Napa River Rutherford Reach Restoration Project
Annual Maintenance and Monitoring Survey

Napa River beaver dam, June 2015

July 2015

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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 during the summer of 2015.

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 activities were completed in the fall of 2014 and the Project is now in the maintenance and monitoring phase. For monitoring and maintenance tracking purposes the 4.5 mile Project reach has been divided into sub-reaches numbered from 1 to 9 starting from the Zinfandel Lane Bridge and ending at Oakville Cross Road. As a result of construction and completion of the Project in 2014, 26 floodplain benches measuring a total of 8,580 linear feet were constructed in Reaches 1-9. A total of 6 side channel, wetland and alcove features were built including the secondary channels constructed at the Round Pond and Wilsey Properties and the backwater alcove features constructed at Rutherford Wine Studios and Cakebread properties. 13 bank stabilization areas were constructed and approximately 14,303 linear feet of setback berms were created in order to widen the distance between agricultural activities and the river channel.

The focus of the 2015 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 an ecologist, fisheries biologist, and hydrologist 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, 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 jam maintenance)
- *Eroding Stream Banks* (Date, River Station, Bank Location, Bank Erosion Location, Bank Erosion Length and Height, Bank Condition, Instability Element Description, Recommendation, Priority, Notes, Photo)
- *Large Woody Debris Place and Naturally Recruited* (Date, River Station, Length, Structure Type, Bed form 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, Hydraulic Constriction, Winter/Summer Refugia, Structure Problem, Repair Recommended, Persistence, Notes)
- *Photographic Documentation Point* (Date, River Station, , Number of Photos, Notes)
- *Riffle Crests* (Date, Notes)

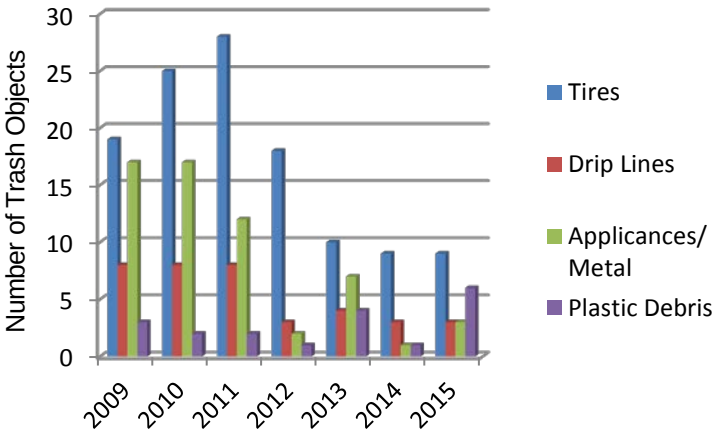
Survey Results:

The annual stream survey was conducted between June 8th through June 11th, 2015; typical weather conditions included sunny to partly overcast skies and one day of morning shower with 30-80% cloud coverage and air temperatures ranging between 59° - 68° Fahrenheit. Stream flow measured at the USGS stream gage (ID#11456000) at the Pope Street Bridge, located approximately 1,100 feet upstream of the Project reach ranged from 1.5 – 2.4 cubic feet per second (cfs). Stream flow was abnormally low due to ongoing drought conditions in the Napa River watershed and the state of California. 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 22 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 22 occurrences were tires. The remaining four (13) occurrences of trash and debris were drip lines, a plastic tarp, a lawn mower, and an oven (**Picture 1**). **Figure 2** shows the locations of the surveyed trash and debris. While overall occurrences of trash and debris are less when compared to the peak number (48) documented in 2011, more were documented this year (22) then last year (13).

Graph 1: Trash and Debris (2009-2015)



Picture 1: Lawn mower in stream channel

Invasive Non-Native and Pierce Host Plants:

Figure 3 depicts the location of significant occurrences of invasive/Pierce host plants that were documented during the 2015 stream survey. Himalayan blackberry, native and hybridized grape, periwinkle (*Vinca major*) 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 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 114,640 square feet (sqft) of non-native invasive and Pierce host plants were documented including 37,582 sqft of Himalayan blackberry, 41,153 sqft of native/hybrid CA grape, 9,612 of periwinkle, 23,252 sqft of Mugwort, and 3,041 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 sp*.) 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 6 through 9 under the post construction re-vegetation maintenance contracts. Species currently being managed include those listed previously as well as position hemlock and tree of heaven.

