California Regional Water Quality Control Board
North Coast Region

ORDER NO. R1-2011-0100

Waste Discharge Requirements

For

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

In the
Bear Creek Watershed

Humboldt County

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The California Regional Water Quality Control Board, North Coast Region, (hereinafter Regional Water Board) finds that:

1. The Bear Creek watershed encompasses approximately 5,440 acres (8.5 mi^2) and is a tributary to the Eel River in the Scotia hydrologic subarea (HSA) of the Lower Eel River hydrologic area. Bear Creek converges with the Eel River approximately eight miles southeast of the town of Scotia and approximately 25 miles from where the Eel River flows into the Pacific Ocean.

2. On October 20, 2010, pursuant to Water Code section 13260(a), the Humboldt Redwood Company, LLC (HRC) submitted a report of waste discharges (ROWD) for its timber harvesting and related management activities on lands in the Bear Creek watershed in Humboldt County. HRC manages its Bear creek timber holdings for growing conifer and hardwood trees for the production of saw and chip logs and other renewable forest products such as bio-fuel, split products, firewood, and burls.

3. On December 15, 2010, Regional Water Board staff determined that the ROWD was complete. The ROWD includes HRCs proposed long term strategy for their management activities in the Bear Creek watershed, maps and appendices. HRC's management plan includes measures designed to prevent or minimize water quality impacts from its management activities in the Bear Creek watershed. Water quality measures are included as Specific Requirements in Section I of this Order.

4. The management plan addresses the following activities:
   - timber harvesting;
   - methods for road use, construction, reconstruction, decommissioning, and repair and maintenance;

- measures to prevent or minimize controllable sediment discharge from roads; skid trails, landslides, and other sources related to timberland management,
- treatment of controllable sediment discharge sources;
- retention of riparian vegetation to preserve and/or restore shade and prevent increases in solar radiation;
- in-stream and riparian zone habitat restoration by repositioning and stabilization of existing in-stream large wood and planting riparian zone conifers zone for habitat restoration; and
- watershed trend monitoring.

Waste Discharge Requirements

5. Water Code section 13260(a) requires that any person discharging waste or proposing to discharge waste within any region that could affect the quality of the waters of the state, other than into a community sewer system, must file with the appropriate Regional Water Board a Report of Waste Discharge (ROWD) containing such information and data as may be required.

6. Pursuant to Water Code section 13263, the Regional Water Board may prescribe requirements as to the nature of any proposed or existing discharge with relation to the receiving water conditions. Requirements shall implement any relevant Basin Plan requirements and take into consideration beneficial uses and water quality objectives reasonably required to protect such uses, and other relevant factors.

7. These Waste Discharge Requirements (WDR or Order) address non-point source activities which have the potential to discharge wastes that affect waters of the State from only those portions of Bear Creek owned and managed by HRC—and rights-of-ways over roads on lands owned by others—totaling approximately 5,168 acres (Figure 1-2 of the ROWD), or 95% of the watershed. The potential water quality impacts are associated with erosion and sediment delivery, and/or changes to riparian systems that may reduce shade and affect water temperatures. The Order includes requirements that prevent or minimize sediment discharges and requirements that prevent increases in water temperature by limiting harvesting adjacent to streams and implementing measures to hasten natural channel recovery processes. In addition, the Order includes a requirement for in-stream restoration.

Total Maximum Daily Loads and Basin Plan Water Quality Standards

8. In 1992, United States EPA added the Lower Eel River to the Clean Water Act section 303(d) impaired waters list due to elevated sedimentation/siltation and

DRAFT

temperature, as part of listing the entire Eel River basin. In 2007, the EPA established Total Maximum Daily Loads (TMDLs) for sediment and temperature for the Lower Eel River. TMDLs are set at levels necessary to achieve the applicable water quality standards, which consist of beneficial uses, water quality objectives, and a non-degradation policy.

9. Bear Creek is within a designated impaired watershed and therefore, subject to the EPA-established TMDL for temperature and sediment for the Lower Eel River.[1] The TMDL identifies estimated sediment loading rates from natural and anthropogenic sediment sources. The TMDL identified landslides as the dominant sediment producing process and found that timber harvesting and roads are the primary source of management related sediment discharge. The temperature TMDL identifies loss of riparian shade due to landslides and timber harvest as one of the predominant factors causing temperature impairment of the Lower Eel River watershed. The temperature TMDL load allocations consist of protection or restoration of natural shade to assure compliance with water quality standards. The TMDL recommends reducing landslide risk from timber harvest related activities, performing road assessments and upgrading deficient roads, and recommends modification to restoration activities based on monitoring results.

10. The provisions described in findings 25 through 33 are expected to achieve TMDL load allocations specified above. Compliance with the provisions of this Order is the regulatory mechanism for HRC to comply with the Lower Eel River watershed TMDLs. The sediment TMDL estimates the amount of sediment that can be delivered to streams within the watershed (tons per square mile per year) without exceeding water quality standards. Reductions in the estimated sediment load from a recent time interval is another way to describe the sediment TMDL loading allocations. Since processes controlling sediment production vary both spatially and temporally and sediment loading rates for Bear Creek are best understood for the most recent decades, the TMDL load allocation of 65% reduction of the sediment load for the period 1989-2003 will be used to track TMDL progress. It is anticipated that implementation of the management strategy, with modifications as needed based on ongoing monitoring and assessment, will result in a reduction of anthropogenic sediment discharges from roads and landslides sufficient to achieve TMDL load allocations. In addition, it is anticipated that implementation of the riparian protection and restoration measures will achieve temperature load allocations and will result in compliance with the temperature objective.

11. The beneficial uses and water quality objectives for the Lower Eel River are contained in the Water Quality Control Plan for the North Coast Region (Basin Plan). The primary beneficial use of concern for this Order is the cold freshwater habitat (COLD), defined as uses that “support cold water ecosystems including, but

[1] U.S. Environmental Protection Agency (USEPA), 2007, Lower Eel River Total Maximum Daily Loads for Temperature and Sediment.

