Introduction

In June 2002, Save-the-Redwoods league acquired 25,471 acres of private timber land from Stimpson Lumber Company. The acquisition was a collaborative effort by numerous public and private entities to transfer the property into public hands as either a National Park or an addition to the adjacent State Parks.

As a commercial property the acreage was aggressively harvested beginning in the early 1950's through the later part of the 1990's. To facilitate timber transportation, a dense network of haul roads was constructed and hundreds of miles of skid trails resulted from ground-based timber operations. Seasonaly high rainfall in Del Norte County combined with numberous roads traversing steep terrain requires intensive maintenance of road drainage featues to avoid storm damage and associated delivery of sediment to the steam channel network. The acquisition included over 320 miles of haul roads and secondary spur roads that were constructed by previous landowners. A park-wide road inventory and assessment was conducted from 2002 to 2005 to quantify the scope and urgency of road problems.

Road Inventory and Assessment

Initial scoping of the road system revealed a subset of roads (124 miles) that were either abandoned or had received "maintenance free" treatment by the previous landowner. These roads had been partially decommissioned and were no longer part of the transportation network. Treatments by the previous landowner consisted of partial removal of stream crossing fill and large cross drains (tank traps) that segmented road and ditch drainage. During the first winter following the acquisition (2002/2003) higher rates of failure were observed on the maintenance-free roads than on roads that were open and monitored. Further investigation revealed numerous critical erosion sites and pointed to several flaws in the treatment method that had been used to treat the maintenance-free roads. As a result, the Landscape Stabilization and Erosion Prevention Plan was developed to immediately address and stabilize the maintenance-free roads.

A comprehensive database was generated from the park-wide road assessment that has aided in the prioritization of road related threats for project funding. This report covers data collected on the subset of roads that are funded for treatment under SWRCB Grant Agreement No: 07-541-550-0, Component Project #2.7, Head Hunter/Smokehouse Non-point Sediment Reduction Project (Table 1 and Figure 1). A complete report covering the methods and results of the property-wide road inventory and geomorphic assessment is in draft form and is expected to be published winter 2008.

Road inventory data were stored in two Access databases. The databases were developed to contain all features collected during the inventory and to be linked dynamically to a spatial framework of linear routes to provide analysis when combined using ESRI Arc software. One database was developed to contain continuous data. These data were continuous along all roads. Road surface material, for example, was captured continuously for all roads (Table 2). The second database was designed to contain discrete point or interval features. These features had limited extent and a distinct set of characteristics that were captured whether at a single point, for example a stream crossing, or over a segment of road, for example, a mass wasting site (Table 3).

An air photo analysis of the road network was conducted to identify skid roads connected to routed treatment roads that have the potential to cause erosion due to their location on the landscape. These potential skid roads were then field checked for each project unit before implementation. Skid roads requiring treatment were added to each appropriate project unit.

Construction Plans and Specifications

Road recontouring involves excavation of embankment fill from road, stabilization of excavated materials on cutbench to completely recover potentially unstable fillslope and restore natural (pre-disturbance) topography. Stream crossing removal involves the excavation of road and landing fill from road - stream channel crossings and stabilization of excavated materials. Stream channel bed, banks, and adjacent slopes are restored to their pre-crossing configuration. Longitudinal stream gradient is reestablished through the crossing site.

Construction Specifications for full road recontouring are as follows:

> The excavator and dozer shall prepare the site by first removing all trees and brush growing on the cutbank, roadbed, and embankment fillslope. Mulch shall be stockpiled on the top of the cutbank or below the embankment fill. Mulch may be stockpiled in piles but shall be left accessible to the excavator when earthmoving tasks are complete. Trees growing in undisturbed soil that were partially buried by road embankment fill may be left standing, however all embankment fill shall be excavated away from around the base. Care should be taken not to damage roots. An excavator mounted vegetation masticator may be used to remove trees and brush. Tree boles shall be left a minimum of 24” high for later extraction with the excavator or dozer. If a masticator is used, a dozer may be employed to accumulate and pile ground mulch for use on finished surfaces. If mulch is limited, the available mulch should be stockpiled near stream crossing excavation sites for later use at those locations.
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> Following clearing operations, a dozer equipped with rippers shall decompact the inboard ditch and the cutbench portion of the road to a minimum depth of 12 inches. The cutbank shall be stripped of all organic accumulations using the dozer or the excavator or a combination of the two. Small, dispersed organic material shall be mixed and incorporated into the fill material and

used to recontour the cutbench. Larger accumulations of organic debris shall be gathered by the excavator or dozer and stockpiled with trees and brush removed from the roadway.

