

ATTACHMENT 9- ECONOMIC ANALYSIS — FLOOD CONTROL BENEFITS

Santa Clara River, San Francisquito Creek Arundo and Tamarisk Removal Project (SC-1/USFS-1)

Summary

The Santa Clara River Arundo and Tamarisk Removal Plan (SCARP) identifies programs and projects that will most effectively remove arundo, tamarisk, and other invasive plants from the Upper Santa Clara River. Implementation of the SCARP within the Upper Santa Clara River Watershed (Watershed) will be conducted in two phases. Phase 1 of the project will remove arundo and tamarisk in the site specific implementation area (Project Area 1), which includes approximately 297 acres. Phase 2 of the project will continue the removal of arundo and tamarisk outside of Project Area 1, up into City- owned reaches along San Francisquito and Bouquet Canyon Creeks, and eventually into Angeles National Forest.

The Santa Clara River, San Francisquito Creek Arundo and Tamarisk Removal Project will finish the implementation of the Santa Clarita Site Specific Plan (SSP), and move SCARP into the Santa Clara River Long Term Implementation Plan. The project will implement Phases D through G of the SSP, which includes the removal of arundo and tamarisk within roughly half of the total SSP project area (about 150 of the 297 acres). In total, 20 acres of arundo and tamarisk will be removed from targeted locations throughout the 150-acre project area.

Two types of restoration efforts will be employed to ensure effective eradication of the invasive species. The first effort will include non-native biomass removal and herbicide application. Arundo may be ground in place with mechanical equipment such as a brush grinder (where appropriate), or removed by manual means employing tools such as chainsaws and brush cutters. Herbicide application will ensure after removal. After this initial treatment, a diligent monitoring and maintenance program will be implemented to facilitate re-treatments, and avoid re-infestation of the site.

Native species common to this area such as willows (*Salix* sp.) and mule fat (*Baccharis salicifolia*) will reestablish readily through natural recruitment once competition from non-native species is removed. Additionally, native plant restoration will ensure reestablishment in areas that require more rapid enhancement than natural recruitment can provide.

A summary of all benefits and costs of the project are provided in Table 1. Flood control benefits are discussed in the remainder of this attachment.

**TABLE 1
 BENEFIT-COST ANALYSIS OVERVIEW**

	Present Value
Costs	\$648,310
Monetized Benefits	
Water Supply Benefits	
Avoided Imported Water Costs	\$674,560
Total Monetized Benefits	\$674,560
Qualitative Benefit or Cost	Qualitative Indicator*
Water Supply Benefits	
Increased Water Supply Reliability	+
Improved Operational Flexibility for CLWA	+
Water Quality Benefits	
Improved Surface Water Quality	++
Reduced Salt Loading	+
Decreased Streambank Erosion	++
Restoration of Native Habitat	++
Reduced Fire Hazard	++
Reduced CO2 Emissions	+
Reduced Stress on the Sacramento-San Joaquin Delta	+
Increased Educational Opportunities	+
Flood Control Benefits	
Reduced Flooding Impact	++

O&M = operations and maintenance

* Direction and magnitude of effect on net benefits:

+ = Likely to increase net benefits relative to quantified estimates.

++ = Likely to increase net benefits significantly.

- = Likely to decrease net benefits.

-- = Likely to decrease net benefits significantly.

U = Uncertain, could be + or -.

The “Without Project” Baseline

The Santa Clara River Arundo and Tamarisk Removal Project will be located near the City of Santa Clarita, within the Upper Santa Clara River Watershed (Watershed). The project area includes a highly visible 150-acre reach of the Santa Clara River, and the lower reaches of two major tributaries just above the confluence of San Francisquito Creek and the South Fork of the Santa Clara River.

The Santa Clara River is subject to frequent flooding especially from winter storms. This poses flooding risks for all areas along its bank, including the City of Santa Clarita, and other Upper Santa Clara River (USCR) floodplain communities and farming properties. Eighteen major flood events have been documented in Los Angeles County since 1965, all of which have been given State disaster designations and most of which were given Federal disaster designations (City of Santa Clarita, 2010). A most recent example is the severe storms in January and February of 2005. Total public damages were approximately \$1.8 million, while private damages were estimated to total \$4 million. The winter storms resulted in the loss of one mobile home on the Santa Clara River, and significant damage and flooding occurred to a mobile home park causing 150 residents to evacuate for several days. The flooding also resulted in the loss of recreational trails and paths along the Santa Clara River and several tributaries. Efforts to recover from the storm required public investment for measures including debris removal, bridge repair, bank stabilization and repair of public trails (Chong et al., 2010; City of Santa Clarita, 2010).

Arundo and tamarisk are both known to increase flood hazards. Both plants can alter stream geomorphology by trapping and stabilizing sediment, which narrows stream channels, widens floodplains, and causes increased flooding (Carpenter 1998; Lovich 2000). By obstructing flows, large stands of arundo and tamarisk may force floodwaters into areas that historically have not experienced water flow. This can worsen bank erosion problems and lead to an increase in the loss of adjacent public and private property. Arundo’s dense but shallow root masses are more easily undercut than deep-rooted native riparian vegetation and therefore provide less protection for streambanks from erosion. Arundo and tamarisk debris may also accumulate downstream of the infestations, trapping sediments, and impeding natural water flow. Arundo debris can create new establishments downstream. In many cases, costly clean up efforts or repairs are required after arundo debris has been spread by flooding (Ventura County Resource Conservation District, 2006).

