Recovery Implementation for Riparian Brush Rabbit and Riparian Woodrat on the Lower Stanislaus River
Annual Report - 2010

San Joaquin River National Wildlife Refuge – Buffington Unit
Stanislaus River Mile 2.1 -5.5 L
Stanislaus County, California

Prepared for:

U.S. Fish and Wildlife Service
San Luis National Wildlife Refuge Complex

RIVER PARTNERS
1301 L St #4
Modesto, CA 95354
info@riverpartners.org
Phone: (209) 521-1700
Fax: (209) 521-7327
www.riverpartners.org

Table of Contents

List of Figures

List of Tables

List of Appendices

Suggested citation:

River Partners. 2010. 2010 Annual Report for the Buffington Unit. Modesto, California.

2010 Annual Report for the Buffington Unit
San Joaquin River National Wildlife Refuge
Stanislaus County, California

I. INTRODUCTION

A. Project Overview

In 2007, River Partners received funding to restore and enhance approximately 53 acres of riparian vegetation along the Stanislaus River on the San Joaquin National Wildlife Refuge (Figure 1). This project supplements River Partners ongoing restoration efforts by increasing overall riparian vegetative cover between the confluence of the San Joaquin River and two of its major tributaries, the Stanislaus and Tuolumne Rivers. The primary goals of this plan are to increase and improve riparian habitat at a key reintroduction site for captive-bred riparian brush rabbits (*Sylvilagus bachmani riparius*) and improve conditions for the San Joaquin riparian woodrat (*Neotoma fuscipes riparia;* "woodrat"), in cooperation with the Endangered Species Recovery Program and US Fish and Wildlife Service, while simultaneously providing multi-species benefits. Habitat restoration goals include creating a network of dense riparian shrub cover -- the habitat structure most preferred by brush rabbits and riparian woodrats in addition to areas of high ground flood refugia for terrestrial wildlife. Other species expected to benefit from this restoration include least Bell's vireo (*Vireo bellii pusillus*, Howell & Dettling 2007), and the valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*, Talley et al. 2006).

B. Purpose of Report

The purpose of this report is to discuss the progress of this restoration during the third year of implementation and discuss future management goals and special considerations (Table 1) specific to the Buffington Unit project as described in the Restoration and Management Plan: Buffington Unit, San Joaquin River National Wildlife Refuge (River Partners 2008a).

This report is an important part of the adaptive management model that River Partners uses to assess projects and programs (River Partners 2008b). This report documents project implementation from January to December 2010. Key functions of the end of season report are to:

- communicate implementation activities to our partners,
- document the completion of project milestones,
- present monitoring results,
- evaluate the effectiveness of field activities, and
- recommend specific actions to help meet the project objectives.

Table 1. Summary of project goals, objectives, and specific considerations for riparian restoration of the Buffington Unit, San Joaquin River National Wildlife Refuge.

Project Goals and Objectives
• Restore riparian habitat on approximately 53 acres
• Provide flood refugia for the riparian brush rabbit and other wildlife
• Provide habitat for riparian-associated wildlife including Federal- and State-listed species including the riparian woodrat, least Bell's vireo, and valley elderberry longhorn beetle.
• Increase the habitat connectivity of the project area to existing riparian habitat
• Establish self-sustaining native plant communities within a three-year period.
• Plant over 20,000 native trees, shrubs and vines.
• Reduce extent of invasive weeds by planting a dense herbaceous understory.
• Monitor plants at the end of each growing season.
• Evaluate project using adaptive management.
• Build partnerships with Federal, State, and local entities.
Site Specific Considerations
• This site can provide habitat to support the reintroduction of the riparian brush rabbit

