Napa River Rutherford Reach Restoration Project
Annual Maintenance and Monitoring Survey

Assessing Instream Habitat Structure, Reach 6, Napa River Rutherford Reach, June 2016

July 2016

Prepared by:
Napa County Flood Control and Water Conservation District
Napa County, California

NAPA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
American Canyon • Calistoga • Napa
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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) 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 stream maintenance survey conducted during the summer of 2016.

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 (trash, etc.) 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 2016 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 aspects of the annual stream survey are:

- 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)

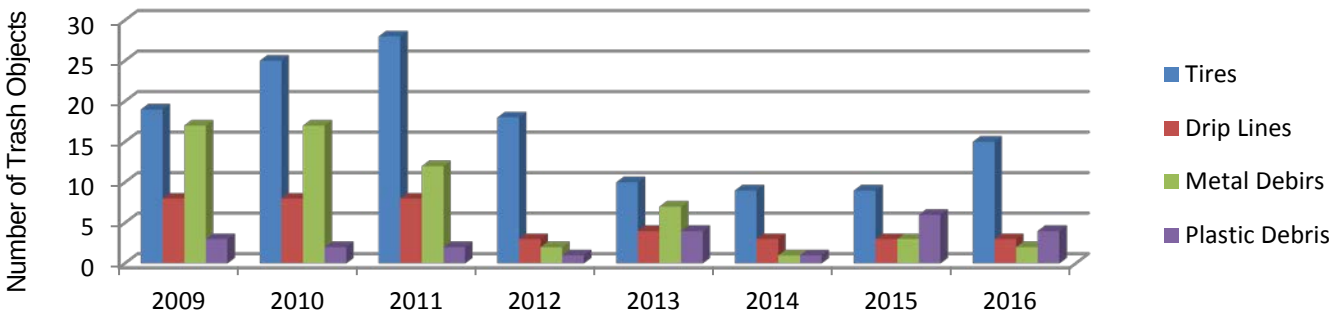
Survey Results:

The annual stream survey was conducted between June 21st through June 23rd , 2016; typical weather conditions included sunny to partly cloudy skies with 5%- 25% cloud cover and air temperatures ranging between 63° - 85° 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 1.0 – 2.2 cubic feet per second (cfs). River channel maintenance issues documented included accumulations of trash and debris located in-channel and at the top of the river banks, invasive and Pierce's disease vegetation located throughout the riparian zone, beaver dam and areas of localized stream bank erosion.

Trash and Debris:

A total of 24 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 (**Picture 1**), drip lines, metal debris and plastic. Since surveys began in 2009, tires have consistently been the dominant debris documented in the channel. This year 15 of the 24 occurrences were tires. The remaining four (9) occurrences of trash and debris were drip lines, a plastic crate and several water heaters. **Figure 2** shows the location 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 was documented this year (24) then last year (22).

Graph 1: Trash and Debris (2009-2016)



Invasive Non-Native and Pierce Host Plants:

Figure 3 at the end of the report shows the location of significant occurrences of invasive/Pierce host vegetation that was documented during the 2016 stream survey. Himalayan blackberry, native and hybridized grape, vinca and Mugwort were the dominant target plants identified; other target species documented include Arundo, tree-of heaven, red sesbania (**Picture 2**) 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 512,088 square feet (sqft) of non-native invasive and Pierce host vegetation was documented during the 2016 survey; for comparison only 101,427 sqft were documented in 2015. Species documented in 2016 include 175,475 sqft of Himalayan blackberry, 329,915 sqft of native/hybrid CA grape, 3,625 of vinca, 2,975 sqft of mugwort and only 98 sqft of Arundo. As in previous years, we encourage landowners to contact the maintenance lead with any additional requests for management of invasive and/or Pierce host vegetation in the riparian zone, beyond the top of bank, that may have not been documented during the channel maintenance survey.

Previous and ongoing efforts to manage and remove Arundo have been successful in significantly reducing the quantity within the Project area; **Graph 2** below depicts the decline of Arundo throughout the Project area. The area of Arundo documented this year was the least every documented, 98 sqft, and was comprised only of small re-sprouts from previously treated clumps; re-sprouts will be re-treated in the fall of 2016.