DRAFT

not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates." This Order focuses on salmonids as the aquatic species that are most sensitive to elevated sediment and temperature conditions. Evidence of salmon population declines is contained in the listing of all the major species under the Endangered Species Act by National MFS. Salmon populations are listed under their geographic area. The Endangered Species Act listing that applies to the Lower Eel River is as follows:

- Southern Oregon/Northern California Coast coho salmon Evolutionary Significant Unit (ESU)
- California Coastal Chinook salmon ESU
- Northern California steelhead Distinct Population Segment (DPS)

12. Pursuant to the Basin Plan, including State Water Resources Control Board Resolution No. 88-63, the existing and potential beneficial uses of waters potentially affected by HRC's management activities in the Bear Creek watershed include:

    a. Cold Freshwater Habitat (COLD)
    b. Wildlife habitat (WILD)
    c. Rare, Threatened, or Endangered Species (RARE)
    d. Migration of Aquatic Organisms (MIGR)
    e. Spawning, Reproduction, and/or Early Development (SPWN)
    f. Flood Peak Attenuation/Flood Water Storage (FLD)
    g. Wetland Habitat (WET)

Applicable State and Federal Regulatory Programs That Apply to Activities Covered by these WDRs

13. HRC management activities in the Bear Creek watershed are also subject to local, State, and Federal laws, policies and ordinances. These include but may not be limited to the following:
    - California Forest Practice Act (Pub. Resources Code, § 4511 et. seq.) and Forest Practice Rules (Cal. Code Regs., tit. 14, §§ 895-1115.3);
    - A multi-species state and federal Habitat Conservation Plan (HCP) approved in 1999 by California Department of Fish and Game, National Marine Fisheries Service, and United States Fish and Wildlife Service;
    - Lake or Streambed Alteration Agreement (Fish & Game Code, §1600).

14. California Department of Forestry and Fire Protection (CAL FIRE) is the state agency responsible for overseeing timber harvesting activities through implementation of the FPR. Landowners proposing to harvest timber are required

DRAFT

to have an approved Timber Harvest Plan (THP), prepared by a Registered Professional Forester (RPF), prior to starting timber harvesting activities. Pursuant to the FPR, the Regional Water Board, Department of Fish and Game (DFG), California Geological Survey (CGS), and other agencies are also responsible agencies that review THPs and provide recommendations to CAL FIRE as part of a "Review Team." CAL FIRE's THP approval process is the functional equivalent to the California Environmental Quality Act (CEQA) review process. The Regional Water Board will continue to participate as a Review Team member for individual THPs proposed in Bear Creek.

15. The Regional Water Board relies in part on enforceable provisions of the Forest Practice Rules (FPR) and HRC's HCP that are related to protection of water quality, which are included specifically or by reference, as enforceable provisions of this Order. Collectively, the regulatory mechanisms described above require implementation of specific prescriptions or management practices that provide a significant level of water quality protection. These WDRs are intended to work in conjunction with, and to supplement, the existing regulations in order to implement Basin Plan water quality standards and restore the beneficial uses of water in the Bear Creek watershed. As such, those FPRs and HCP prescriptions that provide water quality protection are included as enforceable provisions of this Order.

Background

16. Widespread logging of much of the old growth forest occurred in Bear Creek between 1947 and 1966, when almost 90% of the watershed was harvested using a combination of clearcut and intensive partial harvesting methods that caused significant ground disturbance. During that period logging roads and skid trails were constructed throughout much of the watershed, including on steep stream side hillslopes. Logging and road construction practices of the time period resulted in widespread landsliding and road related erosion that discharged large quantities of sediment to Bear Creek and its tributaries.

17. Between the mid 1980s and 1997, the previous landowner, Pacific Lumber Company (PALCO), harvested second growth and residual old growth timber on approximately 37% of the watershed, again using a combination of clearcut and partial harvesting silviculture methods. During this second period of logging, much of the hillslopes that had been tractor logged in the first entry were cable logged, which is considered to cause less ground disturbance than tractor logging.

18. Several large storm events since the 1950s triggered episodes of widespread landsliding from slopes disturbed by logging and logging roads. Many of these landslides formed debris torrents that deposited large volumes of sediment in streams, widened stream channels, and removed much of the riparian vegetation.

DRAFT

The most recent of these large landslide triggering events occurred during a series of storms in December 1996 and January 1997 and severely impacted several miles of the mainstem and major tributaries of Bear Creek.

19. In December 1997, CAL FIRE, DFG, CGS and the Regional Water Board determined, based on field observations and aerial photograph data, that Bear Creek was one of five watersheds significantly cumulatively impacted by sediment discharges after the 1996/1997storms. The other watersheds included, Stitz and Jordan Creeks, which are also tributary to the Eel River in the same vicinity, and Freshwater Creek and Elk River which are tributary to Humboldt Bay approximately 25 miles to the north.

20. In 1998 Pacific Watershed Associates (PWA, 1998), released the results of its sediment source investigation for the Bear Creek watershed conducted in 1997 and 1998. The investigation identified sediment discharge sources from roads and landslides and proposed a plan to reduce sediment discharge. Portions of that plan have been incorporated into the management strategy described in HRC's ROWD. PWA estimated that between 1947 and 1997, sediment discharge increased approximately 20 times above natural rates, primarily from landslides and road related erosion.

21. Interpretations of aerial photographs from the 1940s through 2006, as well as field investigations, indicate that landslides in Bear Creek Watershed most commonly occur on steep streamside slopes that were intensively harvested to the edge of the stream and on which logging roads and skid trails had been constructed. Further, the majority of sediment discharged from shallow landslides in the past two decades has originated from reactivation or enlargement of pre-existing landslides.

