

81-4

Introduction

A. Site Description

Location - right valley side of Bridge Creek

Physiography

relief - work was done at 800 to 2300 ft. (1500 ft. relief)
elevations on the right valley side are 320 to 2400 ft. (208

slopes - on coyote pk NW/4 topo sheet slopes are 33 to 50 percent on about 80% of the unit.

- from geomorphic mapping slopes range from 25% to 65% except immediately adjacent to stream channels where 100% slopes are common on banks.

area - area mapped in 1981 (M752) 610 acres (248ha)

area tributary to sites treated in 81 (i.e. area upslope from M751 and M752 roads)

area upslope plus area downslope to Bridge CK.

road network - three rocky haul roads were treated:

Road	Mileage	Treatment
M752	1.9	CNP's, Rip, Crossings, Drain
M751	1.3	"
M752	2.3	Cross road drain between Culverts only

rehab. summary

M752 - 8 RX's, 3 landings, 2 road failure scar,

M751 - 6 RX's, 1 landing

M752 unit 11 SX's

M751 unit 1 SX

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B. Land Use History

1. Road Construction

M-7-5-2 - Oldest cut date of 1966 identifies this road reach as 1966 or older. However, the 00-6 portion of the M-7-5-2 was built in 1972 so access to these units must have been punched in from the M-3.

M-7-5-1 - Not on March '72 photo

Is on July '73 photo (at least the portion from M-7-5 road to the edge of photo, ~ 1/4 mile)

road evolution - both roads had problem areas in the form of slipouts and crossing washouts. The stream crossing at what is now RX-7 on the M-7-5-1 had partially washed out in the past. There were active outboard edge failures at RF-21, RF-30, the landing immediately south of RX-19, and L-25. There is a slow failure in the M-3-1 road fill about a mile southwest of the M-7-5-2 unit.

2. Timber Harvest

The slopes in the vicinity of the M-7-5-1 road were tractor logged both up and downslope (except beyond this year's unit where Greg did the 1979 unit). All logged areas upslope from the M-7-5-2 unit were tractor logged and all logged areas downslope were cable yarded.

See logging history map.

from Viers map
or air photos

Erosion Features

Types of Features

M752 unit - small gullies between the ridge and M752, mostly G1 to G5, biggest was G.8x2.

One large (30x15x100 or more) gully formed below the M752 due to a misplaced culvert. It was mostly de-watered by construction of RX-27. It was very active and was eating old growth trees but was not fully documented due to treacherous footing and lack of caulk boots. (wimps)

Do gullies take Ex-Lax or Prep. H after eating trees??

M751 unit - except for the crossing at RX-7, the treatments on this road were for potential erosion of presently stable road fill. The stream at RX-7 had overtopped the road in recent years and regular maintenance of the trash rack and downspout were required.

cont. Road failures at sites 30 and especially 21 were very recent (past couple years) and were active sediment sources with future potential

Sediment Sources

RX's - All road crossings were surveyed by tape and clinometer before and after excavation. This allows calculation of erosion potential. For this calculation I assumed that the flow would have eroded the fill down to the straight long profile and channel bottom width that was excavated and that sideslopes would have stabilized at 100% in cross section (therefore steeper along the fall line). The total potential erosion for the 21 RX's and SX's surveyed was 4574 cu. yds., or 43% of the 10,761 cu. yds. excavated from these crossings.

Furthermore, the gully de-watered by RX-27 could have had the potential for 800-1000 cu. yds. of additional erosion,

↓
how is this known? if not mapped?

Sediment Services, cont.

assuming bank sloughing back to 100% sideslopes and headward migration of 100 feet.

The potential future erosion of road failures is very uncertain given the large magnitude but spatially scattered road failures that occurred in the park in Dec. 1981!

Erosion Control Rehabilitation Work

Introduction

Procedures

mapping M-7-51 unit mapped by Teti and Horns, 1981

M-7-5-2 unit mapped by Horns and Kueton,
checked by Teti?

? 147 person hours + 74 person hours travel
77 person hours doing recon + 33 ph's to

~~person~~

prescriptions and checking maps

? 147 person hours + 74 ph's travel

→ This included recon of Ridger's Peak area and
M-6-1, M-6-2 roads. Recon was by small scale
mapping of unit on photos, then walking roads
and flowcourses and adding detail.

heavy equipment - Excavation done by 300H excavator
supported by a 977 (until it was terminated) then a 95
and a D5. A DB ditched out about 20 to 80%
all crossing volume first. This was very cost effective
and fast. The biggest equipment problem was the old
(1960's) 977 loader which repeatedly broke down causing
delays (total of about a week) and extra standby cost.
Total heavy equipment costs were \$81,034.46,
The RNP backhoe was used to remove CMP's.

heavy equipment, cont.

(from sow's, not incl. prompt payment discount, also includes low bay).

labor intensive - Two laborers commuted from Orick to the site daily. They did the following tasks: Brush sites before surveying and excavation, set up camp, help with surveying, setting chokers, chain sawing, spreading mulch, etc.

winter maintenance - Matt + Pat spent 79 ph's (20 hr travel + 59 site) checking sites after storms (1980 included) and doing post storm maintenance. Most of the maintenance was done at 81-4-RX-7.

2. Objectives - Main objectives were to eliminate active gullying associated with misplaced CMP's on haul roads and to remove earth fill (erosion potential) from haul road crossings. Micro-drainage networks were to be restored - primarily by constructing XRD's on the two pulled road reaches and on the M-3-1-2 road upslope from the M-7-5-2.

XRDs do not restore microdrainages; OS would do this.

Repairing the micro-drainage network (putting water back where it belongs) and removing fill from crossings were important because these aspects of disturbance (water diversions and fill in channels) were the features responsible for active and potential erosion from the site.

