Metropolitan Washington
Council of Governments

Stream restoration Questions and Answers
COG staff final draft

1. Why is stream restoration practiced?

There are multiple reasons why local governments and other entities implement stream restoration projects. These include achieving credits for nutrient and sediment reduction under stormwater permit requirements. Other drivers are infrastructure protection, erosion control, flood reduction and water quality improvement. As a result of concentrated runoff from impervious surfaces during rainstorms, most urban streams no longer behave like undisturbed natural streams. Their flows tend to be highly variable, and their abnormally high flows often result in steep, unstable banks. Restoration projects work to restore ecosystem balance and stabilize eroding stream banks as well as provide for repair or replacement of failing infrastructure such as sewer mains and road culverts. They can lessen downstream flood risk, improve water quality, and enhance habitat for animals and plants that live in the streams and the adjacent riparian corridor. *(Also see the responses to question #s 6 and 7.)* By creating a more stable and resilient channel, they can help produce a more sustainable streamside environment in which new trees can grow with less risk from future bank erosion.

2. What is the best method for designing stream restoration projects?

There are many methods that can be used in stream restoration design and implementation. Most fall under the umbrella category of "natural channel design," a term used to differentiate designs that mimic natural processes from traditional civil engineering approaches to stream stabilization, such as concrete channels, check dams, and stone rip-rap. Specific methods within the broad category of natural channel design include regenerative stormwater conveyance, valley restoration, and beaver dam analogs. Stream restoration practices continue to evolve as our understanding of natural systems increases. No single method is always the best and the design applied should vary with conditions within the restoration reach and its surrounding watershed as well as with the goals of a particular project. COG's Best Practices recommend that stakeholders be consulted during the planning stage to help determine a project's extent, goals and methods.

3. How should communities evaluate the success of stream restoration projects?

Stream restoration projects typically seek to achieve multiple goals; the measurement of success also should be varied and flexible. COG's Best Practices recommend that designers and implementers work with the community to establish measurable goals and conduct post-project assessments to measure success. It is important to note that broad-based goals, such as improved water quality along the course of an entire stream, depend on many factors beyond the scope of individual restoration projects.

4. Can upland practices substitute for stream restoration projects?

In many circumstances and certainly in the near term, the answer is no. This is due to the fact that most urban stream systems are out of balance. Without near-term intervention in the stream itself,

they will continue to deteriorate and continue to erode, even in watersheds where best management practices (BMPs) have been installed in upland areas to lessen stormwater flows. Good watershed management does not require a choice between doing one or the other. Most local governments pursue a mix of upland practices and stream restoration in their watershed work, stream work more immediately and upland work over the long-term. Upland stormwater management work varies from regulating development activity to "retrofitting" BMPs into existing developed land, a challenging and often highly expensive practice. Thus, while it is possible to achieve nutrient and sediment reduction by installing BMPs in upland areas away from the stream corridor, implementing such practices can take many decades to even begin to stabilize out-of-balance stream systems. The costs of unstabilized streams are too high to wait this long. In addition, from a strictly regulatory perspective, the sediment and nutrient credits from stream restoration are much higher and more cost effective than those from upland retrofits.

5. Why are trees lost during the construction of stream restoration practices?

Many projects require access to the stream bank by mechanical equipment large enough to move soil, heavy rocks and big trees. In the best projects, designers generate an inventory of natural resources early in the design process and work with staff and citizens to avoid disturbing mature trees or high value ecological areas when laying out the proposed stream and floodplain work. Often, the trees and other vegetation that are removed during construction are either invasive species or are natives growing in highly degraded riparian corridors. During the project, these are replaced with species of greater habitat value that will support the stream's stability and associated wildlife over the long-term. Many trees located along degraded streams are lost over time to bank erosion. Although it may take many years for the tree canopy over stream reaches that have been restored to achieve its former extent, the long-term benefits outweigh the short-term losses.

6. What is the impact on aquatic habitat of stream restoration work?

Grading along banks and work in the stream bed disturbs existing in-stream habitat and can degrade it. COG's Best Practices recommend that project designers identify the most sensitive aquatic habitat and determine how to minimize its disturbance. The greatest impact from construction usually occurs in areas where the stream is already highly disturbed and its existing habitat is highly degraded. After a practice has been installed, stream habitat should improve in these areas.

7. Do stream projects lead to improvements in benthic macroinvertebrates?

Scientific studies of the impact of stream restoration projects on the diversity and abundance of insects and other animals that live in streams have been inconclusive. In particular, small stream-dwelling animals known as benthic macroinvertebrates are a key component of the aquatic food chain; and indices of these organisms are a key indicator of water quality used by EPA and state regulatory agencies to measure the overall health of streams. The scores on these indices (known as BIBIs, an acronym for Benthic Index of Biotic Integrity) are typically very low in degraded urban streams. To date, researchers have not found that stream projects, on average, result in improved scores on BIBIs either in the restored stream reach or downstream of the restoration site. It is likely that stream restoration, by itself, cannot fully repair many highly damaged urban streams. The

projects address only some of the negative impacts of urbanization on streams; they do not, for example, address increased salinity or reduced groundwater flow. The diversity of benthic macroinvertebrates has been in decline for decades as urbanization has increased in the region. It is unrealistic to expect them to improve in the 10 to 20 years that the oldest stream restoration projects have been in place.

8. **Are stream restoration projects being destroyed by the increased frequency and intensity of rainfall in the region?**

Some older projects have been significantly damaged by high flows from recent intense storms. The reasons for damage can range from poor design to improper construction as well as the sheer difficulty of handling high flows in certain stream reaches. Current design practices emphasize resiliency and the ability to adapt to and safely pass high flows. Some projects are specifically designed to direct stream flows into expanded floodplains to minimize erosion and downstream impacts. COG's Best Practices recommend that project managers commit to long-term maintenance and repair of projects that have been installed.