

**Watershed Analysis
for Mendocino Redwood Company's Ownership
in the
Willow and Freezeout Creeks Watersheds**

Introduction

This report presents the results of a watershed analysis performed by Mendocino Redwood Company (MRC) on their ownership in the Willow/Freezeout Creeks watersheds. This report has been developed in an attempt to meet the California Board of Forestry's 45 Day Notice for a Watershed Evaluation and Mitigation Addendum (WEMA). However, the WEMA has evolved into a different proposal and notice by the Board of Forestry titled an Interim Watershed Mitigation Addendum (IWMA). This study was a pilot WEMA for consideration by the Board of Forestry, and it is the intent of MRC to submit this watershed analysis as a WEMA or IWMA should the Board of Forestry pass the notice as a Forest Practice Rule. Should the Board of Forestry not approve the notice, MRC will continue to use the analysis, land management prescriptions and monitoring presented in this watershed analysis.

The MRC ownership in the Willow/Freezeout Creeks watersheds is considered the Willow/Freezeout Creeks watershed analysis unit (WAU). Some analysis for the MRC ownership in the Dutch Bill Planning watershed is presented as part of the Willow/Freezeout Creeks watershed analysis. This area in Dutch Bill Creek planning watershed is not intended to be part of the WEMA or IWMA; should this report be used for that purpose. However, that land will be managed with the same land management prescriptions that are determined from this watershed analysis process.

This section presents an overview of the watersheds and the watershed analysis process followed by MRC. More specific information is found in the individual modules of this report.

Mendocino Redwood Company's Approach to Watershed Analysis

MRC is conducting watershed analysis on watersheds within its ownership in Northern California. The criteria for a watershed to be selected for intensive analysis are: 1) impaired waterbodies pursuant to the Clean Water Act Section 303(d), and 2) key fish populations and 3) forestry operation-related concerns.

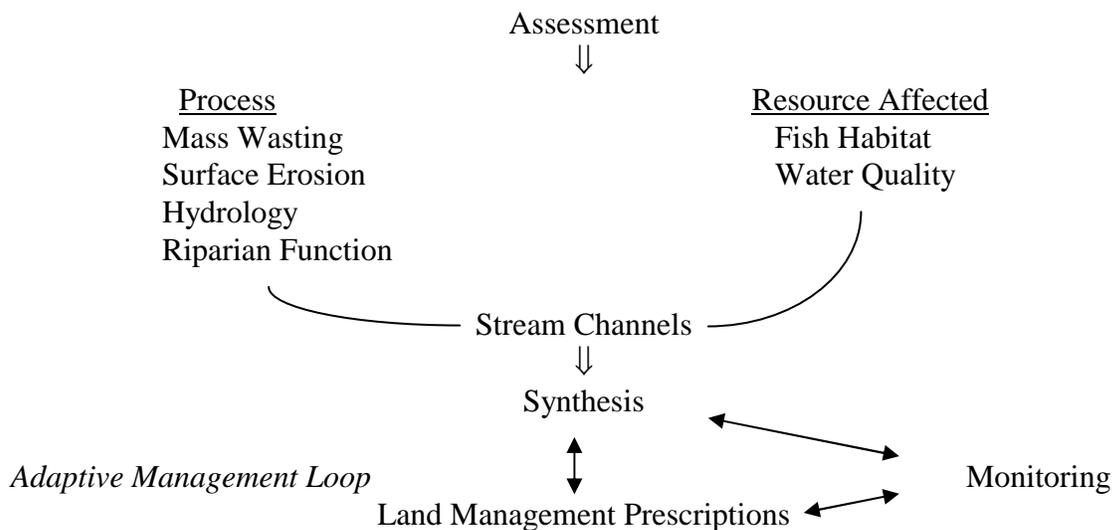
The Willow/Freezeout Creeks watersheds are tributaries to the Russian River that is on the 303(d) list as sediment impaired and a total maximum daily load (TMDL) must be developed for sediment reduction. Willow and Freezeout Creeks and their tributaries support populations of coho salmon and steelhead trout, two fisheries of concern in northern California. For this reason MRC conducted a watershed analysis to assist in their efforts to reduce non-point source pollution, evaluate current and past land management practices and establish a baseline for monitoring of watershed conditions over time. The watershed analysis will also be used to identify needs for site-specific

management planning in the watershed to reduce impacts to aquatic resources and potentially to improve fish and stream habitat conditions.

The watershed analysis of the Willow/Freezeout Creeks WAU was conducted following modified guidelines from the Standard Methodology for Conducting Watershed Analysis (Version 4.0, Washington Forest Practices Board). Some variations of the methods in this manual were performed when it was determined that the methodology better served the purpose of this assessment. MRC is using this process to address cumulative effects from forest practices and provide baseline information of watershed conditions for aquatic habitat and water quality for their ownership.