22. Monitoring in-stream and riparian conditions began in 1998, and has continued to the present. Monitoring data presented in Appendix G of the ROWD, as well as interpretations of aerial photographs from 2003, 2006, and 2010 and field observations support the finding that conditions have improved significantly since the storm event in December 1996. Natural stream processes have removed and redistributed sediment deposited by debris torrents in 1996 and riparian vegetation is returning. Habitat conditions that are more suitable to salmonids are being reestablished along much of the main stem and major tributaries, pool depth and frequency has increased, fine sediment fraction has deceased, and riparian canopy cover is increasing.

23. In October 2008, HRC obtained ownership of PALCO's timberland holdings throughout Humboldt County, including the entire 5,168 acres in Bear Creek.

DRAFT

24. Since acquiring the property, HRC has implemented a significantly different silvicultural management strategy throughout their ownership that predominantly utilizes partial harvesting methods, such as selection silviculture. Partial harvesting results in post harvest conditions that are less susceptible to mass wasting and increased erosional processes as compared to clearcut harvesting.

Management Plan and Practices

Findings 25 through 33 describe the potential impacts of timber harvesting and related management activities and the measures incorporated into the management plan to mitigate those impacts. These findings also describe the provisions of the Order to implement HRC's management plan, which are included as Specific Requirements.

25. Timber harvesting can result in increased rates of shallow landslides on vulnerable slopes due to decreases in root strength and increased soil moisture. Tree roots can enhance the strength of shallow soils, increasing the soil's ability to resist failure. When trees are harvested, their roots gradually decay, reducing the reinforcement they provide and increasing the potential for shallow landslides. The loss of root strength gradually increases over a period of several years, with the critical period of maximum loss occurring approximately 5 to 15 years after harvesting. As new roots grow into the space previously occupied by the older roots system, the support they provide gradually increases. Loss of root strength varies with species and intensity of harvest. Partial harvesting of resprouting species such as redwood or tanoak is thought to minimize the degree and duration of the period of diminished root strength. This is due the fact that a significant portion of trees remain after harvesting and that the roots of those remaining trees do not die back completely after the tree is cut down.

Interception, evaporation, and evapotranspiration of rainfall by forest canopy can reduce the volume of precipitation that infiltrates and remains in soils. Harvesting trees can therefore result in increased soil moisture and runoff, which can contribute to landsliding and increased erosion. Vulnerability to shallow landsliding processes varies throughout a hillslope, primarily as a function of soil depth, slope gradient, contributing drainage area, subsurface hydrology, and soil characteristics.

HRC will utilize a combination of strategies to identify vulnerable portions of the watershed and management activities that have the potential to trigger landslides. The objectives of the landslide reduction strategies are to avoid or restrict harvesting on vulnerable slopes and limit the overall intensity and areal extent of harvesting. Taken together, this combination of strategies is designed to minimize

DRAFT

the potential for increased sediment discharge from timber harvest related landslides. These are discussed in greater detail below and include:

- Use of partial harvesting methods that retain a significant component of post harvest root strength;
- Use of a shallow landslide model to identify high hazard areas and harvest restrictions based on hazard class;
- No harvesting on areas with high landslide hazard and within 100 feet of Class I and II streams; additional restrictions up to 300 feet from the stream or to the break in slope; and review by a licensed geologist;
- Review by licensed geologist before proposed harvesting on vulnerable slopes to characterize landslide hazards, assess the risk of sediment discharge, and develop mitigation measures to reduce the landslide risk;
- Maintain and update an inventory of landslides in the watershed to expand understanding of landslide patterns in the watershed and the effectiveness of management measures, and to revise them as necessary;
- Implement feasible stabilization measures to prevent or minimize ongoing sediment discharge from landslides;
- Establish a harvest rate limit of 30% of the watershed harvested in a ten year period in order to limit the area in post harvest condition of reduced root strength at any given time.

26. HRC has developed a shallow landslide hazard model, which is described in Appendix F of the ROWD. The model combines hillslope angle and topographic convergence from a digital elevation model (DEM) and incorporates a likely range of soil parameters to identify relative hazard classes, ranging from very high to unconditionally stable. HRC calculated landslide hazard for the entire Bear Creek watershed using the model and prepared a map showing landslide hazard, which is included in the ROWD. HRC developed management prescriptions for each hazard class designed to prevent or minimize harvest related landslides, which are presented as Table 1 in Appendix F of the ROWD. Regional Water Board staff reviewed the landslide hazard model, the resulting hazard map and prescriptions in Table 1, and determined that they provide an appropriate tool to help identify and restrict or limit harvesting on vulnerable hillslopes. The management prescriptions included in Table 1, specify that a Professional Geologist (PG) must review and evaluate the potential impacts of any proposed harvesting on areas in high to moderate hazard classes. The prescriptions specify no harvesting on the highest hazard class, unless a PG concludes that there is no potential for sediment discharge.

DRAFT

Section I(B)(1) of the Order requires that HRC identify hazard class of areas that will be harvested based on the landslide hazard map in the ROWD and implement the applicable management prescriptions from Table 1.

Section 1(B)(2) of the Order requires that prior to harvesting on areas shown as the highest hazard Class, HRC must submit to Regional Water Board staff, a report by a Licensed Professional Geologist (PG) demonstrating that the proposed activity willnot increase the potential for sediment discharge..

27. Appendix D of the ROWD describes hillslope prescriptions from HRC's HCP that were developed to minimize management related landsliding from steep streamside slopes as a result of watershed analysis for the Lower Eel River, which includes Bear Creek. The analysis identified landforms most commonly associated with landsliding, based on slope, geologic substrate, and land use history and provides prescriptions to either avoid or limit harvesting on high hazard areas.

    Regional Water Board staff have reviewed the hillslope prescriptions and find that they are reasonable approach to avoiding or limiting harvesting on vulnerable slopes and are an important component of their overall strategy to minimize management related landsliding.

