

REPORT OF THE 1970 SURVEY OF SEDIMENT BELOW
STREAM GAGE SITES 1, 2, AND 3 ON THE
H. J. ANDREWS EXPERIMENTAL FOREST

By Ross Mersereau

There have been no major treatments in these watersheds for several years. Four years have passed since logging and slash burning on watershed 1. On watershed 3, it has been 11 years since roadbuilding, 7 years since logging, 4 years since the slides of December 1964, and almost 2 years since the G Road slide.

Measurements and Calculations

Measurements and calculations were consistent with those used in previous years.

Lines of sight were checked as each line was measured. Any differences in line of sight measurements were averaged; a single measurement was used to compute sediment accumulation for each basin, except in the watershed 2 basin. Here the large difference between lines 1 and 2 and the other lines made it necessary to use two lines of sight. All bench marks, whether permanent or temporary, were checked and found to be nearly identical in elevation with those of the year before.

The sediment basins at #1 and #3 gage sites were cleaned in August 1969 of accumulated sediment by a 1-1/2-cubic yard front-end loader. The following week the initial survey for this report was performed.

Discussion

Although the size of the volume of the accumulation in basins 1 and 3 can probably be traced to lingering effects of past treatments and catastrophic events, they are small enough to suggest that maybe these watershed areas are beginning to stabilize. It should be kept in mind that although the extremely wet January of 1970 produced some fairly high flows in these streams, the winter was generally quite mild and helped minimize bedload movement.

The tail of the slide area below the middle road (G Road) was on watershed 3 in the creek channel at the beginning of the winter season and probably was responsible for most of the bedload accumulation found in the watershed 3 basin.

Cuttings of cottonwood and willow have been planted across this slide to test their usefulness in stabilizing slide areas. So far, the willow has had a low survival rate while the cottonwood has survived extremely well. Their effect on the slide area is unknown at this time.

The accumulated bedload at the watershed 1 basin is about 30 percent of last year's accumulation and, hopefully, shows a beginning of stabilization of the watershed 1 streambed.

Undoubtedly, suspended sediment was lost from the basins this year as in other years; the mild winter and the fact that quite a lot of space was available in the basins throughout the winter probably makes this year's measurement more accurate than measurements of the past several years. Even so, these measurements are still only minimum estimates of bedload volume.

TABLE 1. SEDIMENT ACCUMULATION 1969-70

Year	Number of Points	Line of Sight	Average rod Reading	Average bottom Elev.	Change of Bottom Elev.	Basin area in Sq. ft.	Total Accum. in cu. ft.	Average Accum. Cu. ft./ Acre	Ratio
Watershed 1 -- 237 acres									1/2
1969	217	114.280	9.259	105.021				18.94	
1970	217	114.364	8.715	105.649	.628	2133	1339.524	5.65	5.38
Watershed 2 -- 149 acres									
1969	211	108.018	7.745	100.273				1.06	
1970	21	107.935	7.451	100.484					
	<u>190</u>	107.928	7.586	<u>100.342</u>					
	211		Wt. Ave.	100.356	.083	1887	156.621	1.05	
Watershed 3 -- 250 acres									
1969	202	105.675	8.967	96.708				8.91	3/2
1970	202	105.516	7.402	98.114	1.406	890	1251.340	5.01	4.77

Table 2

SEDIMENT ACCUMULATION SUMMARY SHEET

Bedload Volume
Cubic Feet per Acre

Year	Undisturbed			After Treatment		Ratio	
	W. S. #2	W. S. #3	W. S. #1	W. S. #3	W. S. #1	3/2	1/2
1957	2.56	1.52	2.30			.59	.90
1958	3.52	2.28	1.40			.65	.40
1959	.61	.26	-.16 ^{4/}			.43	-.26 ^{4/}
1960	.23		.08	.42		1.83*	.35
1961	1.82		.21	1.63		.90	.12
1962	.61		1.23	10.84 ^{2/}		17.77*	2.02
1963	.69			1.28	.13	1.86*	.19
1964	.11			.83	.10	7.55*	.91
1965	11.06			2932.40 ^{2/}	2.82	265.13*	.25
1966	2.06			3.28 ^{3/}	.77 ^{4/}	1.59 ^{3/}	.37
1967	-.04			3.56	13.33	--	--
1968	.09			2.77	16.34	30.78	181.56
1969	1.06			8.91	18.94	8.41	17.87
1970	1.05			5.01	5.65	4.77	5.38

* Significant at the 95% level.

^{2/}

Includes material from mass soil movements.

