

Lower American River River Mile 1.8L Bank Protection Project

5th Annual Report 2010



Prepared by:



**Sacramento
Area Flood
Control
Agency**

**Sacramento Area Flood Control Agency
1007 7th Street, 7th Floor
Sacramento, CA 95814
(916) 874-6451
Contact: Lizette Crosbie**

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Introduction

In December 2003 as part of a coordinated effort to obtain Federal Emergency Management Agency (FEMA) certification for the American River levee system, the Sacramento Area Flood Control Agency (SAFCA) undertook construction of the RM 1.8L Bank Protection Project. The purpose of the project was to protect the levee against toe erosion and subsequent levee failure due to high river velocities and shear stress. Construction consisted of extending revetment from the 10 ft contour elevation to the river bottom and constructing a "launchable toe". A commitment was made to replant the site with native plants following heavy construction to reduce or eliminate construction-related effects and enhance environmental quality.

Location and History

The project area is located along the waterside of the American River south levee (left bank) downstream of Highway 160, approximately 1.8 miles east (upstream) of the confluence of the American and Sacramento rivers at River Mile 1.8L. This location is just downstream of Sacramento River Bank Protection Project (SRBPP) Site 1. The project area is approximately 750 feet long and up to 30 feet wide, covering less than an acre of levee surface, berm and channel bottom.

In 2001, the levee was rebuilt and revetted by the Corps of Engineers following a hydraulic fracture of the levee during construction of the American River Common Features slurry wall improvement project. The majority of original mature riparian vegetation along this reach was removed during this 2001 levee reconstruction work.

In late 2003/early 2004, SAFCA added additional protection to the site by installing approximately 10,000 tons of riprap along 750 feet of the levee toe below the ordinary high water mark (Figure 1). Vegetation within the area was limited to the sparse riparian vegetation that was not removed during the 2001 construction or that re-established following the Corps' repair work.

