Napa River Rutherford Reach Restoration Project
Annual Maintenance and Monitoring Survey


Napa River June 2014

July 2014

Prepared by:
Napa County Flood Control and
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Background:

The maintenance program for the Napa River Rutherford Restoration Project (Project) was developed by the Rutherford Landowner Advisory Committee (LAC) and the Napa County Flood Control and Water Conservation District (District) to support the Project and to guide implementation of routine maintenance activities within the Rutherford Reach of the Napa River. The maintenance program was developed to balance the needs of landowners while protecting and enhancing the natural resources of the Napa River. As a result, landowners formed the Rutherford Dust Napa River Restoration Team (also known as "RDRT") and worked with Napa County and its affiliate agencies to design and implement a comprehensive reach-scale restoration project known as the Napa River Rutherford Reach Restoration Project. The Project area is comprised of privately-held property adjacent to a 4.5-mile reach of the Napa River south of the city of Saint Helena, extending from Zinfandel Lane in the north, downstream to Oakville Cross Road in the south (Figure 1). The maintenance program balances the needs of local landowners with protection and enhancement of the river's natural resources. For further details regarding the maintenance program refer to "*Final Maintenance Plan for the Napa River Rutherford Reach Restoration Project*" (Jones and Stokes; August 2008, http://www.napawatersheds.org/files/managed/Document/3590/Rutherford%20Reach%20Maintenance%20Plan.pdf).

As part of the maintenance program, District staff in coordination with the LAC and the Napa County RCD, conducts an annual stream survey to identify and assess issues of maintenance concern. The survey, data analysis, and implementation of maintenance activities are facilitated by the District's Rutherford Reach Maintenance Coordinator (contact information below). This report presents the results and initial maintenance recommendations of the fourth annual stream survey conducted between June 3rd and June 6th, 2013.

Maintenance activities must be in compliance with applicable resource agency permits in conjunction with best management practices (BMPs) specified in the final Maintenance Plan. Permitted activities may include:

- debris (man-made) removal;
- downed tree (also referred to as large woody debris or LWD) relocation and/or stabilization;
- vegetation management, including removal of invasive non-native and Pierce's disease host vegetation, management of emergent (young) in-channel vegetation, and planting for erosion control management;
- installation of erosion control fabric or coir logs, willow pole cuttings;
- maintenance of constructed features including floodplain benches, vegetative buffers, aquatic habitat enhancement structures, and bank stabilization structures.

River restoration construction has been completed from Reaches 1 through Reach 4, as well as Reach 8. At the time of the 2014 survey, constructed restoration elements included 23 inset flood plain benches, 2 backwater alcoves, 1 secondary channel and 10 bank stabilization areas. A total of 137 instream habitat structures had been installed: 104 root wad and bench log structures and 33 boulder clusters. In Reaches 2-4, over 2.4 miles (1 mile east bank/1.4 miles west bank) of agricultural berms were setback in order to increase riparian habitat width (Figures 4 and 5). The focus of the 2014 stream survey included assessing the functionality of these features in addition to the regular activity of identifying and documenting target invasive and Pierce Disease host plant species, potentially erosive LWD, active bank erosion and accumulated trash or debris. Installed structures and graded areas that were not in need of maintenance, but are tracked for monitoring purposes, will be reported on in a separate, detailed habitat monitoring report relative to their habitat value and functionality.

Annual Stream Survey Objectives:

The stream survey begins the maintenance season by collecting and providing field data that will inform the creation of the annual stream maintenance work plan. The annual stream survey also captures data to be utilized in the annual Project monitoring report required to comply with funding and regulatory agency requirements. This additional monitoring data collected will be presented in a separate annual monitoring report. A team of resource specialists, including a geomorphologist, ecologist, fisheries biologist, invasive plant expert and a landowner representative conduct the survey with assistance from District interns.

