

2009 DRY CREEK RED SESBANIA CONTROL PROGRAM MONITORING REPORT



Before Sesbania Treatment 6-24-09



Gary Omori and Rich Gresham



After Sesbania Treatment 11-12-09

Prepared for:

Placer County Resource Conservation District
251 Auburn Ravine Road, Suite 107
Auburn, California 95603-3719
(530) 885-3046 x 118

Prepared by:

Ramona Robison, Ph.D.
California Botanical Surveys and Tours
1925 Meer Way
Sacramento, CA 95822
916-802-2004

January 31, 2010



2009 Dry Creek Red Sesbania Control Program Monitoring Report

Executive Summary

In 2009, the Dry Creek Red Sesbania Control Program continued and two control sweeps of the watershed were conducted; one in July and one in October. A November monitoring visit conducted by SAFCA indicated that less than 1% of the Sesbania population remained. Therefore, the 2009 program met its success criterion. A comparison of 2008 and 2009 monitoring results and control data is presented, and a paper was prepared estimating the time to eradication and control costs for Red Sesbania in Dry Creek.

List of Figures

Figure 1. 2009 Dry Creek Red Sesbania Monitoring Locations

List of Tables

Table 1. Annual Success Criteria
Table 2. 2009 Dry Creek Sesbania Monitoring Data Summary
Table 3. Dry Creek Sesbania Monitoring Data Comparison for June 2008 and 2009 Visits

Appendices

Appendix A. Monitoring Protocol
Appendix B. 2009 Representative Monitoring Photographs
Appendix C. 2009 Monitoring Forms
Appendix D. 2009 Agri Chemical Work Summary
Appendix E. Sesbania Future Costs and Time to Eradication Paper

2009 Dry Creek Red Sesbania Control Program Monitoring Report

Introduction

The Sacramento Area Flood Control Agency (SAFCA) conducted an invasive plant control program for red sesbania (*Sesbania punicea*)(Sesbania) in the Dry Creek watershed from 2004 to 2006. The project was known as the Dry Creek Watershed Red Sesbania Control Project, Phase I (Phase 1 Project). The Phase 1 Project was funded by a California Department of Water Resources Proposition 13 Flood Protection Corridor Program grant administered by SAFCA. Since 2007, the maintenance phase of the removal program has been funded through a partnership between SAFCA, Sacramento County, Placer County, and the cities of Sacramento and Roseville. The project is administered by Placer County Resource Conservation District. The goal of the project is to reduce the potential for flooding in Dry Creek and to improve wildlife habitat in the watershed. The objective is to continue to remove and control seedlings of Sesbania, anticipating a diminishing level of effort over time.

This report presents the results of the 2009 monitoring effort. Monitoring was conducted by Ramona Robison with the assistance of SAFCA staff June, and by SAFCA staff in November. The 2009 Dry Creek Sesbania removal contractor was Agri-Chemical and Supply, Inc., of Salinas, California. Gary Omori, Agri-Chemical's Salinas office Area Manager, directed the removal effort. Agri-chemical conducted two control "sweeps" of the watershed and monitoring was conducted before sweep 1 and after sweep 2.

The contract performance criterion was:

Table 1. Annual Success Criterion			
Year	Anticipated Condition at Start of Work Year	Success Criteria at End to Work Year	Overall Goal
Year 1 (2008)	10-30% cover in lower watershed, >10% cover in upper watershed	Removal of 99% of red sesbania by October 15	Eradication of Red Sesbania; <1% remaining in treatment area at end of program

Methods

In 2008, the Dry Creek Sesbania monitoring program changed to meet requirements of grants and to provide better information on the condition of the infestation. In previous years, a series of over 50 monitoring photographs were taken throughout the watershed. These photographs were useful during the early phases of the project when large shrubs were being removed, creating obvious "before and after" photographs. However, for the past few years the emphasis of control work has been on seedling removal which is not as easily monitored using photographs alone. The performance criterion for the project is removal of 99% of the Sesbania cover, and a quantitative means of assessing cover before and after treatments was needed. The methods developed in 2008 were repeated again in 2009, and a monitoring protocol was developed for future use (Appendix A).

In 2009 we monitored the Sesbania infestation in six locations, collecting data on four 1 meter square quadrats at each location. Sampling locations with sand bars exposed during low flows

2009 Dry Creek Red Sesbania Control Program Monitoring Report

were chosen to represent the upper, middle and lower watershed (see Figure 1 and photographs in Appendix B). Several of the locations in the upper watershed (Royer Park in Roseville and downstream of Walerga Road) had few Sesbania plants, but were chosen to represent the condition in that portion of the Dry Creek watershed. Our choice of quadrat locations within the sandbar was also biased – we tried to choose quadrats with at least one live or dead Sesbania plant in them, even if the majority of the sandbar was free of Sesbania plants. This resulted in a higher cover classification than if randomly placed quadrats were used. However, the sampling unit was really the entire sandbar and the Sesbania occurring there was the focus of the monitoring effort. Permanent quadrats were also not chosen because of the dynamic nature of the river system.

During monitoring visits we took photographs of each quadrat and photographed a six foot tall pole marked off in one foot intervals to record overall vegetation height. We collected percentage cover data in each quadrat for live Sesbania alone and for all other live plant species present. The cover classes used are listed in Table 2. We counted all live Sesbania plants in the quadrat and measured the height of 10 plants to determine mean height per quadrat.

The first monitoring visit was completed on June 24, 2009 by Ramona Robison and Caitlin Talkington of SAFCA. Agri Chemical and Supply, Inc. conducted their first sweep July 20 to 28 and their second sweep October 9 to 12. Only two sweeps of the watershed and two monitoring visits were conducted in 2009 due to budget constraints. The final monitoring visit was completed on November 12, 2009 by KC Sorgen and Sarah Somers of SAFCA.

Results and Discussion

Photographs of the “before and after” condition of the Sesbania infestation in Dry Creek and its tributaries are presented in Appendix B. The table below summarizes the cover classes observed in June (before) and November (after). Data sheets with all quadrat information are included in Appendix C.

Once again, in June, the largest number of live Sesbania plants per square meter was at the SAFCA property north of Hansen Ranch where we counted 82 plants in one of our quadrats. During the November visit the largest number of live plants observed in any of the quadrats was 13 which were treated plants that had started re-sprouting. In many cases there were no live Sesbania plants in the quadrats (Walerga and Hansen locations).

The cover class information presented in Table 2 presents the highest and lowest cover classes observed in the four quadrats at each monitoring location. It should be noted that sample locations within the monitored sandbars were not randomly chosen. An attempt was made to place each quadrat in a location with either a live or dead Sesbania plant. All locations had 5% cover or less in November. When live Sesbania plants were observed during monitoring visits we measured them and then pulled them by hand. There were so few plants remaining in the November visit that we were able to remove all live plants in the six monitoring locations. Most of the quads observed in November had 1% or less sesbania cover with only three quads overall containing 5% or less Sesbania cover.

2009 Dry Creek Red Sesbania Control Program Monitoring Report

Table 2. 2009 Dry Creek Sesbania Monitoring Data Summary					
Monitoring Location	June Cover Classes	November Cover Classes	June Mean Number of Plants per Meter	November Mean Number of Plants per Meter	Notes
Hidden Valley, Granite Bay	4, 3, 1, 2	1, 2, 1, 1, 1, 1, 1	16.75	2.3	
Royer Park, Roseville	2, 3, 2, 5	1, 1, 2, 2	14.75	4.5	
Walerga Road, Placer County	2, 3, 2, 3	1, 0, 0, 0	8.75	NONE	
Gibson Ranch, Elverta	2, 3, 4, 4	1, 1, 1, 1	15.5	NONE	
Above Dry Creek Road	2, 6, 5, 4	Not monitored	53	Not monitored	
Roy Hayer Park, Rio Linda	Not monitored	1, 1, 1, 1	Not monitored	1.75	
Upstream of Hansen Ranch, Rio Linda	3, 4, 4, 4	1, 0, 0, 1	56.3	2.5	
Cover Classes: 0-1%= 1; 1-5%= 2; 5-25%= 3; 25-50%= 4; 50-75%= 5; 75-95%= 6; 95-100%= 7 * Monitoring location was different in August and October than the original June location.					

Outside the six monitoring locations, a few Sesbania plants were observed by monitors downstream of Royer Park. They had not flowered and were approximately 4 feet tall. Sesbania plants were also observed re-sprouting in some locations during the November monitoring visit (see November Appendix C Monitoring Forms).

In 2009 we again collected information on the pant species associated with Sesbania and results were similar to 2008. Many quadrats contained grasses, sedges (*Cyperus* spp.), rushes (*Juncus* spp.), willows (*Salix* spp.), knotweed (*Polygonum* spp.), fireweed (*Epilobium* spp.), mugwort (*Artemisia douglasiana*), beggar’s ticks (*Bidens frondosa*), and valley oak seedlings (*Quercus lobata*). Other non-native and invasive plants were also observed including Himalaya berry (*Rubus discolor*), plantains (*Plantago lanceolata* and *P. major*), cut-leaf geranium (*Geranium dissectum*), cocklebur (*Xanthium strumarium*), sweet clover (*Melilotus* sp.), cudweed (*Gnaphalium* sp.), and Mexican tea (*Chenopodium ambrosioides*).