Management of the surveyed non-native invasive and Pierce host vegetation has already begun and will continue through the end of summer 2016; treatment of this vegetation in Reaches 6 through 9 is being paid for under the post construction re-vegetation maintenance contracts and not with MAD funds.

Graph 2: Arundo mapped and treated (2009-2016)

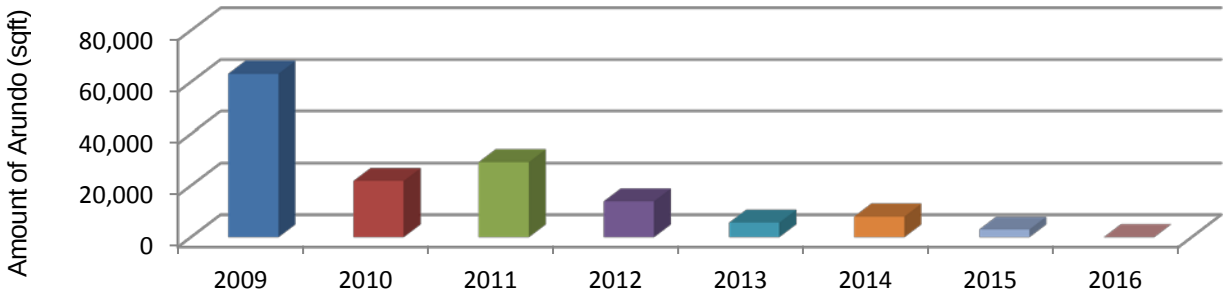


Table 1 below summarizes the invasive non-native and Pierce host plants documented during the 2016 stream survey. Further, **Table 1** lists if the species is a Pierce Disease host and ranks each species as a "high" or "moderate" impact invasive species as defined by the California Invasive Plant council (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 2016 final maintenance memo reflecting the total square footage of invasive and Pierce host vegetation treated during calendar year 2016.

Table 1: Invasive Non-Native and Pierce Host Plants documented during 2016 survey

Common Name	Scientific Name	Infested Area (SqFt)	Native?	Pierce Disease host	Cal-IPC Ranking
Giant reed	*Arundo donax*	98	No	No	High
Mugwort	*Artemisia douglasiana*	2,975	Yes	Yes	None
Periwinkle	*Vinca major*	3,625	No	Yes	Moderate
CA & Hybrid Grape	*Vitus sp.*	329,915	Yes/No	Yes	None
Himalayan Blackberry	*Rubus armeniacus*	175,475	No	Yes	High
Total		**512,088**			

Picture 1: Trash Site Reach 6

Picture 2: Red Sesbania Reach 4

Instream Habitat Structures and Large Woody Debris:

A total of 106 "naturally recruited" large woody debris occurrences (i.e. minimum size one foot diameter and six feet long) were documented during the 2016 survey, very similar to the amount of 110 naturally recruited large woody debris (LWD) occurrences surveyed in 2015. Of the 106 naturally recruited LWD occurrences surveyed none appeared to be contributing to any localized bank erosion, however 2 LWD occurrences in reaches 1 and 5 (**Figure 2**) were significant jams that have been prioritized for thinning out and monitoring over the winter. If warranted, these LWD jams will be further managed to reduce channel erosion and/or flow obstruction by thinning out smaller wood, trimming trunks and/or realigning larger wood if necessary. In general, LWD functions 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 resource monitoring report.

Installed LWD Structures and Constructed/Graded Benches

The 148 installed instream habitat LWD and boulder cluster Project structures were also evaluated during the 2016 stream survey to assess functionality, stability and other attributes. At the time of the survey sixteen (16) of the installed instream habitat structures were completely buried an unable to be evaluated. Of the remaining 132 instream habitat structures that were located 57 of those were found to be providing summer low-flow refugia and 30 were providing winter high-flow refugia and the remaining were functioning as hydraulic constructions, pool scour, bank stability elements or recruiting gravel; in several instances structures provided multiple habitat functions . A more detailed evaluation of the functionality for the instream habitat features will be presented in the 2016 resource monitoring report to be released later this year. The 16 structures that were completely buried, and were therefore not able to be evaluated for habitat functionality, will likely be scoured out/ revealed in future years by high river flows at which time they will surveyed for any maintenance needs and evaluated for habitat value during future surveys.

