BACKGROUND

The goal of this case study is to identify priority sections along major highways that should serve as locations for implementation of conservation actions to enhance or maintain ecological connectivity. The primary resource of interest is areas of high ecological connectivity, as determined by recent efforts to map connectivity with a variety of methods and at a variety of scales across the Northeast. These efforts include mapping of cores and connectors by UMass, and mapping of resilience, local connectivity, regional flow, and riparian climate corridors by TNC. Areas of high connectivity may be underlain by any number of specific ecosystem types but will generally be characterized by freedom from human impairment in the form of roads, development, and other infrastructure. The Staying Connected Initiative (SCI; www.stayingconnectedinitiative.org), a program of Two Countries One Forest (2C1F; www.2c1forest.org) is a partnership of some two dozen private and public entities working together with the goal of conserving, restoring, and enhancing landscape connectivity across the Northern Appalachian/Acadian region of the US and Canada for the benefit of nature and people. The tools employed by the SCI include conservation science, land protection, community outreach, land use planning, transportation, and policy. The SCI focuses its work in 9 priority linkage zones identified through prior analyses by 2C1F (Trombulak et al. 2008) as important for large scale ecological connectivity in the ecoregion. The availability of new regional connectivity datasets, however, raises the possibility of confirming these original linkage areas, determining if additional linkage areas are needed, and identifying areas within linkage zones that should be priorities for transportation mitigation.

PROCESS...

1. Outline

Identify the problem, the resource of interest and what actions need to be implemented

How should we identify priority road segments for connectivity mitigation? Roads are a major disruptor of ecological connectivity. Prioritizing areas of major roadways that have the greatest negative impacts on connectivity can help direct conservation action to the most meaningful locations.

2. Define

Identify important aspects to consider while you are investigating

Consider the types of potential conservation action to be implemented. The Staying Connected Initiative (www.stayingconnectedinitiative.org) uses many tools to protect and enhance ecological connectivity in the Northern Appalachian-Acadian ecoregion, including partnering with

DOT to inform road maintenance and connectivity planning. SCI, or other groups interested in prioritizing road segments for connectivity mitigation, should consider the areas of the landscape where connectivity may be most constrained , the datasets appropriate to different scales of consideration (e.g., Regional Flow, Cores and Connectors), and additional information that can help prioritize locations and actions at the smallest scales (e.g., Habitat Condition for Imperiled Species, land ownership).

3. Explore

Identify specific opportunities by integrating or overlaying the data

*First, use the **Prioritization Tool** to identify potential overlap between high connectivity areas and major roadways. Start by going to www.naturesnetwork.org, click "Data & Tools" in the top navigation menu, click "Prioritization Tool" from the selection of products, and then choose Access Tool. In the tool, choose Custom Scenario. Now build a few models:*

Model 1.

1. *Click on Parameters and select Entire Northeast as your geography (this defaults to HUC12 analysis unit)*
2. *Click on Metrics and select Concentrated Flow Area from the Ecological metrics and Motorway from Land Use metrics*
3. *Specify weights - give Concentrated Flow Areas a weight of 8 and Motorways a weight of 10*
4. *Choose Stratification by State*
5. *Click Get Result*
6. *Use the slider to display by percentile rank and look at the 90th percentile areas*

Model 2.

1. *Repeat Model 1, but replace Concentrated Flow Areas with Cores and Connectors.*
2. *Explore the differences between Model 1 and Model 2 by using the swiper tool.*

Model 3.

1. *Choose a geography of particular interest to you (e.g., your state) and explore similar models at a smaller scale.*
2. *Add additional parameters (e.g., species of interest, land protection status) and explore how they influence the results.*

*Next, use **Databasin** to explore the same problem. Access the NALCC on Databasin at nalcc.databasin.org. Under Browse, choose Galleries and select Case Studies. In the Case Studies gallery choose Terrestrial Connectivity.*

1. *First, load Regional Flow, simplified categories into the map viewer.*
2. *Use the map viewer to explore the region and look at locations of concentrated flow and where they overlap with major roadways (roadways are visible in the basemap).*
3. *On the left hand side Layers tab, choose add datasets and load Cores and Connectors, as well as Habitat Condition for Imperiled Species.*
4. *Explore the differences between the Regional Flow and the Cores and Connector data and the degree to which each is useful for identifying overlap with roadways.*
5. *Zoom into an area you know and explore the Cores and Connectors specifically. Look for places where connectors cross smaller roads. Do you know anything about these areas? Do you live in an area of concentrated or diffuse flow? Are there connectors that cross the roads you take to get to work? Can you imagine mitigation opportunities along those roads that would help enhance connectivity?*
6. *Experiment with the transparency of different layers. Click on the arrow next to a dataset in the Layers tab and change its transparency so you can see underlying features like roads in the basemap.*
7. *Experiment with changing the basemap to aerial imagery and look at the features of the landscape associated with cores and connectors.*
8. *Set the basemap to Streets and identify a section of road you're familiar with that is crossed by more than one connector. Now click on Habitat Condition for Imperiled Species to make it visible in the map. Drag it to the top of the list so it displays above the Cores and Connectors layer.*
9. *Use this layer to think about how you might additionally prioritize road sections. Do some connectors have imperiled habitat within them? Is it in the most intact category?*

4. Reflect

Consider other possibilities by comparing and contrasting different scenarios and what you might want to do next

- *Contrast the results from your models in the Prioritization Tool with what you learned by exploring in Databasin.*
- *What additional information might be helpful to help identify priority road sections for connectivity?*
- *Which datasets are most appropriate at which scales? Do you have local data that could enhance this process?*