In 2009 we observed a few other invasive plants of note while monitoring for Sesbania. Waterprimrose (*Ludwigia* sp.) was observed upstream of Dry Creek Road and Acacia seedlings were observed upstream of Hansen Ranch during 2009 monitoring.

Comparison of 2008 and 2009 Results

The following information compares results of 2008 and 2009 monitoring and control efforts on Dry Creek.

2009 Dry Creek Red Sesbania Control Program Monitoring Report

Monitoring Location	2008 June Mean Number of Plants per Meter	2009 June Mean Number of Plants per Meter	Notes
Hidden Valley, Granite Bay	12	16.75	
Royer Park, Roseville	2	14.75	
Walerga Road, Placer County	3.5	8.75	
Gibson Ranch, Elverta	12.5	15.5	
Roy Hayer Park, Rio Linda (2008)	16.8	53	
Dry Creek Road Upstream (2009)			
SAFCA Property North of Hansen Ranch, Rio Linda	72.5	56.3	

Other invasive species observations

In 2008, Chinese tallow (*Sapium sebiferum*) seedlings were observed in one quadrat in June and two quadrats in October in Roseville at Royer Park. This species was not observed in monitoring quads in 2009. Similarly, Eucalyptus seedlings were observed in June and October on the SAFCA property north of Hansen Ranch in 2008 and were not observed in 2009.

Summary of 2009 Weed Removal Contractor Work

Appendix D contains a summary prepared by Gary Omori, manager of weed removal with Agri Chemical. The following table is summarized from his results. Note that the number of tanks used and number of bags of seeds collected decreased in 2009 compared to 2008.

Removal Dates	Number of Tanks¹ Herbicide Used	Number of Bags² Collected	Number of Operator Hours
July 15 to 23, 2008	434	70	--
September 8 to 12, 2008	32.5	14	--
July 20 to 28, 2009	230	25	430
October 9 to 12, 2009	80	4	200

1. 1 tank load is approximately 4.5 gallons of mixed herbicide solution.
2. 1 seed bag is 33 gallons.

2009 Dry Creek Red Sesbania Control Program Monitoring Report

Conclusions

The 2009 treatment year was successful in removing 99% of the germinated Sesbania population. The contractor also removed all Sesbania pods from the floodway, preventing future germination of those seeds. Since the project started in 2004 the focus has been on removal of upstream seed producing Sesbania plants, and given the reduction in seed production each year (i.e. all seed pods removed), the seedbank should continue to decline over time. While results this year are promising, treatments must continue until the population is reduced to low levels. The size of the Dry Creek Sesbania population increased with the heavy rainfall in 2006 due to high water flows bringing seeds from low-flow channel sediments up onto the upper floodplain where they germinated far from the channel. Therefore the level of treatment effort needed in high rainfall years is expected to increase. This year, 2009, was the first year it was possible to compare the Sesbania percentage cover and seedlings per square meter in order to determine if the amount of seed germinating from the seedbank is decreasing over time. As Table 3 shows, only one monitored location showed a decrease in the number of seedlings per meter.

In order to estimate the time to eradication and costs involved in management, Gina Darin and I prepared a paper for the California Invasive Plant Council's annual symposium in October 2009. The paper is included in this report as Appendix E. We found the model we chose to use, WeedSearch, under-predicted the amount spent on Sesbania removal and management, and predicts that the time to eradication may be as long as 22 years. However, since Sesbania did not begin to rapidly expand its range in California until after 2000, we do not have any direct evidence to indicate the actual time to eradication.

Appendix A – Monitoring Protocol 2009 Dry Creek Red Sesbania Program Monitoring Report

This monitoring protocol describes the methods used in 2008 and 2009 and is intended to serve as a template for future monitoring efforts. Future monitoring protocols may need to be changed as the distribution of sesbania changes over the years and the intensity of the management effort decreases.

Overview of Monitoring:

- Monitor before first treatment and after final treatments
- Collect monitoring data at 6 locations
- Collect 4 1-meter square quadrats per location
- Place quads on low flow sandbar or other area with some sesbania plants
- Photograph quad and take some before and after photos of yearly effort
- Collect percent cover class of sesbania and other plants present in quad
- Count number of sesbania seedlings in quad
- Measure height of 10 sesbania seedlings
- Check random locations along Dry Creek and tributaries to monitor treatment success

Methods

In 2008, the Dry Creek Sesbania Monitoring Program changed to meet requirements of grants and to provide better information on the condition of the infestation. In previous years a series of over 50 monitoring photographs were taken throughout the watershed. These photographs were useful during the early phases of the project when large shrubs were being removed, creating obvious “before and after” photographs. However, for the past few years the emphasis of control work has been on seedling removal which is not as easily monitored using photographs alone. The performance criteria for the project is removal of 99% of the sesbania cover, and a quantitative means of assessing cover before and after treatments was needed.

In 2008 and 2009 we monitored the sesbania infestation in **six locations, collecting data on four 1 meter square quadrats at each location.** Sampling locations with sand bars exposed during low flows were chosen to represent the upper, middle and lower watershed (See attached location maps). Overall, monitoring locations were chosen in areas with easy access from public roads. Several of the locations in the upper watershed (Royer Park in Roseville and Walerga Road) had few sesbania plants, but were chosen to represent the condition in that portion of the Dry Creek watershed. In 2008, we monitored at Hayer Dam Park in Rio Linda. Conditions were good for the first monitoring visit in that location, but during later visits the lower sandbar was flooded due to increased beaver activity downstream. For that reason the monitoring location in that area was changed to upstream of the Dry Creek Road bridge crossing in 2009.

We choose quadrat locations within each monitoring area with at least one live or dead sesbania plant in them, even if the majority of the sandbar was free of sesbania plants. This resulted in a higher cover classification than if randomly placed quadrats were used. However, the sampling unit was really the entire sandbar and the sesbania occurring there was the focus of the monitoring effort. Permanent quadrats were also not chosen because of the dynamic nature of

Appendix A – Monitoring Protocol
2009 Dry Creek Red Sesbania Program Monitoring Report

the river system. Suggested sampling locations within each monitoring area are included in the attached location maps.

During monitoring visits we took **photographs of each quadrat** and photographed a six foot tall pole marked off in one foot intervals to record overall vegetation height. We collected **percentage cover data in each quadrat** for live sesbania alone and for all other live plant species present (see attached blank and example data form). The cover classes used are listed on the monitoring form. We counted all live sesbania plants in the quadrat and measured the height of 10 plants to determine mean height per quadrat.

Description of Monitoring Sites, Upstream to Downstream (see also attached maps)

Hidden Valley

Hidden Valley is the only location where it is necessary to call before monitoring. We usually contact Roy who maintains the open space area for the Hidden Valley Homeowners Association (916-871-7120) to let him know we are going to be out. The parking location is at the end of Pine Gate Way off Auburn Folsom Road. This area has several sampling locations noted because there are a few plants and you may have to search to find some to monitor. Recently we have been sampling in the areas marked as samples 1 to 6, depending on how many plants are present. The area marked as HV sample 7 had a large mature plant growing there until 2007 so there is still an active seedbank. It is slightly drier than the pond-side locations so may not continue to support plants.

2006 was a high rain year and the pond areas overflowed at Hidden Valley. As a result, dirt moved downstream and the size of the infestation moved away from the pond edges. Future control and monitoring efforts should take this into account.

Royer Park

Royer Park is easy to access from the park and ride located on the south side of Douglas off Franklin Street. The sandbar monitored is not heavily infested, and the sesbania is usually in the lowest parts near the water's edge.

Walerga Road

The Walerga Road monitoring location is downstream of the Dry Creek crossing with Walerga. Parking is available on the Walerga Road shoulder. The monitoring location is on a sandbar downstream of the bridge crossing and can be found by following the path that leads in that direction. There is a large metal ball in the stream just upstream of the monitoring location sandbar.

Gibson Ranch

Gibson Ranch is a County Park and so payment for entry may be necessary, but we have been able to park just inside the entry kiosk for free in 2009. The monitoring location is at the end of

Appendix A – Monitoring Protocol
2009 Dry Creek Red Sesbania Program Monitoring Report

a path leading down into the stream from end of the dirt access road. This area has several sand bars to choose from which usually support sesbania near the water's edge.

Dry Creek Road, 2009

This location was chosen in 2009 to replace the Hayer Dam park location further downstream. It is located on Dry Creek Road north of Elkhorn Blvd. on the north side of the bridge. The monitoring location can be reached off the path following the north side of the creek.