    Section 1(B)(2) requires that HRC implement the hillslope prescriptions from the ROWD, including the following:

    a. No harvesting within 100 feet of Class I and II watercourses;
    b. Any harvesting within a headwall swale connected to a Class I, II, or III watercourse shall retain an adequate number of living trees equivalent to a minimum of 150 square feet of basal area per acre;
    c. No ground based equipment, with the exception of at existing roads and equipment crossings, and permitted new road construction within:
        - 150 feet of a Class I watercourses,
        - 100 feet of a Class II watercourse,
        - 50 feet of a Class III watercourse, or to the closest hydrologic divide,

    d. a checklist for foresters preparing timber harvest plans to assist them in identifying vulnerable slopes and provide criteria for review by a PG.

28. Landslide related sediment discharge from hillslopes disturbed by management activity can persist episodically for many years after the initial impact. Appendix A of the ROWD includes an inventory of active landslides observed after the 2003 and 2006 storm seasons prepared by a PG. Fifty three of the 58 landslides (91%) identified in the inventory in Appendix A were reactivations of older landslides. Understanding landslide patterns in the watershed and the effect of land management on slope stability can be used to minimize ongoing landslide related

DRAFT

sediment discharge and identify restoration opportunities. Section 4.1.1 of the ROWD describes HRC plan to conduct field evaluations and aerial photograph interpretation, update and maintain the landslide inventory, and identify new landsliding activity. The ROWD specifies that HRC will acquire and maintain updated, high-angle color stereo pair aerial photographs to update the landslide inventory at an interval of no greater than 5 years.

Section 4.1.2 of the ROWD describes HRC's plan to develop and submit a landslide restoration plan to determine if feasible erosion control measures can be implemented to minimize future delivery. Potential erosion control measures may include, but are not limited to: re-vegetation (e.g. tree planting, seeding, willow waddles), excavation, drainage modification, and buttressing or armoring of unstable areas. The strategies described above are designed to minimize the potential for harvest related landslides by avoiding or limiting harvesting on vulnerable areas. Section 1(B)(4) of the Order requires HRC to maintain the landslide inventory as described in the ROWD. Section 1(B)(5) of the Order requires HRC to submit a landslide restoration plan as described in the ROWD to the Regional Water Board Executive Officer for approval by October 15, 2013.

29. Logging and associated activities, particularly construction and use of roads and skid trails, have the potential to impact water quality. The potential for impacts to occur is highest in the period following disturbance, with a delay of several years for the period of maximum vulnerability due to loss of root strength and diminishes over time as vegetation grows back and disturbed soil stabilizes. This recovery period varies for different processes. In order to limit the potential for impacts to water quality, it is necessary and appropriate to limit the total area within a watershed that is in a condition prone to water quality impacts following harvest by establishing an upper limit to the watershed area that can be harvested in the ten year period following adoption of the Order.

Many studies have been conducted to try to better understand the relationship between rate of harvesting and cumulative watershed effects, which result from a complex interaction of many different factors. Such factors include inherent watershed characteristics, such as geology and geomorphology, external natural processes such as climate and timing of stochastic events (i.e. large storms, earthquakes, fires) and type of management practices and extent of watershed area disturbed. The rate of harvest in a watershed is an important management variable. Several studies cite specific thresholds for the rate of harvest, above which, cumulative impacts become more likely to occur. Studies have linked specific processes to watershed impact, such as increased peak flows (Lisle et al. 2000, Lewis et al. 2001), landslide related sediment discharge (Reid, 1998), road density (Cedarholm et al. 1981, Gucinski et al. 2001, Trombulak et al, 2000), or clearcut equivalent acres (USDA Forest Service, 1974). Appropriate harvest rate thresholds necessary to avoid cumulative watershed impacts presented in the

DRAFT

scientific literature, expressed as watershed area harvested over time (typically percent per year or per decade), vary greatly. The report of the scientific review panel on California Forest Practice Rules and salmonid habitat (Ligon et al, 1999) recommended harvest rates between 30% and 50% per decade, depending on site specific variables, harvesting prescriptions, past watershed disturbance, and other factors.

As part of its ROWD, HRC provided an estimate of forested acres to be actively harvested and managed over the next ten years in Bear Creek watershed. Based on current conditions in the watershed, the proposed partial harvesting or selection silviculture methods, level of geologic review and hillslope protection measures, management practices designed to prevent or minimize sediment discharge, specific requirements established in this Order, and Regional Water Board's ongoing oversight of HRC's management activities, staff finds that HRC's proposed maximum harvest of no greater than 30% of the watershed during the first ten years following approval of the Order is anticipated to be protective of water quality standards within the Bear Creek watershed. This harvest rate is not intended to establish a rate of harvest applicable to other timberlands owned by HRC outside of the Bear Creek watershed.

Section 1(A)(2) requires that HRC limit timber harvesting in the Bear Creek watershed to no more than 30% of the watershed area over the first ten year period following approval of this Order.

30. Timber harvesting can affect water temperature directly by removal of trees that provide shade to stream and riparian zones and indirectly by increasing sediment production from landsliding and other erosion processes that result in pool filling and shallower stream conditions, which are more prone to heating. The debris torrents that occurred in Bear Creek in the 1950s, 1960s, and 1990s filled portions of the mainstem channel with sediment and obliterated much of the riparian vegetation that had provided shade to the stream and riparian zone. It also resulted in a wider shallower channel, which is more susceptible to temperature changes than deeper narrower streams. Analysis from TMDLs developed for temperature impaired waterbodies throughout the North Coast Region have consistently found elevated water temperatures to be the result of increased exposure to solar radiation due to loss of stream shade and alteration of stream channels in response to elevated sediment loads.

Section I(B)(2) of the Order requires that HRC shall not harvest within 100 feet of Class I and II watercourses. Prohibiting all harvesting within 100 feet of Class I and II watercourses will promote regrowth of riparian canopy that was lost to earlier land activities and or destroyed by debris torrents. This level of protection is adequate to preserve and restore natural shade to these watercourses in the Bear Creek watershed.

