

INTRODUCTION

Watershed Analysis For the Mendocino Redwood Company Lands In the Garcia River Watershed

INTRODUCTION

This report presents the results of a watershed analysis performed by Louisiana-Pacific Corporation (the previous landowner) on their ownership in the Garcia River watershed in 1997-1999 and updated by Mendocino Redwood Company (MRC) with information collected from 2000-2003. The MRC ownership in the Garcia River is considered the Garcia watershed analysis unit (WAU). This section presents an overview of the watershed and the watershed analysis process followed. More specific information is found in the individual modules of this report.

This report replaces the previous watershed analysis performed by Louisiana-Pacific Corporation.

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.

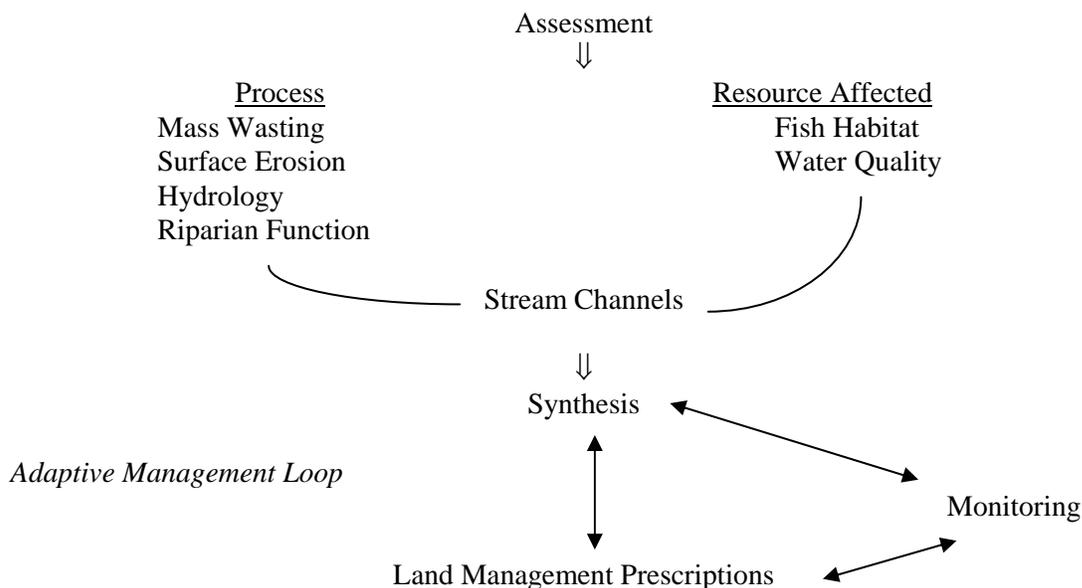
The Garcia River is on the 303(d) list as sediment and temperature impaired and a total maximum daily load (TMDL) has been developed for sediment reduction in the river (NCRWQCB, 2000). The Garcia River and its tributaries support populations of coho salmon, steelhead trout, and chinook salmon, three fisheries of concern in northern California. For this reason a watershed analysis was conducted to assist in 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 Garcia 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 Garcia 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

The initial watershed analysis was produced from a combination of field observations, performed during the summer of 1997, aerial photograph interpretation, and use of existing analysis on the WAU. A road inventory that provided information and treatment immediacies for the road

network was completed in 1998. In 2001 MRC added controllable erosion amounts (potential future point source erosion estimates) to the road inventory. In 2003 MRC performed significant updates to the mass wasting and riparian sections. MRC considered road improvements and performed new surface erosion modeling based on improved information and analysis techniques for the road and skid trail surface and point source erosion manual. All of this led to the development of new watershed prescriptions for the Garcia WAU.

Existing data or analysis used in this watershed analysis included: Louisiana-Pacific's Coastal Mendocino Sustained Yield Plan, The Garcia River Gravel Management Plan, The Garcia River Enhancement Plan, The California Division of Mines and Geology Geomorphology and Landslide maps, Soil Survey information, and monitoring data collected by the landowner. These information sources are cited in each module as they are used.

Aerial photograph interpretation was performed using available aerial photographs. The delineation of time periods for analysis was based on the available aerial photographs. The aerial photographs used are described below.