The essential maintenance aspects of the Annual Stream Survey are to:

- Identify and prioritize maintenance actions, including vegetation management, large woody debris (LWD) realignment and/or relocation, debris (e.g. tires, shopping carts, irrigation lines, etc.) and trash removal, and biotechnical stream bank stabilization;
- Evaluate the status of and define any steps needed to maintain the function of constructed features and in-stream habitat structures;

- Identify infestations of non-native high priority invasive and Pierce's disease host plants and define control treatments to the extent practicable;
- Respond to Landowners requests for maintenance actions within the riparian corridor on their property.

A suite of parameters were measured, recorded and mapped using digital photography and handheld Trimble GPS enabled computers customized to log specific maintenance data parameters. Separate GPS/GIS files were created to capture distinct categories of interest during the survey, the files and the associated data fields include:

- *Maintenance* (Date, River Station, Bank Location, Problem, Invasive Species, Pierce Host, Patch Size, Priority, Recommendation, Photo, Notes, LWD maintenance)
- *Eroding Stream Banks* (Date, River Station, Length, Bank Location, Bank Erosion Location, Average Bank Erosion Height, Bank Condition, Treatment Element, Instability Element Description, Recommendation, Priority, Notes, Photo)
- *Large Woody Debris* (Date, River Station, Length, Bedform Association, LWD Location, LWD Function, Number of Pieces/Configuration, Bank Erosion Potential, LWD Type, Recruitment Mechanism, DBH, LWD Function, Riffle Crest Depth, Max Pool Depth, Structure Problem, Repair Recommended, Shelter Complex, Shelter Cover, Notes, Photo)
- *Photographic Documentation Point* (Date, River Station, , Number of Photos, Notes)

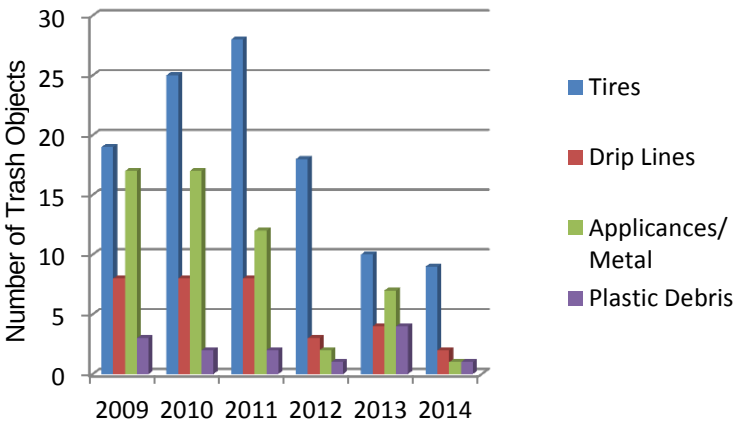
Survey Results:

The annual stream survey was conducted between May 27 through May 29 and on June 12, 2014; typical weather conditions included sunny to partly overcast skies with 0-30% cloud coverage and air temperatures ranging between 68° - 77° Fahrenheit. Average water temperature ranged between 55° - 63° Fahrenheit, stream flow measured at the USGS stream gage (ID#11456000) at the Pope Street Bridge, located approximately 1100 feet upstream of the Project reach ranged from 1.7 – 3.9 cubic feet per second (cfs). Stream flow was abnormally low due to recent drought conditions in the Napa River watershed. River channel maintenance issues documented included trash and debris located in-channel and at the top of the river banks, invasive and Pierce's disease plant species located throughout the riparian zone, beaver dams, eroding stream banks and potentially erosive large woody debris jams located in-channel.

Trash and Debris:

A total of 13 occurrences of trash and debris were documented in the Project area. . Graph 1 Illustrates the number and types of trash documented during the stream survey, including tires, drip lines, appliances and metal debris, and plastic. Since surveys began in 2009, tires have consistently been the dominant debris documented in the channel. This year 9 of the 13 occurrences were tires. The remaining four (4) occurrences of trash and debris were drip lines, a plastic tarp, a car seat, and a large water filter (Picture 1). Figure 2 shows the locations of the surveyed trash and debris. Overall occurrences of trash and debris continue to decline significantly compared to the peak number (48) documented in 2011.