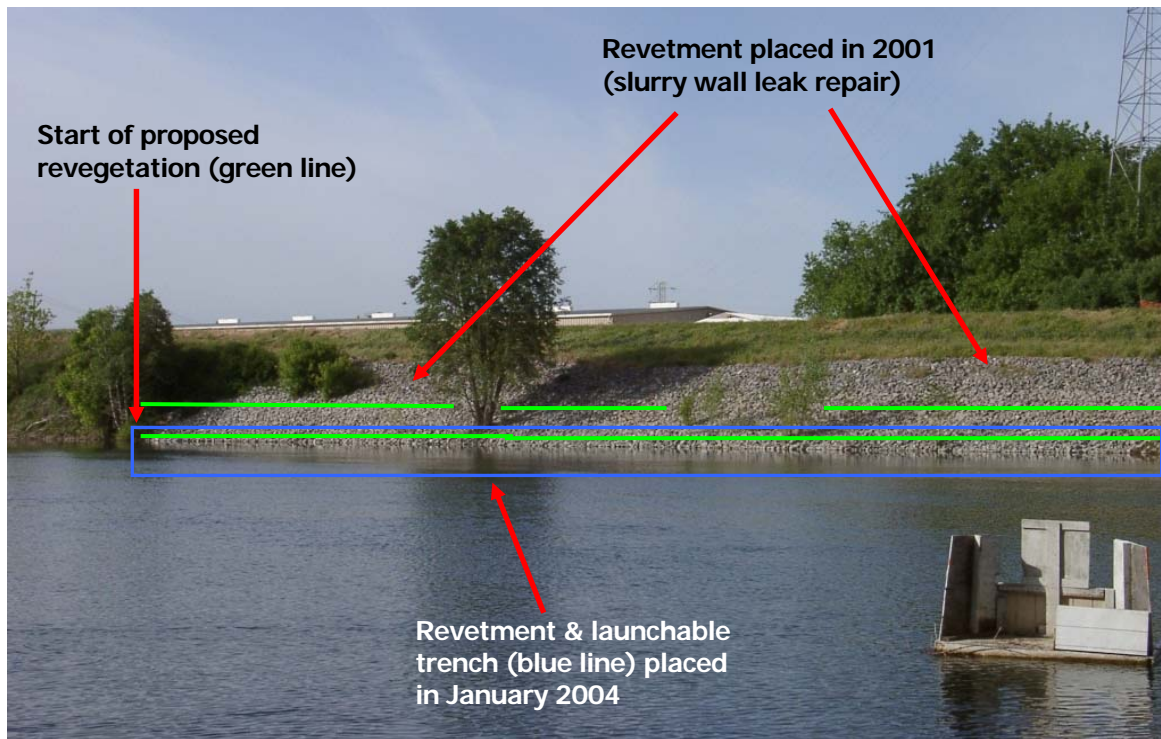


Figure 1 – Existing conditions at upstream end of site

Habitat Mitigation Requirements

Concurrences were received from the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NOAA Fisheries) that this project was not likely to adversely affect the federally threatened Valley Elderberry Longhorn Beetle and would avoid adverse effects to listed species, respectively. Per consultation with the Corps and correspondence with the California Department of Fish and Game (DFG), SAFCA committed to revegetating the site with native riparian species. This revegetation plan, with the exception of planting wild rose, was approved by the Central Valley Flood Protection Board (CVFPB) under permit no. 17785.

Reporting Requirements

Per consultation (200300723) with the U.S. Army Corps of Engineers (Corps), SAFCA is required to submit annual monitoring reports of the native riparian plantings by December 31st of each year for five years or until vegetation survival is deemed successful by the Corps or USFWS. Annual reports will also be submitted to DFG.

Revegetation Plan Description

The revegetation area is roughly 750 feet in length and approximately 30 feet in width, covering less than an acre of levee surface and berm. The revegetation is consistent with the requirements of California Code of Regulations Title 23 Waters Division 1, Reclamation Board and includes most of the species planted by the Corps at Sacramento River Bank Protection Program, Lower American River Site 1.

The revegetation design consisted of two rows of woody vegetation along the bottom one third of the revetment site. The initial planting for this site began in November 2004 and continued into the first part of 2005. The rows were planted 16 feet apart and trees were spaced at 12 ft centers. Scattered shrubs were planted in between the parallel rows (Figure 2) in addition to a band of herbaceous plants along the waterline. Vegetation has been irrigated with an above ground irrigation system. Intensive weeding and irrigation was conducted for the three-year establishment period (2005-2008) and irrigation was reduced to once per week in 2009 and 2010. A summary of the revegetation plan including cross sectional drawings and the planting palette is attached as Exhibit A.

