2.8 Land Use/Land Cover

Land use and land cover of a watershed have a great influence on water quality and stream stability. The watershed's land cover directly impacts stream hydrology by influencing the amount of stormwater runoff. Forests, natural meadows and wetlands naturally absorb rainwater, allowing a portion of it to percolate back into the ground. However, impervious surfaces such as pavement, parking lots, driveways, hard-packed dirt roads and rooftops increase the amount of rainfall that flows over land and reduces the amount of rainfall that percolates into the soil to recharge groundwater wells and streams.

Impervious cover is a major influence on streams and stream life due to the way it changes the amount and duration of stormwater that gets to the stream. Generally, the more impervious surface there is in a watershed, the less groundwater recharge (which supplies summer low flows), and the greater the magnitude of storm flows (and related erosion in streambeds). In addition to degrading streams, watersheds with a high percentage of impervious surfaces are prone to larger and more frequent floods, which cause property damage through inundation, as well as ecological harm resulting from lower base stream flows.

The literature has documented the deleterious effects impervious surfaces have on biota (Limburg and Schmidt, 1990; May et al., 2000; Wang et al., 2001; Roy et al., 2005), stream stability (Booth, 1990; CWP, 1998; White and Greer, 2005; Wohl, 2005) and instream water quality (Groffman et al., 2004 and Deacon et al., 2005). For example, impervious surfaces can raise the temperature of stormwater runoff, which in turn reduces the waters ability to hold dissolved oxygen and harms some game fish populations, while promoting excess algal growth. Field observation, research and hydrologic modeling suggest a threshold of 10% impervious surface in a watershed, after which there is marked transition to degraded stream conditions (CWP, 1998 and Booth, 2000).

Certain types of pollution problems are often associated with particular land uses, such as sedimentation from construction activities. There has been a vast array of research demonstrating that as land uses become more urbanized (built), biotic communities decline in health (Limburg and Schmidt, 1990; Schueler and Holland, 2000; May et al., 2000; Wang et al., 2001 and Potter et al. 2005). Concentrations of selected chemical constituents, including

nitrate, in stream base-flow were strongly affected by the predominant land use in a large Hudson Valley study (Heisig, 2000). The decline of watershed forest cover below 65% percent marked a transition to degraded water quality (Booth, 2000). Based upon these results, land use/cover appears to be attractive attributes for long-term trend tracking. These results can then be correlated with in-stream water quality data and then used to focus best management practices towards the land uses with the greatest impact on water quality.

Land cover of the Manor Kill Watershed was analyzed using the LANDSAT ETM geographic information system (GIS) coverage (provided by the National Land Use Cover Data). To simplify the data, the 47 classifications assigned to the different types of land cover have been re-classified and grouped together under more general land cover categories. The chart below illustrates the categories and percentages of the different land cover types present in the Manor Kill watershed.

Table 2.8.1. Land Cover of Manor Kill Watershed

Land Cover Category	**Acres**	**Percentage**
Agriculture	175	.79%
Barren Land	2	.01%
Development	675	3%
Forested	17,642	80%
Herbaceous	159	.7%
Managed Herbaceous	2,265	10%
Open Water	37	.16%
Shrubland	35	.15%
Wetlands	1,082	5%
Total	22,072	100%