Graph 1: Trash and Debris (2009-2014)



Picture 1: Trash and Debris

Invasive Non-Native and Pierce Host Plants:

Ninety-three (93) occurrences of target plants were identified for treatment within the Project area (Figure 3). Himalayan blackberry, native and hybridized grape and Mugwort (*Artemisia vulgaris*) were the dominant target plants identified; other target species documented include tree-of heaven, red sesbania and black locust but were limited in their distribution. Invasive species such as poison hemlock, fennel, etc. were observed but not quantified during the survey as a result of land owner's requests in previous meetings to focus on and use funds for treatment of only invasive plant species that are considered Pierce host's species or priority invasive non-native species.

A total of 115,436 square feet (sqft) of non-native invasive and Pierce host plants was documented including 48,540 sqft of Himalayan blackberry, 24,840 sqft of native/hybrid CA grape, 6,2777 of periwinkle (*Vinca major*), 29,073 sqft of Mugwort, and 6,706 sqft of giant reed (*Arundo*). It is important to note that there are additional occurrences of grape, periwinkle and other Pierce host plants present beyond the river's top of bank, out of view of the in-channel river survey; therefore we request that landowners contact the maintenance lead with any additional requests for management of invasive and/or Pierce host plants in the riparian zone beyond the top of bank that may not be documented during the channel survey.

Previous and ongoing efforts to manage and remove giant reed (Arundo) have been successful in significantly reducing the amount of giant reed in the entire Project area. Graph 2 below depicts the general decline of Arundo throughout the Project area. The area of Arundo documented this year was approximately equal to that detected last year; this is due to the occurrence of re-sprouting patches and/or patch that were not found previously that will require re-treatment under the Maintenance Assessment District.

Additional non-native invasive plants and Pierce host plant treatment is currently taking place in Reaches 1 though 4 and 8 under the post construction re-vegetation maintenance contracts. Species currently being managed include Himalayan blackberry, Mugwort, periwinkle (*Vinca sp.*), giant reed, tree off heaven and native and/or hybridized grape species

Graph 2: Arundo mapped and treated (2009-2014)