Summary Costs

Heavy Equipment (from sow's) \$76,190.52²

Low Bed (from Purchasing) 1,880.69

Laborers 11,414.00¹

Geologists GS-9: 162 days / GS-5 (Matt + Kevin): 200 days⁵

	<u>Primary</u>	<u>Secondary</u>	<u>Sub-Total</u>
Heavy Equipment	\$52,003 ²	12,921	64,924 ³
Labor	979	3,008	3,987 ⁴
Sub-Total	\$52,982	\$15,929	\$68,911

1. 30% of this was labor done by geologists

2. Not counting RNP backhoe, est. \$4200.00

3. Does not include low bay or other non-rehab. costs. Sites and roads.

4. Does not include winter maintenance

5. As of 18 Feb '82

6. Does not include 30 days spent on other projects (Trapezoidal Solid, Symposium P. Rain Gauges). Includes leave and holidays.

Heavy Eq. Phase

Heavy Eq. Application

General sequence:

Do all winching with old D-6

Develop rock pits (2)

Deliver Rock

Excavate, starting on M752 while rock is still being delivered to M-7-5-1

Excavate M-7-5-1

Equipment Application:

D6 (cheap, old winch cat) — worked alone, winching/worked fine because it couldn't cause any other eq. to go on standby if it broke down

also grossly
underpowered!

977 w/4 in 1 and winch (old, bad shape) plan was to use it to load rock into dump trucks and support excavator. Broke down repeatedly, and caused loss of at least \$1000 in standby of other equipment alone and loss of about a week in the time schedule. Was terminated

D5 and 955 w/4 in 1 — Brought in to replace 977 and support excavator. Both were equipped with power shift. D5 had winch — considered essential for safety support for excavator and to pull slash while excavating. Worked extremely well together although one or the other was sometimes idle or on standby due to insufficient room for both pieces to work with excavator. This was considered a reasonable trade-off since there was good insurance for at least one of the two always being "up" in order to keep the expensive excavator (\$96 per hr) busy.

W24 — This wheeled loader was brought in to replace the 977 in the rock pits. It had the advantage of working very fast (being wheeled) and capable of self-transportation between sites. Our 2 rock pits were separated by about 8 miles.

I consider it worthwhile to have a wheeled loader.

Equipment Application, cont.

just for rock pit work because of its speed. By far the best arrangement would have been a wheeled loader with a bucket and log forks. Although I requested this, Theresa was not able to get it on short notice when the 977 was terminated. This would allow the loader and dump truck combination to do all salvage and rock delivery. We wasted a lot of time trying to load logs on trucks with the 4 in 1 loader.

Cat #12 grader - used to keep roads graded between rock pits and road crossing sites for the dump trucks. Also used to round off the edges of the DB XRD's on the M-3-1-2 road. Worked very well for that!

DB - Developed 2 rock pits, i.e. ripped and pushed rock down to where loader picked it up. Vastly superior to D6 for this, worth the extra low boy time.

Dished out all RX's down to about 70-80 percent of the total volume excavated.

Pushed dirt an average distance of 200 feet up a 0 to 35% grade for \$.50 to \$1.00 per cubic yard. Had a 4-blade, extremely handy for pushing distances.

300H - $1\frac{1}{2}$ yard bucket - Big excavator, almost as heavy as a DB. Its mass prevented it from being able to dig itself as far down into a crossing as we would have liked. Therefore some crossings were left with a slight convex up long profile (like RX2) which was eroded in the Nov. and Dec. storms.

Equipment Application, cont.

Dump Trucks - Total of 4 used, but no more than 3 at a time. Wheeled loader could have kept 4-5 trucks busy when hauling 2 miles.

General Comments:

Long profile of all crossings by tape and clinometer allowed us to determine the depth of each crossing and the final gradient in advance. This was very simple and proved extremely helpful to the operators. We could show them (in our field books) the exact shape of the desired long profile, and by projecting sideslopes up from the ultimate channel bottom, we could point to where the edge of the crossing should be at the road surface.

This allowed the DB operator to consistently blade down to within a few feet of the bottom (under the outboard edge of the road) and gave the excavator, loader, and DS a relatively low gradient ($\sim 30-35\%$) slope to work on.

This meant that we excavated more dirt than what would have been done by, say just a crane or an excavator but the DB (one with power shift) was so efficient that it more than compensated for the big dished out crossings.

Having calculated our crossing volumes with the new formula, we were able to calculate the volumes of each crossing with the same bottom dimensions, but with (arbitrarily) 45% side slopes in cross section. This is intended to represent the volumes that would have been excavated by a crane or excavator. This yields the following result: instead of excavating 10,761 cubic yards, we could have excavated only 7,783 cu. yds. from the same crossings, or 72% of what was actually excavated. Our total excavation cost per cubic yard (RX's only) was ~~\$3.13~~ per cubic yard.

could have
bid sides
back more.
then if downcutting
occurs at least it
shouldn't destabilize
side slopes

This yields the following result:

\$32,597 was spent excavating 10,401 cu. yds. from
• 14 RX's.

A crane or an excavator could have gotten away with excavating only 7500 cu. yds. from the same crossings. The unit costs of excavating such crossings on Terry's, Greg's, and Ed's 1980 sites averaged ~\$2.80 per cu. yd. I suggest adjusting this number upward at least to the extent of error in the double end area method (i.e. $\times$ by 1.19). This gives \$3.33/cu. yd. or \$34,656 for excavating the same crossings that cost \$32,597 on site 81-4. Considering the large uncertainty in the \$2.80 figure, it can at least be said that there is no evidence to indicate that dishing an RX out by DB to a large volume is not cost-effective. In fact, the reverse appears likely, i.e. that the DB is so efficient that it can move more dirt cheaper than a crane or excavator can move less dirt.

Seems that Pat's were underexcavated -- steep, collapsing side slopes -- can't imagine (can, but don't want to!) what would happen w/ steeper side slopes!