MRC’s approach to the Willow/Freezeout Creeks watershed analysis or WEMA was to perform resource assessments of mass wasting, surface and point source erosion (roads/skid trails), hydrology, fish habitat, riparian condition and stream channel condition. Mass wasting, riparian condition and surface and point source erosion modules address the hillslope hazards. The physical processes and potential triggering mechanisms for each hillslope hazard are described in the module reports. The fish habitat and stream channel condition modules address the vulnerability of aquatic resources. The results of the resource assessments are synthesized and reported in a causal mechanism report (Figure 1). A casual mechanism report is produced for each hillslope hazard that has affected or has the potential to adversely affect aquatic resources. The causal mechanism report contains a description of the hillslope hazard and how land use activities trigger or route key input variables such as coarse sediment, fine sediment, wood and heat energy to sensitive resources. A prescription is developed to address the issues and processes identified in each causal mechanism report. Finally, monitoring is suggested to determine the efficacy of the prescriptions to protect sensitive aquatic resources. The monitoring will provide the feedback for MRC’s adaptive management approach to resource conservation.

Figure 1. Watershed Analysis Overview



Assessment Overview

This watershed analysis was produced from a combination of field observations, performed during the summer of 2000, aerial photograph interpretation, and use of existing analysis on the Willow/Freezeout Creeks WAU.

Existing data or analysis used in this watershed analysis included: Louisiana-Pacific's (L-P) Coastal Mendocino Sustained Yield Plan, California Department of fish and Game Stream Inventory for Willow Creek (CDFG,1995), Sediment Supply and Sediment Transport Conditions Willow Creek report (Trihey and Assoc., 1995), Geology for Planning, Sonoma County (Huffman and Armstrong, 1980) and monitoring data collected by L-P and MRC. These information sources are cited in each module as they are used.

Aerial photograph interpretation was performed using available aerial photographs for the recent time period. The delineation of time periods for analysis was based on the available aerial photographs. The aerial photographs used are cited in each module as they are used.

The synthesis of the field observations, aerial photo interpretation and existing analysis on the WAU constitutes the resource assessment modules in this report.

Willow/Freezeout Creeks Watershed Analysis Unit Overview

Physical Characteristics

General Location and Assessment Area

The Willow/Freezeout Creeks WAU is located in the California Coast Range drains into the Russian River only a few miles inland from the Pacific Ocean in Sonoma county, California. The outlet of Willow Creek is in close proximity to the town of Jenner and the Freezeout Creek outlet is adjacent to the town of Duncan Mills.

The assessment area for the watershed analysis are the watersheds of Willow Creek and Freezeout Creeks, physical watershed not planning watershed, and the MRC lands in Dutch Bill Creek. The physical watersheds are used for the analysis because the planning watersheds for both Willow and Freezeout Creeks encompass areas that have no hydrologic connectivity to the MRC lands (both planning watersheds have area on both sides of the Russian River).

The MRC ownership and areas of the physical watersheds for Willow and Freezeout Creeks are shown in Table 1.

Table 1. Selected Physical Characteristics by Watershed for the Willow/Freezeout Creeks WAU.

Characteristics	Willow Creek	Freezeout Creek	Dutch Bill Creek
Watershed Area (ac)	5,650	1,900	12,614
MRC Owned Area (ac)	2,928	1,647	777
MRC Owned Area (%)	52%	87%	6%
Mean Annual Precipitation	50	55	50

Fisheries

Coho salmon (*Oncorhynchus kisutch*) historically resided in the Willow/Freezeout Creeks WAU. It is uncertain if coho are currently present in this WAU. Coho were not observed in this WAU during fish distribution surveys conducted by LP / MRC between 1994 and 2001. The fish species found during these surveys were steelhead (*Oncorhynchus mykiss*), prickly sculpin (*Cottus asper*), coastrange sculpin (*C. aleuticus*), and stickleback (*Gasterosteus aculeatus*) (MRC 2002). See Section F - Fish Habitat Assessment for distribution.

Geology

Lithologically the Willow and Freezeout Creeks WAU are characterized by the Coastal and Central Belts of the Franciscan Complex, and by the Upper Cretaceous sandstone of the Great Valley Sequence. Rocks of the Coastal Belt are highly sheared, and comprise structurally deformed massive, hard greywacke sandstone and shale interbedded with small amounts of limestone and pebble conglomerate. Rocks of the Central Belt underlie most of the area. Central Belt is a tectonic assemblage of fragmented Eastern Belt rocks and Mesozoic volcanic and metavolcanic rocks; it is in fault contact with the Coastal Belt. For much of its location this unit is comprised of Franciscan Melange. Due to high erodibility of the sheared shale (melange), this area is likely to be unstable and prone to mass wasting, especially earthflows. Rocks of the upper Cretaceous unit consist of consolidated, thick bedded, gently homoclinally folded sandstone with interbedded shale or mudstone, siltstone and conglomerate.

Literature Cited

California Department of Fish and Game. Stream inventory report Willow Creek, Sonoma County. File Report, Healdsburg, CA.

Huffman, M.E. and C.F. Armstrong. 1980. Geology for planning in Sonoma County. California Dept. of Conservation, Mines and Geology Special Report 120. Sacramento, CA.

Louisiana-Pacific Corporation. 1997. Sustained Yield Plan for Coastal Mendocino.

