

**China Gulch Road Sediment Reduction Project  
Phase 2A**



**FINAL REPORT**

For

**Trinity County Department of Transportation  
USDI Bureau of Reclamation, Trinity River Restoration Program- Watershed  
Restoration Program (Agreement #07FG200014)  
Trinity County Resource Conservation District China Gulch Dutch Creek  
Sediment Reduction Project (Agreement #08FG20077)**



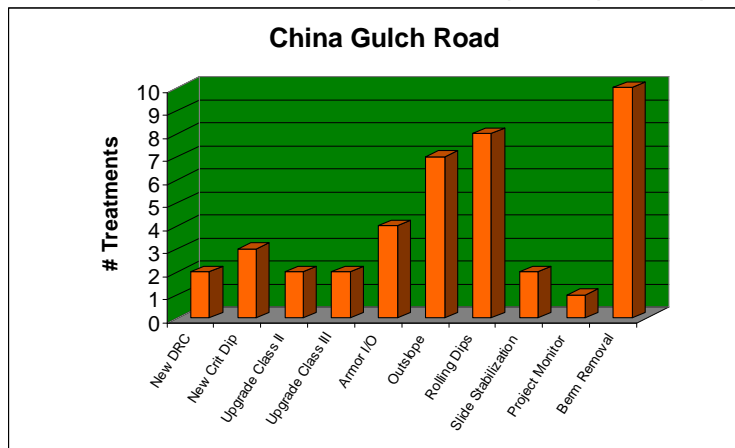
**Prepared By:**  
Five Counties Salmonid Conservation Program

**December, 2010**

**Summary:**

The purpose of this project was to enhance water quality and improve salmonid habitat in the Rush Creek and Weaver Creek watersheds by implementing cost-effective sediment reduction treatments at County road-related sediment source sites on China Gulch Road (Trinity County Road No. 230). Road treatments are expected to prevent at least 3,660 cubic yards<sup>1</sup> of sediment from reaching tributary streams to Rush Creek and Weaver Creeks. Approximately 295 cubic yards of potential sediment was excavated from stream crossings, berms and slide sites. Approximately 240 cubic yards of this material was reincorporated into filling ditches and outloping road segments. Another 20 yards were used on a separate project and the remainder was end hauled to a stable disposal site.

Treatment design was developed utilizing the Direct Inventory of Roads and Treatments (DIRT) inventory and on-the-ground consultation with Trinity County Department of Transportation (DOT) staff to modify recommended treatments as necessary. A total of 41 specific treatments (Figure 1) were done over 1.3 miles of road and at seven identified DIRT inventory sites. The majority of construction was done by DOT from June 15<sup>th</sup>, 2010 through August 15<sup>th</sup>, 2010. Erosion Control measures were installed in September and October 2010 and storm monitoring is on-going. As a result of monitoring in November 2010 the outboard edge of the stream crossing at site 2703 was recompacted, however several short segments that needed rock were not treated and road surface rutting and damage is occurring in these areas. These short segments will not deliver sediment to a stream, but will require repair in spring.



This project utilizes five funding sources including: State Water Resources Control Board Proposition 40 Grant; Trinity River Basin Fish and Wildlife Restoration Program’s Targeted Watershed Implementation Program Grants; US Forest Service RAC Grant (Phase 2B); and Trinity County Department of Transportation and 5C in-kind funds.

To access the project site from Weaverville California, take State Highway 3 north of Weaverville approximately 5 miles. Turn right onto China Gulch road and travel ~1.1 miles to site 2646.1. Continue along the road to the saddle at the ridge top (beginning of site 2700) and the remaining sites are on the Rush Creek side of the road. The last treatment site is at Milepost 2.4. From the last site one can continue to drive ~0.1 mile to where the road terminates on Rush Creek Road. Turn left on Rush Creek Road and follow it until it terminates on Highway 3. A left turn on Highway 3 will complete the loop route back to Weaverville.

<sup>1</sup> The estimated sediment savings reflects an additional 2,200 yd<sup>3</sup> compared to the 2002 DIRT inventory estimated volume of 1,374 yd<sup>3</sup>. Refer to discussion under Project Development and Implementation.

