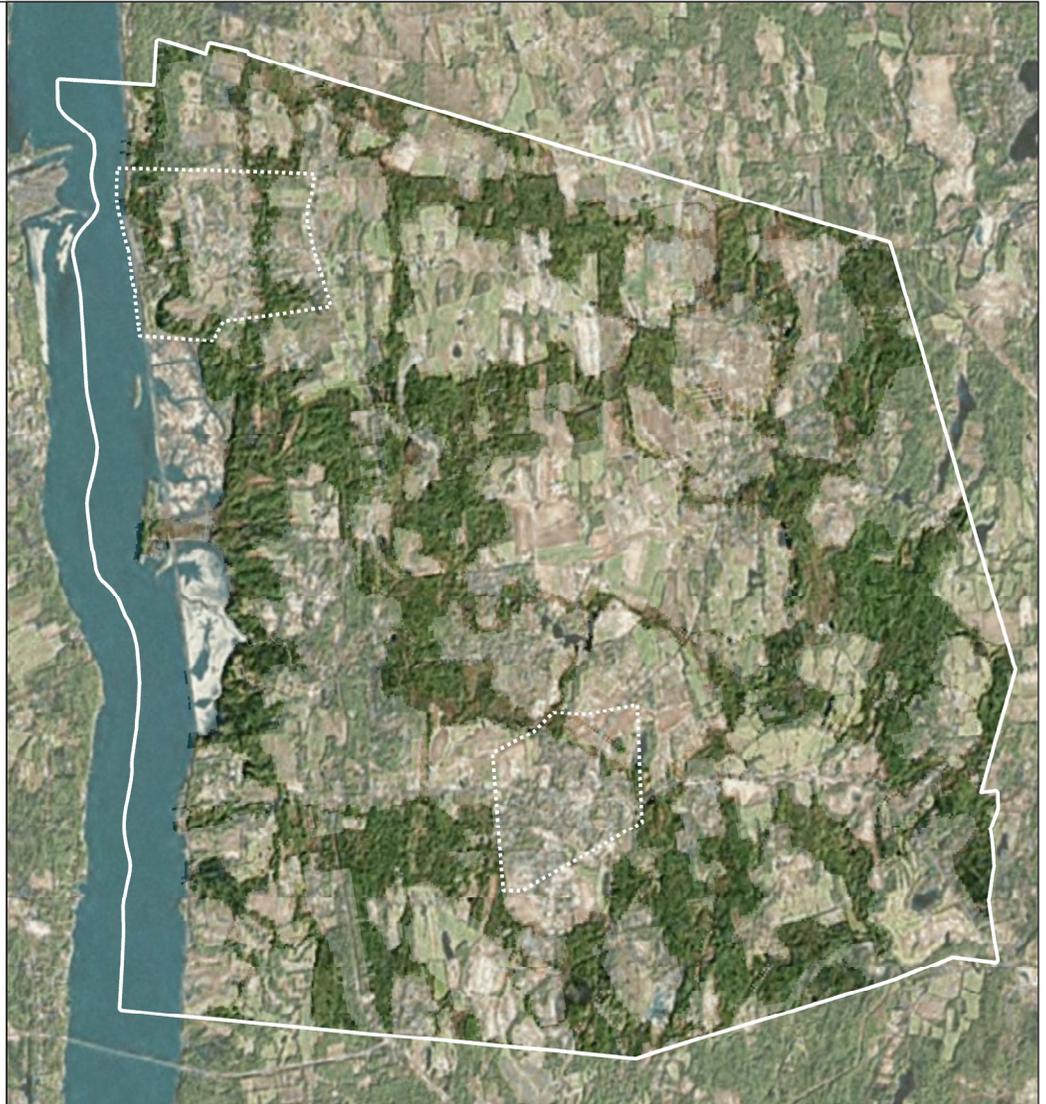


Planning for Resilient, Connected Natural Areas and Habitats: A Conservation Framework



A Pilot Project conducted by:
the Town of Red Hook, Village of Red Hook, and Village of Tivoli

With financial support from:
the Hudson River Estuary Program and Cornell University

Prepared by:
AKRF, Inc.
and
GREENPLAN, Inc.

December 15, 2014

Project Abstract

The Town of Red Hook together with the Village of Red Hook and Village of Tivoli implemented a Pilot Project in conjunction with Cornell University and the NYSDEC Hudson River Estuary Program. The Pilot Project led to the preparation of this Conservation Framework for enhancing wetland, stream, and forest resilience; local connectivity of wildlife habitat; connections to the Hudson River estuary; and adaptations of these ecosystems to climate change by preserving connectivity of intact connected natural areas and habitats. Through an integrated stakeholder engagement process, the Town identified conservation opportunities and near-, mid-, and long-term action items based upon the application of a Geographic Information Systems (GIS) model developed by Cornell University.

Project Team

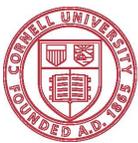
AKRF, Inc.
Graham L. Trelstad, AICP
Peter Feroe, AICP

GREENPLAN, Inc.
Ted Fink, AICP
Michele Greig, PhD, AICP

Stakeholders

Ray Armater, Montgomery Place; Brenda Cagle, Town of Red Hook Town Board; Harry Colgan, Town of Red Hook Town Board; Art Collings, Dutchess Land Conservancy; Neil Curri, Dutchess County Cornell Cooperative Extension; Susan Erzati, Village of Tivoli Trustee; Nancy Guski, Town of Red Hook Conservation Advisory Council (CAC); Laurie Husted, Town of Red Hook CAC Chair and Bard College Sustainability Manager; Chris Klose, Echo Valley Farm; Brent Kovalchik, Village of Red Hook Trustee; Charlie Laing, Town of Red Hook Planning Board; Michael Robertson, Sawkill Farm; Nava Tabak, Scenic Hudson; Bob Wills, Dutchess County Department of Planning and Development

This project was funded by the New York State Environmental Protection Fund through the Hudson River Estuary Program of the New York State Department of Environmental Conservation.



Cornell University



Department of
Environmental
Conservation

Hudson River Estuary Program
A Program of the New York State Department of
Environmental Conservation

Introduction

OVERVIEW

The Town of Red Hook, Village of Red Hook, and Village of Tivoli were selected by the New York State Department of Environmental Conservation (NYSDEC) Hudson River Estuary Program (HREP) to conduct a Pilot Project in conjunction with Cornell University to develop a local conservation planning framework for adapting to climate change by enhancing protection of intact connected natural areas. Biological landscape connections within a watershed's high-integrity forests, streams, and wetlands create pathways for species to migrate and natural communities to shift in response to climate change. A team of consultants (the "Project Team") was retained by the Town of Red Hook to manage the Pilot Project and stakeholder process. AKRF, Inc. was the lead consultant and GREENPLAN, the Town of Red Hook planning consultant, provided valuable input.

The collaborative process included application of a Cornell University Geographic Information Systems (GIS) model to the Town of Red Hook and stakeholder engagement to determine appropriate near-, mid-, and long-term local actions and/or land use tools to effectively preserve key habitat connections. The outcome of the Pilot Project is this Conservation Framework—an inventory of conservation opportunities, linkage strategies, and best practices.

The objectives of the Pilot Project have been identified as:

- 1) Understand local habitat connection models and maps provided by Cornell University;
- 2) Understand connections between the municipality and the Hudson River Estuary;
- 3) Assess the relative vulnerabilities of important habitat connections and prioritize those in greatest need of conservation action;
- 4) Audit how local land use plans and tools support conservation of habitat connectivity and identify opportunities to enhance those plans and tools;
- 5) Develop a Conservation Framework for selected priority connection(s) with a parcel-level linkage design and inventory of conservation opportunities, strategies, and best practices; and
- 6) Make recommendations for near-, mid-, and long-term actions.

The Pilot Project included a focused stakeholder engagement process that identified 19 stakeholders who had participated in previous planning efforts or were actively engaged in planning and preservation efforts within the communities. A series of four (4) stakeholder meetings were held at which a total of 14 individual stakeholders attended (some stakeholders attended more than one meeting).

Throughout the process, the Project Team used the following questions to frame an evaluation of the effectiveness and success of the Cornell GIS tool:

- 1) Can the Cornell GIS model be readily combined with standard GIS datasets without the need for extensive data refinement or manipulation? Is the available level of detail within the datasets sufficient to generate meaningful results from the model?
- 2) Are the outputs from the Cornell GIS model clearly understandable to a community?
- 3) Do the model outputs clearly lead to meaningful public or private actions that result in conservation of habitat linkages?
- 4) Does the model support or contradict previous field-based studies?

HUDSON RIVER ESTUARY ACTION AGENDA

Goal #3 of New York State's *2010-2014 Hudson River Estuary Action Agenda*¹ lays out a vision for conserving "the rich diversity of plants, animals, and habitats that are key to the vitality, natural beauty, and environmental quality of the Hudson Valley."

Goal #3 would be implemented by the following long-range targets:

- Target #1 – Understanding the Status and Trends of Regional Biodiversity;
- Target #2 – Raising the Capacity of Local Partners to Conserve Important Habitats;
- Target #3 – Addressing Climate Change and Monitoring Threats

Within Target #2 and Target #3, the following actions were identified for raising the capacity of local partners to conserve important habitats and addressing climate change and monitoring threats:

- Target #2: Actions Planned for 2010–2014
 - Convey biological information and technical assistance to local partners to reduce the threat of habitat loss and fragmentation and adapt to climate change;
 - Assist 50 local municipalities with recognizing their biodiversity resources and developing conservation plans and strategies.
- Target #3: Actions Planned for 2010–2014
 - Identify and prioritize landscape connections, including those necessary for plants and animals to move northward and to higher elevations in response to climate change;
 - Develop conservation tools and strategies that assist land-use decision-makers and land managers with maintaining priority landscape connections and mitigating impacts of fragmentation and climate change;

These actions also support Goal #4 and Goal #6 of the *Estuary Action Agenda*:

- Goal #4: Protect and restore the streams, their corridors and the watersheds that replenish the estuary and nourish its web of life, and sustain water resources that are critical to the health and well-being of Hudson Valley residents and the ecosystem.

¹ www.dec.ny.gov/lands/4920.html.

- Goal #6: Address the causes of climate change in the Hudson Valley and prepare for projected impacts to safeguard our health and safety and to protect the natural resources and local economies that sustain our communities.

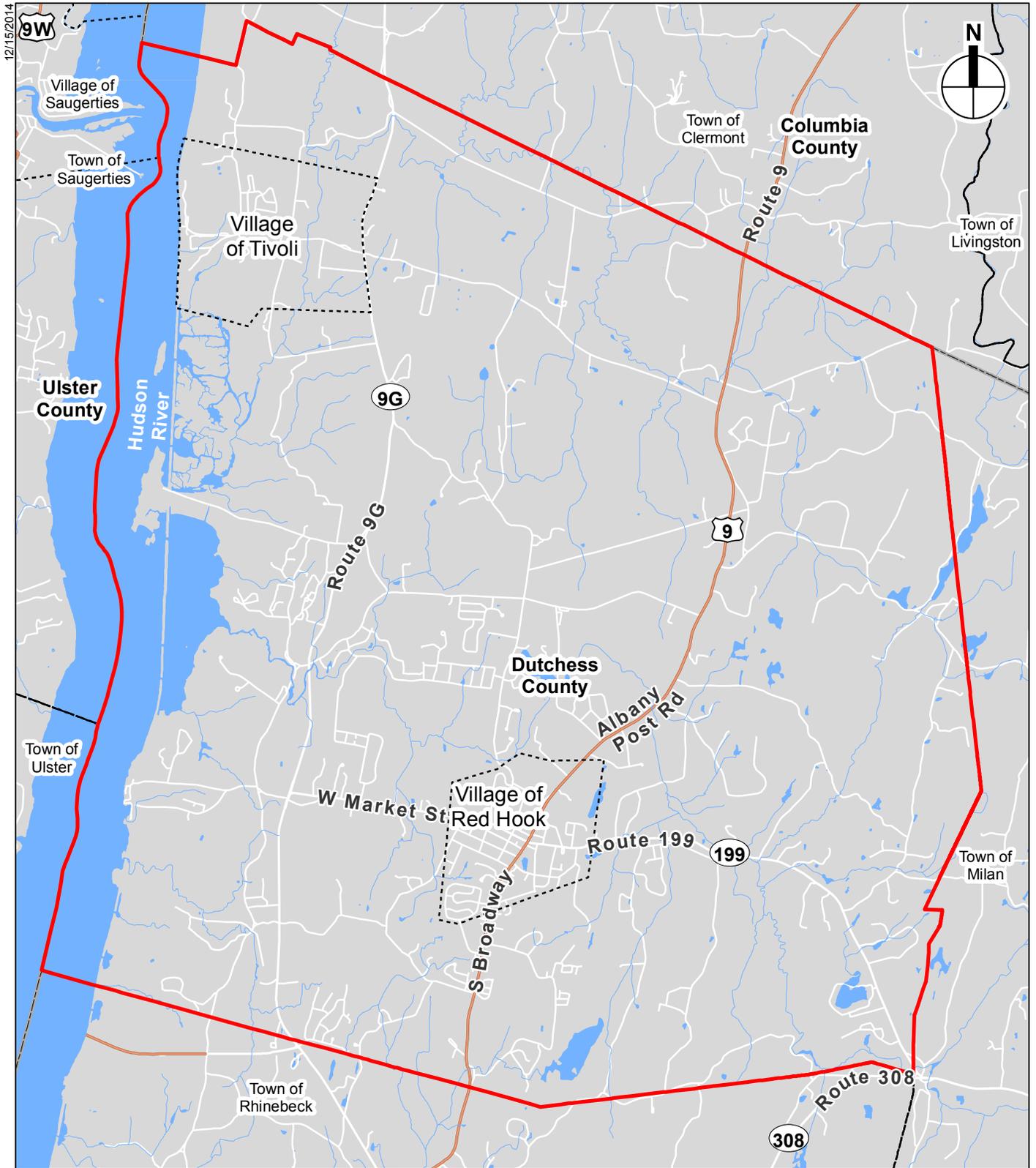
The Town of Red Hook has already taken steps to Target #1 through a series of intermunicipal planning efforts that have identified the existing biodiversity within the community, promoting increased “biodiversity literacy,” and identifying various land use planning tools that can help to preserve the biodiversity in the Town and Village of Red Hook and the Village of Tivoli. Long-Range Target #2, which speaks to raising the capacity of local partners to conserve important habitats, has also been initiated by the Town of Red Hook and this Pilot Project furthers that effort locally. It is hoped that the lessons learned from application of the Cornell GIS model within the Town of Red Hook can demonstrate to other local communities within the Estuary that these tools can be readily applied and can support local objectives of climate change resiliency as well as habitat protection. Finally, it is anticipated that this Pilot Project can assist the Town of Red Hook (and other communities) to prioritize landscape preservation to maintain critical habitat corridors and connections.

