

Summary Report

Watershed Restoration Project 07-02:

Removal of the A120 road – 07-02; Removal of a portion of the A130 East/A100 North roads – 07-02A,

Watershed Restoration project 07-02 was comprised of two different task orders at two different locations within the Lost Man Creek watershed (see Figure 1). Under contract # C8482060010, Task Order 8482070026 was issued to remove the A120 road (unit 07-02), and Task Order 848207A026 was issued to remove portions of the A130 (east) and the A100 (north) roads (unit 07-02A). All work was completed by Z Logging, LLC of Orick, CA. between June 18th and October 15th, 2007. The Redwood National and State Parks geologist for this project was G. Gibbs

Approximately 83,000 cubic yards of road fill were relocated at a total cost of \$565,918, restoring 328 acres as a result of this project. Equipment used on both units consisted of (1) D8K CAT, (1) D6H CAT with grapple, (1) 330 CAT excavator, and (1) D8L high-track CAT (utilized for “big pushes” and when Larry Zuber helped as an extra catskiner).

Table 1 provides a compilation of total project volumes and costs for both the 07-02 and 07-02A units. Excavation volumes and costs for each Task Order are presented independently later in this section of the appendix. For compiled statistics of the Lost Man Creek Watershed Restoration Projects accomplishments during 2006-2007, please see the tables in the preceding 2007 report section (not appendices).

TABLE 1 WATERSHED RESTORATION COSTS SUMMARY FOR PROJECT 07-02: REMOVAL OF THE A120 ROAD AND A PORTION OF THE A130/A100 ROADS					
TREATMENT	QUANTITY	# of JOBS	TOTAL COSTS	% OF GRAND TOTAL	AVERAGE UNIT COSTS
CONTRACT COSTS - HEAVY EQUIPMENT					
STREAM CROSSINGS	19,329 yds ³	14	\$157,077	28%	\$8.13
EXPORT OUTSLOPING	31,858 yds ³	12	\$238,807	42%	\$7.50
OUTSLOPING	31,737 yds ³	25	\$121,122	21%	\$3.82
MISC. BID ITEMS	---	11	\$48,912	9%	---
GRAND TOTAL:	82,924 yds ³	62	\$565,918	100.0%	\$6.82 ^(e)

Past reports (prior to 2007) have included tables showing production rates for each work item (e.g. Appendix 1; Project 06-02; Tables 2-4). Organized by prescription type, these data were generated based on the actual equipment hours required for each site. Due to budgetary / management goals, park representation on the project sites was reduced in 2007. Documentation of equipment hours on specific work items was limited to the time when the COTR was onsite, resulting in incomplete / inconsistent “hours” data. Because the accuracy of production rates data (at the work item resolution) was compromised it is not presented in report tables for this project.

