

# Attachment 1

Monitoring and Reporting Program  
ORDER NO. R1-2011-0100

For

Waste Discharge Requirements

For

Discharges Related to Land Management Activities  
Conducted by Humboldt Redwood Company, LLC

In the  
Bear Creek Watershed

Humboldt County

This Monitoring and Reporting Program (MRP) is issued pursuant to California Water Code Section (CWC) 13267(b) and requires Humboldt Redwood Company, LLC (HRC) to implement the monitoring and reporting program described below. The purpose of the monitoring and reporting program is to ensure that HRC complies with waste discharge requirements established by Order No. R1-2011-0100 (the Order), to track activities covered under the Order that are completed or in progress, and to evaluate the effectiveness of HRC's management plan in protecting and restoring the beneficial uses of water. The Regional Water Quality Control Board has delegated its authority to the Executive Officer to revise, modify, and reissue the MRP

## I. Monitoring

HRC shall monitor watershed conditions according the monitoring program described in the following section, including conducting inspections and collecting data as described below.

### A. Roads

HRC shall inspect all roads within their Bear Creek ownership at least once annually between May 1 and October 15 to ensure that drainage structures and facilities are intact and fully functional, and to identify any active or imminent road-related failures of the road prism, cutbanks, or fills which may have occurred during the previous winter and can deliver sediment to streams (i.e. development of new sediment sources). Requirement to inspect closed and decommissioned roads is limited to the first five years following completion of work.

In addition, all accessible roads shall be inspected as soon as conditions permit following any storm event that generates 3 inches or more of precipitation in a 24-hour period, as measured at the Scotia rain gauge.

**B. THP Area and THP Related Erosion Control Plans**

HRC shall inspect CAL FIRE approved THPs, including; the logging area of active THPs, harvest units, appurtenant roads and individual erosion control sites, a minimum of three times per year according to the following schedule:

- By November 15 to assure project areas are secure for the winter; and/or immediately following cessation of winter period timber harvest activities;
- After 10 inches of cumulative rainfall has fallen between November 15 and March 1 to assess the effectiveness of management measures designed to address controllable sediment discharges and to determine if any new controllable sediment discharge sources have developed;
- After April 1 and before June 15 to assess the effectiveness of existing management measures designed to address controllable sediment discharges and to identify if any new controllable sediment discharge sources have developed.

**C. Landslides (mass wasting)**

HRC shall monitor their property in the Bear Creek watershed for new mass wasting activity. HRC shall conduct a watershed-wide reconnaissance level investigation for mass wasting events utilizing established protocols (WOP-08) following triggering events in or near the Bear Creek watershed at intervals no greater than 5 year. The interval may be determined in part by the occurrence of triggering events defined as (1) greater than 3 inches of rainfall within 24 hours as measured at Scotia; (2) a significant earthquake. Determining if an earthquake is a —triggering event is based upon earthquake magnitude and distance of epicenter from the watershed referencing Figure 2, Graph A of Keefer (1984).

On-ground landslide monitoring and reporting shall include HRC field staff (i.e. forestry, physical sciences, wildlife) contacting/notifying the HRC Geology Department in the event a new or recently active landslide is observed during the course of daily duties (i.e. road inspections, wildlife surveys, aquatics monitoring, THP layout and logging supervision).

HRC shall utilize the reconnaissance level investigation, observations by field staff, and new aerial photographs to update the landslide inventory contained in Appendix A of the ROWD using methodologies consistent with guidelines presented in California Geological Survey Note 52, Guidelines for Preparing Geologic Reports for Regional-Scale Environmental and Resource Management Planning (2001).

HRC shall utilize color, high-angle, stereo pair aerial photographs at a scale of 1:12,000 of the Bear Creek watershed to update the landslide inventory.

HRC shall obtain new aerial photographs of the Bear Creek watershed at intervals no greater than 5 years. The most recent aerial photographs of the Bear Creek watershed were taken in 2010. The next aerial photographic flight shall be flown no later than 2015.

D. Water Quality Trend Monitoring

HRC shall continue to conduct the following annual water quality trend monitoring as described in the report titled 2010 Summary Report of Water Quality Status and Trends (Appendix G of the ROWD),. Sampling procedures for each parameter measured are described in Appendix A of the 2010 Summary Report. HRC's Watershed Operating Protocols (See References at the end of this Attachment) provide a more detailed description of sampling methods for each parameter. Monitoring station locations are shown on Figures 1 and 2.