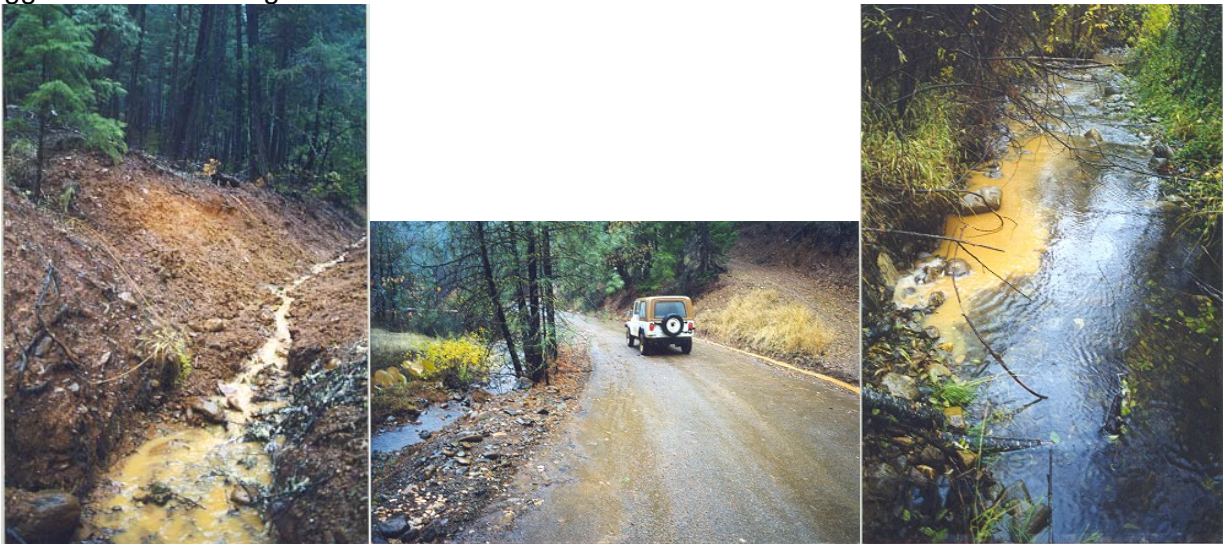


This is Phase 2 of a series of road drainage improvement projects for this road. Phase 1 was completed in 2001, and improved drainage and reduced road and bank erosion on the southern side (Weaver Creek watershed) of the road system. This project consists of two sub-phases-Phase 2A which was completed with this project and upgraded stream crossings, modified road surface drainage, and treated slide areas on the Rush Creek side of the road system. Phase 2b will be to final grade and place rock on the whole road needed to permanently protect the drainage work done in Phase 2A. Final rocking of this road is not planned until after Sierra Pacific Industries (SPI) completes a currently planned timber sale in the area. The decision to delay final rocking is the result of past road bed damage that has occurred as a result of SPI logging on other 5C/County road projects.

### **Project Purpose and Need:**

China Gulch Road (Trinity County Road No.230) is located within the Weaver Creek (49.3 square mile drainage area) and Rush Creek watershed (24.3 square mile drainage area). Weaver and Rush Creeks are tributary to the Trinity River. The watersheds are located within the 2,038 square mile Trinity River Basin hydrologic unit (HUC 18010211).

China Gulch Road was one of the early County roads, connecting Weaverville and Minersville (now flooded by Trinity Lake). Construction of Highway 3 and Rush Creek Roads truncated the original road, leaving only a 2.5 miles remnant section that has limited public value (fire and forest access). Prior to restoration work, it was poorly drained and contributed significant amounts of sediment to Weaver Creek from road ditch diversions, stream diversions, and bank slumps during large storm events (refer to photos below). Upgrades of the Weaver Creek side of the road (southern half) in 2001 minimized road related erosion and demonstrated the benefit of similar work on the remainder of the road. Current road issues in that area are due to aggressive 4x4 driving which removes the rock road surface and creates ruts and mud holes.