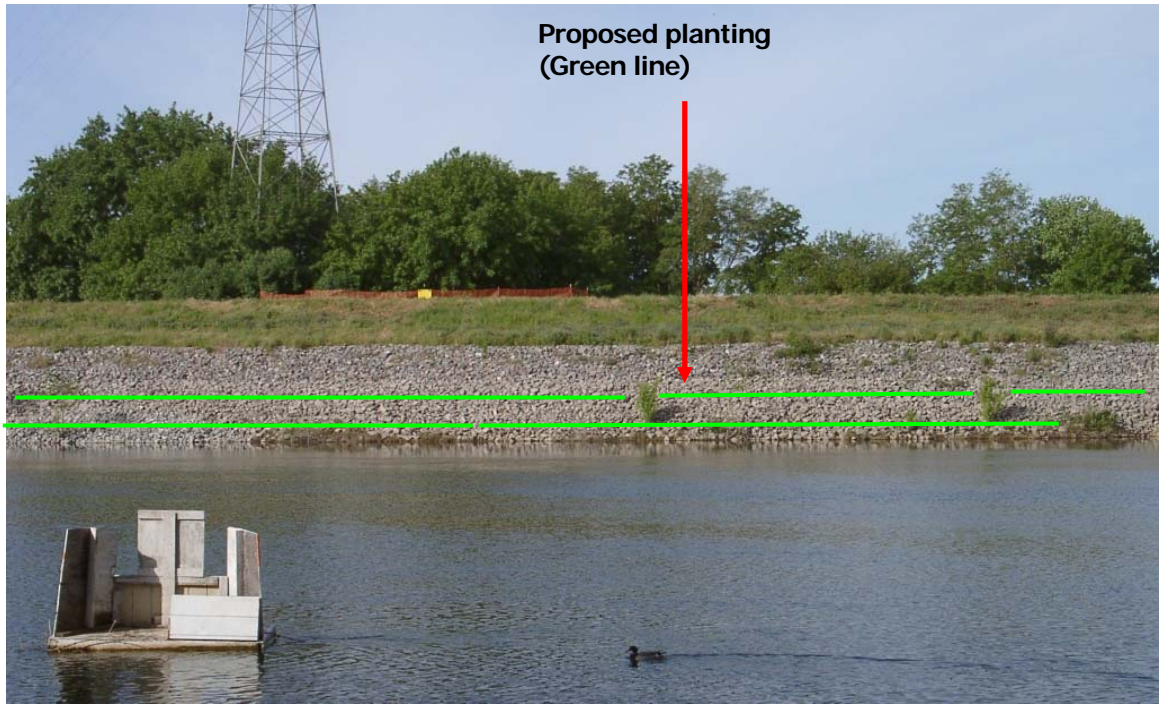


Figure 2 – Pre-project conditions at mid section of RM 1.8L.

Hydraulic Impacts of the Revegetation Plan

Prior to the levee fracture and subsequent reconstruction of the levee in 2001, the site was heavily vegetated with trees and shrubs similar to the existing conditions at the downstream end of the site (Figure 3). SAFCA’s revegetation plan replaced a portion of the vegetation that was present at the site prior to 2001. It was therefore assumed there would be no increase in water surface elevations, or change in velocity distribution, or magnitude as a result of implementing the revegetation plan and a hydraulic analysis was not conducted.

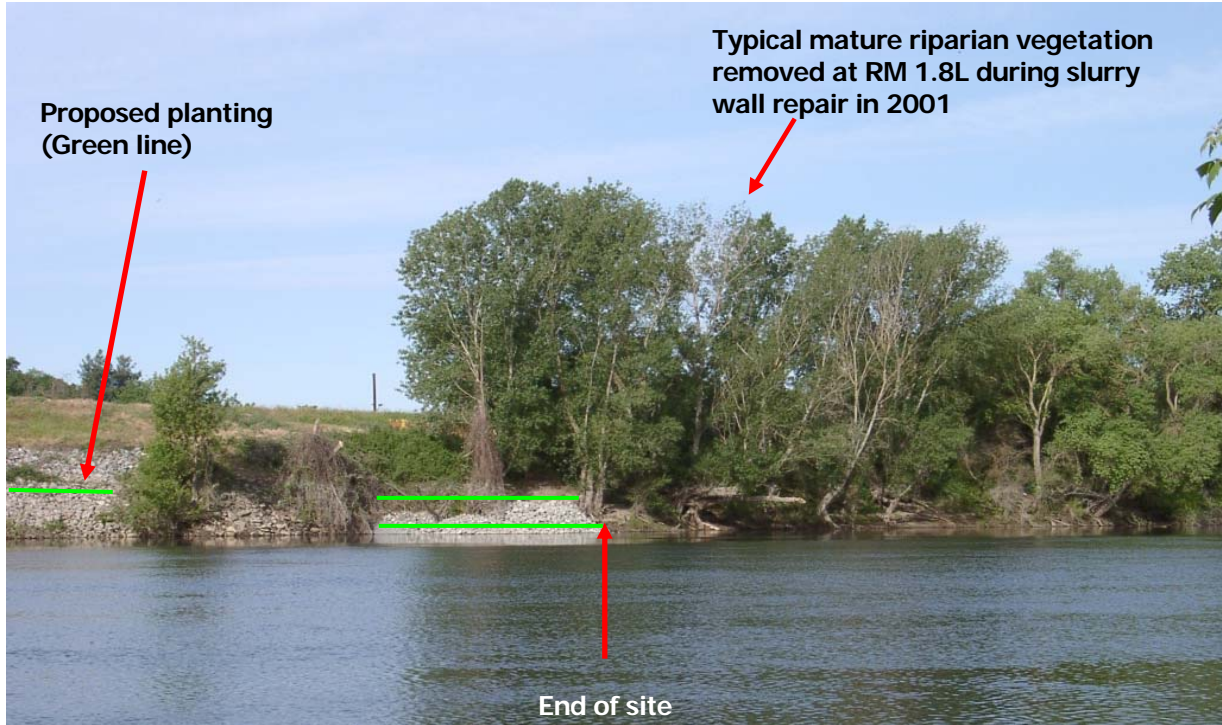


Figure 3 – Mature riparian SRA – existing conditions at downstream end of RM 1.8L.