DRAFT

Because of the link between elevated sediment loads and elevated water temperature, management practices to prevent or minimize sediment discharge from landslides and other harvest related erosion will also prevent increases in water temperature. Sediment impacts related to management activities are described in Findings 25 through 30 and 32 through 35 and implementation of management practices to control sediment are included in Section 1 of the Order.

31. Logging roads can alter hillslope hydrologic processes and increase sediment discharge from surface and gully erosion and landslides. Sediment TMDLs adopted for watersheds throughout the North Coast Region have identified logging roads as one of the most significant sources of anthropogenic sediment discharge. Roads can contribute to landsliding by undermining and oversteepening slopes and placing fill material on steep slopes. Roads also intercept and concentrate shallow groundwater and surface runoff, which can cause gully erosion and saturate vulnerable slopes, increasing the potential for failure. Road crossings of watercourses are subject to the force of high stream flows and failure usually results in direct delivery to streams. Road crossings of watercourses are one of the most common controllable sediment sources. Management practices that have become standard practices used in timberlands throughout the North Coast include a suite of measures to reduce the potential for road related sediment discharge to the extent feasible.

Appendix B of the ROWD contains the sediment source inventory prepared by Pacific Watershed Associates in 1998. Over 95% of the estimated volume of controllable sediment discharge sources associated with roads that were identified by PWA have been treated and are no longer considered to have the potential to discharge. This sediment control work was not conducted in response to a formal order from the Regional Water Board, but Regional Water Board staff have reviewed much of the work on an informal basis and consider the work to have contributed significantly towards reducing sediment discharge in the watershed.

The ROWD describes HRC's overall approach to preventing and minimizing controllable sediment discharge from roads. Appendix E of the ROWD describes prescriptions to control sediment discharge from roads from Section 6.3.3 of HRC's HCP. These prescriptions included as Specific Requirements in Section I(C)(1) of this Order, specify the following measures designed to prevent or minimize sediment discharge from roads:

- minimize concentration of surface runoff;
- minimize potential for watercourse diversion at crossings;
- minimize the length of road surface draining directly to watercourses;
- remove potentially unstable fill material to the extent feasible;

DRAFT

- inspect and maintain roads annually;
- restrict wet weather road use.

Section 1(C)(2) of the Order requires that HRC shall upgrade all roads that currently do not meet the standards described above by October 15, 2013.

Section 1(C)(3) of the Order requires that HRC maintain and update the inventory of controllable sediment discharge sources from roads as described in Section 4.2 and Appendix C of the ROWD. Section I(C)(4) of the Order requires that by October 15, 2013, HRC shall treat those road related controllable sediment discharge sources currently identified in the inventory included in Appendix C of the ROWD.

Section 1(C)(5) of the Order requires that HRC shall inspect all roads within their Bear Creek ownership at least annually and following triggering storm events as specified in the ROWD. New road-related sediment sources that are identified during the inspections will be treated within one year of being identified.

32. Timber harvesting and associated road construction and use have historically left disturbed areas throughout the landscape that have the potential to discharge sediment over extended periods of time. These legacy sites, which should be treated as controllable sediment discharge sources (CSDS), may include failing or failed watercourse crossings, road failures, road surfaces, landslides, unstable watercourse banks, soil stockpiles, skid trails, landings, exposed harvest units, or any other site discharging or threatening to discharge waste or earthen materials.

    Controllable sediment discharge sources are those sites that meet all of the following conditions:

    - is discharging or has the potential to discharge sediment to waters of the state in violation of water quality standards or other provisions established herein;
    - was caused or affected by human activity; and
    - may feasibly and reasonably, respond to prevention and minimization management measures.

    Erosion Control Plans (ECPs), in which landowners identify, evaluate, and treat CSDS, are an important component of a strategy to prevent or minimize ongoing sediment discharge, and also contribute towards achieving sediment TMDL load allocations. Section 4 of the ROWD describes HRC's strategy to develop and implement ECPs for their timberland in the Bear Creek watershed.

    Section I(D) of the Order requires that HRC prepare and submit ECPs to address any CSDS not on a road or inventoried and treated pursuant to Sections I(B) (the landslide restoration plan) or I(C) (the road management plan) of the Order. These

DRAFT

sites shall be inventoried and scheduled for treatment during timber harvest plan development and treated concurrently with timber harvesting in the vicinity.

These CSDSs will be subject to the following:

- Each site shall be inventoried in an ECP, which will include: a description of the current condition of each site, an estimate of the potential sediment volume that could discharge from the site, a narrative description of the proposed management measures, and a schedule for implementation.
- Inventoried sites must be treated in accordance with the established ECP schedule.
- The ECP shall be submitted to the Regional Water Board for review with the timber harvest plan it is associated with.
- If treatment of such sites "strands" any other CSDSs, HRC does not relinquish responsibility for also treating the stranded sites. For logistical reasons, it is recommended that measures be taken to prevent sites from becoming stranded.

33. Channel conditions in much of Bear Creek have improved greatly since 1997; however, excess sediment persists in the channel of much of Bear Creek, and riparian vegetation does not provide shade at levels approximating natural conditions. Large wood performs important functions in stream channels: sorting sediment, scouring pools, and providing cover for fish. Individual pieces of large wood are episodically transported downstream during high, turbulent flow conditions, becoming temporarily lodged at new locations in the channel until they eventually decay or exit the watershed. Large pieces of wood can catch other pieces, creating a log jam. As large wood moves through a stream, it changes flow dynamics, which can scour sediment stored in the channel and banks. These are natural processes that are necessary for properly functioning streams and habitat for salmonids.