Two 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 2016. See **Table 3** below for the location and details of the proposed bank stabilization work to be conducted at these sites.

Table 3: Proposed bank stabilization sites

River Station/Reach	Description	Proposed Work
57+00 (Reach 8)	Arundo treatment site, un-vegetated	Cover bare slope areas with erosion control fabric and jute net, broadcast erosion control seed mix and plant with live willow stakes in fall.
42+35 (Reach 8)	Localized erosion at outlet of floodplain bench	Plant slope with willow pole stakes and/or willow brush mat.

Picture 3: Erosion Site Reach 8

Picture 4: Beaver Dam Reach 9

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 thirteen (13) beaver dams (**Picture 4**) 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 small 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. However, if a particular dam does appear to present a hazard the District will manage the area appropriately by thinning out the structural wood of the dam to allow for sufficient flow and debris conveyance.

Irrigation and 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). The District now has full maintenance responsibility for Reaches 1-4 and 8 (approximately 27 acres). Tasks once paid for under the three year maintenance contracts such as mowing, invasive/Pierce host vegetation 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 2016/2017 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 as needed. 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 work pursuant to the 2016 maintenance survey and expects to complete the work by late summer and/or fall of 2016. 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 channel maintenance request form is included at the end of this report.

Table 4: Landowner Maintenance Requests received to date for maintenance year 2016

Reach	Property	Requested Work	Recommendation
Reach 1	Guggenhime Property	Mow annual grass top of bank and slope for fire suppression concerns,	Work to be completed summer of 2016.
Reach 4	Honig Vineyards	Remove/treat streamside and top of bank Himalayan blackberry, *Vinca,*	Initial mowing and treatment completed in spring, additional work (follow up treatment of

			invasive/Pierce host vegetation) scheduled for late summer 2016
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 2016 with a follow up treatment of invasive/Pierce host vegetation in later summer/ fall 2016.
Reach 9	Bradley/ Levy	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 treatment completed in spring, additional work (follow up treatment of invasive/Pierce host vegetation) scheduled for late summer 2016

Recommendations and Work Plan:

The RDRT maintenance survey team recommends the following work be conducted during fiscal year 2016-2017:

- 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 2 LWD jams (<12-inches-in-diameter and/or <6-feet-long) adjacent to landowners property in Reaches 1 and 5, manage as needed,
- Continue to protect large riparian trees with hardware cloth in areas that are in close proximity of active beaver dams,
- Treat large accessible patches of invasive and Pierce host vegetation with mechanical and chemical (glyphosate) methods including Himalayan blackberry, mugwort, vinca, California grape and arundo; 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 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 table providing additional site specific details (listed by property owner) of the proposed maintenance work for fiscal year 2016/2017 will be brought to and presented to the landowners at the July 28th LAC meeting. This report and the recommendations contained within will be presented to the LAC for review, evaluation and prioritization at a meeting scheduled for July 28th, 2016. 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 extend to October 15th, 2016. This report and a final summary memo of work conducted each year can be accessed and downloaded 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.

Budget:

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 and comply with Project permit conditions. Remaining funds accumulate for future annual maintenance and monitoring work. In the fall of 2016 the District, in coordination with the Napa RCD, will re-survey the entire 4.5 mile channel bottom (thalweg) of the Project reach in order to compare the channel bed elevation with previous thalweg surveys and document physical changes such as deposition and scour which help inform physical changes in the river channel, progress toward Project goals and physical habitat types. There is a significant cost to this survey task ($20,000) that will be absorbed by the MAD; however this monitoring task only takes place once every five years and will not be repeated again until 2021.