1. Photographic documentation of channel changes

HRC shall continue to take yearly photographs of the channel of Bear Creek at monitoring station 107 (Figure 1) to maintain a photographic record of changes to the channel and riparian zone over time.

2. Streambed surveys (longitudinal and cross section profiles)

HRC shall measure channel cross sections and longitudinal thalweg profiles at monitoring stations 107, 120, 203 and 204 (Figure 1) according to the methods described on pages 37 through 40 of Appendix G of the ROWD.

3. Suspended sediment and flow

HRC shall measure turbidity and discharge at sampling station 530 (Figure 1) according to *Watershed Operating Protocols 1 through 5 describing streamflow and sediment sampling procedures, instrumentation, and laboratory methods.*

4. Pebble count measurements

HRC shall collect pebble count measurements at riffles are used to address the APFC matrix target for D50 (diameter of the median [50th of 100] particle). These sediment measures can be tracked over time to determine whether bedload sediments in a watercourse are generally becoming coarser or finer, relative to both sediment loading rates and cumulative effects from management activities.

- Using a transect method within bankfull boundaries, three riffles are surveyed within each monitoring reach with a 200 pebble count each, measuring the intermediate axis of each pebble. See *Watershed Operating Protocol 13, Surface and Sub-surface Sediment Sampling* for full protocol.
- D50 values are calculated for each of three, 200-count surveys and averaged for the reach

5. Bulk sediment samples

HRC shall collect bulk sediment samples from pool to riffle breaks according to methods described in *Watershed Operating Protocol 13, Surface and Sub-surface Sediment Sampling*. Three sediment samples shall be collected using a standard shovel at three pool to riffle breaks within the sampling reach samples and shall be used to assess percent fines less than 0.85 mm and particles less than 6.35 mm.

6. Stream habitat typing

HRC shall conduct habitat typing at monitoring stations 107, 120, 203 and 204 (Figure 1) to assess the abundance (i.e., the percentage of channel length composed of pools), size, and depth of pools. Habitat typing shall address pool-to-pool spacing based on bankfull widths, percent of surface area comprised of pool habitat, number of pools associated with large wood, and average residual pool depth as described in *Watershed Operating Protocol 14, Stream Habitat Typing*.

7. Large wood surveys

HRC shall measure large wood pieces within the stream channel at monitoring stations 107, 120, 203 and 204 (Figure 1) to determine the number, size, and volume of large wood available for creating fish habitat as well as its influences on channel morphology. Data collection for large wood pieces shall be conducted according to the protocols described in *Watershed Operating Protocol 14, Stream Habitat Typing* and shall address diameter, length, volume, and number of pieces per 100 feet.

8. Canopy

HRC shall measure canopy closure over the stream channel annually at monitoring stations 107, 120, 203, and 204 (Figure 1) according to the methods described in *Watershed Operating Protocol – 11 Stream and Riparian Canopy Cover Measurements*.

9. Water temperature

HRC shall measure water temperature at monitoring stations 107 and 203 (Figure 1) over the warmest part of the year (June through September) with continuous recording data logger devices (Hobos or Optic Stowaways). Temperature data shall be used to calculate the Maximum Weekly Average Temperature (MWAT).

Temperature data loggers shall be placed (within pvc cases) into the stream at a location that meets the requirements of having good thermal mixing, adequate cover, and the ability to maintain sufficient flow during the summer months according to the methods described in *Watershed Operating Protocol 09, Stream*

*Temperature Monitoring.* Maximum Weekly Average Temperature values shall be calculated using the methods described in *Watershed Operating Protocol-07 Stream Temperature Monitoring.*

II. Reporting

HRC shall provide the following reports described in each section to the Regional Water Board Executive Officer according to the following schedule:

A. Inspection Reports

1. Roads and THP Erosion Control Plans

By June 30<sup>th</sup> of each year, an annual summary report describing all inspections of roads, erosion control plans associated with timber harvest plans, and landslides conducted during the previous year according to the specifications described in the ROWD and relevant Appendices. The annual summary report shall include at a minimum, the following information for each inspection:

- a. date of the inspection,
- b. inspector(s) name,
- c. area or sites inspected,
- d. observations, including problems identified that result, or have the potential to result in controllable sediment discharge, including discharge notifications,
- e. actions needed to prevent or minimize sediment discharge,
- f. actions taken to prevent or minimize sediment discharge,
- g. a brief evaluation of the causes of the erosional problems and the adaptive management measures that must be taken to prevent recurrence.

