

# Why small wetlands matter

By William H. Schlesinger

Small wetlands—often less than ¼ acre—provide a number of “ecosystem services” that improve the quality of daily life and add value to property in Dutchess County.

The value of wetlands extends beyond those evenings in early spring, when a chorus of spring peepers makes the woods alive with the sound of their music. The value of wetlands extends beyond the wide eyes of a young child who has come upon a male wood duck in a secluded forest pond—wondering how anything could be so beautiful and brightly colored. These are one source of value of life in Dutchess County—why people want to live here.

But, beyond aesthetics and their intangible value, wetlands also provide real economic value to our landscape.

Dutchess County, including the Town of Washington, is extraordinarily dependent upon groundwater for human use; there are nearly 35,000 private wells in Dutchess County. Recharge of groundwater is a current and growing issue for this region, as warmer summer temperatures increase the rates of evaporation of soil moisture and reduce percolation of surface waters. Vernal and ephemeral ponds are extremely effective for transfer of water to groundwater, so their value to communities extends far beyond their actual location and area on the landscape. Buyers of property in which the wetlands have been destroyed may later find their water supplies limited and are likely to demand municipal water as a replacement—a real cost to all taxpayers.

These small ephemeral wetlands or vernal pools normally contain water only during the spring, largely derived from snowmelt runoff. These wetlands are important breeding grounds for amphibians, which control mosquitoes during the period when water is present. Moreover, small wetlands are important loci for the capture and infiltration of moisture from surface runoff, which might otherwise be lost, and are important areas for the bacterial cleansing of nitrogen in runoff, known as denitrification. These small depressions also capture the surface runoff from summer thundershowers, reducing the risk of flooding in downslope regions. It's not that larger wetlands do not also perform these tasks, but the natural array of smaller wetlands across the landscape enhances these important ecosystem properties that we all depend on.

Some have argued that protection should not extend to seasonal wetlands, since they are not easily recognized during dry periods. This is incorrect. Practicing soil scientists recognize distinctive horizons—known as diagnostic horizons—in the soils of these areas, classifying them as hydric soils. This is an official term used to classify wetlands. It is found in all modern texts of soil science, in the journal of the Soil Science Society of America, and on soil maps produced by the U.S. Department of Agriculture. Wetland soil delineation is described in detail by Faulkner et al. (1989) and Magonigal et al. (1993), and it is well accepted by all soil scientists.

Increasingly, ecologists are appreciating the role that soil bacteria play in the cleansing of surface waters, especially in natural wetlands. One group of bacteria, known as denitrifying bacteria, convert soluble nitrate in surface waters to harmless nitrogen gas, which is emitted to the atmosphere. Nitrate in surface water is derived from the excessive use of fertilizer and linked to a number of problems in human health. A network of vernal pools, essentially acting as a set of vernal dams, slows springtime runoff from the landscape, enhancing infiltration of water and denitrification by soil bacteria. In 1996, Cary Institute scientist, Peter Groffman and colleagues published data showing extremely high denitrification rates in vernal pools in Dutchess County.

Because the amphibians they harbor spend the drier months in the surrounding forest, these vernal wetlands need preservation in the context of the entire landscape. Studies by Baldwin et al. (2006) show upland summertime movements up to 300 meters (~900 feet) by frogs and salamanders breeding in ephemeral wetlands, indicating the ideal size of the appropriate buffer zone that should be maintained around these properties. Many species show limited immigration to new areas when their native breeding grounds are destroyed. Vasconcelos and Calhoun (2004) report that frogs are 90% faithful to their birth habitat. The buffer zones around wetlands are as important as the wetlands themselves.

We should not think that more stringent regulations to preserve small wetlands will simply hamper economic progress and rights of land developers in this region. Wetlands preservation offers many benefits to the future occupants of the county. You might suspect that vernal wetlands would harbor insect populations that carry West Nile virus and other disease to suburban inhabitants, but in a healthy vernal system, these insects are maintained at low levels by the amphibians that feed on them. Regulations that preserve small wetlands will also preserve habitat for a variety of species in the landscape; insects and small amphibians are the food for many animals, including birds. And work by Rick Ostfeld and colleagues (2009) at the Cary Institute has shown that high species diversity among birds is effective in reducing the risk of West Nile virus to humans.

The proposed ordinance for the Town of Washington offers a refreshing recognition of the importance of wetlands and wetland preservation, but it should take the final step to ensure the preservation of small vernal wetlands and their appropriate buffer zones.