^{3/}

Sediment accumulation on watershed 3 from December to April only.

^{4/}

Corrected figures of earlier reports.

RI - NW
SOIL STABILIZATION
Watersheds

ELEVATIONS OF SEDIMENT ACCUMULATED
IN CATCHMENT BASINS

FORM RI-2

After cleaning
Date: 8-26-69
Party: Level *Delaware*
Rod *Frederick*
Notes *Altoona*

Benchmark:

H.I.

Elev.

Experimental Area:

Basin Location:

H.S.A

WS #1

Station*	Transects (Designated in ft. starting at crest of dam)													
	1		2		3		4		5		6		7	
	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.
00														
03														
06		3.99		4.29		4.71		4.55		4.54		4.39		4.29
09		4.42		6.99		9.50		9.51		8.51		8.68		6.35
12		6.30		9.73		11.09		11.09		11.17		10.88		10.48
15		8.25		11.20		11.09		10.93		11.39		11.52		11.22
18		8.96		11.35		11.29		11.19		11.12		11.11		11.06
21		7.75		9.49		11.24		10.82		10.95		11.05		10.94
24		7.24		10.07		11.13		11.02		11.05		11.10		10.96
27		5.65		9.38		10.92		11.03		11.13		11.06		10.97
30		5.35		9.00		10.68		10.92		10.98		11.10		10.98
33		5.39		8.90		9.38		10.63		10.82		10.88		10.81
36				8.69		9.77		10.61		10.74		10.56		10.64
39				5.35		9.23		9.82		10.83		10.58		10.29
42				5.02		9.11		9.64		10.63		10.57		10.38
45				4.23		8.81		9.92		10.65		10.72		10.12
48				5.36		8.37		9.36		10.45		10.24		10.24
51				4.49		7.74		9.08		9.80		10.06		10.16
54				3.75		6.30		7.72		9.02		9.53		10.07
57				3.60		5.20		6.58		7.36		8.96		10.10
60						4.55		5.23		6.68		8.71		10.04
63						4.93		5.21		4.57		8.71		9.58
66						5.01		5.17		3.99		6.84		8.84
69						5.25		5.18		3.81	Rock	6.25		7.55
72						5.36		5.35				4.46		5.89
75								5.25				4.31		4.65
78														
81														

Line of Sight is equal to Assumed elevation of 100.00 ft.
Plus Elevation of Auxiliary spike (12.640) Plus the Average
Reading at time of Survey of benchmark on the spike
~~114.640~~ = 114.280

Check on Stamp
at end

Blue Paint

Temp Bm 7-75 2.863

7-06 or 6-75 2.861

5-19 2.862

4-75 2.860

4-06 or 3-72 2.862

3-06 or 2-57 2.860

end 2.860

Average

Auxiliary spike = 12.640

Ave Temp. Bm 2.862

Total Pts = 217

No. Pts	(7)	(15)	(16)	(19)	(18)	(21)	(21)
Total	49.50	119.25	155.56	180.31	183.28	209.11	211.78
Average							

*Numbered to right starting with 0 at borderline which extends upstream from left end of dam.

RI - NW
SOIL STABILIZATION
Watersheds

ELEVATIONS OF SEDIMENT ACCUMULATED IN CATCHMENT BASINS

FORM RI-2

Date: 8/26/69
Party: Level _____
Rod _____
Notes _____

Benchmark:

H.I.
Elev.

Experimental Area: HJA
Basin Location: WS #1

[illegible]

*Numbered to right starting with 0 at borderline which extends upstream from left end of dam.

Benchmark:

H. I.

Elev.

Experimental Area:

Basin Location:

Date: 8-12-70

Party: Level

Rod

Notes $\frac{F_{AF}}{F_{AF}}$ [illegible]

*Numbered to right starting with 0 at borderline which extends upstream from left end of dam.

FORM RI-2

Experimental Area: H3A
Basin Location: W3-

Watersheds

Experimental Area: H3A
Basin Location: W3-

Total Points	= 217
Total Rod Reading	= 1896.11
Average Rod Reading	= 8.0715

*Numbered to right starting with 0 at borderline which extends upstream from left end of dam.

RI - NW
SOIL STABILIZATION
Watersheds

ELEVATIONS OF SEDIMENT ACCUMULATED
IN CATCHMENT BASINS

FORM RI-2

Benchmark:

H.I.
Elev.