RED HOOK’S COMMITMENT TO CONSERVATION

Over the past 30 years, the Town of Red Hook and its two villages, Red Hook and Tivoli (shown in Figure 1), have executed a wide range of planning tools and programs to preserve farms, open space, and other important natural resources in the community. These planning tools include the adoption of *Comprehensive Plans* in all three municipalities, adoption of an *Open Space Plan* for the Town and its two Villages, a Purchase of Development Rights Program, a Community Preservation Project Plan, and recent amendments to the Town’s Zoning Law and Subdivision Regulations to implement the “Centers and Greenspaces Plan.” All of these plans have sought to realize the Town’s goals to protect its full array of extraordinary natural resources and unique quality of life, which sets Red Hook apart from many other Hudson Valley towns.

Protection of Red Hook’s rural quality, agricultural character, and its natural environment have consistently stood out as major goals for residents of the Town. When asked in a public opinion survey, in the late 1980s for the Town’s *Comprehensive Plan*, how important certain issues were, the highest priorities for protection were agricultural lands, scenic vistas, wildlife habitats, groundwater resources, streams and drainage areas, the Hudson Riverfront, wetlands, forests, historic and archaeological sites. These qualities were what residents valued most and wanted to protect. Other priorities for residents were to “preserve and enhance the quality of life,” “maintain and protect rural character,” and ensure the “continuation and diversification of agriculture.” The Town’s 1990 *Comprehensive Plan*, along with the Villages’ adopted Plans (Red Hook’s in 1969 and Tivoli’s in 2005) and the *Open Space Plan* (adopted in 2006), set the stage for a “town and country” vision that identified areas in and adjacent to the two Villages as most appropriate for new development, while emphasizing protection of agricultural and open space lands in other parts of the Town.

In spite of the 1990 *Comprehensive Plan* and the adoption of forward-thinking Zoning and Subdivision Regulations in 1993, by the early 2000s the Town became acutely aware that its farmland was being lost to new development. This disturbing trend was slowly transforming Red Hook from a largely rural-agricultural community to a more suburban community, potentially frustrat-



ing the good intentions of the 1990 *Plan*. In response to this concern, in 2004 the Red Hook Town Board appointed a “Land Use, Conservation, and Development Working Group,” comprising a broad spectrum of community interests, to assess critical land use priorities in the Town. Membership on the Working Group was recommended by a Steering Committee consisting of representatives from the Red Hook Town Board, the Boards of Trustees of the Villages of Tivoli and Red Hook, the Red Hook School District, and the Dutchess County Legislature. This was to become one of the community’s first intermunicipal planning efforts.

The Working Group’s charge was to identify the most critical land use, conservation and development priorities in the Town. The group was specifically asked to suggest where various types of development should best be located and how they should be designed, where open spaces should be protected, and to make recommendations to the Town Board about how to achieve the “town and country” land use vision and goals. The Working Group was assisted in its efforts by the planning firm GREENPLAN, Inc. and Pace University Land Use Law Center. Funding for the project was provided by the Hudson River Valley Greenway Communities Council.

The next planning milestone was the creation of an Intermunicipal Task Force (ITF) between the Town and its two Villages. The purpose of the ITF was to implement the recommendations of the Working Group. A critical recommendation of the Working Group was to permit well-designed, mixed-use districts immediately adjacent to the Village of Red Hook to reinforce the Village’s compact, walkable character, rather than establishing large suburban lots in these areas, as had been occurring. This became the initial focus of the ITF.

Meanwhile, the Town Board had also created an Agriculture Committee to identify ways to keep farming viable in the Town. That Committee recommended that the Town establish a Purchase of Development Rights (PDR) program, which the Town adopted in 2003. This program became so successful that, in 2006, Red Hook sought an amendment to New York State Town Law that allowed it to establish a Community Preservation Plan (CPP) to create a special Transfer Tax on real estate transfers in the Town. Both of these programs used the monies raised to purchase the development rights on important farms and other open space areas in the community.

By the time the ITF was established in 2005, the Agriculture Committee was investigating a Transfer of Development Rights (TDR) program. It became apparent that, with the ITF’s focus on creating traditional neighborhoods adjacent to the Village of Red Hook and the Agriculture Committee’s identification of important farmland that should be preserved, the Town was moving in the direction of creating the sending and receiving zones necessary for a transfer of development rights program. With this realization, the ITF ultimately recommended a strategy for the Town to amend its Code to fully implement the “town and country” or (as it became known) the “centers and greenspaces” land use pattern. The “Centers and Greenspaces Plan” was implemented in 2011 when the Town Board adopted amendments to the Zoning Law and Subdivision Regulations.

Red Hook continues to work on projects that will implement other goals and objectives created from its long-term planning processes. A description of the major milestones associated with the efforts undertaken so far is presented throughout the next section of this report to provide examples of how a community could use existing land use tools to preserve habitat integrity.

CORNELL HABITAT INTEGRITY MODEL

The impacts of community development, especially low-density single-family residential development (often times referred to as “sprawl”) on natural ecosystems and biodiversity have been widely studied.² Communities throughout the Hudson River Valley have integrated various planning and regulatory tools³ into local practice to recognize important ecosystem structures and functions. Many of these tools are based on local studies and mapping of ecosystems and biodiversity. With an increasing knowledge and understanding of potential ecosystem change associated with global climate change and a desire to create more resilient communities that can better respond to physical and ecosystem changes associated with a pattern of more frequent and severe storm events, planners and scientists have begun using tools to assess the resiliency of connected natural areas and habitats.

A team of scientists at Cornell University, in association with the NYSDEC HREP, have applied a GIS methodology used previously in the State of Washington to evaluate connectivity between ecosystems to identify key pathways for migration of wildlife and ecosystem functions in response to climate change.⁴

The GIS model identifies potential pathways across a “habitat integrity surface” – a ranking of the degree of human impact on the integrity of ecosystems, their component organisms, and processes. When creating the habitat integrity surface, an emphasis was placed on forest interior and riparian forest habitat types that had the highest degree of integrity due to the least amount of human impact and the highest likelihood of intact ecosystem structure and function. Wetlands were often, but not always, present within the forest interior and riparian corridors, so were included in the model but not separately.

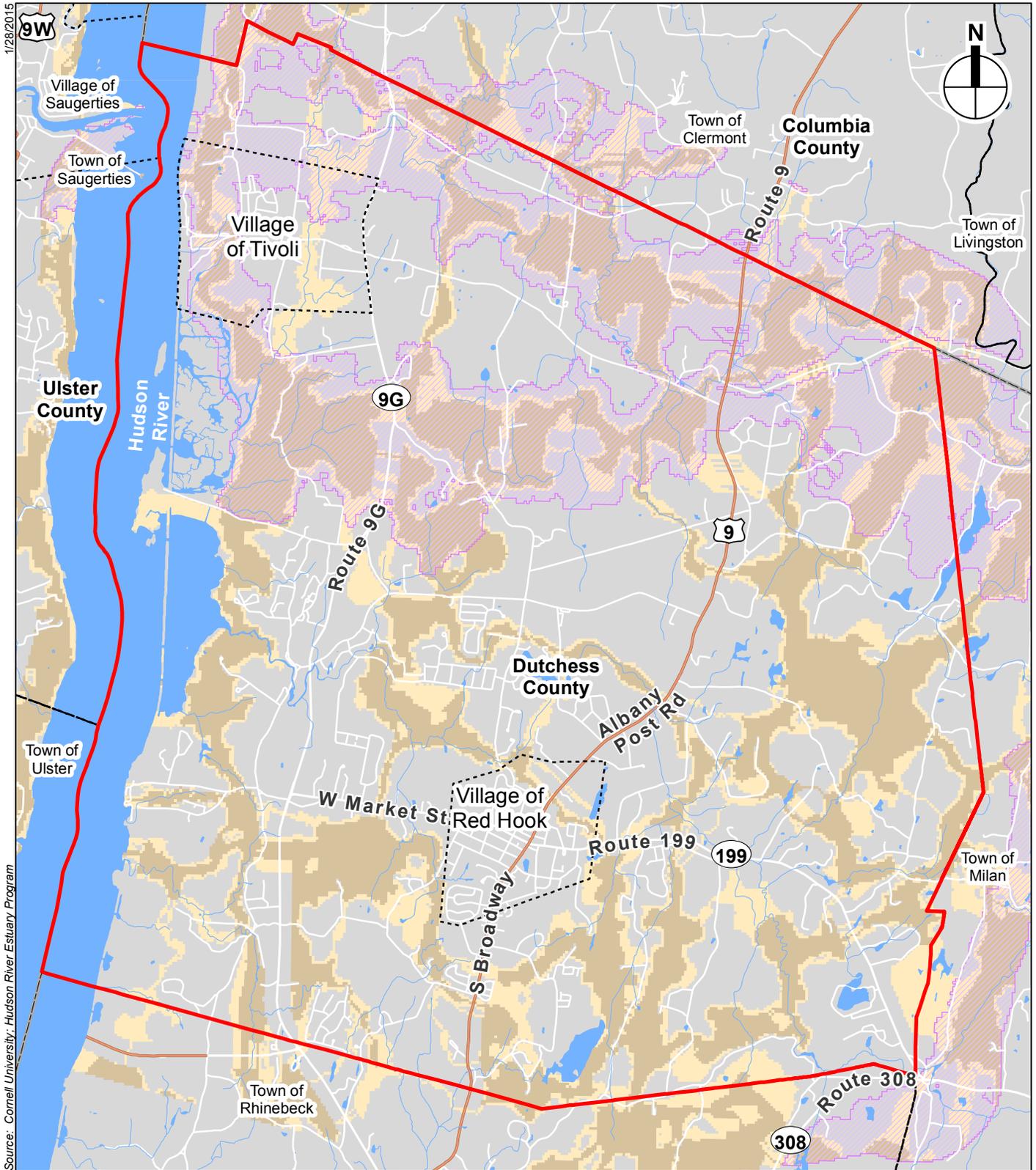
The following base datasets were used in the creation of the habitat integrity surface: National Land Cover Database (2011), National Wetlands Inventory, National Hydrography Dataset Flowlines, streets and railroads. Each grid-cell within the model was assigned a value based on a scaled ranking of least impact to most impact. ESRI’s ArcGIS Linkage Mapper tool was used to model normalized least-cost corridors between regional forest patches of 200 acres or more in size. “High Priority” areas within the habitat integrity surface were those where three (3) or four (4) model runs overlapped (i.e., high agreement among the models). “Low Priority” areas were those where only one (1) or two (2) model runs were coincidental.

The resulting analysis shows the potential pathways that might be used for habitat and species movement or migration in response to climate change at both the regional and the local scales (see Figure 2). The regional scale model considers connectivity between large, unfragmented “core forests” identified by the Nature Conservancy on both the west and east sides of the

2 See, for example, Kiviat, E., and G. Stevens (2001), “Biodiversity Assessment Manual for the Hudson River Estuary Corridor,” Annandale, NY: Hudsonia, Ltd. (Published by the New York State Department of Environmental Conservation); Johnson, E., and M. Klemens, “The Impacts of Sprawl on Biodiversity,” in Johnson, E., and M. Klemens (eds.) (2005), “Nature in Fragments: The Legacy of Sprawl,” New York: Columbia University Press.

3 Town of Milan (2005), “Habitat Assessment Guidelines: Town of Milan.”

4 Martin, J., S. Beyeler, L. Heady, and P. Sullivan (2014), “Integrity-based Forest Connectivity Modeling at Regional and Local Scales in the Hudson River Estuary Watershed.” New York State Department of Environmental Conservation/Hudson River Estuary Program. Department of Natural Resources, Cornell University, Ithaca, NY. (See also: Washington Wildlife Habitat Connectivity Working Group (<http://waconnected.org/statewide-analysis/>)).



1/28/2015
 Source: Cornell University; Hudson River Estuary Program

Habitat Integrity-Based Linkages

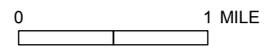
Local Level

- High Priority
- Low Priority

Regional Level

- Habitat Linkages

**Planning for Resilient, Connected
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**Regional and Local Habitat Integrity
 Figure 2**

Hudson River. Regional habitat linkages are generally present in the northern half of the Town of Red Hook and cover portions of the Village of Tivoli. As will be discussed in greater detail below, many of the areas identified in the regional model correspond to wetlands and stream corridors – areas of high biological integrity and connectivity. However, other non-wetland areas are also included. The local habitat integrity model considered potential linkages between conserved forested lands within and immediately surrounding the Town of Red Hook. The Low Priority and High Priority areas predicted for the Town of Red Hook are shown in Figure 2.

