



Assessing the Potential for Urban Watershed Restoration

After many years of neglect and abuse, urban streams and rivers have recently become the focus of restoration efforts throughout many parts of the country. For example, Barth *et al.* (1994) identified over 50 urban watershed programs that have been organized in the last few years. Communities increasingly recognize the value of healthy aquatic systems within urban areas and are taking steps to improve the quality of degraded streams. The motivating factors underlying each program vary. For some, the goal is to improve water quality to receiving waters. In others, the objective is to enhance the urban environment and provide recreational areas. Others seek to recover aquatic diversity within urban streams. These emerging urban watershed restoration efforts are unique in that they target stormwater treatment and habitat enhancement to rehabilitate urban streams.

While many communities now share the goal of urban watershed restoration, they may not always be sure how to go about it, or whether it is really an achievable goal. This article summarizes some of the experience of the last five years in the Mid-Atlantic region. We present a detailed method to assess and identify restoration opportunities and analyze, at subwatershed scale, whether restoration is possible.

Watershed Restoration Feasibility

Before spending millions of dollars and countless hours of staff time, watershed managers must ask a simple question: *Can the watershed really be restored?* We can always do some things to improve water quality to the receiving waters or enhance stream corridor aesthetics, but we must also realize that certain constraints exist within the urban environment that may make complete restoration extremely difficult, if not impossible.

For example, in the ultra-urban setting, where impervious cover exceeds 60 to 70%, most streams may have been previously piped. These areas are going to be next to impossible to restore. Other key criteria that must be considered are identified in Table 1. Although a negative response to a single criteria probably will not make restoration infeasible, a negative response to several criteria may well signal that watershed restoration is not feasible.

In our view, there are essentially three types of urban stream restoration possible. The first is a watershed where it is feasible to at least partially restore a native biological community within the stream. The second is a watershed that acts primarily as a conduit for stormwater runoff, where it is only possible to reduce pollutants to the receiving water body, and few opportunities exist to restore the stream. The third is a watershed where both pollutant load reductions and stream restoration are not feasible, and restoration is limited to stream corridor management. This article presents a restoration process for the first type of system. For those areas where meaningful stream restoration is not attainable, some of the following process may still be useful.

Before discussing a watershed restoration process, it is useful to establish the concept of watershed scale (Figure 1). An urban watershed may be several square miles in area and consist of several major stream systems. A subwatershed usually encompasses first or second order tributaries to the main stream and has a drainage area of approximately 1,000 to 1,500 acres (this can vary depending on regional differences). A subwatershed then consists of several catchments, which usually have drainage areas between 50 and 500 acres.

Meaningful watershed restoration must be conducted at the subwatershed scale for several reasons. First, not all subwatersheds within an urban watershed will have the same level of impervious cover, and therefore impacts and restoration opportunities often

Table 1: Subwatershed Restoration Screening Criteria: Is Restoration Feasible?

- Are stream valley parks present within the subwatershed?
- Is there available public or military land?
- Are the streams and waterways open channels?
- Is prior biological data available for the stream?
- Does the local government have a small-scale GIS database of watershed information?
- Does the subwatershed have a moderate impervious cover (i.e., less than 60 %)?
- Does the local government have a stream buffer program?
- Have stormwater detention structures been historically installed in the subwatershed?
- Are there existing floodways within the subwatershed?