

In addition to the larger recreational lakes just mentioned, the five following surface water bodies are used for potable water supply purposes. See **Map 4**.

- Morris Lake, in Sparta – used by Newton.
- Lake Rutherford, in Wantage – used by Sussex Borough.
- Branchville Reservoir, in Frankford – used by Branchville.
- Franklin Pond, in Franklin – used by Franklin as an emergency water supply.
- Lake Hopatcong - an emergency water supply for several towns.
- Canistear Reservoir, in Vernon – contained on the Newark water supply management lands.
- Heaters Pond, in Ogdensburg – an emergency water supply

## **Groundwater**

Groundwater is any precipitation that percolates into the soil. Groundwater recharge is water that moves as subsurface runoff to wetlands, springs, streams etc., or into water filled layers of porous geologic formations called aquifers. In New Jersey, aquifers might be a few feet below the surface of the Earth, or several hundred feet underground, depending on underlying geologic formations. The rate at which groundwater reaches an aquifer is influenced by natural features such as soil type and bedrock geology. Human influence also has an affect; impervious surfaces, for example, will change the way water flows or will prevent storm water from soaking directly into the ground to become groundwater.

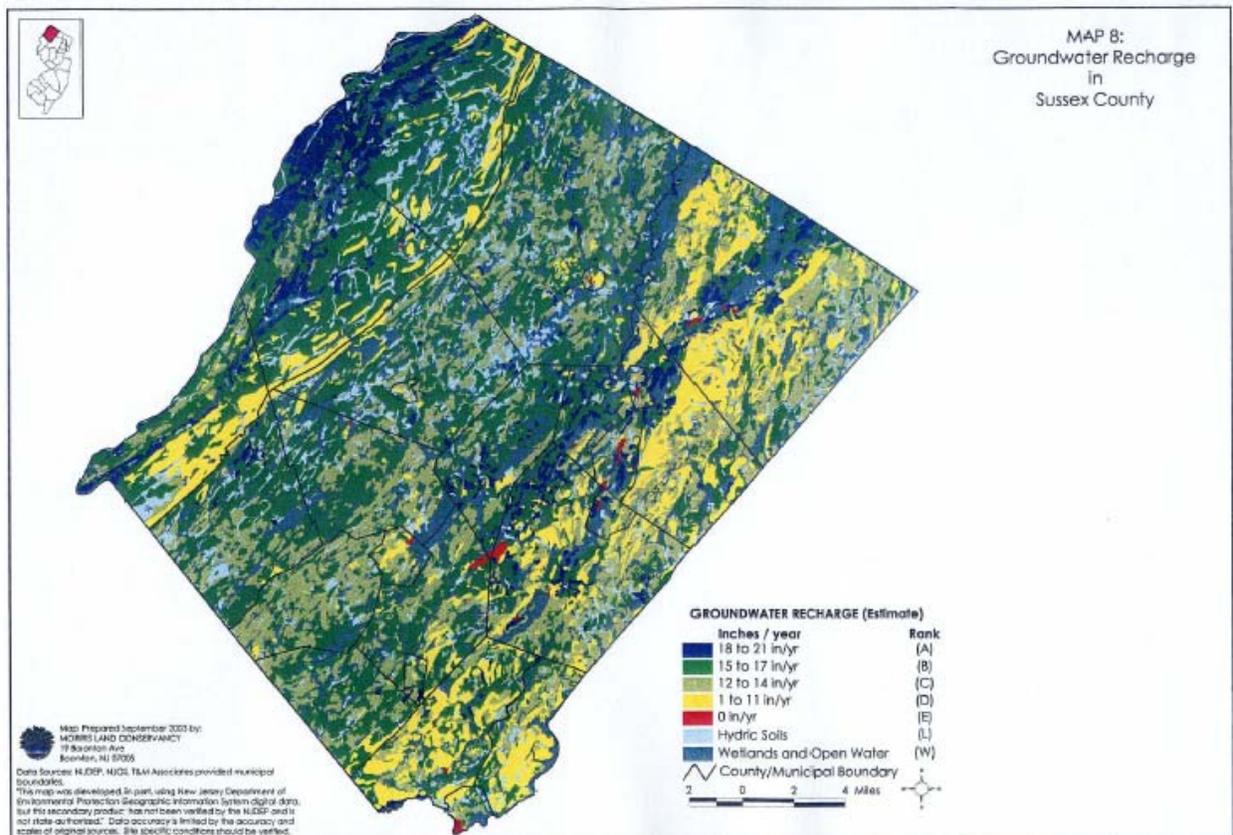
Approximately 95% of Sussex County residents rely on groundwater for consumption. Groundwater is pumped to County residents from aquifers through either private on-site wells, community wells, or municipal wells. The long-term sustainability of the county's groundwater supply will depend on safeguarding water quality and quantity by employing the proper land use practices in areas with high groundwater recharge and aquifer productivity. Safeguarding community and municipal well heads is also an important component of long-term sustainability.