It is important to note that habitat migration may involve movement of individuals or entire populations through the landscape, and it may include not just animals that walk, swim, or fly, but also vegetative species that may colonize new areas in response to stressors in their original habitat. Scientists have already identified movement of species in a generally northward direction as average ambient temperature and precipitation regimes change. These species are seeking the temperature and precipitation patterns that are most favorable to their long-term survival.

OUTREACH SYNTHESIS

The stakeholder group found that the model runs made intuitive sense. Many of the “High Priority” intact connected natural areas correspond to forested riparian habitat and the associated wetlands and stream corridors. The stakeholder group was already aware of the important environmental role played by wetlands and stream corridors and so it was not a surprise that a habitat integrity model would identify these areas as critical to local and regional habitat connectivity. What was perhaps surprising, however, was the low degree of correspondence between the integrity model and existing agricultural lands. When compared to local biodiversity data and knowledge, the habitat integrity model also supported previous and on-going field-based studies.

The ability to overlay local datasets with the habitat integrity model within a Geographic Information System without the need for extensive data refinement or manipulation was an important element to enhance how the data was understood and interpreted by the stakeholder group. GIS is a powerful tool that can be used by communities to develop a baseline understanding of ecological structure, function, and change. The availability of data from State, County, and not-for-profit sources makes it even easier for local communities to build GIS datasets that can inform local planning and decision-making.

In the end, local awareness of regional biodiversity, connectivity, and response to climate change—a key objective of the Hudson River Estuary Program’s *Estuary Action Agenda*—was heightened by the use of the Cornell GIS model. The stakeholder group also found two other documents of use in relation to addressing biodiversity in local land use decision making processes: “Creating a Framework for Change,” by Michael Klemens and Elizabeth Johnson; and the Wildlife Conservation Society’s publication “Protecting Wildlife Connectivity Through Land Use Planning: Best Management Practices and the Role of Conservation Development.”⁵ In “Creating a Framework for Change” Klemens and Johnson outlined the following potential actions that local communities may pursue:

5 Available at: <http://programs.wcs.org/northamerica/AboutUs/Publications.aspx>

- “1. Redirect development into more compact human settlements with consideration of ecological landscape context and constraints.
2. Raise awareness of the opportunities for biodiversity conservation as part of the land-use decision-making process.
3. Increase biodiversity literacy among land-use decision makers: scale, scope and complexity.
4. Extend land-use review concerns beyond threatened and endangered species (in particular large, charismatic ones) to encompass a more complete suite of wildlife and plants and ecological communities.
5. Integrate the protection of key ecological processes into the land-use planning process.
6. Link top-down and bottom-up efforts to maximize effectiveness, and integrate conservation goals into local and regional decision-making processes.
7. Create new partnerships to conserve biodiversity (e.g., biodiversity and local agriculture).
8. Incorporate adaptive management and flexibility into decision making.
9. Monitor effectiveness and create measures of success.”

*“Conserving biological diversity successfully will require weaving conservation into overall social and economic agendas, for if conservation continues to be looked on as yet another special interest, decision makers will invariably give it short shrift. However, if we can **refocus the discussion of biodiversity to make it an integral part of discussions and decisions concerning community character, economic development, sustainable communities, and community self-determination**, we can garner the support of other more established and powerful coalitions, increasing severalfold the likelihood of effecting biodiversity conservation as part of the land-use and governance process.”*

[Klemens, M. and E. Johnson (2005). “Creating a Framework for Change,” in Johnson, E., and M. Klemens (eds.) (2005), “Nature in Fragments: The Legacy of Sprawl,” New York: Columbia University Press]



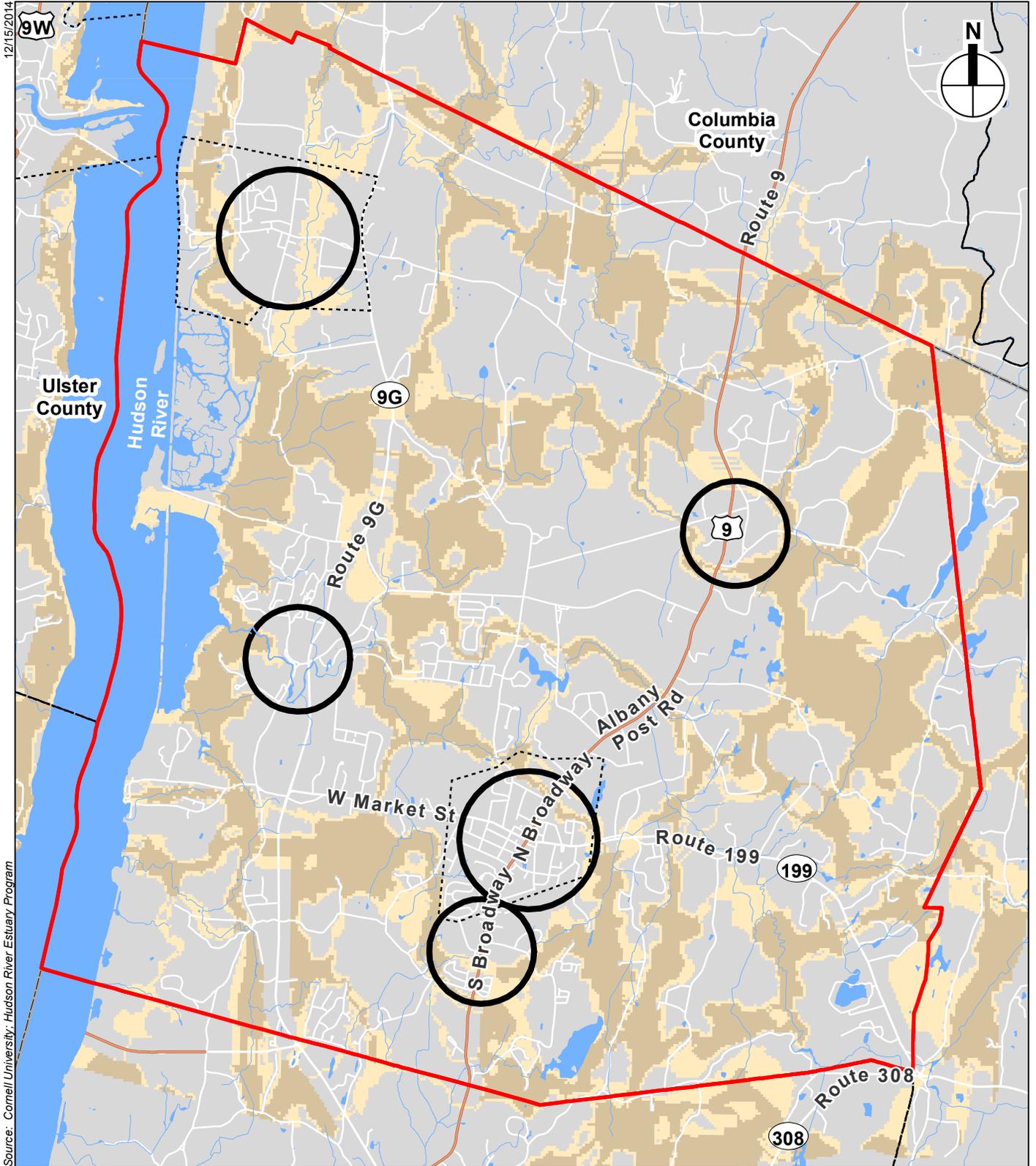
Tools

Once a community better understands the specific habitats and natural areas that are important for preserving the resiliency and integrity of the region's ecosystems, as well as the areas crucial to providing linkages between these high quality habitats, there are many tools that can be used to accomplish conservation. This section describes the many tools that a community could use to help protect these critical areas. The list of appropriate tools is not exhaustive, but rather, it contains those tools that were identified through the stakeholder process as having the potential to be the most effective.

The tools are grouped into three main categories. First, we present general Planning & Zoning tools that are available to communities. Second, we present Environmental Overlays that can be adopted by a municipality. Finally, we present Public Awareness tools that communities may use to further their goals. Throughout this section, we have used Red Hook as an example of how these tools could be used to protect habitat integrity. These examples also help to demonstrate the portions of the integrity surface that are already protected within Red Hook, as well as the gaps in that protection. In the final section of this report, these gaps are addressed by presenting several short-, medium-, and long-term strategies that the Town of Red Hook could implement to further protect these critical resources.

Not every tool described in this section can be, or should be, implemented in every community. Rather, each tool has specific attributes that make it more or less appropriate for a specific community. The communities that are most effective at preserving the region's critical habitat will be those that employ a range of tools and customize them to fit the unique needs, opportunities, and constraints of their community.

It is important to note that the very nature of the resource that is being protected requires that communities think beyond their municipal boundaries. Connecting habitat and providing continuous high-quality habitat necessarily involves inter-municipal cooperation. Communication about what linkages and natural features are being targeted for protection is critical to actually protecting that link. After all, if the habitat being protected in one community does not link with other protected habitat, the value of the linkage is greatly diminished, if not completely destroyed. Therefore, inter-municipal cooperation must be a part of every tool that a community chooses to implement.



Habitat Integrity-Based Linkages

- High Priority
- Low Priority

Planning Area

- Centers

**Planning for Resilient, Connected
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**Centers and Greenspace
Figure 3**

PLANNING & ZONING TOOLS

Municipal planning efforts, whether they are to create plans for an entire community, or a targeted area or resource, can serve to raise awareness about biodiversity and the critical role that habitat protection plays within a community. These plans may be comprehensive plans, or neighborhood plans, open space or farmland protection plans, or they could be targeted biodiversity and habitat assessments. The key element to the success of the planning process in increasing public awareness of biodiversity issues is the degree of public involvement in, and awareness of, the planning process and, ultimately, the plan's findings. During any planning process, there are always several goals that must be balanced. Inserting biodiversity and habitat protection as one of those goals not only helps to educate the public, but can also re-shape the direction of an overall planning effort by clearly articulating the areas in which habitat protection is most critical to biodiversity and resiliency.

Centers and Greenspace

A well thought out, clearly-articulated plan for accommodating and directing growth in a community can be a powerful tool for a community looking to protect its natural resources. Specifically, a plan that directs growth towards centers (hamlets, villages, downtowns, crossroads, etc.) while restricting growth in a community's greenspace can go a long way towards protecting critical habitat. Such a plan would serve as the basis for updating the community's zoning in order to more fully implement the goals.

Communities that are preparing to, or have begun to, update their Comprehensive Plan may consider incorporating the centers and greenspace concept into their plan. Communities that have recently completed, or are about to complete, a Comprehensive Planning effort may find that engaging in a new plan effort may not be feasible. For those communities, targeted updates to the zoning code, or the creation of a smaller-scope centers plan may be more appropriate.

In 2005, the Red Hook Town Board, working with the Villages of Red Hook and Tivoli, appointed an 11-member Intermunicipal Task Force, comprising representatives from each of the three municipalities, to prepare a wide variety of amendments to the Town's land use controls. The Task Force worked for over three years to create the "Centers and Greenspaces Plan" and proposed amendments to the Town's Zoning and Subdivision Laws. In preparing the amendments, the Task Force sought out the preferences and priorities of townspeople during an extensive public participation process that included numerous community meetings, workshops, and discussions with stakeholders, community groups, and Town and Village Boards and committees.

Figure 3 illustrates how the five identified "centers" are primarily outside of the linkage network. This is expected given that patterns of development in existing hamlets and growth centers wouldn't have high habitat integrity. Again, it is important to note that Red Hook (town and villages) adopted this award-winning plan *before* having any data on habitat connectivity. The centers they identified as ripe for new and denser development, and the greenspaces they identified for lower rates of growth, were based on other planning goals, but have a high degree of correlation to the intact connected natural areas.

Special Zoning Districts

Communities may use their zoning power to create zoning districts that protect intact connected natural areas to implement a well-considered plan. These districts may take several different approaches to limiting disturbance to these important areas. They may limit the footprint of development allowed on a parcel, require conservation of key natural resources or areas within a parcel, or even include a provision for transferring development rights away from sensitive areas and into areas identified for greater density. The efficacy of using zoning to protect intact connected natural areas depends in large part on the degree to which there are fewer, larger parcels that make up the natural area that is the target of conservation. If the natural area that is the target of preservation is sliced up into many small parcels, it may be difficult to achieve the goal of preserving the natural area intact through the creation of a special zoning district. If, on the other hand, a natural area is spread over only a few large parcels, then crafting a special zoning district to protect that feature, while still leaving a landowner with a use for that land, may be achievable.

Communities that have recently performed substantial updates to, or complete re-writes of, their zoning code may not be ready to entertain additional zoning amendments. However, for other communities, analyzing the degree to which a special zoning district may help preserve their critical habitat may be a useful exercise. This is especially true of communities that have already recognized the goals of habitat preservation in their comprehensive plans or other community plans. For those communities, much of the leg-work of identifying the resources that need to be protected and the parcels that make up that resource may have already been completed.

Using Red Hook as an example, after the adoption of the “Centers and Greenspaces Plan,” the Town made several amendments to the Zoning Law, including the creation of two new zoning districts, the Agricultural Business (AB) District and the Traditional Neighborhood Development (TND) District, which work together. The purpose of the AB District is to implement the goals of the Town’s Comprehensive Plan and Open Space Plan to protect agricultural lands, discourage incompatible land uses, and promote agriculture as a component of the local economy now and in the future. The purpose of the TND District is to ensure that development adjacent to the Village of Red Hook is designed to conform to the Village’s traditional compact, pedestrian-oriented, mixed-use neighborhood pattern. Adoption of these two new Zoning Districts in 2011 promotes small town development, with close-knit villages surrounded by rural countryside, in keeping with traditional rural land use patterns of the Hudson Valley and in conformance with the Town’s Comprehensive Plan and Open Space Plan, rather than the sprawl-type development that was previously allowed by the Zoning. By relieving some of the development pressure from the less-developed portions of the Town, the TND and AB Districts may also have the ancillary benefit of diminishing development in areas of high habitat or connectivity value.