**Above Left diverted Class III streams erode the ditch, road and hillslope. Turbid runoff from the road contrasts with the flow in China Gulch Creek stream (Middle) and the effect China Gulch Creek as it flows into Little Browns Creek (Right).**

The portion of the road treated under this project (northern half of the road) had the potential to have the same drainage concerns as documented in as the southern half if left untreated. In fact this portion of the road has to be rebuilt following the 1997 New Years Day storm due to road drainage system failures.



**Outsloped segments of the south side of China Gulch Road repaired in 2001 reduced bank slides, ditch down cutting, road gullying and fill failures. There has been no maintenance on this road in the intervening nine years except for slide removal at Site 2464.1**

China Gulch Road is a very low-use road that accesses SPI and National Forest lands, there are no homes or other private lands accessed from this road (except for two homes on the paved segment at the southern end of the road). Garbage dumping and illegal firewood harvesting are constant problems on this remote road.

Road runoff, on the Rush Creek side of the project, discharges into Class II and III streams that drain directly into Rush Creek. The portion of the road system within the Weaver Creek watershed drains into China Gulch, then Little Browns Creek, and then Weaver Creek. Both Weaver and Rush Creeks provide important spawning and rearing habitat for Coho and Chinook salmon and steelhead (CDFG 2004; Boberg, 1979). The Weaverville Community Services District has a water system intake immediately downstream of the mouth of Weaver Creek in the Trinity River and sediment from a wide variety of upstream sources contributes to turbidity in Weaver Creek and the river.

The project level watersheds lie within the Weaverville Formation, an Oligocene continental geologic formation, “composed of weakly consolidated mudstones, sandstones, conglomerate with an impervious dark green clay matrix and sparse interbeds of light colored tuffs (Irwin, 1974). The Weaver Formation tends to be unstable, particularly along road cuts and stream banks where slopes are oversteepened (DWR, 1980)”. The elevation of the project treatment sites range from ~2,410 feet at the intersection of China Gulch Road and Rush Creek Road to ~2,890 feet at the ridge saddle separating the watersheds.

The area consists of a series of steep slopes with some mid slope benches that exhibit scarps, cracks, pistol butted trees, and other indications of potential instability. The primary management concerns in this geologic regime and affiliated soils include severe hazard of erosion, steep slopes and low water availability. Cut slopes are susceptible to severe erosion in these geology and affiliated soils and proper design of road drainage and culvert placement and sizing can help control that erosion.

Limiting factors to salmonids in Weaver and Rush Creeks include spawning and rearing requirements; excessive sediment yield; and summer water quantity and quality. Sediment (sand and fines) is filling in downstream pool and riffle components effectively reducing the amount of rearing habitat.

The Trinity River has a TMDL (Total Maximum Daily Load) allocation plan which identifies roads as significant sediment sources and has identified the Weaver Creek area as having the highest potential for road related sediment problems within the Trinity River watershed (EPA, 2000).

The Weaver Creek watershed also has the highest road density within the Middle reach of the Trinity River watershed (South Fork to Lewiston). The total road miles are shown in the table below according to road ownership type:

### Summary of Roads by Ownership Type

ROAD OWNER	Total Length (mi)	% TOTAL
Bureau of Land Management	13	4%
State of California	16	5%
Private	109	38%
Trinity County	37	13%
US Forest Service	115	40%
TOTAL	290	

Table 3.3 of the TMDL (below) includes watershed sediment indicators and targets that when implemented provide measureable indicators of future instream habitat recovery. This project implements all six target actions for these watersheds.

Watershed Indicators			
Diversion potential & stream crossing failure potential	≤1% crossings in 100 yr storm	Conduct road inventory to identify and fix stream crossing problems (Weaver and Hagans 1994). See USDA (1999) Roads Analysis for assessing road network.	Estimates potential for reduced risk of sediment delivery from hillslope sources to the watercourse
Hydrologic connectivity of roads	Decreasing length of road	Conduct road inventory to identify and fix road drainage problems (Weaver and Hagans 1994).	Estimates potential for reduced risk of sediment delivery from hillslope sources to the watercourse
Annual road inspection & correction	Increased mileage inspected and corrected	Roads inspected and maintained, or decommissioned or hydrologically closed prior to winter- No migration barriers.	Estimates potential for reduced risk of sediment delivery from hillslope sources to the watercourse
Road location, surfacing, sidecast	Reduce density next to stream, increased % outsloped and hard surfaced roads	see text	minimized sediment delivery
Activities in unstable areas	avoid and/or /eliminate	Subject to geological/geotechnical assessment to minimize delivery and/or show that no increased delivery would result	minimized sediment delivery from management activities
Disturbed Area	Decrease in impaired subareas	Disturbed area is area covered by roads, landings, skid trails, agriculture, etc.	Correlated with suspended sediment (Lewis 1998)