    Section 8 of the ROWD describes HRC's approach to reposition and stabilize large wood in the channel and plant conifer trees in the riparian zone to enhance pool formation and sediment sorting and restore riparian vegetation along mainstem reaches of Bear Creek. The work will be conducted by field crews using portable tools. Motorized vehicles will not be used in the stream zone to access sites or to move logs. The stabilization work will be conducted according to standard practices as described in references such as the California Department of Fish and Game *Habitat Restoration Manual* or the Natural Resources Conservation Service *Stream Restoration Design: National Engineering Handbook, Part 654.*

    Section 1(E) of the Order requires HRC to submit the plan described above to the Regional Water Board Executive Officer for approval by June 30, 2013. The plan shall include the following components:

DRAFT

- goals, describing the desired outcome of the restoration plan to address identified problems;
- objectives, describing specific actions that can reasonably be expected to achieve the stated goals;
- a projected timeline for implementation of restoration activities; and
- monitoring to evaluate the effectiveness of the plan towards achieving the stated goals.

Annual WDR Fee and Administration

34. Enrollment and Fees
All activities conducted by HRC in the Bear Creek watershed that result or have the potential to discharge wastes described in the findings and pursuant to the General and Specific Requirements (Sections I and II) of these WDRs shall be under a single annual fee associated with the WDR.

Annual WDR fees are assessed for the privilege of discharging wastes pursuant to a WDR that may affect California's surface waters. California Water Code Section 13260 requires that every holder of a WDR pay a yearly fee to the State Water Resources Control Board (State Water Board). Annual fees for WDRs are established by the State Water Board pursuant to a rating classification established in California Code of Regulations, Title 23, Division 3, Chapter 9.

The State Water Board has developed a fee schedule for Waste Discharge Requirements which establish a range of fees based on a Threat to Water Quality (TTWQ) and Complexity rating given to each waste discharge permit. The designated threat and complexity rating determines the fees for the WDR. It is important to note, however, that the rating classification system was written for facilities with discrete sources of discharge, not for activities that result in nonpoint source discharges on timberlands that can range up to many thousands of acres.

Based on these considerations, staff recommend that the annual feefor this Order shall be based on a TTWQ classification '3' and Complexity classification 'B'.

Application and payment of a fee for enrollment of individual projects such as THPs is not required as has been typically done with THPs enrolled in the General Waste Discharge Requirements for Timber Harvest Activities on Non-Federal Lands in the North Coast Region.

35. Monitoring and Reporting
HRC shall maintain coverage by submission of an annual work plan and summary report as described below, demonstrating compliance with the conditions and

DRAFT

provisions established by the WDR. The annual work plan describing management activities planned for the coming year is necessary, along with an annual summary report describing management activities conducted during the previous year and including an update and evaluation at an interval of no more than every five years.

A Monitoring and Reporting Program (Attachment 1) is necessary to:

- track progress of activities conducted in compliance with waste discharge requirements;
- evaluate the effectiveness of HRC's management plan in protecting the beneficial uses of water; and
- provide feedback on HRC's management activities planned for the upcoming year in the Bear Creek watershed.

36. CEQA
On September 9, 2011, the Regional Board provided notice of intent to adopt a mitigated negative declaration (SCH No. 2011092021) for the project (California Code of Regulations title 14, § 15072.) The Initial Study and mitigated negative declaration reflects the Regional Water Board's independent judgment and analysis. The documents or other material, which constitute the record, are located at 5550 Skylane Blvd, Suite A, Santa Rosa, CA 95403.

Based on the Initial Study and Mitigated Negative Declaration, the waste discharge requirements for timber harvesting and related activities in accordance with this Order will be consistent with the Basin Plan and will be in the public interest. The Regional Water Board has reviewed and considered the environmental document and any proposed changes incorporated into the project or required as a condition of approval to avoid significant effects to the environment. The Regional Water Board conducted a public hearing on November 3, 2011 in Santa Rosa, California, considered all evidence concerning this matter, and adopted the Negative Declaration. The Regional Board will file a Notice of Determination within five days from the issuance of this Order. Mitigation measures necessary to reduce or eliminate significant water quality impacts are included as conditions of approval in the Order section below.

THEREFORE, pursuant to California Water Code, the Regional Water Board hereby approves and adopts Order No. R1-2011-0100, and directs the Executive Officer to file all appropriate notices. Humboldt Redwood Company, LLC, hereinafter referred to as HRC, shall comply with the following:

I. SPECIFIC REQUIREMENTS

A. <u>Timber Harvesting</u>
1. The HRC shall not utilize the clearcutting harvest method as defined in California Code of Regulations, title 14, section 913.1.

DRAFT

2. Harvesting of HRC timberland in the Bear Creek watershed shall not exceed 30 percent of the total acres owned within the watershed (1,550 acres) over the ten year period between 2011 and 2020; this harvest rate shall apply for the ten year period thereafter, pending reconsideration and revision by the Regional Water Board. Of this harvest area, silvicultural methods and acreage shall be distributed as follows:

    a. No more than 1,550 acres shall be harvested using single tree and group selection silviculture as defined in California Code of Regulations, title 14, section 913.2.
    b. No more than 200 acres shall be harvested using Variable Retention or Rehabilitation of Understocked Area silvicultural methods as defined in California Code of Regulations, title 14, section 913.4.
    c. The combined total from 2a and b above shall not exceed 1,550.

B. <u>Riparian Protection and Landslide Prevention</u>

1. Prior to conducting timber harvesting activities, HRC shall identify the landslide hazard of all areas proposed for harvesting based on the hazard map in Appendix F of the ROWD. Harvesting shall be conducted in accordance with the prescriptions for each landslide hazard class as described in Table 1 of Appendix F.

2. HRC shall conduct timber harvesting activities in accordance with the prescriptions for riparian and hillslope protection measures described in the Appendix D of the ROWD, including the following:

    a. No harvesting within 100 feet of Class I and II watercourses;
    b. Any harvesting within a headwall swale connected to a Class I, II, or III watercourse shall retain an adequate number of living trees equivalent to a minimum of 150 square feet of basal area per acre;
    c. No ground based equipment, with the exception of at existing roads and equipment crossings, and permitted new road construction within:
        - 150 feet of a Class I watercourses,
        - 100 feet of a Class II watercourse,
        - 50 feet of a Class III watercourse, or to the closest hydrologic divide.