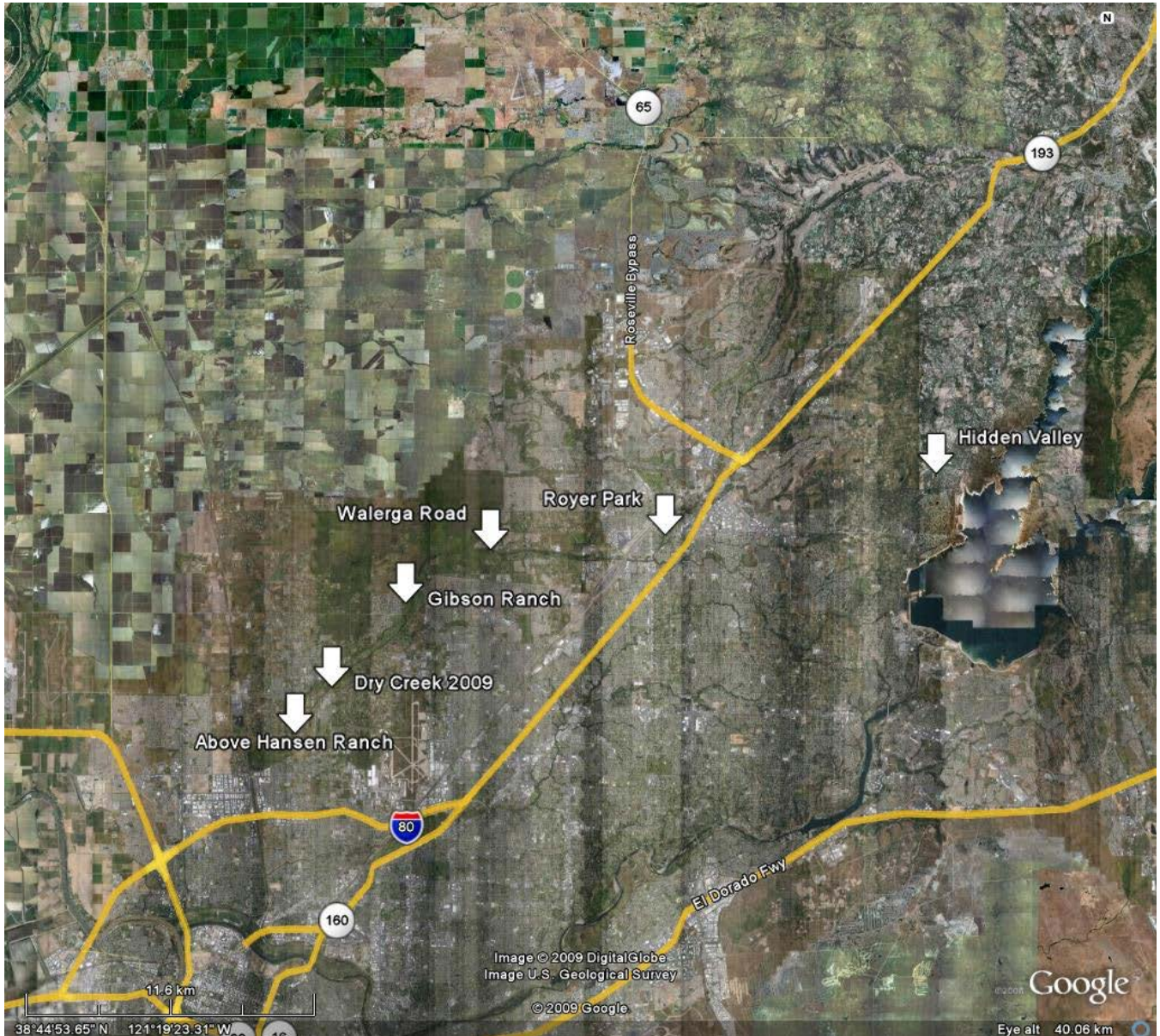
Above Hansen Ranch

The parking location for this monitoring location is on the corner of Ascot and 4th Street. There is a path that leads upstream, around the flood control gate and toward the creek. The sandbar is located on the northwest side of the creek, downstream of the intersection with a tributary channel. This area was chosen due to its ease of access from the public road. However, Hansen Ranch downstream contains some of the largest infestations in the watershed and would also be a good monitoring location. In 2006 the sesbania in the lower parts of Hansen Ranch also expanded after high flows and flooding. Sesbania on Hansen Ranch can be found along the main Dry Creek channel as well as the along the normally dry side channel located to the north of the main channel.

**Appendix A – Monitoring Protocol
2009 Dry Creek Red Sesbania Program Monitoring Report**

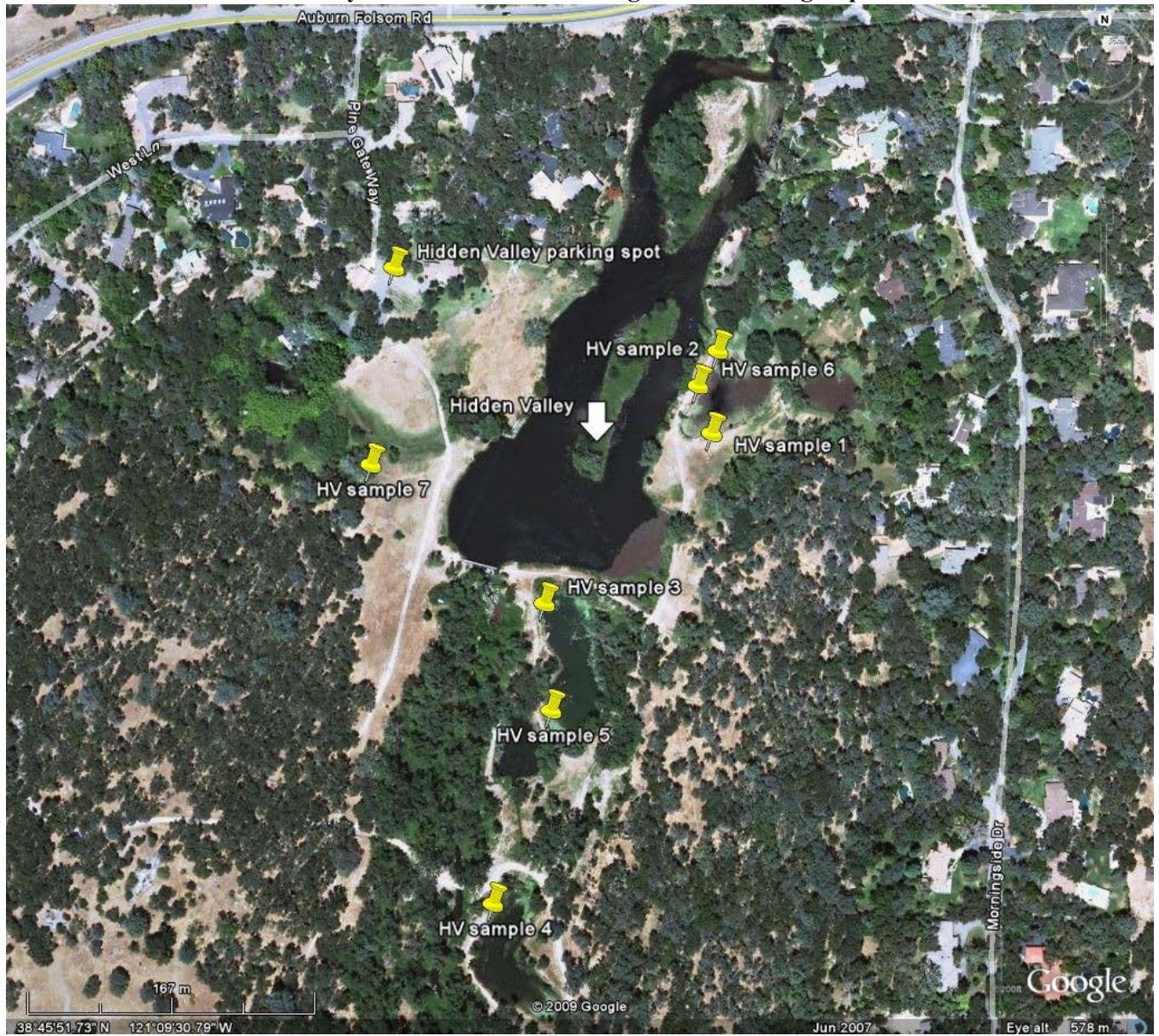
Dry Creek Monitoring				
Date and Location:	Data Collected by:			
	Quad 1	Quad 2	Quad 3	Quad 4
GPS waypoint And location				
Photographs				
Total percentage cover Sesbania				
Total cover in quad				
Number of Sesbania				
Height 1				
Height 2				
Height 3				
Height 4				
Height 5				
Height 6				
Height 7				
Height 8				
Height 9				
Height 10				
Mean height				
Asso. 1				
Asso. 2				
Asso. 3				
Asso. 4				
Asso. 5				
Asso. 6				
Asso. 7				
Asso. 8				
Asso. 9				
Asso. 10				

**Appendix A – Monitoring Protocol
2009 Dry Creek Red Sesbania Program Monitoring Report**



Dry Creek Sesbania Monitoring Locations 2009

Appendix A – Monitoring Protocol
2009 Dry Creek Red Sesbania Program Monitoring Report



Hidden Valley Overview

Appendix A – Monitoring Protocol
2009 Dry Creek Red Sesbania Program Monitoring Report