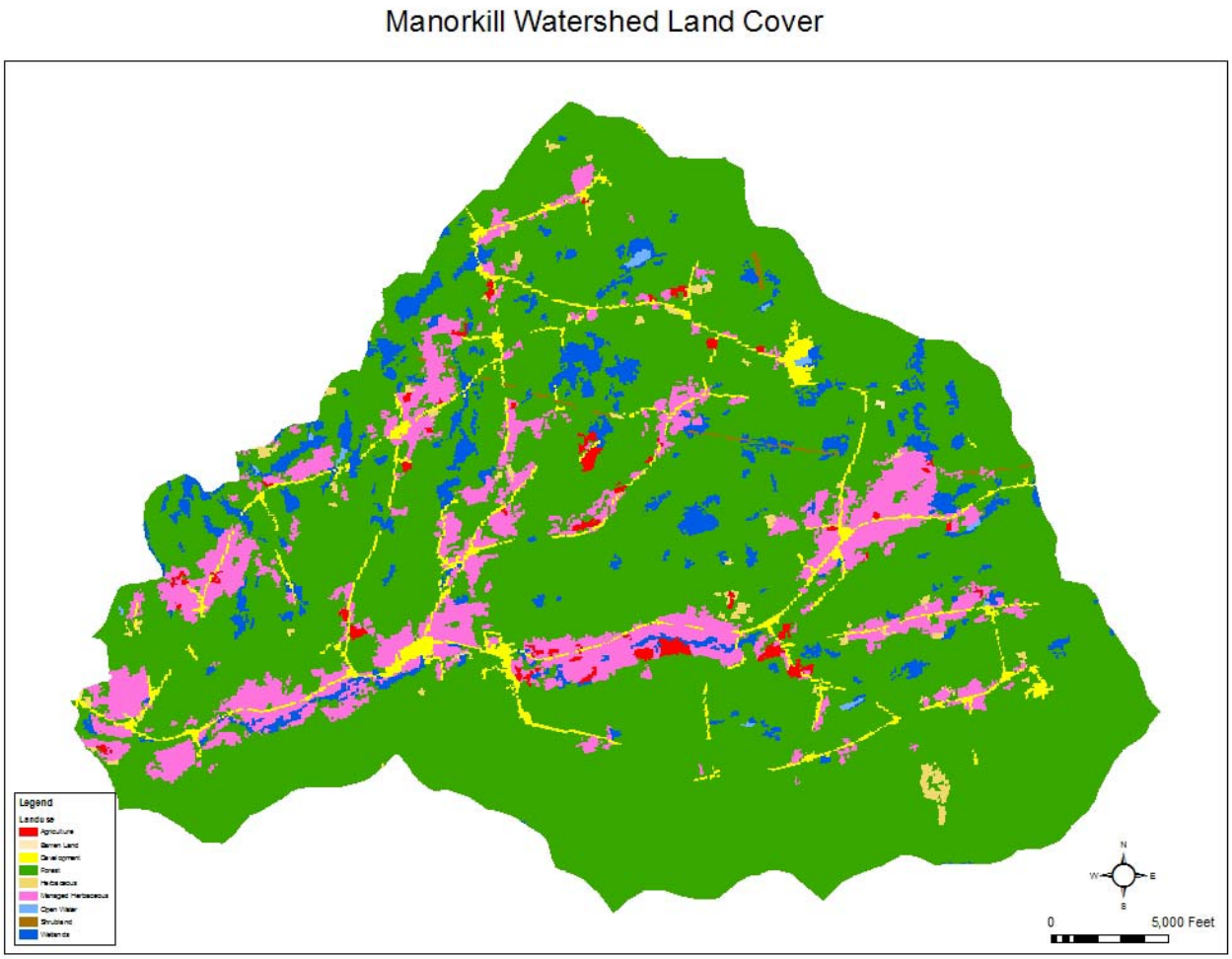

Figure 2.8.1. Land Cover of the Manor Kill Watershed 2001(NLCD).

The Manor Kill Watershed is predominately forested, with deciduous, coniferous and mixed forest comprising 80% of the total land area. Agriculture and cultivated herbaceous land cover coincides with farming activity—a predominant, yet declining land use in the watershed. Farming activities, primarily hay fields and small dairy operations are concentrated along the stream valleys. Along the Manor Kill, open pastures run adjacent to the stream for several miles.

Similar to agriculture, development is concentrated along the stream valleys. Along the Manor Kill there are three more densely built hamlets and lower-density residential scattered the length of the stream. Large expanses of mowed lawn were typical of the residential growth along the stream. Throughout the rest of the watershed, low-density, rural residential is the predominant development pattern.

With minimal development pressure, the small, natural resource-based economy of the area dictates much of the land use in the watershed. In additional to agriculture, logging is a common practice in the Manor Kill. There are several active and gravel mines, some located adjacent to the stream; and numerous in-active waste ground sites.

Protected Lands

Although outside of the Catskill Park, significant tracts of land in the Town of Conesville, particularly along the southern and eastern boundaries of the Manor Kill basin, are protected under public ownership. To determine the percentage of parcels within the Manor Kill basin that were protected, ownership and property use classifications as documented on records of the Schoharie County Real Property Tax Service Department, were analyzed.

In 2008, 13% of the lands in the Manor Kill watershed were protected as Forested, Conservation Lands. Of these, 10% was owned by New York State; 2.8% was owned by New York City; and .5% was owned by Schoharie County.

Table 2.8.2. Acreage and Percentage of Protected Land within the Manor Kill Watershed

Owner	**Acres**	**Percent**
City of New York	610	2.8%
Schoharie County	117	.5%
New York State Forest Lands	2,232	10%

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