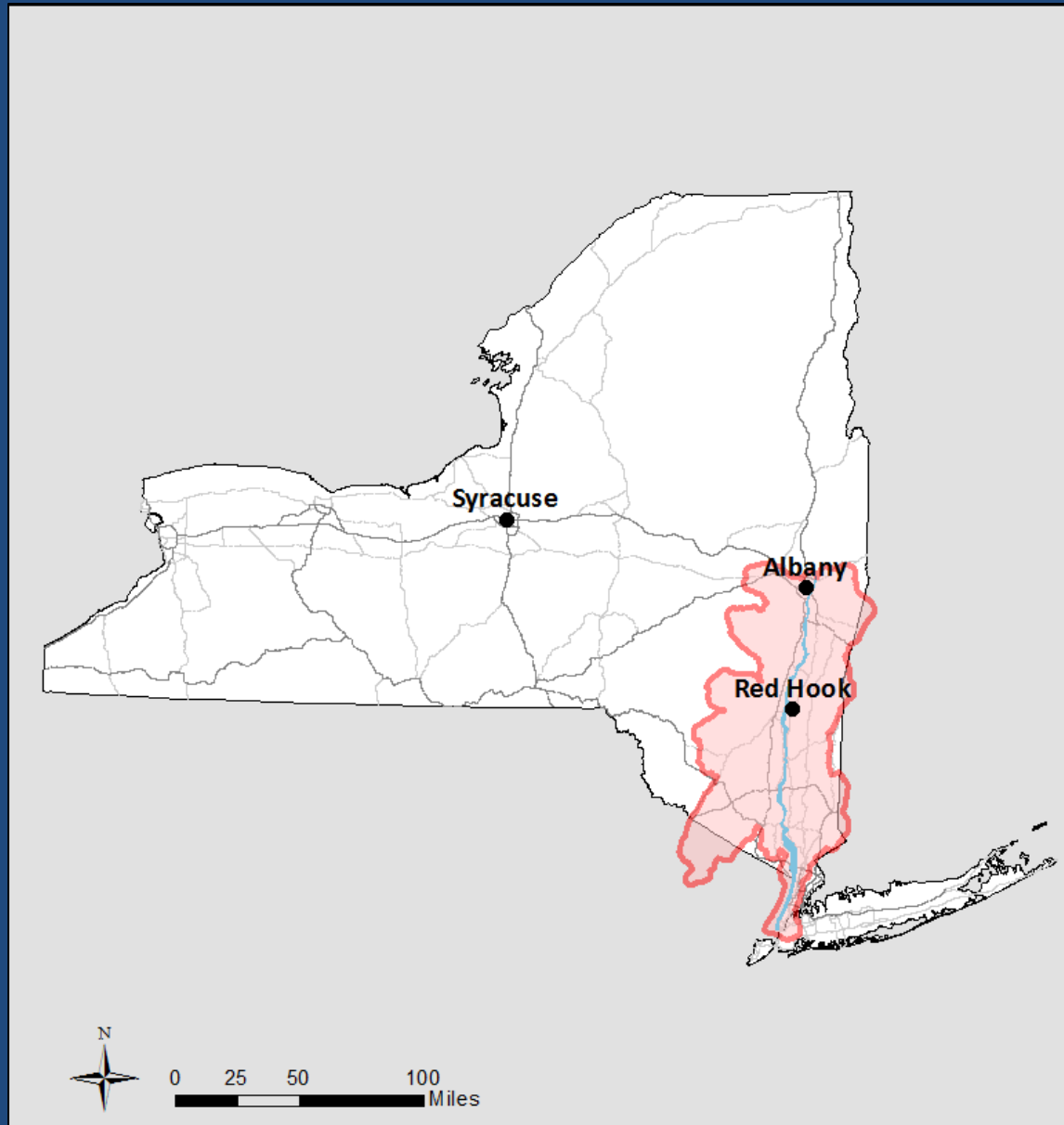
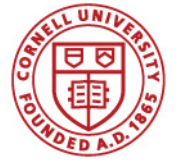


Project Goals

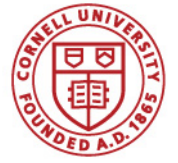
- Identify important ecological linkages (local and regional)
- Partner with Red Hook to incorporate linkages into ongoing conservation planning



Case study



Data Analysis: Tools and Models



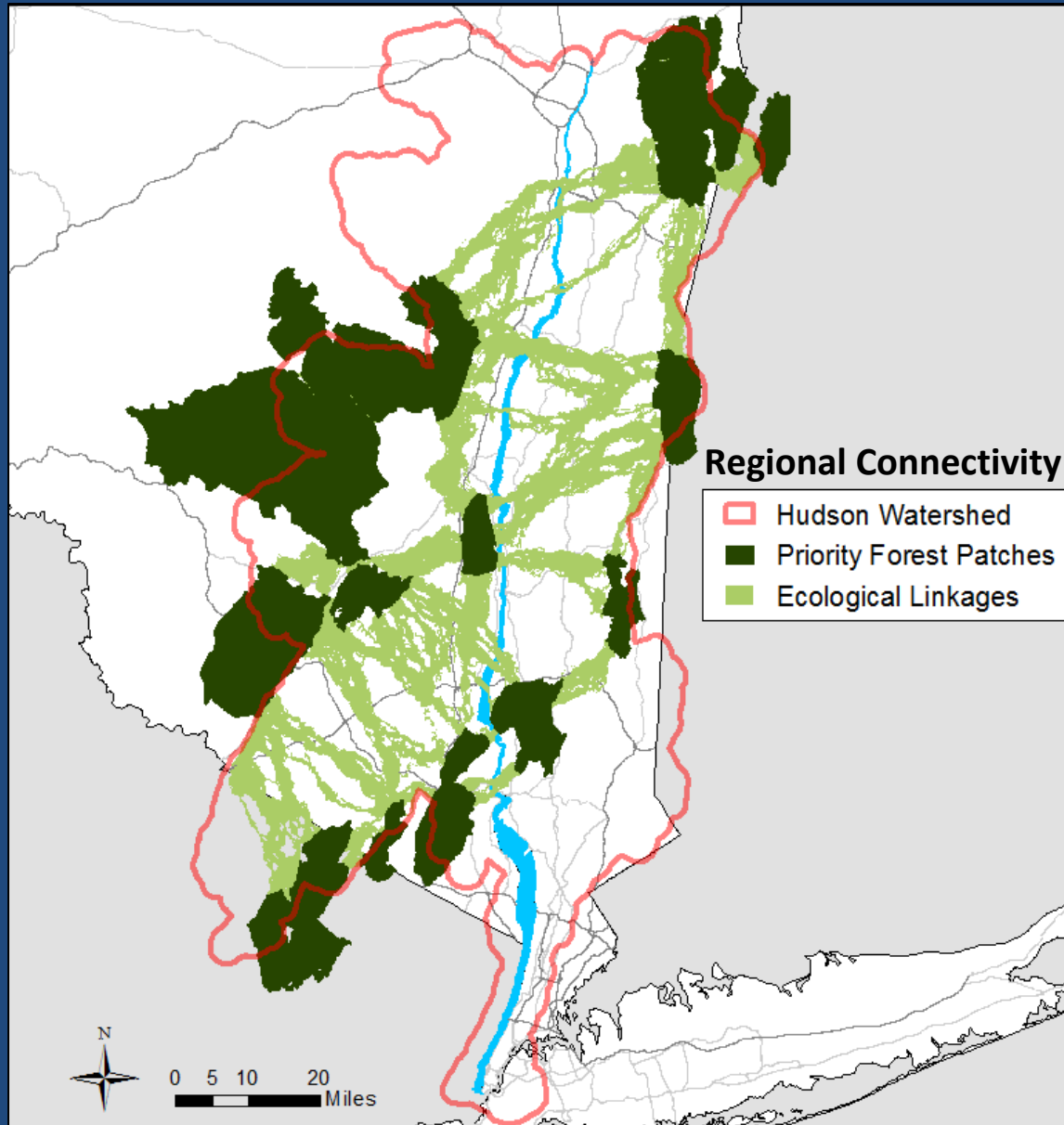
Linkage Mapper – ArcGIS integrated tool for regional habitat connectivity analyses