Performance Standards & Monitoring

SAFCA will maintain the vegetation for a three year pre-establishment period. This period will include regular intensive irrigation, noxious weed abatement and protection of plants from browse damage. The site will be adaptively managed for an additional two years following pre-establishment for a total monitoring period of 5 years. Annual monitoring will occur through the pre-establishment period (years 1-3) and the post establishment period (years 4-5) to measure success as follows:

Years 1–2 = 80 % survival

Years 3–4 = 70 % survival

Year 5 = 60 % survival

The annual monitoring will include a complete count of the trees and shrubs to track the sites performance toward meeting the survival success criterion. In 2007-2009, height measurements were recorded for a random sampling of 20%¹ of the trees and shrubs and the data was used as a surrogate to measure plant vigor. However, the random sampling method for measuring tree height precludes annual comparisons of growth and is not a good method for determining the average health/growth of plants at this site. Therefore, height measurements are no longer included as of 2010. Instead, individual trees and shrubs are counted and assigned a qualitative health rating of “good”, “fair”, or “poor”. This is based on the general appearance of the entire plant, accounting for the amount of yellowing leaves and any obvious signs of disease. If the success criterion is not met, a replanting effort will occur the following winter/spring season and supplemental irrigation will occur.

Results & Discussion

The results of the 2010 (Year 5) survey indicate that the survival rate is 84% (Table 1), exceeding the 60% survival goal for year five. The predominant species at the site is box elder and the following species were not planted but have volunteered at the site: arroyo willow, walnut (*Juglans spp.*), valley oak, interior live oak, Fremont cottonwood and sycamore.

Table 1 - Number of surviving plants by species

Species	Number Planted	2007	2008	2009	2010
Arroyo willow		15	19	19	19
Box elder	40	40	60	66	63
Fremont cottonwood		7	22	25	36
Goodding's willow	15	0	1	1	1
Interior live oak		1	1	0	0
Sycamore		3	2	3	3
Valley oak		1	1	1	1
Walnut		1	1	2	1
White alder	36	7	8	6	9
Blue elderberry		4	3	3	4
Sandbar willow	31	0	24	16	15
Wild rose	60	13	11	11	0
Total	182	92	153	153	152
Total Percent Survival		51%	84%	84%	84%

Most of the trees at the site were observed to be in a healthy state during the annual survey and appeared to be on their way to establishment. However, it was noted that some volunteer walnut trees growing near the top of the site have been lost due to mowing along the levee.

¹ In 2007 approximately 25% of the trees and shrubs were sampled.

This site has been challenging since the initial planting period in the winter 2004/2005. This may be attributable to the lack of soil due to riprap that is up to four (4) feet deep. While the plants along the higher elevation remain comparatively smaller, the trees planted closer to the river appear healthier and have grown more rapidly. This could be attributed to soil and nutrient inundation from high water levels occurring more frequently at lower elevations, and that plants at these lower elevations may also be more readily accessing water from the river. To comply with conditions of the Central Valley Flood Protection Board Permit, wild rose, blackberry and grape were removed from the site in 2010 and trees were pruned to improve visual inspections by the American River Flood Control District.

Proposed Remedial Measures

SAFCA has surpassed the 5th year success criterion of 60% survival and is seeking concurrence from the Corps, USFWS and DFG that all mitigation obligations have been met. SAFCA shall continue to decrease the frequency of irrigation at the site to ensure the plants are self-sustaining. Thereafter, the site will continue to be monitored so as to ensure its long term establishment and success.

