

TOMPKINS COUNTY HABITAT CONNECTIVITY STRATEGY



May 2018

Tompkins County is known for its scenic natural features and beautiful rolling landscapes. Residents and visitors alike cherish the vast natural attractions and recreational opportunities the County and region has to offer, including waterfalls, trails, lakes, and diverse habitat. Tompkins County has long been recognized as a desirable place to live and access to its natural areas and its associated resources plays a substantial role. Sustaining these resources and the species that rely on them for habitat provides community and economic development opportunities that make Tompkins County a desirable place to live and visit. Losing these natural areas would not only impact plant and animal species but also potentially change community character.

Tompkins County has developed this Habitat Connectivity Strategy to help combat habitat fragmentation, preserve habitat diversity, and promote ecosystem resilience. The framework provided here identifies (1) specific habitat corridors for native flora and fauna to have the ability to freely move in response to climate change; (2) key undeveloped areas that should be protected from fragmentation to retain habitat; and (3) broad strategies and policies that can be implemented to improve habitat connectivity.

Section One: Introduction and Framework

Conservation research has defined habitat connectivity as the linking of key habitat patches via migration corridors as a way to facilitate the maintenance of critical population size, viable breeding, and climate-related range shifts. Habitat throughout the world faces a variety of threats; the combined threat to habitats from landscape fragmentation and climate change are of specific concern locally. Climate change will alter the biological and physical conditions of habitats. An example of this is that as the intensity and frequency of precipitation events increases, wetlands may change location and type meaning the flora and fauna that rely on them may change. The natural response from most species to such changes is to migrate over time to areas with the conditions needed to survive. Unfortunately, as the natural landscape is fragmented from a variety of causes, species are often unable overcome obstacles in their way to migrate successfully. Fragmentation of the landscape, even without the added threat from climate change, decreases habitat diversity and species mobility throughout the landscape.

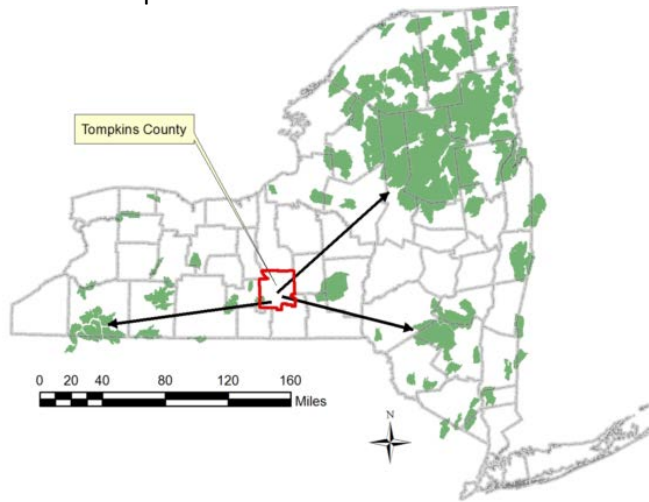
This Habitat Connectivity Strategy bridges conservation and habitat recommendations from previous plans and provides both broad and specific actions for promoting habitat connectivity in Tompkins County. It was prepared to address an action identified in the 2015 County Comprehensive Plan to "Build on the recommendations in the Finger Lakes Trail Corridor Protection Plan (FLT Plan) to identify specific areas and tools to improve connectivity between Natural Features Focus Areas." It also addresses a recommendation from the FLT Plan to "Implement a Systematic Effort to Secure the Protection of Ten Significant Open Space Resource Areas within the Emerald Necklace." This strategy combines conservation approaches outlined in the County's 2015 [Comprehensive Plan](#), the 2007 [Conservation Plan](#), and a 2016 analysis based on a Landscape Connectivity Model (Detailed in the report in Appendix A "Conservation in a Changing Climate: Integrity-Based Landscape Connectivity and Resilience in Tompkins County, NY") conducted by graduate students at Cornell University. The Conservation Plan highlighted the need for strengthening ecosystem resilience, outdoor recreation opportunities, and environmental goods and services throughout the Finger Lakes Region. The landscape connectivity analysis modeled local and regional species flows across south-central New York and identified community connectivity opportunities.