<u>Aerial Photo Year</u>	<u>Scale</u>	<u>Photo Source</u>
1952	1:20,000	Mendocino County Assessor
1966	1:18,000	Company photos
1978	1:15,840	Company photos
1987	1:12000	Company photos
1996	1:12,000	Company photos
2000	1:13000	Company photos

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

GARCIA RIVER WATERSHED ANALYSIS OVERVIEW

Physical Characteristics

General Location

The Garcia WAU is a coastal watershed that drains into the Pacific Ocean and is located in southwestern Mendocino county, California, at 123 degrees 44'W and latitude 38 degrees 56'N. The mouth is approximately 40 miles south of Fort Bragg and just north of the city of Point Arena.

The Garcia River watershed encompasses approximately a 114 mi² area. The Garcia River is broken up into 12 different planning watersheds as delineated by the California Water Agency. MRC owns approximately 16 percent of the land in the Garcia River watershed, distributed among 6 planning watersheds (see Base Map, Garcia River Watershed Map and Table 1). The basin's elevations range from sea level to 2470 feet. Regional air temperatures range between a low of about 40 degrees Fahrenheit in December and a high of about 90 degrees Fahrenheit in August. Rainfall is seasonal in this region, with most of the rain (approximately 58 inches/year) occurring between October and May.

Table 1. Selected Physical Characteristics by Planning Watershed for the Garcia River WAU (from L-P's Coastal Mendocino SYP, 1997).

Characteristics	Signal Creek 1137002 0	Unnamed North 11370021	Unnamed South 11370022	South Fork Garcia 11370023	Rolling Brook 11370024	North Fork Garcia 11370025	Total
Watershed Area (ac)	3,955	3,424	2,624	5,594	8,000	10,374	33,971
L-P Owned Area (ac)	90	1,050	243	5,148	4,582	397	11,509
L-P Owned Area (%)	2.3	30.7	9.3	92	57.3	3.8	33.9
Mean Annual Precipitation	67	64	60	53	53	57	58

Fisheries

Coho salmon are currently known to reside in the WAU, see the fish habitat module for distribution. Other fish species known to reside in the WAU are steelhead, sculpin, stickleback, and unspecified species of lamprey. In addition, fall run chinook (king) salmon have occurred historically (The Garcia River Enhancement Plan, 1992) with infrequent observations currently in the mainstem Garcia River.

Forest Management

Coniferous forest is the dominant land type of the WAU. The major management action in the WAU is from forest management, with some minor recreation use. Historic logging occurred in the lower areas of the Garcia River watershed in the late 1800's to early 1900's (The Garcia River Enhancement Plan, 1992). From aerial photo interpretation it appears that little "modern" forest harvest (modern implies current management activities which could affect present day river conditions) occurred prior to the 1950's. There was some road building and selective harvest of trees, but, no significant management. The majority of the modern forest management in the Garcia WAU began in the 1950's.

The 1950's to the 1960's saw intense logging in the Garcia WAU. The practices of the period were done at standards lower than what current forest practice rules would allow and the watershed received high soil erosion impacts. Much of the remaining timber volume in the Garcia WAU was harvested in the 1970's and 1980's and significant regeneration of the forest was conducted. The 1990's has seen little forest management activity in the Garcia WAU as regeneration is being facilitated. The current status in the WAU is a young forest.