2. Landslides

By June 30<sup>th</sup> of each year, an updated landslide inventory, describing any landslide activity observed within the past year, including;

- a. A map showing locations of landslide activity,
- b. Whether landslide is new or reactivation of existing landslide,
- c. Estimated volume of sediment discharged,
- d. Hazard class (as described in Appendix F of the ROWD) at landslide initiation point (taken as the predominant class of the source area)
- e. Management activities (such as timber harvesting or road work) that may reasonably be considered to have caused or affected landslide activity

3. Water quality trends monitoring data

A synthesis of the results of water quality monitoring data collected during the previous year as specified in Section I(D), including: stream flow, sediment, water

temperature, channel form, and large wood in the channel, according to the specifications of Appendix G of the ROWD. The synthesis shall highlight observed trends and provide analysis of the findings.

**B. Annual Summary Report**

By Jan 31 of each calendar year, an update of all of their activities conducted during the previous year to comply with the Order by submitting an Annual Summary Report to the Executive Officer. The Annual Summary Report shall summarize activities conducted during a calendar year (from January 1 through December 31) and shall include, at a minimum, the following information:

1. Timber Harvest
  - a. The total acreage harvested, including;
    - i. THP number
    - ii. Acres harvested by silviculture method
    - iii. Acres harvested by landslide hazard class
2. Measures Implemented to Prevent or Minimize Controllable Sediment Discharge from Roads and Erosion Control Plans
  - a. An updated inventory and maps of road related sediment discharge sources, including:
    - i. New road related controllable sediment discharge sources identified during the previous year,
    - ii. road related controllable sediment discharge source treated in the past year,
    - iii. An updated summary of total road length that conforms to the storm proofed standard, as defined in Appendix E of the ROWD,
  - b. A summary of road grading, including a map showing all road segments graded over the past year.
  - c. A summary of new road construction, including a map showing all road segments constructed during the past year.
  - d. A summary of controllable sediment discharge sources treated during the past year, including:
    - i. A map showing the location of each CSDS treated
    - ii. A brief description of prevention and minimization measures implemented at each treated site
3. In-stream Restoration and Riparian Restoration Activities  
An annual update on progress towards development and implementation of an In-Stream and Riparian Restoration Plan as specified in Section I (E) of these WDRs. The update shall include at a minimum, the following:

- a. A narrative description of progress towards developing a plan;
- b. A restoration plan when completed;
- c. A schedule for implementation of restoration work;
- d. A narrative description of restoration work conducted;
- e. The results of monitoring of restoration activities.

#### 4. Landslide Restoration

An annual update on progress towards development and implementation a plan to prevent and minimize ongoing sediment discharge from recently active landslides as specified in Section I(B)(5) of these WDRs. The update shall include at a minimum, the following:

- a. A narrative description of progress towards developing a plan;
- b. A restoration plan when completed;
- c. A schedule for implementation of restoration work;
- d. A narrative description of restoration work conducted;
- e. A summary of monitoring of restoration activities.

#### C. Annual Work Plan

By November 15 of each year, an annual work plan to the Regional Water Board describing management activities HRC plans to conduct during the upcoming calendar year (January 1 to December 31). HRC shall certify that the activities included in the work plan are in compliance with the waste discharge requirements of Order R1-2011-0100.

Regional Water Board staff will review and may provide written comments and or request additional information as necessary by December 15. If directed, HRC shall submit a revised final annual work plan to the Regional Water Board by December 31.

Regional Water Board and HRC staff shall also meet annually, if requested by either party, to review proposed work to discuss the timing of and type of activities planned for the year.

The proposed activities for upcoming year annual work plan shall include, at a minimum, the following information:

##### 1. Timber harvest

- a. The total acreage HRC anticipates harvesting in the coming year pursuant to Section I(A) of the Order, including;