Traditional Neighborhood Design

Zoning to facilitate traditional neighborhood design (TND) and development within targeted areas can provide growth opportunities while allowing for lower density elsewhere in a community. Similar to conservation subdivisions, the primary limitation of this tool for habitat protection is the size of the natural area(s) that could be protected when this zoning tool is

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implemented at the parcel level. Since most areas zoned for TND have smaller parcel sizes, large tracts of intact habitat are unlikely to be able to be protected. However, smaller, but still critical, habitat linkages may still be protected by employing well thought out TNDs that protect certain natural features within the region's centers. In addition, TND is often the implementation of a centers and greenspace plan within the identified 'centers,' which in turn serves to protect the greenspaces

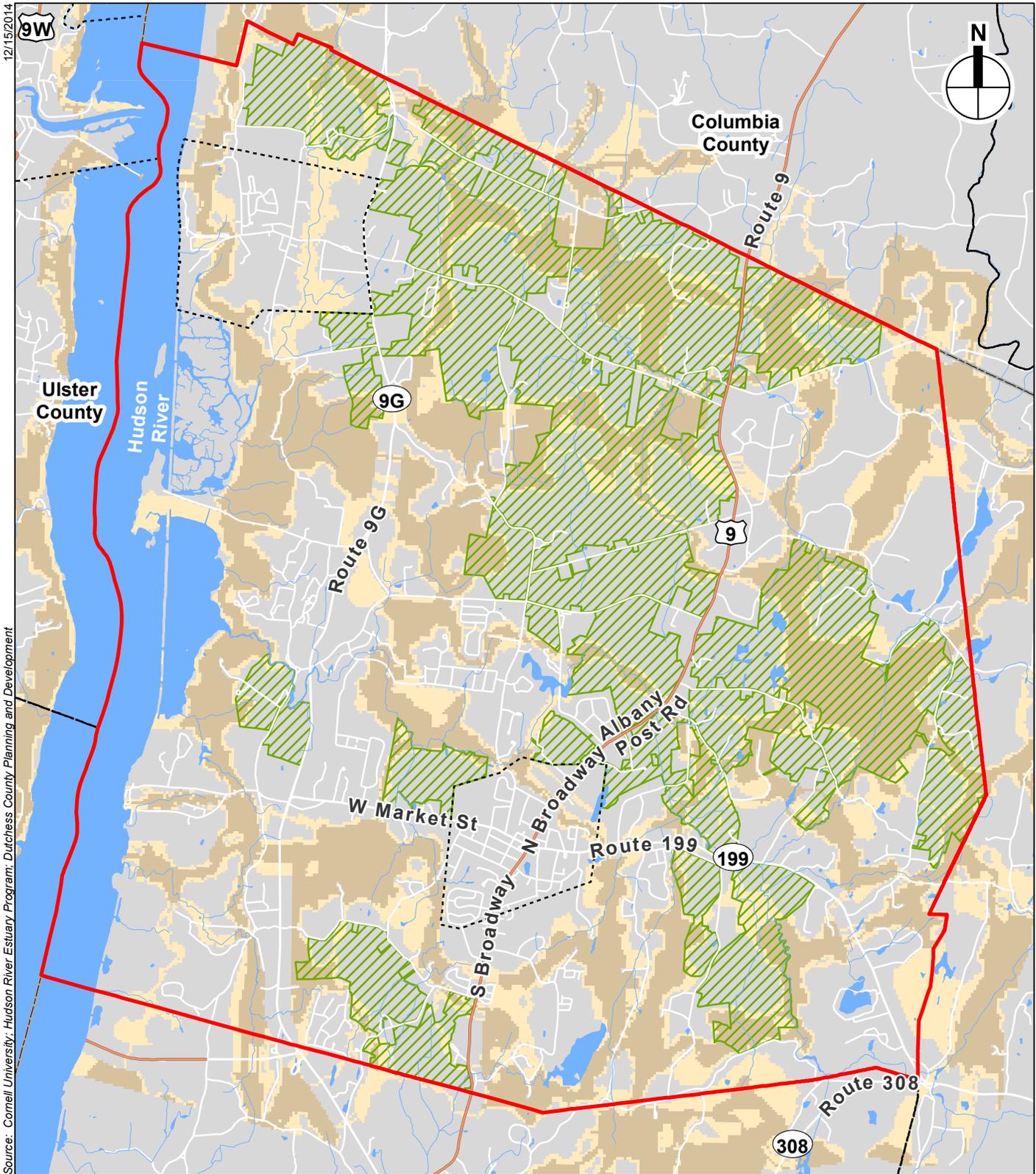
Within the Town of Red Hook, the "form-based" TND District permits the same features that characterize existing villages, such as walkable, mixed-use neighborhoods and more variety and choice in housing types. It includes three subdistricts: the Commercial Center, the Residential Neighborhood, and the Office-Industrial area. The Commercial Center permits a traditional Main Street with buildings close to the sidewalk and parking behind buildings and on the street. Reduced setbacks permit shopfronts to be built to the sidewalk, and an increase in maximum lot coverage (up to 85% through incentive zoning) allows for a continuous row of shops to encourage walking. The Residential Neighborhood Subdistrict has a base zoning of one or two dwelling units per net acre (depending on location). Developers can increase building potential above the base zoning, in keeping with the existing Village character, by contributing to a dedicated fund through incentive zoning. These funds can only be used to purchase development rights from lands in the AB District, thereby shifting building potential from the Town's farmlands to its center. (Alternatively, a developer can purchase development rights directly from a landowner in the AB District.)

In Red Hook, the Open Space Incentive zoning provisions authorize adjustments to building potential in the TND District in exchange for funds to be used exclusively to preserve greenspaces in the AB District, at no direct cost to residents and taxpayers of the Town. This is the mechanism for transferring building potential to lands that have been identified for development (i.e., "centers") in the Town's Comprehensive Plan from lands that have been identified in the Plan for conservation (i.e., "greenspaces"). In this way, residential development is promoted in the traditional neighborhoods, where it supports Village businesses and encourages additional commercial development in the TND Commercial Center, rather than on farmland. Large development projects in the TND Residential Neighborhood are required to consist of a minimum of three different housing types (such as cottages, houses, duplexes, townhouses or apartments), with no one type comprising less than 20% of the total units proposed. These measures are intended to ensure an adequate supply of more affordable housing types in the Town.

Agriculture Business District

The Agriculture Business (AB) District works in tandem with the TND district to guide growth within the Town of Red Hook. The AB District continues to permit and enhance agricultural uses by permitting, for example, larger farm markets, wineries, distilleries, cider mills, and agritourism uses. Many of these permitted uses receive a streamlined review process, requiring only minimal site plan review with no public hearing.

When a landowner chooses to develop a property, however, landowners can avail themselves of different development options for their properties. Under the "conservation option," they can participate in the Town's purchase of development rights program, community preservation



Source: Cornell University: Hudson River Estuary Program: Dutchess County Planning and Development
12/15/2014

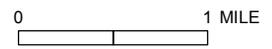
Habitat Integrity-Based Linkages

- High Priority
- Low Priority

Zoning

- Agriculture Business District

**Planning for Resilient, Connected
Natural Areas and Habitats**



**Agriculture Business District
Figure 4**

fund, or the incentive zoning program to sell their development rights at the density that was permitted under the previous Zoning Law. This creates an incentive for landowners in the AB District to sell development rights and protect their lands rather than develop them for residential purposes. Under the “limited development option,” landowners in the AB District can develop their lands at a density of one (1) dwelling unit per 10 acres; with this option clustering or “conservation subdivision” is required.

It is important to note that the purpose of this district was not to preserve habitat integrity, but rather to preserve important farmland resources. To the extent that these resources overlap with critical habitat resources, as shown in Figure 4, this district will help the Town preserve habitat integrity. A community that chooses to implement a zoning district specific to biodiversity could use a similar principle. Critical habitat could be protected similar to how agricultural resources are protected in Red Hook’s AB District.

Conservation Subdivision

Allowing, or requiring, conservation subdivisions (or cluster subdivisions) can also help protect critical habitat at the parcel level. However, to the extent that the lands being conserved in the subdivision are not contiguous to other preserved land, or are simply not large enough in scope, conservation subdivision on its own may not be an effective means of preserving large, intact areas of critical habitat. Conservation subdivisions may help to preserve more narrow areas of habitat connectivity or smaller linkages within a community, especially if these natural areas are within only a few large lots that are likely to be subdivided, rather than be developed without lot-line changes. Where a community has proactively identified broader swaths of land to be preserved within largely undeveloped areas (especially areas with other protected lands), conservation subdivision may be more successful in preserving the larger, intact connections that are preferred for habitat and connectivity. The Millbrook Greenway in New Paltz is a good example of a community proactively identifying desired, connected open space over several parcels, and then working with multiple landowners to acquire land or design easements to ensure the land is preserved and connected across parcels.

In the Town of Red Hook, the regulations for conservation subdivision in both the Zoning Law and the Subdivision Regulations were updated in 2011 to more concertedly preserve the natural and scenic qualities of open space in the Town. Conservation subdivisions follow a four-step design process that identifies important natural resources, such as wetlands, valuable soils, habitats, and other special features of the site around which development is designed. This allows residential development to fit into the landscape while conserving greenspaces and minimizing impacts on agricultural lands. In all of the Town’s Zoning Districts, the regulations were also revised to require greater open space protection. For example, in the AB District, a minimum of 80% open space is now required to be permanently protected with a conservation easement in a conservation subdivision.

Property Acquisition and Conservation Easements

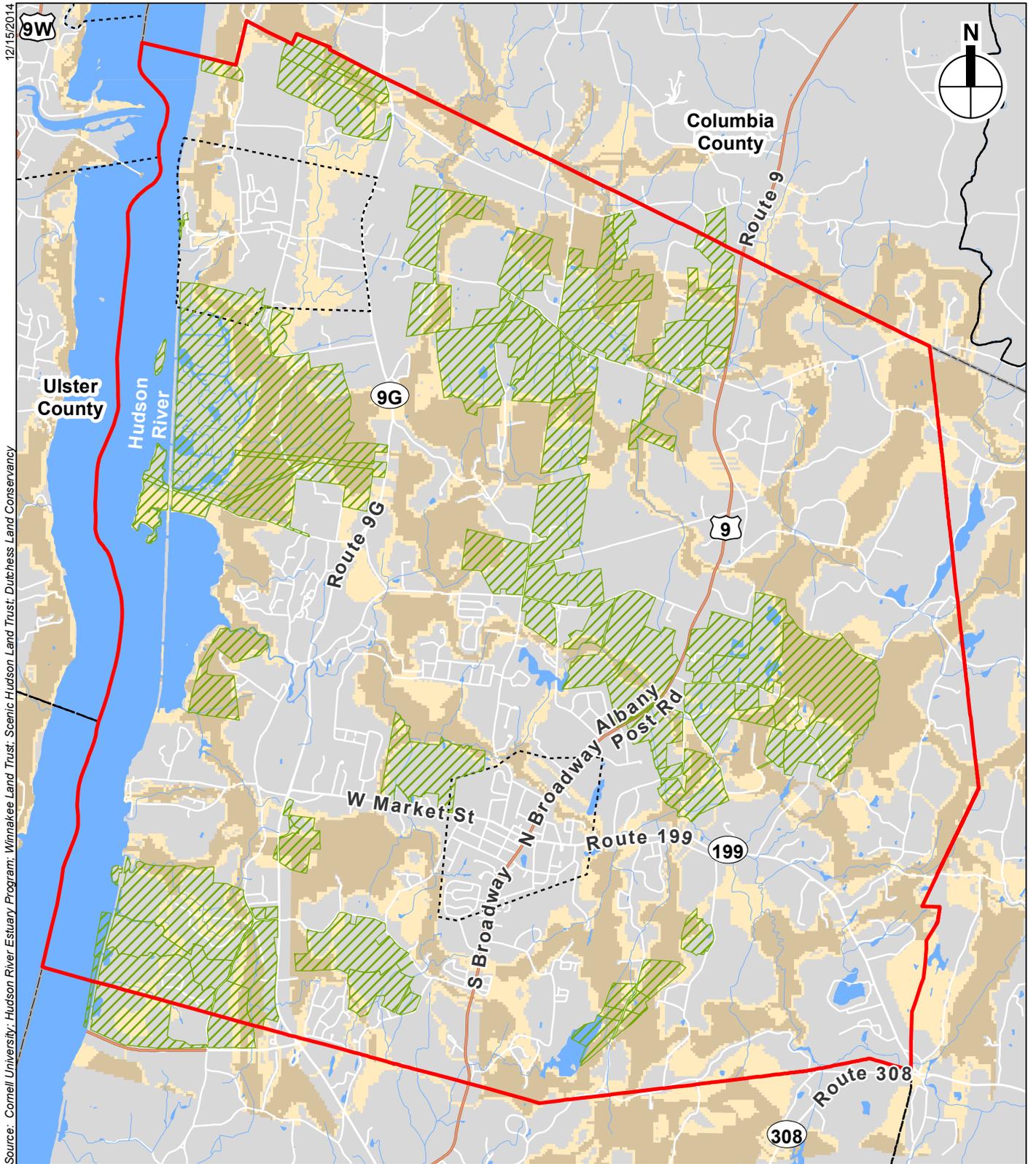
One of the simplest, and potentially most effective, methods of protecting critical habitats from development is to acquire the property in question. This could take the form of fee simple acquisition or the purchase of a conservation easement by a municipality or a recognized conservation organization. In order to make the most efficient use of scarce public and private resources, a community-wide plan for prioritizing parcels for protection should be developed. There are many examples of open space preservation, habitat protection, and community preservation plans throughout the Estuary region that can be used as models for such a plan.