If stable areas exist along the road cutbench, the dozer begins pushing embankment fill into the cutbank in maximum 6-inch lifts. The dozer continues to push material against the cutbank compacting it in lifts until the material becomes too steep on which to operate, or no more fill is available locally. As the dozer cuts embankment fill it leaves a berm on the outside (downslope) edge to prevent material from being sidecast downslope. At some sites, where the hillslope is not too steep, the dozer may be permitted to travel below the fill, enabling it to cut and move the entire embankment fill onto the road cutbench. This is typical in prairie settings or where vegetation is sparse enough for the dozer to operate off the road without damaging trees and shrubs.

The excavator follows the dozer and makes a pass removing the berm and what remains of the embankment fill beyond. The excavator completes the slope match at the top of the cutbank. The material at the bottom of the embankment fill is retrieved and placed last on the recontoured surface, as it contains the most organic material an provides nutrients and seeds to the newly recontoured surface. Where a complete match is not possible due to a deficit of fill material, the excavator may pull down the top corner of the cutbank where practical and blend with the fill below.

Where recontoured slopes permit, the final surface may be smoothed by back-dragging with the dozer blade, or by sliding the back of the excavator bucket back and fourth across the recontoured slope. Excavator buckets equipped with a blade attachment may also be used to smooth the recontoured slope.

Trees and brush removed prior to excavation may be raked across the surface with the excavator to remove the equipment tracks, and then spread evenly over the surface as mulch. At some locations, mulch material may be saved and redistributed at stream crossings where more complete mulch coverage may be necessary to reduce surface erosion.

Cutbanks exposing seeps or springs, or those along the axes of topographic swales, shall not be recontoured. Instead, the embankment fill adjacent to the wet area shall be exported to nearby dry section of the road. An outsloped cutbench shall extend along all wet road sections.

Road through-cuts shall only be treated if the available fill can achieve a full match eliminating the possibility of runoff concentrating in the through-cut. In most cases a crown of soil approximately 5% of the total through-cut depth is left over the finished recontour to ensure runoff does not reoccupy the through-cut. As with road bench fill, through-cut fill shall be well compacted by the dozer depositing the material in maximum 6-inch lifts. Through-cuts that are steeply inclined on the slope shall be drained of subsurface flow using subsurface ditch relief drains. These drains are cut into the outboard berm and daylight on the adjacent slopes. The ditches are backfilled and provide a porous conduit for concentrated subsurface flow. In some cases where through-cuts are steeply inclined, recontouring may not be recommended due to a high probability of post-treatment failure.

Where gullies or other diversions have incised across crossing sites, reestablishment of the crossing grade shall be deeper than the intersecting diversion channel. This will eliminate the possibility of reoccupation of the treated feature by flow in the restored channel.

If a long section of road is not suitable for fill stabilization or there is an excess of fill at a landing site, the excavator removes the embankment fill and loads it into a dump truck to be end-hauled to more stable road reaches nearby. The excavator and dozer recover the entire embankment fill and outslope the cutbench of the road. On steep linear grades broad swales are constructed along the road cutbench at appropriate locations to convey flow into natural drainage features below the road.

Usually dozer pushes in excess of 600 feet require exportation with dump trucks. Whenever possible exported fill will be distributed widely across nearby, stable road reaches to distribute the surplus material rather than surcharging one specific area. When space is limited along nearby stable road reaches, other roads in the project area may be identified to store fill. Roads with gentle and stable sideslopes or throughcuts with low gradients will be used to deposit exported material. Sites with springs or other adverse hydrologic conditions shall not be used to store exported fill. Exported fill shall not be deposited in natural stream channels or wetland areas. As exported fill is deposited, the material shall be spread and compacted in 6-inch lifts by the dozer. Exported fill shall be deposited as close to the source area as possible to reduce the potential for spread of exotic plants and soil-borne plant pathogens. Mulch stockpiled adjacent to fill sites shall be spread evenly over the surface.

Cutbanks immediately adjacent to stream crossings are not typically used for fill stabilization. Instead, the fill is tapered toward the crossing and the cutbank is left exposed. This reduces the slope on each side of the crossing reducing the chance for direct sediment delivery if a post-treatment slope failure occurs. In crossings with gentle sideslopes, cutbanks may be used for fill stabilization if post-treatment failure is not considered a significant hazard.