Habitat Strengths

Tompkins County is situated in south-central New York between the State's Southern Tier and Finger Lakes regions. The northern portion of Tompkins County is dominated by agricultural land uses and a substantial portion of Cayuga Lake, the largest of the 11 New York Finger Lakes. Southern Tompkins County is characterized by large contiguous patches of upland forest split by developed lowlands and secondary highways.

Regionally, Tompkins County lies at an important midway-point between habitat cores in the Allegheny Mountains to the southwest, the Catskills to the southeast, and Adirondack Mountains to the northeast. The New York State Department of Environmental Conservation and The Nature Conservancy have specifically noted portions of Tompkins County serve as an important habitat corridor that links these areas (green patches in Figure 1).

Figure 1: Study Area Context Map



Tompkins County includes an abundance of healthy habitat located on land protected under conservation easement as preserves or as managed park land, State Forest or Wildlife Management Areas. Much of the protected land falls within the southern part of the County in a swath often referred to as the “Emerald Necklace”.

Habitat Weaknesses

In examining aerial imagery of Tompkins County, one gets the sense of a well-connected landscape in which plants and animals can move freely. The reality is that much of the land within and between protected areas is held under private ownership by timber companies and absentee landowners. Historically, ownership and type of land use has changed quite quickly and local governments rarely have adequate regulations in place to protect these quality habitats. One important purpose of this strategy is to identify lands that serve as the most important habitat connections, which in turn allows supportive landowners and municipalities to proactively approach habitat connectivity.

Habitat Threats

Climate Change

Climate change is already affecting New York State and Tompkins County and its impacts are expected to increase in the future. Climate change models predict shifting patterns in plant and animal species as extreme weather, temperature, and drought are expected to increase. Mean temperatures are expected to increase 1.5°F to 3.0°F by the 2020s and up to 4.0°F to 9.0°F by the 2080s. While heavy precipitation events have increased in the past few decades, drought conditions may also increase in the summer months¹. Maintaining and creating diverse connected landscapes in Tompkins County should allow wildlife to better withstand these fluctuations in temperature and precipitation.

Habitat Fragmentation

Major habitat threats to natural resources in the county include: fragmentation of the landscape due to subdivisions and development, non-sustainable agricultural practices, degraded water quality as

¹ Responding to Climate Change in New York State: The ClimAID Integrated Assessment for Effective Climate Change Adaptation, pg 2.

impervious surfaces increase, filling and degradation of wetlands from development, and threats to the biodiversity from specific invasive species.

Habitat Opportunities

Multiple conservation and natural resource planning approaches have been incorporated in this Strategy to provide a path for promoting habitat connectivity and preserving diverse ecosystems. One example includes how development and changes in infrastructure can present opportunities for improving habitat such as clustering subdivisions, green infrastructure improvements, and infrastructure design that can help address on-site stormwater management and facilitate water passage while allowing for the connection of aquatic and terrestrial habitat. These improvements can be implemented as roadside ditches, culverts, and bridges are scheduled for replacement.

Other ancillary benefits may be achieved as habitat is improved throughout the County. As an example, formal stream buffer protections may be secured at a size large enough to provide water quality benefits, provide for wildlife habitat, and still have adequate space for a passive recreational trail. Funding for habitat improvement opportunities with added ancillary benefits may be easier to obtain.

Section Two: Building the Strategy

This Habitat Connectivity Strategy has been developed within the context of the entire Tompkins County Comprehensive Plan (2015) and works in concert with the County's many initiatives to promote natural resource protection. Adverse natural resource impacts can be attributed to many factors including specific types of housing development, economic decisions, transportation infrastructure, and climate change. Thus, maintaining and improving habitat connectivity requires a diverse, holistic approach.

The County's Comprehensive Plan (2015) and Conservation Plan (2007) are the foundation of the County's natural resource planning priorities which provide the initial framework for identifying important areas for habitat conservation. The Comprehensive Plan's Natural Resources principle states that *Tompkins County should be a place where natural features and working rural landscapes are preserved and enhanced.*

This Strategy incorporates the following habitat connectivity objectives:

Objective 1: Maintain large, intact patches of important native vegetation by preventing fragmentation of those patches by development.