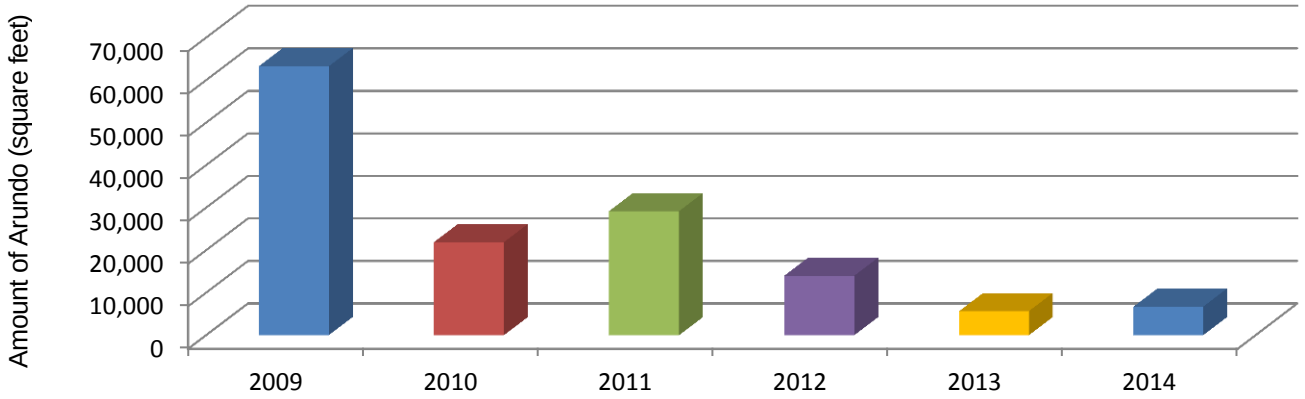


Table 1 summarizes the invasive non-native and Pierce host plants documented during the 2014 stream survey. Further, Table 1 lists if the species is a Pierce Disease host and ranks each species as a "high" or "moderate" impact invasive species as defined by the California Invasive Plant council (Cal-IPC); the Cal-IPC list primarily includes plants exhibiting some level of invasiveness in native habitats. A revised table will be presented in the spring 2015 final maintenance memo reflected the total square footage of invasive and Pierce host plant species ultimately treated.

Table 1: Invasive Non-Native and Pierce Host Plants documented during 2014 survey

Common Name	Scientific Name	Infested Area (SqFt)	Native?	Pierce Disease host	Cal-IPC Ranking
Giant reed	*Arundo donax*	6,706	No	No	High
Mugwort	*Artemisia douglasiana*	29,073	Yes	Yes	None
Periwinkle	*Vinca major*	6,277	No	Yes	None/Moderate
CA & Hybrid Grape	*Vitus sp.*	24,840	Yes/No	Yes	None
Himalayan Blackberry	*Rubus armeniacus*	48,540	No	Yes	High
Total		**115,436**			

Instream Habitat Structures and Large Woody Debris:

A total of 241 large woody debris (LWD) occurrences and boulder cluster installations were documented and evaluated during the 2014 stream survey. Of these occurrences, 137 were instream habitat structures installed as part of the restoration Project. The remaining 104 occurrences were naturally recruited LWD (minimum size: one foot diameter and six feet long. Of the 104 naturally recruited LWD occurrences, none appeared to be contributing to any localized bank erosion. Four (4) of the occurrences (Figure 2) were jams that have been prioritized for monitoring over the winter. If warranted, these occurrences will be managed to reduce channel erosion or flow obstruction by thinning out smaller wood, trimming trunks, and/or realigning larger wood. In general, LWD function as important in-stream fish habitat and the District manages LWD jams only when a clear problem exists. The distribution, habitat function and accumulation trends of all occurrences of LWD will be presented in a separate annual habitat monitoring report.

LWD features were ranked as a potentially significant maintenance issue according to the following criteria:

- Potential for LWD to cause imminent bank failure beyond riparian zone.
- Risk to adjacent infrastructure and agriculture (i.e., structures, earthen berms, roads, pumps, utilities, crops).
- Potential for significant backwater formation.
- Extent of LWD mass relative to cross-sectional stream channel area (i.e. extent of channel blockage/hydraulic radius).
- Location relative to planned Project features that provide opportunity to re-use LWD in construction.
- Landowner priority.

Installed LWD Structures and Constructed/Graded Benches

As mentioned previously, at the time of the survey, construction has been completed through Reach 4 and Reach 8, resulting in the creation of 23 inset flood plain benches, 2 backwater alcoves, 1 secondary channel, 10 bank stabilization areas and installation of 137 instream habitat structures. At the time of the survey, all LWD and boulder cluster structures located appeared to be functioning as designed and will not require maintenance in 2014. However, 25 structures were either partially or fully buried and were not able to be completely evaluated for habitat suitability; these structures may be revealed in future years by high stream flow scour at which time they will inspected for maintenance and evaluated for habitat. District staff will adjust and tighten an anchor cable on the one installed LWD structure at river station to secure it before the onset of winter high flows (Table 2).

Table 2: Installed instream structures identified for maintenance

River Station/Reach	LWD feature	Recommendation	Notes
237+80 (Reach 1)	Large bench log	Maintenance Recommended	Tighten/adjust loose anchor bolts and cables attached to LWD and ballast boulders

Three areas of localized bank erosion (Picture 3) were documented during the survey that the District intends to address/stabilize using a combination of bio-technical methods during the fall of 2014. See Table 3 for the location and details of the proposed bank stabilization work to be conducted at these sites.