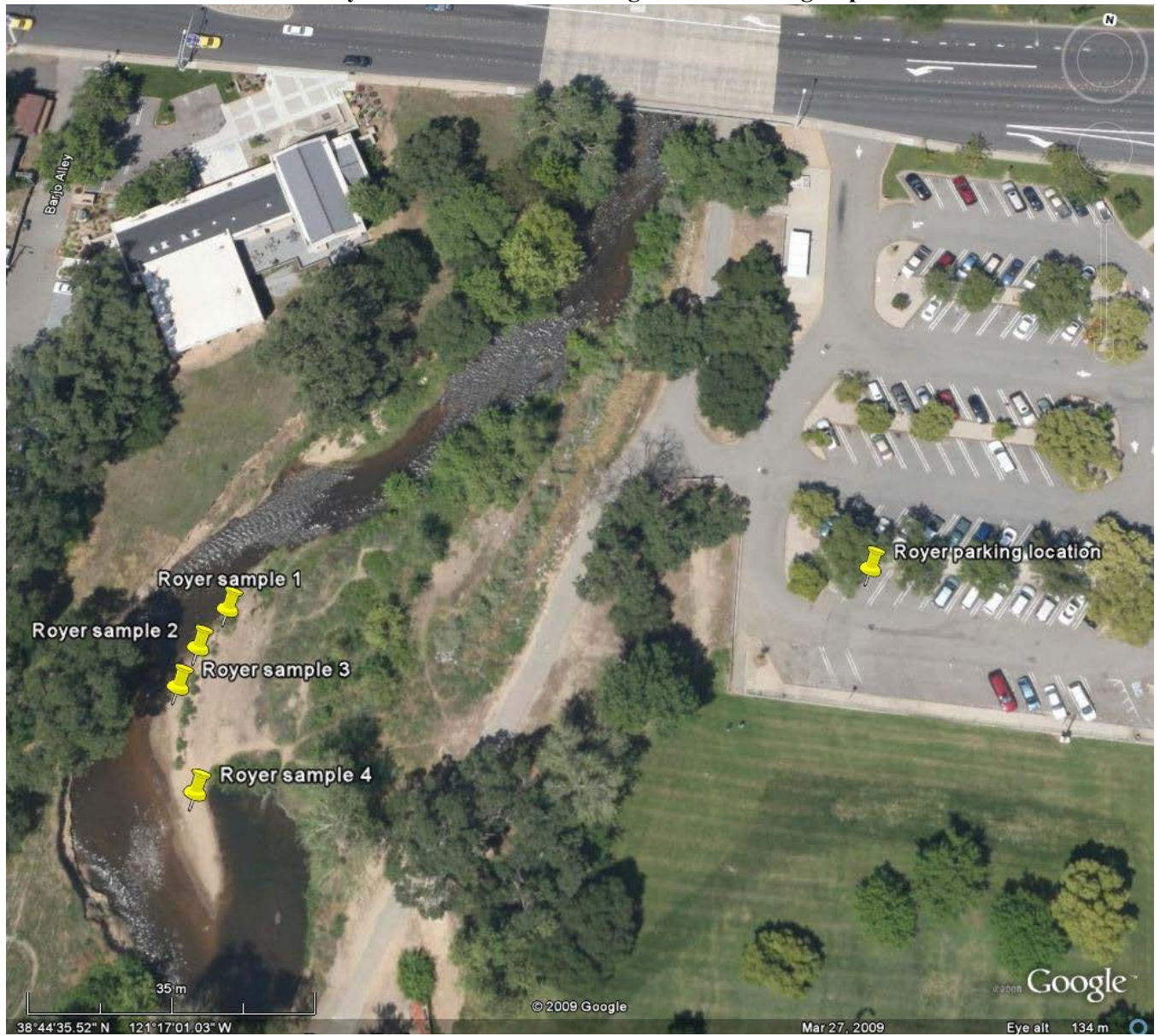
Hidden Valley Close-Up 1

Appendix A – Monitoring Protocol
2009 Dry Creek Red Sesbania Program Monitoring Report



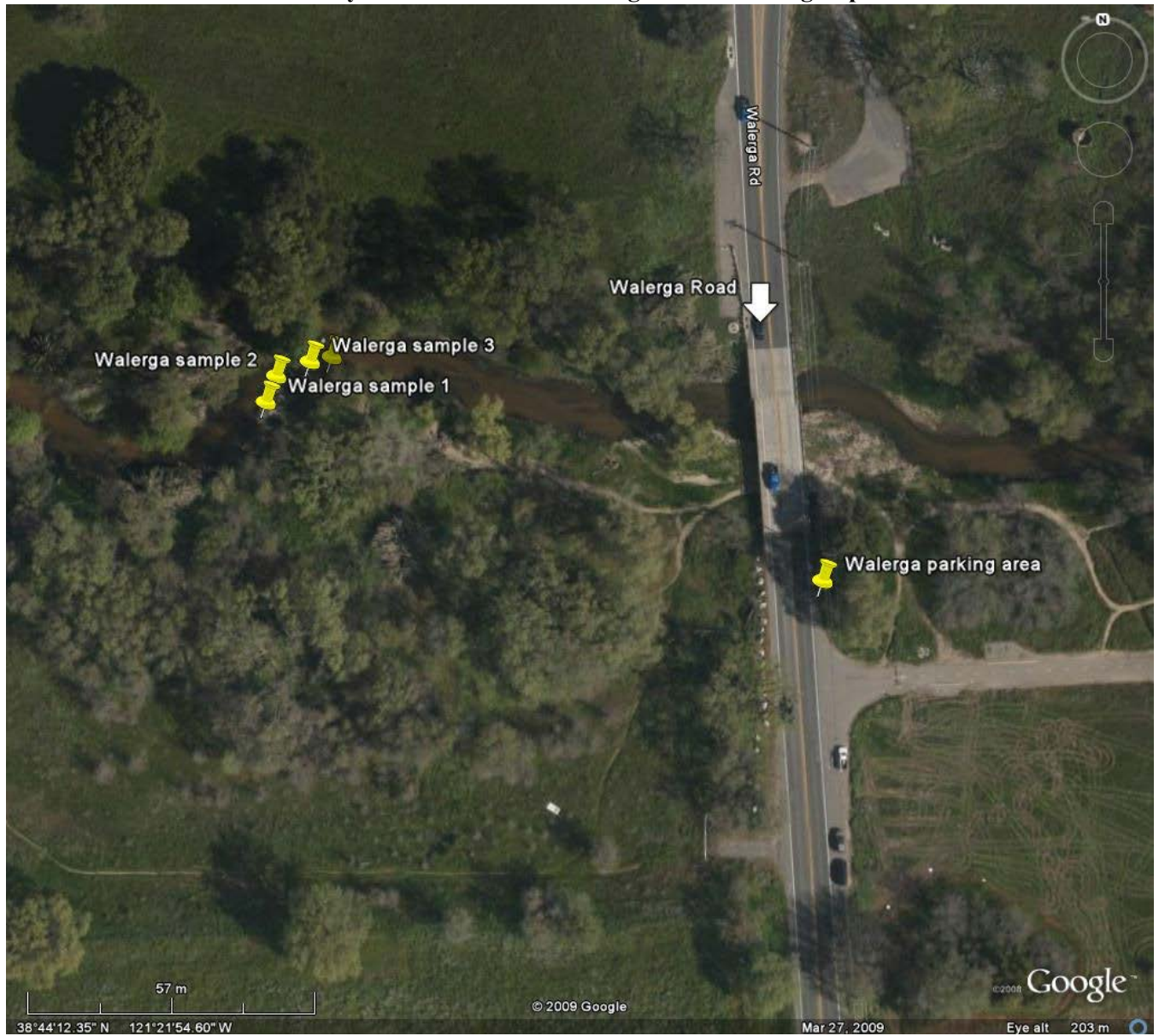
Hidden Valley Close-Up 2

Appendix A – Monitoring Protocol
2009 Dry Creek Red Sesbania Program Monitoring Report



