

2011 DRY CREEK RED SESBANIA CONTROL PROGRAM MONITORING REPORT

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Executive Summary

The Dry Creek Red Sesbania Control Program maintenance phase, initiated in 2007, continued in 2011 with three control sweeps of the watershed in July, August and October. A monitoring visit was conducted in June before the first sweep, in September after the first sweep and in November after the last sweep was complete. The November monitoring visit indicated that less than 1% of the Sesbania population remained. Therefore, the 2011 program met its success criterion. A comparison of 2008, 2009, 2010 and 2011 monitoring results and control data is presented. Additionally, copies of powerpoint presentations given at two conferences as part of a statewide Sesbania mapping project, which included Dry Creek locations, are included, as well as an abstract for a scientific paper accepted for publication in the Journal of Environmental Management.

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Acronyms and Abbreviations

Phase 1 Project	Dry Creek Watershed Red Sesbania Control Project, Phase I
SAFCA	Sacramento Area Flood Control Agency
Sesbania	Red sesbania (<i>Sesbania punicea</i>)

2011 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 2011 monitoring effort. Monitoring was conducted by Ramona Robison dba California Botany during June, September and November, 2011. The 2011 Dry Creek Sesbania removal contractor was Agri-Chemical and Supply, Inc. (Agri-Chemical), of Salinas, California. Gary Omori, Agri-Chemical’s Salinas office Area Manager, directed the removal effort. Agri-Chemical conducted three control “sweeps” of the watershed and monitoring was conducted before sweep 1, after 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 methods 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, 2010 and 2011, and a monitoring protocol is included in Appendix A.

In 2011, the *Sesbania* infestation was monitored in six locations, and data was collected in 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 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.

Figure 1. Dry Creek *Sesbania* Monitoring Locations



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 17, 2011 by Ramona Robison and Nita Barve before the first sweep by Agri-Chemical. The second monitoring was conducted on September 5, 2011 by Ramona Robison and Nita Barve, and the third monitoring visit was on November 16, 2011, by Ramona Robison and K.C. Sorgen of SAFCA. Agri-Chemical conducted their first sweep July 21 through 27 and August 9 through 11, and their second sweep was completed October 12 through 15, 2011.

In 2011 Sesbania monitoring quad locations were entered into Calflora. Calflora is a nonprofit organization dedicated to providing information about California plant biodiversity for use in Education, Research and Conservation and can be accessed at <http://www.calflora.org/>. Quad locations were added during the September 5, 2011 monitoring visit.

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.

In 2011 the largest number of live Sesbania per square meter was located at Gibson Ranch (65) followed by Royer Park (52). This contrasts with previous years where the largest numbers of Sesbania per square meter were found lower in the watershed at the sandbar north of Dry Creek Road (2010) and on the SAFCA property north of Hansen Ranch (2009). These changes may have been due to the earlier 2011 pre-monitoring date in June compared to July. Since 2011 was a wet year flows in Dry Creek were high and seedlings had just sprouted in June. During the November visit the largest number of live plants observed was 9 at Hidden Valley. This was also the location of the highest post-monitoring seedling count in 2010. Seedlings were also observed sprouting on the sandbars in November 2011 at Royer Park, Walerga Road, and upstream of Dry Creek Road.

The cover class information presented in Table 2 shows all 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. Most locations had 5% cover or less in November, with higher cover classes observed at Hidden Valley and Royer Park. These values may represent the cover of one large plant in the monitoring quad at these locations. 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.

Table 2. 2011 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
Hidden Valley, Granite Bay	2, 2, 3	3, 2, 3, 2	18	5.25
Royer Park, Roseville	2, 4, 2, 1	3, 2, 2, 2	16	1.5
Walerga Road, Placer County	1, 1, 1, 1	2, 2, 3, 1	5	1.5
Gibson Ranch, Elverta	2, 2, 2, 2	2, 2, 1, 2	27	1
Above Dry Creek Road	2, 2, 2, 1	3, 2, 1, 1	9	3.25
Upstream of Hansen Ranch, Rio Linda	1, 2, 2	2, 2, 1, 1	3	1

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

Outside the six monitoring locations, additional sites were checked for Sesbania throughout the Dry Creek watershed. A summary of additional locations checked as well as some notes on the monitoring locations is included below.

June 17, 2011

Hidden Valley (monitoring location)

Found a few 1.5 meter plants, most of the usual spots were just germinating (appx. 14 cm). Only monitored 3 plots in this location. Did not see any plants in the tributary location southwest of the Pine Gate parking area, looks like Gary treated there in 2008, 2009 and 2010.

Royer Park (monitoring location)

Found a few plants in the usual location on the sandbar. Appx. 17 cm tall.

Vernon Road crossing, downstream of Mike Joseph property

Observed one plant on a sandbar upstream of our vantage location

PFE road overcrossing with Dry Creek

Did not observe any red sesbania from the bridge height.

Walerga Road crossing (monitoring location)

A few plants on the sandbar just germinating, most around 2 cm tall.

