Comments on M.O.R.E. proposal to expand legal use of mountain biking trails on the Baltimore City Reservoir lands
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Well-managed recreational use can be compatible with protection of water quality in the drinking water reservoirs. However, the primary interest for the reservoir forests should be water quality, and other uses should not be allowed to compromise that primary goal. Continuing use of and expanding over 34 miles of mountain bike trails primarily in the buffer of the drinking water source for the Baltimore metropolitan area greatly increases vulnerability for erosion and sedimentation. Use of trails or roads in stable locations with sufficient buffers should not pose this threat.

Sediment is the most common impact from trails. Eroded sediment usually is the greatest sources of phosphorus, one of the most problematic pollutants for freshwater systems, and contributes other pollutants bound to the sediment. Unless trails are well laid out and maintained, they tend to concentrate water that otherwise would sheet flow or infiltrate into the forest floor. Water will follow the steepest path available to it, and conditions generated by trails (compaction and incision) tend to concentrate flow unless trails are specifically designed to avoid concentrated flow. Concentrated flow is much more likely to reach a stream or be able to flow unabated through a small buffer and enter the water even if stream crossings are not present.

Some disturbances that expose the soil are short-term, such as during construction, but then can stabilize with vegetation or other cover. The greatest problems occur when a chronic condition tends to worsen over time rather than self-heal, such as when a gully starts on a sloping trail and ends in a stream. Some gullies become sufficiently deep that they can erode deeper than an adjacent stream and "capture" it, sending even more water down the trail and to waters downslope. Sediment contributions in these situations are significant and long-term, and should be avoided wherever possible. Excess sediment increases turbidity, excess phosphorus encourages algal blooms, and other eroded material can add organic carbon that serves as precursors to problematic disinfection byproducts in drinking water.

Likelihood of sediment-laden runoff moving from a trail, across a buffer and into water, increases with slope, which is why many buffer requirements expand buffer width for steeper slopes. Once a pathway shortcircuiting the buffer functions (e.g., a gully) is established, it tends to erode down and further concentrate water, a trend of negative reinforcement. Repairing such breaches in function is very difficult on steep slopes as water tends to erode around materials placed to stem flow in the gully. The most effective strategies typically are to stop the erosion at its source, often involving relocating problematic trails or roads.

There are some common best management practices that can dramatically limit contribution of sediment, for example:

- Establish buffers between trails and streams (generally range from 50 to 300 ft, commonly 100 ft)
- Expand buffers on slopes (4 ft for every percent slope is used for forest harvest activities)
- Avoid steeply sloped areas
- Do not run trails straight up and down slopes
- Avoid direct connections of ditch or gully to stream (by road layout, grade control, water bars, and similar treatments)
- Minimize stream crossings and cross at stable locations

Buffers are particularly important to protect. Because they are directly adjacent to the water, there are no opportunities to further mitigate impacts. The reservoirs tend to have steeper slopes near the water body than many natural features. The water line backed up from the dams usually falls at what was mid-slope in the naturally formed stream valleys. This exacerbates vulnerability to erosion since features like floodplains or backwater flowpaths are not typically present along the created waterbody, and there are few opportunities to slow flow and infiltrate runoff closest to the water's edge. The geography of the created reservoirs makes the protection of the buffers even more critical for protecting water quality and maintaining sufficient buffering capacity to trap upslope sediment and avoid further sedimentation and turbidity in the reservoir.

An extensive trail system primarily in the buffer constitutes an increased level of risk for water quality, and sets up conditions to have significant problems in severe storms. Sediment contribution tends to be episodic, with most of a year's or decade's contribution occurring in a few large storms. The scale of risk may not be apparent during years without very large storms. To be able to maintain water quality in the future, trails should be located generally outside of a 100-foot buffer (more on slopes) and avoid concentrated flow that sets up a path for continued and increasing sediment additions.

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