This project was planned and conducted by the Five Counties Salmonid Conservation Program (5C) in cooperation with Trinity County. The 5C Program is a conservation strategy formed in 1998 by the counties of Del Norte, Humboldt, Mendocino, Siskiyou and Trinity to develop land use conservation standards and implement modifications in policies and practices that will result in reducing erosion and restoring anadromous salmonid fisheries habitat within the federally threatened Southern Oregon-Northern California Coast (SONCC) Evolutionarily Significant Unit (ESU) for coho salmon. The 5C Program's work on sediment reduction and barrier removal projects has been, and continues to be, an essential step toward the delisting of this ESU. The Program's policies and projects have also been cited in a decision to not list Smith, Klamath and Trinity River steelhead trout as "Threatened" under the Endangered Species Act (Federal Register: April 4, 2001).

The project was also part of a concerted 5C effort to implement a variety of restoration projects in the Weaver Creek watershed. These projects include: Finley Gulch Migration Barrier Removal and Stream Clean Up Project (completed in 2009); Browns Mountain Road Sediment Reduction Projects (completed in 2008 and 2010); Little Browns Creek Migration Barrier



Removal, Sediment Reduction and Stream Restoration Project (completed 2007); Roundy Road & North Roundy Road Sediment Reduction Projects (completed 2007); Weaver Basin Wetlands Program (completed in 2005 with on-going activities); Sidney Gulch Urban Stream Plan Draft Revision (completed in 2004); China Gulch Road Phase 1 Project (completed in 2001); and West Weaver Creek Migration Barrier Project (Completed in 2001). Numerous additional 5C supported projects are being developed in this watershed including the Lower Sidney Gulch Stream and Floodplain Restoration Project; Garden and Sidney Gulch Migration Barrier Removal Projects; Sidney Gulch Stormwater Basin Program; Lower East Weaver Creek Habitat and Sewer Line Protection Project; and Upper East Weaver Habitat, Barrier and Water Conservation Program.

In addition to 5C projects, the Forest Service and Trinity County RCD are implementing road upgrades and decommissions on National Forest roads as part of their Browns Project. Portions of this work are being funded under the Targeted Watershed Implementation Program as well.

### **Project Development and Implementation:**

Project phases included: 1) Site Treatment Design; 2) Permitting; 3) Treatment Staking; 4) Construction; and 5) Pre/During/Post-project Monitoring.

The DIRT inventory was completed in 2003 for the Rush Creek watershed side of the road system. The DIRT methodology is based on the protocols for forest and ranch road inventories set forth by Pacific Watershed Associates (PWA) but are modified to reflect the differences between private and public roads. Refer to [www.5counties.org](http://www.5counties.org) for a thorough DIRT background and description.

China Gulch Road in the Rush Creek watershed identified 7 'Sites', or road-related sediment sources that could deliver 1,374 yd<sup>3</sup> over a 10-year period. Given that there was active erosion or ditch and stream flow diversion occurring at each site, all sites were given a high priority for implementation.



**Above left pre-project ditch diversion down the road. Above right post project outcropping, ditch removal and rolling dips drain water across the road rather than down it. Below pre-project culvert misaligned and directed into bank was replaced with a proper aligned and larger culvert**

The estimated sediment savings in this report (3,660 yd<sup>3</sup>) is higher than identified in the DIRT inventory. The higher number includes 800 yd<sup>3</sup> for the landslide at Site 2646.1 which was not

included in the DIRT inventory as it was on the uninventoried Weaver Creek side of the road<sup>2</sup>. Approximately ~50 yd<sup>3</sup> of “uninventoried” berm material was removed from all segments of the road as well. An additional 1,360 yd<sup>3</sup> was added to the DIRT volume to reflect downstream channel and landslide erosion potential associated with debris torrent/slide potential of the sites<sup>3</sup>. In this case, channel instability and erosion from the 1997 storm documented the effects of inner gorge erosion from a debris slide originating directly above Site 2700 as well as slide potential from sites 2701-2704. Refer to Attachment 2 for the list of sites and treatments implemented.