McCardy location in housing development

One plant observed over 1.5 meter tall downstream of the bike trail bridge

Gibson Ranch (monitoring location)

Monitored old location. From inside gate walked on path south of cow pasture and monitored first accessible sandbar on west side of creek. A few plants were 12 cm tall, but most were 1 to 2 cm. 107 plants total in all 4 quads.

Hayer Park

No red sesbania observed in area just west of picnic tables.

Dry Creek Road upstream of crossing (monitoring location)

Observed sprouting plants between 6 and 14 cm tall.

Elkhorn Boulevard, upstream of bridge in we channel

Lots of plants germinating on sandbar.

Upstream of Hansen Ranch (monitoring location)

Only found 3 plot locations to monitor. Plants were from 2 to 50 cm and we observed 8 in our plots.

September 5, 2011

Miner's Ravine Road intersection with Dry Creek

No *Sesbania* observed.

Vernon Road downstream of Joseph property

Small *Sesbania* observed on sandbar.

Foothills Boulevard bridge downstream

No *Sesbania* observed

McCarthy Court

3 *Sesbania* observed under bridge.

Watt Avenue crossing with Dry Creek

1 *Sesbania* observed on downstream side. Lots of sprayed dead plants on gravel bar across stream.

Hayer Park near bridge

No *Sesbania* observed.

November 16, 2011

Hansen Ranch

Observed 1 *Sesbania* plant downstream of bridge across the wet channel of Dry Creek on Coyle property and 5 plants near the power pole north of the bridge. *Sesbania* observed in the ditch near the gravel parking area north of pump station. Also observed scattered plants in the upland areas adjacent to Dry Creek.

Rio Linda Boulevard crossing with Dry Creek dry channel

No *Sesbania* plants observed.

16th and Q streets

No live *Sesbania*

Elverta Road crossing of Dry Creek

Observed *Sesbania* plants downstream.

Watt Avenue crossing

No *Sesbania* observed.

Walerga Road

One *Sesbania* plant observed upstream of monitoring area.

PFE Road crossing

Several plants observed under bridge in side channel east of main channel.

Vernon Road downstream of Joseph property

One live plant and several dead plants observed.

In 2011 we again collected information on the plant species associated with *Sesbania* and results were similar to previous years. 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 Mexican tea (*Chenopodium ambrosioides*). 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 carpetweed (*Mollugo verticillata*). Appendix D contains a list of plants observed in the monitoring quads in 2011, including updated taxonomy from the new Jepson Manual (Baldwin et al. 2012).

Comparison of 2008, 2009, 2010 and 2011 Results

The following information compares results of 2008, 2009, 2010 and 2011 *Sesbania* monitoring and control efforts on Dry Creek.

Table 3. Comparison of Mean Number of Sesbania Plants per meter Observed in June 2008, June 2009, July 2010 and June 2011 at Dry Creek Monitoring Locations

Monitoring Location	2008 June Mean Number of Plants per Meter	2009 June Mean Number of Plants per Meter	2010 July Mean Number of Plants per Meter	2011 June Mean Number of Plants per Meter
Hidden Valley, Granite Bay	12	17	23	18
Royer Park, Roseville	2	15	3	16
Walerga Road, Placer County	4	9	12	5
Gibson Ranch, Elverta	13	16	28	27
Roy Hayer Park, Rio Linda (2008)	17	53	38	9
Dry Creek Road Upstream (2009, 2010 and 2011)				
SAFCA Property North of Hansen Ranch, Rio Linda	73	56	23	3
Overall mean number of plants per meter	20	28	21	13