Graph 2: Arundo mapped and treated (2009-2015)

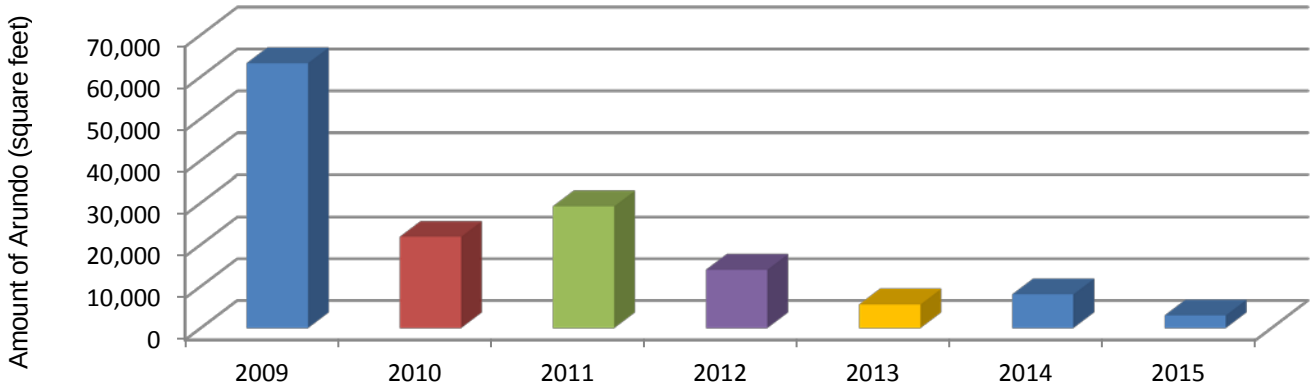


Table 1 summarizes the invasive non-native and Pierce host plants documented during the 2015 stream survey. Further, **Table 1** lists if the species is a Pierce Disease host and ranks each species as a "high" or "moderate" impact invasive species as defined by the California Invasive Plant council (Cal-IPC); 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 reflecting the total square footage of invasive and Pierce host plant species ultimately treated through spring 2016.

Table 1: Invasive Non-Native and Pierce Host Plants documented during 2015 survey

Common Name	Scientific Name	Infested Area (SqFt)	Native?	Pierce Disease host	Cal-IPC Ranking
Giant reed	*Arundo donax*	3,041	No	No	High
Mugwort	*Artemisia douglasiana*	23,252	Yes	Yes	None
Periwinkle	*Vinca major*	9,612	No	Yes	Moderate
CA & Hybrid Grape	*Vitus sp.*	41,153	Yes/No	Yes	None
Himalayan Blackberry	*Rubus armeniacus*	37,582	No	Yes	High
Total		**114,640**			

Instream Habitat Structures and Large Woody Debris:

A total of 257 large woody debris (LWD) occurrences and boulder cluster installations were documented and evaluated during the 2015 stream survey. Of these occurrences, 147 were instream habitat structures installed as part of the restoration Project. The remaining 110 occurrences were naturally recruited LWD (minimum size: one foot diameter and six feet long. Of the 110 naturally recruited LWD occurrences, none appeared to be contributing to any localized bank erosion. Two (**Figure 2**) of the occurrences, both in Reach 9, were jams (**Picture 3**) 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.

Installed LWD Structures and Constructed/Graded Benches:

As mentioned previously, at the time of the survey, construction for the entire Project, reaches 1-9, has been completed, resulting in the creation of 26 inset flood plain benches, 6 side channel, wetland and alcove features, 13 bank stabilization areas and installation of 147 instream habitat structures. At the time of the survey, thirteen (13) of the LWD structures were buried while the remaining LWD structures and boulder clusters that were able to be located appeared to be functioning as designed and will not require maintenance in 2015. The 13 structures that were buried and were therefore not able to be completely evaluated for habitat suitability will likely be revealed in future years by high stream flow scour at which time they will inspected for any maintenance needs and evaluated for habitat suitability.

Three areas of localized bank erosion (**Picture 2**) were documented during the survey that the District intends to address/stabilize using a combination of bio-technical methods during the fall of 2015. See **Table 3** for the location and details of the proposed bank stabilization work to be conducted at these sites.

Picture 2: Reach 4 erosion site (June 2015)

Picture 3: LWD jam marked for management

Table 3: Proposed bank stabilization sites

River Station/Reach	Description	Proposed Work
150+35 (Reach 4)	Localized erosion at outlet of floodplain bench	Plant slope with willow pole stakes and/or willow brush mat.
140+25 (Reach 8)	Localized erosion at outlet of floodplain bench	Plant slope with willow pole stakes and/or willow brush mat.
56+75 (Reach 8)	Arundo treatment site, un-vegetated	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, a significant level of beaver activity (dam building, downing of trees) has been noted in the Project reach. District staff documented twelve (12) beaver dams (See report cover photo) in the Project reach. In general, the District does not consider beaver dams to be an issue that would cause bank erosion or localized flooding; the dams are relatively small in relative to the river channel and typically wash away during high winter flows. During the low flow season, the dams impound slow water, providing cool pool habitat for aquatic wildlife.