Figure 1. Buffington Project Location

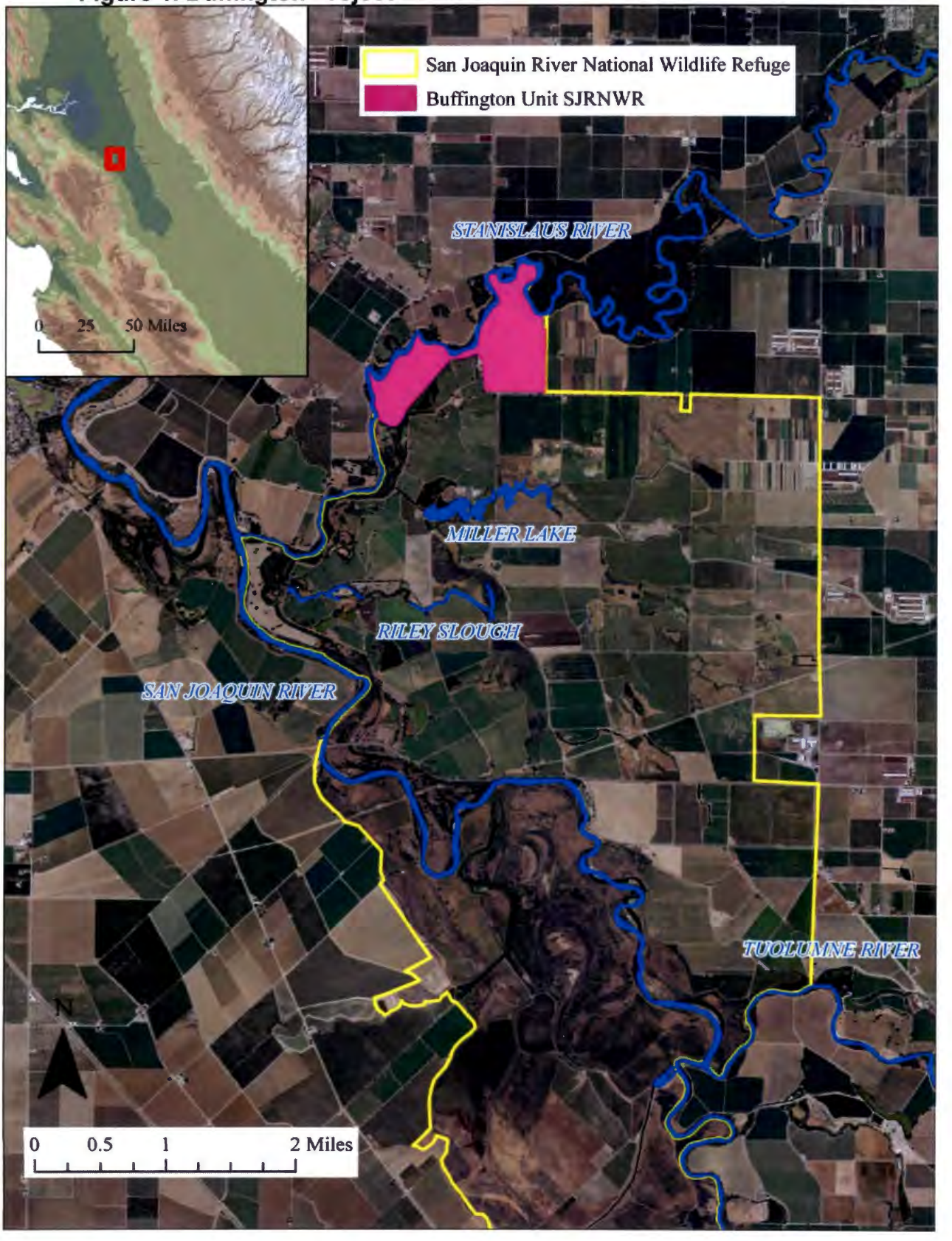
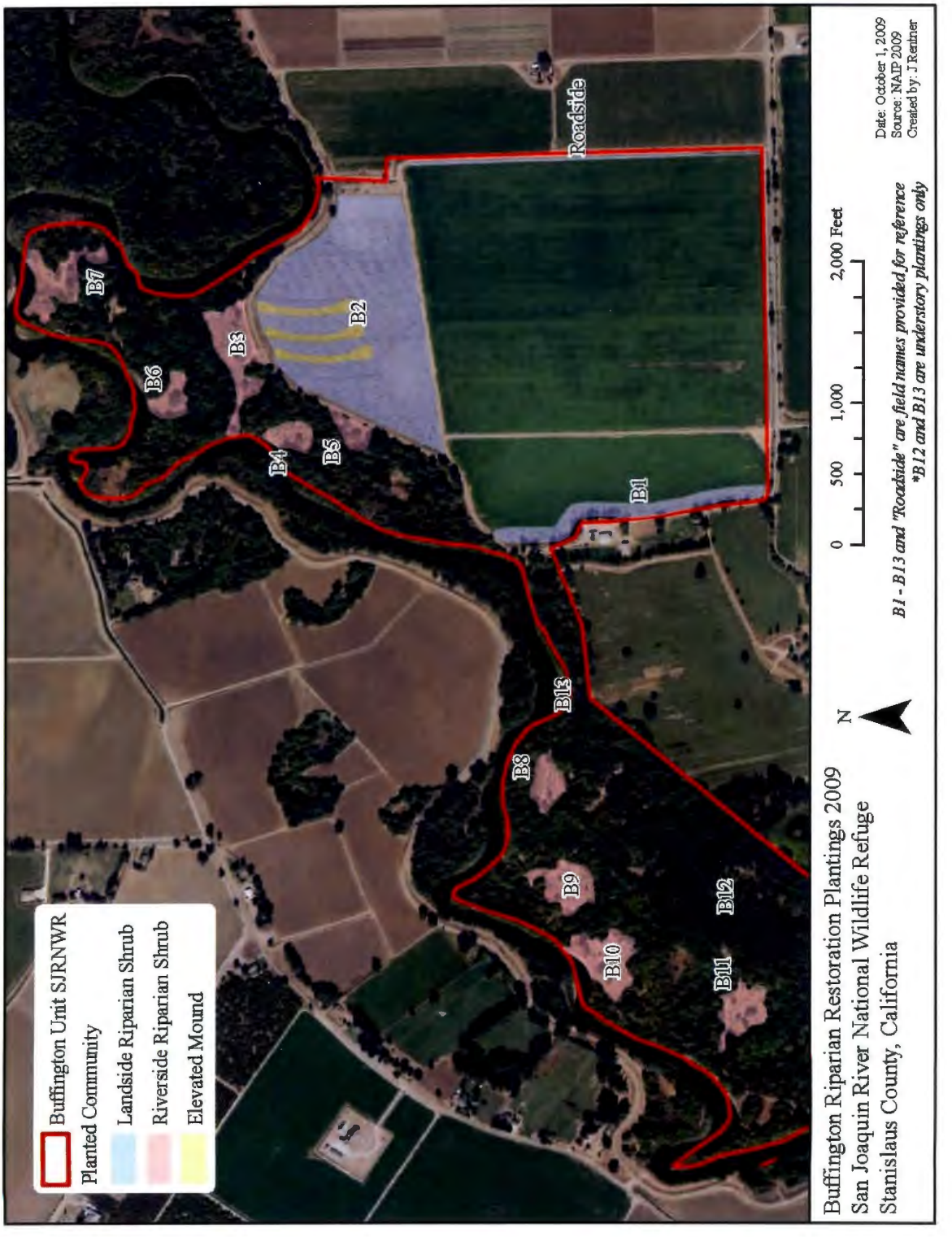


