

Napa River Rutherford Reach Restoration Project Annual Maintenance Survey



Napa County Flood Control staff collecting data in the Rutherford Reach of the Napa River, June, 2009

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TABLE OF CONTENTS



Background	1
Survey Results	2
Landowner Maintenance Requests	5
Recommendations	5
References	6

Figures

Figure 1:	Project Map	7
Figure 2:	LWD, Trash and Debris Map	8
Figure 3:	Invasive Plant Map	9

Background:

Historic land use practices in the Napa River Watershed have resulted in confinement of the river into a narrow channel, loss of riparian and wetland habitats, accelerated channel incision and bank erosion, and reduction in the quality and quantity of in-stream habitat for salmonids and other native fish. Because of ongoing channel degradation, properties along the Rutherford Reach of the Napa River have been subject to bank instability and failure leading to the loss of valuable vineyard land, threat to structures, and costly repairs. As a result, affected landowners formed the Rutherford Dust Napa River Restoration Team (also known as “RDRT”) and have worked with Napa County and its affiliate agencies to design and implement a comprehensive reach-scale restoration called the Napa River Rutherford Reach Restoration Project (Project). The project area is comprised of privately-held parcels 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 for the Project was developed by the RDRT Landowner Advisory Committee (LAC) and the Napa County Flood Control and Water Conservation District (District) to support routine maintenance activities within the Rutherford Reach needed for a successful Project. 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 please refer to “*Final Maintenance Plan for the Napa River Rutherford Reach Restoration Project*” (Jones and Stokes; August 2008, <http://www.napawatersheds.org>). Critical elements of that plan are described below.

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 recommendations of the first annual stream survey conducted from June 1st through June 5th, 2009.

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 invasive non-native and Pierce’s disease host vegetation control, management of emergent (young) in-channel vegetation, and planting for erosion control management;
- installation of erosion control fabric or coir logs;
- maintenance of constructed features, including floodplain benches, vegetative buffers, aquatic habitat enhancement structures, and bank stabilization structures.

As of the time of this survey no in-stream structures, flood plain benches, riparian plantings or other constructed features have been installed in the Project reach. (Project construction commenced in August, 2009). Therefore, the primary maintenance focus of the 2009 stream survey was to identify and document target invasive plant species, Pierce Disease host plant species, potentially erosive LWD, and trash or debris.

Annual Stream Survey Objectives:

The stream survey commences the maintenance season by collecting and providing field data that will inform in-stream maintenance issues. A team of four resource specialists, including a geomorphologist, an aquatic/riparian biologist, a fisheries biologist, an invasive plant expert, and a landowner representative conducted the survey with assistance from two District interns.

The essential maintenance objectives 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, barrels, etc.) trash removal, and biotechnical stabilization;
- Evaluate the status of, and define the steps needed to maintain the function of constructed in-stream habitat enhancement structures;
- Identify infestations of non-native invasive and Pierce's disease host plant species, and define control treatments to the extent practicable;
- Respond to Landowners requests for maintenance actions on their property.

A suite of parameters were measured along the channel, recorded using digital photography, and mapped using two handheld computers equipped with GPS and customized software to log specific maintenance data. Four separate GIS *layers* were created to capture various categories of interest via GPS during the survey, the layers and the associated data fields include:

- Maintenance (Date, River Station, Problem, Invasive Species, Pierce Host, Recommendation, Priority, Notes)
- Eroding Stream Banks (Date, River Station, Length, Bank Location, Bank Condition, Stability Element, Instability Element, Recommendation, Priority, Notes)
- Large Woody Debris (Date, River Station, Length, Bedform Association, Bank Location, Function, Number of Pieces, Bank Erosion Potential, LWD Type, Recruitment Mechanism, DBH, Notes)
- Photographic Documentation Point (Date, River Station, Start Photo, End Photo, Photographer Location, Photographer Location, Compass Bearing, Subject, Notes)

The annual stream survey also captures data to be applied to Project monitoring required to comply with funding agency requirements. These results are summarized in a separate annual monitoring report (available upon request). Once the annual stream survey is complete and the data has been analyzed by the survey team, maintenance actions are to be prioritized by the District in coordination with the LAC based on the following factors.

- Condition of existing bank stabilization and in-stream habitat enhancement structures.
- Potential for future significant streambank failure/erosion beyond the riparian corridor and vegetated buffer.
- Risks to adjacent infrastructure and agriculture (i.e. structures, earthen berms, roads, pumps, wells, crops)
- Potential for future significant streambank failure/erosion.
- Potential for increased flood damage.
- Available budget.