Objective 2: Establish priorities for species protection and protect habitats that promote the distribution and abundance of those species.

Objective 3: Maintain connections among wildlife habitats by identifying and protecting key corridors for movements.

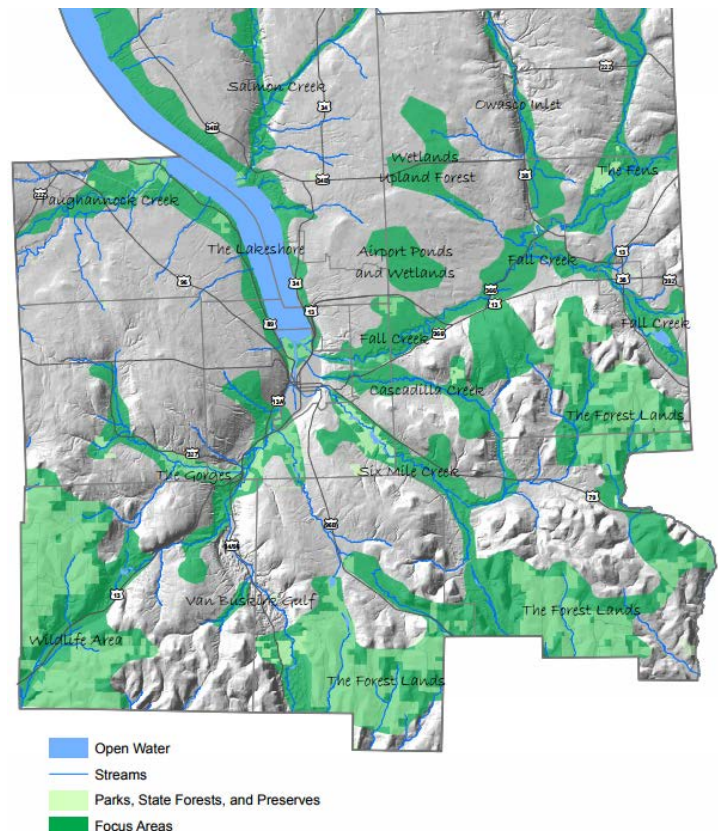
Objective 4: Maintain significant ecological processes in protected areas.

Figure 2: Tompkins County Natural Features Focus Areas

Natural Features Focus Areas

A solid approach to habitat connectivity should be based on a regional analysis of the location of key natural features, such as wetlands, forests, and streams. The Tompkins County Conservation Plan (2007) provides such a foundation for identifying these key natural features.

The Conservation Plan identified the primary benefits associated with each of the fourteen Natural Features Focus Areas (NFFAs) such as habitat, biodiversity, fishing, hunting, sustainable agriculture, water quality, and flood mitigation. The Plan also identified approximately 20,000 acres in Tompkins County as Priority Protection Areas (PPA) based on a detailed analysis of key resources in each Focus Area. These areas have distinct opportunities to foster multi-objective conservation opportunities as well as improve habitat connectivity. Figure 2 depicts



the location of the fourteen Natural Features Focus Areas.

Landscape Connectivity Model

In 2016, Tompkins County identified the need to better understand the relationships between NFFAs and PPAs to see if opportunities existed for improving landscape connectivity. As detailed in Appendix A, at the regional level, corridors avoid more populated areas such as Ithaca, Cortland and Watkins Glen for two reasons: 1) habitat cores themselves tend to not be located near areas of intense development and 2) high resistance values cause corridors to flow around, not through, such areas. A substantial amount of protected lands currently exist in Tompkins County, particularly in its southern portion. In particular tracts of protected forested land anchored by the Connecticut Hill Wildlife Management Area and State Forests in Newfield, Danby, Hammond Hill, Yellow Barn, and Shindagin Hollow. The connections between these areas are often referred to as the “Emerald Necklace” and form a natural network for regional habitat connectivity opportunity. Protected lands within the Emerald Necklace are owned and managed by a mix of conservation partners including the County, the Finger Lakes Land Trust, and New York State. In the northern part of the County, natural lands along Fall Creek connecting up to the Owasco Inlet serve as important local habitat corridors. Conservation partners throughout the Finger Lakes actively seek opportunities to conserve areas around these protected areas. Several Natural Feature Focus Areas (NFFA), like the Six Mile Creek NFFA and other creek corridors, provide important local habitat connections in and through their distinct areas, however they do not across the region in the way that the noted areas do. Conservation of these areas are still very important due to their impact to water quality and flood mitigation and also potential risk of conversion by subdivision, though habitat connectivity may not be the leading reason for their protection.