14 - Road Crossings (plus 3 SX's at RX 5, RX 15, and RX 18)

	Primary	Cu. Yds.	Secondary	Sub-Total
Equipment	32,597	(10,401)	11,110	*43,707
Labor	947		2,880	3,827
Sub-Total	*33,544		*13,990	*47,534

TOTAL

9 - Skid Trail Crossings (not counting SX's at RX-5, 15, and 18)

	Primary	Cu. Yds.	Secondary	Sub-Total
Equipment	4,821	(525)	572	*5393
Labor	0		128	128
Sub-Total	*4,821		700	*5521

TOTAL

23 Crossings (RX's + SX's)

	Primary	Cu. Yds.	Secondary	Sub-Total
Equipment	37,418	(10,926)	11,682	*49,100
Labor	947		3,008	3,955
Sub-Total	*38,365		*14,690	*53,055

4 Landings

	Primary	Cu. Yds.	Secondary	Sub-Totals
Equipment	43071	(2600)	0	4307
Labor	32		0	32
Sub-Totals	\$4339		0	\$4339
TOTAL				

2 Road Failures (Outsloping)

	Primary		Secondary	Sub-Totals
Equipment	428		0	\$428
Labor	0		0	0
Sub-Totals	\$428		0	\$428
TOTAL				

16 Feb '82

Teti

Site E1-4 Equipment Costs (Accounting)

Equipment Rental Costs from SOW's
does not include prompt payment
discounts, if any.

76,190.52

Equipment Rental Costs Accounted for

RX's and SX's (includes rock quarry + delivery) 49,100

Landings and Road Failure headscarps 4,735

Rehab. costs on roads (less an estimated

*4200 for RNP backhoe and cost of
hauling CMP's to G-line deck by RNP
truck)

9,850

Misc. costs on roads (repair, maintenance)

1,424 ✓

Salvage logs*

1,683 ✓

Travel (non-site related)

2,366 ✓

Standby (non-site related)

2,200 ✓

Waiting and Talking

2,176 ✓

Left over at end of summer (non-amendable P.O.)

672

Re-excavation and rocking of 1980 sites

1,178

Rock delivery to unexcavated M-7-5-1 RX's

1,239

75,384

Amount to be Accounted for

76,190.52

Accounted for

76,623

Excess Accounted for

432.48

~~76,190.~~

76,623

Low Bed Costs

4,843.94 ✓

* Does not include self-loading log truck, delivery of logs to Redwoods United
in Manila.

Equipment Cost Summary Site B1-4 from SOW's

	<u>COST PER HOUR</u>	<u>Regular Hours</u>	<u>Standby With Op.</u>	<u>Standby Without</u>	<u>Down Time</u>	<u>Total Cost</u>
1 DBH Model 46A Power Shift	(75.00)	237	1½		10	* 17,841
2 Cat #12 Grader	(39.00)	33½	1	8	5	1,419
3 D6	(39.00)	73½	2½			2,927.75
4 W24 Case wheeled loader	(40.00)	40½	9½			1,810
9 10 yd. dump (Total, 4 trucks)	Various Rates	174	37	47½		7,372.83
5 977 w/4 in 1	(42.00)	7.1	11		45	3,268
6 300 H Excavator	(96.00)	234	12	3½	10½	23,259.44
7 955 L Power Shift w/4 in 1	(65.00)	137½	21½	21½		10,335
8 D5 Power Shift	(45.00)	160½	24½			7,957.50
10 BACKHOE						
Sub-Total						* 76,190.52 ⁽¹⁾

Low Bed Costs: Move In Move from M-7-S-2
To M-7-S-1 Move Out

DB Tractor	* 513.75	Self-Trans.	* 341.25
955 Loader	292.50	} 461.25	562.50
300H Exc.	360.00		262.50
D5 Tractor	292.50		489.44
977 Loader	257.25		Moved out at own expense due to termination
D6 Tractor	225.00	330.00	225.00
W24 Loader	231.00	Self-Trans	Moved to other job in Park
	* 2172 ✓	* 791.25 ✓	* 1880.69 ✓
			= * 4843.94 ✓
TOTAL			* 81,034.46

NOTE

1. Does not include prompt payment discounts

81-4 Labor Intensive Costs

	Person Hours	Cost ¹	
Site-Related Labor	481	\$3872	✓
Set up and take down 2 camps, build camp furniture, haul water, etc.	154	1240	✓
CMP removal (24 total)	35	282	✓
Log Salvage	86	692	✓
Miscellaneous ²	228	1835	✓
Commuting Orick-Site-Orick (2 hrs/day)	289	2326	✓ — EVAL.
Admin. Time in Orick (1 hr/day)	145	1167	✓ — EVAL.
	1418	\$11,414	

→ 15.4 days of setting up camps ?? What kind of furniture was built? Where is it now?

Shower, Sun-shelter, tables, camp desk, water-container-filling station, all left at M-T-S-L camp.

1. At an average cost of \$8.05 per hour (weighted average for laborers + geologists)
2. Assisting with surveying and photo points, maintaining tools in the field, observing heavy equipment operators for safety and communication, and moving vehicles.

Rock Quarrying and Delivery SITE 80-6

worksite _____
or _____
TASK _____

WORK SITE	EQUIP- MENT	HOURS	COST			SECONDARY TREATMENTS		TOTAL SITE COST	REMARKS
						H.E.	LABOR		
						HOURS	COST		
M-6-2 PIT FOR M-7-5-1 ROAD	D8	2	\$150	Travel	Q				Q = Quarrying D = Delivery 7 To 8 cu. yds per load were assumed.
		1/2	38	Wait	Q				
		4 1/2	337	Production	Q				
AND	977	2	84	Travel	Q				
M-3-1 PIT FOR		3 1/2	91	Standby	Q				
		15	630	Production	Q				
M-7-5-2 ROAD	D6	1 1/2	59	Travel	Q				
		1 1/2	60	Production	Q				
	W24	9 1/2	190	Standby	Q				
		6	240	Travel	Q				
		1	40	Wait	Q				
		33 1/2	1340	Production	Q				
	Trucks	83 1/2	1369	Standby	D				
		12	408	Travel	D				
		5	175	Waiting	D				
		137	4699	Production	D				
Sub-Totals			941	Travel					
			1650	Standby					
			253	Waiting					
			7066	Production					
Total			\$9910						

TOTAL VOLUME QUARRIED + DELIVERED = 560 yds
(70 cu. yds. remain unused on M-7-5-1 Rd)

Unit Cost of Quarrying + Delivery to Sites =
\$9910 / 560 cu. yds = \$17.70 / cu. yd.