In 2003 the voters of the Town of Red Hook approved a proposition authorizing the expenditure of \$3.5 million for the acquisition of interests or rights in real property for the preservation of farmland in the Town, pursuant to § 247 of the General Municipal Law. The purpose of the Farmland Protection Program is to preserve important agricultural resources by purchasing development rights (PDR) and acquiring conservation easements on agricultural resources in the Town.

In 2006, the New York State Legislature amended Article 4 of the New York State Town Law by adding a new Section 64-h to authorize the Red Hook Town Board to establish, through a local referendum, a Community Preservation Fund supported by revenues from a two (2) percent real estate transfer tax on amounts over and above the Dutchess County median home price. The local law establishing the Community Preservation Fund was adopted in 2007 after the referendum was approved by voters. Deposits into the fund can include revenues from a number of sources, including any revenues from the real estate transfer tax. This legislation allows the Town of Red Hook to continue to protect its farmland and open space. A Community Preservation Plan (CPP) prioritizing properties for preservation was adopted by the Town in 2011.

To date, the PDR and CPP programs have resulted in the preservation of more than 5,000 acres of agricultural and open space lands in the Town. The Scenic Hudson Land Trust (SHLT), Dutchess Land Conservancy (DLC), and Winnakee Land Trust (WLT) have partnered with Red Hook to acquire the development rights on these lands (see Figure 5). Red Hook has also been able to leverage County, State and Federal funding for some of the properties, allowing the Town to “stretch” its own funds for purchasing development rights on farmland and open space. Red Hook continues to work with its farmers and other landowners to secure conservation easements on lands targeted in the CPP.

This tool, property acquisition and conservation easements, is one that can be utilized by all communities. While Red Hook has, to date, used it primarily for the protection of agricultural resources, the same principle would apply to conservation of intact connected natural areas. Communities that do not yet have a plan that identifies and prioritizes parcels for conservation (such as an open space plan), can use the output of the habitat integrity model to help create a priority list of parcels deserving of protection. Communities that have already created an open space protection plan, or community preservation plan, such as Red Hook, can utilize the data on habitat integrity to update their plans and incorporate this new information into the priority ranking of parcels. As shown in Figure 6, which focuses on the northeast section of the Town, the current list of parcels identified in the CPP does not necessarily align well with the parcels identified by Cornell’s model as most important to preserving intact connected natural areas. The Town, as discussed in the last section of this report, has recognized the importance of updating this plan.



Source: Cornell University: Hudson River Estuary Program; Wipnakee Land Trust; Scenic Hudson Land Trust; Dutchess Land Conservancy

Habitat Integrity-Based Linkages

- High Priority
- Low Priority

Privately Owned Conserved Land

- (not publicly accessible)

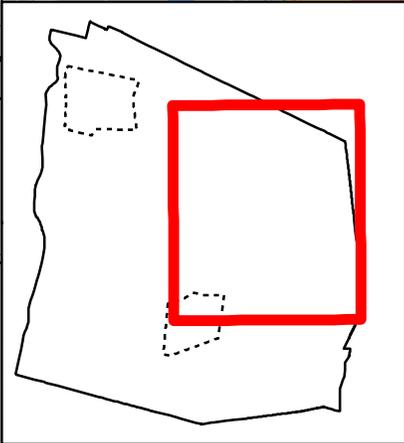
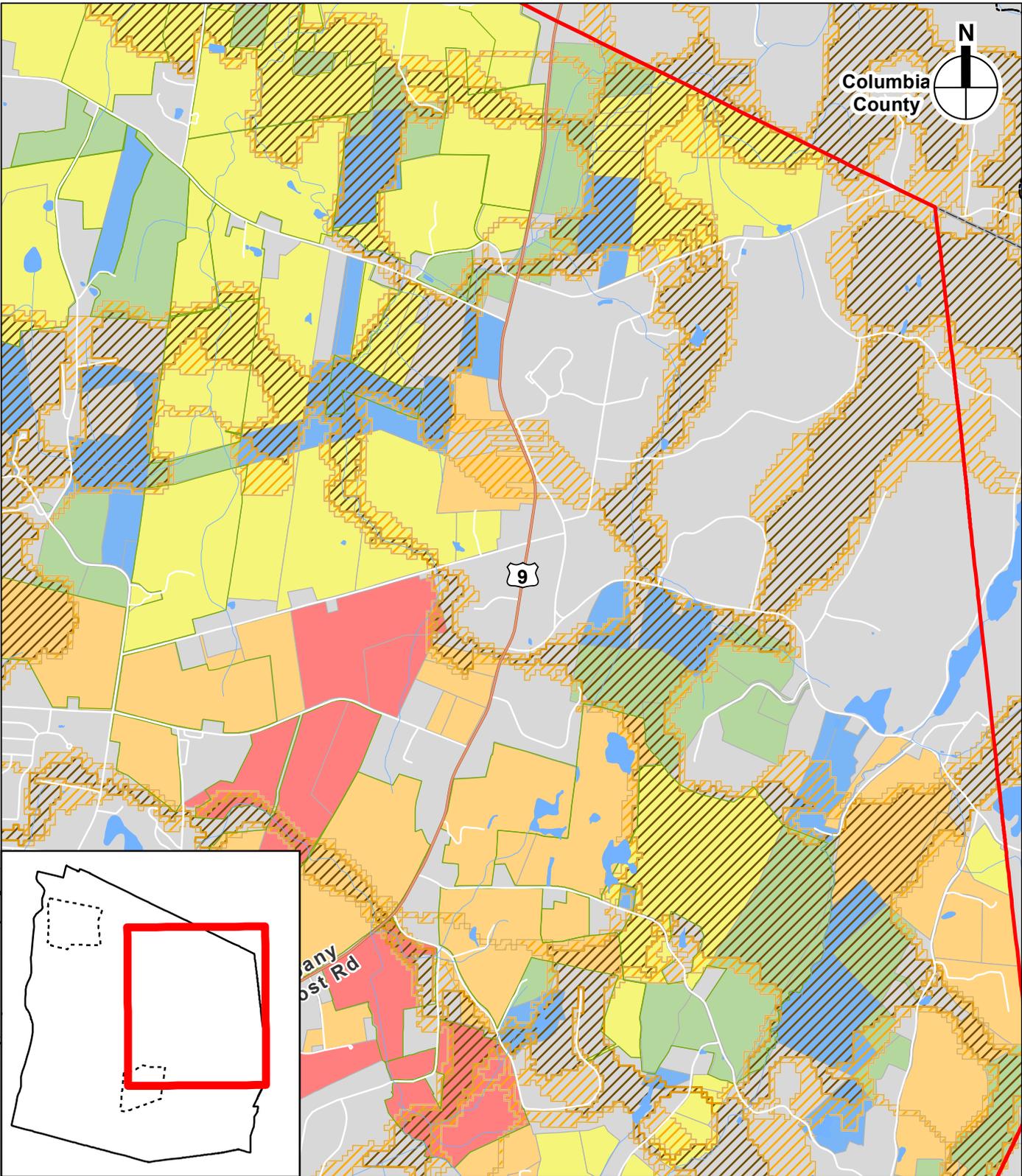
**Planning for Resilient, Connected
Natural Areas and Habitats**

**Privately Owned Conserved Land
Figure 5**



12/15/2014

Source: Cornell University; Hudson River Estuary Program; Town of Red Hook



Habitat Integrity-Based Linkages

-  High Priority
-  Low Priority

CPP Priorities

- 
- High
 - Low

0 0.5 MILES



ENVIRONMENTAL OVERLAY TOOLS

Environmental overlays, as discussed here, refer to local laws that protect certain environmental features. These overlays may be codified in zoning, or may be incorporated as stand-alone sections of a community’s code.

Wetlands

Riparian corridors and their associated wetlands often provide important habitat. Therefore, protecting wetlands from development has not only water quality benefits, but also biodiversity and habitat benefits. Many communities, and New York State DEC, identify a 100 foot adjacent area (buffer) around wetlands as being part of a regulated area within which certain activities are either prohibited or limited. The buffers are intended to protect wetland structure and function, including habitat.

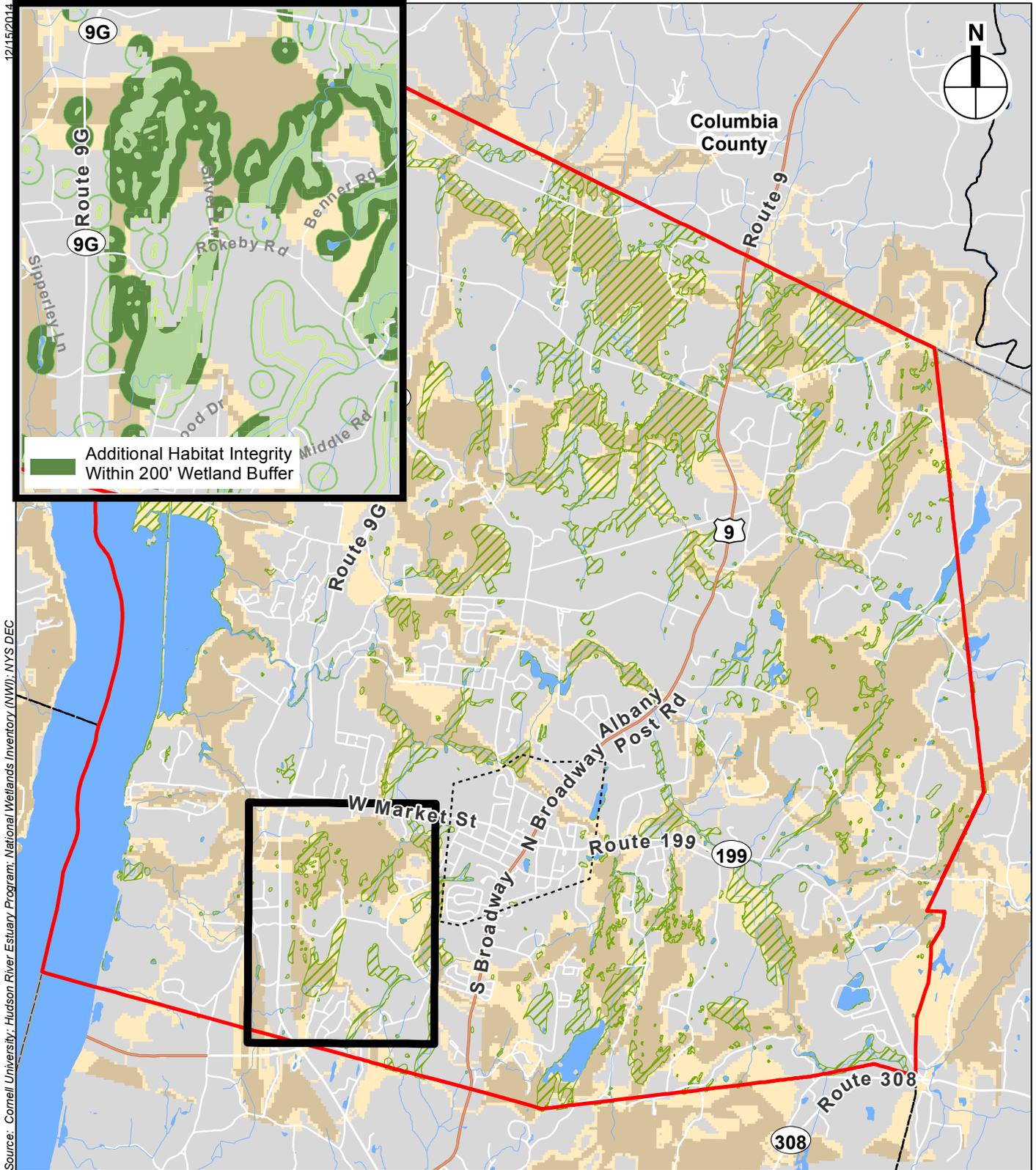
There are approximately 3,400 acres of mapped state (DEC) and federal (NWI) wetlands within Red Hook, not including the Hudson River. The Town currently regulates a 100 foot buffer around wetlands mapped by DEC and wetlands “established by the Town.” However, the Town currently does not have a map that establishes any locally-regulated wetlands so only the DEC wetlands would be protected at the Town and State level. Fully 21% percent of the areas identified by Cornell’s model as high or low priority for habitat integrity are mapped wetlands (see Figure 7). If a 100 foot buffer is applied to these mapped wetlands, another 14% of the linkages identified by the model would be covered, for a total of 3,300 acres, or 35% of the priority habitat connections. If a 200 foot buffer¹ is applied to these mapped wetlands, another 12% of the linkages identified by the model would be covered, for a total of 4,406 acres, or 48% of the integrity surface. Based on this example, it is clear that local regulations that protect wetlands, and their buffers, from development may be highly effective at protecting critical habitat linkages.

Wetland Areas within Habitat Linkages

	Within All Linkage Areas	Percentage of Total Linkage Area	Within High Priority Linkage	Percentage of High Priority Linkages	Area Within Low Priority Linkage	Percentage of Low Priority Linkages
Wetlands	1,982 acres	21%	1,420 acres	24%	562 acres	16%
0-100 foot Buffer	1,318 acres	14%	808 acres	14%	510 acres	14%
100-200 foot Buffer	1,107 acres	12%	627 acres	11%	480 acres	13%

Looked at another way, approximately 59% of the wetlands within the Town have been identified as critical habitat linkages.