Construction Specifications for stream crossing removal are as follows:

The excavator shall prepare the site by first removing all trees and brush growing on the cutbank, roadbed, and embankment fillslope of the adjacent road sections. Trees and brush growing on the crossing fill are also removed. Mulch shall be stockpiled on the top of the adjacent road cutbanks or elsewhere in the crossing excavation area. Mulch may be stockpiled in piles but shall be left accessible to the excavator when earthmoving tasks are complete. Trees growing in undisturbed soil that were partially buried by fill may be left standing, however all fill shall be excavated away from around the base. Care should be taken not to damage roots. An excavator mounted vegetation masticator may be used to remove trees and brush. Tree boles shall be left a minimum of 24" high for later extraction with the excavator or dozer. If a masticator is used, a dozer may be employed to accumulate and pile ground mulch for use on finished surfaces.

If the stream is flowing, water is diverted away from excavation areas to reduce turbidity. Where channel widths are wide enough a berm is constructed to divert water away from the work area. Where channels are narrow, a small diversion dam is built upstream and stream flow is piped around the worksite and discharged into the stream below the worksite. If flow travels subsurface through the site and cannot be captured and diverted, a filter fabric silt dam will be constructed immediately downstream of the construction footprint.

At failed crossings, a small road bench is reconstructed along the upstream end of the crossing to allow access to both sides of the crossing. A minimal amount of fill is used and streamflow (if present) is piped around the site or a culvert is installed to convey streamflow under the temporary road.

Following clearing and access operations, a dozer equipped with rippers shall decompact the inboard ditch and the cutbench portion of the adjacent road sections to a minimum depth of 12 inches. The cutbank shall be stripped of all organic accumulations using the dozer or the excavator or a combination of the two. Small, dispersed organic material shall be mixed and incorporated into the fill material and used to recontour the cutbench. Larger accumulations of organic debris shall be gathered by the excavator and stockpiled with trees and brush removed from the crossing and adjacent roadway.

If stable areas exist along the adjacent road cutbench, the dozer begins pushing the crossing fill into the cutbank in maximum 6-inch lifts. The dozer pushes the material to the most distant sections of road first and moves back toward the crossing to avoid becoming overwhelmed by large accumulations of excavated fill at the crossing site. The dozer continues to push material out of the crossing compacting it in lifts until the recontoured material becomes too steep on which to operate, the dozer reaches the local Ordinary High Water elevation, or no more fill is available in the crossing. As the dozer cuts crossing fill it leaves a berm on the downstream edge to prevent material from being sidecast downslope toward the stream.

Cutbanks exposing seeps or springs, or those along the axes of topographic swales adjacent to crossing sites shall not be recontoured. Instead, the crossing fill and embankment fill from the wet road reach shall be exported to dry section of the road farther from the crossing. An outsloped cutbench shall be left adjacent to the stream crossing if wet areas are present.

As the dozer begins the crossing excavation, the excavator positions itself at the downstream edge of crossing and begins removing fill and placing it where the bulldozer can push it to the storage area. In crossing excavations where stream flow is present, the excavator always works from downstream extent of excavation to the upstream extent to prevent pooling and uncontrolled release of water and sediment in the event of a failure of the bypass piping.

Usually dozer pushes in excess of 300 feet require exportation with dump trucks. If the adjoining road is not suitable for material storage, the excavator removes the crossing fill and it is loaded directly into a dump truck, and material is end-hauled to stable road reaches near the crossing excavation. Whenever possible exported fill will be distributed widely across nearby, stable road reaches to distribute the surplus material rather than surcharging one specific area. When space is limited along nearby stable road reaches, other roads in the project area may be identified to store fill. Roads with gentle and stable sideslopes or through-cuts with low gradients will be used to deposit exported material. Sites with springs or other adverse hydrologic conditions shall not be used to store exported fill. Exported fill shall not be deposited in natural stream channels or wetland areas. As exported fill is deposited, the material shall be spread and compacted in 6-inch lifts by the dozer. Exported fill shall be deposited as close to the source area as possible to reduce the potential for spread of exotic plants and soil-borne plant pathogens. Mulch stockpiled adjacent to fill sites shall be spread evenly over the surface.

The dozer and excavator continue to work in tandem until all crossing fill within the stream channel and on the adjacent slopes has been removed. In addition to the crossing fill, any material deposited in an upstream colluvial/alluvial wedge is removed whenever practicable. The extent/distance to which the upstream material is removed shall be weighed against the expected collateral damage to the riparian corridor. Extensive riparian disturbance is warranted only in situations where large amounts of sediment are determined to be unstable. The excavation should be designed to match the slopes and banks upstream and downstream from the crossing.

In cases where the failed crossing includes a large inner-gorge gully or has incised below pre-disturbance stream grade, it may be necessary to leave the channel configuration in its unnatural condition.