Figure 2. Buffington Project Map



II. PROJECT ACCOMPLISHMENTS YEAR 2010

A. Implementation Overview

Project implementation in 2010 consisted largely of maintenance activities. Much of the maintenance efforts were aimed at reducing weed pressure and aid in the continued establishment of woody and in the establishment of native herbaceous species were planted in the winter of 2009. Weeds that were historically problematic on site included yellow starthistle and milk thistle. These two weed species, in addition to other weed species were treated throughout 2010 by spot spraying with herbicides and manual hoeing when accessibility was limited. These efforts will benefit the establishment of the native herbaceous understory, ultimately resulting in minimal weed pressure across the project area.

In addition to weed control, replanting of blackberry occurred in Field B10 in February of 2010. Monitoring took place during the growing season (June-August). The results of the 2010 monitoring can be found in section III (3), Monitoring Results. A comprehensive list of maintenance activities and dates of activities is detailed in table 2.

Table 2. Summary of 2010 Field Activities on the Buffington Unit of the SJRNWR.

Activity	Dates
Maintenance	
Flood and drip irrigation occurred from early spring to early fall	April-October
Mowing took place to help reduce weed seed bank	May-August
Spot sprayingwas implemented to eliminate weed species while preserving nearby natives	February-September
Manual hoeing of weed species took place in areas difficult to access with spray equipment	April-June
Planting	
Golden currant was replanted to increase survivorship	January
Blackberry was replanted in field B10 to optimize habitat benefits for riparian brush rabbit	February
Monitoring	
Site Visits	January-October
Woody Species Monitoring	June-August
Herbaceous Monitoring	August
Photo points	August

III. MONITORING RESULTS

A. Woody Species Monitoring

Woody species monitoring was conducted by staff during the growing season of 2010 (June-August). Overall species survivorship was high, 87% survivorship on the landside of the levee and 90% on the riverside of the levee. The majority of species had survivorship above 90% (Fig. 3), and few species had low survivorship. Golden currant on the landside of the levee had the lowest survivorship, 25%, however showed 80% survivorship on the riverside of the levee. Sandbar willow and valley oak were the only two other species to have below 80% survivorship; 73% and 78% respectively. Because of the overall high survivorship on both sides of the levee, no replants are scheduled for 2011.