Picture 3: Reach 8 erosion site (June 2014)

Picture 4: Beaver dam

Table 3: Proposed bank stabilization sites

River Station/Reach	Property	Proposed Work
156+80 (Reach 4)	Caymus Vineyards	Cover bare slope areas with erosion control fabric, straw wattles and jute net, broadcast erosion control seed mix and plant with live willow stakes in fall.
39+60 (Reach 8)	Laird	Repair scour behind LWD structure with bio block's, willow pole stakes and/or willow brush mat.
36+20 (Reach 8)	Cake bread Vineyards	Cover bare slope areas adjacent to LWD structure with erosion control fabric and jute net, broadcast erosion control seed mix and plant with live willow stakes in fall.

As documented in previous surveys, an increasing amount of beaver activity (dam building, downing of trees) has been noted in the Project reach. District staff documented six beaver dams (Picture 4) in the Project reach but does not consider these to be an issue that could cause bank erosion or localized flooding. The beaver dams are small and have completely washed away during high winter flows in the past in every instance. During low flow, the dams impound slow water, providing cool pool habitat.

Irrigation and General Vegetation Maintenance

As the District assumes greater responsibility of restored areas (i.e. when the three year vegetation maintenance contracts expire) additional costs will be assumed by the Maintenance Assessment District (MAD) fund. The District now has full maintenance responsibility for Reaches 1-3 (approximately 10.5 acres). Tasks once paid for under the three year maintenance contracts such as mowing, invasive/Pierce host plant management, watering, mulching, etc. are now paid for under the MAD. General vegetation maintenance and periodic watering at these restored sites will be conducted as needed in fiscal year 2014/2015 to ensure restored areas are being adequately maintained. If water is no longer available from specific landowners for periodic irrigation, water will be trucked in and paid for using funds from the MAD. It is the District's preference to first use water supplied from landowners when available before trucking in and paying for water with MAD funds. This issue is dealt with on a case by case basis.

Landowner Requests for Maintenance

Table 4 below lists landowner maintenance requests received, either verbally or by written form, by the District at the time of drafting this report. The District has already begun conducting the requested work and expects to complete these tasks by late summer and/or fall of 2014. Additionally, the District would like to remind landowners that maintenance requests are accepted, and work will be considered, throughout the year. A copy of the landowner maintenance request form is included at the end of this report. Table 4 below details the specifics of the landowner requests received thus far for the 2014 maintenance season.

Table 4: Landowner Maintenance Requests received to date for maintenance year 2014

Reach	Property	Requested Work	Recommendation
(Reach 2)	Quintessa Vineyards	Remove/treat streamside and top of bank Himalayan blackberry, *vinca* and Mugwort, remove debris and trash	Complete requested work. Work is currently schedule to take place in July of 2014 with a follow up treatment of invasive/Pierce host vegetation in the fall of 2014 and summer of 2015.
(Reach 6)	Star Vineyards	Remove/treat streamside and top of bank Himalayan blackberry and Mugwort, remove/thin large woody debris and trash	Complete requested work. Work is currently schedule to take place in July of 2014 with a follow up treatment of invasive/Pierce host vegetation in the fall of 2014 and summer of 2015.

Recommendations and Work Plan:

The RDRT maintenance survey team recommends the following work be conducted during fiscal year 2014-2015:

- Removal of all trash and debris from the stream channel that can be readily accessed and accomplished with hand labor, pulley or winch assisted mechanisms.
- Monitor 4 LWD jams (<12-inches-in-diameter and/or <6-feet-long) adjacent to landowners property and manage as necessary.