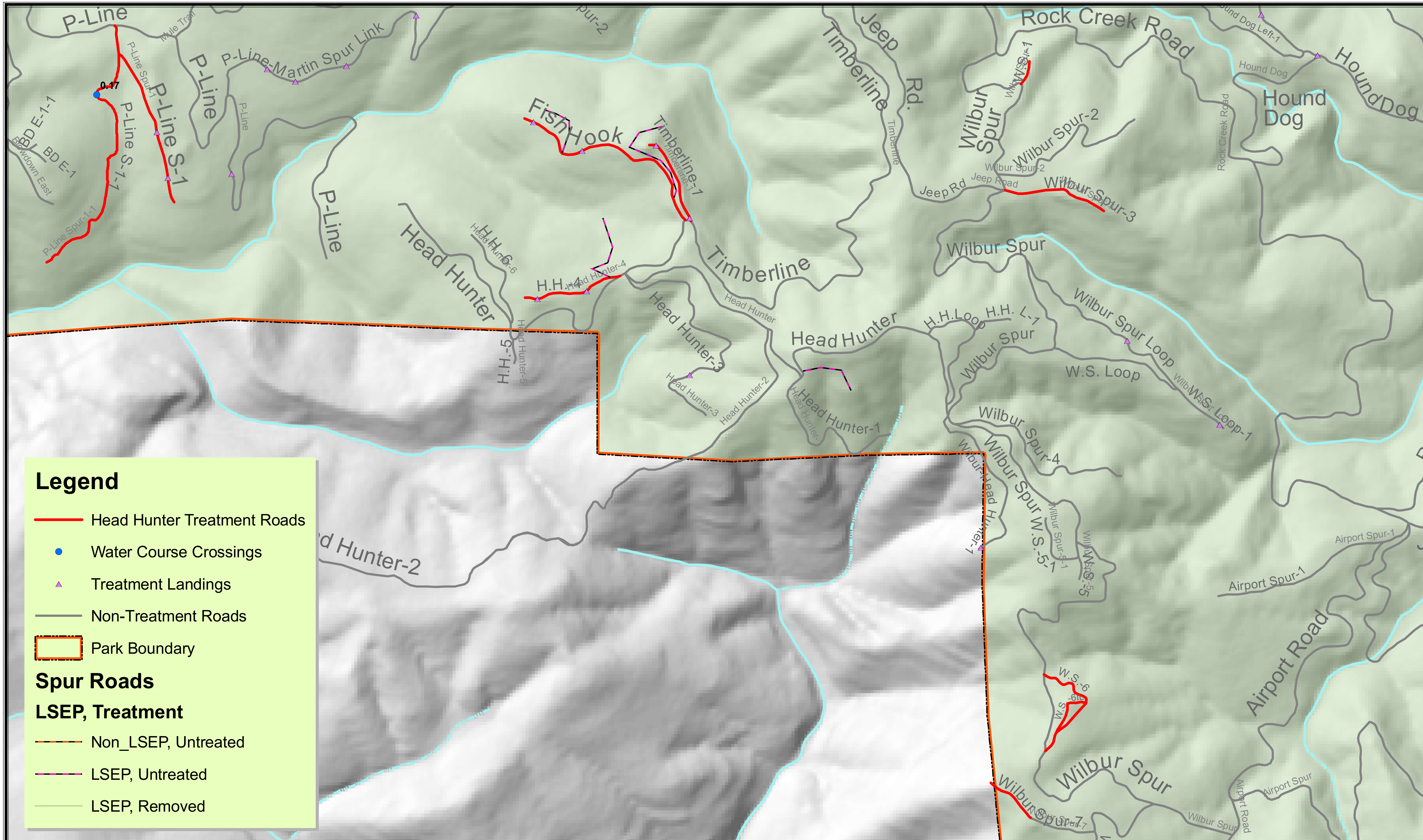
The excavator makes final adjustments to the excavated stream crossing. The final surface is smoothed by back dragging with the dozer or with the excavator bucket. Excavator buckets equipped with a blade attachment shall be used to smooth the recontoured slope.

Trees and brush removed prior to excavation are then spread over the surface of the side slopes as mulch. Mulch shall be preferentially applied to stream crossing sites to reduce the delivery of sediment from surface erosion on crossing sideslopes. Within 50 feet of stream crossing excavations mulch shall be applied to sideslopes to provide 70% to 90% surface coverage. Between 50 feet and 100 feet mulch shall be applied to sideslopes to provide 50% to 70% surface coverage. Road approaches with less than a 50 foot natural buffer to stream channels shall be treated with mulch applied to provide 50% to 70% surface coverage. Where the quantity of mulch material is insufficient to meet these requirements, locally derived material will be imported to the crossing sites from nearby interfluvial road sections. Mulch applied at crossings should be pressed onto the ground surface wherever possible using either the excavator or the dozer.