3. HRC shall prepare and submit an engineering geologic report to the Regional Water Board prior to conducting timber harvesting activities when any of the management activities and landscape conditions described below are present:

DRAFT

- harvest within a distance of up to 300 feet from a watercourse, dependent upon watercourse classification and slope condition as described in Appendix D of the ROWD;
- harvest, road construction, or reconstruction within an inner gorge, headwall swale connected to a Class I, II, or III watercourse, earthflow, debris slide slope, or slopes exceeding 60%;
- when required by the prescriptions based on the landslide hazard class according to I(B)(1);
- Regional Water Board staff request in writing an engineering geologic report to evaluate whether a proposed timber harvesting activity has the potential to result in sediment discharge from landsliding.

The report shall be prepared by a California Licensed Professional Geologist in conformance with the guidelines of California Department of Conservation Division of Mines and Geology (now California Geologic Survey) Note 45 to evaluate the potential impacts of the proposed harvesting to water quality. At a minimum, the geologic report shall characterize geologic hazards, evaluate the risk posed to the beneficial uses of water by the management activity, and develop appropriate mitigations.

The report may be submitted before or during the timber harvest plan review process conducted by CAL FIRE, or by request of the Executive Officer. The Regional Water Board staff shall provide comments within 45 days of submittal of the report and if deemend necessary, may request additional information or require additional conditions be incorporated to further reduce or mitigate the potential for sediment discharge. If additional information or mitigation is required, HRC shall not proceed with the proposed activity until demonstration that the potential impacts to the beneficial uses of water will be adequately mitigated.

4. HRC shall maintain and update the landslide inventory included in Appendix A of the ROWD according to the specifications described in Section I(C) of the Monitoring and Reporting Program in Attachment 1 of this Order.

5. By October 15, 2013, HRC shall submit to the Regional Water Board Executive Officer, a Landslide Restoration plan to prevent and minimize ongoing sediment discharge from landslides. The plan shall be designed to evaluate and if feasible, prioritize, implement, and monitor measures to prevent or minimize sediment discharge from active landslides. The Landslide Restoration plan shall at a minimum include the following components:
   - Identify landslides that have the potential to discharge sediment to waters of the state in violation of the water quality standards;

DRAFT

- Evaluate the feasibility of measures to prevent or minimize sediment discharge from these landslides, that may include, but are not limited to: re-vegetation (e.g. tree planting, seeding, willow waddles), excavation, drainage modification, and buttressing or armoring of unstable areas;
- A projected timeline for implementation of site specific prevention and minimization measures; and
- A plan to track and monitor the effectiveness of prevention and minimization measures.

C. Road Management

1. HRC shall implement management practices and specifications described in Appendix E of the ROWD to prevent and minimize sediment discharge from active roads.

2. By October 15, 2013, HRC shall upgrade all roads to meet the storm-proofed standard as described in Appendix E of the ROWD.

3. HRC shall maintain and update the inventory of controllable sediment discharge sources from roads, included in the ROWD in accordance with the methods described in Section 4.2 of the ROWD.

4. By October 15, 2013, HRC shall treat those road related controllable sediment discharge sources currently identified in the inventory included in Appendix C of the ROWD.

5. HRC shall inspect all roads within their Bear Creek ownership at least annually between May 1 and October 15, as specified in Appendix E of the ROWD.

6. In addition, HRC shall inspect storm-proofed roads 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.

7. Within one year of identifying new sediment discharge sources from roads HRC shall document, notify the Regional Water Board, and implement measures to prevent or minimize sediment discharge at any new controllable sediment discharge sources identified during the road inspections.

DRAFT

D. Erosion Control Plans

Any CSDS not on a road or inventoried and treated as part of the Road Management activities described in Section I(C) or the Landslide Restoration plan in Section I(B)(5), shall be inventoried and scheduled for treatment during timber harvest plan development and treated concurrently with timber harvesting in the vicinity.

These CSDSs may include, but are not limited to: failing skid trail crossings, watercourse diversions inside harvest units, etc. Such sites will be subject to the following:

- Each site shall be inventoried in an ECP, which will include: a description of the current condition of each site, an estimate of the potential sediment volume that could discharge from the site, a narrative description of the proposed management measures, and a schedule for implementation.
- Inventoried sites must be treated per the site specific ECP schedule.
- The ECP shall be submitted to the Regional Water Board for review with the timber harvest plan it is associated with.
- If treatment of such sites "strands" any other CSDSs, HRC does not relinquish responsibility for also treating the stranded sites. For logistical reasons, it is recommended that measures be taken to prevent sites from becoming stranded.

E. In-Stream Large Wood Stabilization and Riparian Zone Planting

By June 30, 2013, HRC shall submit to the Executive Officer for review and approval, a plan to reposition and stabilize large wood in channel reaches with excess sediment and plant conifer trees in the riparian zone. The goal of the plan shall be to enhance pool formation and sediment sorting and restore the conifer component of the riparian vegetation along mainstem reaches of Bear Creek. The plan shall be developed with input from Regional Water Board staff and other appropriate state and federal agencies. HRC shall implement the plan according to the schedule approved by the Executive Officer or another agency determined the most appropriate lead for the project.

II. GENERAL REQUIREMENTS

1. HRC shall comply with all applicable water quality standards, requirements, and prohibitions specified in the Basin Plan as modified, and policies adopted by the State Water Board.

2. HRC shall allow Regional Water Board staff entry onto all land within the Bear Creek watershed covered by the WDR including appurtenant roads for the

DRAFT

purposes of observing, inspecting, photographing, video taping, measuring, and/or collecting samples or other monitoring information to document compliance or non-compliance with this Order. If entry is unreasonably withheld, the Executive Officer may terminate the applicability of the Order and may result in enforcement action.

