Lower Silver Creek, has seen its hydrology progressively altered over the last 100 years by intense urbanization. In the summer of 2002, the Santa Clara Valley Water District started the construction of a 5-mile long flood control channel improvement project with the objective of providing 100-year flood protection while enhancing habitat value through the creation of a functional riparian and wetland system. To meet this objective, efforts were made to enhance in-stream and riparian ecosystem features while integrating principles of fluvial geomorphology into the project design. Design features included: 1) a vegetated multi-stage channel composed of an in-channel floodplain to dissipate high flow energy and facilitate the formation of a base flow channel by natural fluvial processes and, 2) a sediment transport channel sized to mobilize and transport sediment at an ecologically relevant frequency. The downstream reach of the project (approximately 2.5 miles) was completed in stages from November 2003 to November 2005. This presentation will present results of five years of monitoring riparian, wetlands and geomorphological features as well as address the major benefits, constraints, and limitations of integrating fluvial geomorphology concepts with urban stream flood control efforts.

**INTRODUCTION**

San Jose residents living on the eastern side of the City have been exposed to potentially devastating floods and environmentally degraded creeks for decades. In 1999, flood damages associated with a 100-year flood event in Lower Silver Creek (Figure 1) were estimated at over $12 million including the cost associated with providing flood shelter and utility to hundreds of displaced individuals. As local agencies, including the Santa Clara Valley Water District, recognized that creeks can be more than just storm drains, flood management in many urban areas has increasingly included efforts at creating more natural green space and improved ecosystem functions. The Lower Silver Creek Project offered a unique opportunity to improve the level of flood protection while greatly enhancing the natural habitat within the creek corridor.

The project’s primary objectives were (1) to improve flood protection; (2) maximize habitat values for mitigation and environmental enhancement; and (3) improve water quality. From 1983 to 2000, the project went through several iterations among stakeholders in an effort to provide the maximum habitat values and flood conveyance within a highly constrained right of way. In 2000, it was recognized that concepts of fluvial geomorphology could be successfully integrated into the design without having to increase the right of way through purchase of adjoining properties. Further, the geomorphological elements introduced had the potential to help meet the requirements set by regulations with respect to streambank regeneration, wetland protection, sediment transport dynamics, and future maintenance needs.

The geomorphological elements included a multistage channel composed of an in-channel floodplain, a sediment transport channel, and a naturally formed base-flow channel. Figure 1 illustrates the design concept. The central element of the design is the sediment transport channel, which was sized to convey relatively frequent flows (i.e., flows with less than a 2-year recurrence interval) in a manner that would also transport sediment, as these events were determined to be the most significant with respect to sediment management throughout the Lower Silver Creek system. The design of this feature also allowed relatively natural channel forms to develop and persist within the confined creek corridor.

The downstream reaches of the project (approximately 2.5 miles) was completed in November 2005. The upstream reaches are currently being completed as funding becomes available.

**WETLAND ESTABLISHMENT**

Results of the delineation show that 4.85 acres of wetlands have been established in Reaches 1 and 2 or that 87.6% of the sediment transport channel is occupied by wetlands.

**RESULTS**

These 5 photographs (Figure 2) taken at the same location from 2003 to 2009 illustrate the rapid development of riparian vegetation in the lower reach of the project.

**CONCLUSIONS**

- **OBJECTIVES**
- **RESULTS AT YEAR 5**

There is a continuing need for more riparian vegetation on the banks. Additional maintenance may be necessary.

- **Wetland Maintenance and Sediment Removal Needs**
- **CONCLUSIONS**

Although the main objective of the project is to improve flood protection, the relative dry years that have characterized northern California weather since the project was constructed have not yet put its flood carrying capacity to the test.