Logs and rocks should not be placed in the excavated portion of the channel because this often causes lateral migration resulting in bank erosion and slope undercutting. Slope undercutting may destabilize the crossing sideslopes and deposit large volumes of sediment directly into the stream channel. Logs should be placed on the channel margins or can span the channel to provide for future LWD recruitment. In situations where the gradient of the channel will remain unstable following excavation, check dams may be constructed to retain sediment within or adjacent to the treated reach. The check dams shall be designed by a licensed geologist experienced in fluvial geomorphology and open-channel hydraulics. The materials used in the construction of the check dams shall be obtained near the site and be composed of natural materials (i.e., large logs, rootwads, and boulders). Saw-cut ends, cable, bolts, rebar, and other hardware shall be concealed to the maximum extent possible.

Where stream crossing excavations extend upstream to disturbed portions of the natural channel and no apparent natural top of the crossing is obvious, the channel grade at the top of the excavation should be anchored to some grade control such as a rock outcrop, a large tree root, or large woody debris firmly embedded in the channel. In the absence of any hard-point, the upstream end of the crossing should be tapered to the unnatural channel grade as far upstream as is practical to minimize headcutting of the stream as it adjusts to the newly established local gradient.

Road sections immediately adjacent to stream crossings should not be fully recontoured. Instead, the fill is tapered toward the crossing and some cutbank is left exposed. This reduces the slope on each side of the crossing and reduces the chance for a post-treatment slope failure that will deliver sediment directly to the drainage network. In crossings with gentle sideslopes, cutbanks can be fully recontoured if post-treatment failure is not considered a significant hazard.



Head Hunter Non-point Source
Sediment Reduction Project
Project Sites 2008/2009

N

0 0.1 0.2 0.4 0.6 0.8 Miles

Road Name	Open Distance (km)	Abandoned Distance (km)	Winterized Distance (km)	Treatment Distance (km)
Fish Hook	0.00	0.29	0.71	1.00
Fish Hook-SR1	0.00	0.37	0.00	0.37
Fish Hook-SR2	0.00	0.19	0.00	0.19
Head Hunter-4	0.00	0.32	0.00	0.32
Head Hunter-4-SR1	0.00	0.26	0.00	0.26
Head Hunter-SR1	0.00	0.19	0.00	0.19
P-Line Spur-1	0.00	0.60	0.00	0.60
P-Line Spur-1-1	0.00	0.00	0.84	0.84
Timberline-1	0.00	0.29	0.00	0.29
Wilbur Spur-1	0.00	0.08	0.00	0.08
Wilbur Spur-3	0.00	0.00	0.33	0.33
Wilbur Spur-6	0.00	0.39	0.00	0.39
Wilbur Spur-6 Inner Loop	0.00	0.16	0.00	0.16
Wilbur Spur-7	0.55	0.17	0.00	0.17
Totals (km)	**0.55**	**3.32**	**1.88**	**5.20**
Totals (mi)	**0.34**	**2.06**	**1.17**	**3.23**

Route Name: Fish Hook
Date: 1/29/03

Surveyed by: DRP
Pages:1

Address	Usability	Surface	Surface Condition	Width	Embankment Volume	Grade	Pitch	Inboard Ditch	Vegetation Load	Road Drainage
0.00	u2	s2	sc3	w3	0	g1	p4	i1	v2	d1
0.04	u2	s2	sc3	w2	4	g1	p4	i2	v3	d1
0.09	u2	s2	sc3	w2	5	g1	p4	i5	v3	d1
0.29	u3	s2	sc2	w3	5	g5	p2	i7	v2	xd
0.30	u3	s2	sc2	w3	5	g6	p2	i7	v2	xd
0.33	u3	s2	sc2	w3	5	g6	p5	i7	v2	xd
0.36	u3	s2	sc2	w3	5	g7	p3	i7	v2	xd
0.40	u3	s2	sc2	w3	5	g6	p4	i7	v2	xd
0.64	u3	s2	sc2	w3	6	g5	p4	i7	v2	xd
0.84	u3	s2	sc2	w3	4	g6	p4	i7	v2	xd
0.90	u3	s2	sc2	w3	4	g5	p4	i7	v2	xd
0.96	u3	s2	sc2	w3	10	g5	p4	i7	v2	xd
1.00	end	end	end	end	end	end	end	end	end	end