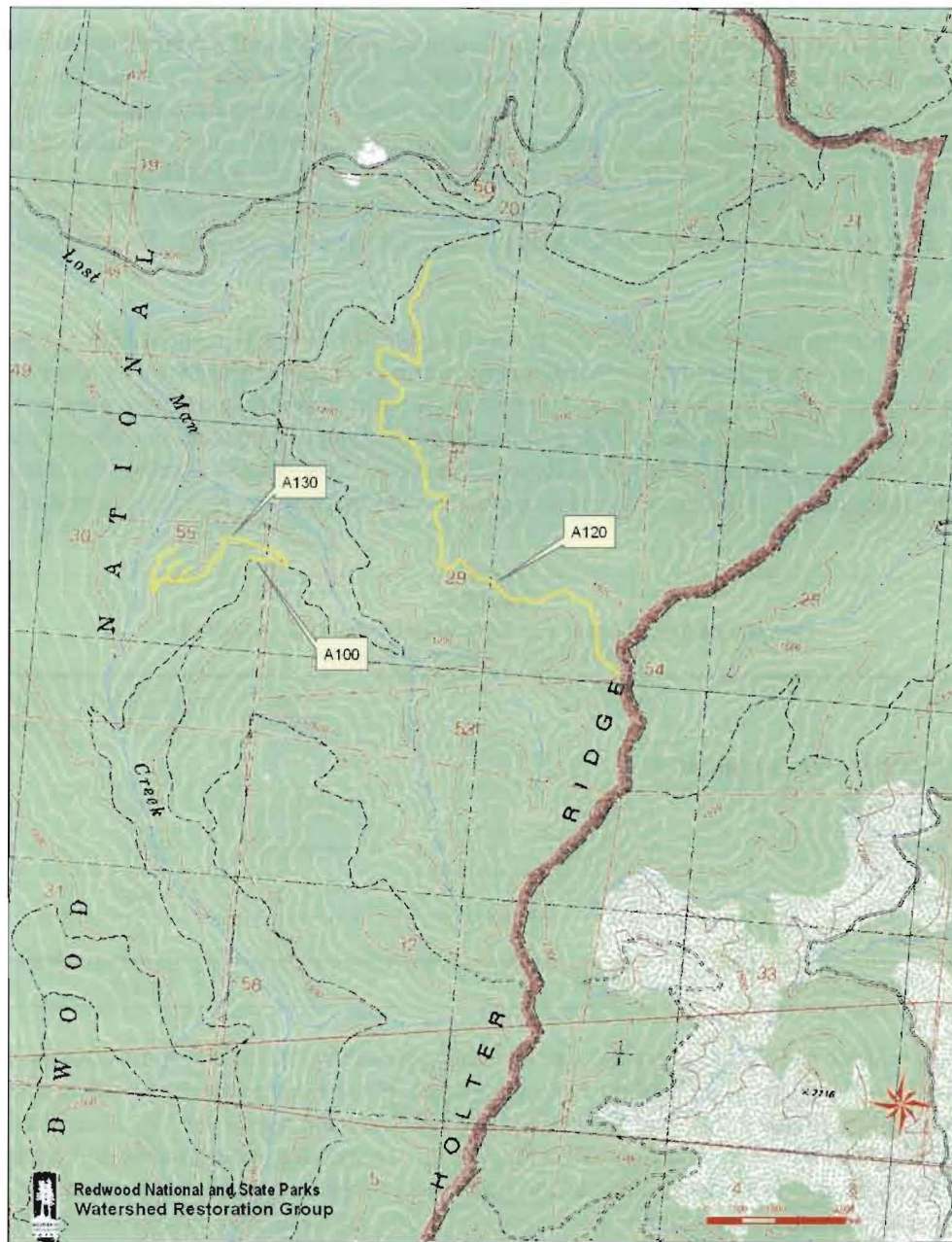


Figure 1. Location map for A120 and A130/A100 roads, Lost Man Creek.

A120 ROAD (UNIT 07-02)

Watershed Restoration Unit 07-02 was designed to remove the entire length of the A120 road, between the A100 north and Holter Ridge roads. The A120 road was located on the eastern slope of the Lost Man Creek watershed, running from the inner gorge of the middle fork to near the headwaters of the little south fork, changing aspect from northwest to southwest respectively (see Figure 1).

Unit 07-02 relocated a total of 53,759 cubic yards of road fill along the A120 road at a total cost of \$365,567, restoring 249 acres. The project addressed erosion problems along the entire 10,800

feet of the A120 road. Heavy equipment was moved in on June 18th and actual excavation work began June 19th under Task Order Number T8485070026. On September 7th, final work items were completed and equipment was moved to the A141 road to be staged for a move in to the A130 road. No move out was paid for the A120 road; equipment walk time was added to move in cost for the A130 road (project 07-02A). The project moved nearly 54,000 cubic yards of material over 12 weeks, which equates to a gross scale production rate of 4,500 cubic yards per week; or an average of roughly 90 cubic yards per hour for the entire project. Project costs are summarized in Table 1.

The geologist for this project was G. Gibbs. It was the project geologist's responsibility to perform all formulation and evaluation of rehabilitation prescriptions, complete the surveying and photo-documentation, generate the plansheets and technical specifications for contracting, oversee the heavy equipment operations as the COTR, and complete the final documentation. The project geologist/Contracting Officer's Technical Representative (COTR) was not onsite for all heavy equipment operations, but did inspect and accept each work item as the project progressed.

TABLE 1 WATERSHED RESTORATION COSTS SUMMARY FOR UNIT 07-02: REMOVAL OF THE A120 ROAD					
TREATMENT	QUANTITY	# of JOBS	TOTAL COSTS	% OF GRAND TOTAL	AVERAGE UNIT COSTS
CONTRACT COSTS - HEAVY EQUIPMENT					
STREAM CROSSINGS	16,789 yds ³	9	\$142,385	39%	\$8.48
EXPORT OUTSLOPING	14,686 yds ³	4	\$117,888	32%	\$8.03
OUTSLOPING	22,284 yds ³	15	\$85,326	23%	\$3.87
MISC. BID ITEMS	---	9	\$19,967	6%	---
GRAND TOTAL:	53,759 yds ³		\$365,566	100.0%	\$6.80 ^(c)

The first wrinkle in the season came the second week when the excavator operator (Kevin) quit. RX-1 was 30% complete when he didn't show for work, but the contractor had a fill-in operator onsite by mid-morning (Paul). Paul worked for one week, during which time he completed RX-1 and established the bottom of the excavation for RX-2. He was very comfortable and competent running the excavator, but not available as the permanent replacement operator because he also happens to be "the best feller-buncher in the county". Consequently, the contractor preferred to have Paul working on his logging contracts. The contractor auditioned one potential excavator operator (who didn't work out) for two days before bringing on Jerry. Jerry was thrown right into the fire by having to start with a stream crossing as his first site. He was very comfortable running the excavator and voicing his limitations. Now we had a solid crew that was sensitive to the environmental concerns of the park, eager to try new ideas, and working with a premium placed on safety.

Prescriptions and Treatments

Restoration focused on the removal of the stream crossings and unstable side cast fill, and restoring natural hillslope topography and drainage patterns interrupted by the A120 road. The excavation of the stream crossings uncovered the natural channel bed and banks, and excavated fill was used to mimic the surrounding natural topography. Recovered organic and nutrient rich side cast was returned to the surface in order to help speed recovery of native vegetation. Vegetation removed

during excavation was stockpiled and dispersed along the finished surface, according to RNSP Post-excavation erosion control guidelines, in order to inhibit surface erosion and provide habitat. In some cases, if the erosion control guidelines would still be met, the larger boles were left stockpiled due to the cumbersome nature of their size and length.

