

# The Ground Water Sentinel

Passaic Valley Ground Water Protection Committee ~ Volume II, Issue 2 - July 2003

## Costs of Mixed Use of Ground and Surface Water Supplies

More and more municipalities dependent on ground water are considering importing surface water in order to supplement the water being pumped from wells. Many communities which have used the same pipes to deliver surface water and ground water from different sources have had problems occur. The types of problems depend on “the relative chemistry of the two waters” to be mixed, and on how the water delivery systems have been maintained.<sup>1</sup> Some of the costs associated with problems which may occur are described below.

- ◆ The rates for surface water are usually higher than those charged for well water from the ground because storing and treating surface water is more costly.
- ◆ Ground water often contains levels of calcium, iron, and manganese that gradually coat the water delivery pipes. Surface water is usually more acidic than the ground water. It may dissolve and slough off solids coating these pipes. This could lead to discolored water coming out of faucets, and may stain clothing in washing machines.
- ◆ If the surface water coming through the pipes is more acidic than the ground water, leaching of manganese or lead from the pipes will increase and contaminant levels may get so high that safe drinking water levels are exceeded. The costs of remedying this situation on a case by case basis would be high. One solution might be to replace the water delivery pipes throughout the town.
- ◆ Surface water and ground water differ. When the source of a water supply changes, the taste, color, and odor of the water coming out of taps changes. Such changes lead to complaints from water users, which can erode public confidence, even if the water is safe to drink.
- ◆ Surface water often contains more organic matter than ground water. This organic matter combines



with disinfectants, such as chlorine, to form disinfection byproducts. Some disinfection byproducts may cause cancer. If these disinfection byproducts increase to unacceptable levels, correcting this problem would increase treatment costs.

- ◆ Taking surface water will increase the demand for water from this source, which may already be over used in the Passaic River Basin. Considerable controversy could occur over water between those who have prior rights to the water and the municipality looking for an additional water source. This situation would surely raise rates and may incur legal costs.
- ◆ The watershed that supplies water to the surface water supply is probably the same watershed that replenishes the ground water pumped from the wells that the municipality is now using. The amount of water that can be stored in the ground or in the surface water bodies and used later is limited by rainfall and land usage in a watershed. The state mandated limit on pumpage is designed to protect the rights to water for all people in the Passaic River Basin. If more water is to be used, then new water supplies, whether from the ground or surface water supplies, would have to be drawn from sources well beyond the Passaic River Basin. This would raise costs and user rates.

Surface water and ground water are good water supplies in separate systems, but alternating the use of ground water and surface water in the same delivery system can cause costly problems for a community. If a municipality, which is dependent on ground water, has overextended itself, it should initiate an aggressive program of water conservation.

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<sup>1</sup>Personal communication from Rick Karlin at the American Water Works Association Research Foundation in April 2003.

## Runoff Rules Recognize Recharge

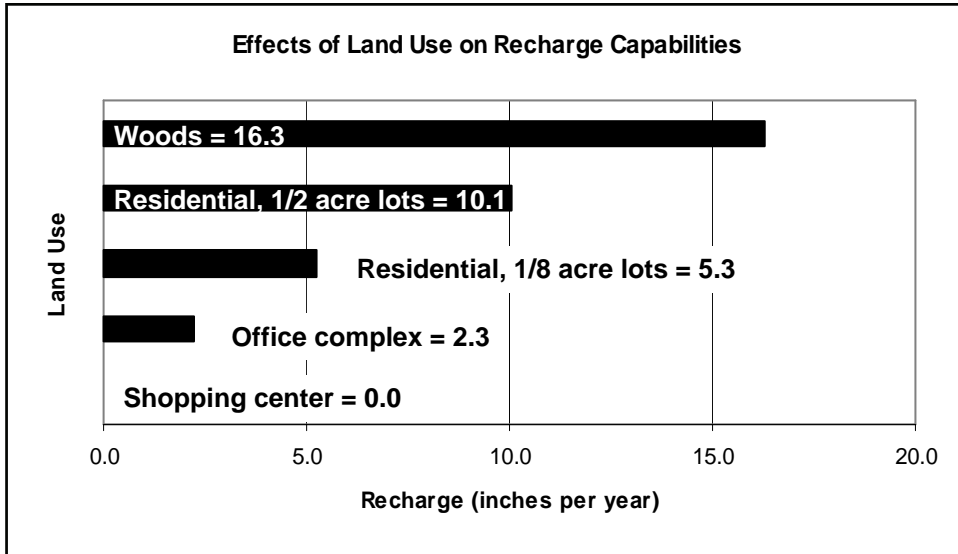
The New Jersey Department of Environmental Protection (NJDEP) is proposing new stormwater management rules, which recognize the impacts of land use on ground water recharge. These rules would "establish new runoff control performance standards for ground water recharge, water quality and water quantity." The rules proposed at N.J.A.C. 7:8-5.4.2 establish a new paradigm for the calculation of the amount of runoff that is allowed in a given storm. The old rules regulate the rate at which runoff can leave a site, but not the volume. This has led to increased flooding, decreased recharge and base flows, and decreased availability of both ground water and surface water for water supplies. The new rules would require that the recharge capability be maintained on a site on which land use changes are proposed.

Ground water recharge areas are land surfaces where the soil naturally allows rain water to seep down to the water table. Ground water recharge areas function best when the land surface and the ground below it is permeable, so water can seep into and move through the ground. Trees, bushes and grasses put down roots, and help to keep soil permeable. It is the combination of water permeable soils and vegetation that keep ground and surface water sources of drinking water clean and plentiful. When land is built upon, impervious surfaces, such as buildings, roads and parking lots, seal up the surface and prevent rain water from seeping into the ground.

People have developed the land in many different ways. Many of these changes in land use have added impervious surfaces, and decreased the permeability of soils. Now less water is soaking into the ground and recharging ground water than before the natural landscape was altered. This means that there is less water stored in the ground that can later be used for drinking water. The graph at left compares the amounts of water that recharge ground water in an average year on the same type of

soil (Haledon) with the same amount of rain and snow (Chatham Borough), but with different land uses.<sup>1</sup> Increasing ground water recharge is possible if rain is contained and storm water is directed into the ground, instead of being piped to a stream.

<sup>1</sup>Charles, E.G., C. Behroozi, J. Schooley, and J.L. Hoffman. 1993. A method for evaluating ground water recharge areas in New Jersey. New Jersey Geological Survey Report GSR-32. Division of Science and Research, New Jersey Department of Environmental Protection and Energy, Trenton, NJ.



### **Well Head Protection Presentations Available for Municipalities and Groups**

The PVGWPC will come to your Town Council, Planning Board and Environmental Commission meeting with an introductory talk and PowerPoint slideshow about the benefits of Well Head Protection. Presentations are geared specifically to your town's characteristics and well head protection delineations.

Call Louisa Lubiak at 908-766-7550 for more information and to schedule presentations.



A copy of the Model Municipal Well Head Protection Ordinance can be obtained On-line at [www.passaicriver.org](http://www.passaicriver.org), by calling Louisa Lubiak at 908-766-7550, or by sending an e-mail request to [l\\_lubiak@passaicriver.org](mailto:l_lubiak@passaicriver.org).