Dump Truck Standby
 D.C. 12 hr. SB @ 17.50
 J.C. 3 1/2 SB @ 17.50
 F.V. 11 1/2 SB @ 21.49
 F.V. 19 SB @ 10.50
 J.H. 9 1/2 SB @ 17.00

Dump Truck Travel
 D.C. 5 1/2 hr. @ 35.00
 J.C. 2 1/2 hr. @ 35.00
 F.V. 4 hr. @ 31.99
 J.H. 0 hr.

Dump Truck Waiting
 D.C. 4 hr. @ 35.00
 J.C. 1 @ 35.00
 F.V. 0
 J.H. 0

Dump Truck Production
 D.C. 36 @ 35.00
 J.C. 50 @ 35.00
 F.V. 22 1/2 @ 21.99
 J.H. 28 1/2 @ 34.00

Treatments of Haul Road Reaches SITE 81-4

worksite _____
or _____
TASK _____

WORK SITE	EQUIPMENT	HOURS	COST (Nearest Dollar)	SITE COST	QUANTITY	COST/QUANTITY	SECONDARY TREATMENTS H.E. LABOR	LABOR ⁵	REMARKS
<u>RIP</u> M-7-5-2	DB	21	\$1575	\$1575	1.9 mi.	\$829/mi.	✓		Total Ripped = 3.1 Miles
M-7-5-1	DB	3½	263	263	1.3 mi.	\$202/mi.			Total Cost = \$1838
				TOTAL \$1838	3.1 mi.	\$593/mi.			Avg. Unit Cost = \$593/mi.
<u>Construct¹ NB's + XRD's</u>									Total Length of Haul Roads Drained with NB's and XRD's = 5.2 mi.
M-7-5-2	D-8	16 ✓	\$1200						Includes 2.0 mi. of the M-3-1-2 that was not ripped or otherwise treated.
	955	4½ ✓	293						Total Cost = \$7244
	300 H	26½ ✓	2544						Total # of Drains = 154
	D5	8½ ✓	383	\$4420	75 ea (1.9 mi.)	\$59/ea			Avg. Unit Costs:
M-3-1-2	D-8	8½ ✓	637						\$47 each
	Grader ²	5½	215	\$852	37 ea (2.0 mi.)	\$23/ea			\$1393 per mile
M-7-5-1	D-8	7 ✓	525						
	300 H	7 ✓	672						
	955	5 ✓	325						
	D5	10 ✓	450	\$1972	42 ea (1.3 mi.)	\$47/ea			
				TOTAL \$7244	154 ea (5.2 mi.)	\$47/ea			
						\$1393/mi.			
<u>Remove³ CMP's</u>									
M-7-5-2 and M-7-5-1	Res. Mgt. Backhoe	120	\$4200 ⁴						M-7-5-2 TOTAL = 15 CMP's
	DB	5	375						M-7-5-1 TOTAL = 10 CMP's
	977	3½	147						Only the CMP at RX-2 was not removed by backhoe.
	300 H	½	48						Therefore 24 CMP's were removed by backhoe.
	D5	½	23						Price includes stockpiling of CMP's at end of site but not transport to G-Line deck.
	Trucks	2	70	\$4863	24	\$203/ea			
¹ 95% are XRD's ² Graded to keep M-3-1-2 more passable to trucks and to open up the outlets. ³ Not included under channel excavation. ⁴ Using \$35/Hour (operated) as a rate. ⁵ Includes all overhead time									

5 pd's not included in cost.

Haul Roads cont.

SITE 81-4

Worksite _____
or _____
TASK _____

WORK SITE	EQUIP- MENT	HOURS	COST	SECONDARY TREATMENTS			TOTAL SITE COST	REMARKS
				H.E.	HOURS	LABOR		
211 Roads Dnt.								
1-7-5-2	977	2 1/2	\$105	✓				Minor Outsloping
-7-5-2,	D6	5	195✓					
1-3-1, 1-LINE, AND -7-5-1	Grader	23	897	✓				RF-21 Repair and Maintenance
REPAIR AND MAINTENANCE								
100 Rd. Bri	D6	8 1/2	332	✓				Installation Only

Skid Trail Cross vgs

worksite _____
or
TASK _____

Access Trail Const. and Waterboring
Winching Slash, and Excavation

WORK SITE	EQUIP- MENT	HOURS	COST Nearest \$	Cu. yds.	# PER Cu. yd.	SECONDARY TREATMENTS		TOTAL SITE COST	REMARKS	
						H.E.	LABOR			
						HOURS	COST			
SX-23	D6	6½	293	✓		0	0			
	300H	1½	144			0	0			
	D5	3½	157			0	0			
			\$594	124 ³	4.79					
SX-26A	D6	½	23	{ 15 ² 20 ² 10 ² 42 ³ 97 ³ 100 ² 40 ² }		0	0		26 A through F are along the same channel. Same one as RX-27. <u>Costs are lumped</u> 26G is on different channel about 200 ft. north of 26E <u>Only 26F was rocked</u>	
" B	D8	14	1050			0	0			
" C	300H	21½	2064			0	0			
" D	955	6	390			1	65			
" E	D5	1	45			0	0			
" F							*266			
" G				40 ²						
			\$3572	324	11.02					
SX-29	D6	2	90	✓		0	0			
	300H	4	384			0	0			
	955	½	33			1	65			
	D5	4½	202			0	0			
			\$709	77 ³	9.21		*177			
1.	Exact volume within measured linear dimensions (±10%), but no pre-excitation survey.									
	Visual estimates of volume (±30%)									
3.	Exact volume within estimated linear dimensions (±20%)									