To better understand regional habitat patterns and connectivity, the County collaborated with a graduate student team from Cornell University to develop a local habitat connectivity analysis utilizing national, state, and local conservation agency resources². The study incorporated an approximately 50 by 60 mile regional area surrounding Tompkins County and identified key parcels that serve as important pathways for ecological processes and connections both within and between important natural areas. The Geographic Information System model connects habitat patches by identifying appropriately sized corridors to facilitate species migration. The model assumed that organisms will take the path of least resistance when moving between resource patches. The goal of the model was to place Tompkins County within the context of species flows across South-Central New York and to provide the County with a view of community connectivity opportunities. The model is based on the methodologies of The Nature Conservancy’s [Resilient and Connected Project](#) and New York State Department of Environmental Conservation’s [Strategic Plan for State Forest Management](#).

² The model is further described in the project report Conservation in a Changing Climate: Integrity-Based Landscape Connectivity and Resilience in Tompkins County, NY (2017).

The model further reviewed Priority Protection Areas (PPA) from the County’s Conservation Plan in light of the model’s identified key regional patches and corridors. This comparison identified opportunity areas to advance regional connectivity while also advancing other locally important conservation goals. Based on their location, a range of different legislative, voluntary and technical recommendations have been suggested. Connecting existing resources could substantially improve habitat and species resilience to growth and development pressure, invasive species, and climate change.



Finger Lakes Land Trust Park Preserve – Dryden, NY
(Photo by Bill Hecht)