3. HRC shall comply with all water quality-related HCP prescriptions, conditions included in an approved THP, and any additional mitigation measures identified and required pursuant to CAL FIRE CEQA process.

4. HRC shall comply with the Monitoring and Reporting Program R1-2011-0100 attached to this Order.

5. HRC shall comply with all mitigation measures identified in the environmental assessment and Mitigated Negative Declaration prepared to comply with CEQA.

6. This Order does not authorize discharges from the aerial application of herbicides or pesticides. HRC shall submit a ROWD prior to any proposed aerial application of pesticides that could discharge to waters of the State.

7. HRC shall notify the Regional Water Board in writing at least 30 days prior to any proposed ground-based application of pesticides within 100 feet of a Class I or Class II stream. The notification shall include the type of pesticide(s), method and area of application, projected date of application, and measures that will be employed to assure compliance with applicable water quality requirements.

8. Water quality issues identified on any particular THP and not resolved prior to THP approval by CALFIRE, shall be resolved to the satisfaction of Regional Water Board Executive Officer, prior to commencement of that THP.

9. HRC shall maintain copies of all correspondence and records collected and prepared to document compliance with this Order and provide access to Regional Water Board to review and copy.

10. All activities covered by this Order must comply with local, state, and federal law.

11. No discharge of waste into the waters of the state, whether or not the discharge is made pursuant to waste discharge requirements, shall create a vested right to continue the discharge. All discharges of waste into waters of the state are privileges, not rights. (Wat. Code, § 13262, subd.(g).)

12. Prior to implementing any change to the project or activity that may have a significant or material effect on the findings, conclusions, or conditions of this

DRAFT

Order, the Applicant shall obtain the written approval of the Regional Water Board Executive Officer.

13. The Regional Water Board may add to or modify the conditions of this Order, with notice and as appropriate, as appropriate in response to monitoring results or to implement any new or revised water quality standards and implementation plans adopted and approved pursuant to the Porter-Cologne Water Quality Control Act or the Clean Water Act.

14. Discharges of waste not specifically regulated under this Order are prohibited except in compliance with the Water Code.

15. This Order does not apply to waste discharges that require a separate permit from the State or Regional Water Board or other agencies, such as activities that require a Clean Water Act section 404/401 permit, a National Pollution Discharge Elimination System (NPDES) permit, or a construction stormwater permit.

16. These WDRs may be modified, revoked and reissued, or terminated if the Executive Officer makes any of the following determinations:

    a. HRC is conducting activities that do not comply with any condition or provision of this Order;
    b. HRC is conducting activities that are reasonably likely to result, or has resulted in a violation or exceedence of any applicable water quality requirement;
    c. HRC is conducting activities that vary from the provisions of this Order such that those activities could adversely affect water quality;
    d. When requested by HRC, another state agency, or a subdivision of the state (county), or a federal agency, upon a demonstration that the project or activity would cause a violation of water quality standards or otherwise violate these WDRs.

17. In the event of any violation or threatened violation of the conditions of this Order, the violation or threatened violation shall be subject to any remedies, penalties, process or sanctions as provided for under applicable state law.

18. Should it be determined by HRC or the Regional Water Board that unauthorized discharge of waste are causing or contributing to a violation or an exceedence of an applicable water quality requirement or a violation of a WDR prohibition (below), the HRC shall:

    a. Implement corrective measures immediately following discovery that applicable water quality requirements were exceeded or a prohibition violated, followed by notification to the Regional Water Board by telephone or email as soon as possible, but no later than 48 hours after the discharge

DRAFT

has been discovered. This notification shall be followed by a report within 14 days to the Regional Board, unless otherwise directed by the Executive Officer, that includes:

i. the date the violation was discovered;
ii. the name and title of the person(s) discovering the violation;
iii. a map showing the location of the violation site;
iv. a description of recent weather conditions prior to discovering the violation;
v. the nature and cause of the water quality requirement violation or exceedence or WDR prohibition violation;
vi. photos of the site documenting the violation;
vii. a description of the management measure(s) currently being implemented to address the violation;
viii. any necessary maintenance or repair of management measures;
ix. any additional management measures which will be implemented to prevent or reduce discharges that are causing or contributing to the violation or exceedence of applicable water quality requirements or WDR prohibition violation;
x. an implementation schedule for corrective actions; and,
xi. the signature and title of the person preparing the report.

b. HRC shall revise the appropriate technical report (ie. ECP, Inventory, or other required information as applicable) immediately after the report to the Regional Board to incorporate the additional management measures that have been and will be implemented, the implementation schedule, and any additional inspections or monitoring that is needed.

19. Emergency Maintenance
If there is an imminent threat to life, property, or public safety, or a potential for a sediment discharge with catastrophic environmental consequences, HRC will notify Regional Water Board staff of the emergency and the planned or implemented action within 14 calendar days.

III. DISCHARGE PROHIBITIONS

1. The discharge of soil, silt, bark, slash, sawdust, or other organic and earthen material from any logging, construction, or associated activity of whatever nature into any stream or watercourse in the basin in quantities deleterious to fish, wildlife, or other beneficial uses is prohibited.

DRAFT

2. The placing or disposal of soil, silt, bark, slash, sawdust, or other organic and earthen material from any logging, construction, or associated activity of whatever nature at locations where such material could pass into any stream or watercourse in the basin in quantities which could be deleterious to fish, wildlife, or other beneficial uses is prohibited.

3. Discharges of waste, which are not otherwise authorized by waste discharge requirements or other Order issued by this Regional Water Board or the State Water Resources Control Board, to waters of the state are prohibited, except as allowed below.

4. Discharges must not cause or threaten to cause pollution, contamination, or nuisance.

5. Discharges must not adversely impact human health or the environment or the beneficial uses of water set out in the Basin Plan.

Certification:

I, Catherine Kuhlman, Executive Officer do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, North Coast Region, on November 3, 2011.

_____

Catherine Kuhlman
Executive Officer

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