**Site 2700a- Upslope partially gutted channel and culvert inlet before (left). Large RSP installed upstream of stream crossing (middle). Shallow, undersized 30' x 18" culvert with outlet scour creating a plunge site (right).**



**Buried wood in the outboard fill as well as accumulated surface wood (below left). Excavating to remove old culvert, woody debris and fill (middle). Installed 60' x 24" culvert set near channel gradient (~14' below road grade) with critical dip and RSP installed (right).**



Numerous field reviews were conducted between 5C and DOT staff with two formal site reviews (July 2009 and May 2010) conducted to discuss and modify specific treatment sites. Site layout and staking was completed in July 2009 and a Project Agreement with Trinity County Department of Transportation (DoT) was completed in September 2009 and revised several time prior to construction implementation. Environmental compliance (CEQA and NEPA) was

<sup>2</sup> The Weaver Creek side of China Gulch Road was not inventoried in DIRT as treatments were done prior to the development of the inventory program.

<sup>3</sup> The DIRT volume includes the estimated road fill volume lost but does address channel and bank and scour that would occur upstream or downstream of the crossing. At these sites existing evidence of channel and bank scour following 1997 storms provided the basis for an estimate of future off-site volume saved



completed in 2010 and permitting (1602, WWDR) was completed in July, 2010. A Categorical Exemption under Section 15301(c) & 15302(c) was filed with Trinity County on April 15<sup>th</sup>, 2010. On June 29<sup>th</sup>, 2010 the US Forest Service Trinity River Management Unit District Ranger determined that the project is a routine activity that falls under Forest Service Handbook (FSH) 1909.15, Section 31.12, Category 4; Repair and maintenance of roads, trails, and landline boundaries (36 CFR 220.6(d) (4)) and categorically excluded the proposed action from documentation in an EIS or EA.

A CDFG Streambed Alteration Agreement notification was prepared and submitted on June 7, 2010 and on July 13, 2010; CDFG Environmental Staff member Eda Eggeman, DOT Road Supervisor Dennis Fullerton and 5C staff member Mark Lancaster reviewed the four sites included in the Notification. The completed permit (1600-2010-0189-R1) was received on July 23, 2010, and was distributed to the DOT staff working on the project. DOT completed the required USA Dig notifications in June 2010.

5C staff members (Rourke, Jordan and Lancaster), conducted photo monitoring and treatment site staking for this project. A photo-monitoring protocol was established and records were maintained. This work was completed intermittently from June 2010 to November 2010 and is on-going in response to storm events. Pre-project, as well as during and post-project photos, are included in Attachment 3.

Construction by DOT road crew staff started on June 15<sup>th</sup> and was completed on October 15, 2010. Jordan and Lancaster conducted construction site visits and Lancaster worked on project implementation with DOT crew members.