26 A through F
are along the same
channel. Same one
as RX-27.

Costs are lumped

26G is on different channel
about 200 ft. north of
26E

Only 26F was rocked

TASK

Access: Trail Const. and Waterboring
Winching Slash, and Excavation

WORK SITE	EQUIPMENT	HOURS	COST	cu. yds.	SECONDARY TREATMENTS		TOTAL SITE COST	REMARKS
					H.E.	LABOR		
					HOURS	COST		
SX-15				12 ¹				Costs were lumped with RX-15
SX-18				28 ¹				Costs lumped with RX-18
SX 30-6-11	300H 955 D5	0 0 0	0 0 0	✓	1/2 1 1/2 1	48 98 45	*266	15 cu. yds. of rock were added to the 1980 SX-11 site
SX 30-6-13	300H 955 D5	1/2 3 1/2 3 1/2	48 228 157	30 ²	3 0 0	288 0 0		1980 site was re-excavated. Convex long profile was being undercut. Channel now has much greater capacity.
1. Surveyed - volume using exact formula Visual estimate of additional volume removed in 1981. * Cost of imported rock								

Haul Road Crossings

Waste site _____
or _____
TRUCK _____

Access, Winching Slash, and Excavation

WORK SITE	EQUIPMENT	HOURS	COST	Cu. yds. EXCAVATED	\$ PER CU. YD.	SECONDARY TREATMENTS		TOTAL SITE COST	REMARKS
						H.E.	LABOR		
						HOURS	COST		
HAUL ROAD CROSSINGS									
RX-1	DB	1	*75			0	0		
	300H	7½	720			2	*192		
	955	7½	488	✓		2	130		
	D5	4½	202			0	0		
			*1485	403	3.68		*708		
RX-2	DB	9	675			0	0		
	300H	5½	528			½	48		
	955	5	325	✓		½	33	1834	
	D5	5	225			0	0	2188	
			*1753	894	1.96		*354	2.45/4d	
X-3	DB	1½	113			0	0		
	300H	2½	240			1½	144		
	955	2	130	✓		1½	97		
	D5	3	135			0	0		
			*618	213	2.90		*354		
X-5	D6	3	135			0	0		
	DB	9	675			0	0		
	300H	8½	816			1	96		
	955	8	520	✓		1½	97		
	955SB	3	114			0	0		
	D5	11½	518			0	0		
			*2778	847	3.28		*531		
*	Cost of Imported Rock								

Weekside _____
or
Task _____

WORK SITE	EQUIPMENT	HOURS	COST	Cu. yds. EXCAVATED	# PER CU. YD.	SECONDARY TREATMENTS		TOTAL SITE COST	REMARKS
						H. E.	LABOR		
						HOURS	COST		
X-6	D8	16½	1238	✓	1.43	0	0	194 1079 4009 1.95	
	300H	6	576			1	96		
	300H5B	3½	189			0	0		
	955	7	455			1½	98		
	D5	10½	472			0	0		
			~~\$2930~~				~~*885~~		
			2054						
X-7	D6	7½	~~338~~	✓	6.96	0	0		Weir with 4½ ft. x 3 ft. spillway installed. Secondary costs include 17 person days for construction and 1½ hours of D5+ 955+300H time (\$309) for installation.
	D8	12	900			0	0		
	300H	18	1728			3½	336		
	955	18½	1202			3½	227		
	D5	20½	923			1½	68		
			~~\$5094~~				~~*885~~		
			731						
I-15	D6	4½	~~203~~	✓	2.64	0	0		
	D8	6½	487			0	0		
	300H	5	480			0	0		
	977	3½	147			0	0		
			~~\$1317~~						
			499						
I-17	D6	1	~~45~~	✓	4.63	0	0		
	D8	7	525			0	0		
	300H	12	1152			4	384		
	977	15	630			4½	189		
			~~\$2552~~				~~*885~~		
			508						
* Cost of Imported Rock									

Overhead and Non-rehab. costs B1-4

Equipment	Talk		Wait		SB with		SB wait		Travel		Salvage	
	hours	cost	hours	cost	hours	cost	hours	cost	hours	cost	hours	cost
D6					2.5	(61.25)						
DB	1	(75.00)	5	375.00	1.5	(66.00)			13	(975.00)	1	(75.00)
300H	3	(288.00)	6	576.00	12	(648.60)			4.5	(432.00)	—	+1.5 left over
955	2.5	(162.50)	4.5	(292.50)	6	(228.00)	21.5	(580.50)	1	(65.00)	—	+5 left over
977			4	(168.00)	7.5	(195.00)			3.5	(147.00)	12	(504.00)
D5			4	(180.00)	12	(360.00)			1	(45.00)	1	(45.00) + 4.5 left
D6	1.5	(58.50)			2.5	(61.25)			9	(351.00)	5.5	(214.50)

	Talk	Wait	Standby	Travel	Salvage	Left Over
D6	39.00		61.25	351.00	214.50	
DB	75.00	375.00	66.00	975.00 ✓	75.00	— \$1566.00
300H	288.00	576.00	648.60	432.00 ✓	—	144.00 2088.60
955	162.50	292.50	808.50	65.00 ✓	—	325.00 1328.50
977	—	168.00	195.00	147.00 ✓	504.00	— 1014.00
D5	—	180.00	360.00	45.00 ✓	45.00	202.50 832.50
D6	58.50	—	61.25	351.00 ✓	214.50	— 685.25
	<u>\$584</u>	<u>\$1592</u>	<u>\$2200</u>	<u>\$2366</u>		<u>\$672</u>
	545					\$7,511.85

↓
 \$1053.00
 D.C. Truck + 297.50
 J.C. Truck + 332.50
 TOTAL SALVAGE = \$1683.00 ✓
 (Not counting log truck)

non-Salvage = \$6673.35

website _____
or _____
TASK _____

WORK SITE	EQUIPMENT	HOURS	COST	cu. yds. EXCAVATED	# PER CU. YD.	SECONDARY TREATMENTS		TOTAL SITE COST	REMARKS
						H.E. HOURS	COST		
RX-18	D6	3½	~~158~~			0	0		Volume and cost includes a 28 cu. yd. skid trail excavation immediately downstream from RX.
	D8	3	225			0	0		
	300H	4	384			0	0		
	977	2	84	✓		0	0		
			<u>851</u>	429	~~7.98~~				
RX-19	D6	1	~~45~~			0	0		
	D8	3	225			0	0		
	300H	9	864			½	48		
	955	3	195	✓		2	130		
	D5	5	225			0	0		
	D55B	2½	75			0	0		
		<u>1629</u>	472	~~3.45~~		*708			
RX-22	D6	1½	~~22~~			½	22		
	D8	6	450			0	0		
	300H	13	1248			0	0		
	955	5½	358	✓		1½	98		
	9555B	2	76			0	0		
	D5	13½	608			0	0		
			549	~~5.11~~		*885			
* Cost of imported Rock									

