2.8 Land Cover/Land Use

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 in-stream 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 appear 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.

In this section, land cover and land use data were analyzed for both the Schoharie Creek Main Stem Watershed and the Schoharie Creek Basin (Figure 2.8.1). As defined by the U.S. Geological Survey, a *drainage basin* is the land area where precipitation runs off into, and is drained by, a river, stream, lake or reservoir. Large drainage basins, such as the Schoharie Creek Basin, contain multiple smaller drainage basins also known as *watersheds*. Within the Schoharie Creek Basin, there are several watersheds including the Schoharie Creek Main Stem Watershed.

Land cover of the Schoharie Creek Main Stem Watershed and overall Schoharie Creek Basin was analyzed using the LANDSAT ETM 2001 geographic information system (GIS) coverage created by the New York City Department of Environmental Protection (DEP) (Figure 2.8.1). The categories are comprised of 47 different classification descriptions. To simplify the categories, land cover classifications have been grouped together and re-classified to convey the general land cover category that each classification falls under. For example, the classification descriptions of central business district, residential, and industrial, among others, have been combined and re-classified as development. Approximately 85% of the Schoharie Creek main stem watershed (Table 2.8.1; Figure 2.8.2) and 86% of the Schoharie Creek Basin (Table 2.8.2; Figure 2.8.3) was covered by coniferous, deciduous, or mixed forest, while development covered approximately 3.5% and 3.0% respectively. Proper land use planning

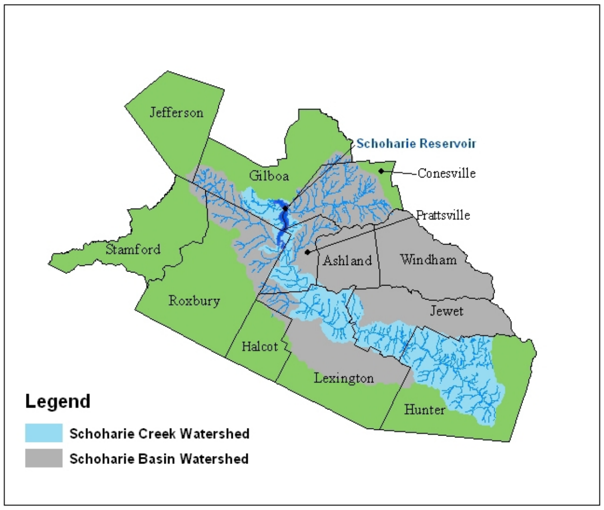

Figure 2.8.1. Schoharie Creek Main Stem Watershed (blue) and the Schoharie Basin Watershed (gray)

to direct development into priority areas while preserving sensitive areas should be utilized to limit the impact of future development and subsequent increases in impervious surfaces.

Table 2.8.1. 2001 Land Cover of Schoharie Creek Main Stem Watershed

Land Cover Category	Acres	Percent Cover
Agriculture	840.91	1.41%
Development	2075.54	3.47%
Dumps	23.85	0.04%
Exposed Soil	1.00	0.00%
Forest	50584.37	84.64%
Herbaceous	944.16	1.58%
Managed Herbaceous	888.19	1.48%
Mined Lands	35.58	0.06%
Shrubland	1865.86	3.12%
Water	1340.89	2.24%
Wetland	1163.81	1.95%
Total	59,764.16	100%