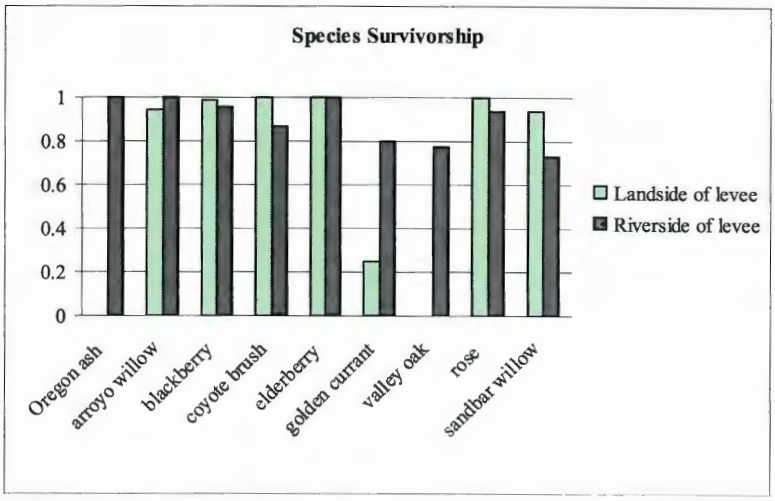
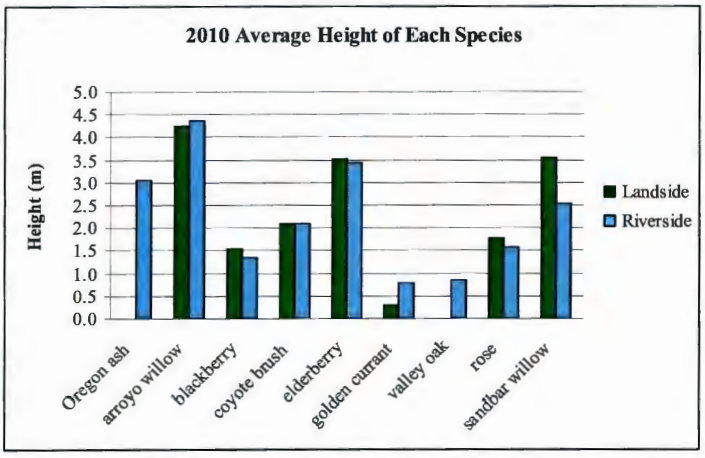


Figure 3. Survivorship of each species on the landside and riverside of the levee on the Buffington Unit of the San Joaquin River National Wildlife Refuge.



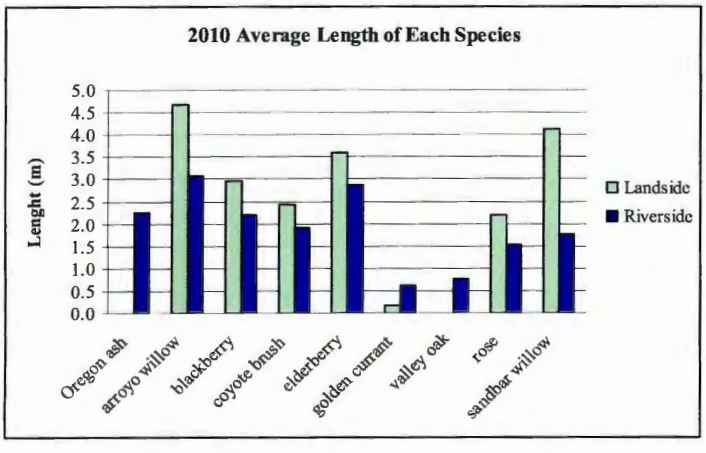


Figure 4 (Top) and 5 (bottom). 2010 Average height (top) and length (bottom) of each species on the landside and riverside of the levees.