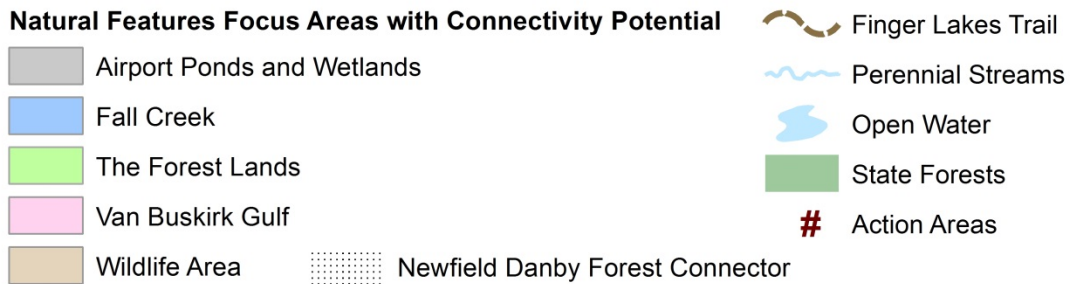
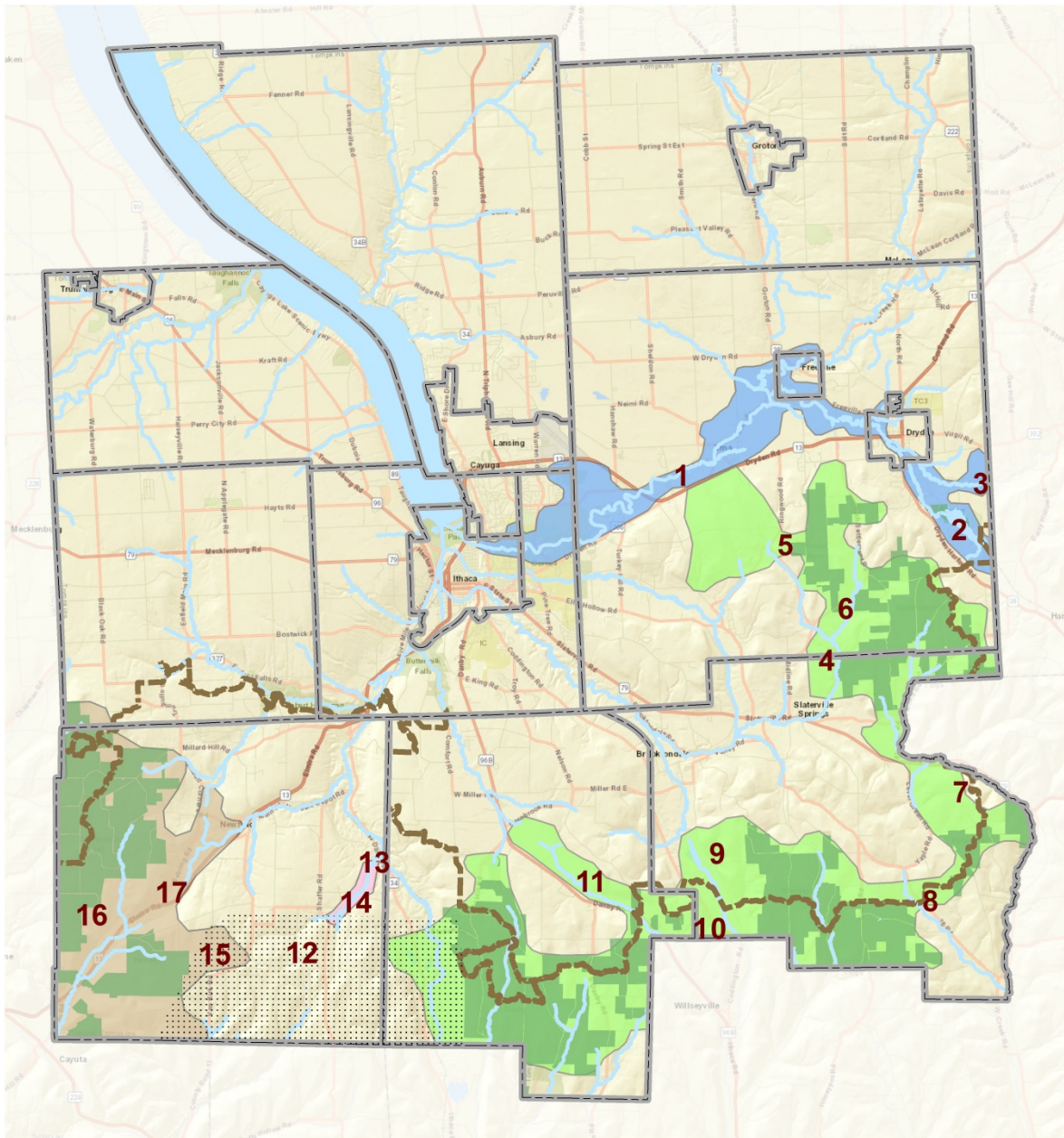
Section Three: Recommendations to Advance Habitat Connectivity

This Strategy has identified two different approaches for achieving habitat connectivity. The first approach categorizes 17 **Site Specific Actions** that are associated with Priority Protection Areas. The second proposes a **Broad Connectivity Approach** to advance conservation habitat connectivity.

SITE SPECIFIC ACTIONS

Site specific actions promoting habitat connectivity were developed and paired with Priority Protection Area recommendations from the County’s Conservation Plan (2007) and recommendations from the Landscape Connectivity Model. Based on their location and type, actions are of varying levels of importance, though together they provide specific locations with the greatest opportunity for improving habitat connectivity while also advancing other conservation goals in Tompkins County. The following summarizes the 17 site specific actions. Figure 3 illustrates the general connectivity locations for each site specific action.

Figure 3: General location for Site Specific Actions



Communities without site specific actions in their communities should still consider some of the following action to help improve connectivity in their local habitat networks.