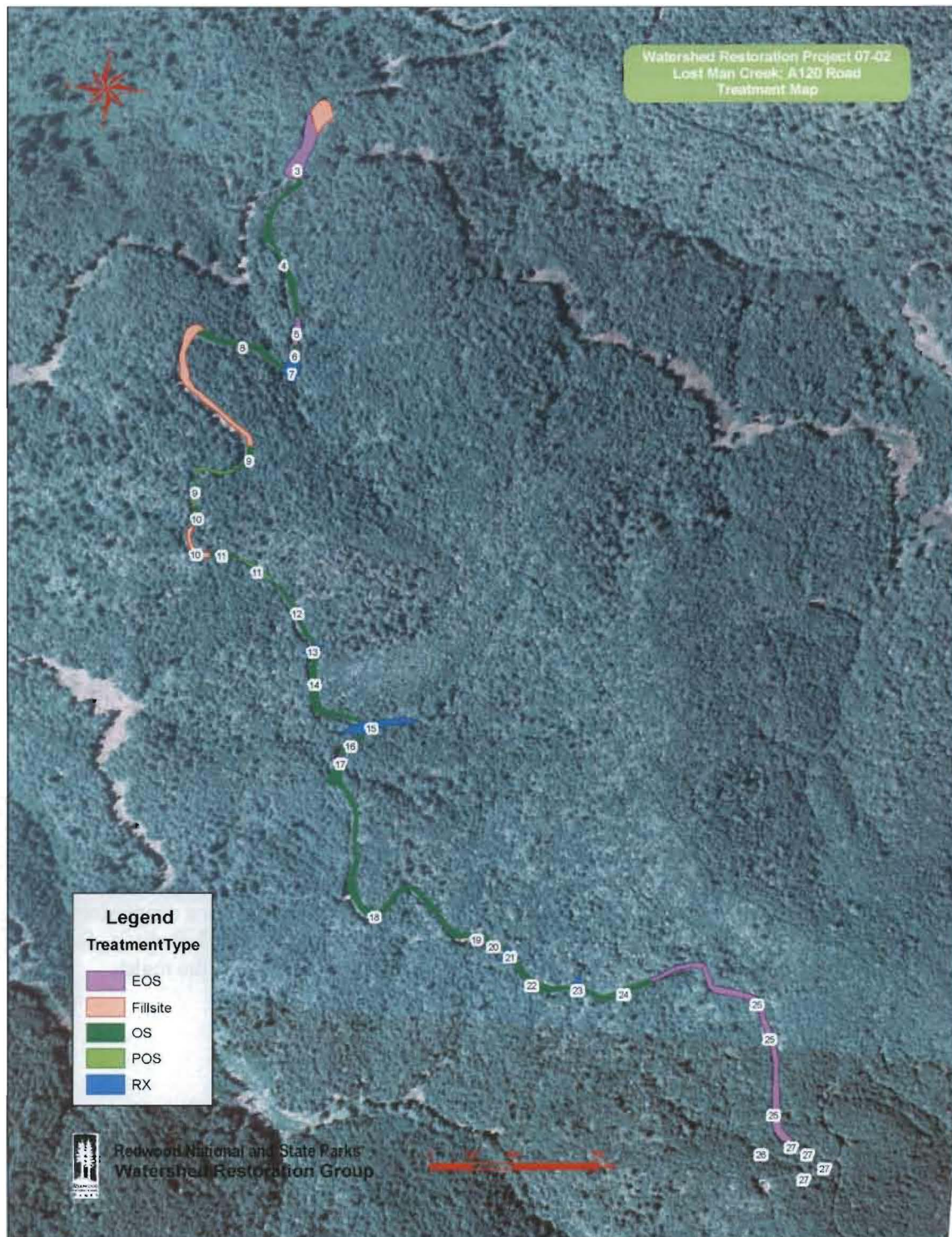


Figure 2. As built plan map for the A120 road: project unit 07-02. White dots are work item numbers.

The project consisted of 27 work items and 7 miscellaneous bid items, which included the excavation of 8 haul road (and 1 skid road)-stream crossings (RX), 2,080 ft of road export out sloping (EOS), 5,590 ft. of road out sloping (OS), and 740 ft. of partial out sloping (POS) (Figure 2). Partial out slope treatment was applied to sites where removal of all unnatural fill was not necessary to achieve hydrologic transparency. Miscellaneous bid items included 2 slopework treatments, as well as cross road drain and rolling dip installations to eliminate potential diversions associated with worksite access roads. Project costs are summarized in Table 1.

Stream Crossings (RX)

RX-1

RX-1 changed excavator operators after about 30% done. A total of 2,774 cubic yards of material was excavated from this crossing. The final configuration was left with a log spanning the channel near the top of the excavation.



RX-1; Looking downstream.