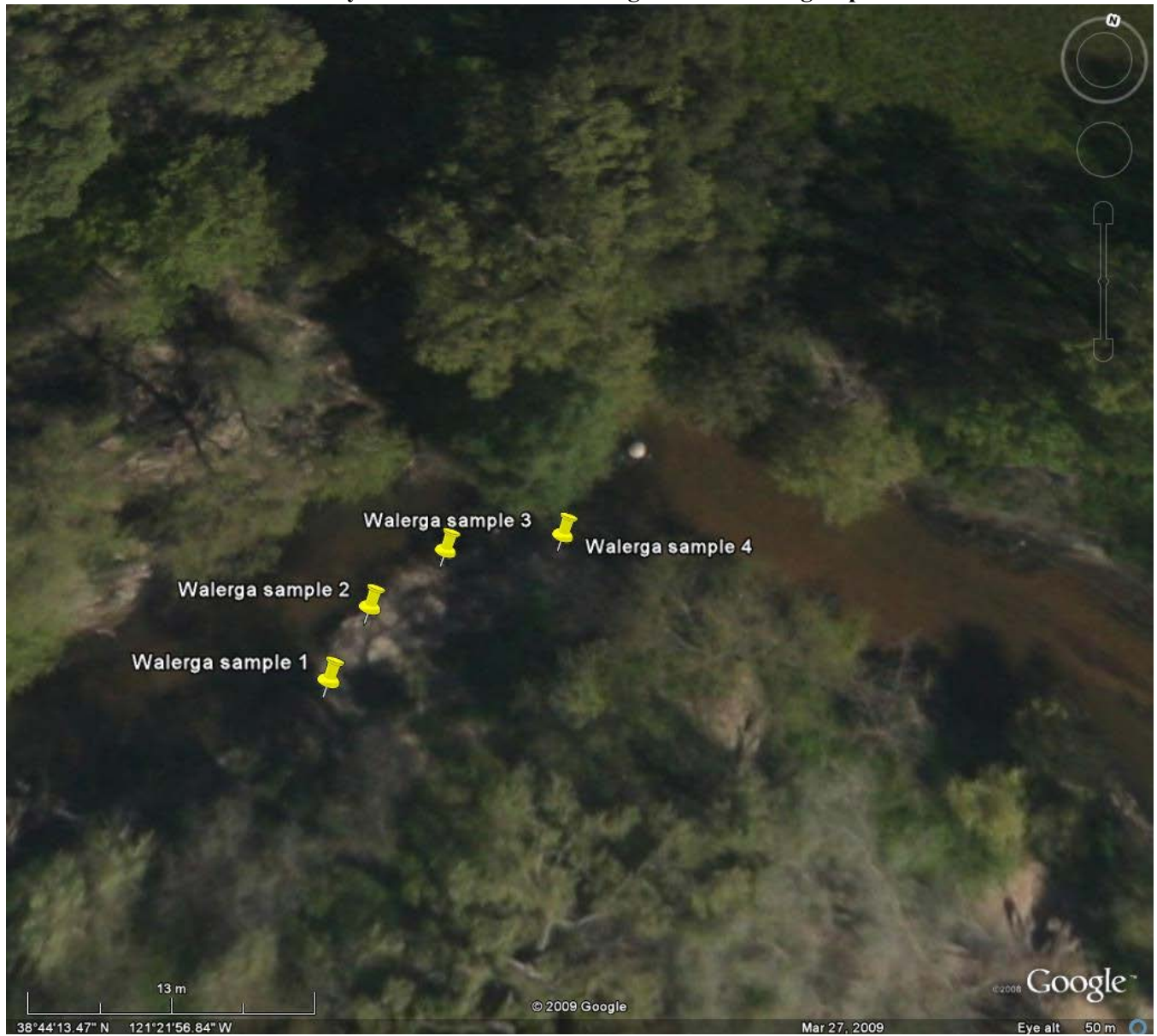
Royer Park, Roseville

Appendix A – Monitoring Protocol
2009 Dry Creek Red Sesbania Program Monitoring Report



Walerga Road Overview

Appendix A – Monitoring Protocol
2009 Dry Creek Red Sesbania Program Monitoring Report



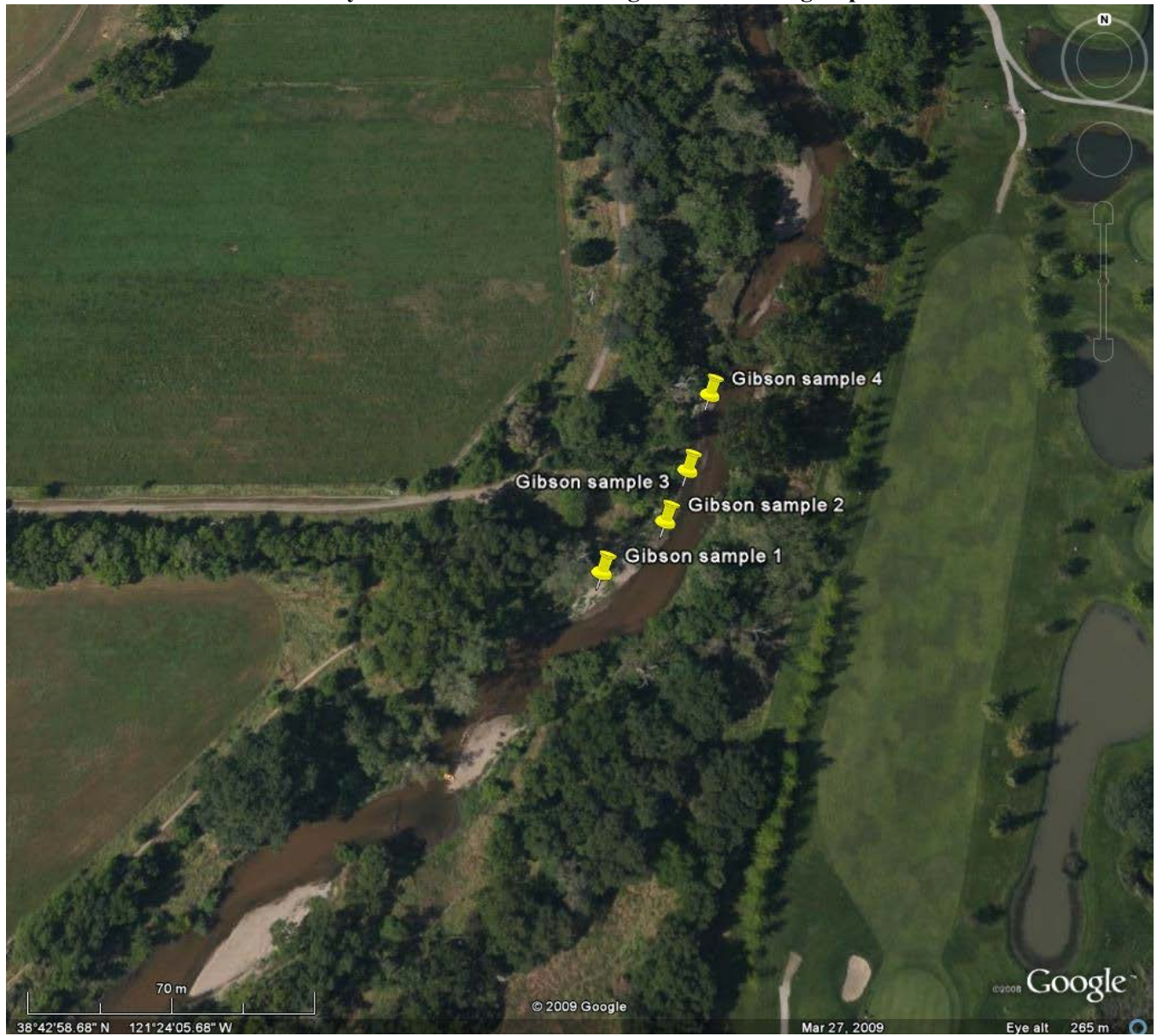
Walerga Road Close-Up

Appendix A – Monitoring Protocol
2009 Dry Creek Red Sesbania Program Monitoring Report