Survey Results:

The annual stream survey was conducted from June 1st through June 5th, 2009 and included mild weather conditions, 20-50% cloud coverage and light rain the mornings of June 1st and June 5th. Average water temperatures ranged between 62° - 65° Fahrenheit, stream flow measured at the USGS stream gage (ID#11456000) located approximately 1100 feet upstream the beginning of the Project reach ranged from 9.0 – 8.4 cubic feet per second (cfs).

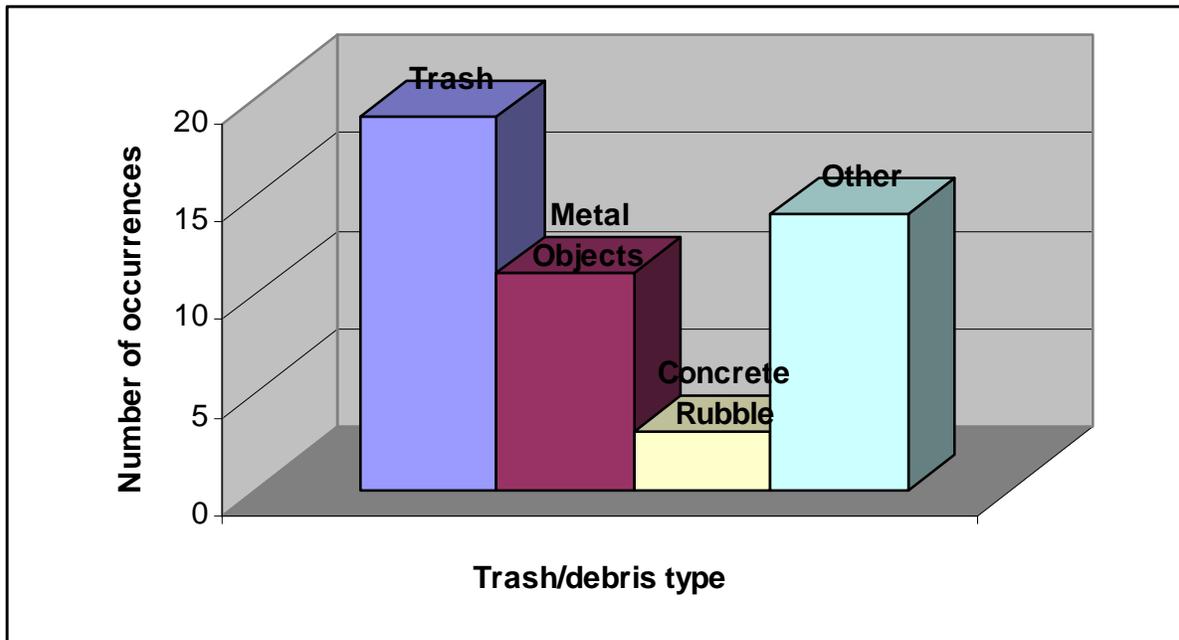
Issues documented during the stream survey included trash and debris located in-channel and at the top of the stream banks, invasive plant species located throughout the riparian zone and potentially erosive large woody debris

jams located in-channel. A total of 173 features were identified and documented within the Project area. The following subsections describe issues identified in the Project area.

Trash and Debris:

A total of 47 occurrences of trash and debris were documented in the Project area with the dominant trash and debris type being tires (19) and the remaining 28 occurrences of trash and debris were objects such as irrigation drip lines, tarps, metal objects (storage drums, appliances, lawn mowers, etc.), a TV set, kiddy pool, car batteries, concrete rubble and a 1947 Buick automobile. Figure 2 shows the location of the trash and debris documented while Chart 1 below represents the amount of trash types documented during the stream survey.

Chart 1: Trash and Debris



Invasive Plants:

A total of 121 occurrences of invasive plants were identified and documented within the Project area (Figure 3). Giant reed was the dominate invasive plant while tree-of-heaven, poison hemlock, Himalayan blackberry, and periwinkle also occurred in relatively high populations with sesbania, black locust, and fennel occurrences being relatively low. The distribution of giant reed was generally limited to those areas not treated previously through invasive plant removal programs. The largest patches of giant reed within the Project area occurred on the west bank from river station (RS) 187+00 to RS 146+00 and on both the east and west banks downstream of RS 68+00 to RS 00+00 (Oakville Cross Road); Figure 3. The distribution of tree-of-heaven, poison hemlock, Himalayan blackberry, periwinkle and fennel occurrences were roughly continuous throughout the project area while sesbania and black locust was generally limited to nine small patches. Table 1 summarizes the invasive plant species observed during the 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.