RX-2

RX-2 had 2 different excavator operators. Paul established the bottom of the excavation, then Jerry cut his teeth on the remainder of this excavation. Spring at right bank was given a depression to flow to channel axis. Lots of springs on this crossing – 3 on right bank and one left of top. Small amount of fill placed on left bank, near top, in order to slope the flat spot above the mulch.



RX-2; Looking towards right bank.

RX-3

RX-3 was the largest crossing of the project with 6,025 cubic yards excavated. Skid road along right bank, upstream of A120 was removed up to major break in slope, approximately 250 feet.

The bottom of the excavation was not straight-forward, because a Large-wood/chunk trash pile extended beyond a reasonable reach for the excavator. The D-8K dozer and a choker were used to remove a large root wad and old growth chunks from the axis of the channel at the designed bottom in order to leave the channel flowing freely onto existing (post-logging) gravels below the excavation.

The left bank kept moving left as more and more chunks were uncovered. Humboldt logs were not layed parallel in this fill, but were jack-strawed such that subsurface flow was dispersed and deflected (instead of concentrated) along the logs. This resulted in fill saturation higher in the prism than would normally be expected: excessive moisture differential was paid for this work item.



RX-3; Looking upstream, from left bank.
Upper left portion of photo is skid road along right bank.

One technical problem with this excavation was how to remove the skid road from the right bank of the channel, upstream of the A120, while needing to exit the site via the A120 along the left bank. As the excavation progressed upstream, a temporary crossing was installed from the cutbank of the A120 (on the left bank) to the skid road upstream of the A120 (on the right bank). This temporary crossing provided an exit path that the excavator could remove from a position on the left bank approach of the A120, after the skid road had been removed.

RX-4

RX-4 was excavated from the designed excavation bottom to the Inboard edge of the A120 road, removing a total of 1,075 cubic yards of material. A temporary culvert had been installed in 2000 when the road was improved to gain access to remove the A100 road. This culvert was removed in sections as excavation proceeded from bottom to top. Above the A120 road, excavation would be ineffective.

RX-5

RX-5 had a culvert installed shallow in the fill to drain overflow when water ponded inboard of the road. The subsurface was gooey along the right edge, high in the fill. This crossing also had right bank erosion near the bottom of the excavation, under a chunk that had second growth redwoods growing on it. The scar of this pre-excavation erosion is still visible post treatment.

The treatment excavated a total of 1,549 cubic yards of material from the crossing. The final configuration revealed a substantial knickpoint in the channel near the inboard edge of the haul road. There is a spring day-lighted here at the left edge of the channel that may cause some adjustment during the first winter flows.

RX-6

No channel gravels or clay at bottom of this excavation; where water has been running at least since the road was built. If we explored any deeper, then the channel would not be free flowing. A buried stump in the axis of the crossing has no clear indicator of which side of the stump the natural channel ran. Moreover, the upper extent of the excavation appears to have a headwall swale (bowl-like) morphology. Ultimately, the channel bottom was placed in the most logical (best guess) location and some minor adjustment is expected at this site.

One possible explanation of the history of this site is that it is very near the inception point of this class 3 stream and was bladed to a depth during road construction/timber harvest that obliterated any evidence of its original 'natural' location.

RX-7

RX-7 was a surprise: it was not designed as a stream crossing excavation because it appeared to be a swale in an old landslide scar that was seeping some flow during the wet season. This site was therefore lumped into the long EOS treatment for work item #25. Once the digging began, it became apparent that this "swale" carried significant water, even at the end of August, and would require something closer to a channel excavation than an EOS. Its excavation volume (300 yd³) was therefore split out from the rest of work item #25 and paid as a stream crossing. It was not excavated above the inboard edge of the road, but was broadened and deepened compared to the EOS treatment in order to capture all seep flow from this swale.

RX-8

RX-8 was also an unexpected stream crossing. The road setting was practically on the ridge here and only minor spring flow was anticipated because there is no evidence of a flow course downslope. By the time the out board edge of the fill prism was excavated, it was apparent that the spring had been saturating the fill along a downslope axis. It was decided that creating a low spot for the flow to channelize would best mimic the prior natural processes. Like RX-7, this excavation volume (100 yd³) was also split from work item #25 and paid at a stream crossing excavation unit cost.

Export Outslowing (EOS)

At work item # 3 the crew encountered 500+ feet of knotted bull line at the lower extent of the fill prism. The line was partially buried in places, totally buried in others, wrapped around large cull logs, and generally would have been a nightmare to uncover, manage and deposit in a safe place. This can of worms was deemed too much of a risk to uncork for the potential benefit that would be achieved by excavating this last 5% of the fill. Ultimately, the spring flow at the inboard edge of the A120 was channeled through a break where the cable was not observed.

Work items #5 and #17 were very straight-forward swale excavations.

For work item #25, excavation was lumped into one long Export outslope because there was a net deficit of storage compared to excavation volume and some moisture was expected along the last reach (station 95+00 to 103+00). Before this work item was completed it would be subdivided to include 2 small stream crossing excavations (see RX-7 and RX-8, above).

