APPENDIX E: BIODIVERSITY ASSESSMENT OVERVIEW

In 2001, the New York State Department of Environmental Conservation (DEC) published the *Biodiversity Assessment Manual for the Hudson River Estuary Corridor* (2001) by Erik Kiviat and Gretchen Stevens of Hudsonia Ltd. The manual profiles 38 ecologically significant habitat types of New York's Hudson Valley, including tidal and non-tidal wetlands and uplands; discusses the plants and animals of conservation concern each habitat may support; and provides recommendations for protecting the biodiversity values of those habitats. The manual also provides an approach for using existing map resources and air photos to predict the locations of ecologically significant habitat in the Hudson River estuary watershed. This method is described in greater detail in the *Biodiversity Assessment Guidebook* (Heady and Stevens 2011).

The biodiversity assessment method was designed for use by community volunteers, such as members of conservation advisory councils (CAC) and planning boards, as well as professional biologists and planners working in the region. Assessment involves use of readily-available data sources to identify potential locations of habitats. Map information such as soil drainage, bedrock chemistry, wetlands, and slope is paired with air photo signatures to identify habitats such as upland forest, wet clay meadow, intermittent stream, tidal marsh, and carbonate crest. Use of Geographic Information Systems (GIS) can enhance the process but is not necessary. Finally, site visits are recommended to verify habitat predictions and refine the habitat map.

Volunteers display completed habitat maps. © M. Taylor

Since 2002, hundreds of municipal officials, land trust staff, planners, and community volunteers have completed training in biodiversity assessment through a partnership with Hudsonia and the DEC Hudson River Estuary Program. Many participants have used the approach to pursue habitat mapping projects and to advance conservation practices in their community.

The biodiversity assessment project process involves the following steps:

© L. Heady

Form a team. It is recommended to include both municipal officials and community volunteers in the assessment team. A good-sized group has about 7 to 10 members, but the most important factor is finding members willing to make a time commitment to learning the techniques and applying them to the study area and municipal planning.

Identify a study area. The size of the study area will depend on the capacity of the group, but a goal of several thousand acres is a good start. Criteria for selecting a study area may include potential threats, conservation opportunities, important resources, or lack of information. The area can include both public and private lands.

Gather materials. Once a study area is selected, it is recommended that the group first gather existing information about the study area, such as local biological surveys or environmental review documents. Next, the group will need to acquire the resources necessary to conduct map and air photo analysis. These include bedrock geology maps, topographic maps, county soil surveys, wetland maps, stereoscopic aerial photos, and digital orthoimagery. Many of the resources gathered for the municipal NRI will be valuable for this process. See Appendix C for sources of GIS data and Appendix D for how to obtain commonly used paper maps and aerial photos.

Analyze the information. There are properties of maps and air photos that are particularly useful to biodiversity assessment, and combinations of signatures that are indicative of particular habitats. The manual and guidebook both provide guidance on map analysis, and the Hudson River Estuary Program and Hudsonia offer periodic trainings and short courses for hands-on learning of these skills. The process involves compiling information for the study area and then sketching out where several predictors of habitats occur. For example:

> *Topographic maps* can be used to identify steep slopes with potential for rocky habitats and intermittent streams, and find low-lying or level areas where wetlands may occur or knoll-and-basin terrain where vernal pools may be located.
>
> *Soils maps* can be used to characterize the drainage, chemistry, and depth to bedrock in the study area, which can help to predict the occurrence of wetlands, rocky habitats, and pH-dependent habitat types.
>
> *Air photos* can be used to inform the map-based habitat predictions by looking at vegetation type, wetland signatures, and land use.

Using a base map such as orthoimagery or a topographic map and reviewing the other maps, the group can analyze overlapping resources and draw boundaries to indicate where particular habitats may occur. Groups with GIS capacity can digitize the habitat boundaries onto a suitable base map.

Field verify. Once habitat predictions have been sketched or digitized, field visits will help to confirm the habitat type. For example, although there are several map signatures that can help to predict the location of vernal pools, a site visit is needed to look at and verify the wetland. Similarly, map analysis may suggest the location of a wet meadow, but a site visit to look at plants will determine whether it is a wet clay meadow or calcareous wet meadow. Conducting field verifications requires contact with landowners to get permission to access private lands. Local land trusts may be helpful as they often have good working relationships with landowners. Where permission is not granted, sometimes a visual survey from the road or adjacent lands may help confirm habitat types.

Finalize the map and documentation. After revising the draft habitat map based on field work, the group should be on its way to having a habitat map that can be added to the NRI and used for environmental reviews, municipal planning, and education. The map will be most useful if it's digitized and able to be used in GIS (see Figure E-1). Habitats on the map should be labeled and the map should include a title, scale bar, north arrow, legend, and a disclaimer that clearly states the appropriate uses of the habitat map and limitations for site-level planning given the scale and predictive nature of the habitat mapping.