Route Name: Head Hunter - 4 Surveyed by:DRP
Date:1/29/03 Pages: 1

Address	Usability	Surface	Surface Condition	Width	Embankment Volume	Grade	Pitch	Inboard Ditch	Vegetation Load	Road Drainage
0.00	u2	s2	sc2	w1	0	g1	p4	i7	v2	d1
0.03	u2	s2	sc2	w2	3	g2	p4	i1	v2	d1
0.04	u2	s2	sc2	w2	3	g3	p4	i2	v2	d1
0.12	u2	s2	sc2	w4	8	g1	p4	i2	v2	d1
0.15	u2	s2	sc2	w2	6	g1	p4	i2	v2	d1
0.26	u2	s2	sc2	w2	6	g3	p4	i2	v2	d1
0.28	u2	s2	sc2	w3	10	g3	p4	i2	v2	d1
0.30	u2	s2	sc2	w4	12	g1	p4	i2	v2	d1
0.32	end	end	end	end	end	end	end	end	end	end

Route Name:P-Line Spur-1							Surveyed by:SEW			
Date:2/17/03							Pages: 1			
Address	Usability	Surface	Surface Condition	Width	Embankment Volume	Grade	Pitch	Inboard Ditch	Vegetation Load	Road Drainage
0.00	u2	s2	sc3	w1	0	g2	p5	i7	v2	d1
0.04	u2	s2	sc3	w1	0	g5	p5	i7	v2	d1
0.08	u2	s2	sc3	w2	0	g5	p5	i7	v2	d1
0.09	u2	s2	sc2	w1	2	g3	p4	i7	v2	d1
0.29	u2	s2	sc2	w2	2	g3	p4	i7	v2	d1
0.30	u2	s2	sc2	w2	0	g1	p4	i7	v2	d1
0.36	u2	s2	sc2	w4	12	g1	p4	i7	v2	d1
0.42	u2	s2	sc2	w1	0.25	g1	p4	i7	v2	d1
0.44	u2	s2	sc2	w1	0.25	g2	p4	i7	v2	d1
0.51	u2	s2	sc2	w4	5	g1	p4	i7	v2	d1
0.60	end	end	end	end	end	end	end	end	end	end

Route Name:P-Line Spur-1-1 Date:03/09/05						Surveyed by:SEW Pages:1				
Address	Usability	Surface	Surface Condition	Width	Embankment Volume	Grade	Pitch	Inboard Ditch	Vegetation Load	Road Drainage
0.00	u3	s3	sc2	w2	0.50	g6	p4	i7	v3	xd
0.04	u3	s3	sc2	w2	3.00	g6	p4	i7	v3	xd
0.08	u3	s3	sc2	w2	5.00	g7	p3	i7	v3	xd
0.17	u3	s3	sc1	w2	5.00	g5	p3	i5	v3	xd
0.25	u3	s3	sc1	w2	7.00	g6	p3	i5	v3	xd
0.29	u3	s3	sc1	w2	3.00	g6	p4	i5	v3	xd
0.38	u3	s3	sc1	w2	5.00	g5	p5	i5	v3	xd
0.42	u3	s3	sc1	w2	5.00	g6	p4	i7	v3	xd
0.58	u3	s3	sc1	w1	10.00	g6	p2	i7	v3	xd
0.63	u3	s3	sc1	w1	5.00	g6	p4	i7	v2	xd
0.71	u3	s3	sc1	w1	5.00	g7	p4	i7	v2	xd
0.74	u3	s3	sc1	w1	5.00	g6	p4	i7	v2	xd
0.78	u3	s3	sc1	w1	5.00	g5	p4	i7	v2	xd
0.82	u3	s3	sc1	w4	5.00	g5	p4	i7	v2	xd
0.84	end	end	end	end	end	end	end	end	end	end

Route Name: Timberline-1 Surveyed by: DRP
Date: 1/27/04 Pages: 1

Address	Usability	Surface	Surface Condition	Width	Embankment Volume	Grade	Pitch	Inboard Ditch	Vegetation Load	Road Drainage
0.00	u2	s3	sc2	w2	4	g1	p4	i7	v2	d2
0.02	u2	s3	sc2	w2	2	g4	p5	i7	v2	d2
0.05	u2	s3	sc2	w2	2	g5	p2	i7	v2	d2
0.06	u2	s3	sc2	w2	2	g5	p3	i7	v2	d2
0.08	u2	s3	sc2	w2	2	g5	p2	i7	v2	d2
0.10	u2	s3	sc2	w2	2	g5	p5	i7	v2	d2
0.14	u2	s3	sc2	w2	2	g6	p5	i7	v2	d2
0.18	u2	s3	sc2	w2	2	g5	p2	i7	v2	d6
0.19	u2	s3	sc2	w2	2	g5	p4	i7	v2	d6
0.20	u2	s3	sc2	w2	3	g6	p3	i7	v2	d6
0.23	u2	s3	sc2	w2	3	g1	p3	i7	v2	d6
0.25	u2	s3	sc2	w2	3	g3	p5	i7	v2	d6
0.27	u2	s3	sc2	w4	10	g1	p4	i7	v2	d6
0.29	end	end	end	end	end	end	end	end	end	end