Structural growth of woody species was also documented during our monitoring. Figure 4 and 5 shows the average height and width of each species on the landside and riverside of the levee. Arroyo willow had the tallest average height on both sides of levee (4.2 m landside and 4.3 m riverside) and the widest canopy on the landside (4.6 m) however elderberry had a slightly wider average canopy length on the riverside of the levee (arroyo willow= 3.0 m; elderberry=3.5 m). Rose was taller than blackberry on both the landside and riverside fields (rose= 1.7 m landside, 1.5 m riverside; blackberry= 2.2 m landside, 2.0 m riverside), although blackberry was wider than rose on both sides of the levee (rose= 1.5 m landside, 1.4 m riverside; blackberry= 3.0 m landside, 2.2 m

riverside). Golden currant was the smallest average plant on either side of the levee although was larger in both height and width on the river side of the levee (0.3 m tall landside; 0.7 m tall riverside; 0.2 m wide landside; 0.6 m wide riverside). Monitoring vegetation structure provides quantitative habitat measures that provides insight for managers to determine habitat suitability for riparian brush rabbit, a target species for this restoration project.

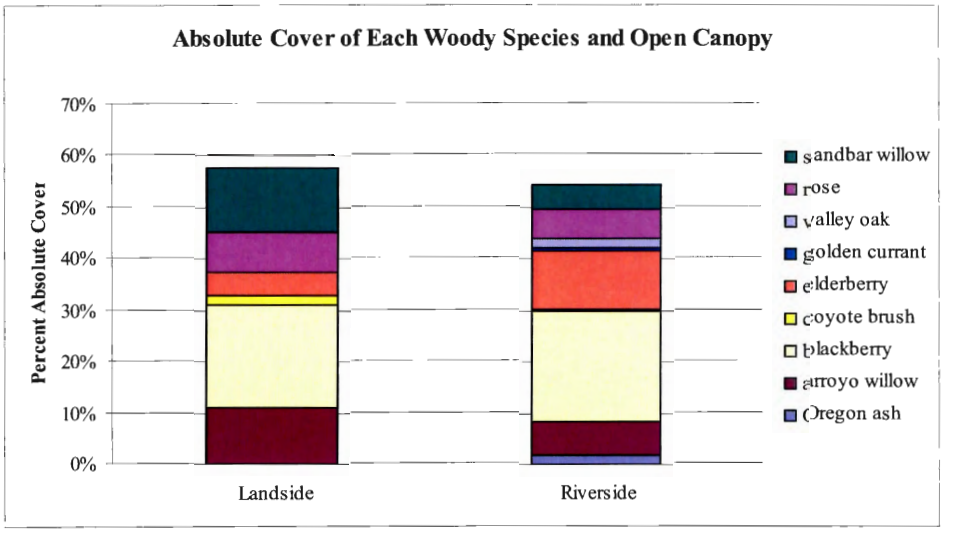


Figure 6. Percent contribution to absolute cover for each woody species.

Canopy cover was also measured using a line-intercept transect method. Figure 6 shows the absolute cover of each species on the landside and river side of the levee. This measure indicates how much cover each individual species comprises. Additionally, we analyzed this data to look at cover of three separate height classes of woody species cover (fig. 7); short 0-1 m, medium height 1- <3 m, and tall >3 m. The percent cover values are the same for each side of the levee however this presentation of the data gives an indication for the habitat structure present. Overall canopy cover was 58% on the landside of the levee and 55% on the riverside of the levee.

