

## Attachment A

# Best Management Practices for Stream Restoration Activities in the Elk River Watershed Associated with the Initial Study and Mitigated Negative Declaration for Order No. R1-2016-0004

## I. Introduction

Best management practices (BMPs) provided here may be applicable to prevent, minimize, and control the discharge of waste and other controllable water quality factors associated with stream restoration/remediation. These BMPs are all considered enforceable conditions under the Order No. R1-2016-0004, Waste Discharge Requirements for Nonpoint Source Discharges and Other Controllable Water Quality Factors Related to Timber Harvesting and Associated Activities Conducted by Humboldt Redwood Company, LLC, in the Upper Elk River Watershed, Humboldt County, as applicable to a given site, and are referenced by and made conditions in the mitigated negative declaration (CEQA document) for the Order, as well. Some or all may be added to the Order as mandatory BMPs for all sites.

Where applicable, in-stream work, including placement of wood for enhancement of fish habitat or sediment storage, armoring of banks using unanchored wood structures, excavation of channels and stream banks to stabilize, trap, or remove excess sediment, shall be done in accordance with techniques in the California Salmonid Stream Habitat Restoration Manual (Habitat Restoration Manual). The placement and construction of such in-stream structures shall be planned and conducted to persist when subjected to large flood events.

## II. Standard BMPs for Restoration Projects

Where applicable during restoration or remediation, the following BMPs will be used to avoid or minimize adverse impacts:

### *Temporal Limitations on restoration activities*

- To avoid migrating fish and sedimentation of the stream channel, stream restoration will be conducted between May 31 and October 15. Exceptions may be requested on a site-specific basis. Work prior to May 31 or beyond October 15 may be authorized provided the work would be completed outside the rainy season, avoiding potentially rising stream flows and exposure of disturbed soils to significant rainfall.
- When a 7-day National weather forecast of rain for Eureka at <http://www.weather.gov> includes a minimum of 5 consecutive days with any chance of precipitation, 3 consecutive days with 30% or greater chance of precipitation, or 2 consecutive days of 50% or greater chance of precipitation, HRC shall finish all work underway at crossings, immediately deploy erosion control materials after completing work, and refrain from starting any new work prior to the rain event. Regardless of season, erosion control measures shall be stockpiled on

site if encroachment work occurs when the NWS forecast predicts a “chance” or greater (30% of more) of rain within the week following construction activity.

*Limitation on Earthmoving*

- Disturbance to existing grades and vegetation will be limited to the actual site of the restoration project and necessary access routes.
- Placement of temporary access roads, staging areas, and other facilities will avoid or minimize disturbance to habitat as much as possible.
- Disturbance to native shrubs, woody perennials or tree removal on the streambank or in the stream channel will be avoided or minimized to the fullest extent possible.
- Whenever feasible, finished grades will not exceed 1.5:1 side slopes. In circumstances where final grades cannot achieve 1.5:1 slope, additional erosion control or stabilization methods will be applied as appropriate for the project location.
- Spoils and excavated material not used during construction will be removed and placed outside of the 100-year floodplain, and stored/disposed of in compliance with Order conditions related to spoils management.
- Upon completion of grading, slope protection of all disturbed sites will be provided prior to October 15 through a combination of permanent vegetative treatment, mulching, geotextiles, and/or rock.
- Only native plant species will be used with the exception of non-invasive, non-persistent grass species used for short-term vegetative cover of exposed soils.
- Rock placed for slope protection will be the minimum necessary to avoid erosion, and will be part of a design that provides for native plant revegetation and minimizes bank armoring.