<http://www.circuitscape.org/linkagemapper>

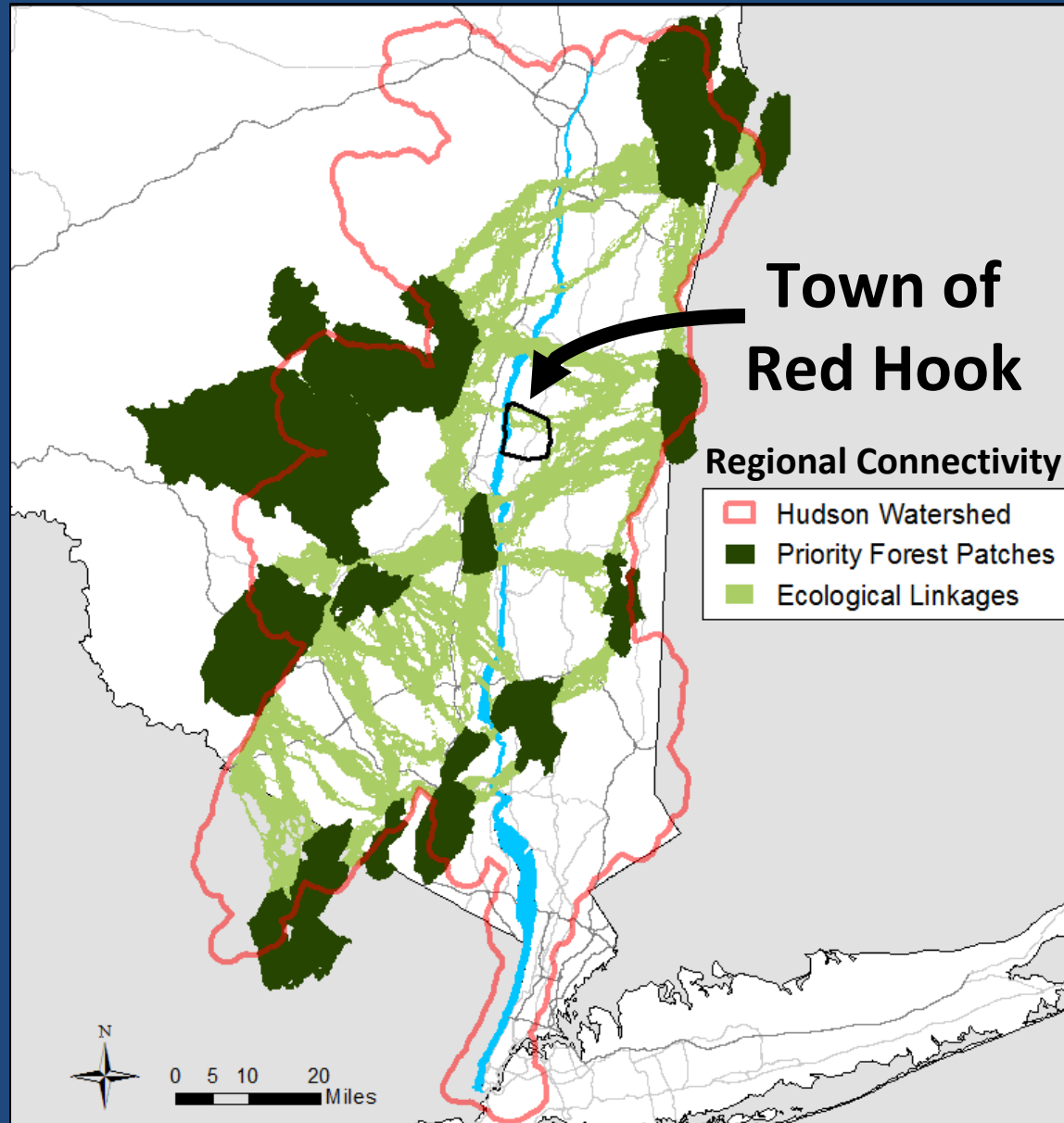
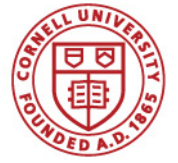
Many open-source and ArcGIS based tools for modeling connectivity

- Circuitscape
- Connectivity Analysis Toolkit (CAT)
- Maxent
- Marxan.
- Etc..etc..etc...

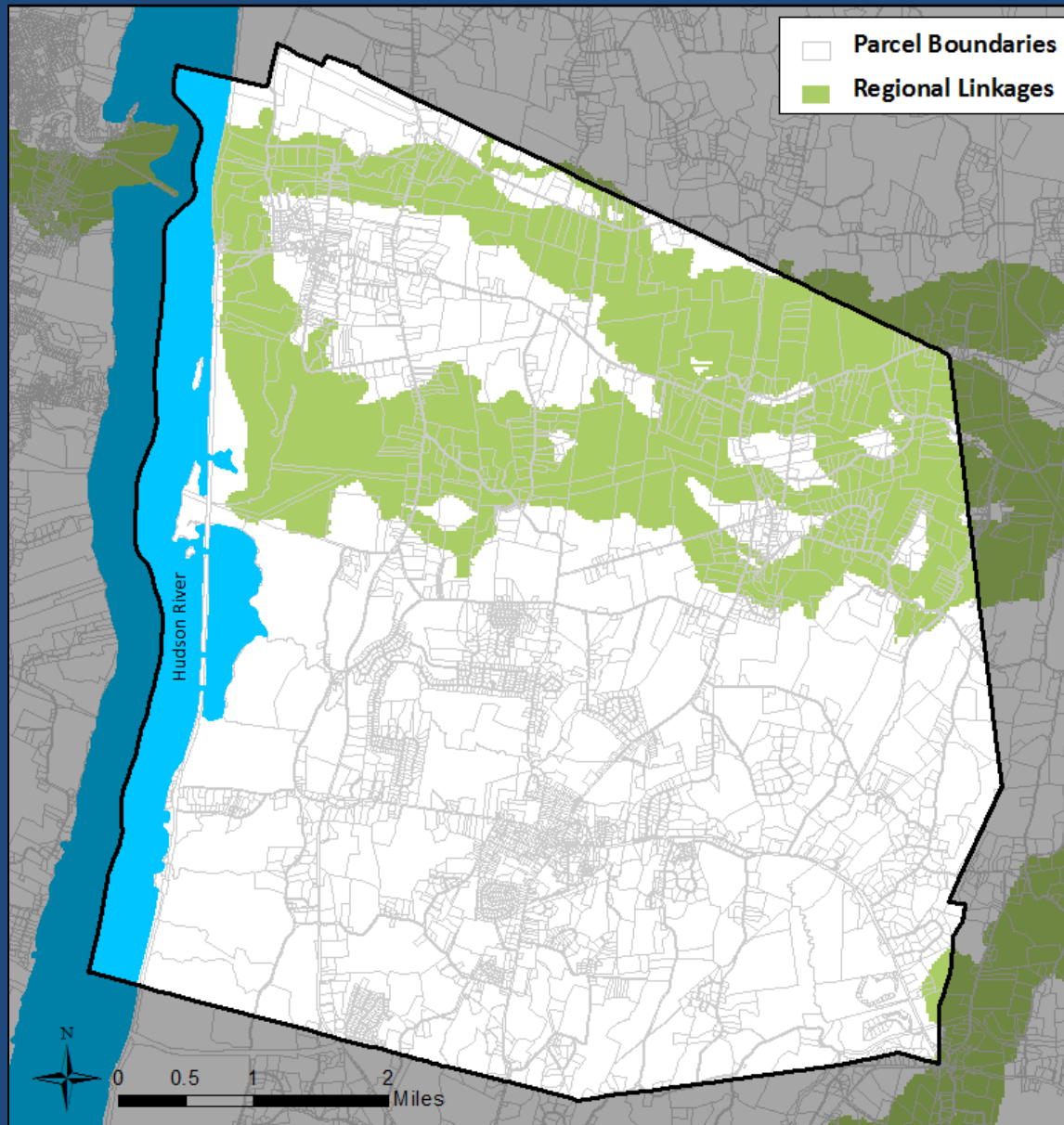
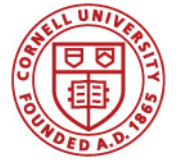
Case study