### Groundwater Recharge

Groundwater recharge has been estimated by the New Jersey Geological Survey using 1995/97 Landuse/Landcover data, soils data, and local climatological data. This information was combined to generate an estimated groundwater recharge in inches per year, which was then converted to a ranking system of eight categories (A-E, L, W and X).

The highest estimated recharge occurs in two parallel belts through the county. See **Map 8: Groundwater Recharge in Sussex County**. The first runs northeasterly through the western margin of the county, in Walpack Valley and the Upper Delaware Valley. The largest areas of that belt are located in northwestern Sandyston and western Montague Townships. The second belt runs northeasterly through the east-central region of the county, along the base of Sparta, Hamburg and Wawayanda mountains. This belt is

generally located in the upper Wallkill Valley and Vernon Valley. The second tier of estimated groundwater recharge is located throughout the remainder of the county in isolated patches. Two notable concentrations, however, are in Stillwater and Hampton Townships, and in Sandyston and Montague Townships. The lowest estimated groundwater recharge occurs along the Kittatinny Ridge and in the Highlands, where soils have been scoured away by glacial activity, exposing numerous bedrock outcroppings.

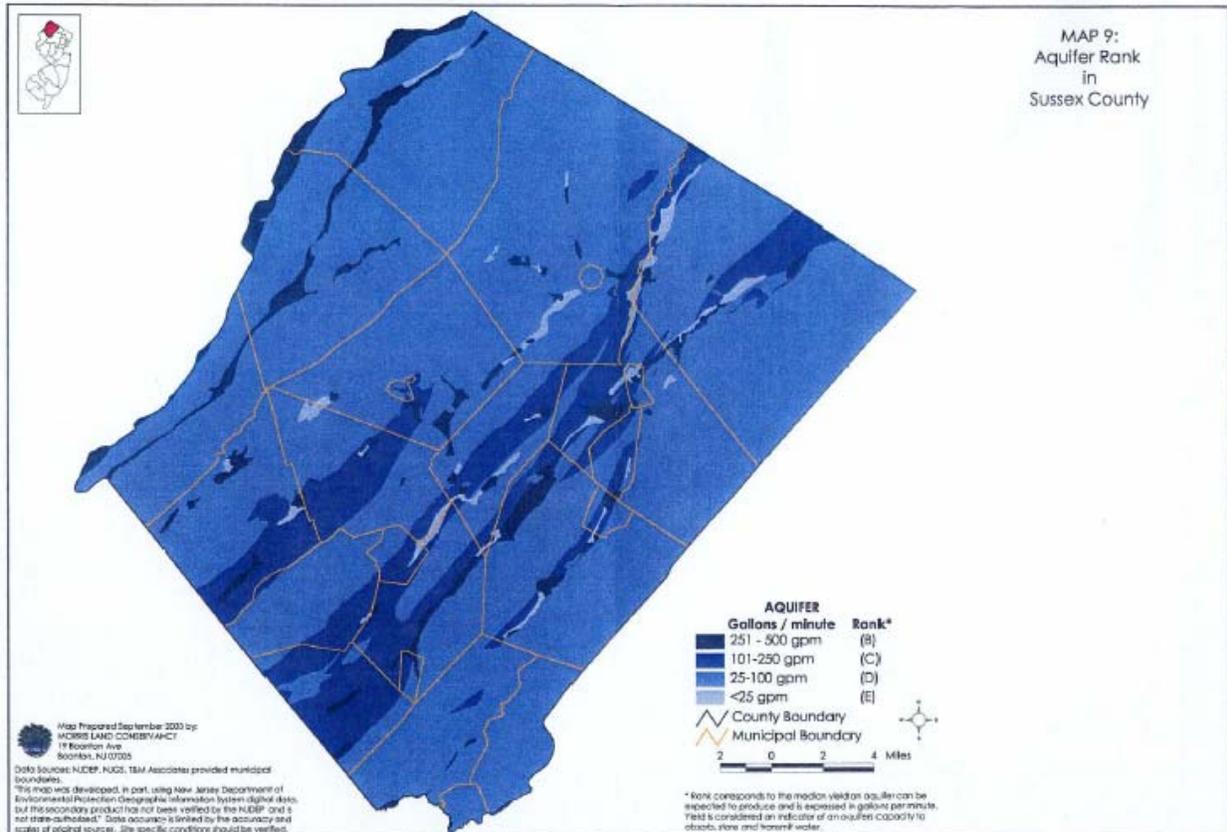


## Aquifer Rank

The New Jersey Geological Survey ranks aquifers by their ability to yield groundwater to high capacity wells. This rank corresponds to the median yield an aquifer can be expected to produce and is expressed in gallons per minute. The yield of an aquifer is also taken as a reliable indicator of the aquifer's ability to absorb, store and transmit water. Aquifer rank is broken into five categories (A through E) corresponding to a range of gallons per minute. There is no aquifer in Sussex County in the A range. Thus in Sussex County aquifers are ranked B through E; Sussex County's highest-ranking aquifers are not commensurate with the highest ranking aquifers statewide.

As with groundwater recharge, the areas of highest aquifer rank also include parts of the Walpack Valley, Upper Delaware Valley, Wallkill Valley and Vernon Valley. Several areas throughout the Kittatinny Valley contain the highest rank as well. Two belts of the

second tier of aquifer rank in Sussex County run through eastern Stillwater, central Hampton and Frankford Townships, and along the base of Allamuchy, Sparta, Hamburg and Wawayanda mountains, becoming smaller and more discontinuous in the northern part of the county. Part of the latter belt is interwoven with areas of highest aquifer yield. The vast majority of the remainder of the county contains the third level of aquifer rank. See **Map 9: Aquifer Rank in Sussex County**.