A draft cost estimate to complete the maintenance and monitoring tasks for fiscal year 2016/2017 using funds generated from the MAD is provided in **Table 5** below. **Table 5** also includes an accounting of expenditures spent for the last two fiscal years as well as the fund balance as of July 1st, 2016. 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 2016/2017 will be provided in the spring 2017 final maintenance memo and spring LAC meeting.

Table 5: Expenditures from past two fiscal years and estimated expenditures for fiscal year 2016/2017

Task	Annual Expenditures by Fiscal Year			
	Budget Item per Engineers Report	**2015**	**2016**	**Proposed 2017**
Annual surveys & development of work plans, report, monitoring, administration	9, 10	$24,457	$41,398	$26,100*
Vegetation/ invasive plant management of floodplain benches, irrigation	2,4,5,8	$22,736	$31,932	$54,009
Streambank erosion and habitat structure maintenance	3,6,7	$1,136	$1,115	$11,880
Debris/LWD Thinning and/or removal	1	$932	$1,393	$2,520
Total expenditures		**$49,261**	**$75,838**	**$94,509**
Annual assessment balance		$48,899	$22,322	$3,651
Cumulative fund balance (with interest) 7/30/2016	**$370,698**			

*Projected expenditures for FY 2016/2017 including encumbrances and $20,000 for channel thalweg survey (conducted 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*; 2015.

USGS Real-Time Water Data Web Site for stream gage #11456000 accessed on 07-14-2016: http://waterdata.usgs.gov/nwis/uv?11456000

Stream Survey Team:

Michael Gordon, Engineering Technician, NCFCWCD
Joe Panchesson, Intern, NCFCWCD
Paul Blank, Senior Hydrologist, Napa County Resource Conservation District
Jonathan Koehler, Senior Biologist, Napa County Resource Conservation District
Jeremy Sarrow, Watershed & Flood Control Resources Specialist, NCFCWCD

Report Production:

Jeremy Sarrow, Watershed & Flood Control Resources Specialist, NCFCWCD

Figure 1: Project Location Map

Figure 2: LWD, Trash and Debris Map

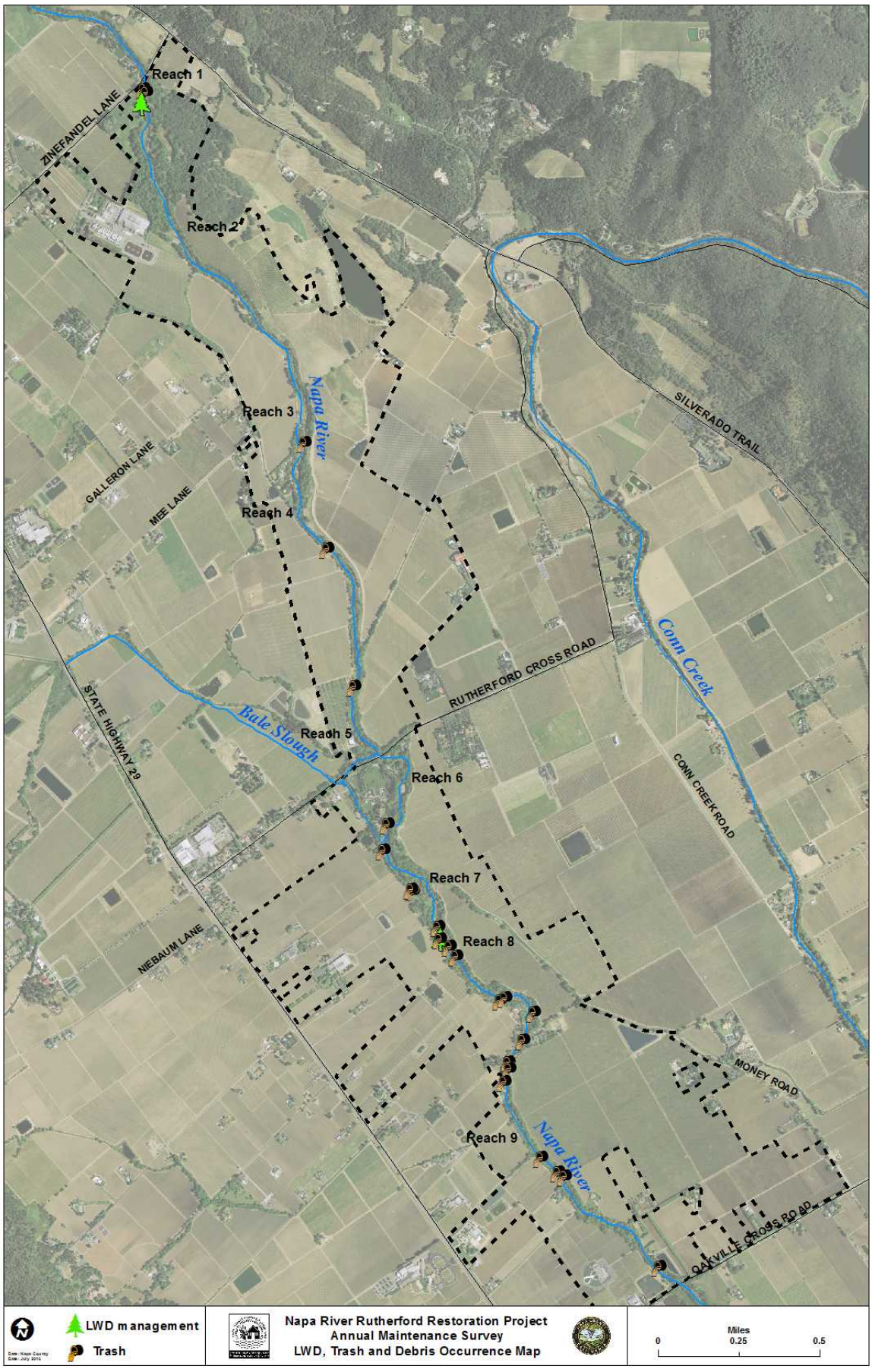


Figure 3: Invasive/ Pierce Host Plant Occurrence Map

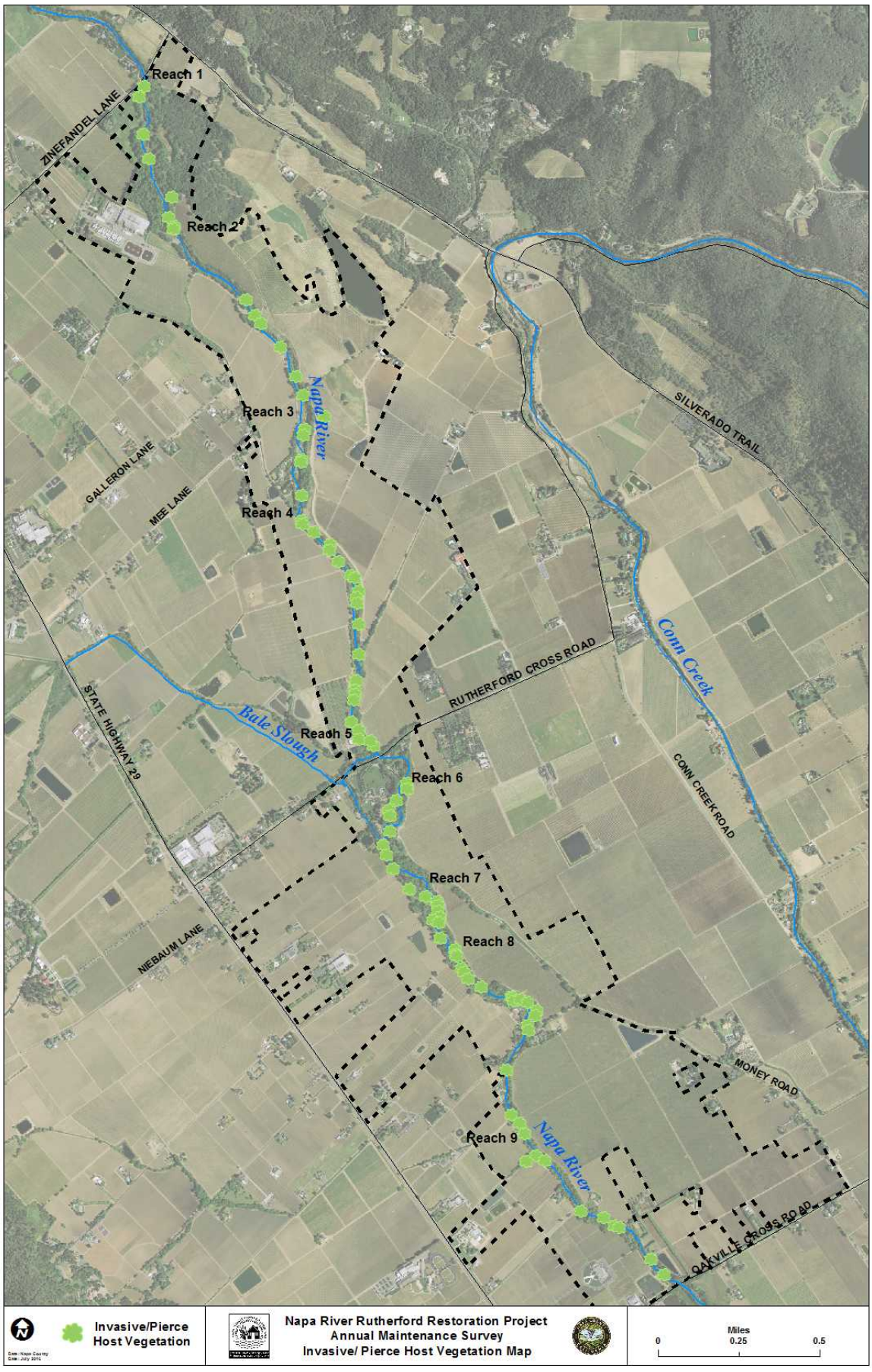
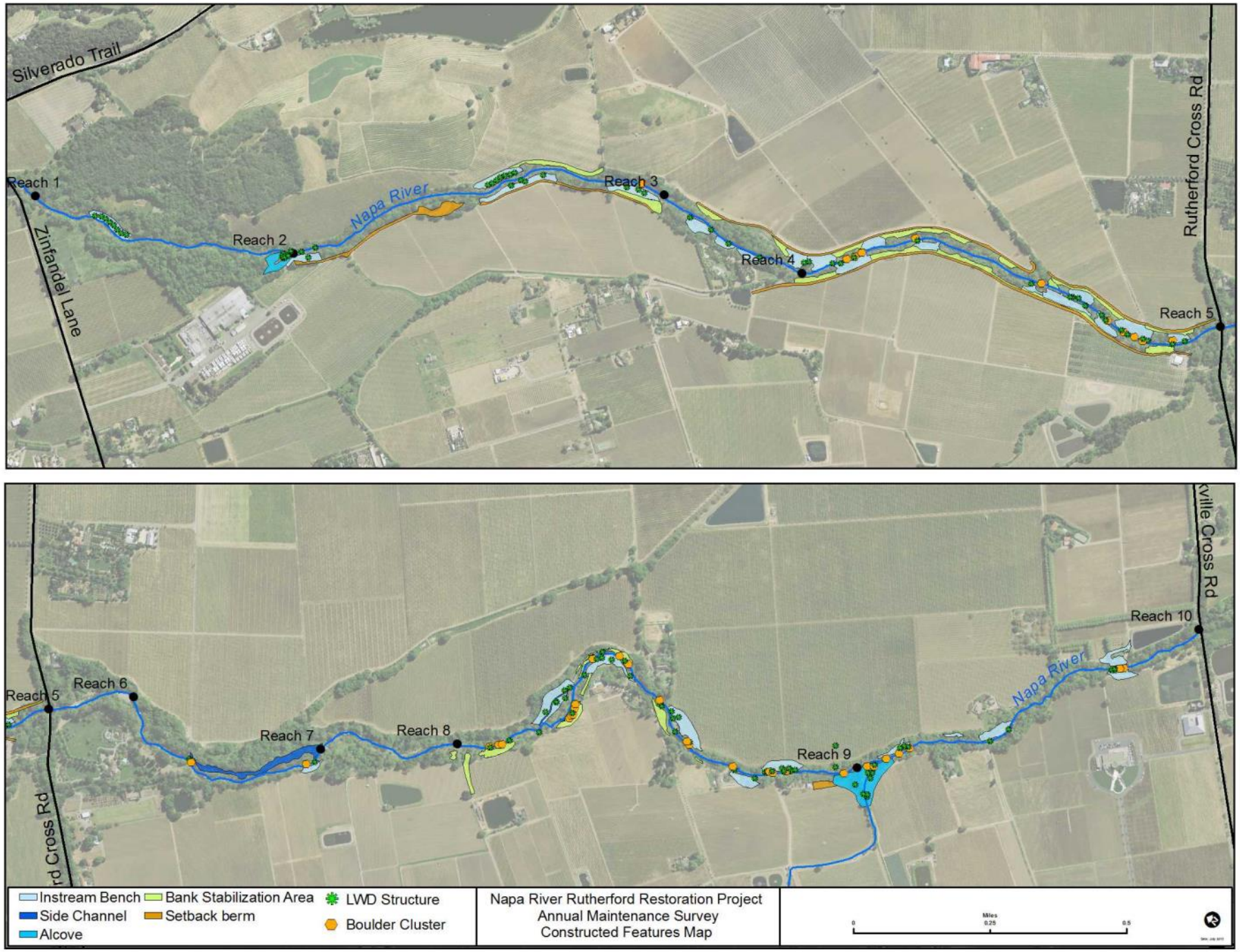