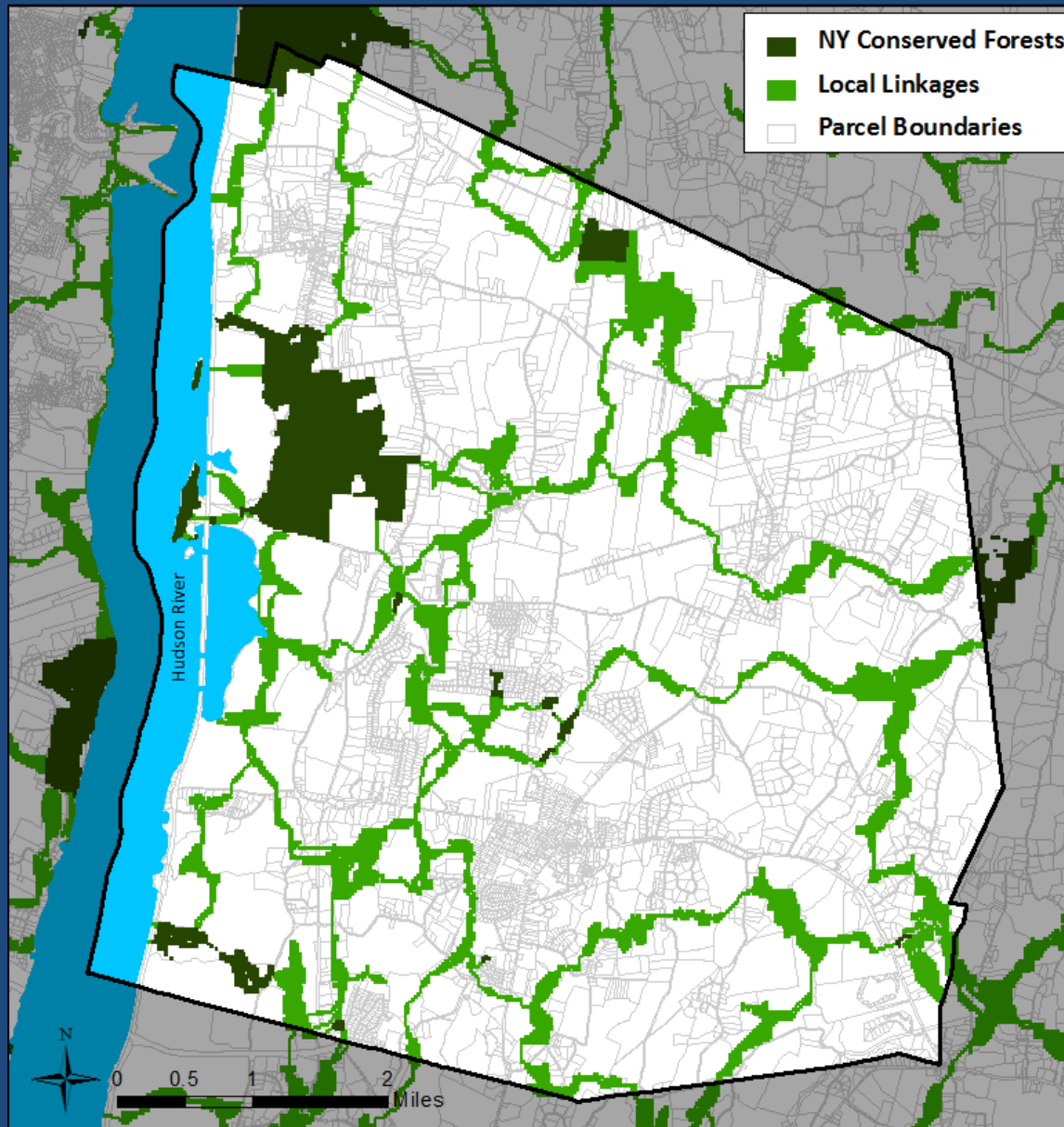
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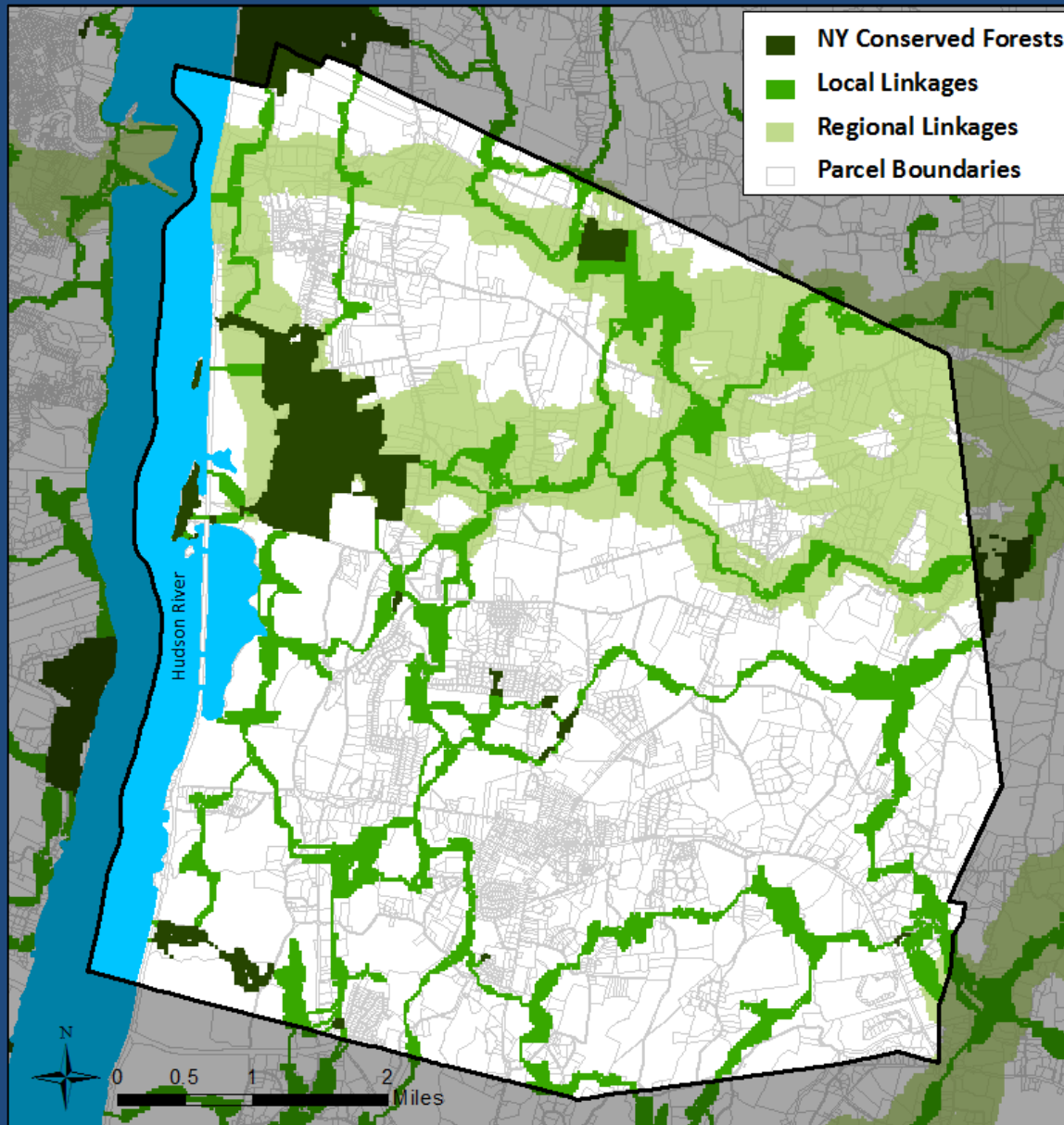
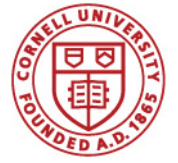
Case study