FALL CREEK

1. **ACTION:** Protect sensitive portions of Fall Creek in areas susceptible to development such as the vacant or public utility parcels abutting the north and south sides of Route 13 to Route 366. Culverts in this location should be assessed according to the North Atlantic Connectivity Collaborative (NAACC) framework to ensure they are both conducive to wildlife movement and also reduce flood risk.
2. **ACTION:** Preserve key habitat around Dryden Lake and limit development in this area to maintain habitat and connection to Yellow Barn and Hammond Hill State Forests south west of Dryden Lake.
3. **ACTION:** Identify habitat corridors surrounding the Dryden aquifer recharge area and increase the riparian buffer along Virgil Creek. The Virgil Creek and Dryden Lake Multiple Use Area should be further protected and serve as a riparian corridor between the Kennedy and Hammond Hill State Forests.

THE FOREST LANDS

4. **ACTION:** Protect lands adjacent to Yellow Barn and Hammond Hill State Forests and Mount Pleasant areas. Limit the subdivision of large parcels in this area to preserve remaining forest cover.
5. **ACTION:** Connect Mount Pleasant to Yellow Barn State Forest by securing vacant parcels directly south of the intersection of Mineah and Ringwood Roads.
6. **ACTION:** Pursue easement opportunities for large agricultural parcels between Yellow Barn and Hammond Hill State Forests. Two culverts within this area should be assessed to ensure free flow of water and associated species movement.
7. **ACTION:** Establish strong riparian buffer protections and promote the use of conservation subdivisions within the entire Forest Lands NFFA. NOTE: Promoting adequate riparian buffer protections is also a noted Broad Connectivity Strategy. All municipalities and agencies should seek to improve how and where riparian buffers are implemented.
8. **ACTION:** Preserve remaining private forestland between Shindagin Hollow and Potato Hill State Forests which would ensure a permanent route for the Finger Lakes Trail corridor in this area while also preserving habitat viability.
9. **ACTION:** Protect wetlands in the Wilseyville Creek Valley and formalize connections between Caroline Pinnacles and Shindagin Hollow State Forest.
10. **ACTION:** Connect the Danby State Forest to Shindagin Hollow. This area serves as an important connection for habitat viability and potential route for the Finger Lakes Trail. There are four bridges and culverts along Wilseyville Creek that should be assessed.
11. **ACTION:** Protect habitat and headwater wetlands that feed the Unique Natural Areas (UNAs), including the Danby Fir Tree Swamp (UNA -172).
12. **ACTION:** Develop additional regional connection between Newfield and Danby State Forests. The significant wetlands, riparian zones and bridges/culverts in the area between these State Forests present connectivity opportunities. This area is an important at-risk habitat corridor made up of a wide variety of landowners. Opportunities for added to protection in this corridor may vary based on landowner preferences and the paths for connectivity may be based on those opportunities and interests.

VAN BUSKIRK GULF

13. **ACTION:** Acquire and protect land to the southwest and northeast of Van Buskirk Gulf to connect Danby State Forest to Newfield State Forest. Several large riparian parcels are vacant in the upper section of Van Buskirk Gulf. Multiple culverts within the Gulf and its tributaries should be assessed for connectivity impediments. Five bridges/culverts along Route 96 may provide connectivity opportunities.
14. **ACTION:** Van Buskirk Gulf was identified as containing a corridor between Danby and Newfield State Forests. This corridor has the potential to connect existing protected lands near the West Danby Fire Station to the Lindsay Parsons Biodiversity Preserve.

WILDLIFE AREA

15. **ACTION:** Preserve land adjacent to County-owned Forest land and maintain connectivity with the Newfield State Forest. This area could form the western boundary of connection along Van Buskirk Gulf that could extend to Danby State Forest.
16. **ACTION:** Protect and establish key habitat connections with inholdings in Connecticut Hill, the southeast end of Newfield State Forest, and Cornell's Arnot Forest.
17. **ACTION:** Protect wetlands in Key Hill Swamp and Seven Springs Swamp Unique Natural Areas as well as pursue connectivity to Newfield State Forest and Connecticut Hill Wildlife Management Area.

BROAD CONNECTIVITY APPROACH

The broader action approach targets conservation, habitat connectivity, and community collaboration.

NOTE: Communities without site specific actions in their communities should still consider some of the following action to help improve connectivity in their local habitat networks. The following 12 broad connectivity actions identify the five principles described in Section Two and fall into three categories: legislative, voluntary, and those that are technical and/or advisory in nature.