*Limitations on Construction Equipment*

- HRC must ensure that chemical contamination (fuel, grease, oil, hydraulic fluid, solvents, etc.) of water and soils is prohibited during routine equipment operation and maintenance.
- Heavy equipment will not be used in flowing water.
- When possible, existing ingress or egress points will be used or work will be performed from the top of the creek banks.
- Use of heavy equipment will be avoided in a channel bottom with rocky or cobbled substrate.
- If access to the work site requires heavy equipment to travel on a rocky or cobbled substrate, a rubber tire loader/backhoe is the preferred vehicle.
- The amount of time this equipment is stationed, working, or traveling within the creek bed will be minimized.
- Minimize soil compaction by using equipment with a greater reach or that exerts less pressure per square inch on the ground, resulting in less overall area disturbed or less compaction of disturbed areas.

- When heavy equipment is used, any woody debris and stream bank or streambed vegetation disturbed will be replaced to a pre-project density with native species appropriate to the site.
- The use or storage of petroleum-powered equipment will be accomplished in a manner that prevents the potential release of petroleum materials into waters of the state (Fish and Game Code 5650). To accomplish this, the following precautionary measures shall be followed:
  - Schedule excavation and grading activities for dry weather periods.
  - Designate a contained area for equipment storage, short-term maintenance, and refueling. Ensure it is located at least 50 feet from waterbodies.
  - Inspect vehicles for leaks and repair immediately.
  - Clean up leaks, drips and other spills immediately to avoid soil or groundwater contamination.
  - Conduct major vehicle maintenance and washing off site.
  - Ensure that all spent fluids including motor oil, radiator coolant, or other fluids and used vehicle batteries are collected, stored, and recycled as hazardous waste off site.
  - Ensure that all construction debris is taken to appropriate landfills and all sediment disposed of in upland areas or off-site, beyond the 100-year floodplain.
  - Use dry cleanup methods (i.e. absorbent materials, cat litter, and/or rags) whenever possible. If necessary for dust control, use only a minimal amount of water.
  - Sweep up spilled dry materials immediately.

### *Erosion Control*

- Erosion control and sediment detention devices and materials will be incorporated into the restoration work design and installed at the time of project implementation.
- Effective erosion control measures will be in-place at all times during project work. Work within the 5-year flood plain will not begin until all temporary erosion controls (straw bales or silt fences that are effectively keyed-in) are in place down slope of restoration activities.
- Non-invasive, non-persistent grass species (i.e. barley grass) may be used for their temporary erosion control benefits to stabilize disturbed slopes and prevent exposure of disturbed soils to rainfall.
- Upon work completion, all exposed soil present in and around the restoration sites will be stabilized within 7 days.
- Soils exposed by restoration operations will be seeded, mulched, slash packed, to prevent sediment runoff and transport.
- The work area will be restored to pre-construction condition or better.

*Miscellaneous*

In siting temporary stream crossings, identify locations where erosion potential is low. Avoid areas where runoff from roadway side slopes will spill into the side slopes of the crossing.

Vehicles and equipment shall not be driven, operated, fueled, cleaned, maintained, or stored in the wet or dry portions of a water body where wetland vegetation, riparian vegetation, or aquatic organisms may be destroyed.

Disturbance of riparian vegetation shall be avoided or minimized. When removed pursuant to the provisions of the work, riparian vegetation shall be cut off no lower than ground level to promote rapid re-growth.

Retain as much understory brush and as many trees as feasible, emphasizing shade producing and bank stabilizing vegetation.

In the event that restoration occurs in previously undisturbed areas, HRC must conduct a cultural resources investigation and paleontological survey prior to any substantial disturbance. The cultural resources investigation must include, at a minimum, a records search for previously identified cultural resources and previously conducted cultural resources investigations of the project parcel and vicinity. This record search should include, at a minimum, contacting the appropriate information center of the California Historical Resources Information System. In coordination with the information center or a qualified archaeologist, a determination regarding whether previously identified cultural resources will be affected by the proposed activity must be made and if previously conducted investigations were performed. The purpose of this investigation would be to identify resources before they are affected and avoid the impact.

