

President

William H. Schlesinger

12 July 2010

Mr. Michael Murphy
Town of Washington Wetlands Committee
Town Hall
P.O. Box 667
Millbrook NY 12545

Dear Mike:

Unfortunately, I will be traveling at the time of the Town meeting to discuss the proposed ordinance protecting wetlands. However, in my position as President of the Cary Institute, let me offer the following scientific analysis of the importance of wetlands, especially small wetlands and vernal pools, in the Town of Washington.

From what I hear about the ordinance, I fear that the proposed legislation will not pertain to any wetland less than $\frac{1}{4}$ acre. This is most unfortunate. With this criterion, more than half of the wetlands in the Town would be unprotected. Small wetlands provide a number of “ecosystem services” that improve the quality of our daily life and add value to our properties in Dutchess County.

I am not talking simply about those evenings in early spring, when a chorus of spring peepers makes the woods alive with the sound of their music. I am not talking about 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 brightly colored. These all add to the value of life in Dutchess County—why people want to live here.

But, beyond aesthetics and their intangible value, wetlands 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 from 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 likely to demand municipal water as a replacement—a real cost to all taxpayers.

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—known as diagnostic—horizons in the soils of these areas, classifying them as hydric soils. This is an official term used to classify these 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 Megonigal et al. (1993), and it is well accepted by all soil scientists.

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. 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.

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 his 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 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 would best be extended considerably beyond the buffers that are proposed.

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 other species in the landscape. Amphibians themselves are the food for many animals,

including birds. And work by Rick Ostfeld et al. (2009) at the Cary Institute has shown that high species diversity among birds is effective in reducing the prevalence of West Nile virus.

In short, while the proposed ordinance for the Town of Washington offers a refreshing recognition of the importance of wetlands and wetland preservation, you should take the final step to preserve small vernal wetlands and their appropriate buffer zones.

Finally, I hope you will ensure that there is adequate enforcement of wetlands preservation laws that you enact. No law is effective unless it is adequately enforced.

Sincerely,



William H. Schlesinger

President

Fellow, Soil Science Society of America

Member, National Academy of Sciences

Cc: Dr. Thomas Beaumont

References:

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