¹ Note that the typical wetland buffer is 100 feet to protect the hydrologic structure and function of a wetland. This theoretical 200 foot buffer demonstrates the potential for habitat protection also associated with wetlands. Some studies indicate that, depending on site-level characteristics, larger buffers may be more effective at improving water quality through enhanced nitrogen removal. See the Environmental Law Institute’s “Planner’s Guide to Wetland Buffers for Local Governments” (http://www.eli.org/sites/default/files/eli-pubs/d18_01.pdf).



Source: Cornell University; Hudson River Estuary Program; National Wetlands Inventory (NWI); NYS DEC

Habitat Integrity-Based Linkages

- High Priority
- Low Priority

Wetlands

- NWI and DEC Mapped Wetlands

**Planning for Resilient, Connected
Natural Areas and Habitats**

**Wetlands
Figure 7**

While state and federal regulations prohibit the filling or disturbance of wetlands without a permit, local ordinances that prohibit filling of wetlands would protect wetlands from actions that require only local approvals, such as site plan or subdivision. Local ordinances can protect isolated wetlands, or wetlands that may not be hydrologically connected to mapped waters of the United States. These wetlands, though not regulated by the federal government, may still have important habitat value. A municipality’s wetlands law could also regulate development within a certain distance of wetlands. Except for state-mapped and regulated wetlands, buffers around wetlands are not regulated. Local ordinances also give the community’s Planning Board more responsibility for analyzing impacts to wetland areas and their buffers, as well as responsibility for minimizing those impacts.

Streams

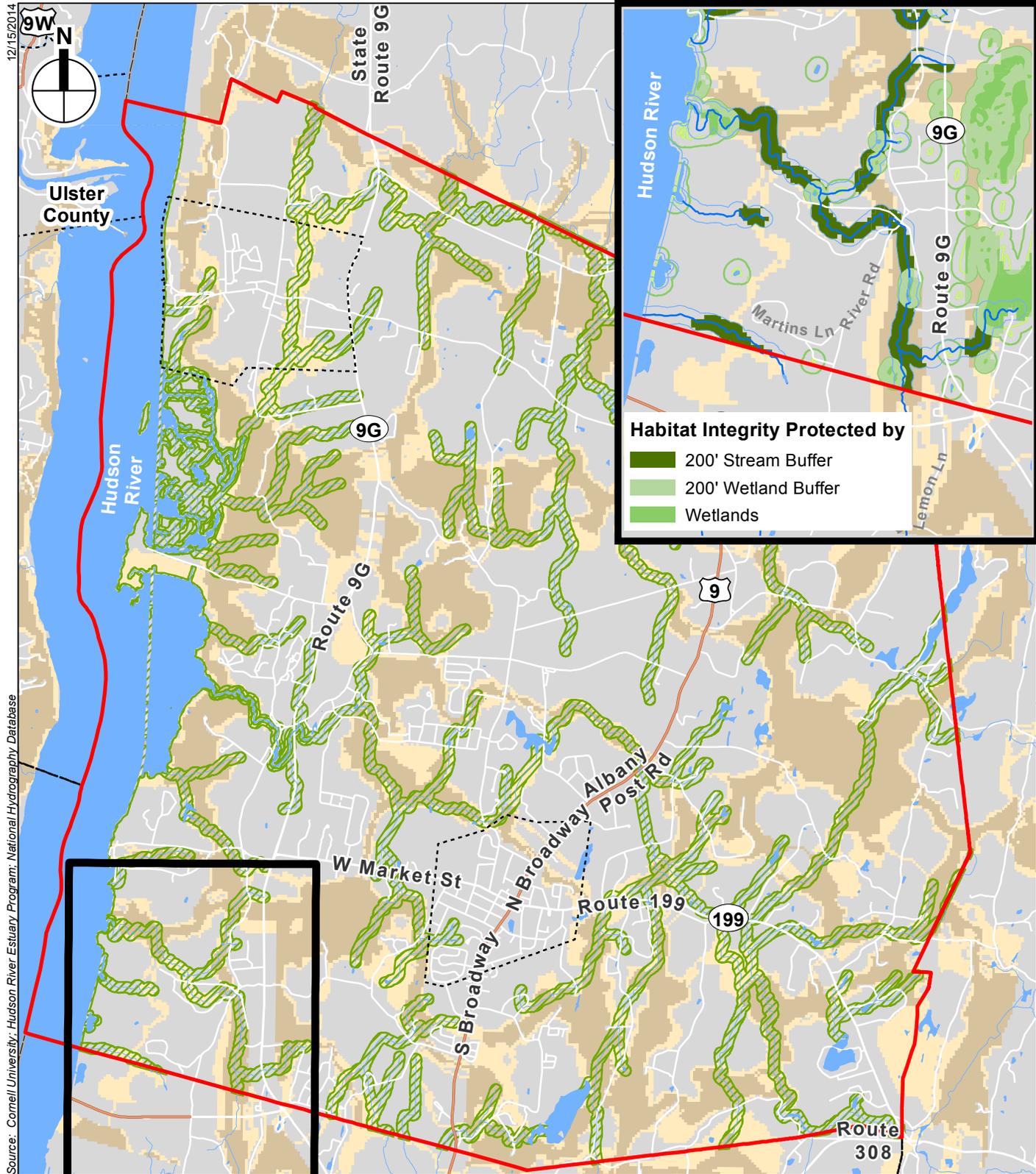
Another tool that communities can use to protect critical habitat and the linkages between larger areas of habitat is the separate protection of areas along streams and waterways. Not all streams and waterways are considered wetlands, so separate regulation may be useful to fully protect these resources. As noted above, these riparian corridors are critical pathways that often serve to connect large portions of intact habitat. By protecting the areas around streams through an overlay limiting encroachment into a stream buffer, communities can protect these linkages.

Using Red Hook as an example, it is easy to see the overlap between stream corridor protection and conservation of habitat linkages (see Figure 8). If the Town were to protect a 100 foot stream buffer, it could protect 1,279 acres of habitat linkages. While 729 of those acres are within wetlands or a 100 foot buffer around wetlands, 550 acres are outside of a 100 foot wetland buffer. Taken together with protection of wetlands and a 100 foot buffer around those wetlands, protection of a 100 foot stream buffer would protect 40% of the habitat integrity surface in the Town.

If the stream buffer were increased to 200 feet, an additional 1,110 acres of habitat integrity would be protected, 336 acres of which are in addition to areas within a 200 foot buffer around mapped wetlands. Thus, taken together with protection of wetlands and a 200 foot buffer around those wetlands, protection of a 200 foot stream buffer would protect approximately 55% of the habitat integrity surface in the Town.

Stream Corridors within Habitat Linkages

	Within All Linkage Areas	Percentage of Total Linkage Area	Within High Priority Linkage	Percentage of High Priority Linkages	Area Within Low Priority Linkage	Percentage of Low Priority Linkages
100-foot Stream Buffer	1,279 acres	13%	834 acres	14%	445 acres	12%
Exclusive of 100' Wetland Buffer	550 acres	6%	342 acres	6%	208 acres	6%
200-foot Stream Buffer (exclusive of 100' Buffer)	1,110 acres	12%	703 acres	12%	407 acres	11%
Exclusive of 200' Wetland Buffer	336 acres	4%	218 acres	4%	118 acres	3%



Source: Cornell University, Hudson River Estuary Program, National Hydrography Database

Habitat Integrity-Based Linkages

- High Priority
- Low Priority

200-Foot Stream Buffer



Planning for Resilient, Connected
Natural Areas and Habitats

Streams
Figure 8

Communities can consider protecting streams at all levels, not just those classified by DEC. Intermittent streams are often overlooked but are important features both for water quality and quantity protection and for habitat protection. Including intermittent streams in a local regulation would enhance a community's overall stream protection and habitat protection strategy.

PARCEL LEVEL ASSESSMENT TOOLS

Many community land use regulations provide broad latitude for Planning Boards to evaluate conditions specific to the parcel level. Standards for review and approval of site plan and subdivision applications oftentimes permit a Planning Board to consider a range of environmental and ecological conditions on the site and within the immediate surrounding area.

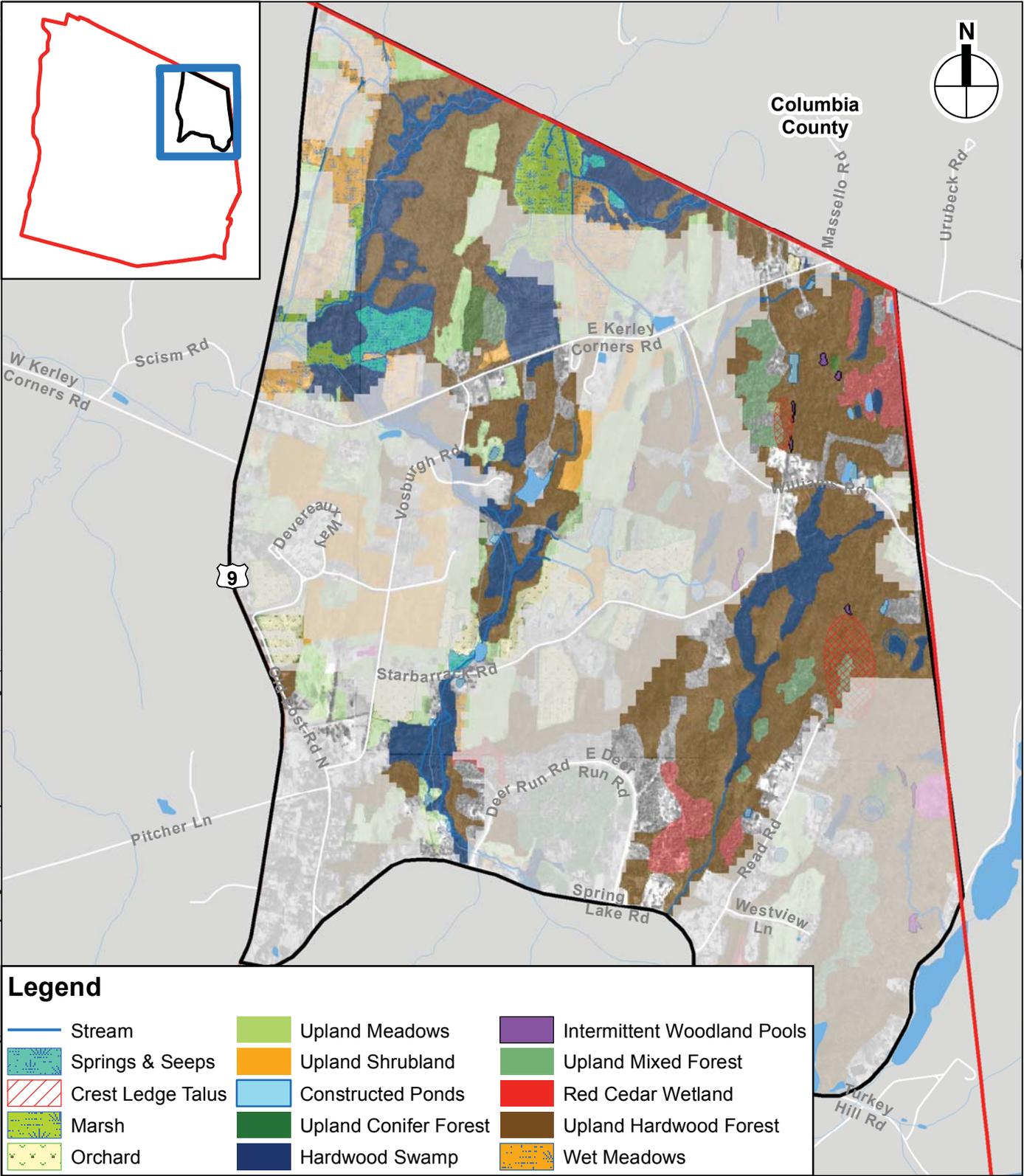
Biodiversity

Communities that have undertaken biodiversity or habitat assessments on a Town- or Village-wide basis may consider regulating future development within certain of these habitat types. Not only will such regulation protect current species inhabiting the region, but they will also enhance the resiliency of the region to climate change by protecting areas critical to linking various habitat types. The Town of Warwick, for example, has adopted a biodiversity overlay zoning district, which compels certain applicants to evaluate the biodiversity of the parcels as part of the land development review process. Other communities might choose to handle biodiversity awareness through an inventory and mapping process applied at the site plan or subdivision review process, instead of through a formal overlay.

In 2009, residents of the Town, through a 10-month Biodiversity Assessment Training (BAT) course led by Hudsonia in partnership with the HREP, investigated the habitats in the northeastern portion of the Town, which has been recognized as having high-quality intact habitat. In addition to mapping and recording critical habitat types, which can be used to help make future land use decisions, the BAT process helped educate Town residents and decision-makers on the importance of biodiversity and habitat protection. This awareness has, in turn, spurred other conservation efforts and best practices with regard to land management. It has also increased attention to biodiversity issues during the routine land use decision making processes of the Planning and Zoning Boards.

Not surprisingly, areas that have been identified by a targeted study, such as the one conducted in Red Hook, as having a high degree of biodiversity, or areas that have been recognized as having specialized or important habitat types (i.e., Crest, Ledge, and Talus), correlate well with areas identified by the model as being of high value to habitat integrity. As shown in Figure 9, areas of intact forest, shown in the dark brown, and other important habitat types are highly correlated with areas of high linkage potential. (Areas outside of the linkages identified by Cornell are faded gray on the figure, leaving the mapped habitat areas within the priority linkages to be displayed.)

Many communities, however, have not yet had the opportunity to conduct biodiversity assessments of their municipality, or even parts thereof. The main limiting factors are often time (commitment of staff and volunteer resources), as well as the money needed to conduct useful assessments. There are several options for these communities that wish to use biodiversity measures as a way to protect habitat integrity, but have not yet been able to conduct a study.