Howl Road Crossings, cont.

worksite
or
TASK

Heavy Equipment Access, Winching Slash, and Excavation

WORK SITE	EQUIPMENT	HOURS	COST	cu. yds. EXCAVATED	# PER CU. YD.	SECONDARY TREATMENTS			TOTAL SITE COST	REMARKS
						H.E.	COST	LABOR		
RX-24	D6	2	90			0	0			
	D8	12	900			0	0			
	300H	11	1056			1 1/2	144			
	955	11 1/2	748			1	65			
	955SB	10 1/2	399			0	0			
	D5	12	540			0	0			
			~~3733~~	1600	~~2.93~~		*531	6.7 pd's		+1.25 pd's Brushing +.5 pd's winching slash
RX-27	D6	2	90			0	0			
	D8	12 1/2	938			0	0			
	300H	7 1/2	720			1	96			
	955	7 1/2	487			1	65			
	D5	6 1/2	293			0	0			
	D5SB	7	210			0	0			
			~~2738~~	461	~~5.94~~		*885	1.5 pd's		pd's +.5 Brushing +.75 Winching slash
RX-28	D8	12 1/2	938			0	0			
	300H	11 1/2	1104			0	0			
	955	5 1/2	357			1	65			
	D5	6 1/2	293			0	0			
			~~2692~~	741	3.63		*531	.25 pd's		+pd's .5 Brushing .75 strapping
* Cost of Imported Rock										

Landing Excavations

SITE 81-4

worksite _____
or _____
TASK _____

WORK SITE	EQUIP- MENT	HOURS	COST	SITE COST	QUANTITY	COST / QUANTITY	SECONDARY TREATMENTS		REMARKS
							H.E.	LABOR	
Landings									
L-4	DB	5½	\$413						Volume of irregular shape estimated from tape and clinometer survey. (± 50 cu. yd) An estimate of compo fill excavated.
(M-7-5-1 Road)	955	2	130						
	D5	2	90	\$633 ✓	400 yds	\$1.58/yd.			
L-20	DB	8	600						Volume estimated by extrapolation from L-4 and L-25 costs
(M-7-5-2)	300H	9	864						
	D5	4	180	\$1644 ✓	1000 yds	1.65/yd.			
L-25	DB	7	525						Volume of relatively uniform shape estimated from tape and clinometer survey. (± 50 cu. yd) An estimate of compo fill excavated.
(M-7-5-2)	D5	7½	337						
	D5SB	3	90						
	300H	3	288						
	D6	3½	758	\$1398 ✓	800 yds	\$1.75/yd.			
L-31	DB	5½	413						Volume estimated by extrapolation from L-4 and L-25 costs
(M-7-5-2)	300H	2½	240	\$653 ✓	400 yds	1.65/yd.			

Road Repair and Maintenance (for dump truck access)
and M-Line maintenance

D6	5 hrs	@ \$39/hr	\$195.00
Cat #12 Grader	28½ hrs	@ \$39/hr.	<u>1111.50</u>
			\$1306.50 ✓

1800 Road Bridge Installation

D6	8½ hrs.	@ \$39/hr.	\$331.50 ✓
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Remove CMP's (excluding haul to G-Line deck by Park 2½ ton truck)

300 H Excavator	½ hr.	@ \$96.00	\$48.00
D8	5 hr.	@ 75.00	375.00
D5	½ hr.	@ 45.00	22.50
977	3½ hr.	@ 42.00	147.00
Truck (D. Gossairt)	1 hr.	@ 35.00	35.00
Truck (J. Gossairt)	1 hr.	@ 35.00	<u>35.00</u>
			\$662.50

DOESN'T
INCLUDE
COST OF
BACK HOE

RNP Backhoe

(M-7-5-1: 11 CMP's, M-7-5-2: 15 CMP's)

Rip

D8 24½ hrs @ 75.00

*1837.50 ✓

Cross Road Drain (+WB's)

D5 18½ hrs @ 45.00

*832.50

D8 31½ hrs @ 75.00

2362.50

955 9½ hrs @ 65.00

617.50 ✓

300H 33½ hrs @ 96.00

3216.00

*7028.50

Salvage Logs (delivered to end of rehabed roads. Does not include self-loading log truck delivery to Redwoods United.)

D6 5½ hrs @ 39.00

*214.50

D8 1 hr. @ 75.00

75.00

D5 1 hr. @ 45.00

45.00

977 12 hr. @ 42.00

504.00

Truck (D.C.) 8½ hr. @ 35.00

297.50

Truck (J.C.) 9½ hr. @ 35.00

332.50

*1468.50

Quarry and Deliver Rock

Truck (F.V.)	22½ hrs	@ 31.99	* 719.78
Truck (J.C.)	50 hrs	@ 35.00	1750.00
Truck (J.H.)	28½ hrs	@ 34.00	969.00
Truck (D.C.)	36 hrs	@ 35.00	1260.00
977	15 hrs	@ 42.00	630.00
D8	4½ hrs	@ 75.00	337.50
W24	33½ hrs	@ 40.00	1340.00
D6	1½ hrs	@ 39.00	58.50
			* 5724.78

590 cu. yds. = * 9.70

Travel

D6	9	@ 39.00	* 351.00 ✓
Cat #12	4½	@ 39.00	175.50
W24	6	@ 40.00	240.00
300H	4½	@ 96.00	432.00 ✓
955	1	@ 65.00	65.00 ✓
D8	13	@ 75.00	975.00 ✓
D5	1	@ 45.00	45.00 ✓
977	3½	@ 42.00	147.00
Trucks	8	@ 35.00	280.00
Truck (F.V.)	4	@ 31.99	127.96
			* 2838.46

Standby Time

	SB with Op.		SB without Op.	
Trucks (F.v.)	11½ @ 21.49	*247.14	19 @ 10.50	199.50
(J.H.)	9½ @ 17.00	161.50		
(Cossairts)	24½ @ 17.50	428.75	19 @ 17.50	332.50
977	11 @ 26.00	286.00		
D5	24½ @ 30.00	735.00		
D8	1½ @ 44.00	66.00		
955	21½ @ 38.00	817.00	21½ @ 27.00	580.50
300H	12 @ 54.05	648.60	3½ @ 41.95	146.83
W24	9½ @ 20.00	190.00		
Cal #12	1 @ 28.50	28.50	8 @ 10.50	84.00
D6	2½ @ 24.50	61.25		
		*3669.74		*1343.33

TOTAL STANDBY COSTS = *5013.07

Other Non-Productive Time (Talking, Waiting, etc.)