Without the project, arundo and tamarisk will continue to spread, covering a greater percentage of the Watershed. The expansion of these species will exacerbate the already negative impact of the species on flooding by obstructing flood flows and causing associated damage to public facilities, including bridges and trails, and to private property. Continued spread of arundo and tamarisk will result in more areas facing flooding issues, more frequent flooding problems for flood events with shorter return intervals, and increased debris-related impacts on flooding.

Flood Control Benefits

Removal of arundo and tamarisk in the project area will decrease flooding impacts. Because of the difficulty in quantifying the effect of vegetation on flooding events, this Attachment 9 does not attempt to monetize damages. Instead, the benefit is described qualitatively below.

Reduced Flooding Impact

Within the City of Santa Clarita alone, 360 commercial properties, 323 industrial properties, 2,213 residential properties, and 37 special purpose properties are located in a high-risk flood zone (City of Santa Clarita, 2010). The 150 acres targeted in the first phase of the project include the confluence of San Fancisquito Creek and the Santa Clara River. This highly visible area bordered by recreational trails and owned by the City is surrounded by developed commercial, industrial, and residential properties. This project will eliminate approximately 20 acres of arundo and tamarisk from the project site through mechanical grinding, biomass removal, and herbicide application. According to the City of Santa Clarita Hazard Mitigation Plan, there is a “desire to maintain the river’s natural character, yet provide adequate safety through the use of appropriate non-structural flood/erosion control measures” (City of Santa Clarita 2010). This project provides such a non-structural flood reduction strategy within the City of Santa Clarita.

The effect of arundo removal on reduced flood incidence is uncertain, thus, the benefits are not quantitatively estimated. Nevertheless, removal of this invasive species will restore normal stream geomorphology by preventing the trapping and stabilization of sediment, allowing stream channels to widen, and reducing the incidence of debris build up in the floodway. Removal of arundo in the stream channel will reduce the likelihood that floodwaters will be forced outward beyond the stream channel capacity due to obstruction of flows. Furthermore, this project not only makes flooding improvements relative to today’s status-quo, but those benefits are even more pronounced compared to the without project baseline of increasing arundo infestation and associated increased flooding risk.

Reduced costs associated with arundo and tamarisk debris removal also could be significant. As noted in Attachment 8, Arundo and tamarisk increase streambank erosion, which damages riparian habitat and farmland due to channel obstruction. Arundo, in particular, increases erosion due to its shallow root system, which reduces bank stability. A Santa Ana Watershed Project Authority (SAWPA) document cites a report stating that cleanup of arundo debris washed downstream costs the public millions each year (Zembal and Hoffman, 2000). The SAWPA report also describes arundo-related damages to bridges in the area ranging from \$260,000 for repairs to \$8 million for new construction (close to \$324,000 for repairs and \$9,967,000 when updated to 2009 dollars). This benefit is included as a qualitative benefit due to the difficulty in applying these values to the Santa Clara River Watershed. However, it is useful in understanding the potential magnitude of arundo-related infrastructure impacts.

Distribution of Project Benefits, and Identification of Beneficiaries

The Santa Clara River and San Francisquito Creek Arundo and Tamarisk Removal Project provides flooding-related benefits to a variety of stakeholders. First, property owners located in flood prone areas immediately adjacent to the project site will experience reduced impact during flood events. Second, downstream riverside property owners along the Santa Clara River will experience reduced flooding and associated debris clean-up.

**TABLE 2
 PROJECT BENEFICIARIES SUMMARY**

Local	Regional	Statewide
Property owners in flood prone areas immediately adjacent to and downstream from the project site	Downstream riverside property owners along the Santa Clara River who will face less debris related flooding	--

Project Benefits Timeline Description

Project implementation will be completed in December of 2012, with some administration and monitoring activities taking place through 2015. A 50-year useful project life is assumed for this analysis. Thus, benefits are calculated through 2062 (50 years after the project begins providing benefits in 2013).

Potential Adverse Effects from the Project

The Santa Clara River, San Francisquito Creek Arundo and Tamarisk Removal Project may have short-term negative impacts during removal work, but steps will be taken to avoid long-term disturbance to habitat and native species living in the area. A CEQA document is being prepared and will address any potential adverse impacts.

Summary of Findings

Arundo increases flood hazards by trapping and stabilizing sediment, narrowing the stream channel, and widening the floodplains. This project will eliminate about 20 acres of arundo and tamarisk from the project site through mechanical grinding, biomass removal, and herbicide application. Removal of this invasive species will restore the natural stream geomorphology by preventing the trapping and stabilization of sediment, allowing stream channels to widen, and reducing the incidence of debris build up in the floodway. Commercial, industrial, and residential property owners in flood prone areas immediately adjacent to, and downstream from, the project site will experience reduced flooding incidence as a result of the project. Downstream riverside property owners along the Santa Clara River will face less debris related to flooding. Monetized values were not claimed for reduced flooding incidence, although existing data from past flooding events suggest potentially large benefits. Consequently, this benefit is assessed qualitatively as summarized in Table 3.

TABLE 3
QUALITATIVE BENEFITS SUMMARY – FLOOD CONTROL BENEFITS

Benefit	Qualitative Indicator
Reduced Flooding Impact	++

This analysis benefits is based on available data and some assumptions. As a result, there may be some omissions, uncertainties, and possible biases. In this analysis, there are no quantitative or monetized benefits calculated. As a consequence, there are no identifiable biases or uncertainties in flooding benefits of this project.

References

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