Experimental Area: HJA
Basin Location: WS-2

Date: 8-11-70
Party: Level RM
Rod RLF
Notes GH

Station*	Transects (Designated in ft. starting at crest of dam)											
	1		2		3		4		5		6	
	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.
00												
03		3.72		3.83		4.49		4.56		5.18		5.76
06				4.91		5.92		6.62		6.62		6.53
09				5.90		7.05		7.69		7.47		7.59
12				6.20		7.82		8.28		8.30		8.33
15				7.10		8.49		8.76		8.80		8.78
18				7.70		8.57		8.88		9.07		8.96
21		6.66		8.49		9.10		8.74		8.54		8.62
24		7.11		8.69		8.64		7.14		8.49		8.93
27		7.66		8.91		8.15		7.39		8.85		9.09
30		6.70 ^{Rock}		8.70		8.39		7.79		8.96		9.08
33		7.35		8.68		8.46		8.20		8.99		8.81
36				8.58		7.75		8.22		8.77		8.67
39				8.08		7.69		8.16		8.53		8.50
42				7.71		7.46		7.72		8.34		7.95
45				7.19		7.34		7.31		7.90		7.39
48				6.94		6.91		6.64		6.98		7.05
51				6.54		6.62		6.42		6.47		6.70
54				5.58		5.62		6.52		6.52		6.26
57										4.53 ^{Rock}		4.14
60												4.19

Total Pts 1 & 2 (21)
Total Rod Reading = 156.47
Ave Rod Rdy = 7.451
Total Points Rest = 190
Total Rod Reading = 1491.34
Ave Rod Rdy = 7.8586

Total Points = 211
Total Rod Reading = 1597.81
Average Rod Reading = 7.573

Elevation of BM is assumed to be 100.00 feet.
Line of sight is 100.00 plus Rod Reading at time of survey = 107.928 for transects 3 thru 18
Line of sight Transects 1 & 2 = 107.935

No. Pts	(5)	(16)	(16)	(17)	(17)	(17)	(17)
Total	35.48	120.99	124.36	131.13	137.60	137.26	134.95
Average							

*Numbered to right starting with 0 at borderline which extends upstream from left end of dam.

RI - NW
SOIL STABILIZATION
Watersheds

ELEVATIONS OF SEDIMENT ACCUMULATED
IN CATCHMENT BASINS

FORM RI-2

Benchmark:

H.I.
Elev.

Experimental Area:

Basin Location:

HJA

WS-2

Date: 8-11-70

Party: Level

Rod

Notes

Station*	Transects (Designated in ft. starting at crest of dam)													
	8		9		10		11		12		13		14	
	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.
00														
03		4.60		4.82		4.59		5.02		3.90		4.04		4.32
06		6.16		6.50		6.46		6.43		5.32		4.69		5.20
09		7.31		7.48		7.49		7.06		6.44		6.11		6.26
12		8.33		8.05		8.00		8.08		7.39		7.10		6.75
15		8.66		8.65		8.47		8.17		7.56		7.21		6.70
18		8.61		8.67		8.37		8.28		7.81		7.32		6.83
21		8.65		8.69		8.14		8.14		7.99		7.39		6.98
24		8.70		8.69		8.34		8.27		8.04		7.26		6.62
27		8.49		8.46		8.40		8.27		7.97		7.30		6.24
30		8.38		8.46		8.39		8.10		7.97		7.17		6.02
33		8.55		8.36		8.38		8.05		7.64		6.88		5.34
36		8.34		8.06		8.01		7.80		7.53		6.33		4.136 Trail
39		8.22		7.71		7.80		7.49		7.12		5.80		4.29 Trail
42		7.63		7.36		7.19		6.87		6.20		4.44 Trail		
45		7.20		6.98		6.67		6.12		5.00		4.15 Trail		
48		6.68		6.55		5.99		5.16		3.97 Trail				
51		6.09		5.82		5.14		4.49		3.73 Trail				
54		4.10		4.00		3.92		3.60 Trail						
57		4.03		3.95		3.42								

Permanent BM start 7.928 or 107.928 - 5.060 = 102.868

" " end 7.928

Auxiliary BM elev. 5.060

End of line start: 5.060 (Bench mark for Transects 1 & 2 is 5.060)

End: 5.053 Then reset level Add .007 to A of sight

End of Line 2 = 5.053 27

" " 3 5.053 64

End of line 7 5.057 34

End of Line 9 5.050 21

End of line 11 5.053 19

End of Line 13 5.052 11

End of Line 15 5.053 14

Ave. Aux. Bm. Rdy. = 5.053

53 = 97 8"

Center of Spillway 5.23

No Pts	(16)	(15)	(15)	(14)	(12)	(11)	(8)
Total	126.00	118.67	116.10	107.13	89.66	75.87	52.40
Average							

*Numbered to right starting with 0 at borderline which extends upstream from left end of dam.