Outsloping (OS)

Outslope treatments were very uneventful. The cutbank was not matched with fill at every location (full recontour), but all benches were relieved to an angle that would allow free drainage of runoff. Work items #4, 14, 18, 22, 24, and fillsite #2 were left with stockpiled logs not spread evenly over the finished surface of the outslope: the logs were very large and unmanageable, and the mulching guidelines were met without dispersing these boles. It has been suggested that these log piles will provide habitat diversity for fishers and other terrestrial critters.

One outslope of note is work item # 14. Work Item #14 had a large cut bench as it approached and rounded a small ridge. The outer limit of the fill prism (along the west-facing approach to the ridge) was cut by a scarp that was deeper than the fill material. It was decided that the scarp would be pulled back, but going after all the fill here would provide a negligible benefit to the resource. The full bench area was used for fillsite.

Partial Outsloping (POS)

The Partial outslope treatment is applied to low to moderate erosion risk sites that require some treatment by virtue of being within a restoration unit. In other words, if a reach of road is between other treatment sites, then it will be treated to obtain hydrologic transparency. This treatment excavates just enough of the unnatural fill to leave a free draining slope. It does not eliminate the cutbank scar, and does not necessarily return topsoil to the surface.

The A120 had 2 partial outslope treatments: work items #9a and 11a. For cost analysis, partial outslope treatments are lumped with outslope treatments.

Miscellaneous

The miscellaneous portion of the cost accounting for project unit 07-02 includes all payments outside of the excavation treatment categories described above (Table 5). Move in and move out are the cost of moving heavy equipment (including highway transport incidentals) to and from the lowboy drop-off; in this case, the Holter Ridge gate at Bald Hills Road.

Miscellaneous move in/out are the cost required to walk equipment in/out from/to the lowboy drop-off point as well as the cost of bonding (required by the federal government) and administrative expenses incurred during this phase. The A120 road had no move out costs because equipment was walked from the project end location to the staging area of the A130 project: these miscellaneous costs were included on the move in for the A130 project.

Other miscellaneous cost would include any additional work requested from the “Miscellaneous Earthwork Prices” section of the contract bid schedule, such as slopework, or culvert installation. This project had 2 “slopework” treatments and 5 rolling dip installations.

TABLE 5 MISCELLANEOUS BID ITEM COSTS FOR UNIT 07-02: REMOVAL OF THE A120 ROAD				
WORK ITEM #	ITEM TITLE	QUANTITY	UNIT PRICE	TOTAL COSTS
1	MOVE IN	1 JOB	---	\$2,138
1A	MISCELLANEOUS MOVE IN	1 JOB	---	\$13,193

2	MOVE OUT	---	---	\$0
2B	MISCELLANEOUS MOVE OUT	---	---	\$0
	SLOPEWORK	2	---	\$3,575
	ROLLING DIPS	5	---	\$1,061
Total				\$19,967

Threatened and Endangered Species Concerns

TABLE 6 AREAS AFFECTED BY RESTORATION UNIT 07-02: REMOVAL OF THE A120 ROAD						
TOTAL ACRES DISTURBED	RIPARIAN BUFFER ACRES DISTURBED	WILDLIFE HABITAT ACRES DISTURBED				TOTAL ACRES RESTORED ⁵
		START DATE	MAMU DEGRADED ²	MAMU CORVID ³	MAMU NESTING / NOISE .25 MI BUFFER ⁴	
8.9	1.9	6/19/07	0	0.5	0	249

¹ These statistics are actual "as built" acreages.

² Marbled Murrelet habitat degraded.

³ Marbled Murrelet habitat subject to potential increased corvid threat.

⁴ Marbled Murrelet nesting habitat potentially affected by noise (restoration site within 0.25 mile buffer of habitat)

⁵ Acres restored are defined as the hydrologically connected landscape area that is influenced by the road removal.

TABLE 7 STATISTICS FOR RESTORATION UNIT 07-02: REMOVAL OF THE A120 ROAD				
SITE TYPE	# OF SITES ¹	VOLUME EXCAVATED	VOLUME PREVENTED FROM ERODING	VOLUME PREVENTED FROM DELIVERY
STREAM XING	9	16,789 yds ³	9,281 yds ³	8,724 yds ³
ROAD REACH	10,800 ft	36,970 yds ³	26,057 yds ³	8,749 yds ³
	TOTAL	53,759 yds ³	35,338 yds ³	17,472 yds ³

¹ For road reaches, the number of sites is the length of road (ft.).

Other Observations and Enlightenments

Mulching

The mulching guidelines developed during the Larry Damm and North Fork Lost Man Creek restoration work utilized on site vegetation for use as ground cover to reduce surface erosion. During the 2006 work on both the A140 south project (06-02) and the Manning Creek project (06-03), a distinct difference was noted in the character and potential effectiveness of the on site vegetation to meet the intent of the mulching guidelines.

The trees in the South Fork Lost Man area tend to somewhat older, there by larger and taller. Due to the height and size of the trees it was often necessary, due to safety concerns, to undermine roots prior to pushing a tree over. With the tree heights often exceeding 100 feet, the

tops and limbs of trees would typically land within the forest stands outside of the excavation boundary. When the tree was retrieved onto the work site, the limbs would typically be stripped off by the 'out of bounds' vegetation. This affect produced a clean 100 ft+ bole of the tree with no top and little to no limbs, which are the most appropriate size for evenly distributed mulch.