Areas outside of the linkages identified by Cornell are faded gray, while areas within the linkages are transparent, displaying the habitat mapped during the 2009 biodiversity study. The biodiversity study identified multiple habitat types, which are shown with different colors. The key forested habitat is shown in dark brown. However, other important habitat types coincide with areas identified as key habitat linkages.

0 0.5 MILES

If a community is interested in regulating areas of high habitat value, they could require that certain land use applicants (large parcels or subdivisions, or applicants in certain identified sensitive areas of a community) conduct a biodiversity study and/or habitat assessment on their site. The Town of Milan has followed this approach and developed a set of “Habitat Assessment Guidelines” that are incorporated into the review process. While this approach would only benefit the particular parcel on which an application was made, it may educate the municipality on the critical habitat features in their community more generally and may help steer development into more appropriate areas of a particular parcel.

Another option would be for the community to partner with a university or non-profit organization, such as Hudsonia, to conduct targeted habitat assessment and biodiversity studies. Some communities within the Estuary region, such as Red Hook, have taken this approach. Communities can also complete a Natural Resources Inventory² to gather existing data, including habitat information, or request a Habitat Summary from the Hudson River Estuary Program. As mentioned above, a major benefit of these approaches is the education and awareness that follows, the availability of better information for evaluating potential impacts to habitat, and the ability to conduct natural resource-based planning.

Conservation Analysis

Communities that have adopted conservation subdivision regulations that emphasize the preservation of open space and ecological features on a property can make use of a “conservation analysis” to identify key attributes of a parcel at the time of a subdivision application.³ Requiring a conservation analysis (or parcel-specific habitat assessment) during the development application process may be a way to protect critical habitats within a community. However, similar to using subdivision controls to protect habitat, this tool only looks at a single parcel at a time, and does not allow the protection of off-site habitat areas. Therefore, this tool may be quite effective on large tracts of land, or on parcels that have a wide variety of habitat types on site, but might not be as effective where the natural area to be protected spans many parcels. For example, a large property that is cleared in the front, but is hardwood forest towards the rear, where it abuts a larger intact forest, may benefit from a habitat assessment that is done during the development process. This analysis would identify the forest as contributing to a larger intact forest and having a high degree of biodiversity and habitat integrity. However, if an intact forest is divided among many parcels, a biodiversity study on a single parcel, and parcel-specific measures to protect that portion of the habitat, will not necessarily lead to preservation of the entire habitat area since preservation would require information on adjacent parcels to be readily available. In addition, the Planning Board would likely lack the ability to implement a multi-parcel conservation program.

2 Haeckel, I. and L. Heady (2014), “Creating a Natural Resources Inventory: A Guide for Communities in the Hudson River Estuary Watershed.” Department of Natural Resources, Cornell University; and New York State Department of Environmental Conservation, Hudson River Estuary Program, Ithaca, NY.

3 Arendt, Randall G. (1996), “Conservation Design for Subdivisions: A Practical Guide to Creating Open Space Networks.” Washington, DC: Island Press. See also the Wildlife Conservation Society’s “Protecting Wildlife Connectivity Through Land Use Planning: Best Management Practices and the Role of Conservation Development” (available at: <http://programs.wcs.org/northamerica/AboutUs/Publications.aspx>).

Design Guidelines

Many communities have incorporated design guidelines into their planning toolbox for both site plan and subdivision review. Some guidelines have the full weight of zoning, while others are mostly suggestions, with the majority somewhere in between. Well-written design guidelines that are a product of a public planning process and have public buy-in can be powerful tools for protecting critical habitat features. However, the opposite is also true. Many communities have created design guidelines to advance other planning priorities (open space protection, farmland protection) that may be at odds with habitat protection. Communities should evaluate any existing design guidelines they may have and carefully consider the full implications of future design guidelines on the protection of habitat integrity.

PUBLIC AWARENESS TOOLS

This set of tools describes the several actions that a municipality can take to educate its residents and decision-makers about biodiversity and habitat conservation, without necessarily enacting any regulations or statutes. The effectiveness of these tools rests with the degree to which they inform key decision makers in the community, such as Planning Board members, as well as the community at large. Additional strategies for public education and raising awareness on biodiversity are included in a collaborative document produced by the New York Cooperative Fish and Wildlife Research Unit of Cornell University and the Hudson River Estuary Program.⁴

Environmental Assessment Form (EAF) Workbook

One of the primary intents of the State Environmental Quality Review Act (SEQRA) is to have “all agencies conduct their affairs with an *awareness* that they are stewards of the air, water, land, and living resources, and that they have an obligation to protect the environment for the use and enjoyment of this and all future generations.”⁵

The Environmental Assessment Form is one tool that local agencies use to generate that awareness for both the decision-makers and the general public. In 2012, NYSDEC released new versions of the Short and Full EAFs and workbooks that provide useful guidance on how to complete an environmental assessment of a project. The workbooks also provide the users (Applicants and Boards) with some of the context and technical resources needed to understand both the questions and the answers in the EAF. For instance, the workbooks explain how habitats can be classified, why certain types of habitat are more valuable for wildlife than others, and what planning tools are available to communities to protect that habitat. The workbooks also provide citations and links to other resources on biodiversity and habitat training from the state and federal government, as well as from private non-profit organizations committed to habitat

4 Strong, K. (2008). “Conserving Natural Areas and Wildlife in Your Community: Smart Growth Strategies for Protecting the Biological Diversity of New York’s Hudson River Valley.” New York Cooperative Fish and Wildlife Research Unit, Cornell University; and New York State Department of Environmental Conservation, Hudson River Estuary Program, Ithaca, NY.

5 State Environmental Quality Review Act at 6 NYCRR Part 617.1(b).

protection. Planning Boards can use this tool to enhance their understanding of biodiversity and to apply reasonable measures to protect biodiversity in the context of a SEQRA review.

Critical Environmental Area

Under SEQRA, local agencies can designate a “Critical Environmental Areas” (CEA) within their boundaries. CEAs “must have an exceptional or unique character with respect to one or more of the following:

- A benefit or threat to human health;
- A natural setting (e.g., fish and wildlife habitat, forest and vegetation, open space and areas of important aesthetic or scenic quality);
- Agricultural, social, cultural, historic, archaeological, recreational, or education values; or,
- An inherent ecological, geological or hydrological sensitivity to change that may be adversely affected by ay change.”⁶

By designating a CEA, a municipality ensures that the potential of any Type I or Unlisted Action to impact the CEA is evaluated during the SEQRA process. Communities wishing to use a CEA to protect habitat integrity could do so in several ways. They could create a CEA that encompasses the areas of the large, intact forests that form the basis for the habitat integrity surface; they could create a CEA that encompasses all of the high (and/or low) priority integrity surfaces; or, they could create a CEA that includes only specific portions of those areas—perhaps the areas deemed most at risk, or most important to regional habitat connectivity.

Designating a CEA will not prohibit development within that area. Rather, it will trigger a review of the development’s impact on the critical environmental features within the CEA by the relevant approving agency. Inherent in the designation of a CEA, and the review process that follows, is a broad-based education for board members on the importance of biodiversity and habitat connectivity.

Public-Facing Education

There are many other ways a community can help educate its residents and decision-makers about biodiversity and the importance of preserving intact connected natural areas. During the stakeholder involvement process for this project, the group identified several ways that would be particularly effective.

Open Houses

The stakeholder group suggested that conducting site visits on land that has a high value for biodiversity may be particularly effective. Many residents, even those that serve on land use boards, may not have first-hand knowledge of what an intact riparian wetland system looks like or understand its habitat potential. The stakeholders believed that exposing residents to examples of high-quality habitats and natural systems would lead to increased awareness of habitat and biodiversity planning issues and ultimately make them more supportive of efforts to protect those resources.

6 6 NYRCRR 617.14(g)

Message

Being able to succinctly and accurately convey what habitat integrity is and why it is important to protect is obviously critical to the success of any community in protecting that resource. Through the resources of the HREP and other organizations, such as Hudsonia, many communities are better able to articulate this “what and why”. However, the stakeholder group suggested that wasn’t necessarily enough. They suggested that communities examine how habitat protection furthers the other goals that community members may already have. In this way, habitat protection can serve to advance two goals at once. For example, residents that value connected recreational trails for walking, biking, or riding would seem to share the goal of preserving intact connected natural areas that can provide those opportunities. The same might be true for hunters. Other community members might highly value the water quality of their community. Protecting wetland resources would therefore resonate with those citizens. Still other community members might value the health benefits of intact natural areas, such as the potential reduction in the prevalence of Lyme disease in larger forests. Finally, residents concerned about the fiscal implications of stormwater regulations and water and sewer treatment regulations might appreciate the ecological services that are provided for free by certain healthy, functioning ecosystems, such as those that support higher levels of biodiversity.

Recommendations for Red Hook

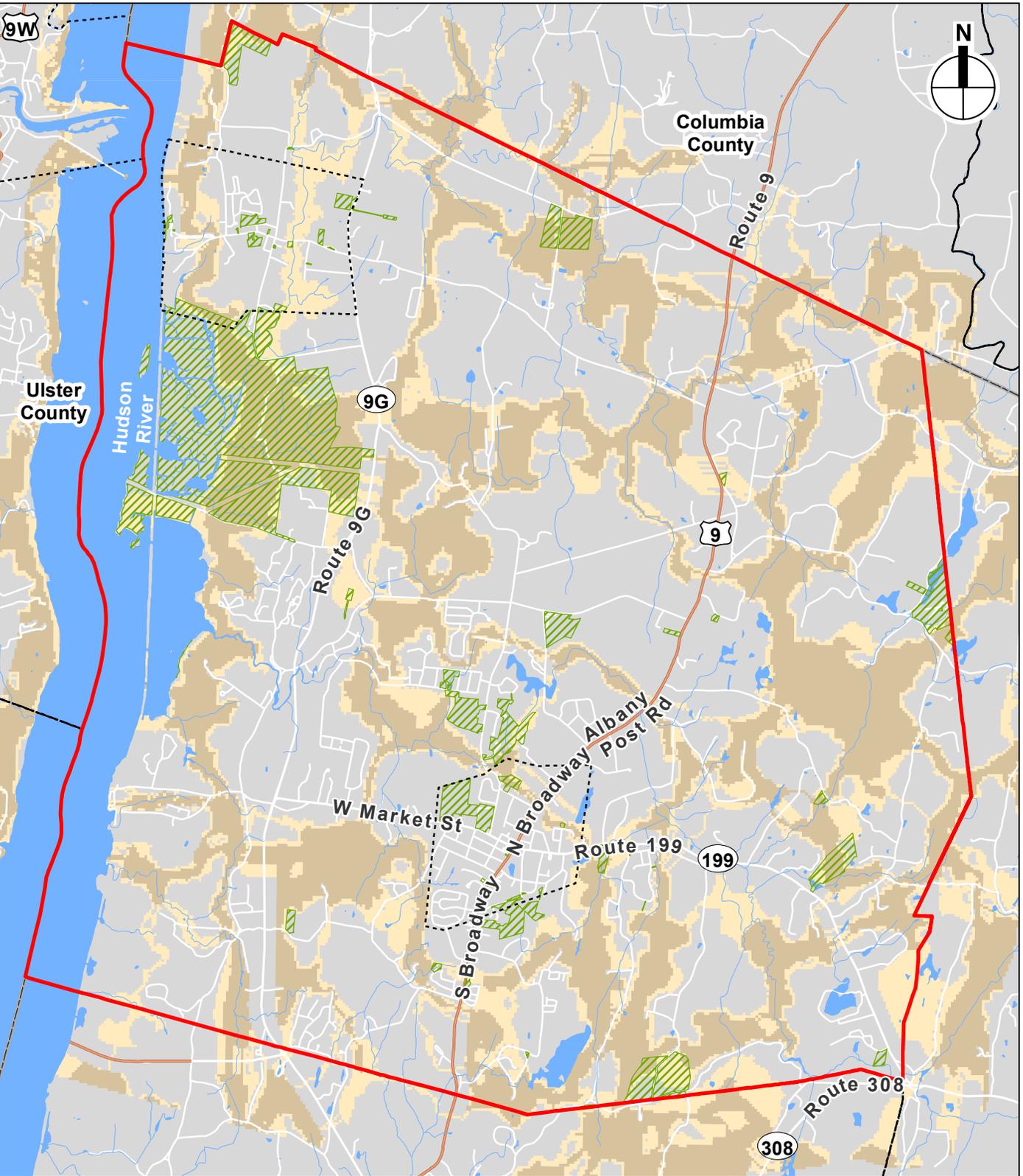
HABITAT ALREADY PROTECTED

When considering which tools are most appropriate to protect habitat, communities should consider how much, and which, lands are already protected from development to some degree. For example, parklands within a community, especially passive parkland or nature preserves, are relatively well-protected from development that would diminish their value as habitat. Other municipally-owned land, whether it is used by the Department of Public Works, or used as watershed protection land, is also somewhat protected, although it may still be vulnerable to development for municipal use such as construction of a new garage or salt shed. The municipality would be in a strong position to weigh the benefits and potential impacts of any development prior to implementation. Some communities may also have significant amounts of land that are subject to conservation easements, or that have been purchased fee simple by conservation organizations. These lands are also relatively well protected from impacts to habitat caused by development, as discussed in the previous section. In any of these cases, stewardship and management are essential to maintain and improve the habitat values of protected lands.

Within the Town of Red Hook and its Villages, there are approximately 5,687 acres of privately-owned land that is subject to a conservation easement or owned outright by a conservation organization. 2,297 acres of that land are within the boundaries of the priority habitat areas identified by the GIS model, as shown in Figure 5. These are areas for which the community does not need to develop new ways to protect its habitat value; however, depending on the easement or conservation partner, stewardship planning may be advisable to ensure necessary habitat management and best practices are used on the land to maintain its habitat connectivity values (e.g., timber harvesting or mowing schedules).