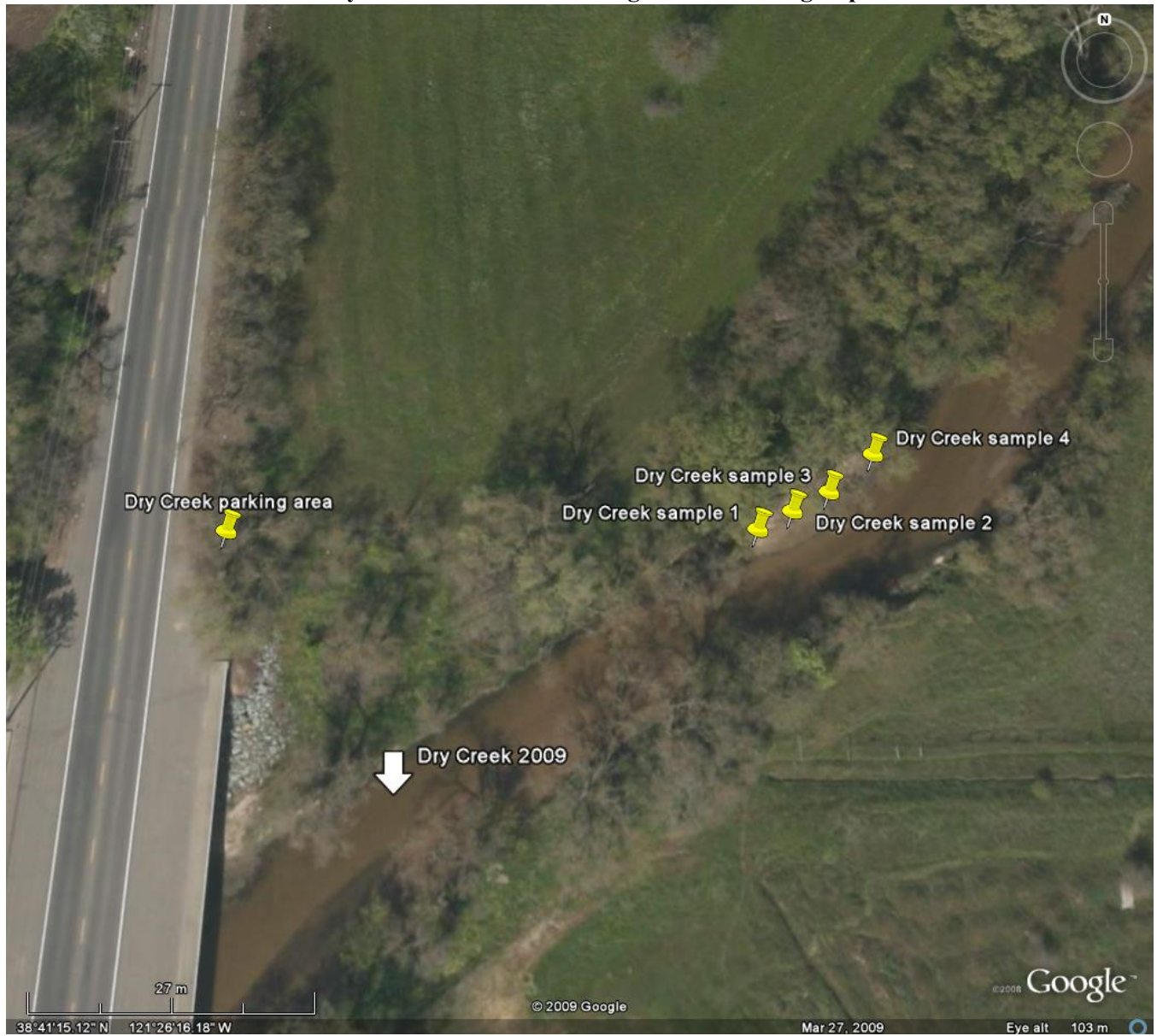
Gibson Ranch Overview

Appendix A – Monitoring Protocol
2009 Dry Creek Red Sesbania Program Monitoring Report



Gibson Ranch Close-Up

Appendix A – Monitoring Protocol
2009 Dry Creek Red Sesbania Program Monitoring Report



Dry Creek 2009

Appendix A – Monitoring Protocol
2009 Dry Creek Red Sesbania Program Monitoring Report



Above Hansen Ranch Overview

Appendix A – Monitoring Protocol
2009 Dry Creek Red Sesbania Program Monitoring Report



Appendix A – Monitoring Protocol
2009 Dry Creek Red Sesbania Program Monitoring Report



Above Hansen Ranch Close-Up

**Appendix B – 2009 Representative Photographs
2009 Dry Creek Red Sesbania Program Monitoring Report**

SAFCA Property North of Hansen Ranch, Downstream of Rio Linda Blvd.



SAFCA Property North of Hansen Ranch 6-24-09



SAFCA Property North of Hansen Ranch 11-12-09



SAFCA Property North of Hansen Ranch 6-24-09



SAFCA Property North of Hansen Ranch 11-12-09

**Appendix B – 2009 Representative Photographs
2009 Dry Creek Red Sesbania Program Monitoring Report**

Upstream of Dry Creek Road and Roy Hayer Park, Rio Linda



Upstream of Dry Creek Road 6-24-09



Roy Hayer Park 11-12-09



Upstream of Dry Creek Road 6-24-09



Roy Hayer Park 11-12-09

**Appendix B – 2009 Representative Photographs
2009 Dry Creek Red Sesbania Program Monitoring Report**

Gibson Ranch Park, East of Entry Kiosk



Gibson Ranch 6-24-09



Gibson Ranch 11-12-09



Gibson Ranch 6-24-09



Gibson Ranch 11-12-09

**Appendix B – 2009 Representative Photographs
2009 Dry Creek Red Sesbania Program Monitoring Report**

Walerga Road, Downstream of Bridge



Walerga 6-24-09



Walerga 11-12-09



Walerga 6-24-09



Walerga 11-12-09

**Appendix B – 2009 Representative Photographs
2009 Dry Creek Red Sesbania Program Monitoring Report**

Royer Park Downstream of Douglas Blvd., Roseville



Royer Park 6-24-09



Royer Park 11-12-09



Royer Park 6-24-09



Royer Park 11-12-09

**Appendix B – 2009 Representative Photographs
2009 Dry Creek Red Sesbania Program Monitoring Report**

Hidden Valley, Granite Bay



Hidden Valley 6-24-09



Hidden Valley 11-12-09



Hidden Valley 6-24-09



Hidden Valley 11-12-09

Appendix C – 2009 Monitoring Forms; 2009 Dry Creek Red Sesbania Program Monitoring Report

Dry Creek 2009 Monitoring				
Date and Location: 6/24/09	Hidden Valley		Data Collected by:MR/KT	
	Quad 1	Quad 2	Quad 3	Quad 4
GPS waypoint And location	Adjacent to creek near parking area	Northeast pond near oak	Furthest south pond near big rock	Pond downstream from bridge
Photographs	8869-8870	8871-8872	8876-8877	8880-8881
Cover Class of live Sesbania in quad	4	3	1	2
Cover Class of all live vegetation in quad	5	3	6	7
Number of live Sesbania in quad	45	12	1	9
Height 1 (cm)	12.2	7	16.5	12
Height 2	13	7		9.9
Height 3	13.5	24.8		8.7
Height 4	25.8	20		14
Height 5	25.6	20.2		16.2
Height 6	22	28.4		17.4
Height 7	28.8	5.5		7.5
Height 8	28.6	9		9
Height 9	8	5.8		17.4
Height 10	15	5		
Mean height	19.3	13.3	16.5	12.5
Asso. 1	Mentha (2)	Dead grasses (6)	Live grasses (6)	Sonchus (3)
Asso. 2	Cyperus (3)	Cyperus(3)	Lotus (3)	Conyza (3)
Asso. 3	Rubus (2)	Anagalis arvensis (2)	Polygonum (2)	Lotus (3)
Asso. 4	Juncus bufonius (1)	Epilobium (2)	Gnaphalium (1)	Live grasses (4)
Asso. 5	Geranium dissectum (2)	Live grasses (2)	Unknown forb (1)	Artemisia douglasiana (2)
Asso. 6	Epilobium (1)	Mentha (1)		Rubus discolor (3)
Asso. 7	Live grasses (3)			
Asso. 8	Medicago (1)			

Notes:

Cover Classes: 0-1%= 1; 1-5%= 2; 5-25%= 3; 25-50%= 4; 50-75%= 5; 75-95%= 6; 95-100%= 7

Appendix C – 2009 Monitoring Forms; 2009 Dry Creek Red Sesbania Program Monitoring Report

Dry Creek 2009 Monitoring				
Date and Location: 6/24/09	Royer Park		Data Collected by:MR/KT	
	Quad 1	Quad 2	Quad 3	Quad 4
GPS waypoint And location	Sandbar north of parking lot	Sandbar north of parking lot	Sandbar north of parking lot	Sandbar north of parking lot
Photographs	8862-8863	8864-8865	8866 plot only	8867-8868
Cover Class of live Sesbania in quad	2	3	2	5
Cover Class of all live vegetation in quad	2	5	4	6
Number of live Sesbania in quad	4	4	2	49
Height 1 (cm)	12.4	8	20	40.2
Height 2	6.3	20	17	41
Height 3	10.9	36.2		44
Height 4	14	11.8		45.2
Height 5				30
Height 6				21.4
Height 7				11
Height 8				35
Height 9				37.8
Height 10				18.7
Mean height	10.9	19	18.5	32.4
Asso. 1	Portulaca (1)	Polygonum (3)	Polygonum (3)	Melilotus (3)
Asso. 2	Polygonum (1)	Portulaca (1)	Xanthium (3)	Lotus corniculatus (3)
Asso. 3	Palm seedling (1)	Xanthium (2)	Cyperus (3)	Polygonum (3)
Asso. 4		Melilotus (1)	Verbascum blattaria (1)	Live grasses (4)
Asso. 5		Lotus (1)	Live grass (2)	Ludwigia (1)
Asso. 6		Ludwigia (2)	Verbena (1)	Artemesia douglasiana (1)
Asso. 7		Live grasses (1)	Kixia (1)	Verbena (1)
Asso. 8			Melilotus (1)	Cyperus (2)
Asso. 9			Salix (2)	Bidens (1)
Asso. 10			Chenopodium ambrosioides (1)	Vicia (1)
			Ludwigia (1)	Verbascum blattaria (1)

Cover Classes: 0-1%= 1; 1-5%= 2; 5-25%= 3; 25-50%= 4; 50-75%= 5; 75-95%= 6; 95-100%= 7

Appendix C – 2009 Monitoring Forms; 2009 Dry Creek Red Sesbania Program Monitoring Report