This situation persisted with the A120 project. During the winter of 2006 we met with both of the contractors working in Lost Man Creek to address the issue of extra effort (and time) spent handling this large wood. At that time, the best idea that we came up with to reduce the amount of time spent handling wood while still achieving the intent of the mulching guidelines was to leave some of the larger trees where they fell (outside of the excavation area). This would be done where sufficient smaller vegetation existed to meet the mulching guidelines.

When work started on the A120, it was suggested that the large trees could be removed and stockpiled without too much extra burden by using the grapple D-6 dozer. The bigger time sink (with limited returns) was actually trying to mulch with these large tree trunks. Therefore, the solution (tested) on this project was to leave the trees stockpiled in areas where they were not needed to meet the mulching guidelines and where they would be erosionally benign. Some trees, however, were still so large that they were a struggle for the grapple CAT and some were left out of the excavation area.

A130/A100 ROADS (UNIT 07-02A)

Watershed Restoration Unit 07-02A was designed to remove the A130 road, between the South Fork of Lost Man Creek and the A100 north, as well as the A100 north road between the A130 road and the A100/A140 road junction. These road segments were located on the eastern slope of the South Fork of Lost Man Creek, running primarily on the inner gorge of the south fork and the little south fork, changing aspect from northwest to north respectively (see Figure 1). Vehicle access was open to the A100 / A130 junction, but the A130 road was overgrown with alders (up to 10" diameter), brush, and fallen trees.

Unit 07-02A relocated a total of 29,165 cubic yards of road fill at a total cost of \$200,351, restoring 79 acres. The project addressed erosion problems along 5,050 feet of road that included the A130, its associated skid road complex, and the A100. Heavy equipment was moved in on September 10th and actual excavation work began September 11th under Task Order Number T848507A026. On October 13th, the final work item to be accomplished this season was completed.

On October 15th equipment was moved out and the A140 and A141 access roads were winterized. The project moved approximately 29,000 cubic yards of material over 5 weeks, which equates to a gross scale production rate of 5,800 cubic yards per week; or an average of roughly 117 cubic yards per hour for the entire project. Project costs are summarized in Table 1.

The geologist for this project was G. Gibbs. It was the project geologist's responsibility to perform all formulation and evaluation of rehabilitation prescriptions, complete the surveying and photo-documentation, generate the plansheets and technical specifications for contracting, oversee the heavy equipment operations as the COTR, and complete the final documentation. The project geologist/Contracting Officer's Technical Representative (COTR) was not onsite for all heavy equipment operations, but did inspect and accept each work item as the project progressed.

TABLE 1 WATERSHED RESTORATION COSTS SUMMARY FOR UNIT 07-02A: REMOVAL OF A PORTION OF THE A130/A100 ROADS					
TREATMENT	QUANTITY	# of JOBS	TOTAL COSTS	% OF GRAND TOTAL	AVERAGE UNIT COSTS
CONTRACT COSTS - HEAVY EQUIPMENT					
STREAM CROSSINGS	2,540 yds ³	5	\$14,692	7%	\$5.78
EXPORT OUTSLOPING	17,172 yds ³	8	\$120,919	60%	\$7.04
OUTSLOPING	9,453 yds ³	10	\$34,970	18%	\$3.70
MISC. BID ITEMS	---	3	\$29,770	15%	---
GRAND TOTAL:	29,165 yds ³		\$200,351	100.0%	\$6.87

This restoration unit is located almost entirely within an area restricted to noise prior to September 15th due to the presence of threatened and endangered species (MAMU). The project was able to start one week prior to the 15th of September because the first work item (#3) was outside of the restricted area, and an existing skid road was used to access this work item without traveling through the restricted area.

Prescriptions and Treatments

Restoration focused primarily on the removal of the stream crossings and unstable side cast fill, and restoring natural hillslope topography and drainage patterns interrupted by this portion of the A130/A100 roads. Vegetation removed during excavation was stockpiled and dispersed along the finished surface, according to RNSP Post-excavation erosion control guidelines, in order to inhibit surface erosion and provide habitat.

The project design consisted of 32 work sites but only the first 25 work items were accomplished prior to the onset of winter weather. The project, as built, included the excavation of five skid road-stream crossings, 2,070 ft. of road export outsloping, and 2,455 ft. of road outsloping, which was almost entirely (2,335 ft.) the "partial outslope" variety of outsloping (Fig 3). Additionally, 3 miscellaneous bid items (move-in / move-out) included rolling dip installations to winterize the access roads. Project costs are summarized in Table 1.

The A130 road historically crossed the South Fork of Lost Man Creek (southwest of work item #3), but that crossing washed out many years ago. Furthermore, the first 500 feet of the road, from South Fork Lost Man creek to work item #3 is involved in an active landslide / rotational slump. This landslide guided the decision to leave this reach untreated: the unnatural fill would be a small quantity saved compared to the large volume of natural hillslope that is mobilized, the excavatable dirt would be very expensive to move owing to the cost to rebuild access and the shortage of proximal storage sites. Moreover, it was generally agreed that lacking a treatment that addressed the cause of the landslide (and not just the symptom); there would be a high probability of doing more harm than good by accessing the reach of road.