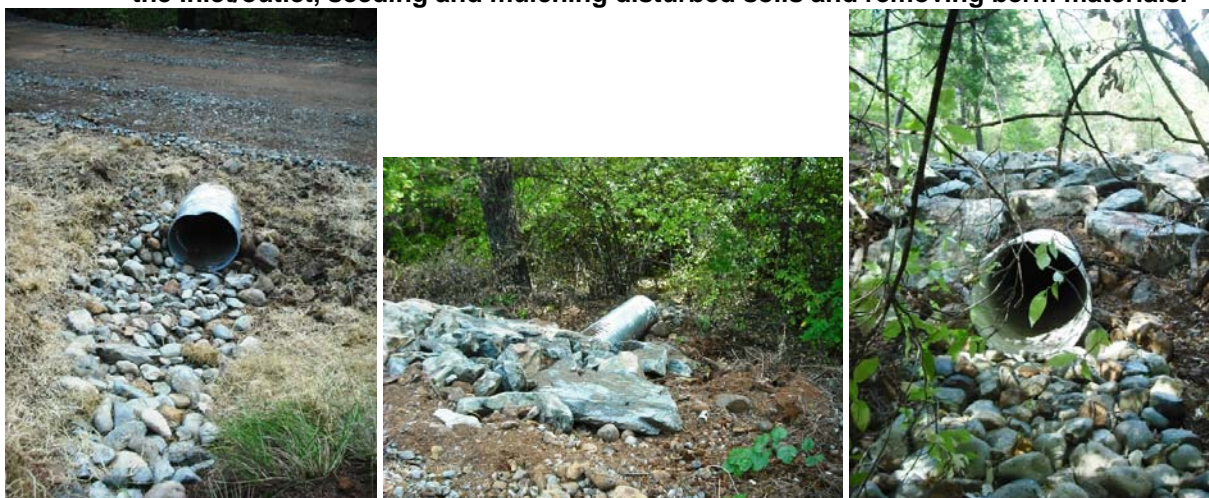
After each site was constructed, all disturbed and exposed soil surface areas were either rocked and/or revegetated with native grass seed mix and certified weed-free straw mulch. All final erosion control work was completed prior to October 15, 2010. Approximately 25 yd<sup>3</sup> of spoils material were disposed of at the Weaverville DOT resorting yard in Weaverville as a result of this project. Approximately 260 yd<sup>3</sup> of excavated fill were used to reconstruct the roadway and on a separate project. The rock/native road surface road was re-graded upon completion of treatment construction.

**At Site 2703 (below left) misaligned (solid white line in photo) and undersized culvert erodes bank and road and has high diversion potential down road. Natural channel alignment is shown as dashed white line. A larger, properly aligned culvert with inlet rock apron erosion control and energy dissipater was installed (middle photo). An offset critical dip, energy dissipater, and erosion control (seed, mulch, and fiber roll) were installed as well.**





**Site 2704 treatments (below) included culvert upsizing from 12" to 18", rock armoring the inlet/outlet, seeding and mulching disturbed soils and removing berm materials.**



Project monitoring consisted of the pre, during and post photo and construction phase monitoring. Monitoring of the roadway condition and treatment effectiveness will continue for three years by the 5C, especially during large storm events. The DOT will continue to maintain the road on a regular basis.

Many site treatments, such as stream crossing upgrades and ditch relief culverts, have additional treatments associated with them such as installing rock armor or excavating aggraded sediment from upstream of the culvert inlet. Treatment sites are included in the project photo log (Attachment 3) with treatment descriptions.

### **Project Results:**

Completion of the project provided the following benefits:

- Eliminating the potential for approximately 3,660 cubic yards of county road related sediment delivery to Rush Creek and Weaver Creeks and the Trinity River;
- Returning the treated road segments to as hydrologically neutral a state as is safe, practical and economical;
- Improving spawning and rearing habitat for juvenile and adult Coho and Chinook salmon and steelhead;
- Increasing the flow capacities of the stream crossing culverts that were upgraded to allow for higher flows and associated bedload and debris;
- Preventing and minimizing the time and funds expended by the Trinity County Department of Transportation on maintenance and emergency efforts during high flow events to remove debris and implement clean-up efforts on the road;
- Implementing the Trinity River Record of Decision (ROD), by providing:
  - Sediment management, including the supplementation of spawning

- gravels below the Trinity River Dam and reduction in fine sediments which degrade coho salmon habitat;
- Watershed restoration efforts, addressing negative impacts which have resulted from land use practices in the basin.

**Project Costs:**

The overall cost of the project for Phase 2A is \$106,264 or \$29/yd<sup>3</sup>. Phase 2b, which is an integral part of this project will be completed in 2011. The Trinity River Basin Fish and Wildlife Restoration Program's Targeted Watershed Implementation Program Grants (#07FC2) provided 3.6% (\$3,846) of the Phase 2A project funding. The China Gulch-Dutch Creek Sediment Reduction Project Agreement with the Trinity County RCD (BOR Grant #08FG20077 provided 26.3% (\$27,932). The majority, 63.4% (\$67,386) was funded from the State Water Resources Control Board Proposition 40 Trinity Consolidated Drinking Water Program Grant; and the Trinity County Department of Transportation contributed 6.7% (\$7,100) in staff time and equipment. The remaining Phase 2b funds (\$50,000) are from a US Forest Service RAC grant.