Dry Creek 2009 Monitoring				
Date and Location: 6/24/09	Walerga Road		Data Collected by:MR/KT	
	Quad 1	Quad 2	Quad 3	Quad 4
GPS waypoint And location	Sandbar downstream of Walerga bridge	Sandbar downstream of Walerga bridge	Sandbar downstream of Walerga bridge	Sandbar downstream of Walerga bridge
Photographs	8854-8855	8856-8857	8858-8859	8860-8861
Cover Class of live Sesbania in quad	2	3	2	3
Cover Class of all live vegetation in quad	2	3	2	4
Number of live Sesbania in quad	2	13	9	11
Height 1 (cm)	15	9	12.5	20
Height 2	9.5	20	12	12.8
Height 3		20.8	4.2	3.1
Height 4		26.8	4.2	4.9
Height 5		25	6.5	5.5
Height 6		15.2	10.8	12.5
Height 7		13	10.4	3
Height 8		9.5	6.5	16
Height 9		18.4	5	9.3
Height 10		18.6		21
Mean height	12.3	17.6	8	10.8
Asso. 1	Live grass (1)	Xanthium (3)	Polygonum(1)	Xanthium (3)
Asso. 2	Polygonum (1)	Polygonum (2)		Vitis? (1)
Asso. 3	Rumex (1)	Cyperus (2)		Polygonum (2)
Asso. 4				Live grasses (2)
Asso. 5				
Asso. 6				
Asso. 7				
Asso. 8				
Asso. 9				
Asso. 10				

Notes:

Cover Classes: 0-1%= 1; 1-5%= 2; 5-25%= 3; 25-50%= 4; 50-75%= 5; 75-95%= 6; 95-100%= 7

Appendix C – 2009 Monitoring Forms; 2009 Dry Creek Red Sesbania Program Monitoring Report

Dry Creek 2009 Monitoring				
Date and Location: 6/24/09	Gibson Ranch		Data Collected by:MR/KT	
	Quad 1	Quad 2	Quad 3	Quad 4
GPS waypoint And location	Sandbar east of entrance kiosk	Sandbar east of entrance kiosk	Sandbar east of entrance kiosk	Sandbar east of entrance kiosk
Photographs	8843-8844	8848-8849	8850-8851	8852-8853
Cover Class of live Sesbania in quad	2	3	4	4
Cover Class of all live vegetation in quad	4	5	5	5
Number of live Sesbania in quad	5	17	19	21
Height 1 (cm)	7	29.2	21	6
Height 2	10.5	11	18.4	16
Height 3	6.5	25	29	13.2
Height 4	30	22.6	23.4	15.4
Height 5	9	33	35	20
Height 6		19.4	33.8	23
Height 7		16.6	30	15
Height 8		23	16	19.8
Height 9		21	25	16.6
Height 10		21.5	21.8	19.8
Mean height	12.6	22.2	25.3	16.5
Asso. 1	Live grasses (2)	Xanthium (3)	Xanthium (2)	Cyperus (3)
Asso. 2	Polygonum (2)	Polygonum (3)	Cyperus (3)	Polygonum (3)
Asso. 3	Cyperus (2)	Medicago (1)	Live grasses (2)	Live grasses (2)
Asso. 4	Chenopodium ambrosioides (1)	Unknown comp. (1)	Unknown forb (1)	Unknown forb (3)
Asso. 5	Artemesia douglasiana (1)	Mollugo (2)	Polygonum (3)	Chenopodium ambrosioides (1)
Asso. 6	Portulaca (1)	Cyperus (2)	Gnaphalium (1)	Veronica americana (1)
Asso. 7	Bidens (1)	Chenopodium ambrosioides (1)	Mollugo (1)	
Asso. 8	Convolvulus (1)	Gnaphalium (1)	Populus seedling (1)	
Asso. 9	Veronica americana (1)	Populus seedling (1)	Mentha (1)	
Asso. 10		Acacia seedling (1)		
		Verbascum blattaria (1)		
		Live grasses (2)		

Notes:

Cover Classes: 0-1%= 1; 1-5%= 2; 5-25%= 3; 25-50%= 4; 50-75%= 5; 75-95%= 6; 95-100%= 7

Appendix C – 2009 Monitoring Forms; 2009 Dry Creek Red Sesbania Program Monitoring Report

Dry Creek 2009 Monitoring				
Date and Location: 6/24/09	Dry Creek Road		Data Collected by:MR/KT	
	Quad 1	Quad 2	Quad 3	Quad 4
GPS waypoint And location	Sandbar upstream of bridge, north side	Sandbar upstream of bridge, north side	Sandbar upstream of bridge, north side	Sandbar upstream of bridge, north side
Photographs	8835-8836	8837-8838	8839-8840	8841-8842
Cover Class of live Sesbania in quad	2	6	5	4
Cover Class of all live vegetation in quad	4	7	6	5
Number of live Sesbania in quad	6	62	88	56
Height 1 (cm)	15	25	21	11
Height 2	8.5	31.2	25	10.2
Height 3	16.2	22	31.4	21
Height 4	17	30.2	34	19
Height 5	12.8	28.4	37	17.2
Height 6	6	27	41	17
Height 7		13	27.8	11.5
Height 8		12.5	28	9
Height 9		23	20.2	24.4
Height 10		21.5	33	11
Mean height	12.6	23.4	29.8	15.1
Asso. 1	Live grass (3)	Chenopodium ambrosioides (3)	Polygonum (3)	Live grasses (2)
Asso. 2	Chenopodium ambrosioides (2)	Polygonum (2)	Xanthium (1)	Bidens (1)
Asso. 3	Medicago (1)	Live grasses (3)	Amaranth (1)	Polygonum (2)
Asso. 4	Populus seedling (1)	Unknown forb (1)	Live grasses (2)	Xanthium (2)
Asso. 5	Polygonum (1)	Veronica americana (1)	Unknown forb (2)	Unknown forb (1)
Asso. 6	Unknown forb (1)	Mollugo (1)	Chenopodium ambrosioides (1)	Mulberry seedling (1)
Asso. 7	Gnaphalium (1)	Cyperus (2)	Mollugo (1)	
Asso. 8	Veronica americana (1)	Portulaca (1)	Medicago (1)	
Asso. 9	Urtica (1)	Convolvulus (1)	Melilotus (1)	
Asso. 10	Hirschfeldia? (2)		Vicia (1)	
	Cyperus (1)		Cyperus (1)	

Notes:

Cover Classes: 0-1%= 1; 1-5%= 2; 5-25%= 3; 25-50%= 4; 50-75%= 5; 75-95%= 6; 95-100%= 7

Appendix C – 2009 Monitoring Forms; 2009 Dry Creek Red Sesbania Program Monitoring Report

Dry Creek 2009 Monitoring				
Date and Location: 6/24/09	Upstream of Hansen Ranch		Data Collected by:MR/KT	
	Quad 1	Quad 2	Quad 3	Quad 4
GPS waypoint And location	Sandbar upstream of east end of Ascot	Sandbar upstream of east end of Ascot	Sandbar upstream of east end of Ascot	Sandbar upstream of east end of Ascot
Photographs	8819-8820	8821-8822	8823-8824	8825-8826
Cover Class of live Sesbania in quad	3	4	4	4
Cover Class of all live vegetation in quad	5	6	6	5
Number of live Sesbania in quad	23	64	82	?
Height 1 (cm)	19.8	21.4	14.2	5
Height 2	15.6	20	21.4	8.1
Height 3	16	7.3	5.9	13.4
Height 4	6.5	14	25	11.5
Height 5	6.4	25	24.4	16.6
Height 6	28.2	21	12.4	15.4
Height 7	21.4	15.5	24.6	20
Height 8	16.4	20.2	15	18.2
Height 9	26	25	10.9	18.6
Height 10	12.5	13.4	8	12.8
Mean height	16.9	18.3	16.2	14
Asso. 1	Xanthium (3)	Xanthium (3)	Xanthium (3)	Xanthium (2)
Asso. 2	Cyperus (3)	Live grasses (3)	Live grasses (3)	Plantago major (1)
Asso. 3	Live grasses (3)	Polygonum (2)	Cyperus (3)	Live grasses (3)
Asso. 4	Polygonum (3)	Cyperus (3)	Polygonum (3)	Unknown forb (2)
Asso. 5	Chenopodium ambrosioides (1)	Vicia (1)	Unknown forb (1)	Cyperus (3)
Asso. 6	Chamaesyche (1)	Chenopodium ambrosioides (1)	Acacia seedling (1)	Chenopodium ambrosioides (1)
Asso. 7	Convolvulus (1)	Medicago (1)	Bidens (1)	
Asso. 8		Unknown forb (1)		
Asso. 9				
Asso. 10				

Cover Classes: 0-1%= 1; 1-5%= 2; 5-25%= 3; 25-50%= 4; 50-75%= 5; 75-95%= 6; 95-100%= 7

Appendix C – 2009 Monitoring Forms; 2009 Dry Creek Red Sesbania Program Monitoring Report

Dry Creek 2009 Monitoring				
Date and Location: 11/12/09	Hidden Valley Form #1		Data Collected by: KC/SS	
	Quad 1	Quad 2	Quad 3	Quad 4
GPS waypoint And location				
Photographs	65-66	67	68-69	70-71
Cover Class of live Sesbania in quad	1	2	1	1
Cover Class of all live vegetation in quad	1	6	4	4
Number of live Sesbania in quad	(4 dead)	1	(6 dead)	(1 dead)
Height 1 (cm)	None	57.2	None	(1 dead)
Height 2				
Height 3				
Height 4				
Height 5				
Height 6				
Height 7				
Height 8				
Height 9				
Height 10				
Mean height		57.2		
Asso. 1	Unknown (1)	Live grass (5)	Rubus discolor (3)	Paspalum ?
Asso. 2		Trifolium (3)	Unknown (2)	Rubus discolor ?
Asso. 3		Cyperus (2)	Polygonum (1)	
Asso. 4		Plantago (3)	Live grass ?	
Asso. 5				
Asso. 6				
Asso. 7				
Asso. 8				
Asso. 9				
Asso. 10				