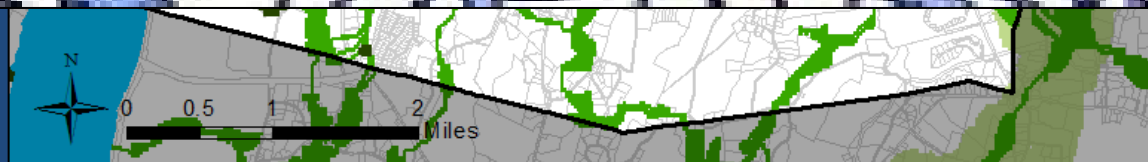
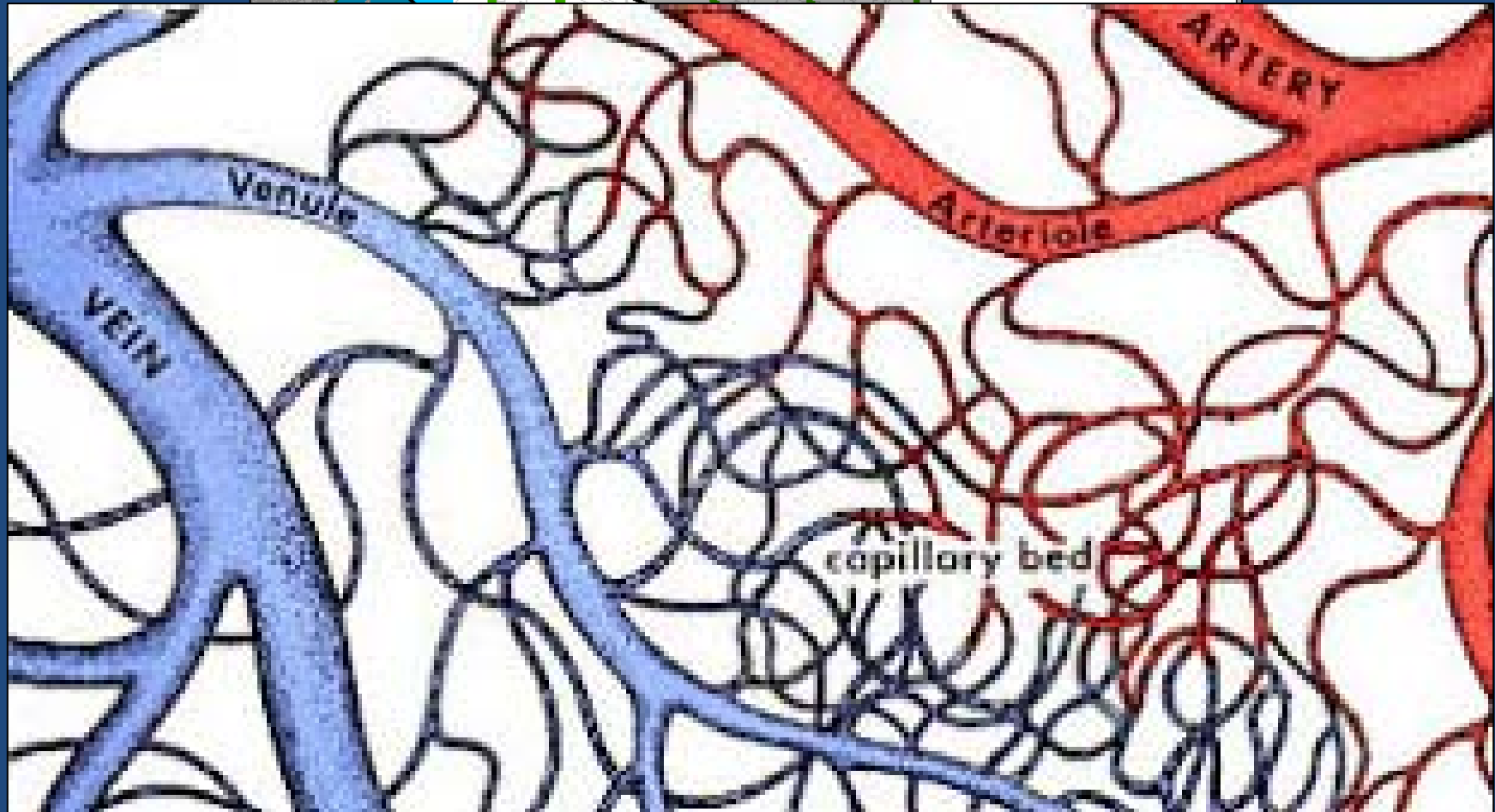
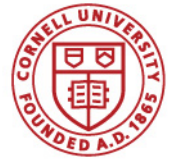
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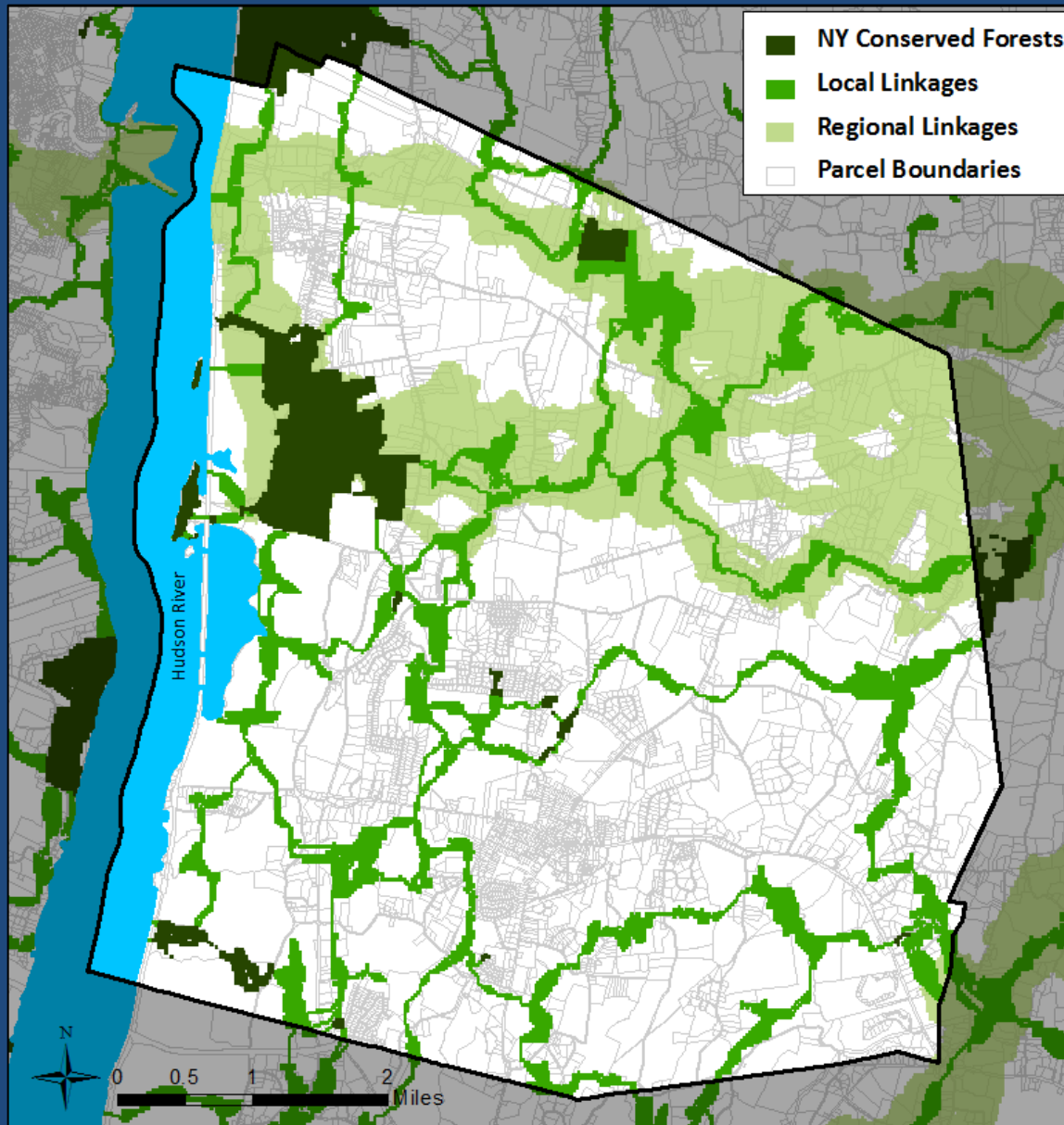
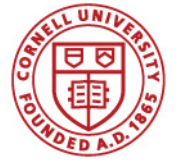
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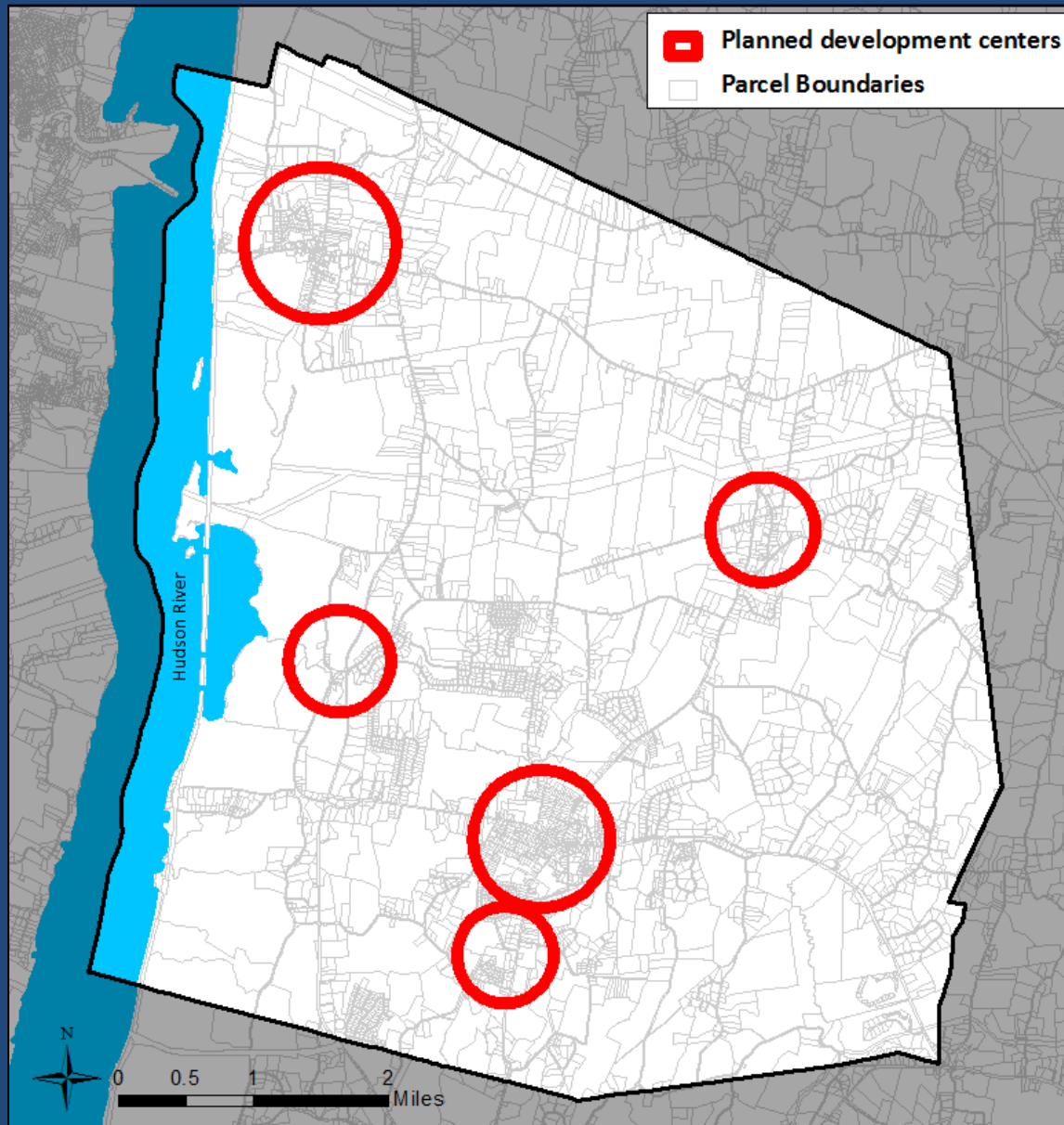
