

Section I

Aquatic Resources Monitoring Plan for the Willow/Freezeout Creeks Watershed Analysis Unit

Introduction

Aquatic resources monitoring will be conducted in the Willow/Freezeout Creeks WAU. This monitoring is to assist Mendocino Redwood Company to assess impacts to aquatic resources associated with past or future timber harvest and related forest management activities in the Willow/Freezeout Creeks WAU. The monitoring suggested in this plan is developed primarily from the watershed analysis of the Willow/Freezeout Creeks WAU. However, other monitoring efforts have been conducted over time in the Willow/Freezeout Creeks WAU by the previous landowner and are continued in this monitoring plan.

The monitoring is a combination of hillslope and in-stream assessments. Forest harvesting and related activities can influence or alter inputs of sediment, wood and heat (solar radiation). It is these inputs that are the focus of the monitoring. Methods to evaluate factors that could alter the input of sediment, heat or wood are the hillslope monitoring portion of this plan. Evaluation of factors which could be influenced in the stream channel, water or fish habitat due to sediment, wood or heat are the focus of the in-stream monitoring.

Monitoring Plan Goals

- Test the efficacy of the Willow/Freezeout Creeks WAU prescriptions to address impacts to aquatic resources from timber harvest and related forest management activities.
- To assess long term channel conditions. Are current and future forest management practices inhibiting, neutralizing or promoting stream channel conditions for aquatic habitat?

A monitoring report will be produced each year that monitoring is conducted in the Willow/Freezeout Creeks WAU. The report will cover the monitoring and analysis that has occurred up to that year. If no monitoring is conducted in a given year than no report will be produced. The goal will be to have a report completed by February of the year following the monitoring.

The monitoring matrix (Table I-1) outlines the hillslope and in-stream monitoring MRC will be conducting in the Willow/Freezeout Creeks WAU. The monitoring will be performed periodically. MRC will be developing a property wide aquatic monitoring strategy. Once that monitoring strategy is complete, the precise timing of the monitoring in the Willow/Freezeout Creeks WAU will be finalized. The information collected in this monitoring effort will be used as part of an adaptive management approach to the Willow/Freezeout Creeks WAU. The monitoring results will be compared to the baseline information generated in the Willow/Freezeout Creeks Watershed Analysis to discover if aquatic habitat or water quality concerns are improving, staying the same or degrading. If aquatic habitat or water quality concerns are not improving then the land management prescriptions will be altered to better protect those impaired resources.

In addition to the aquatic resources monitoring, monitoring of the road infrastructure will be performed annually, particularly during the Winter period

Table I-1. Monitoring Matrix for Willow/Freezeout Creeks Watershed Analysis Unit.

Monitoring Objectives	Reasoning, Comments	Technique
1. Determine effectiveness of measures to reduce management created mass wasting.	Management created mass wasting is significant contributor of sediment delivery.	Evaluation of mass wasting following a large storm events or after approximately 20 years.
2. Determine effectiveness of erosion control practices on high and moderate surface erosion hazard roads and landings.	Roads provide sediment delivery in the Willow/Freezeout Creeks WAU.	Randomly selected watercourse crossings, landings and road lengths for erosion evaluation.
3. Determine in-stream large woody debris amounts over time.	Large woody debris is needed for stream channel and aquatic habitat improvement in the Willow/Freezeout Creeks WAU.	Stream LWD inventories and mapping of LWD designation areas in select stream reaches and long term channel monitoring sites.
4. Determine if stream temperatures are staying within properly functioning range for salmonids.	Stream temperature can be a limiting factor for salmonid growth and survival.	Stream temperature probes and modeling conducted in strategic locations.
5. Determine if fine sediment in stream channels is creating effects deleterious to salmonid reproduction.	Many forest practices can produce high fine sediment amounts. Need to ensure fine sediments are not impacting salmonid reproduction.	Permeability measurements on select stream reaches (bulk gravel samples if necessary).
6. Determine long-term channel morphology changes from coarse.	Channel morphology can be altered from sediment increases, possibly affecting aquatic habitat.	Thalweg profiles and cross section surveys on select stream reaches.
7. Determine presence and absence of fish species in Class I watercourses.	Management practices and resource protections can affect distribution of aquatic organisms.	Electro-fishing at select locations to determine species composition and presence.
8. Determine rate or erosion and effectiveness of mitigation measures for gullies.	Gully erosion is a significant sediment delivery process in the WAU.	Transect and permanent cross section monitoring.