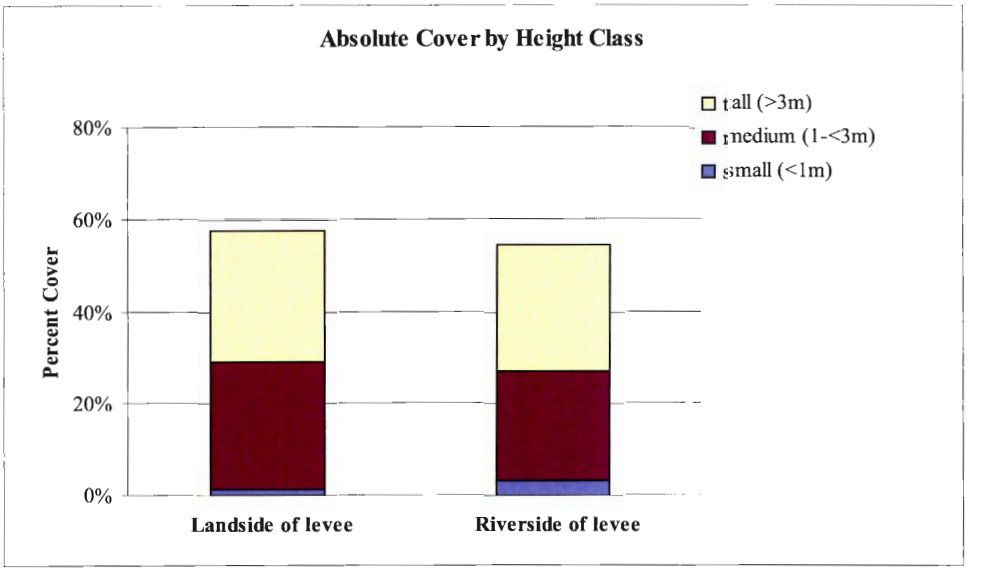


Figure 7. Percent contribution to absolute cover for each height class, tall, medium and small.

B. Herbaceous Understory Monitoring

Understory seeding was completed in December of 2009 with a mix native perennial species known to aggressively colonize a site and reduce competing weed species cover in the long term. It has been documented that the species selected respond well to disturbance, including flood and fire, and are expected to persist on the site indefinitely. The aisles between planting rows are direct seeded with three mixtures; one third of the aisles with a mugwort mix, one third with a gumplant mix, and one third with creeping wildrye. Additional species are included in the mugwort and gumplant mixes, including evening primrose and western goldenrod, to increase understory diversity and wildlife benefits. In fields on the landside of the levee, in addition to seeding the aisles, the planting berms were also direct seeded by hand.

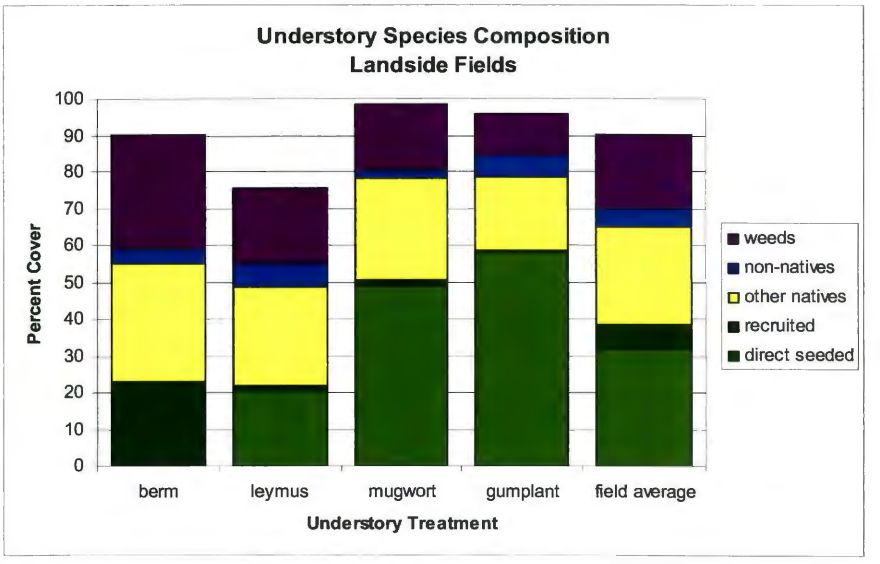


Figure 8. Percent cover of the herbaceous understory in the landside fields.