*Channel Excavation and stream bank stabilization*

Stream banks and bed excavations shall begin when there is no flowing water in the stream unless adequate site specific provisions are incorporated into a project.

Excavating earthen material from channels should recreate the original channel grade and orientation, with a channel bed that is as wide, or slightly wider, than the original watercourse. Channel profiles and cross-sections should be surveyed before and after excavation as needed to provide information on channel response at sites where upstream channel incision or impacts on downstream channel stability is possible.

If channel sideslopes are disturbed, that should be excavated to a stable angle (generally less than 2:1) to prevent slumping and soil movement.

Longitudinal channel excavations, including channel reconstruction and relocation projects, shall be inspected annually for stability for the first three years following work. Any maintenance need identified shall be completed as soon as possible after discovery, and no later than one year after discovery.

Any stream bank area left barren of vegetation as a result of restoration activities shall be stabilized prior to October 15 in the year work was conducted. Stabilization methods may include seeding, mulching, planting, slash packing, or implementation of other appropriate erosion control methods as needed to prevent erosion and protect beneficial uses. Bank stabilization structures shall be constructed to remain in place during periods of high flow including 100-year flood flows.

Stabilization methods include re-sloping the banks, installing rocks, rock rip-rap, toe trenches (keyways), LWD and bio-engineered features. Installation of log stream bank stabilization structures shall be done in accordance with techniques in the Habitat Restoration Manual.

Material used for bank stabilization shall be clean, competent materials that will not discharge sediment or other forms of pollution to waters of the State.

Annual inspections for the purpose of assessing the effectiveness of soil stabilization methods will be conducted for two years following restoration activities.

#### *Limitations on Work in Streams and Wet Areas*

- Work should generally occur during the lowest flow period of the year;
- Prevent any construction debris from falling into stream channels. Any material that does fall into a stream during construction should be immediately removed in a manner that has minimal impact to the streambed and water quality.
- If it is necessary to conduct work in or near a live stream, the work space will be isolated to avoid construction activities in flowing water.
- When restoration work is conducted in Class I watercourses, the shape and gradient of the streambed and channel shall be left such that unimpeded fish passage of all life stages is possible in these locations.
- Within 5 calendar days prior to entering or working in a Class I watercourse, a qualified fisheries biologist or qualified designee shall examine the project or crossing site to determine the presence of redds, fish or other aquatic vertebrates within the project area and 100 feet upstream and downstream.
- Water will be directed around the work site.
- Where available, existing ingress/egress points will be utilized and work will be performed from the top of the bank to the maximum extent possible.
- Use of heavy equipment in a channel will be avoided when possible. If access to the work site requires the use of heavy equipment within the channel, the first choice will be to use a rubber tire loader/backhoe. Only after this option has been determined infeasible will the use of tracked vehicles be considered.
- The amount of time construction equipment is stationed, working or traveling within the creek bed will be minimized.

- If the substrate of a seasonal pond, creek, stream or water body is altered during work activities, it will be returned to approximate pre-construction conditions after the work is completed.

*Temporary Stream Diversion and Dewatering: All Live Streams*

- For construction in a flowing or pooled stream or creek reach, or where access to the stream bank from the channel bottom is necessary, the work area will be isolated with the use of temporary cofferdams upstream and downstream of the work site and all flowing water will be diverted around the work site throughout the construction period.
- Other approved water diversion structures will be utilized if installation of cofferdams is not feasible.
- Cofferdams will be constructed with the use of off-site river-run gravel and/or sand bags. The upstream end of the upstream cofferdam will also be reinforced with thick plastic sheeting to minimize leakage.
- The diversion pipe will consist of a large plastic HDPE or ADS pipe or similar material, of a sufficient diameter to safely accommodate expected flows at the site during the full construction period.
- The pipe will be protected from construction activities to ensure that bypass flows are not interrupted.
- Continuous flow downstream of the work site will be maintained at all times during construction.
- When construction is complete, the flow diversion structure will be removed in a manner that allows flow to resume with a minimum of disturbance to the substrate.