Mendocino Redwood Company. 2002. Aquatic species distribution on Mendocino Redwood Company forestlands, 1994, 1995, 1996 2000 and 2001. Company report, Fort Bragg, CA.

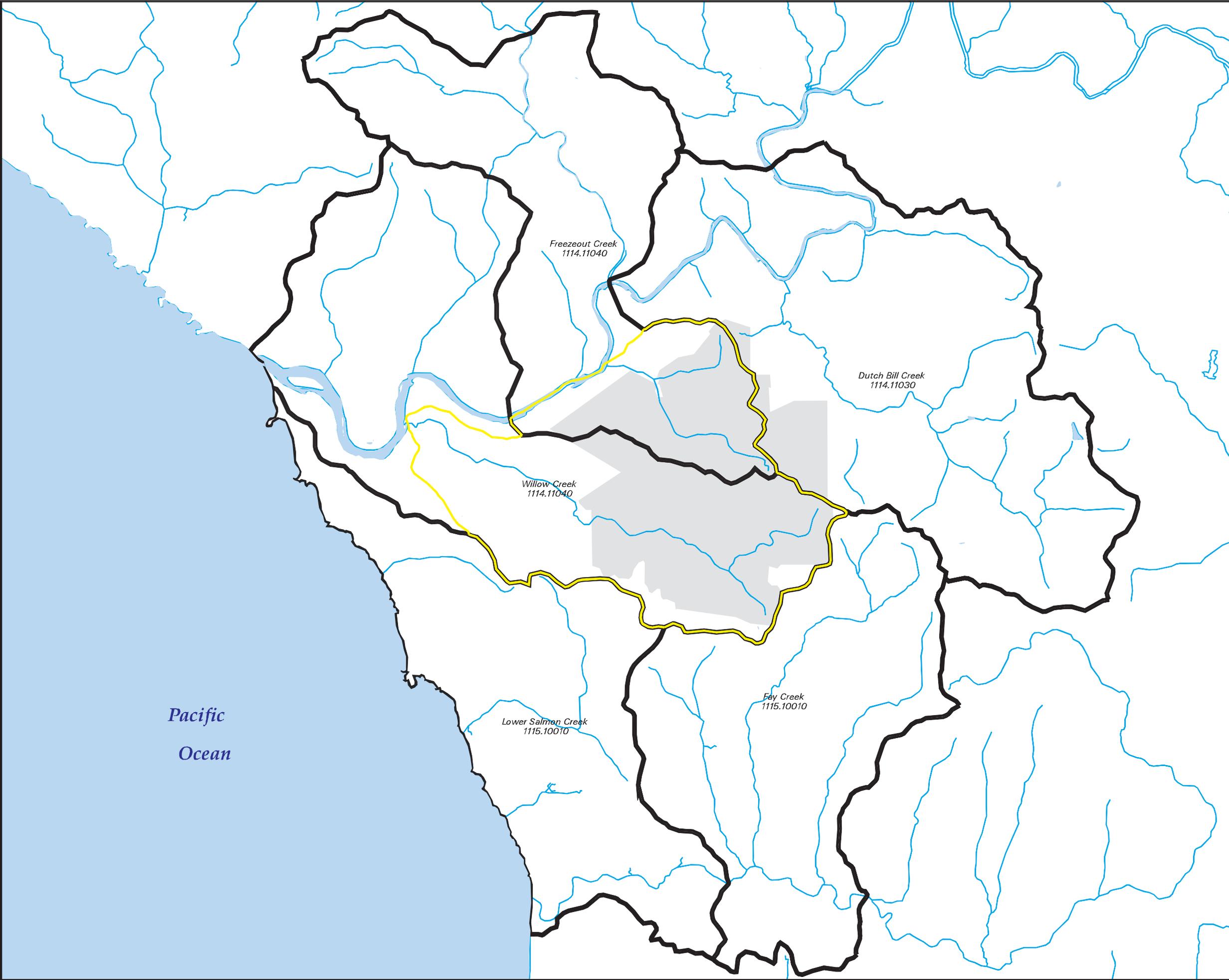
Trihey and Associates. 1995. Sediment supply and sediment transport conditions Willow Creek, Sonoma County, California. Report prepared for State Department of Parks and Recreation Russian River – Mendocino District.

Washington Forest Practice Board. 1995. Standard methodology for conducting watershed analysis. Version 3.0. WA-DNR Seattle, WA.

Willow Creek / Freezeout Creek Watershed Analysis Unit

Willow Creek / Freezeout Creek Watersheds

- Streams
- Watershed Assessment Unit
- Planning Watershed
- Ocean, Lake, Pond
- MRC Ownership



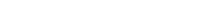
Pacific
Ocean

Willow Creek / Freezeout Creek Watershed Analysis Unit

Base Map

-  MRC Ownership
-  Planning Watershed Boundary

Transportation

-  Paved Road
-  Rocked Road
-  Native Road
-  Jeep Trail
-  Railroad

Flow Class

-  Class I
-  Class II
-  Class III

Topography

-  Index Contour (200' interval)
-  Regular Contour (40' interval)