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 are assumed by the Maintenance Assessment District (MAD) fund. The District now has full maintenance responsibility for Reaches 1-4 (approximately 20.3 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 2015/2016 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 will be addressed on a case by case basis.

Landowner Requests for Maintenance:

In additional to the regular maintenance work (invasive/Pierce host plant management, irrigation, LWD management, etc.) that takes places throughout the entire 4.5 mile Project reach, **Table** 4 below lists specific maintenance requests from landowners

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 2015. 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: Landowner Maintenance Requests received to date for maintenance year 2015

Reach	Property	Requested Work	Recommendation
Reach 1	Guggenhime Property	Mow annual grass top of bank and slope for fire suppression concerns.	Completed requested work spring 2015.
Reach 2	Quintessa Vineyards	Remove/treat streamside and top of bank Himalayan blackberry, *vinca* and Mugwort, remove debris and trash	Initial mowing completed in spring, additional work (follow up treatment of invasive/Pierce host vegetation) scheduled for late summer of 2015.
Reach 8	AJM Vineyards	Remove/treat streamside and top of bank Himalayan blackberry and elderberry.	Work is currently schedule to take place in July of 2015 with a follow up treatment of invasive/Pierce host vegetation in the fall of 2015.
Reach 8	Gemelch/ Frost Fire	Plant additional native trees in Arundo removal area to create additional riparian cover and screen adjacent property	Completed requested work spring 2015; planted approximately four 15 gallon toyon shrubs in area and hooked up to existing irrigation system.
Reach 9	United/ Spencer	Remove/manage beaver dams	District has wrapped all large cottonwoods with hardware fabric in areas of beavers dam in order to preclude further downed trees
Reach 9	Swanson Vineyards	Remove/treat streamside and top of bank Himalayan blackberry, *vinca*.	Initial mowing and herbicide treatment completed in spring, additional work (follow up treatment of invasive/Pierce host vegetation) scheduled for late summer 2015

Recommendations and Work Plan:

The RDRT maintenance survey team recommends the following work be conducted during fiscal year 2015-2016:

- 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.
- Manage 2 LWD jams (<12-inches-in-diameter and/or <6-feet-long) adjacent to landowners property in Reach 9.
- Continue to protect large riparian trees with hardware clothe in areas that are in close proximity of active beaver dams
- Treat large accessible patches of invasive and Pierce host plants with glyphosate including Himalayan Blackberry, Mugwort, Vinca, 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.

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 30th 2015. The report will also be available by request from the County or downloadable from the Napa County WICC to all landowners participating in the Project as well as interested regulatory agency staff. 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 to October 2015. 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/5501. 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. In the fall of 2015 the District, in coordination with the Napa RCD, will be re-occupying the 21 monitoring transects originally established for the project. There is a significant cost to this task ($20,000) that will be absorbed by the MAD; however this monitoring task will not be repeated again until 2020.

A draft cost estimate to complete maintenance and monitoring tasks for fiscal year 2015/2016 using funds generated from the MAD is provided in **Table 5**. **Table 5** also includes an accounting of expenditures spent for the last two fiscal years as well as the fund balance as of June 30, 2015. 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 2015/2016 will be provided in the spring 2016 final maintenance memo.

Table 5: Estimated expenditures for fiscal year 2016 and actual fund balance and expenditures in past two fiscal years

Task	Annual Expenditures by Fiscal Year			
	Budget Item per Engineers Report	2014	2015	Proposed 2016
Annual surveys & development of work plans, report, monitoring, administration	9, 10	37,560	24,457	41,482**
Vegetation/ invasive plant management of floodplain benches, irrigation	2,4,5,8	35,100	22,736	35,250
Streambank erosion and habitat structure maintenance	3,6,7	8,043	1,136	4,500
Debris/LWD Thinning and/or removal	1	5,649	932	2,500
Total expenditures		**86,352**	**49,261**	**83,732**
Annual assessment balance		11,808	48,899	14,428
Cumulative fund balance (with interest) 6/30/2015	**$360,426**			

** Includes $20,000 for re-occupying monitoring cross section surveys sites; performed once every 5 years.

Contact: Jeremy Sarrow, Watershed & Flood Control Resources Specialist, NCFCWCD, jeremy.sarrow@countyofnapa.org