D6	1½	@	39.00	\$ 58.50
Cat #12	½	@	39.00	19.50
W24	1	@	40.00	40.00
300H	10½	@	96.00	1008.00
955	12	@	65.00	780.00
D8	6	@	75.00	450.00
D5	8½	@	45.00	382.50
977	4	@	42.00	168.00
Truck (D.C.)	4	@	35.00	140.00
(J.C.)	1	@	35.00	35.00
				\$ 3081.50

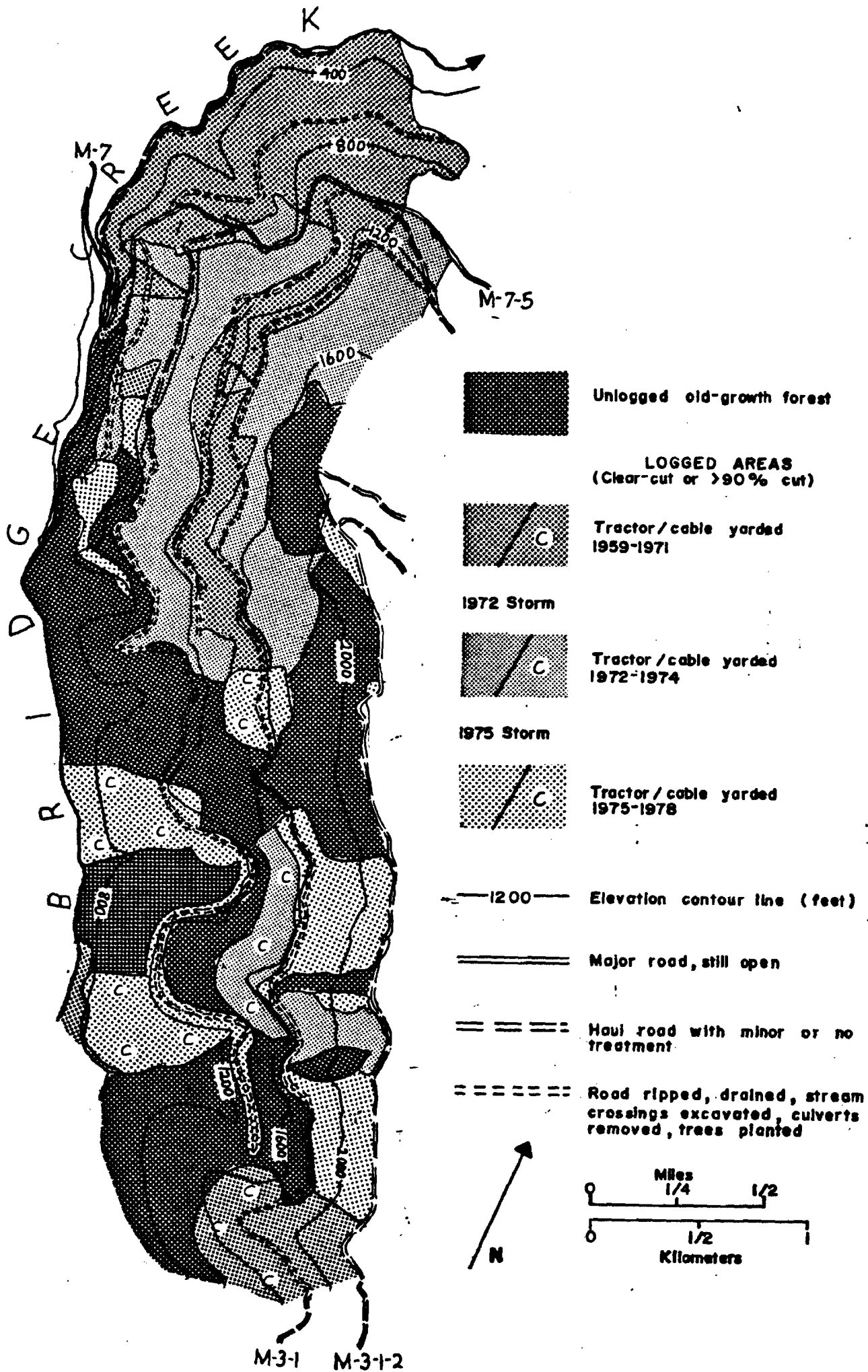


Table 1.
Vegetation Treatment. Rehabilitation Site 81-4
Bridge Creek, M-7-5-1 Road

Site Descriptions	Acreage	Planting Treatment
RX-1	.06	308 A at 3'
RX-2	.08	376 A at 3'
RX-3	.06	276 A at 3'
RX-5	.22	1048 A at 3'
RX-6	.29	1400 A at 3'
RX-7	.30	1440 A at 3'
Road Surface ^a	5.57	930 R and 930 Df at 10' ^b
Total	6.58	4848 A 930 R 930 Df

- RX - Road crossing
- A - Alder, 1 year, containerized
- R - Redwood, 1 year, containerized
- Df - Douglas-fir, 2 year, bareroot
- a - includes landings and road stretches exclusive of crossings
- b - conifers planted at 10-foot spacings, alternating Redwood and Douglas-fir; every other conifer received a fertilizer tablet.