## **References:**

Boberg, J. & C. Kenyon. 1979. Stream Inventory: Trinity County. California Department of Fish and Game.

CA Department of Water Resources. 1980. Main Stem Trinity River Watershed Erosion Investigation. 33 pp.

Recovery Strategy for California Coho Salmon. 2004. Report to the California Fish and Game Commission. 786 pp.

United States Environmental Protection Agency (USEPA). 2001. Trinity River Total Maximum Daily Load for Sediment. USEPA, Region IX. San Francisco, California. 142 pp.

Weaverville Area Soil Survey. United States Department of Agriculture Natural Resources Conservation Service. 1986.

## **Attachments:**

- 1) Project Location Map
- 2) Project Treatment Site Descriptions
- 3) Project Photo Log



## Attachment 2: Project Treatment Site Descriptions

### Road (CGR) Sediment Reduction Project AS-Built Information

- 1) Milepost 0.00 is at the intersection of Highway 3 & China Gulch Road
  - 2) Sites are tagged as close as possible to the mileage for each site (usually a culvert inlet area) with Aluminum tags
  - 3) General Post Site Treatment Work: rock entire length of China Gulch Road (~13,200' x 15' average width = 198,000 sq ft) with Class 2 or 3 Ag Base rock, or other Trinity County DOT specification rock (cost dependent-RCR watershed is priority).
  - 4) Rolling Dip depth should be approximately 12" to 18"
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**Site 2646.1 –**  
1.09 miles  
**UTM: 510163 / 4513252**

Pre-Project Description: Large hillslope landslide.

Treatment:

**2646.1(a)**

- Excavated toe of slide: 90' long x 10' tall x 6' deep (~200 cyds) and reincorporate a portion of the excavated material into filling the ditch & outsloped of road segments at Sites 2700 – 2706
- Shape excavated surface and upper slide surface so that water does not pool.
- Place & key 1½-ton RSP along toe of slide: 90' long x 10' tall

**2646.1(b)**

- Seeded with native grass seed and mulched with certified weed free straw
- Revegetated lower 1/3 of slide with native brush & tree species (5C staff to assist)

**Site 2700 –**  
1.561 miles  
Surface: Rocked

Pre-Project Description: Debris torrent landslide upslope of a small class 3 stream with plugged, undersized pipe and diversion down road to sites 2701 + with upslope instability in general area. Fill slope contains evidence of buried logs. Site includes 728' of ditch/cutbank which includes 200' of USFS road delivery and an active slide above inlet. Inlet and inlet area completely covered. Road slope average is 7%.

Treatment:

**2700(a)**

- Excavated ~ 130 yd3 (50' x 9' x 8') to remove and replace 18" CMP with 24" x 50' CMP set at 25% vertically alignment to near channel grade of 30%. Reinstalled approximately 90 yd3 of material back into site.
- Installed critical dip, including placement of ~60yd3 of large diameter RSP and filter fabric.

RSP extended from toe of crossing to ~10' into outboard side road segment. Filter fabric extends throughout fill and crossing length.

- Placed energy dissipater rock at the outlet of 24" CMP

**2700(b)**

- Excavated material from upstream channel: 10' long x 12' wide x 4' deep (~17 cyds)
- Place & key 1½-ton RSP into excavated area (~20 cyds)
- Rock excavated channel area with 6" to 10" angular rock: 30' long x 12' wide

**2700(c)**

- Filled ditch & outsloped road ~345' up right from new 24" CMP inlet to just before the curve in the road

**2700(d)**

- Installed rolling dip 150' up right of new 24" CMP Inlet

**2700(e)**

- At ~345' up right of new 24" CMP Inlet, installed the excavated 18" x 30' CMP culvert from Site 2702 just before the curve in the road where the road starts to inslope

**Site 2701**

1.598 miles

Surface: Rocked

Pre-Project Description: Cutbank slide is aggravated by the diverted stream at Site #2700. There are outboard fill face scarps. May lose road here. Do not side cast here.

