INTRODUCTION

Watershed Analysis for Mendocino Redwood Company's Ownership in the Navarro River Watershed

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This report presents the results of a watershed analysis performed by Mendocino Redwood Company (MRC) on their ownership in the Navarro River watershed. The MRC ownership in the Navarro River watershed is considered the Navarro watershed analysis unit (WAU). This section presents a brief overview of the watershed and the watershed analysis process followed by MRC. More specific information is found in the individual modules of this report.

MENDOCINO REDWOOD COMPANY'S WATERSHED ANALYSIS APPROACH

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

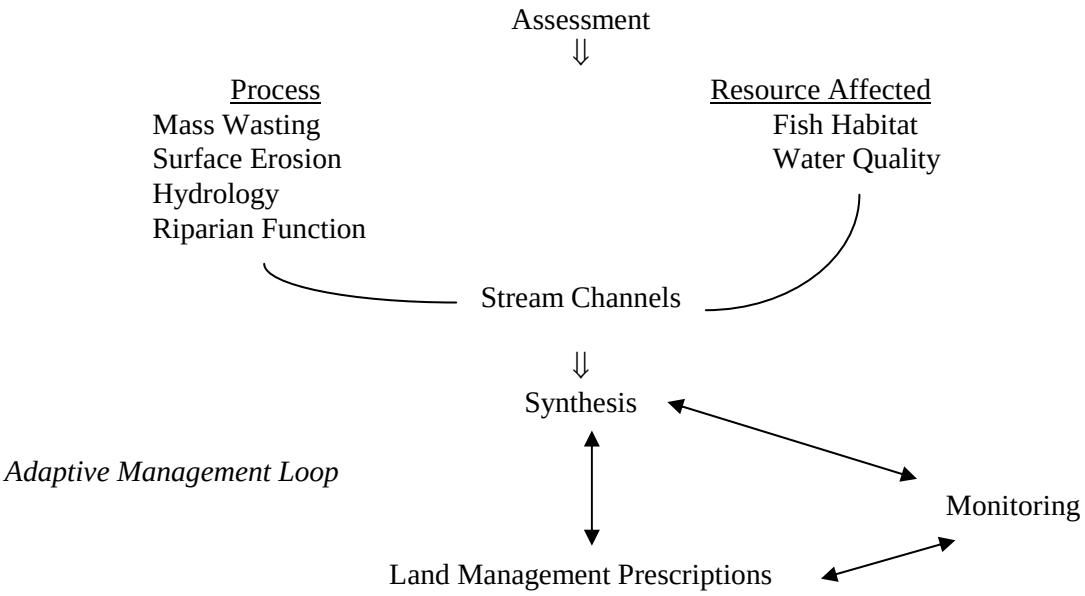
The Navarro River is on the 303(d) list as sediment and temperature impaired and a total maximum daily load (TMDL) has been developed for sediment and temperature reduction in the river (NCRWQCB, 2000). The Navarro River and its tributaries support populations of coho salmon and steelhead trout, two 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 aquatic habitat conditions.

The watershed analysis of the Navarro River 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. The watershed analysis process is not yet a regulatory requirement in the state of California. However, 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 Navarro River watershed analysis 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 causal mechanism report is produced for each hillslope hazard that has affected or has the potential to adversely affect aquatic 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 1999-2001, aerial photograph interpretation, and use of existing analysis on the Navarro WAU.

Existing data or analysis used in this watershed analysis included: Louisiana-Pacific's (L-P) Coastal Mendocino Sustained Yield Plan, Fish and Game Reports on large woody debris removal, monitoring data collected by L-P, and a fish habitat assessment report prepared by Alice Rich for L-P. 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 described below.

Aerial Photo Year	Scale	Photo Source
1952	1:20000	Mendocino County
1963	1:20000	Mendocino County
1973	1:20000	Mendocino County
1978	1:15840	Mendocino Redwood Co.
1981	1:20000	Mendocino County
1988	1:12000	Mendocino Redwood Co.
1988	1:31680	Mendocino County
1996	1:12000	Mendocino Redwood Co.
2000	1:13000	Mendocino Redwood Co.

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

NAVARRO RIVER WATERSHED OVERVIEW

Physical Characteristics

General Location

The Navarro WAU is located in the California Coast Range and drains into the Pacific Ocean in western Mendocino County, California. The outlet of the Navarro River is approximately 17 miles south of the city of Fort Bragg.

The Navarro River watershed encompasses approximately a 315 mi^2 area. The MRC ownership is within 17 different planning watersheds in the Navarro watershed as delineated by the California Water Agency. MRC separates its ownerhsip within the Navarro River watershed into two administrative units Navarro East and Navarro West, this breakdown is defined in Table 1. MRC owns approximately 27 percent of the land in the Navarro River watershed (see Base Map, Navarro River Watershed Map and Table 1). The basin's elevations range from sea level to 3,411 feet. Rainfall is seasonal in this region, with most of the rain (approximately 40-60 inches/year, Table 1) occurring between October and May.

Table 1. Selected Physical Characteristics by Planning Watershed for the Navarro River WAU.

PLANNING WATERSHED	Planning Watershed Number	INVENTORY BLOCK	PLANNING WATERSHED ACRES	MRC OWNED ACRES
Little North Fork Navarro River	114.50060	Navarro East	7,085	6,423
John Smith Creek	114.50061	Navarro East	3,674	2,080
Dutch Henry Creek	114.50062	Navarro East	7,315	4,625
Mill Creek	114.50070	Navarro East	7,738	429
Upper South Branch Navarro River	114.50050	Navarro East	7,898	4,807
Middle South Branch Navarro	114.50051	Navarro East	6,464	6,095
Lower South Branch Navarro River	114.50052	Navarro East	4,448	3,988
North Fork Indian Creek	114.50041	Navarro East	8,902	1,729
Rancheria Creek	114.50020	Navarro East	6,259	742
Upper Navarro River	114.50071	Navarro West	3,757	2,925
Floodgate Creek	114.50072	Navarro West	3,834	704
Middle Navarro River	114.50073	Navarro West	5,728	4,641
North Fork Navarro River	114.50074	Navarro West	5,709	3,943
Flynn Creek	114.50075	Navarro West	4,864	2,874
Ray Gulch	114.50076	Navarro West	3,910	2,982
Lower Navarro River	114.50077	Navarro West	7,776	4,583
Hendy Woods	114.50043	Navarro West	7,770	998

Fisheries

The anadromous fish species inhabiting the Navarro River WAU are steelhead trout (*Oncorhynchus mykiss*), coho salmon (*O. kisutch*) and Pacific lamprey (*Lampetra tridentata*). Non-anadromous species include sculpin (*Cottus spp.),* threespine stickleback (*Gasterosteus aculeatus*), California roach (*Lavinia symmetricus*), and Sacramento sucker (*Castomus occidentalis*). On MRC's property there are approximately 45 stream miles of habitat being utilized by coho and 95 stream miles of habitat being utilized by steelhead in the Navarro River watershed.

LITERATURE CITED

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

North Coast Regional Water Quality Control Board (NCRWQCB). 2000. Navarro River watershed technical support document for the total maximum daily load for sediment and the total maximum daily load for temperature. Technical Report. Santa Rosa, CA.

Washington Forest Practice Board. 1995. Standard methodology for conducting watershed analysis. Version 4.0. WA-DNR Seattle, WA.