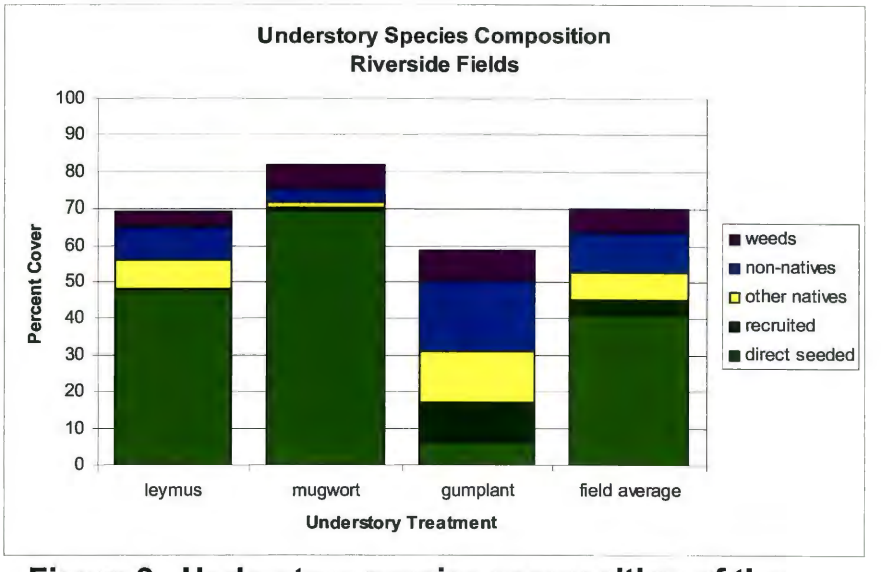


Figure 9. Understory species composition of the Riverside Fields.

Monitoring efforts during the growing season of 2010 provides us with data to quantify the establishment of our seeded native species at the Buffington Unit. Figure 8 and 9 shows the contribution to herbaceous cover that each category of plant provides on the landside and riverside of the levee respectively. The category "Seeded" includes species that were planted at a site and include mugwort, creeping wildrye, evening primrose, and western goldenrod. "Recruited" species are those that were planted in the aisles and as seedlings (such as blackberry and coyote brush) and were observed in areas where they were not directly seeded. "Other natives" include species which are not seeded or planted at the project

but which are native to the area. "Non-natives" include species which are not native to the area but are not listed as weeds by the California Department of Food and Agriculture (CDFA). "Weeds" include any on-native species listed on the California Invasive Plant Council's Noxious Weed List (CalIPC 2006) as well as any species listed as noxious by the CDFA. A list of all species encountered in herbaceous monitoring is included in Appendix B.

C. Photo Points

Permanent photo points were established in April 2008 to visually monitor changes on the site over the course of the project. Photo point monitoring is conducted annually in the late growing season. The locations and directional information for these photo points is provided in Appendix A. A sample of photos that are representative of the site are presented in Appendix A. All photos presented were taken in August of 2010.

IV. DISCUSSION

A. Analysis of Activities

Average survivorship of all species across the site was 87% which exceeds the minimum performance standard of 70%. Only golden currant on the land side of the levee showed survivorship lower than 70%, indicating that this species may not be well suited to these fields. The overall high performance of vegetation at this site creates a dense habitat cover that is structurally diverse and will provide valuable cover and forage for wildlife species including riparian brush rabbit.

B. Activities and Potential Challenges for 2011

River Partners activities at the Buffington Unit for the year 2011 will focus on continued weed control and irrigation. The additional season of irrigation and weed control will help native species establishment by encouraging root growth of native species to reach the water table and by discouraging cover from non-native and invasive weed species.

In addition to maintenance activities River Partners will continue to monitor plant growth, survivorship, and herbaceous understory establishment. These measures document the plant growth and establishment in the early maintenance years of restoration. This information also provides important baseline data for future long-term monitoring of restoration sites.

River Partners anticipates no major challenges for 2011 and anticipates focusing activities on maintenance and monitoring.

V. CONCLUSIONS

For project year three (Jan. 2010 – Dec. 2010) of the restoration for the Buffington Tract, San Joaquin River National Wildlife Refuge, restoration has met and exceeded

the goals outlined in the Restoration Plan. Survivorship for all planted species exceeded the minimum performance criteria of 70%, and because of high overall survivorship across the site, no replants were installed in 2010. Maintenance and monitoring activities in 2011 will ensure the future success of this restoration.

VI. REFERENCES

[Cal-IPC] California Invasive Plant Council. 2006. California Invasive Plant Inventory. Cal-IPC Publication 2006-02. Berkeley, California: California Invasive Plant Council. 39 p. http://www.cal-ipc.org/ip/inventory/index.php. Accessed: August 28, 2010.

ESRP (Endangered Species Recovery Program) 2002. Controlled Propagation and Translocation of Riparian Brush Rabbits: Annual Report for 2002.

Howell, C.A. & M.D. Dettling. 2007. Least Bell's Vireo Monitoring, Nest Predation Threat Assessment, and Cowbird Parasitism Threat Assessment at the San Joaquin River National Wildlife Refuge: 2007 Field Season Final Report.

River Partners. 2008a. Restoration Plan for the Buffington Tract, San Joaquin River National Wildlife Refuge. Modesto, California.