Table 1: Invasive Plants

Common Name	Scientific Name	Pierce Disease host	Cal-IPC Ranking
Tree-of-heaven	<i>Ailanthus altissima</i>	No	Moderate
Giant reed	<i>Arundo donax</i>	No	High
Poison hemlock	<i>Conium maculatum</i>	Yes	Moderate
Fennel	<i>Foeniculum vulgare</i>	No	High
Black locust	<i>Robinia pseudoacacia</i> ,	No	Limited
Himalayan blackberry	<i>Rubus armeniacus</i>	Yes	High
Red sesbania	<i>Sesbania punicea</i>	No	High
Periwinkle	<i>Vinca major</i>	Yes	Moderate

Large woody debris (LWD):

A total of nine occurrences of large woody debris (LWD) were documented and ranked that represent potential maintenance issues (Table 2, Figure 2). LWD that ranked low did not receive any specific recommendations, while the LWD that ranked medium was recommended to be monitored to track any additional accumulation, mobilization, or incipient scour. For LWD that ranked high it is recommended that the LWD be treated by either realignment, relocation, or thinning out of smaller wood (<12-inches-in-diameter and/or <6-feet-long) to provide aqueduct hydraulic conveyance of high stream flows and prevent flooding and/or bank erosion. In locations where LWD was located in proximity of a designed Project feature, the LWD will be integrated into the design feature for use during Project construction.

LWD features were ranked on a three-tiered system (low, medium and high) 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 backwater formation.
- Extent of LWD relative to cross-channel distance (i.e. extent of channel blockage).
- Location relative to planned Project features that provide opportunity to use LWD in construction.
- Landowner priority.

Table 2 lists the rankings and recommendations for large woody debris structures that were identified for maintenance actions.

Table 2: LWD identified for maintenance monitoring or treatment

River Station ID	LWD feature	Priority	Recommendation	Notes
50+70	Large single LWD, side channel, large pool	Medium	Monitor	Monitor for accumulation
58+80	Small wood accumulation (>10), side channel, small pool	Medium	Monitor	Monitor for potential bank erosion
81+00	Large wood accumulation/jam (>10), full channel, large pool	High	Monitor /Partial treatment	Thin out smaller wood to reduce backwater potential
85+00	Large single LWD, full channel, large pool, root wad attached	Medium	Monitor	Adjacent to designed feature: incorporate into project construction
85+65	Large wood accumulation (2 < 9), riffle bar stability	Low	Monitor	Monitor for potential erosion
92+50	Medium wood accumulation (2 < 9), side channel, medium pool	Medium	Monitor	Adjacent to proposed bench cut: incorporate into project construction

138+70	Medium wood accumulation (2 < 9), full channel, medium pool	Medium	Monitor/ Partial treatment	Thin out smaller wood to reduce flood potential – landowner request
167+40	Center/full channel willow mass providing instream shelter	Low	Monitor	Monitor for potential erosion, may consider thinning out of smaller wood
193+90	Large wood accumulation/jam (>10), full channel, large pool, root wad	Medium	Monitor	Monitor for potential erosion, possible candidate for thinning and/or realignment of wood

Landowner Requests for Maintenance

A total of four Landowner Requests Forms were received by the District requesting maintenance actions. Requested maintenance actions ranged from removal of specific patches of invasive and Pierce Disease host plants to realignment and/or relocation of large and/or small woody debris. Table 3 below details the specifics of Landowner Request Forms received for maintenance year 2009.

Table 3: Landowner Request Forms received for maintenance year 2009

River Station ID	Parcel #	Requested Work	Recommendation
45+00-47.5+00	031-010-006-000	Remove abandon appliances and non-native plants	Conduct requested work
55+00-64+00	030-190-028-000	Stabilize bank erosion, remove non-native plants and trash/debris	Primary bank erosion will be repaired during project construction, vegetation and debris will be addressed this season
129+00-139+00	030-090-003-000	Remove non-native and Pierce Disease host plants	Conduct requested work
136+00-143+00	030-230-004-000	Thin out Large wood material, remove non-native plants	Conduct requested work at appropriate locations

Recommendations:

The RDRT maintenance team recommends the following work be conducted during fiscal year 2009-2010:

- Removal of all trash and debris from the stream channel that can be fairly easily accessed with a combination of hand labor and/or pulley/winch assisted mechanisms.
- Realignment and thinning out of two LWD structures (<12-inches-in-diameter and/or <6-feet-long) adjacent to Landowner property as recommended by survey team and requested by Landowner (Table 2).
- Control and treat large accessible patches of invasive plants that are ranked as “high” impact invasive species and are known Pierce Disease hosts, including poison hemlock, periwinkle, and Himalayan blackberry, control and treat giant reed and Red sesbania patches with appropriate control measures including mechanical removal and herbicide application (this task also includes re-vegetation planting and irrigation of treatment sites where treatment has left significant gaps in the riparian under story canopy).