References:

Jones and Stokes. August 2008. *Final Maintenance Plan for the Napa River Rutherford Reach Restoration Project.*
USGS; 2015. USGS Real-Time Water Data Web Site for stream gage #11456000 accessed on 07-06-2015: http://waterdata.usgs.gov/nwis/uv?11456000

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Figure 1: Project Location Map

Figure 2: LWD, Trash and Debris Map

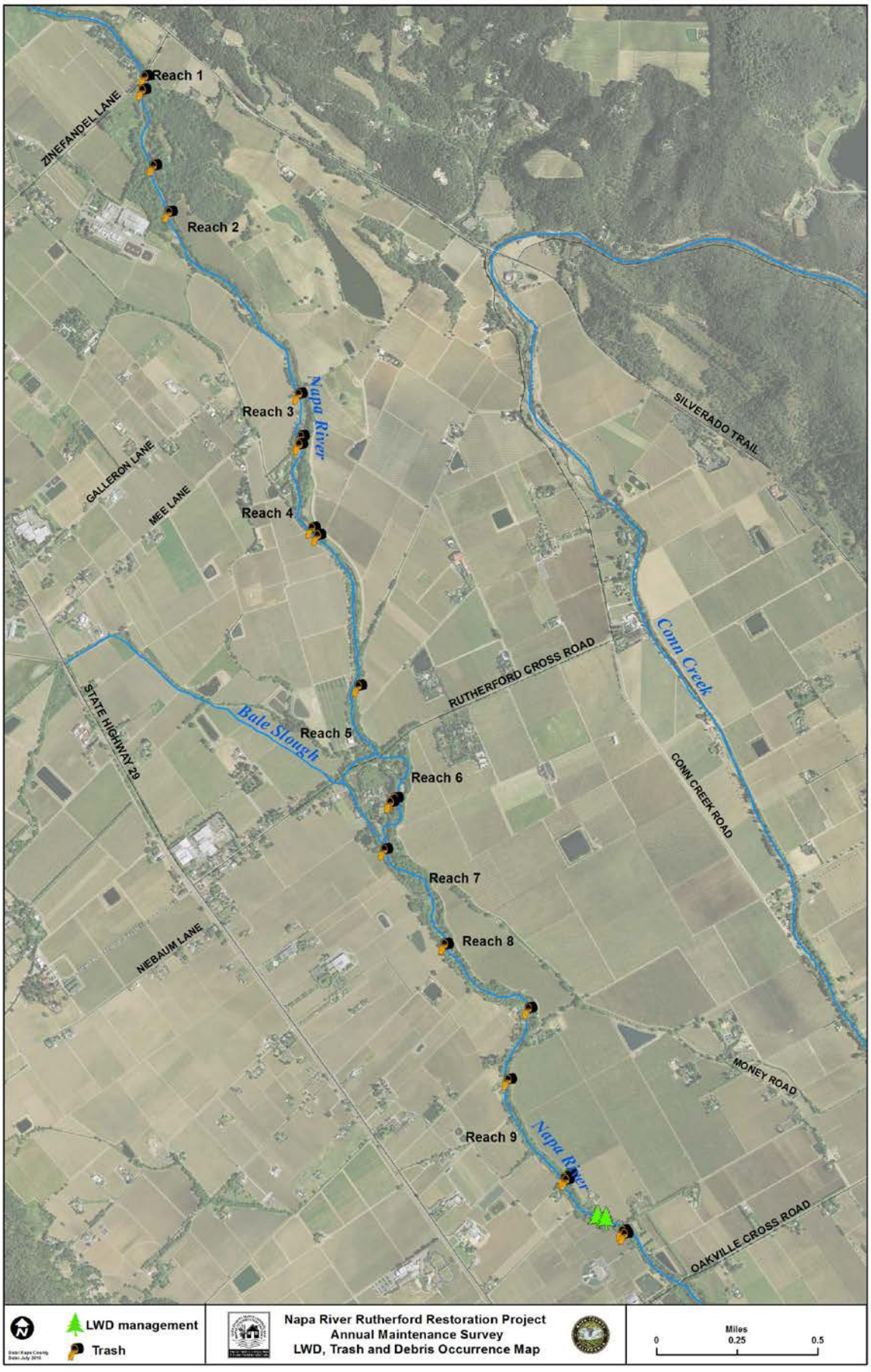

Figure 3: Invasive/ Pierce Host Plant Occurrence Map

Figure 4: Constructed Features Map