- i. Name of harvest plan (and CAL FIRE THP number when available);
- ii. Acres to be harvested by silviculture method;
- iii. Acres to be harvested by landslide hazard class, as described in Section I(B)(1) of the Order;
- iv. Engineering geologic reports for harvest area as required in Section I (B) (3).
- v. Road construction, reconstruction, and maintenance work, planned to be conducted pursuant to Section 1(C) of the Order
- vi. Description and map location of all road construction, reconstruction, or decommissioning planned for the coming year,
- vii. Types of routine work, including maintenance and inspections (location does not need to be included in the annual report.)
- viii. Erosion Control Plan, anticipated to be conducted pursuant to Section 1(D) of the Order
- ix. Prevention and minimization measures for controllable sediment discharge sources planned for the upcoming year
- x. Stream and Landslide Restoration
- xi. Location of planned projects for large wood repositioning and stabilization and riparian zone planting to be conducted as part of a plan submitted as required by Section I(E)
- xii. Location and Measures to prevent and minimize sediment discharge from existing landslides as required by Section I(B)(5)
- xiii. Notification of revisions to the annual work plan  

The annual work plan should be considered a planning document. The actual work conducted in the upcoming year may differ from what is described in the plan due to changes in conditions or other considerations.
- xiv. Work plan updates  

HRC shall notify the Regional Water Board no less than quarterly in writing when it becomes apparent that a deviation from the current annual work plan is necessary. The notification shall include a description of how the work differs from the annual work plan and an explanation for the change.

#### D. Five year Summary Report

HRC shall provide a five year retrospective summary and evaluation of the effectiveness of their management activity in preventing and minimizing discharges

of sediment and protection of water temperature increases that may impact the beneficial uses of water in Bear Creek.

By no later than June 30, 2016, HRC shall submit the first five year update and evaluation to the Regional Water Board. The report content may be developed in consultation with the Regional Water Board staff, such that the report may be useful to evaluate the General and Specific requirements of the WDR and provide insight into future revisions to the WDR. The five year update and evaluation shall include the following information:

1. Landslide Inventory

An updated landslide inventory and evaluation of the effectiveness of management measures intended to reduce the potential for management related landslides. The updated inventory shall include a description of all landslide activity identified during the previous five years based on field observations, interpretation of updated aerial photographs, and other available data sources, including;

- a. An updated landslide inventory, describing any landslide activity observed within the past year,
- b. Whether landslide is new or reactivation of existing landslide,
- c. Estimated volume of sediment discharged,
- d. Hazard class (as described in Appendix F of the ROWD) at the landslide initiation point,
- e. A map showing locations of landslide activity that has occurred during the previous five years,
- f. A description of data sources,
- g. Copies of aerial photographs from the previous five year period (may be scanned)
- h. A discussion of association observed during the previous five year period between management activities and active landslides

2. Roads

HRC shall conduct a survey of the road system in the Bear Creek watershed to evaluate the effectiveness of prescriptions to control sediment from roads. The survey shall report the following:

- a. Length of road hydrologically connected to watercourses,
- b. For road segments that are hydrologically connected to watercourses, a description of methods used to prevent surface erosion (e.g. what percentage are rocked, seed and mulched, etc.),

- c. Identification of stream crossings that are not sized to pass 100 year return interval flow and anticipated debris or do not have a structure in place to prevent stream diversion.

#### CERTIFICATION

All reports required by this Monitoring and Reporting program or other information requested by the Regional Water Board determination of compliance shall be signed a duly authorized representative of HRC. Any person signing a document under this requirement shall make the following certification:

“I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.”

Any person failing to furnish technical or monitoring reports or falsifying any information therein is guilty of a misdemeanor, and may be subject to civil liability. (Water Code section 13268)

Ordered by: \_\_\_\_\_

Catherine Kuhlman  
Executive Officer

November 3, 2011

## References

California Geological Survey, 2001, Note 52, Geologic Reports for Regional-Scale Projects

HRC, 2004. Aquatic trends monitoring site selection, monumenting and documentation, WOP-15, Humboldt Redwood Company, Scotia, CA.

HRC, 2004. Basics of topographic surveying, WOP-10, Humboldt Redwood Company LLC, Scotia, CA.

HRC, 2004. Laboratory analysis of suspended sediment, WOP-05, Humboldt Redwood Company, Scotia, CA.

HRC, 2004. LWD recruitment, WOP-33, Humboldt Redwood Company, Scotia, CA.

HRC, 2004, Stream and Riparian Canopy Cover Measurement, WOP-11, Humboldt Redwood Company, Scotia, CA.

HRC, 2004. Stream and riparian canopy cover measurement, WOP-12, Humboldt Redwood Company, Scotia, CA.

HRC, 2004. Stream habitat typing and measurement, WOP-14, Humboldt Redwood Company, Scotia, CA.

HRC, 2004. Surface and subsurface stream sediment sampling, WOP-13, Humboldt Redwood Company, Scotia, CA.