Communities that have undertaken a biodiversity assessment project have been successful in implementing follow-up conservation actions, including expanding the study area to new parts of their community, creating habitat assessment protocols for planning board reviews, and incorporating their habitat maps into a municipal NRI (see Appendix J).

Helpful resources:

Heady, L. and G. Stevens. 2011. Guidebook for Biodiversity Assessment: A Companion to the Biodiversity Assessment Manual for the Hudson River Estuary Corridor. Hudsonia Ltd., Annandale, NY. 86 pp.

Kiviat, E. and G. Stevens. 2001. Biodiversity Assessment Manual for the Hudson River Estuary Corridor. NYS Department of Environmental Conservation, Albany, NY. 507 pp.

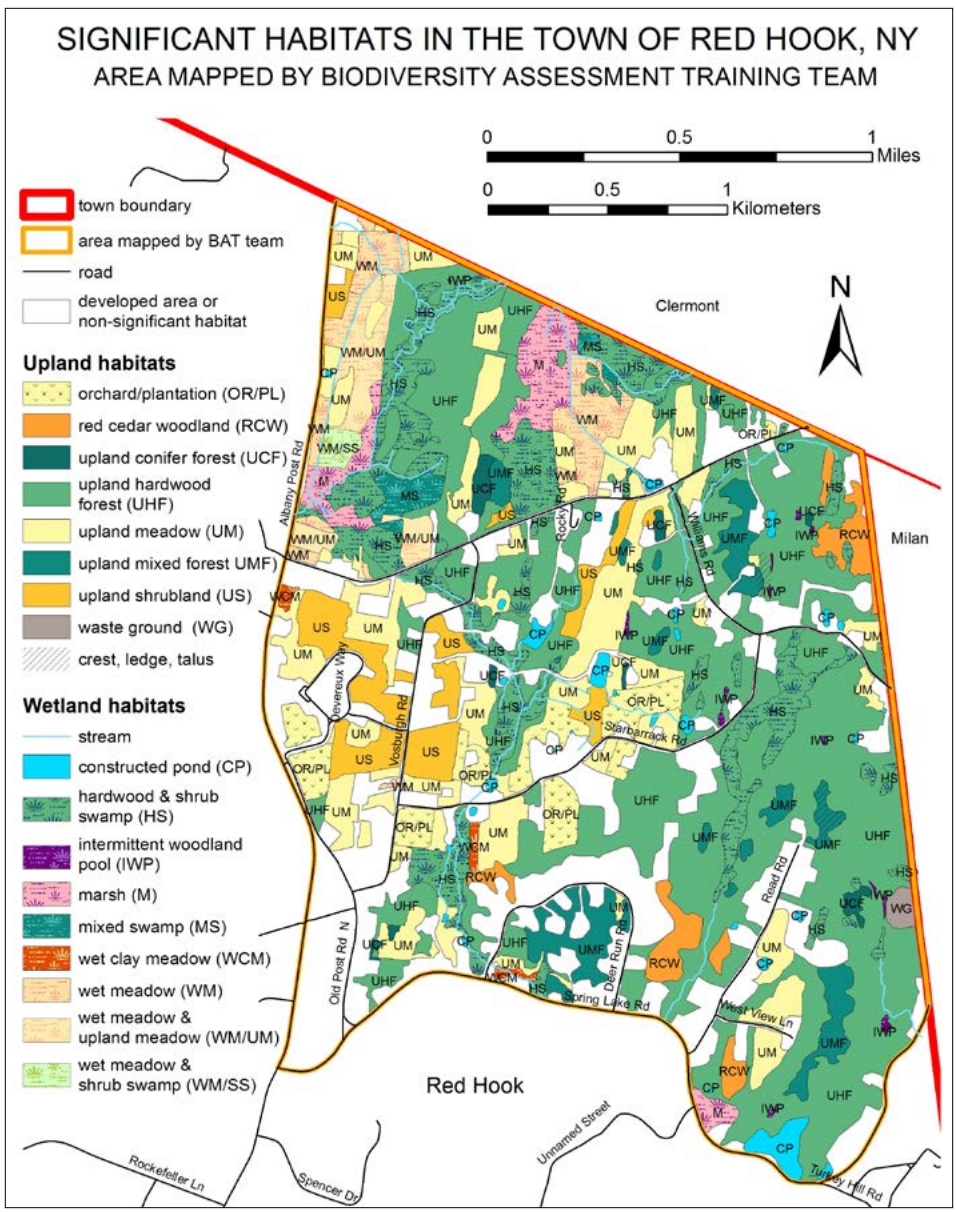

Figure E-1: Example of a habitat map created by a volunteer biodiversity assessment team and digitized for use in GIS.