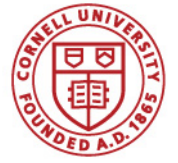
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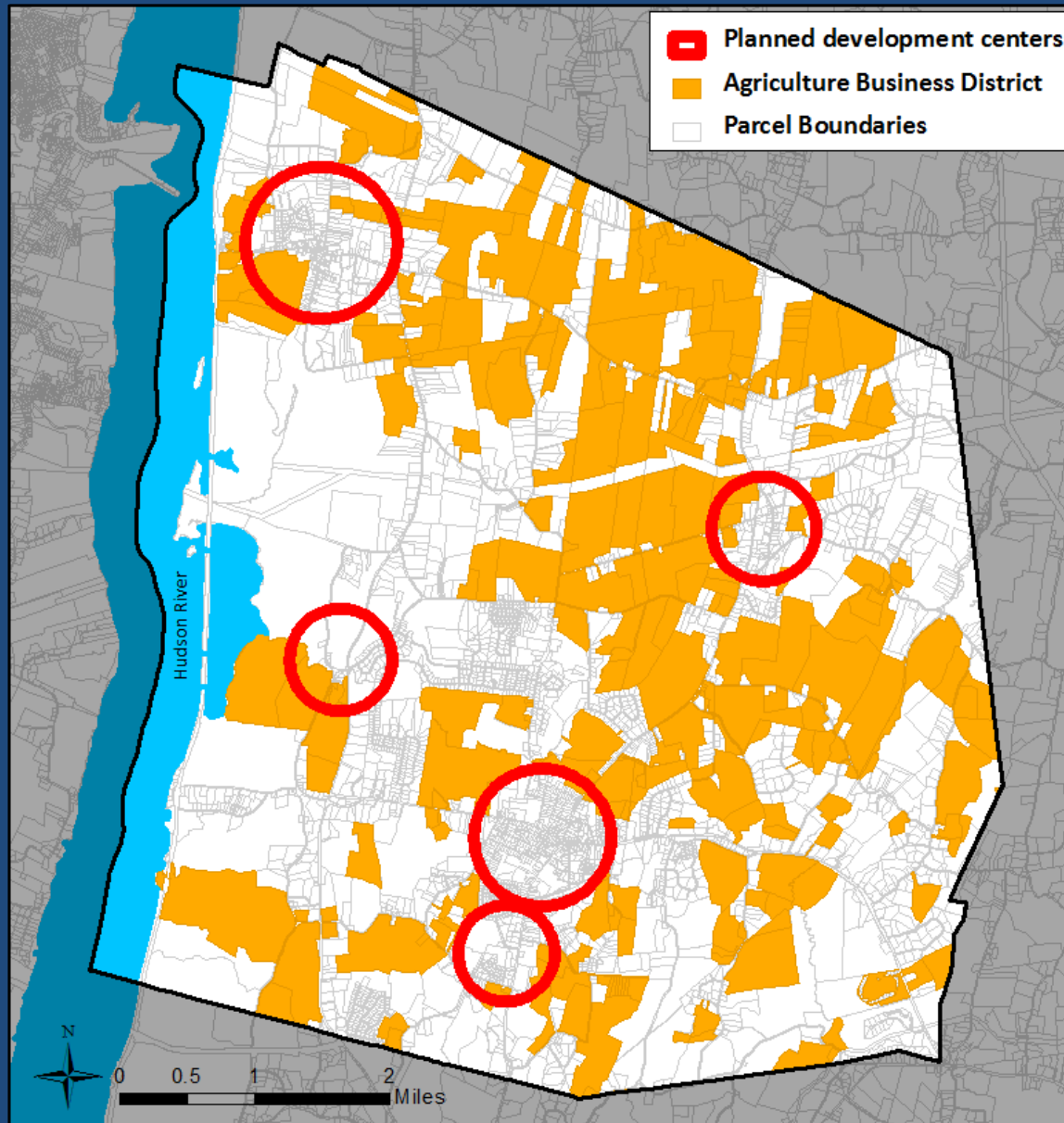
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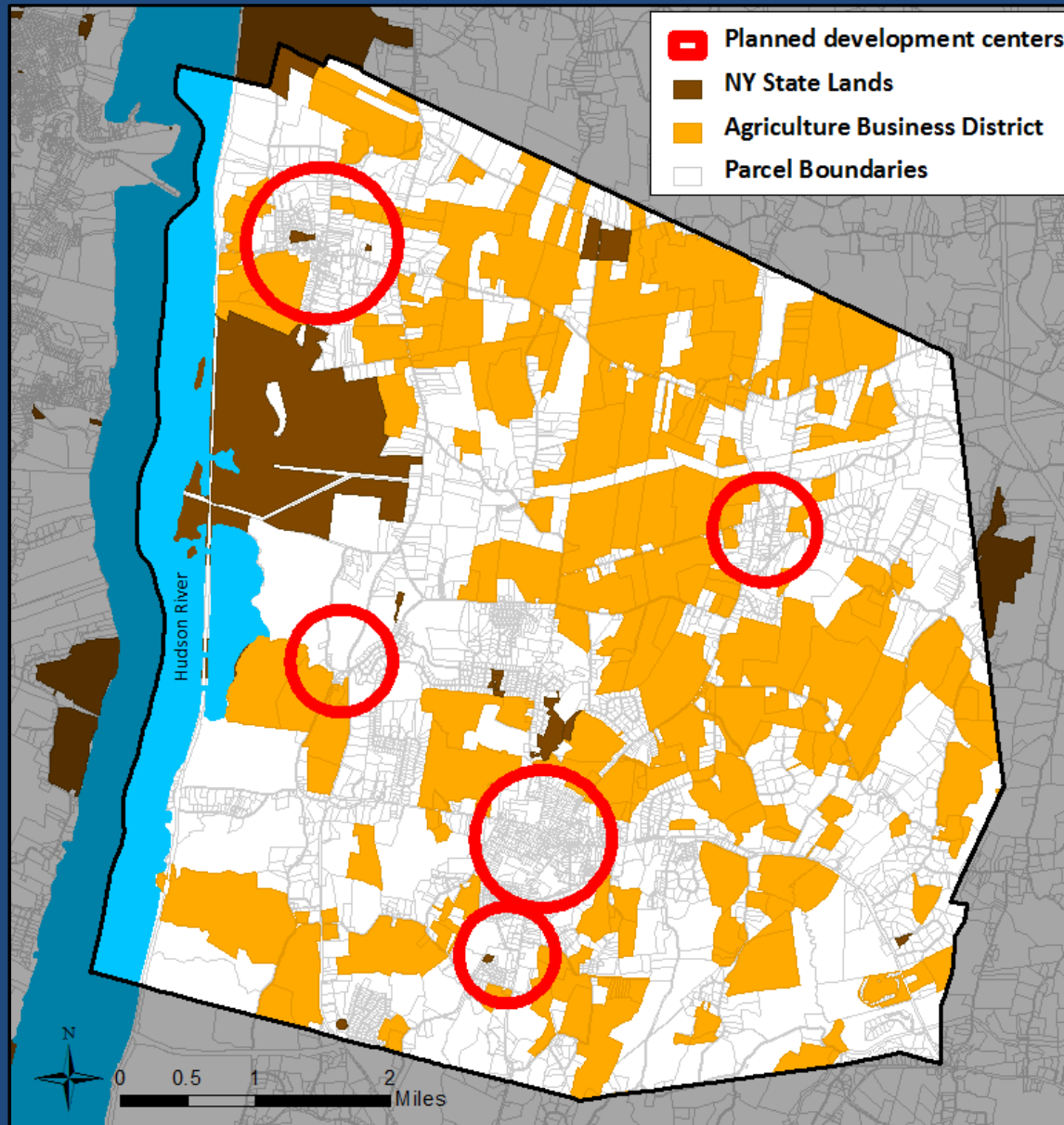
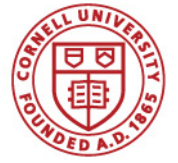