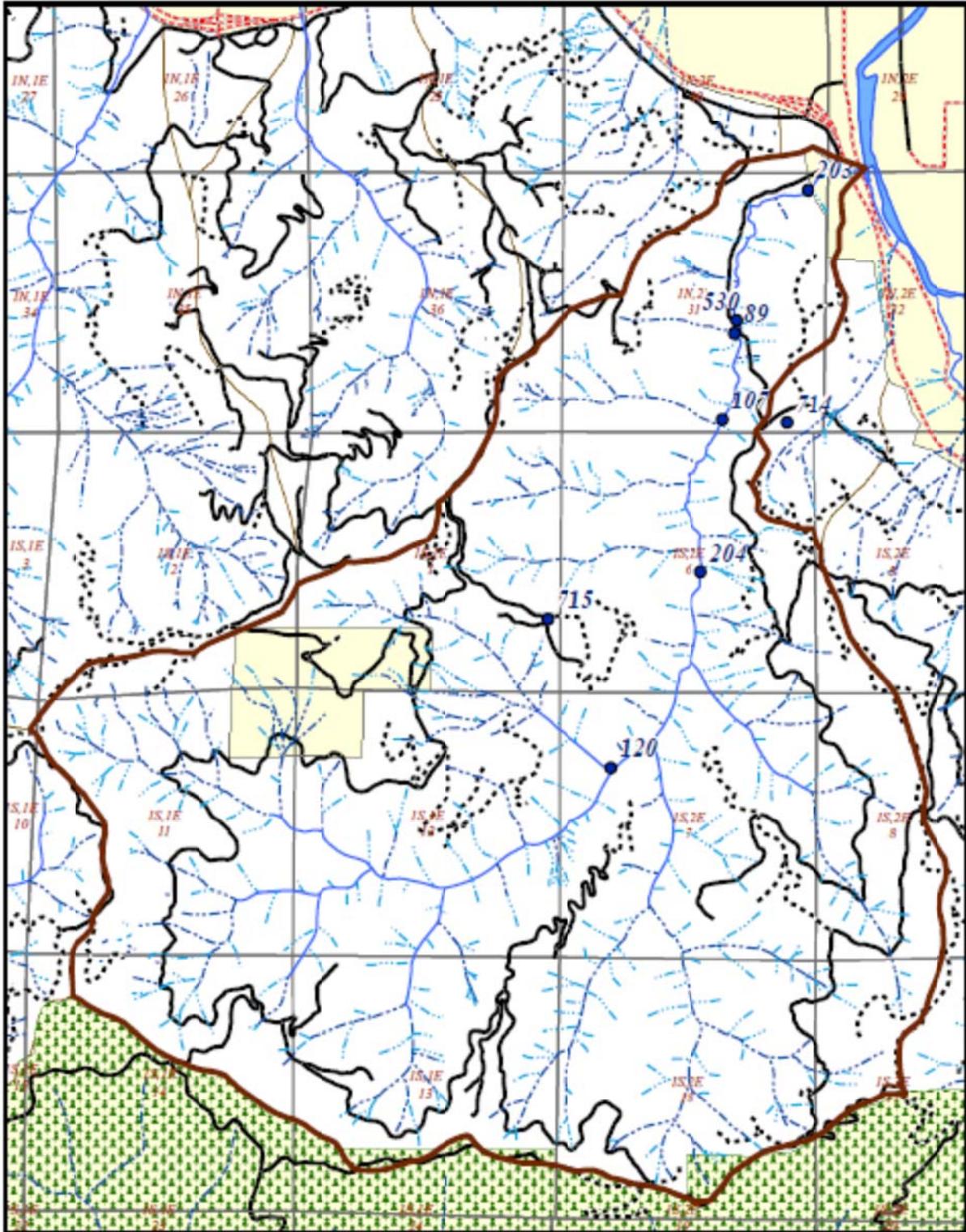
HRC, 2004. Temperature instrumentation and deployment, WOP-09, Humboldt Redwood Company, Scotia, CA.

HRC, 2005. Survey with total station, WOP-31, Humboldt Redwood Company, Scotia, CA.

HRC, 2005. Stream surveying for aquatic trends, WOP-25, Humboldt Redwood Company, Scotia, CA.

Keefer, D.K., 1984, Landslides Caused by Earthquakes, Geological Society of America, .95, p.406-421.

Figure 1



**Figure 2**