Figure 4: Constructed Features Map



Napa River Rutherford Reach Special Benefit Zone
Channel Maintenance Assessment District

RIVER CHANNEL MAINTENANCE REQUEST FORM

The Channel Maintenance Assessment District (MAD) is administered by the Napa County Flood Control District (NCFD) in cooperation with the participants in the Napa River Rutherford Reach Special Benefit Zone, which includes all river front properties between Zinfandel Lane and the Oakville Cross Road. The NCFCD holds the regulatory permits to conduct maintenance activities in the Napa River on behalf of the participants. Every June, NCFCD staff performs a river survey to identify channel maintenance issues and develop an annual work plan. Throughout the year, property owners and land managers may use this form to submit river channel maintenance requests to NCFCD staff for evaluation and treatment assessment. Requests may also be made directly to Jeremy Sarrow, the Channel Maintenance Coordinator at any time.

PERMITTED CHANNEL MAINTENANCE ACTIVITIES:

1) Control of Pierce's disease host plant and other invasive vegetation
2) Removal of trash and debris
3) Maintenance of downed trees, log jams, and accumulated woody debris
4) Repair and stabilization of eroding stream banks
5) Repair and maintenance of installed River Restoration Project features

SUBMIT CHANNEL MAINTENANCE REQUESTS TO:

Jeremy Sarrow,
Channel Maintenance Coordinator
jeremy.sarrow@countyofnapa.org
(707) 259-8204

Napa County
Flood Control and Water Conservation District
804 First Street
Napa, CA 94559

CONTACT INFORMATION:

PROPERTY: _____

NAME: _____

EMAIL: _____

PHONE: _____

CHANNEL MAINTENANCE REQUEST

Please provide a brief description of your river channel maintenance request including: type of problem to be addressed, location, access instructions, constraints on timing or type of treatment, and any other relevant information.

_____

_____

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_____

REQUEST DATE _____

Landowners are invited to participate in the Landowner Advisory Committee (LAC) meetings to review and comment on the channel maintenance activity and budget priorities for the year. Annual channel maintenance reports are online at the Napa County Watershed Information Center and Conservancy: www.napawatersheds.org/app_folders/view/3577