Management Issue #3 - Increases in Impervious Surfaces

Background

The enclosed article from the UCONN NEMO program, "Impacts of Development on Waterways" provides a good primer on the issues associated with impervious cover and the affects it has on water quality, aquatic habitat, and stream morphology among other things. Since this article was published more recent research has shown that impervious cover levels as low as 4-5% in a watershed can cause aquatic ecosystems to begin to degrade ("The Effects of Urbanization on the Biological, Physical and Chemical Characteristics of Coastal New England Streams" U.S. Geological Survey 2004). As depicted in the enclosed map the Eightmile River Watershed currently has a fairly low impervious cover level of approximately 3%. This level is a key reason why the Eightmile River Watershed is still an intact and functioning watershed ecosystem, the key outstanding resource value for the Wild & Scenic Study. The second map shows the potential impervious levels possible for each of the local subwatersheds within the Eightmile River Watershed if the communities were fully built out. As can be seen local watersheds could experience substantial increases in imperviousness causing significant degradation of water quality, aquatic habitats and watershed hydrology.

Recommendation

Each community commits to a maximum impervious surface limit of 10% for any local watershed and 4% for the Eightmile River Watershed as whole. This approach asks each community to work with the Eightmile River Committee to refine and assess the current and future levels imperviousness in your community and adopt appropriate tools to address impervious surface growth in your community. The East Haddam model is one recommended approach.

The East Haddam Model

East Haddam is exploring an approach to managing impervious surfaces based on the possible implementation of zone changes. The approach involves adjusting the zoning classification for an area to manage residential density. By doing so the maximum number of residential units per local watershed is adjusted to a level that will not cause the exceedance of established impervious surface limits. If, for example, it was determined a local watershed at buildout would exceed the impervious surface limits, the zoning classification of the watershed could be adjusted to match the maximum amount of residential units possible in order to not exceed those limits. The advantage of this approach is that once the zoning is re-adjusted there is no other process the commission or applicants must go through to address imperviousness issues - the goal is built into the zoning classification.

Following is numerical example of how the process might work, based on a generic watershed that is 6,000 acres in size and has 2-acre zoning.

Step 1: Set maximum impervious surface limits for each watershed in the community.

10% maximum impervious cover limits is established per local watershed

Step 2: Determine acreage of existing impervious cover in watershed.

Current Imperviousness in 6,000 acre Generic Watershed = 5% or 300 acres

Step 3: Determine acreage of imperviousness at maximum impervious limit of 10%

Maximum Impervious in 6,000 acre Generic Watershed = 600 acres

Step 4: Determine the remaining buildable land in the watershed.

Remaining Buildable Land in Generic Watershed = 2,000 acres

Step 5: Determine potential new residential units if fully built out.

Potential New Residential Units = (2000acres/2-acre zoning) x 0.8 (efficiency factor to account for land taken up by new roads or other natural feature limitations) = 800 new units

Step 6: Determine potential new impervious cover based on number of new residential units.

Potential New Impervious = 800 units x 2 acres per unit x 0.2267 (ISAT coefficient developed by UCONN to calculate impervious cover for developed areas) = 362 acres

Step 7: Calculate total imperviousness at full buildout.

Total Impervious at Buildout = 300 ac. + 362 ac. = 662 ac. or 10.9% of generic watershed area. This exceeds the 10% limit.

Step 8: Determine the maximum increase in impervious acreage in the generic watershed based on the impervious surface limit.

Maximum Imperviousness of 600 acres less existing imperviousness of 300 acres = Maximum Impervious Increase = 300 Acres

Step 9: Determine the maximum number of residential units that would not cause an exceedance of the impervious surface limit of 10%.

Target Maximum Residential Units = 300 acres / (2 acres x 0.2267 (ISAT coefficient)) = 662 units

Step 10: Determine what the maximum lot size could be to support the impervious surface limit of 10%. This would be the lot size used to determine the new zoning classification for the generic watershed.

Total Potential Lots = Maximum Residential Units That Would Not Cause an Exceedance on Impervious Surface Limits (662) divided by the efficiency factor (0.8) = 828 lots

Maximum Acres Per Unit = 2000 acres / 828 units = 2.42 acres per unit

Actions

1. Each community adopts maximum impervious surface limits of 10% per local watershed and 4% for the Eightmile River Watershed as a whole.

2. Working with the Eightmile River Committee, undertake a detailed assessment of current and potential imperviousness in each local watershed for each community. Through such an analysis identify the amount of impervious cover still possible in each local watershed before the maximum impervious cover limit is reached.

3. Analyze the implementation of different tools to manage impervious surface levels, including the East Haddam model. Determine the most effective, appropriate and realistic tool for managing impervious surfaces and pursue its adoption.