1. **ACTION:** Host meetings of planning and conservation partners to explore opportunities for advancing cross county actions (Potential lead conservation partner: Finger Lakes Land Trust (FLLT)).
2. **ACTION:** Coordinate a public education effort that highlights the ecological and economic benefits of having and utilizing a Forest Stewardship Plan on rural properties (Potential lead conservation partner: NYS Dept. of Environmental Conservation).
3. **ACTION:** Gauge community support for real estate transfer tax or other funding initiatives that could help secure key pieces of land necessary for habitat connection and provide additional funding for the *Tompkins County Capital Reserve Fund for Natural, Scenic and Recreational Resource Protection Program* (Potential lead: FLLT).
4. **ACTION:** Provide information to landowners, local governments, and conservation agencies about how to support connectivity goals. This may include the promotion of Best Management Practices, education, and or technical assistance. This could also include a discussion of reducing "edge effects" of key agricultural, rural residential and suburban cleared properties and also raise public awareness on the benefits of increased biodiversity (Potential lead conservation partner: Tompkins County Department of Planning and Sustainability (TCDPS)).

5. **ACTION:** Collaborate with conservation partners, educational institutions, and research entities to gather on-the-ground verification of species movement data to validate and where appropriate, adjust connectivity model findings (Potential lead: Cornell University Department of Natural Resources).
6. **ACTION:** Engage with wildlife experts to identify connectivity needs for a range of individual species of concern and their protection needs. Examples could include a diverse group of species like bobcat, fisher or newts. Building off this information, local conservation partners can create a protection and management plan to ensure that habitat requirements are met. This effort should include species beyond those currently categorized as Threatened and Endangered (Potential lead: NYS Dept. of Environmental Conservation).
7. **ACTION:** Identify priority culverts in need of replacement utilizing the North Atlantic Aquatic Connectivity Collaborative (NAACC) framework. Seek grant funding to replace improperly sized culverts with ones that are habitat friendly, and support both the free flow of water as well as improved aquatic and terrestrial species movement particularly in the areas of significant stream corridors like Cayuga Inlet, Six Mile and Fall Creek. (Potential lead: Tompkins County Soil and Water Conservation District).
8. **ACTION:** Advocate for habitat friendly conservation regulations and provide assistance and feedback to municipalities on zoning and other regulations. Address key areas to conserve habitat, improve water quality, and protect sensitive areas from development. Examples of areas where improvements should be made include:
 - o Enhanced protection in the form of riparian buffer zones for all waterways to promote water quality and habitat connectivity.
 - o Conservation zones and subdivisions in key areas to preserve sensitive habitat.
 - o Opportunities for forest and habitat protection and agricultural zoning (Potential lead: TCDPS).
9. **ACTION:** Advance site specific actions in Priority Protection Areas as well as on specific unprotected parcels as identified through the connectivity model (Potential lead conservation partner: TCDPS).
10. **ACTION:** To combat habitat degradation, seek opportunities to support improve ecological functions within habitat areas. This includes work to reduce the impact of invasive plant and animal species and improve stream and riparian habitat by utilizing Best Management Practices (BMPs) (Potential lead: USDA NRCS).
11. **ACTION:** Advocate habitat connectivity friendly policies to be incorporated on State Forest Land through New York's Department of Environmental Conservation Unit Management Plans in the region. This could include limiting recreational activities that disturb key habitat areas and incorporate biological principles at the site scale to:
 - a. Facilitate wildlife movement across areas dominated by human activities;
 - b. Minimize human contact with large native predators; and
 - c. Mimic features of the natural local landscape in developed areas.
 (Potential lead: TCDPS).
12. **ACTION:** When applicable, and or appropriate, seek opportunities to advance the appropriate social benefits (recreation, education, and aesthetics) that corridors can provide near Tompkins County Priority Trails. Habitat improvements can provide significant benefits to passive recreation in locations where space allows. (Potential lead conservation partner: TCDPS and Tompkins County Strategic Tourism Board).

Appendix A: “Conservation in a Changing Climate: Integrity-Based Landscape Connectivity and Resilience in Tompkins County, NY

Available upon request from the Tompkins County Department of Planning & Sustainability