Similarly, land that is municipally owned—by the two Villages, Town, State (some of which is conserved land, some of which is used as highway maintenance areas), the school district, the County, and the Town of Rhinebeck—can be considered relatively protected from adverse impacts to habitat, if managed properly, or provide opportunities for demonstration projects (e.g., riparian habitat restoration, native landscaping, or no-mow areas) (see Figure 10). While some use may occur within these parcels, Red Hook is in a good position to thoroughly evaluate the potential impacts to habitat connectivity from any continued use and, presumably, can decide not to use all or a portion of that land, or to set aside certain lands for habitat protection. When publicly owned land is taken together with privately owned conserved land, parcels in the Agriculture Business District and other conservation zoning districts, and other land that may intrinsically be less developable, such as wetlands, waterbodies, and steep slopes, it can be seen

12/15/2014
Source: Cornell University: Hudson River Estuary Program: Dutchess County Planning and Development

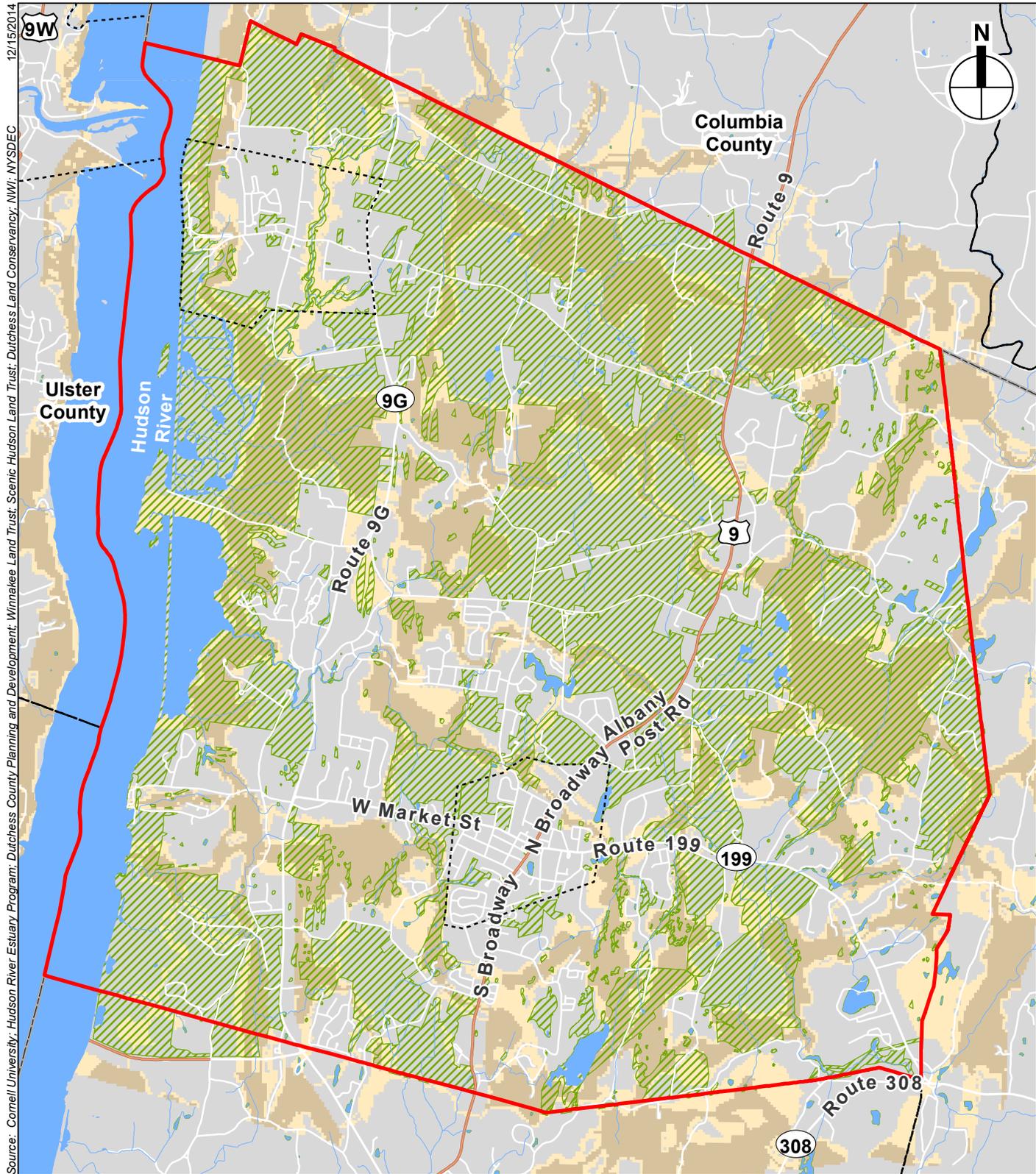


Habitat Integrity-Based Linkages

- High Priority
- Low Priority

Publicly Owned Land





Habitat Integrity-Based Linkages

- High Priority
- Low Priority

Protected Lands



Note: Includes publicly owned land, land subject to conservation easement, wetlands, waterbodies, and steep slopes, cemeteries, ROW for Central Hudson, and parcels within the AB or WC zoning district in the Town, and parcels within the LC zoning districts in the Villages.

that the Town and Villages have a significant portion of their critical linkages already subject to some measure of protection (see Figure 11).

CONSERVATION FRAMEWORK

Although the Town of Red Hook has undertaken significant planning efforts that have resulted in the conservation of large areas of agricultural land and greenspaces, the Cornell mapping tool, together with the analysis presented above, reveals that additional work could be undertaken to more concertedly preserve intact connected natural areas. Some of this work involves making minor amendments to the Zoning Law or designating additional resources that would be governed by the existing regulations. A list of short-, medium-, and long-range action items for the Town of Red Hook to consider is presented in Table 1.

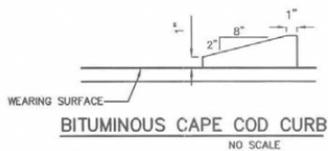
Two of the objectives of this pilot project were to assess the relative vulnerabilities of important habitat connections and prioritize those in need of greatest conservation action, and develop specific parcel-level recommendations to achieve the conservation objectives. Given the timeframe provided for the pilot project, however, the stakeholder group was not able to drill down to the parcel level to prioritize specific parcels and to identify specific actions that would be appropriate to protect habitat connectivity for each parcel. The stakeholder group was not only wary of inflicting “regulation fatigue” on residents seeking to improve existing developed properties or home-builders seeking to develop previously approved lots, but also felt that a more deliberative process, such as a reprioritization of the Community Preservation Plan (see below), to identify relative vulnerabilities and priorities for preservation would require a longer period of time to accomplish. With additional time, it is likely that those objectives could be met and that integration of the habitat linkage model into community preservation plans and regulations could achieve community-wide and parcel-level protection.

The stakeholder group did identify several actions that could be implemented without extensive further analysis. The Town currently regulates “all development or other land alteration proposed within 100 feet of the normal streambank of any NYSDEC-classified stream within the Town of Red Hook . . . and within 100 feet of the boundary of a freshwater wetland as mapped by the NYSDEC or established by the Town of Red Hook” (Town of Red Hook Zoning Law § 143-30.A “Development Near Bodies of Water”). Any such development requires a special permit from the Planning Board, whose review of the application “shall include but not be limited to consideration of impact on the following factors: water recharge areas, water table levels, water pollution, aquatic and plant life, drainage patterns stormwater runoff, flooding, runoff, erosion control and essential vegetative growth” (§ 143-30.B). As demonstrated in the previous section, GIS can be used to determine whether regulation of the area within 100 feet of a NYSDEC-classified stream or wetland is sufficient to conserve the connected natural areas identified by the Cornell mapping. If it is insufficient, a Zoning amendment could increase the regulated area (for example, to 200 feet of the boundary of a stream etc.). Similarly, the list of factors that must be considered during Planning Board review could be amended to include a reference to “intact connected natural areas.”

On the other hand, regulated areas could also be broadened simply through designation. For example, the Town has not yet identified any freshwater wetlands to which §143-30.A would apply (such as through creation of a Town wetland map). Locally designating freshwater

Table 1: Recommended Tools to Conserve and Restore Ecological Connectivity, Town of Red Hook

Short-Term Actions:
Map areas of concern and designate them as “Critical Environmental Areas” (CEA) pursuant to SEQR 617.14
Mid-Term Actions:
Amend Zoning Law:
Review requirements for Development near Bodies of Water (§143-30)
Review requirements for Stream Corridors (§143-47D(1))
Review purposes and criteria for mandating Conservation Subdivisions (§143-33)
Review AB District siting standards for residential development (§143-39.1G)
Amend Subdivision Regulations:
Review Resource Analysis Map (§120-23)
Review Supplemental Plat requirements for Conservation Subdivision (§120-28)
Review Community Preservation Program Plan (e.g., to see if parcels in the northeast section of the Town should have a higher ranking for preservation since they are in a local and regional connectivity area)
Long-Term and Ongoing Actions:
Work with Bard College and Hudsonia to conduct habitat studies of significant areas identified by mapping
Adopt a Biodiversity Overlay District with thresholds for requiring a habitat assessment for new development
Maintain a database of habitat assessments and wetlands delineations prepared for development projects and conservation easements
Increase public/agency awareness of ecological connectivity when reviewing potential development impacts
Adopt a Forestry Management Plan, amend the Town’s Timber Harvesting provisions, and encourage Planning Board awareness to prevent fragmenting the three large forested areas identified in Open Space Plan
Use mapping to prioritize “pinch points” that should be restored to increase ecological connectivity
Use mapping to identify areas where mitigation strategies (e.g. Cape Code style curbing, amphibian under-passes) should be used for new roads and highway improvements



Studies have shown that Cape Cod style curbing, with its gently sloping surface, allows amphibians a safer passage to and from breeding sites.

wetlands (such as NWI wetlands and vernal pools) by the Town Board would implement this section of the Zoning Law more broadly without the need for a Zoning amendment. Similarly, in §143-47.D(1) of the Zoning Law (“Stream Corridors”), identification of “other streams and tributaries as may be subsequently designated by the Town Board upon recommendation of the Conservation Advisory Council” would have the same effect.

As discussed previously, the Red Hook Town Code includes provisions for conservation subdivision, in both the Zoning Law and the Subdivision Regulations. The purposes of a conservation subdivision in § 143-33.A of the Zoning Law could be reviewed to ensure that preservation of connected natural areas has been adequately covered. This chapter of the Code permits the Planning Board to mandate conservation subdivision under certain circumstances, such as when a project is located within or contiguous to a Critical Environmental Area (CEA) designated pursuant to Article 8 of the Environmental Conservation Law. The Town of Red Hook does not currently include any CEAs within its boundaries. But as with the local designation of wetlands and streams, adoption of a CEA in the Town would permit broader Planning Board authority to mandate conservation subdivision to preserve the natural resources identified in the CEA, without the need for a Zoning amendment. The Planning Board could also request or require conservation subdivision in connectivity areas such that development is sited away from the important connections and is managed properly.

In discussions with stakeholders during the Red Hook pilot project, the creation of a CEA to protect intact connected natural areas was met with the greatest interest of all the recommended tools. The Town has undertaken such extensive amendments to its Zoning and Subdivision Regulations in recent years that some stakeholders expressed a concern about “Zoning fatigue.” Creation of a CEA is a relatively straightforward process that can be undertaken by a local agency, as defined under SEQRA, such as the Town Board or the Planning Board. In this case, the CEA could include all of the areas mapped as connected habitat by the Cornell GIS model. Alternatively, it could be limited to areas that might not adequately fall under protection of the Town Code, such as the three large intact forested areas that have been identified in the Open Space Plan. The connected natural areas identified by the Cornell model would certainly meet the criteria for “an inherent ecological, geological or hydrological sensitivity to change that may be adversely affected by any change” that would merit designation as a CEA. Following designation, the potential impact of any Type I or Unlisted action on the environmental characteristics of the CEA would be a relevant area of environmental concern that must be evaluated in the determination of significance under SEQR. The ongoing intermunicipal cooperation between the Town of Red Hook and its two Villages would be helpful in adopting a CEA to protect natural resources that crossed municipal boundaries.

It should be mentioned that a review of the Community Preservation Plan (CPP) would be warranted based on the information provided by the Cornell model. The Town is required to review the CPP every five years to determine if parcels identified for preservation should be re-prioritized based on new information. Certainly, the mapping of intact connected natural areas constitutes new information that should be considered in the evaluation of significant lands to conserve. Interestingly, one of the three large intact forested areas identified in the Open Space Plan is located in the northeast corner of the Town (near the Red Hook/Milan border); yet many of the parcels in this area were either given a relatively low priority in the CPP, or were not

identified for protection (see Figure 6). The new information provided by the Cornell model would warrant a re- evaluation of lands in this area.

Perhaps the biggest challenge Red Hook will face in its continuing evolution to create a livable community in the 21st century will be to balance the goal to protect habitat resiliency with the goal to protect agricultural resources. In some areas of the community, these goals may conflict. Perhaps all connected natural areas cannot be protected, any more than all agricultural lands can be. For example, the stakeholder group felt that further regulation of sensitive habitat at the parcel level for single-family residential use on pre-existing lots would not be supported by the community. Thus, gaps in protection may likely exist. Therefore, prioritizing areas of significance for these different resource values may be necessary and may frame the discussion for future planning efforts.

In many instances, the Town may see a benefit in reaching out to a local or regional land trust or private property owner for assistance in identifying critical landscapes or ecological resources for protection and opportunities for landscape preservation through conservation easements or stewardship programs. Implementing a broad-based conservation program often requires the participation of multiple players and is not always best accomplished through a regulatory approach only. Partnerships between the community and property owners and not-for-profit organizations can be an essential element in a community-wide conservation framework.