Figure 2. Total Number of Red Sesbania Seedlings per Meter by Year and Location

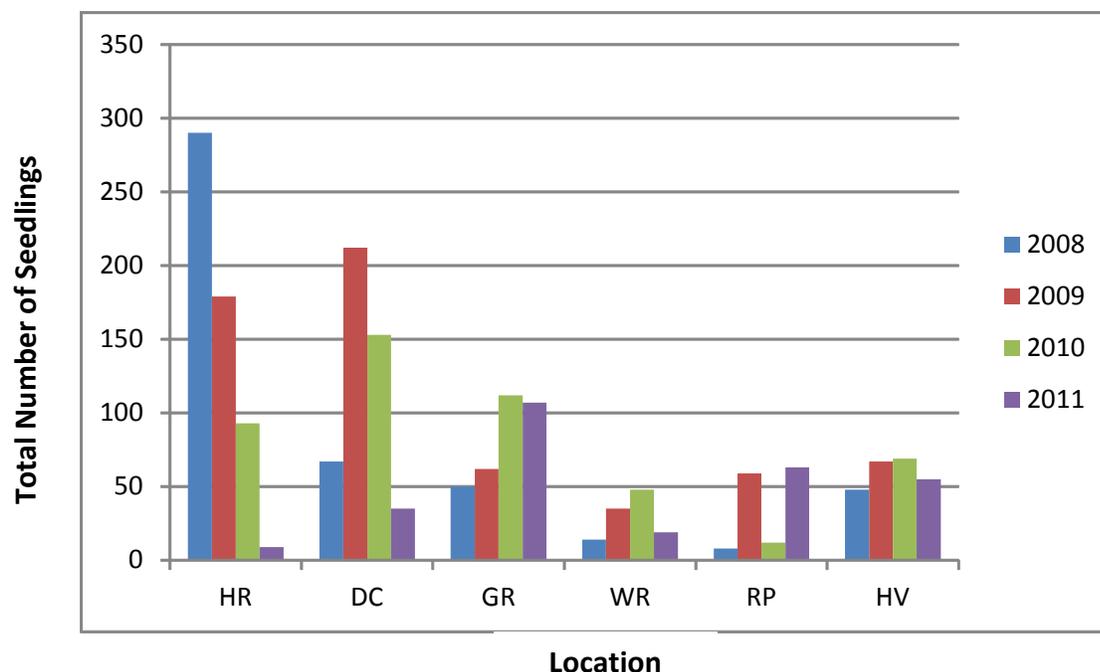


Table 3 and Figure 2 show the general downward trend of Sesbania seedlings in the Dry Creek watershed. Table 3 shows the mean number of plants per square meter before treatment has declined slightly. The lower numbers in 2011 may be due to the early monitoring in June. It is also

interesting to note that the number of plants per meter declined at the downstream end of the watershed. Figure 2 shows the total number of seedlings observed for all 6 monitoring locations by year and location. Hansen Ranch (HR), the furthest downstream location, is located on the left side of the figure and Hidden Valley (HV), the upstream location, is located on the right.

Other Invasive Species Observations

In 2008, Chinese tallow (*Sapium sebiferum*) seedlings were observed in one quadrat in June and two quadrats in October at Royer Park in Roseville. This species was not observed in monitoring quads in 2009, but was detected again in one 2010 quadrat. In 2011 Chinese tallow was again observed in one quad at Royer Park in June and it was observed growing elsewhere on the sandbar. Catalpa (*Catalpa bignonioides*) was observed in several quads in the monitoring area (Royer Park and Gibson Ranch). Mature trees of this species are common along Dry Creek, but it has not yet begun to spread rapidly throughout the system.

Notes on Landowner Access Coordination

In 2011, access requirements were similar to previous years. The procedure has been to send out letters to landowners adjacent to treatment areas before the first sweep. In addition, some landowners request contact before access and they are called at the specified time before work is conducted (Appendix E). The landowners or managers requiring calls or where calls are suggested are highlighted in yellow. The longest notice required is for the grazing lessee at Hansen Ranch, where a week's notice is requested if possible. Mike Joseph, a landowner in Roseville, must be contacted before access, and he requested an in-person meeting in 2009 which was attended by the weed removal monitor and Agri-Chemical. Doug Ose should be contacted before accessing Gibson Ranch and the Hidden Valley contact should also be called. The weed removal monitor and Agri-Chemical continue to coordinate on calling landowners.

Summary of 2011 Weed Removal Contractor Work

Appendix E contains a summary prepared by Gary Omori, manager with Agri-Chemical. The following table is summarized from his results. Note that the number of tanks of herbicide used decreased in 2011 compared to 2008 levels. Additionally, GIS points continued to be collected in 2011 by Agri-Chemical. This data shows the treatment locations for each year. The number of points in the sesbania treatment database for each year was: 1,131 points (2008), 10,021 points (2009), 6,537 points (2010) and 3,509 points (2011).

Table 4. Dry Creek Sesbania Weed Removal Contractor Summary 2008, 2009, 2010 and 2011

Removal Dates	Number of Tanks ¹ Herbicide Used	Number of Bags ² of Sesbania Seed Pods 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
July 19 to 24, 2010	14	147	350
October 4 to 8, 2010	8	3	412
July 21 to 27, 2011	69	Less than 1	108
August 9 to 11, 2011	250	Less than 1	291
October 12 to 15, 2011	6	0	9

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

Conclusions

The 2011 treatment year was successful in removing 99% of the germinated Sesbania plants. 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 extent 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. The comparison of four years of monitoring in Table 3 shows that the number of seedlings of Sesbania germinating per meter remains high, with a slight decrease in the lower parts of the watershed. It appears from the Agri-Chemical's information in Table 4 that the amount of herbicide needed to treat plants is decreasing. Since the number of operator hours needed is still high, this may indicate that the number of plants sprayed is lower, because it takes the same amount of time to access the plants given the long river distances included in the treatment area.

Several presentations were made about the Dry Creek Sesbania project in 2011 and early 2012. In November 2011 the first presentation was made at the Central California Invasive Weed Symposium held in Monterey by Ramona Robison and Gary Omori. Then on January 12, 2010 Ramona Robison again presented on Dry Creek Sesbania monitoring at the state-wide California Native Plant Society Conservation Conference. Copies of the powerpoints for these presentations are included in Appendix G.

Finally, Appendix H contains an abstract prepared for a scientific paper which has been accepted with revisions for publication in the Journal of Environmental Management. The revised paper should be submitted to the Journal by May 2012 and would be anticipated to be published in late 2012 or 2013.

Appendix A

Monitoring Protocol

This monitoring protocol describes the methods used from 2008 to 2011 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, 2009, 2010 and 2011 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.

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