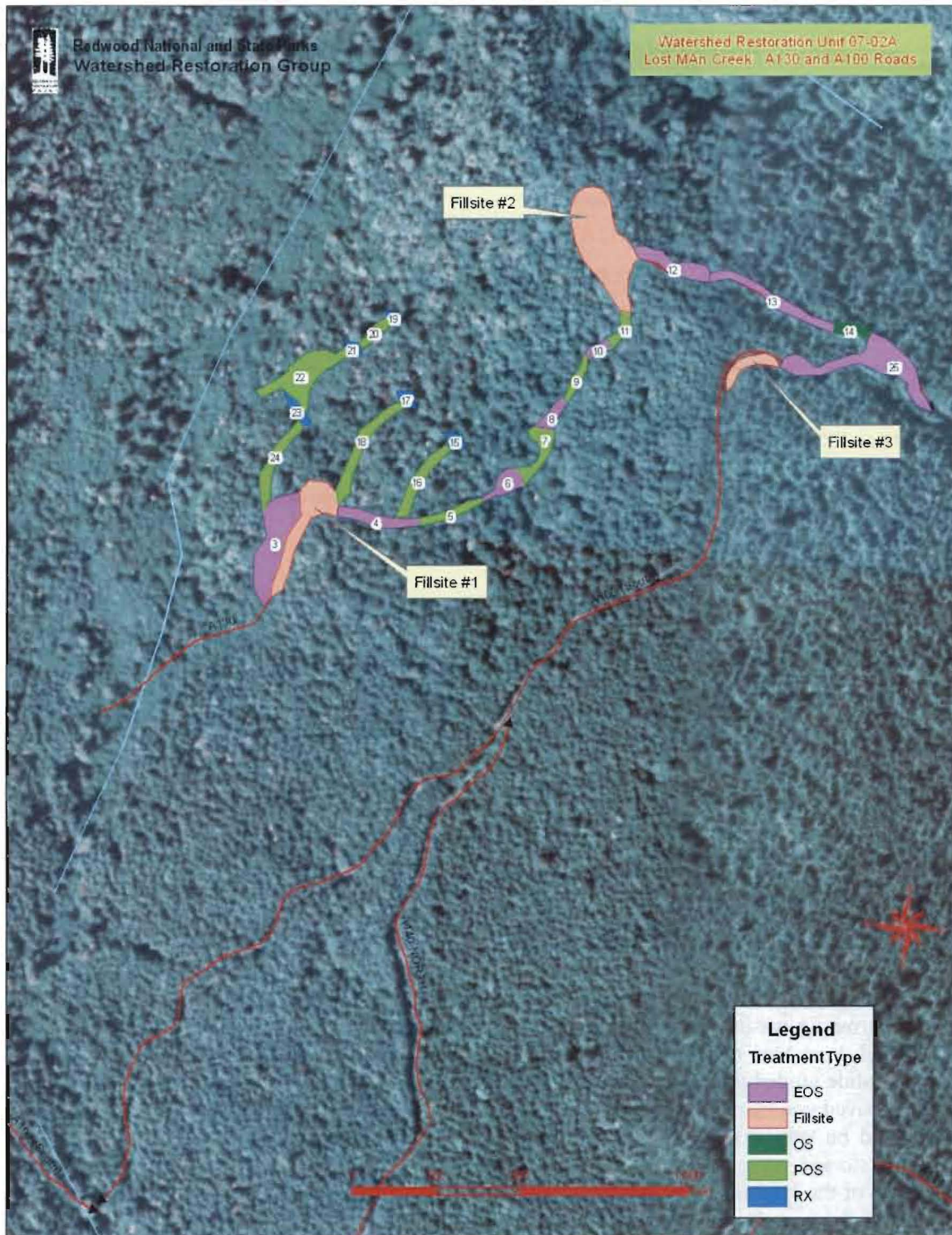


Figure 3. As Built map for the 07-02 project unit 07-02A: A130 and A100 roads

Stream Crossings (RX)

The stream crossing excavations on this unit were sites #15, 17, 19, 21, and 23. They are all located downslope from the A130 road proper, within a geomorphic concavity (hollow) between the ridges underlying fillsite #1 and fillsite #2. This hollow is an ancient earthflow, and the

stream channels are not well defined on this slope. The diversions however are obvious. The object of the skid road excavations was, therefore, to make the road hydrologically transparent to concentrated runoff. This required excavating above the inboard edge of the road (in most cases) to capture the incoming flow. By eliminating the diversions attributable to the roads, at the very least, the rate of erosion on this mobile slope will be reduced.

Work Item #23 was the largest of the 5 crossings treated on this unit (900 cubic yards), and also the biggest culprit of diversion generated erosion. Prior to treatment, concentrated overland flow was diverted at work item #23 onto an adjacent landing (work item #22) that was saturated and failing. The 2004 road assessment estimated that the potential future erosion volume at this site (assessment site #0513041) could be greater than 5000 cubic yards, with 100 % delivery to Lost Man Creek.