River Partners, 2008b. 2010 Monitoring Program Plan for River Partners. Chico, California.

Talley, T.S., D. Wright, M. Holyoak. 2006. Assistance with the 5-Year Review of the Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) Report prepared for the United States Fish and Wildlife Service, Sacramento, CA.

Appendix A

Photographs of Buffington Unit, San Joaquin River National Wildlife Refuge

(Above) Field B3. View of field B3 from atop the project levee facing North. **(Top Left) Field B2**. Top left is view of field from atop the project levee. **(BottomLeft) Field B2.** Pphoto shows dense vegetative cover on one of the 'bunny berms' strategically placed in the field to direct brush rabbit and other mammals to high ground during

(Left) Field B9. Photo showing dense understory of mugwort and native riparian vegetation including coyote brush and arroyo willow amongst others.

(Right) Field B7. Photo of field B7 showing developing blackberry, box elder, sandbar willow and coyote brush, and others surrounded by remnant valley oak forest.

Appendix B

Master Species list for 2010 Herbaceous Monitoring

Common name	*Latin name*	Native	weed status
goosefoot	*Amaranthus spp*	Non-native	
fiddleneck	*Amsinckia menziesii*	Native	
mugwort	*Artemisia douglasiana*	Native	
fat hen	*Atriplex triangularis*	Native	
coyote brush	*Baccharis pilularis*	Native	
black mustard	*Brassica nigra*	Non-native	moderate
foxtail chess	*Bromus madritensis ssp. rubens*	Non-native	high
spikeweed	*Centromadia pungens*	Native	
lamb's quarters	*Chenopodium album*	Non-native	
nettle-leaf goosefoot	*Chenopodium murale*	Non-native	
poison hemlock	*Conium maculatum*	Non-Native	moderate
field bindweed	*Convolvulus arvensis*	Non-native	none / C
south american horseweed	*Conyza bonariensis*	Non-native	
mare's tail	*Conyza canadensis*	Native	
swine cress	*Coronopis didymus*	Non-Native	
calabazilla	*Cucurbita foetidissima*	Native	
nutsedge	*Cyperus eragrostis*	Native	
jimson weed	*Datura wrightii*	Native	
stinkwort	*Dittrichia graveolens*	Non-native	moderate
barnyard grass	*Echinochloa sp*	Non-native	
willowherb	*Epilobium ciliatum*	Native	
broad-leafed filaree	*Erodium botrys*	Non-native	
western goldenrod	*Euthamia occidentalis*	Native	
California cudweed	*Gnaphalium californicum*	Native	
gumplant	*Grindelia camporum*	Native	
sunflower	*Helianthus annuus*	Native	
telegraph weed	*Heterotheca grandiflora*	Native	
prickly wild lettuce	*Lactuca serriola*	Non-native	
silver leaf horseweed	*Laennecia coulteri*	Native	
pepperweed	*Lepidium latifolium*	Non-native	High
creeping wildrye	*Leymus triticoides*	Native	
Spanish clover	*Lotus purshianus*	Native	
hyssop's loosestrife	*Lythrum hyssopifolium*	Non-native	moderate
sweet clover	*Melilotus albus*	Non-native	
annual yellow sweetclover	*Melilotus indicus*	Non-native	
Indian tobacco	*Nicotania quadrivalvis*	Native	
evening primrose	*Oenothera elata*	Native	
bristly ox-tongue	*Picris echioides*	Non-Native	limited
smartweed	*Polygonum spp.*	Non-Native	
rabbitsfootgrass	*Polypogon monspeliensis*	Non-native	limited
common purslane	*Portulaca oleraceae*	Non-native	
wild radish	*Raphanus sativus*	Non-native	
California rose	*Rosa californica*	Native	
California blackberry	*Rubus ursinus*	Native	
curly dock	*Rumex crispus*	Non-native	limited
sandbar willow	*Salix exigua*	native	
milk thistle	*Silybum marianum*	Non-native	limited
common nightshade	*Solanum americanum*	Native	
sow thistle	*Sonchus oleraceus*	Non-native	
johnson grass	*Sorghum halpense*	Non-Native	none / C
strawberry clover	*Trifolium fragiferum*	Non-native	
stinging nettle	*Urtica dioica*	Native	
water speedwell	*Veronia anagallis-aquatica*	Non-native	