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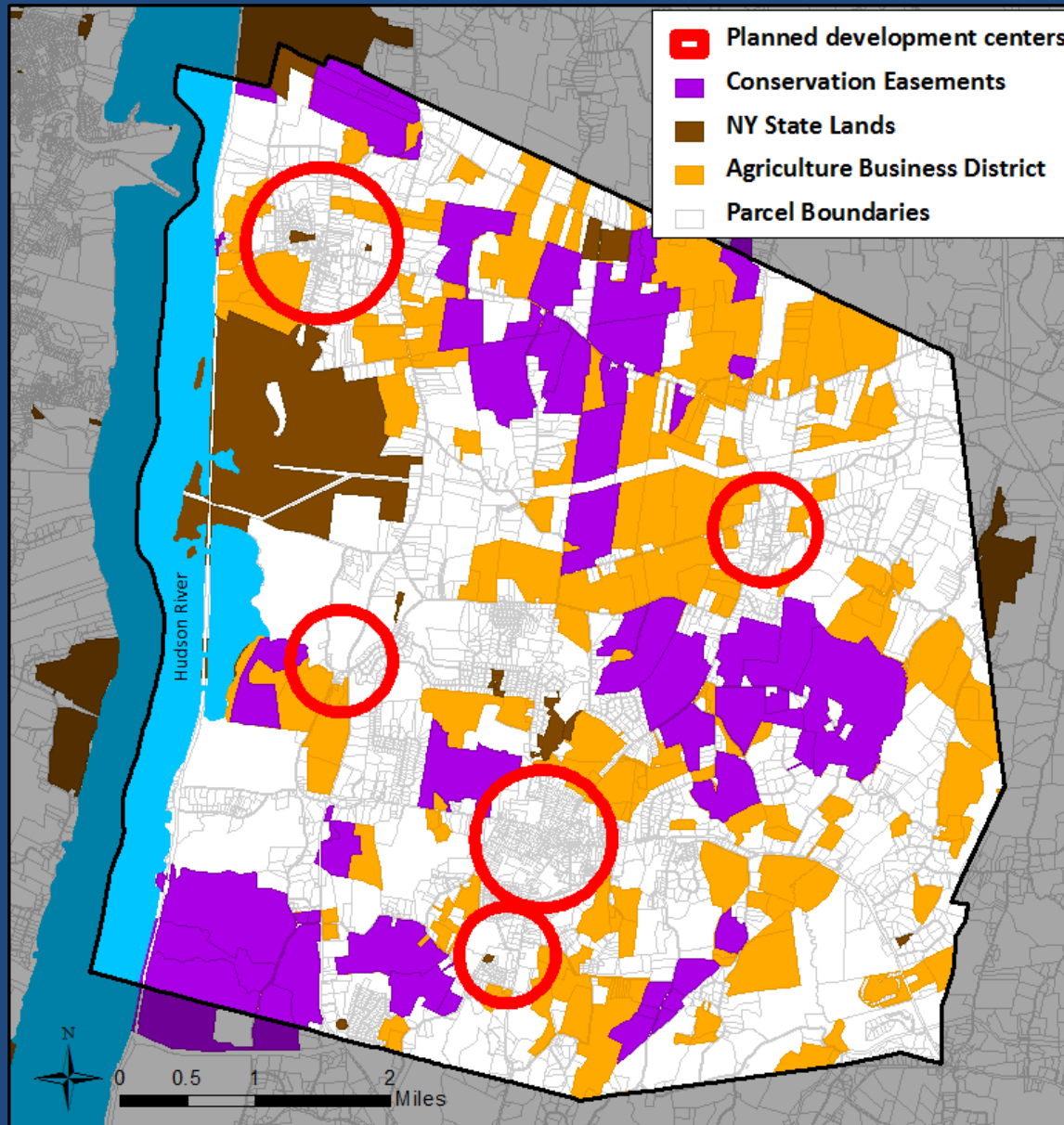
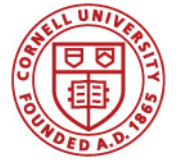
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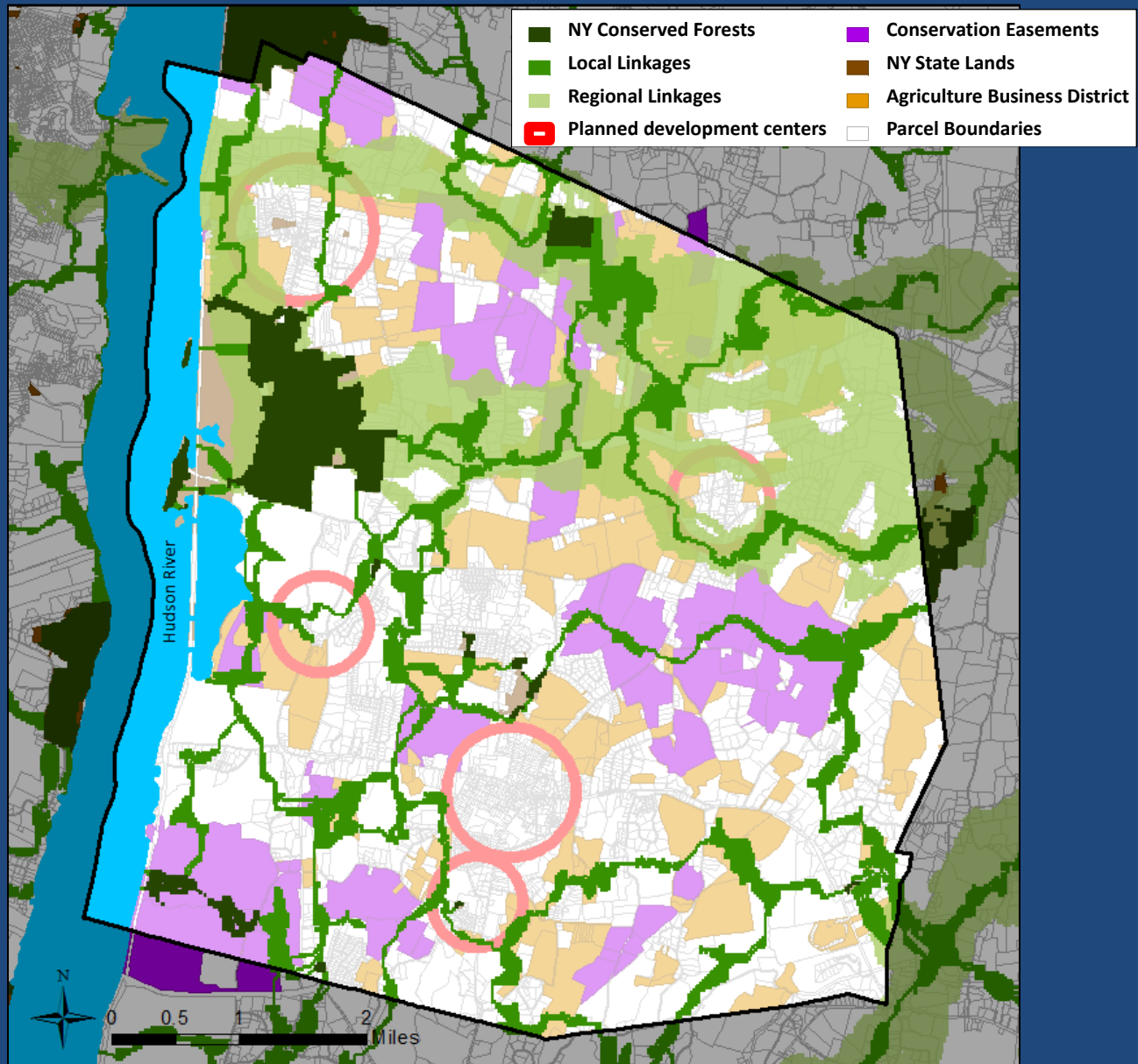
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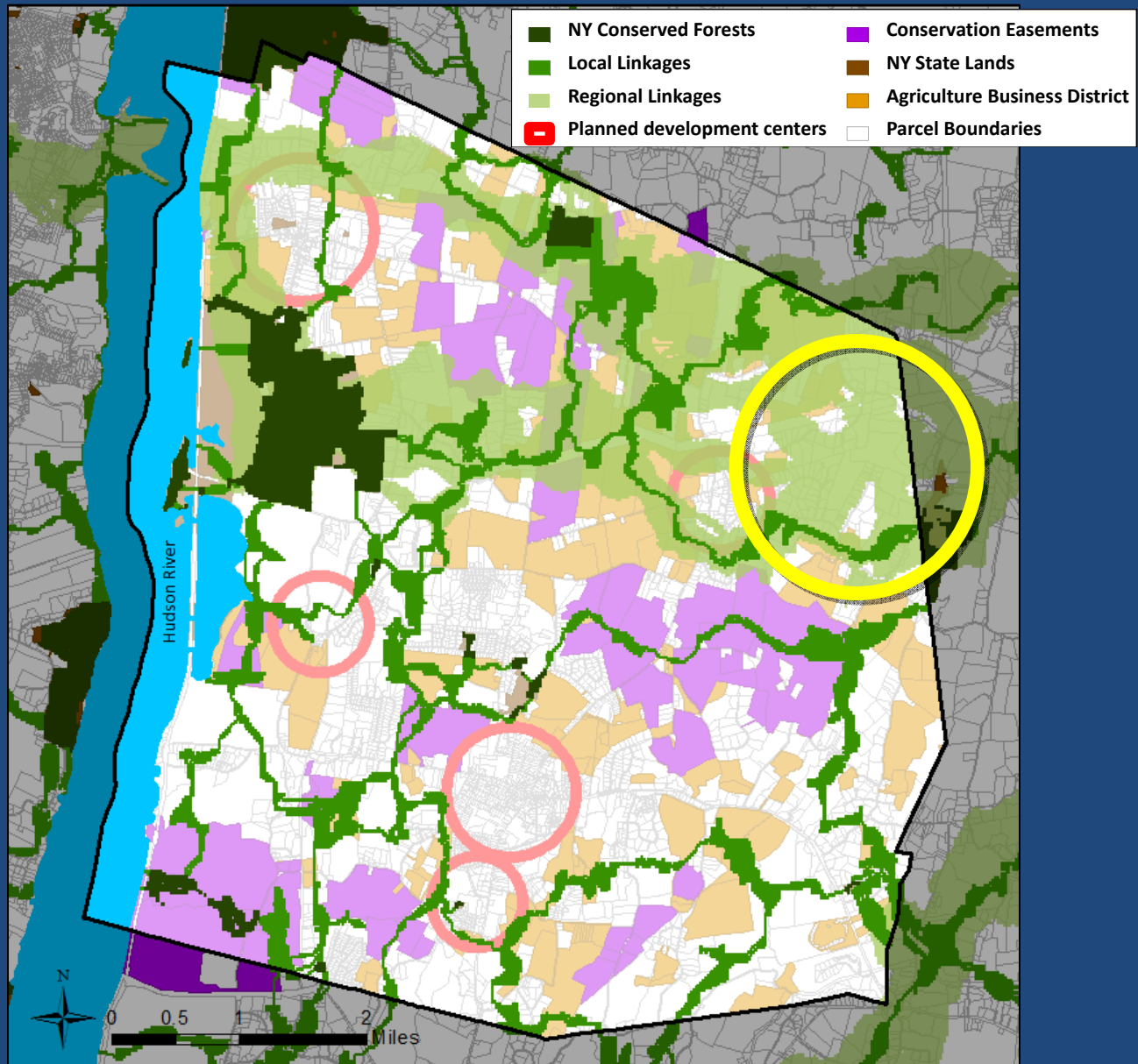
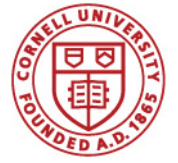