Export Outslowing (EOS)

Export Outslowing was the lion's share of the treatments for this restoration unit. Work items #3 and #25 were the largest excavation sites on the 07-02A unit at 3,956 yds³ and 3,513 yds³, respectively.

Work Item #3

This site allowed us to start unit 07-02A before September 15th because it is outside of the noise restricted bird zone, and accessible via a skid road that is outside of restricted area. The excavation started on the right edge of an active landslide that runs from above the A130, downslope, to South Fork Lost Man Creek. Well established flow running here was left untouched. Portion of landing that was treated had scarps 6 to 25 feet in height running the length of the outboard edge of fill.

Work Item #12

This site was bounded by a vertical landslide scarp through the outboard edge of the fill prism. The excavator had to bench down in three steps in order to get as much unnatural material as possible, relieving the potential energy of this head scarp. As the excavation progressed, the site got too steep and narrow to traverse, which prevented the crew from spoiling as much fill as designed at fillsite #2. This required an additional push differential be paid for work item #12.

Outslowing (OS)

The only traditional outslope treatment of this unit was work item #14. This site was only 120 ft of road length and only excavated 229 cubic yards of fill material. Cost for outslowing in Table 1 includes partial outslowing (POS) treatments.

Partial Outslowing (POS)

The Partial outslope treatment is applied to low to moderate erosion risk sites that require some treatment by virtue of being within a restoration unit. In other words, if a reach of road is between other treatment sites, then it will be treated to obtain hydrologic transparency. This treatment excavates just enough of the unnatural fill to leave a free draining slope. It does not eliminate the cutbank scar, and does not necessarily return topsoil to the surface.

The 07-02A unit had 9 partial outslope treatments. The high percentage of POS sites on this unit owes to the fact that there was a high percentage of road length that was more of a diversion threat than a catastrophic failure threat. In fact the diversions were promoting the failure of large perched fills: i.e. work items #3 and #22.

For cost analysis, partial outslope treatments are lumped with outslope treatments.

Miscellaneous

The miscellaneous portion of the cost accounting for project unit 07-02A includes all payments outside of the excavation treatment categories described above (Table 5). Move in and move out are the cost of moving heavy equipment (including highway transport incidentals) to and from the lowboy drop-off. Unit 07-02A did not have move in transport costs because the equipment was walked from unit 07-02 and did not require a lowboy. Move out was paid from the Holter Ridge gate at Bald Hills Road to the contractor's equipment storage facility at Big Lagoon.

Miscellaneous move in/out are the costs required to walk equipment in/out from/to the lowboy drop-off point as well as the cost of bonding (required by the federal government) and administrative expenses incurred during this phase. The A130/A100 road had additional miscellaneous move in costs to account for the time the equipment was walked from the A120 project end location to the staging area of the A130 project.

TABLE 5				
MISCELLANEOUS BID ITEM COSTS FOR UNIT 07-02A: REMOVAL OF A PORTION OF THE A130/A100 ROADS				
WORK ITEM #	ITEM TITLE	QUANTITY	UNIT PRICE	TOTAL COSTS
I	MOVE IN	1 JOB	---	\$0
1A	MISCELLANEOUS MOVE IN	1 JOB	---	\$20,296
2	MOVE OUT	1 JOB	---	\$2,200
2A	MISCELLANEOUS MOVE OUT	1 JOB	---	\$7,274
			Total	\$29,770

Threatened and Endangered Species Concerns

TABLE 6 AREAS AFFECTED BY RESTORATION UNIT 07-02A: REMOVAL OF A PORTION OF THE A130/A100 ROADS						
TOTAL ACRES DISTURBED	RIPARIAN BUFFER ACRES DISTURBED	WILDLIFE HABITAT ACRES DISTURBED				TOTAL ACRES RESTORED ⁵
		START DATE	MAMU DEGRADED ²	MAMU CORVID ³	MAMU NESTING / NOISE .25 MI BUFFER ⁴	
5.6	0.40	9/10/07	0.1	0.5	0	79

¹ These statistics are actual "as built" acreages.

² Marbled Murrelet habitat degraded.

³ Marbled Murrelet habitat subject to potential increased corvid threat.

⁴ Marbled Murrelet nesting habitat potentially affected by noise (restoration site within 0.25 mile buffer of habitat)

⁵ Acres restored are defined as the hydrologically connected landscape area that is influenced by the road removal.

TABLE 7 STATISTICS FOR RESTORATION UNIT 07-02A: REMOVAL OF A PORTION OF THE A130/A100 ROADS				
SITE TYPE	# OF SITES ¹	VOLUME EXCAVATED	VOLUME PREVENTED FROM ERODING	VOLUME PREVENTED FROM DELIVERY
STREAM XING	5	2,540 yds ³	26,650 yds ³	26,650 yds ³
ROAD REACH	5,315 ft.	26,325 yds ³	17,580 yds ³	15,631 yds ³
	TOTAL	29,165 yds ³	44,230 yds ³	42,281 yds ³

¹ For road reaches, the number of sites is the length of road (ft.).