Table 2.
Vegetation Treatment. Rehabilitation Site 81-4
Bridge Creek, M-7-5-2 Road

Site Description	Acreage	Planting Treatment
RX-15	.15	702 A at 3'
RX-16	.12	562 A at 3'
RX-17	.16	760 A at 3'
RX-18	.11	536 A at 3'
RX-19	.10	494 A at 3'
RX-22	.18	878 A at 3'
SX-29	.03	158 A at 3'
SX-23	.03	N/T
RX-24	.15	300 A at 3'
XRDs, RX-24 to RX-27	--	588 A at 3'
RX-27	.16	788 A at 3'
SX-26A	.01	42 A at 3'
SX-26B	.03	148 A at 3'
SX-26D	.04	174 A at 3'
SX-26E	.04	188 A at 3'
SX-26F	.01	56 A at 3'
RX-28	.23	1098 A at 3'
Road Surface ^a	9.92	3,380 R and 3,380 Df at 8' ^b
Total		7472 A 3380 R 3380 Df

RX - Road Crossing

SX - Stream Crossing

XRD - Cross Road Drain

A - Alder, 1 year, containerized

R - Redwood, 1 year, containerized

Df - Douglas-fir, 2 year, bareroot

a - includes landings and road stretches exclusive of crossings.

b - conifers planted at 8-foot spacings, alternating Redwood and Douglas-fir every other conifer received a fertilizer tablet.

Table 3.
Vegetation Treatment. Rehabilitation Site 81-5
Devils Creek, Y-2 Road

Site Description	Acreage	Planting Treatment
RX 2+20	.12	594 A at 3'
RX 35+25	.04	170 A and 30 R at 3'
RX 39+14	.04	176 A and 36 R at 3'
RX 46+13	.15	611 A and 125 R at 3'
RX 48+50	.25	1022 A and 210 R at 3'
RX 53+68	.03	126 A and 26 R at 3'
RX 56+87	.05	211 A and 45 R at 3'
RX 76+61	.12	471 A and 95 R at 3'
RX 133+77	.11	462 A and 90 R at 3'
XRDs, RX 133+77 to RX 188+21	--	2000 A and 2000 R at 1-5'
RX 156+13	.05	216 A and 40 R at 3'
RX 188+21	.09	372 A and 76 R at 3'
RX 204+50	.01	281 A and 57 R at 3'
RX 207+43	.09	347 A and 71 R at 3'
Road Surface ^a	14.91	3300 R and 3300 Df at 10' ^b
	16.06	7069 A 6201 R 3300 Df

RX - Road Crossing

XRD - Cross Road Drain

A - Alder, 1 year, containerized

R - Redwood, 1 year, containerized

Df - Douglas-fir, 2 year, bareroot

a - includes landings and road stretches exclusive of crossings.

b - conifers planted at 10-foot spacings, alternating Redwood and Douglas-fir; every other conifer received a fertilizer tablet.

COST ANALYSIS FOR PLANTING OF TREES AND FERTILIZER TABLETS
REHABILITATION SITE 81-4, BRIDGE CREEK, M-7-5-1 AND M-7-5-2 ROADS
REHABILITATION SITE 81-5, DEVILS CREEK, Y-2 ROAD

Table 4
Numbers and Costs For Trees and Fertilizer Tablets

	M-7-5-1	M-7-5-2	Y-2	Total	Unit Price Per Item	Amount
Alder ^a	4848	7472	7069	19,389	.15	\$2908.35
Redwood ^a	930	3380	6201	10,511	.15	1576.65
Douglas-fir ^b	<u>930</u>	<u>3380</u>	<u>3300</u>	<u>7,610</u>	.0875	<u>665.88</u>
Total	6708	14,232	16,570	37,510		\$5150.88
Fertilizer Tablet ^c	930	3380	3300	7,610	.012	<u>91.32</u>
Total for Trees and Fertilizer Tablets						\$5,242.20

a - 1 year, containerized; b - 2, year, bareroot, c - Agriform 20-10-5 Fertilizer tablets.

Table 5
In-House Labor Costs for Planting Trees
Rehabilitation Site 81-5, Devils Creek (Y-2 Road)

Date	Labor	Wage/Hour [*]	Hours	Amount
3-16-82	Laborer	\$8.13	10	\$81.30
	Laborer	8.13	10	81.30
3-17-82	Laborer	8.13	10	81.30
	Laborer	8.13	10	81.30
3-18-82	Laborer	8.13	10	81.30
	Laborer	8.13	10	81.30
3-22-82	Laborer	8.96	10	89.60
	Laborer	8.46	10	84.60
	Laborer	8.13	10	81.30
	Laborer	8.13	10	81.30
3-23-82	Laborer	8.96	8	71.68
	Laborer	8.13	8	66.04
	Laborer	8.13	8	66.04
	Laborer	8.13	8	66.04
3-24-82	Laborer	8.13	<u>8</u>	<u>66.04</u>
Total			140	\$1160.44

* Wage/hour includes overhead

Table 7.

Total Costs for Vegetation Treatments
Rehabilitation Site 81-4, Bridge Creek (M-7-5-1 & M-7-5-2 Road)
Rehabilitation Site 81-5, Devils Creek (Y-2 Road)

Material Costs	\$5,242.20
Contract Costs	4,029.76
Operation dates 2-16-82 to 3-6-82	
1.75 lost crew days	579.25
Labor Costs	<u>1,160.44</u>
Total Cost	~~\$11,041.65~~ \$11,011.65



Unit: 81-4 PP11 7/16/81



Unit: 81-4 PP11 9/29/81



Unit: 81-4 PP11 11/19/81



Unit: 81-4 PP11 8/18/82



Unit: 81-4 PP19 7/16/81



Unit: 81-4 PP19 8/18/82



Unit: 81-4 PP11 9/29/83



Unit: 81-4 PP6 7/17/81



Unit: 81-4 PP6 11/17/81



Unit: 81-4 PP6 7/26/82



Unit: 81-4 PP6 8/17/83



Unit: 81-4 PP7 9/10/81



Unit: 81-4 PPC 8/18/82



Unit: 81-4 PPC 7/21/81