Experimental Area: H-4
Basin Location: WS-2

[illegible]

*Numbered to right starting with 0 at borderline which extends upstream from left end of dam.

RI - NW
SOIL STABILIZATION
Watersheds

ELEVATIONS OF SEDIMENT ACCUMULATED
IN CATCHMENT BASINS

FORM RI-2
After cleaning
Date: 8/26/69
Party: Level JR
Rod RF
Notes: Radar

Benchmark:

H.I.

Elev.

Experimental Area:

Basin Location:

4JA

#3

Station*	Transects (Designated in ft. starting at crest of dam)											
	1		1A		2		3		4		5	
	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.
00	*											
02.5	D.E. 17"	9.64			9.78		10.03		10.16		10.05	9.91
4		9.68			9.91		9.99		10.18		9.99	9.85
6		9.73			9.92		9.86		10.16		9.99	9.83
8		9.83			9.99		10.09		10.12		10.15	10.05
10		9.87			9.94		9.96		10.16		10.08	9.98
12		9.84			10.00		9.90		10.15		9.92	9.89
14		9.89			9.90		9.88		10.09		9.98	9.89
16		9.82			9.85		9.83		10.04		10.03	10.09
18		9.72			9.82		9.87		10.11		10.02	9.91
20		9.71			9.79		9.77		10.03		9.93	9.83
22		9.55			9.73		9.72		9.95		9.92	9.79
24		9.44			9.52		9.61		9.87		9.67	9.67
26		9.23			9.33		9.39		9.76		9.65	9.51
28		9.11			9.09		9.26		9.57		9.37	9.40
30	*	8.76			9.08		9.17		9.18		9.18	9.01
32	D.E. 20"	8.23			8.75		8.80		8.88		8.90	8.65
34		7.98			8.52		8.24		8.58		8.45	WALL INT.
36		7.46			7.77		7.71		7.65	35.5" WALL CORNER	4.54	
38		7.05			7.32		7.12		7.17		4.35	
40		6.62		5.77	6.89		6.75		6.47			
42		6.43		5.89	6.54		6.45		5.51			
44		6.10		5.81	6.22		6.04		4.41			
46		5.82		5.91	5.80		5.18		4.55			
48		5.27		5.75	5.52		4.38		4.44			
Line of Sight = 99.983 (see last year) + Rod on Bench mark (5.692) = 105.675												
(24)												
BS. on B.M.			0.238									
FS. to T.P.			11.790	11.552								
BS. to T.D.			090	5.606								
FS. to spike			5.696	17.158								
spike essentially the same as last year.												
B.M. Reading												
Stand -		5.693	END OF SURVEY	5.691								
END of LINE 2		5.693										
END of LINE 5		5.693										
END of LINE 7		5.693										
END of LINE 9		5.691										
* END of LINE 11		5.691	(5)	(24)	(24)	(24)	(24)	(19)	(16)			
D.E. = DAM EDGE												
Total		204.78	29.13	208.98	207.00	207.19	174.17	155.26				
Average												

*Numbered to right starting with 0 at borderline which extends upstream from left end of dam.

RI - NW
 SOIL STABILIZATION
 Watersheds

 ELEVATIONS OF SEDIMENT ACCUMULATED
 IN CATCHMENT BASINS

 Benchmark:
 H.I.
 Elev.

 Experimental Area: HJA
 Basin Location: 3

 Date: 8-26-69
 Party: Level
 Rod
 Notes

Transects (Designated in ft. starting at crest of dam)

Station*	7	8	9	10	11	12	1B	
	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.
00								
02.5		9.76		9.71		9.55		9.51
4		9.86		9.69		9.53		9.53
6		9.90		9.70		9.59		9.60
8		9.93		9.86		9.61		9.67
10		9.90		9.89		9.80		9.66
12		9.98		9.86		9.77		9.72
14		9.87		9.81		9.79		9.75
16		9.96		9.84		9.74		9.79
18		9.96		9.87		10.01		9.73
20		9.83		9.79		9.73	21.9'	9.65
22		9.68		9.75		9.83	WALL	
24		9.54		9.66	24.7'	9.56		
26		9.39		9.47	WALL			
28		9.15		WALL				
30		8.73						
32								
34								
36								
38								
40								5.78
42								5.81
44								5.66
46								5.58
48								

Total Number of Points 202
 Total Average Rod Readings 1811.37
 Average Rod Reading 8.967

Total 145.34 122.03 117.16 96.84 87.02 28.64 2283

Average

*Numbered to right starting with 0 at borderline which extends upstream from left end of dam.