Route Name:Wilbur Spur-1
Date:02/15/05
Surveyed by:SEW
Pages:1

Address	Usability	Surface	Surface Condition	Width	Embankment Volume	Grade	Pitch	Inboard Ditch	Vegetation Load	Road Drainage
0.00	u2	s3	sc3	w2	4.00	g1	p4	i7	v2	d4
0.02	u2	s3	sc3	w2	4.00	g5	p4	i7	v2	d4
0.08	end	end	end	end	end	end	end	end	end	end

Route Name:Wilbur Spur-3 Date:02/15/05							Surveyed by:SEW Pages:1			
Address	Usability	Surface	Surface Condition	Width	Embankment Volume	Grade	Pitch	Inboard Ditch	Vegetation Load	Road Drainage
0.00	u3	s2	sc3	w2	4.00	g3	p4	i7	v2	xd
0.04	u3	s2	sc3	w4	4.00	g1	p4	i7	v2	xd
0.07	u3	s2	sc3	w2	4.00	g7	p4	i7	v2	xd
0.12	u3	s2	sc3	w2	4.00	g1	p4	i7	v2	xd
0.14	u3	s2	sc3	w4	4.00	g1	p4	i7	v2	xd
0.17	u3	s2	sc3	w2	3.00	g1	p4	i7	v2	xd
0.19	u3	s2	sc3	w2	3.00	g3	p4	i7	v3	xd
0.23	u3	s2	sc3	w2	3.00	g5	p4	i7	v3	xd
0.27	u3	s2	sc3	w2	2.00	g6	p4	i7	v3	xd
0.31	u3	s2	sc3	w4	10.00	g6	p4	i7	v3	xd
0.33	end	end	end	end	end	end	end	end	end	end

Route Name: Wilbur Spur 6 Surveyed by:SEW
Date: 1-22-03 Pages: 1

Address	Usability	Surface	Surface Condition	Width	Embankment Volume	Grade	Pitch	Inboard Ditch	Vegetation Load	Road Drainage
0.00	u2	s2	sc2	w1	0.0	g3	p5	i7	v2	d2
0.03	u2	s2	sc2	w1	0.0	g1	p5	i7	v2	d1
0.05	u2	s2	sc2	w1	0.0	g2	p4	i7	v1	d1
0.09	u2	s2	sc2	w1	0.0	g5	p4	i7	v1	d1
0.10	u2	s2	sc2	w1	0.0	g1	p4	i7	v1	d1
0.13	u2	s2	sc2	w4	0.0	g5	p4	i7	v1	d1
0.18	end	end	end	end	end	end	end	end	end	end

Route Name:Wilbur Spur-6 Inner Loop
Date:02/15/05

Surveyed by:SEW
Pages:1

Address	Usability	Surface	Surface Condition	Width	Embankment Volume	Grade	Pitch	Inboard Ditch	Vegetation Load	Road Drainage
0.00	u2	s3	sc2	w1	0.00	g4	p5	i7	v2	d1
0.03	u2	s3	sc2	w1	0.00	g2	p5	i7	v2	d1
0.05	u2	s3	sc3	w4	1.50	g1	p4	i7	v2	d1
0.09	u2	s3	sc3	w2	0.00	g1	p4	i7	v2	d1
0.11	u2	s3	sc3	w2	0.00	g5	p4	i7	v2	d1
0.12	u2	s3	sc3	w2	0.00	g1	p4	i7	v2	d1
0.13	u2	s3	sc3	w2	0.00	g6	p4	i7	v2	d1
0.16	end	end	end	end	end	end	end	end	end	end