LITERATURE CITED

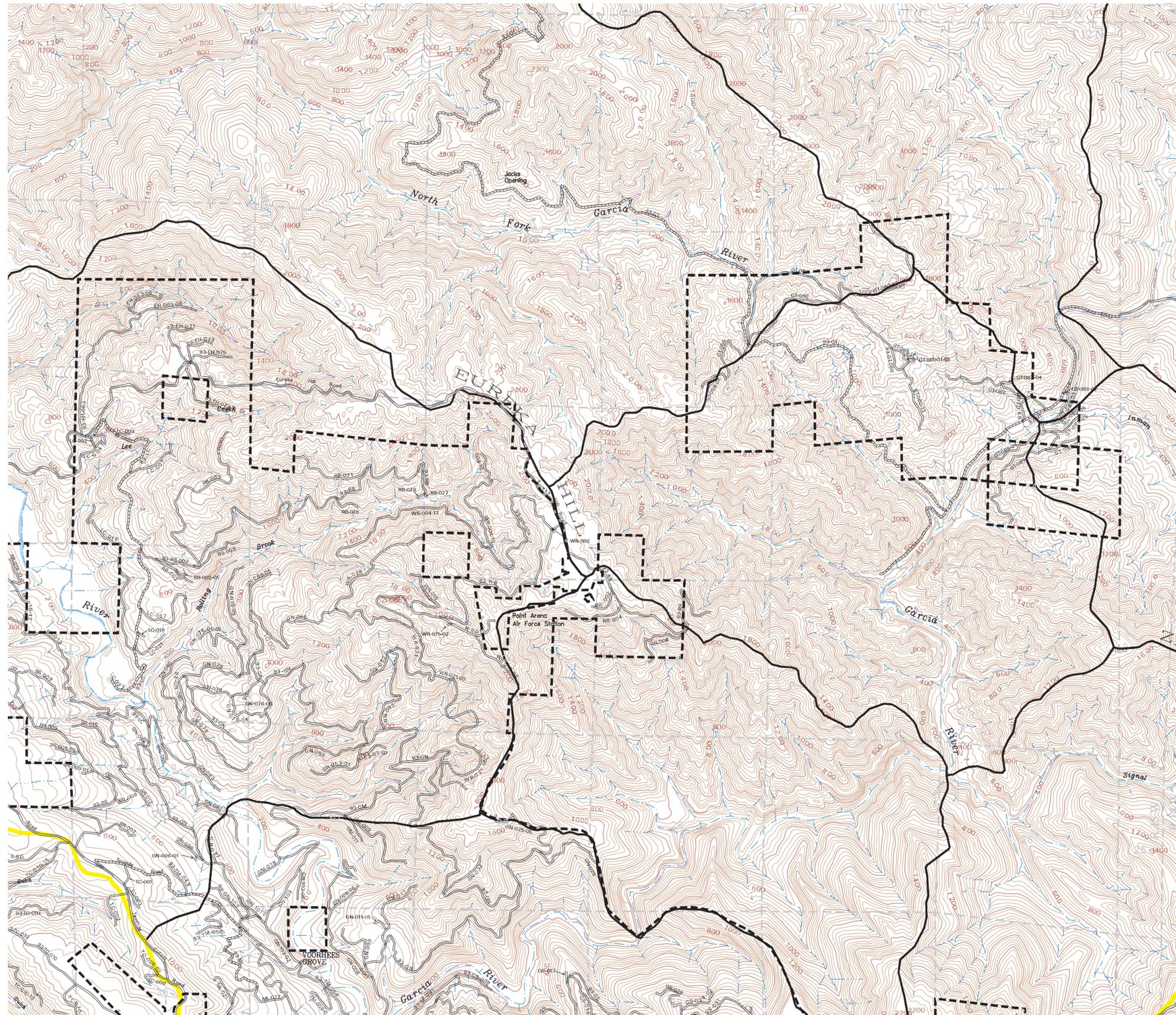
Louisiana-Pacific Corporation. 1997. Sustained Yield Plan for Coastal Mendocino.

Mendocino County Resource conservation District. 1992. The Garcia River watershed enhancement plan. Report prepared for the California State Coastal Conservancy.

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

Garcia River Watershed Analysis Unit

Base Map



- MRC Ownership
- Planning Watershed Boundary
- █ Garcia River Watershed Boundary