While it is anticipated that many of the invasive plants can be eradicated due to their natural history, such as giant reed (a perennial), 100% eradication is likely neither possible nor realistic with species such as poison hemlock (a biennial) within the first, second or third treatment years. Control and adaptive management of target invasive plant species over the life of the Project is the goal. All maintenance work will be conducted in accordance with the regulatory permits issued for the Napa River Rutherford Reach Restoration Project.

References:

Jones and Stokes, G. Hayes, L. Micheli. January 2009. *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; 2009. USGS Real-Time Water Data Web Site for stream gage #11456000 accessed on 06-12-2009:
<http://waterdata.usgs.gov/nwis/uv?11456000>

Acknowledgements:

Stream Survey Team

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Figure 2: LWD, Trash and Debris Occurrence Map

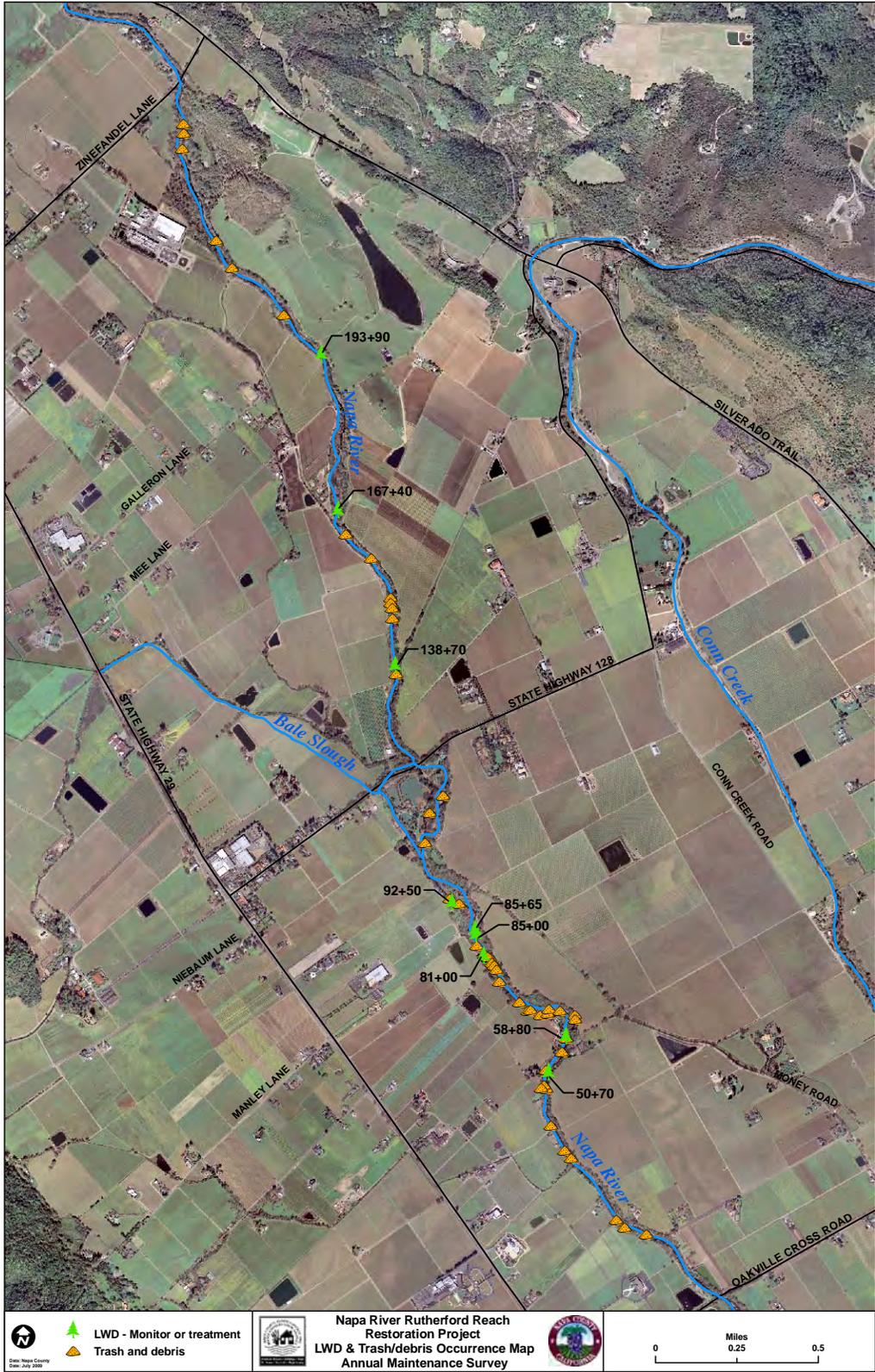


Figure 3: Invasive Plant Species Occurrence Map