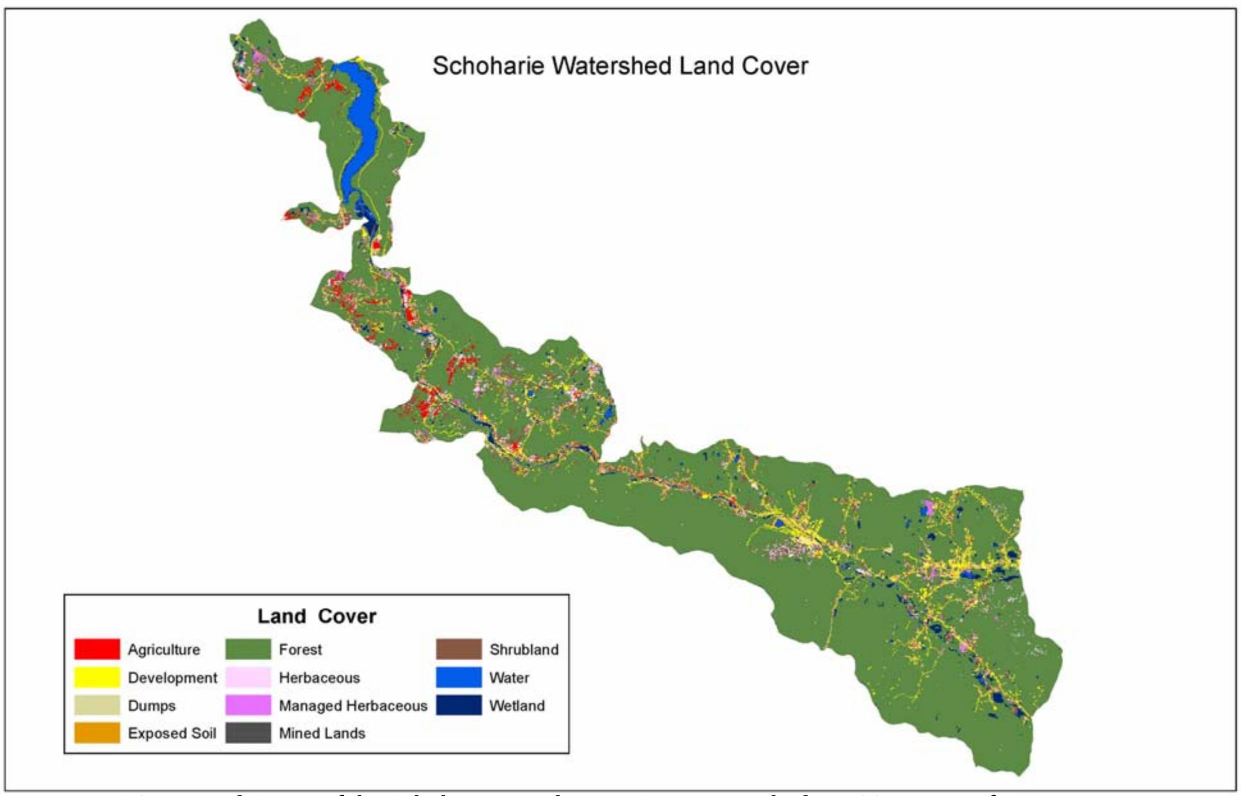

Figure 2.8.2. Land Cover of the Schoharie Creek Main Stem Watershed in 2001. Large format map is available in the back pocket of this plan.

Table 2.8.2. 2001 Land Cover of Schoharie Creek Basin		
Land Cover Category	**Acres**	**Percent Cover**
Agriculture	4432.24	2.20%
Development	5947.97	2.94%
Dumps	39.49	0.02%
Exposed Soil	38.87	0.02%
Forest	172079.21	85.57%
Herbaceous	4160.20	2.07%
Managed Herbaceous	3417.75	1.70%
Mined Lands	53.62	0.03%
Shrubland	6920.65	3.44%
Water	1658.79	0.83%
Wetland	3294.82	1.64%
Total	202,043.61	100%