Transportation

- Paved Road
- - - - - Rocky Road
- · · · · Native Road
- · · · · Jeep Trail

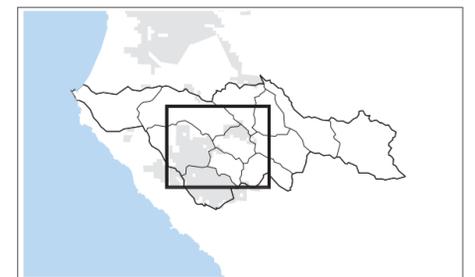
Flow Class

- Class I
- Class II
- Class III

Topography

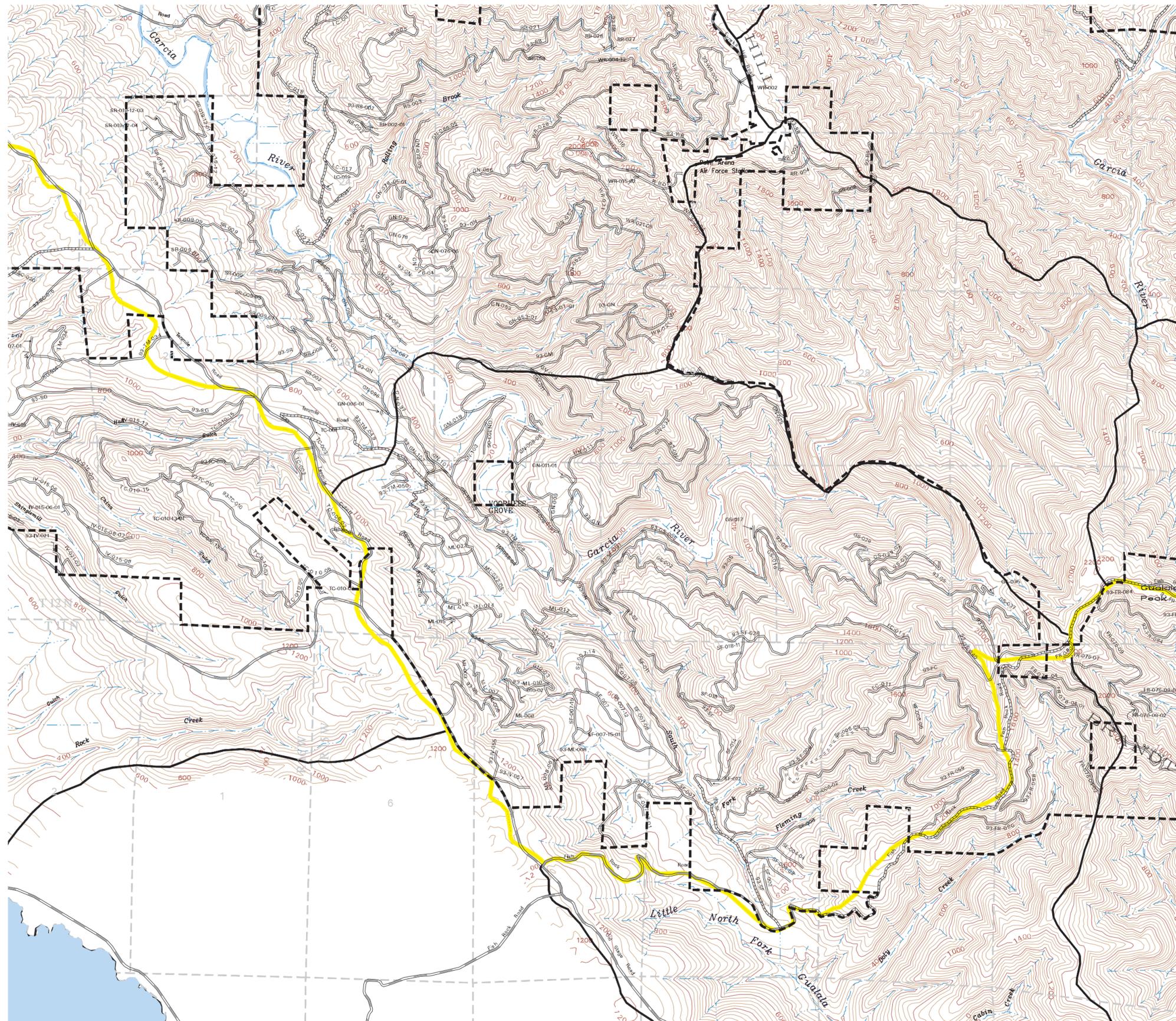
- Index Contour (200' interval)
- Regular Contour (40' interval)

Sheet 1



Garcia River Watershed Analysis Unit

Base Map



- MRC Ownership
- Planning Watershed Boundary
- Garcia River Watershed Boundary

- Transportation
- Paved Road
 - - - - - Rocky Road
 - · · · · Native Road
 - · - · - Jeep Trail

- Flow Class
- Class I
 - - - - - Class II
 - · · · · Class III

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

Sheet 2