*Protection of Sensitive Species*

Sensitive species - Consult with federal, state and local agencies regarding location of rare, threatened or endangered species.

Prior to commencing work, designate and mark a no-disturbance buffer to protect sensitive species and communities.

All work performed within waters of the state shall be completed in a manner that minimizes impacts to beneficial uses and habitat. Measures shall be employed to minimize land disturbances that will adversely impact the water quality of waters of the state. Disturbance or removal of vegetation shall not exceed the minimum necessary to complete Project implementation.

All equipment, including but not limited to excavators, graders, barges, etc., that may have come in contact with extremely invasive animals or plant or the seeds of these plants, shall be carefully cleaned before arriving on site and shall also be carefully cleaned before removal from the site, to prevent spread of these plants.

Vegetation shall be established on disturbed areas with an appropriate mix of California native plants and/or seed mix. All initial plantings and seed shall be installed upon completion of the construction of the detention basin.

### *Spoils*

To ensure spoil pile stability and to reduce the potential for spoil pile slope failure or transport to waters of the state, it is advisable to implement the following measures in placing or disposing of spoils onsite:

- Rip compacted soils prior to placing spoils to prevent the potential for ponding under the spoils that could result in spoil site failure and subsequent sedimentation;
- Compact and contour stored spoils to mimic the natural slope contours and drainage patterns to reduce the potential for fill saturation and failure;
- Ensure that spoil materials are free of woody debris, and not placed on top of brush, logs or trees.

Do not locate spoil piles in or immediately adjacent to wetlands and watercourses, or in a manner or location that would result in any runoff from the spoil pile ending up in wetlands and watercourses.

Separate organic material (e.g., roots, stumps) from the dirt fill and store separately. Place this material in long-term, upland storage sites, as it cannot be used for fill.

Keep temporary disposal sites out of wetlands, adjacent riparian corridors, and ordinary high water areas as well as high risk zones, such as 100-year floodplain and unstable slopes.

Spread material, which is not planned to be reused, in compacted layers, generally conforming to the local topography.

After placement of the soil layer, track walk the slopes perpendicular to the contour to stabilize the soil until vegetation is established. Track walking creates indentations that trap seed and decrease erosion of the reclaimed surfaces.

Revegetate the disposal site with a mix of native plant species. Cover the seeded and planted areas with mulched straw at a rate of 1 to 1 ½ tons per acre. Apply jute netting or similar erosion control fabric on slopes greater than 2:1 if site is erosive.

## **III.References**

Handbook for Forest, Ranch, & Rural Roads: A Guide for Planning, Designing, Constructing, Reconstructing, Upgrading, Maintaining, and Closing Wildland Roads  
[http://www.pacificwatershed.com/sites/default/files/handbook\\_chapter\\_download\\_page.pdf](http://www.pacificwatershed.com/sites/default/files/handbook_chapter_download_page.pdf)

A Water Quality and Stream Habitat Protection Manual for County Road Maintenance in Northwestern California Watersheds  
<http://www.5counties.org/roadmanual.htm>

Construction Site BMP Fact Sheets  
<http://www.dot.ca.gov/hq/construc/stormwater/factsheets.htm>

California Riparian Habitat Restoration Handbook  
[http://www.conservation.ca.gov/dlrp/watershedportal/InformationResources/Documents/Restoration\\_Handbook\\_Final\\_Dec09.pdf](http://www.conservation.ca.gov/dlrp/watershedportal/InformationResources/Documents/Restoration_Handbook_Final_Dec09.pdf)

The Practical Streambank Bioengineering Guide  
[http://www.nrcs.usda.gov/Internet/FSE\\_PLANTMATERIALS/publications/idpmcpu116.pdf](http://www.nrcs.usda.gov/Internet/FSE_PLANTMATERIALS/publications/idpmcpu116.pdf)