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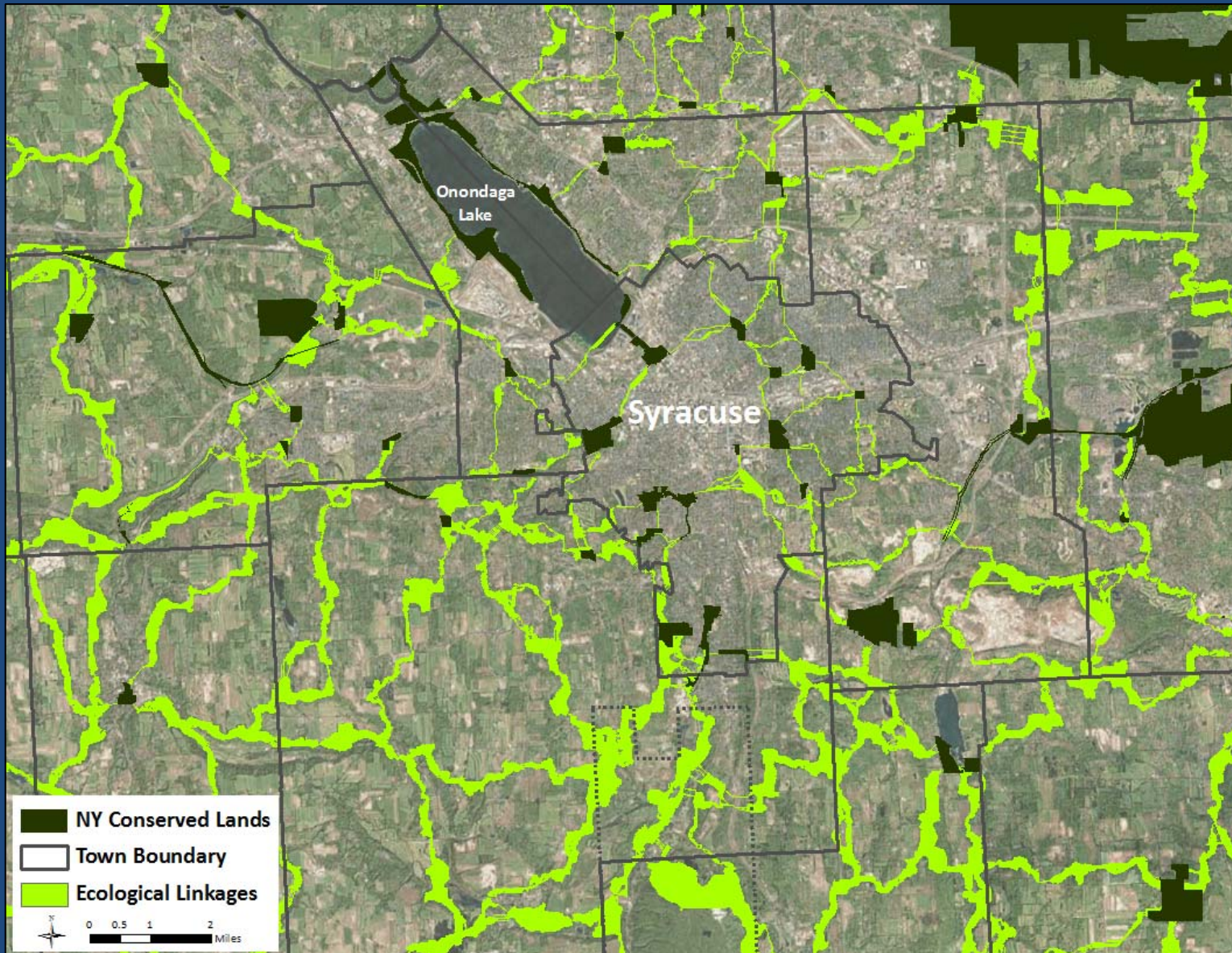
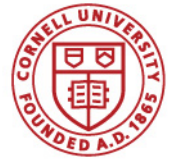
Case study



Case study



Connectivity in Onondaga County?



Take Home Concepts



- **What is habitat connectivity?**
 - What's the motivation for considering habitat connectivity?
- **How does one go about identifying important habitat linkages and connections?**
 - Data analysis tools and models
- **Practical Application**
 - A case study of incorporating habitat linkages into the conservation planning process

Contact information



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