Treatment:

**2701(a)**

- Filled ditch and outsloped road up right to the critical dip at Site 2700

**2701(b)**

- Installed rolling dip in natural dip at Site 2701

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**Site 2702**

1.697 miles

Surface: Rocked

Pre-Project Description: Road is within potential unstable areas. Ditch with ditch erosion, ditch diversion and stream delivery. Ditch relief culvert has a shotgunned outlet. Outlet area armored. Treated sites #2700 & 2701 to reduce delivery to this site.

Treatment:

**2702(a)**

- Excavated existing 18" x 30' CMP & reused at Site 2700(e)

**2702(b)**

- Filled ditch & outsloped road up right 475' to Site 2701

- Filled ditch & outsloped road down left 180' to curve (maintained ditch & inslope after curve & down left to Site 2703)

### **2702(c)**

- Installed rolling dip where 18" CMP had been
- Install rolling dip 210' up right from where 18" CMP had been

\*\*Between Site 2702 and Site 2703, cleaned up the road shaping/ruts, outsloped and spot rocked upon **completion. Cleaned existing ditch relief culvert.**

### **Site 2703**

2.038 miles

Surface: Rocked

Pre-Project Description: Active class III stream with slight sediment fan at inlet. Culvert poorly aligned with channel, causing outboard fill erosion, along with road runoff. There are four old tires in inlet basin that have been pulled from inlet.

Treatment:

### **2703(a)**

- Excavated sediment fan from upstream channel: 40' long x 6' wide x 1' deep (~9 cyds)
- Rock armor excavated channel area with 6" to 8" Rock: 40' long x 6' wide

### **2703(b)**

- Replaced culvert with 36" x 60' CMP at channel grade of 20% & aligned
- Armored outlet area with ¼-ton rock: 10' l x 10' w (~ 7 cyds)
- Installed "C" Dip (with large rock & filter fabric) at the base of the skid trail to catch runoff

### **2703(c)**

- Installed rolling dip 400' & 800' up right of new 36" culvert inlet to catch surface runoff and potential ditch diversion flow

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### **Site 2704**

2.073 miles

Surface: Rocked

Pre-Project Description: Active class III channel with an undersized, damaged culvert. Also drains an active spring/ditch.

Treatment:

### **2704(a)**

- Replaced existing 18" culvert with 24" x 50' CMP at channel grade of 43% & aligned

### **2704(b)**

- Prescribed Critical dip not installed as deemed unnecessary,

### **2704(c)**

- Filled ditch & outsloped road for 140' up right from new 24" CMP inlet to Site 2703



**Site 2705**

2.3 miles

Surface: Rocked

Pre-Project Description: Active Class II stream channel that's has a poorly aligned culvert. Also 1166' of road runoff and ditch delivery with road/ditch erosion.

Treatment:

**2705(a)**

- Replaced existing culvert with 30"x 60' CMP at channel grade of 20% & aligned
- Removed large stump from outlet area
- Rock armored outlet channel: 30 square feet
- Installed "C" dip with large rock & filter fabric

**2705(b)**

- Retained ditch for 300' up right of the newly installed 30" culvert in order to protect riparian vegetation along cutbank.

- Rocked the ditch for only 15 feet up right of the newly installed 30" culvert

**2705(d)**

- Filled ditch and outsloped road from Site 2704 to 300' up right of the new 30" culvert at site 2705a.

**2705(e)**

- Installed rolling dips at 370', 530' and 920' up right of the new 30" culvert

**Site 2706**

2.407 miles

Surface: Rocked

Pre-Project Description: Spring/Class II crossing that appears to be properly functioning. The ditch length before this crossing has some cutbank slides but not going to deliver much to a stream.

Treatment:

**2706(a)**

- Installed a rolling dip upslope of the upstream edge of the cutbank slide in order to dewater the slide (the slide is approximately 200 feet up the road from the existing 18" culvert at Site 2706)

**2706(b)**

- Filled ditch and outsloped road from 2706(a) up road to Site 2705