Total Rod Readings 1811.37
 Average Rod Reading 8.967

RI - NW
SOIL STABILIZATION
Watersheds

ELEVATIONS OF SEDIMENT ACCUMULATED
IN CATCHMENT BASINS

FORM RI-2

Benchmark:

H.I.
Elev.

Experimental Area: HJA
Basin Location: #3

Date: 8-11-70
Party: Level RLF
Rod Rm
Notes G.H.

Station*	Transects (Designated in ft. starting at crest of dam)											
	1		1A		2		3		4		5	
	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.
00												
02.5		9.67				9.90		10.12		9.49		9.39
4		9.66				9.80		9.89		9.48		9.25
6		9.55				9.66		9.33		9.10		9.26
8		9.29				8.60		8.58		8.54		9.32
10		8.42				8.47		8.46		9.01		9.18
12		8.26				8.36		8.74		8.96		7.50
14		8.11				8.28		8.80		7.91		7.13
16		7.98				8.18		8.28		7.67		6.97
18		7.91				8.02		8.19		7.77		7.26
20		7.60				7.87		7.95		8.12		8.10
22		7.25				7.60		7.79		8.10		8.68
24		6.92				7.39		7.65		8.00		8.03
26		7.22				7.08		7.29		7.45		7.80
28		6.97				6.37		7.13		7.38		7.55
30		6.50				5.96		6.89		7.15		7.27
32		5.62				5.76		6.27		6.38		6.75
34		5.90				5.72		5.74		5.63		6.00
36		5.67				5.40		5.30		5.38		5.61
38		5.90				5.38		5.06		5.13		5.20
40		5.70		5.66		5.40		5.00		5.11		
42		5.51		5.54		5.14		4.91		5.65		
44		5.40		5.47		5.02		3.45 ¹⁰⁹		5.23		
46		5.29		5.28		5.06		5.00		5.27		
48		5.07		5.22		5.20		5.21		5.07		

Total number Points 202
Total Rod Readings 1495.28
Average Rod Reading 7.402

		1	2
BS	on BM	.130	.279
FS	to TP	12.533	12.732
BS	to TP	1.141	.828
FS	to spike	5.847	5.537
		17.099	17.162

Bm Reading

End of line 1	5.535	End of survey =	5.532
End of line 10	5.536		
End of line 8	5.532	Average Bm Rod Reading =	5.533
End of line 6	5.532		
End of line 4	5.530		
" " 2	5.533		

No. Pts	(24)	(5)	(24)	(24)	(24)	(19)	(16)
Total	171.27	27.17	169.62	171.48	172.98	146.25	123.09
Average							

*Numbered to right starting with 0 at borderline which extends upstream from left end of dam.
Ave Rod Rdy = 7.402

RI - NW
SOIL STABILIZATION
Watersheds

ELEVATIONS OF SEDIMENT ACCUMULATED
IN CATCHMENT BASINS

FORM RI-2

Benchmark:

H.I.

Elev.

Experimental Area:

Basin Location:

HCA

#3

Date: 8-11-70

Party: Level Fredrikson

Rod Messersmith

Notes (see Hawk)

Station*	Transects (Designated in ft. starting at crest of dam)											
	7	8	9	10	11	12	13					
	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.
00												
02.5		9.34		9.83		9.59		9.43		9.28		9.64
4		9.27		9.37		9.11		8.90		9.97		9.64
6		8.49		8.51		8.58		8.56		8.72		9.29
8		7.56		7.70		8.03		8.11		8.31		7.12
10		6.87		7.15		7.48		7.77		8.06		
12		6.61		6.89		7.29		7.59		7.95		
14		6.72		6.94		7.21		7.56		7.93		
16		6.94		7.10		7.34		7.63		7.70		
18		7.17		7.29		7.48		7.48		7.63		
20		7.46		7.29		7.37		7.73				
22		7.60		7.28		7.43						
24		7.31		7.25		7.36						
26		7.55		7.57								
28		7.28										
30		7.01										
32												
34												
36												
38												
40												
42												5.26
44												5.29
46												5.19
48												4.98

Line of Sight = $99.983 + 5.533 = 105.516$

No. Pts	(15)	(13)	(12)	(10)	(9)	(3)	(4)
Total	113.18	100.17	94.27	80.76	75.75	28.57	20.72
Average							

*Numbered to right starting with 0 at borderline which extends upstream from left end of dam.