Route Name: Wilbur Spur-7
Date: 1-22-03
Surveyed by:SEW
Pages: 1

Address	Usability	Surface	Surface Condition	Width	Embankment Volume	Grade	Pitch	Inboard Ditch	Vegetation Load	Road Drainage
0.00	u1	s2	sc3	w1	0.0	g4	p4	i7	v2	d2
0.03	u1	s2	sc3	w1	0.0	g4	p4	i5	v2	d2
0.09	u1	s2	sc3	w1	0.5	g4	p4	i7	v2	d1
0.13	u1	s2	sc3	w2	0.0	g4	p4	i2	v2	d1
0.17	u1	s2	sc3	w2	0.5	g4	p4	i1	v2	d1
0.24	u1	s2	sc3	w2	0.5	g4	p4	i7	v2	d1
0.28	u1	s2	sc3	w2	0.0	g3	p4	i7	v2	d1
0.36	u1	s2	sc3	w2	0.0	g4	p4	i1	v2	d1
0.40	u1	s2	sc3	w2	0.0	g3	p4	i7	v2	d1
0.42	u1	s2	sc3	w2	0.0	g3	p6	i7	v2	d1
0.48	u1	s2	sc3	w2	5.0	g4	p4	i7	v2	d2
0.52	u1	s2	sc3	w4	5.0	g1	p4	i7	v2	d1
0.55	u2	s2	sc1	w1	5.0	g8	p4	i7	v1	d1
0.57	u2	s2	sc1	w1	1.0	g7	p4	i7	v1	d1
0.68	u2	s2	sc1	w4	8.0	g5	p4	i7	v2	d1
0.72	end	end	end	end	end	end	end	end	end	end

Continuous Event Key

Characteristic	**Values**	**Value codes**	**Characteristic**	**Values**	**Value codes**
Usability	open	u1	Vegetation Load	low	v1
	abandoned	u2		med	v2
	winterized	u3		high	v3
	recontoured	u4			
			Road Drainage	tread drainage	d1
Surface	asphalt	s1		rills/tire ruts	d2
	gravel	s2		road gully	d3
	soil	s3		water bars	d4
				insloped/ditch	d5
Surface Condition	poor	sc1		outsloped/none	d6
	fair	sc2		tank traps	xd
	good	sc3			
Width (m)	3-5	w1			
	5-8	w2			
	8-12	w3			
	>12	w4			
Embankment	0	f1			
Volume m^3/m	0.25	f2			
	0.5	f3			
	0.75	f4			
	1.0	f5			
	1.25	f6			
	1.5	f7			
	2.0	f8			
	3.0	f9			
	5.0	f10			
	8.0	f11			
	>8.0	f12			
Grade %	0 to 3	g1			
	3 to 7	g2			
	7 to 15	g3			
	>15	g4			
	0 to -3	g5			
	-3 to -7	g6			
	-7 to -15	g7			
	>-15	g8			
Pitch	inboard	p1			
	outboard	p2			
	outboard bermed	p3			
	flat	p4			
	entrenched	p5			
	crowned	p6			
Inboard Ditch	open	i1			
	vegetated	i2			
	armored	i3			
	gullied	i4			
	filled	i5			
	double I/O	i6			
	none	i7			

Route	Address Start	Address End	SiteType	Crossing Volume	Upstream Sediment Plug Volume	Landing Volume
Head Hunter-4	0.12	0.15	Landing			1200
Head Hunter-4	0.12	0.16	Mass Wasting			
Head Hunter-4	0.28	0.32	Mass Wasting			1125
Wilbur Spur-3	0.04	0.07	Landing			500
Wilbur Spur-3	0.14	0.17	Landing			650
Wilbur Spur-3	0.30	0.33	Landing			800
Wilbur Spur-7	0.68	0.70	Mass Wasting			
Wilbur Spur-7	0.70	0.73	Landing			1600
Fish Hook	0.11	0.14	Mass Wasting			
Fish Hook	0.15	0.19	Mass Wasting			
Fish Hook	0.20	0.22	Mass Wasting			
Fish Hook	0.45	0.46	Mass Wasting			
Fish Hook	0.77	0.79	Landing			1350
Fish Hook	0.96	1.00	Landing			550
Fish Hook SR2	NR		Landing			1200
P-Line Spur-1	0.36	0.42	Landing			725
P-Line Spur-1	0.53	0.60	Landing			925
P-Line Spur-1-1	0.17		Stream Humboldt Crossing	4201	50	
P-Line Spur-1-1	0.43	0.45	Mass Wasting			
P-Line Spur-1-1	0.58	0.63	Mass Wasting			
P-Line Spur-1-1	0.58	0.62	Spring/Seep			
P-Line Spur-1-1	0.78	0.79	Mass Wasting			
P-Line Spur-1-1	0.82	0.84	Landing			1500
P-Line Spur-1-1	0.83	0.84	Mass Wasting			