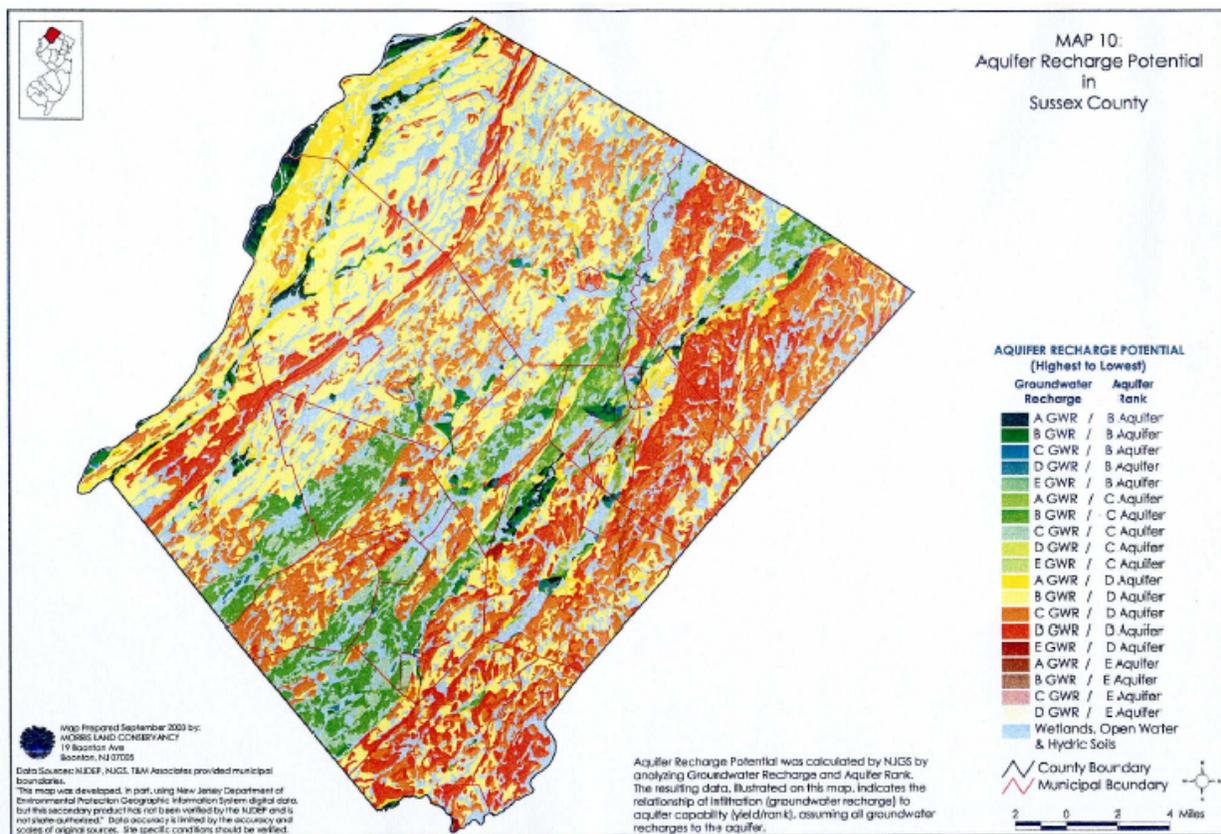
### Potential Aquifer Recharge

Although groundwater recharge data is a good indicator of rates of infiltration, it does not necessarily represent areas where precipitation will percolate to an aquifer. However, by combining groundwater recharge data with aquifer rank data, the relative value of potential aquifer recharge areas can be delineated. The logic of this model is that the greatest potential for aquifer recharge is likely to be located where a high amount of groundwater recharge occurs, and also where aquifer rank (yield) is high. One important assumption of this model however, is that all groundwater reaches the underlying aquifer, when in fact some will discharge as subsurface runoff to streams, wetlands etc.

No absolute numbers are provided for potential aquifer rank; rather the data is depicted as areas where groundwater recharge ranks (A-E, L, W and X) intersect with aquifer ranks (B-E). This produces 19 relative values for potential aquifer recharge in Sussex County (There are not 20 because there is no area overlap of the E groundwater recharge and E aquifer rank).

The highest potential aquifer recharge areas are located along the Delaware River, and along the run of the Big and Little Flat Brook, extending north into Montague Township. Western Sparta and western Hardyston Townships also contain the highest potential aquifer recharge. Several small, isolated patches in the central valley round out the highest areas of potential aquifer recharge.

Two large belts, which correspond almost exactly with the aquifer rank data, provide a second tier of potential aquifer recharge. One belt runs northeast through eastern Stillwater, central Hampton and southern Frankford Townships; another runs along the base of Allamuchy, Sparta, Hamburg and Wawayanda Mountains, becoming patchy and discontinuous towards the northern end of the county. See **Map 10: Aquifer Recharge Potential in Sussex County**.



## Land Use

The New Jersey Department of Environmental Protection has developed a Geographic Information System (GIS) data layer called 1995/97 Landuse/Landcover. This layer was created from the analysis and interpretation of color infrared (CIR) imagery from 1995/97 and contains detailed information regarding vegetation type and land use in New Jersey. At present this GIS data layer is the most accurate and up-to-date source for land use/land cover information in New Jersey. **Maps 11, 13, 15 and 17**, as well as the