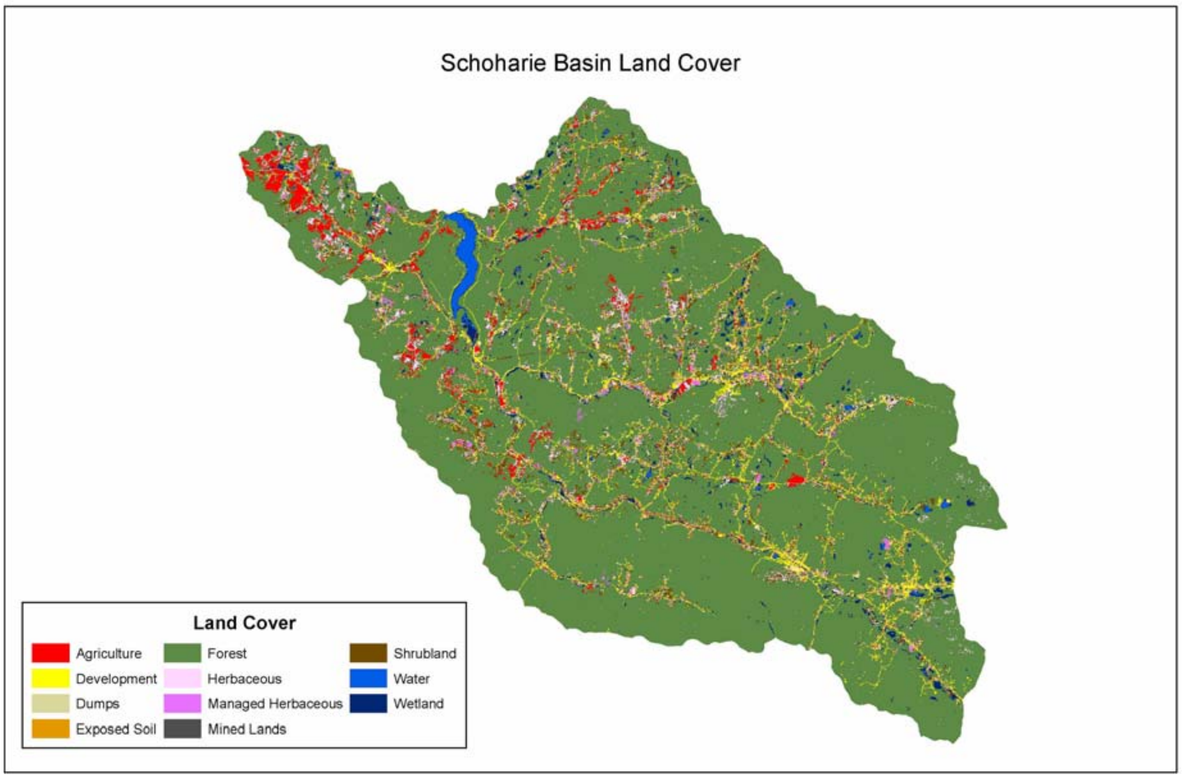

Figure 2.8.3. Land Cover of the Schoharie Creek Basin in 2001. Large format map is available in the back pocket of this plan.

Protected Lands

To determine the percentage of parcels within the Schoharie basin that were protected as Wild, Forested, Conservation Lands & Public Parks, the ownership and property use classifications as documented on records of the Greene, Schoharie and Delaware County

Real Property Tax Service Departments, were analyzed. In 2006, approximately 27% of the Schoharie Creek Main Stem Watershed lands and 24% of the Schoharie Creek Basin lands were protected as Wild, Forested, Conservation Lands & Public Parks. The primary owner of the protected lands was New York State with 57% of protected land at the Main-stem watershed scale and 74% at the basin-scale. Under current State laws, these lands owned by the State will remain undeveloped. In 2006, approximately 4.8% of land within the Watershed and Schoharie Basin was owned by New York City (Table 2.8.3).

Table 2.8.3. Acreage and percentage of protected lands within the Schoharie Creek Main Stem Watershed and Schoharie Creek Basin.

Property Use Class	**Schoharie Creek Main Stem Watershed**		**Schoharie Basin Watershed**	
	Acres	Percent	Acres	Percent
Wild, Forested, Conservation Lands & Public Parks	15,588	27%	49,557	24%
NYC Owned Land	2,829	4.83%	9,469	4.77%

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