- Treat large accessible patches of invasive and Pierce host plants including Himalayan Blackberry, Mugwort, native and hybridized grape species and giant reed; this task also includes appropriate re-vegetation planting/seeding and irrigation of treatment of sites where treatment has left significant gaps in the riparian under story canopy.
- Repair and stabilize exposed stream bank erosion areas as proposed in Table 3.
- Conducted annual spring/ summer mowing of non-native grasses/shrubs on constructed flood plain benches as needed.
- Complete maintenance work requested by landowners; continue to respond to maintenance requests for landowners through the calendar year.

A more detailed work plan with the proposed maintenance work for fiscal year 2014/2015, listed by property owner, is included in a table at the end of this report. This draft report and the recommendations contained within will be presented to the LAC for review, evaluation and prioritization at a meeting scheduled for July 17th 2014 and will be available for comment to all landowners participating in the Project as well as engaged regulatory agencies. After completing the review, evaluation and prioritization of the annual maintenance report with the LAC and regulatory agencies, maintenance activities outlined in this report will begin and likely extend through December 2014. This draft report and a final recommendations and actions report can be accessed electronically from the Watershed Information Center & Conservancy of Napa County (WICC) http://www.napawatersheds.org/app_folders/view/3577. All maintenance work will be conducted in accordance with the regulatory permits issued for the Napa River Rutherford Reach Restoration Project.

Estimate of Cost/Fund Balance:

The Maintenance Assessment District (MAD) has been in place since June, 2008 and generates annual revenues of $98,160. Funds pay for annual vegetation and debris management and maintenance work, the annual river survey, report production and periodic monitoring surveys to gather data against which to track changes in channel and habitat conditions. Remaining funds accumulate for future annual maintenance and monitoring work.

A draft cost estimate to complete maintenance and monitoring tasks for fiscal year 2014/2015 using funds generated from the MAD is provided in Table 5. Table 5 also includes an accounting of expenditures spent to date by fiscal year as well as the remaining fund balance by fiscal year. It is anticipated that maintenance tasks will be conducted by the Napa County Flood Control and Water Conservation District and contractors. An update of the actual expenditures for fiscal year 2015 will be provided in the spring of 2015.

Table 5: Estimated expenditures for fiscal year 2015 and actual fund balance and expenditures in past fiscal years

	Annual Expenditures by Fiscal Year (FY)						
Task	2009	2010	2011	2012	2013	2014	2015
Annual surveys & development of work plans, report and monitoring	20,954	37,495	27,440	28,008	16,201	32,155	23,520
Trash removal & disposal fees	0	2,144	2,144	3,013	120	258	258
Invasive plant management	1,320	8,027	8,479	10,519	12,722	7,495	10,200
LWD Thinning and/or removal	0	1,760	1,496	2,867	17,913	923	7,000
Habitat structure maintenance, re-vegetation, watering, erosion repair	0	0	1,320	3,995	2,642	20,327	14,960
Field equipment, supplies, administration, misc.	314	826	392	875	175	1,220	600
Engineers report, public notice, legal	23,933	1,655	1,655	1,655	1,655	352	568
Total expenditures	***46,521***	***51,907***	***42,926***	***50,932***	***51,428***	***62,730***	***57,106***
Remaining balance	90,389	47,728	56,484	48,291	46,732	35,430	*41,054
Cumulative fund balance (with interest) to date	$366,108						

* Assumes full assessment of $98,160 collected for FY 2015.

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References:

Jones and Stokes, G. Hayes, L. Micheli. January 2011. *Monitoring Plan for the Rutherford Reach Restoration of the Napa River.*

Jones and Stokes. August 2008. *Final Maintenance Plan for the Napa River Rutherford Reach Restoration Project.*

USGS; 2014. USGS Real-Time Water Data Web Site for stream gage #11456000 accessed on 07-06-2014: http://waterdata.usgs.gov/nwis/uv?11456000

Stream Survey Team

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Report Production

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Figure 1: Project Location Map