Notes:

Cover Classes: 0-1%= 1; 1-5%= 2; 5-25%= 3; 25-50%= 4; 50-75%= 5; 75-95%= 6; 95-100%= 7

Appendix C – 2009 Monitoring Forms; 2009 Dry Creek Red Sesbania Program Monitoring Report

Dry Creek 2009 Monitoring				
Date and Location: 11/12/09	Hidden Valley #2		Data Collected by: KC/SS	
	Quad 1	Quad 2	Quad 3	Quad 4
GPS waypoint And location	#1	#1.2	#1.3	
Photographs	72-73	74-76	77-78	
Cover Class of live Sesbania in quad	1	1	1	
Cover Class of all live vegetation in quad	4	1	4	
Number of live Sesbania in quad	10 live (re- sprouting)	1 live (70 dead)	4 live	
Height 1 (cm)	37.2		116.8	
Height 2	32		43.8	
Height 3	31.6		75	
Height 4	38.8		84.8	
Height 5	36.6			
Height 6	34.8			
Height 7	23.4			
Height 8	33.2			
Height 9	31.2			
Height 10	43.6			
Mean height	34.2	NOT COLLECTED	80.1	
Asso. 1	Polygonum (1)	Unknown (1)	Unknown (3)	
Asso. 2	Live grass (4)		Live grass (3)	
Asso. 3				
Asso. 4				
Asso. 5				
Asso. 6				
Asso. 7				
Asso. 8				
Asso. 9				
Asso. 10				

Notes:

Cover Classes: 0-1%= 1; 1-5%= 2; 5-25%= 3; 25-50%= 4; 50-75%= 5; 75-95%= 6; 95-100%= 7

Appendix C – 2009 Monitoring Forms; 2009 Dry Creek Red Sesbania Program Monitoring Report

Dry Creek 2009 Monitoring				
Date and Location: 11/12/09	Royer Park		Data Collected by: KC/SS	
	Quad 1	Quad 2	Quad 3	Quad 4
GPS waypoint And location				
Photographs	748-750	752-754	758-760	None?
Cover Class of live Sesbania in quad	1	1	2	2
Cover Class of all live vegetation in quad	2	5	No value	No value
Number of live Sesbania in quad	2 live (re-sprouting) (3 dead)	1	2	13 live (re-sprouting) 6 dead
Height 1 (cm)	50.6	161	83.4	134
Height 2	78		67.2	125
Height 3				93
Height 4				102.6
Height 5				161
Height 6				120
Height 7				129
Height 8				103.4
Height 9				98.4
Height 10				116
Mean height	64.3	161	150.6	118.2
Asso. 1	Lotus (2)	Polygonum (3)	Polygonum (2)	NOT COLLECTED
Asso. 2		Paspalum (3)	Ludwigia (2)	
Asso. 3		Plantago (2)	Lotus (1)	
Asso. 4		Vicia (1)	Cyperus (2)	
Asso. 5		Verbena (1)	Live grass (3)	
Asso. 6		Lotus (1)	Unknown (1)	
Asso. 7		Cyperus (2)		
Asso. 8				
Asso. 9				
Asso. 10				

Notes:

Cover Classes: 0-1%= 1; 1-5%= 2; 5-25%= 3; 25-50%= 4; 50-75%= 5; 75-95%= 6; 95-100%= 7

Appendix C – 2009 Monitoring Forms; 2009 Dry Creek Red Sesbania Program Monitoring Report

Dry Creek 2009 Monitoring				
Date and Location: 11/12/09	Walerga Road		Data Collected by: KC/SS	
	Quad 1	Quad 2	Quad 3	Quad 4
GPS waypoint And location				
Photographs	338-340	341-343	346-347	344-345
Cover Class of live Sesbania in quad	1	0	0	0
Cover Class of all live vegetation in quad	1	5	3	0
Number of live Sesbania in quad	(5 dead)	None	None	None
Height 1 (cm)	None	None	None	None
Height 2				
Height 3				
Height 4				
Height 5				
Height 6				
Height 7				
Height 8				
Height 9				
Height 10				
Mean height	None	None	None	None
Asso. 1	None	Live grass (5)	Salix gooddingii (1)	None
Asso. 2			Live grass (3)	
Asso. 3			Polygonum (2)	
Asso. 4				
Asso. 5				
Asso. 6				
Asso. 7				
Asso. 8				
Asso. 9				
Asso. 10				

Notes: 2 tall semi-living Sesbania across from Arundo/Catalpa clump.

Cover Classes: 0-1%= 1; 1-5%= 2; 5-25%= 3; 25-50%= 4; 50-75%= 5; 75-95%= 6; 95-100%= 7

Appendix C – 2009 Monitoring Forms; 2009 Dry Creek Red Sesbania Program Monitoring Report

Dry Creek 2009 Monitoring				
Date and Location: 11/12/09	Gibson Ranch		Data Collected by: KC/SS	
	Quad 1	Quad 2	Quad 3	Quad 4
GPS waypoint And location				
Photographs	725-727	728-730	731-733	734-735
Cover Class of live Sesbania in quad	1	1	1	1
Cover Class of all live vegetation in quad	3	1	3	1
Number of live Sesbania in quad	(1 dead)	(1 dead)	(1 dead)	(8 dead)
Height 1 (cm)	None	None	None	None
Height 2				
Height 3				
Height 4				
Height 5				
Height 6				
Height 7				
Height 8				
Height 9				
Height 10				
Mean height	None	None	None	None
Asso. 1	Polygonum (3)	None	Scirpus californicus (1)	
Asso. 2			Echinochloa (1)	
Asso. 3			Polygonum (1)	
Asso. 4			Typha (1)	
Asso. 5			Cyperus (2)	
Asso. 6			Live grass (1)	
Asso. 7				
Asso. 8				
Asso. 9				
Asso. 10				

Notes:

Cover Classes: 0-1%= 1; 1-5%= 2; 5-25%= 3; 25-50%= 4; 50-75%= 5; 75-95%= 6; 95-100%= 7

Appendix C – 2009 Monitoring Forms; 2009 Dry Creek Red Sesbania Program Monitoring Report

Dry Creek 2009 Monitoring				
Date and Location: 11/12/09	Hayer Dam		Data Collected by: KC/SS	
	Quad 1	Quad 2	Quad 3	Quad 4
GPS waypoint And location				
Photographs	708-710	712, 714, 715	717-719	721-723
Cover Class of live Sesbania in quad	1	1	1	1
Cover Class of all live vegetation in quad	4	3	1	No value
Number of live Sesbania in quad	1	(7 dead)	(3 dead)	6
Height 1 (cm)	300	None	None	4
Height 2				1.4
Height 3				1.2
Height 4				1.6
Height 5				1
Height 6				2
Height 7				
Height 8				
Height 9				
Height 10				
Mean height	300			1.9
Asso. 1	Artemesia douglasiana (2)	Cyperus (2)	None	None
Asso. 2	Live grass (1)	Polygonum (1)		
Asso. 3	Unknown (1)	Paspalum (1)		
Asso. 4				
Asso. 5				
Asso. 6				
Asso. 7				
Asso. 8				
Asso. 9				
Asso. 10				

Notes:

Cover Classes: 0-1%= 1; 1-5%= 2; 5-25%= 3; 25-50%= 4; 50-75%= 5; 75-95%= 6; 95-100%= 7

Appendix C – 2009 Monitoring Forms; 2009 Dry Creek Red Sesbania Program Monitoring Report

Dry Creek 2009 Monitoring				
Date and Location: 11/12/09	Upstream of Hansen Ranch		Data Collected by: KC/SS	
	Quad 1	Quad 2	Quad 3	Quad 4
GPS waypoint And location	SAFCA property north of Hansen Ranch	SAFCA property north of Hansen Ranch	SAFCA property north of Hansen Ranch	SAFCA property north of Hansen Ranch
Photographs	693-695	696-698	699-701	702-706
Cover Class of live Sesbania in quad	1	0	0	1
Cover Class of all live vegetation in quad	1	4	1	1
Number of live Sesbania in quad	1	0	0	9
Height 1 (cm)	1.8	0	0	1.4
Height 2				2
Height 3				2
Height 4				1
Height 5				1
Height 6				1.4
Height 7				2.2
Height 8				1
Height 9				1.2
Height 10				
Mean height	1.8			1.5
Asso. 1	None	Polygonum (2)	Unknown (1)	None
Asso. 2		Unknown (1)		
Asso. 3				
Asso. 4				
Asso. 5				
Asso. 6				
Asso. 7				
Asso. 8				
Asso. 9				
Asso. 10				

Notes:

Cover Classes: 0-1%= 1; 1-5%= 2; 5-25%= 3; 25-50%= 4; 50-75%= 5; 75-95%= 6; 95-100%= 7