Figure 2: LWD, Trash and Debris Map

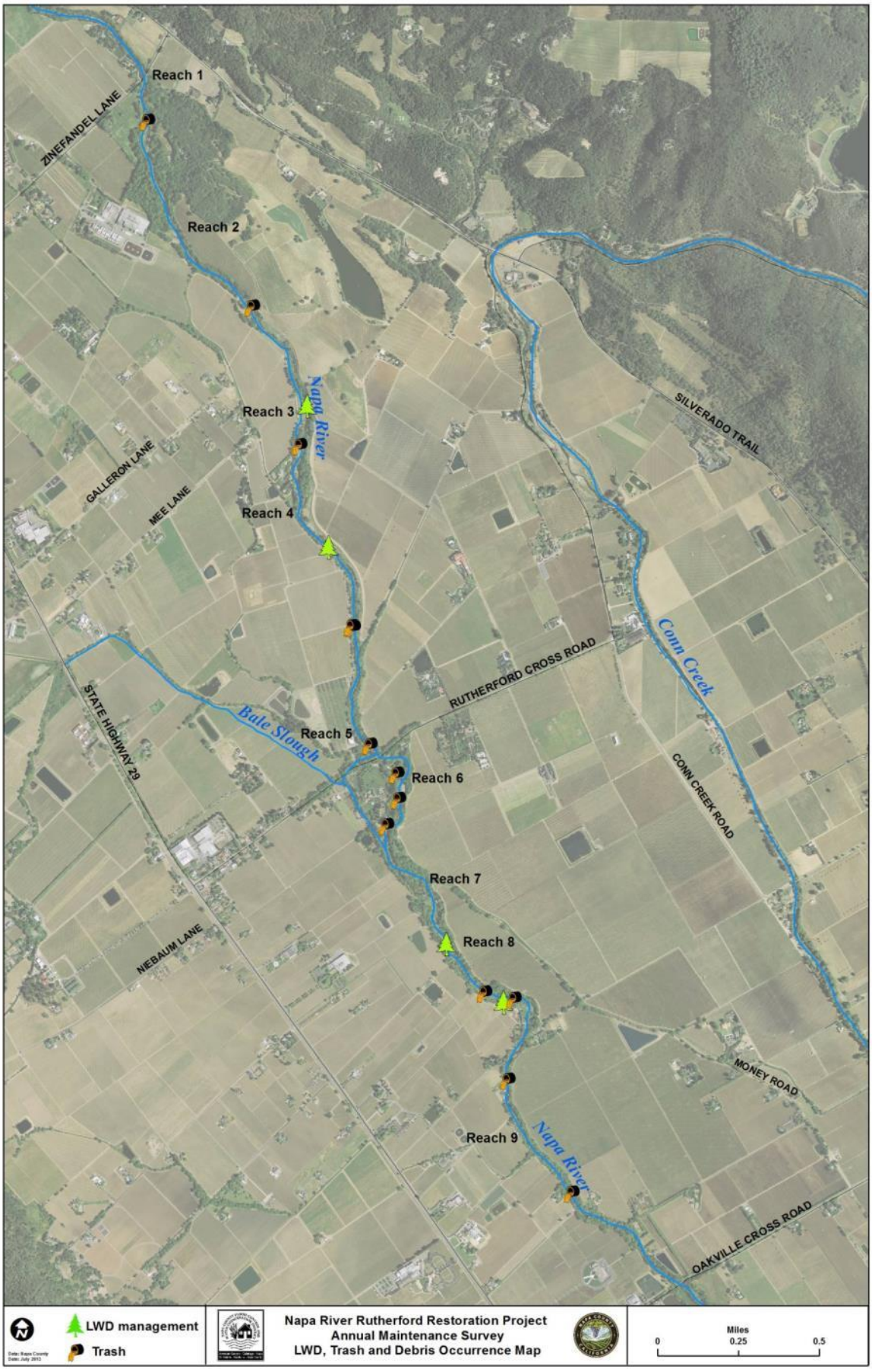

Figure 3: Invasive/ Pierce Host Plant Occurrence Map

Figure 4: Constructed Features Map