

REPORT OF 1967 SURVEY OF SEDIMENT BASINS BELOW STREAM GAGE SITES
1, 2, and 3 ON THE H. J. ANDREWS EXPERIMENTAL FOREST

By Ross Mersereau

The 1967 survey report includes measurement notes from (1) measurement of sediment from watersheds 1 and 2, in July 1967, (2) the initial survey of the watershed 3 basin, in August 1966, after its remodeling in April 1966, and (3) the measurement of the watershed 3 basin in August 1967.

Treatment this year consisted of the burning of the slash in watershed 1, in October 1966, followed by cleaning of the creek bed throughout the winter.

On watershed 3, two winters have passed since the slide of December 1964. It has been four years since logging and eight years since road construction.

On watershed 1, it has been one year since completion of logging, and almost one year since the watershed was burned.

Measurements

Elevation measurements were consistent with those used in previous years. At watershed 3, the elevation of the auxiliary spike was found to be lower by .004 foot in August of 1967 than it had been in August of 1966, possibly caused by settling of the dam. This distance was taken into consideration during calculation of the "average bottom elevation."

Calculations

Sediment accumulation was determined by the procedures outlined in 1959 by Sturges.

"Line of sight" figures in Table 1 were computed so as to accommodate "line of site" errors, as was done in the 1966 report.

The .004 foot difference in elevation of the watershed 3 auxiliary spike created an error which would increase the "average bottom elevation;" therefore, this figure was subtracted from the 1967 "average bottom elevation" before the "change of average bottom elevation" was computed.

Because the watershed 2 accumulation was computed as a minus number, it was assumed that no change in bottom elevation took place. Therefore, ratios formed between sediment accumulations in the watershed 2 basin and those in watersheds 1 and 3 were considered meaningless; and no ratios were computed on Table 2.

Discussion

Throughout the winter of 1966-1967, visual observation indicated that large amounts of sediment were being deposited in the watershed 1 basin. These observations were borne out by measurement of the basin in 1967.

The average accumulation in the watershed 1 sediment basin of the ten years from 1957 through 1966 is .89 cubic feet per acre. This year the average accumulation was approximately 15 times greater. Considering the 1966-1967 treatment on watershed 1, we can ask the question: Should we attribute the increase in bedload volume in the watershed 1 sediment basin to the slash burning of watershed 1 in October 1966?

It is known that a number of slides occurred in the banks along the watershed 1 stream channel in January 1965. Because little of this slide material has appeared in the sediment basin before this year, it might be assumed that naturally occurring and/or logging deposited debris has obstructed its movement downstream. The burning of slash on the watershed was quite effective in removing the debris from the stream channel. Only those logs that might possibly have moved down the channel during high water were removed during the cleaning of the creek bed. Little if any overland movement of water has been noted in watershed 1 either before or since slash burning took place. Also, no slides of any consequence have taken place since the slash was burned. Therefore, it seems safe to assume (1) the greater part of the increase in bedload volume was derived from slide material which was already in the channel and (2) this slide material was released by the removal of debris by slash burning.

Table 1

SEDIMENT ACCUMULATION 1966-1967

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. in Cu. ft./ Acre
<u>Watershed 1</u>					<u>237 Acres</u>			
1966	237	--	--	106.562				
1967	18	114.697	6.138	108.559				
	81	114.698	6.330	108.368				
	93	114.699	6.563	108.136				
	10	114.700	8.141	106.519				
	19	114.701	7.239	107.462				
	16	114.702	7.779	106.923				
				<u>108.043</u>	1.481	2133	3158.973	13.329
				Wt. Avg.				
<u>Watershed 2</u>					<u>149 Acres</u>			
1966	229	--	--	100.901				
1967	50	107.972	7.448	100.524				
	179	107.969	6.966	101.003				
				<u>100.898</u>	-.003	1887	-5.661	-.038
				Wt. Avg.				

SEDIMENT ACCUMULATION 1966-1967
(continued)

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. in Cu. ft./ Acre
<u>Watershed 3</u>					<u>250 Acres</u>			
1966	80	107.071	10.374	96.697				
	43	107.065	10.915	96.150				
	78	107.067	11.872	95.195				
				<u>95.997</u>				
				Wt. Avg.				
1967	28	106.003	9.684	96.319				
	102	106.004	8.580	97.424				
	71	106.005	9.317	96.688				
				<u>97.010</u>				
			Less ^{1/}	<u>-.004</u>				
				97.006	1.009	890	898.010	3.560

^{1/} Correction for settling of bench mark on the dam.

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			10.84 ^{2/}	1.23	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	--	--

* Significant at the 95% level.

^{2/}Includes material from mass soil movements. (slide material)

^{3/}Sediment accumulation on watershed 3 from Dec. to April only.

^{4/}Corrected figures of earlier reports.

Benchmark:

H.I.

Elev.

Experimental Area: HJA

Basin Location: WIS #1

Date: 7-25-67

Party: Level meridian

Rod Levno

Notes meridian

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		4.67		4.76		5.06		5.02		5.05		4.96		4.90
09		5.97		6.53		7.09		7.25		7.03		6.93		6.78
12		6.97		8.12		8.56		8.22		8.06		8.13		8.20
15		7.44		8.53		8.34		7.13		6.79		6.85		6.92
18		7.63		8.77		7.95		6.59		6.25		6.12		6.15
21		7.77		8.97		8.15		6.63		6.18		6.20		6.13
24		7.50		8.65		7.76		6.45		6.27		6.23		6.31
27		7.13		8.36		7.68		6.56		6.58		6.51		6.71
30		6.66		8.08		7.94		7.02		7.38		7.52		7.34
33				7.73		8.34		7.68		7.97		7.93		7.56
36				7.67		8.29		8.33		8.43		8.13		7.55
39				7.45		8.20		8.44		8.55		7.86		7.15
42				6.56		8.03		8.48		8.14		7.55		7.25
45				6.63		7.61		8.01		7.47		7.04		6.80
48				6.53		6.72		7.30		7.02		6.80		6.57
51				5.47		7.04		6.86		6.34		6.31		6.04
54						6.77		6.56		6.41		6.13		5.91
57						5.43		6.98		6.50		5.92		5.83
60						4.98	Rock	6.43	Rock	5.78		5.67		5.70
63								6.63		5.65		5.58		5.64
66								6.33		5.46		5.66		5.64
69								5.71		5.45		5.67		5.53
72										5.50		5.44		5.54
75										5.21		5.51		
		(7)		(10)		(16)		(19)		(22)		(22)		(22)
		51.10		86.41		124.47		137.55		149.21		146.18		143.18
		7.30		8.14		7.78		7.24		6.78				

BM = spike in Tree stump

Red on BM Start of Line #1 2059

" " " Start of Line #3 2062

Total
Average

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

2059

atersheds

Benchmark:

H.I.
Elev.

Experimental Area: HJA

Basin Location: WS #1

Date: 7-25-67

Party: Level Leuno

Rod microscreen

Notes Leuno

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														
06		4.90												
09		5.82		5.32		4.91		4.79						
12		8.12		7.44		6.72		5.80		4.47				
15		7.42		7.81		8.02		7.73		4.65				
18		6.12		6.24		6.81		7.05		6.70				
21		6.16		6.17		6.41		6.49	Brush	7.14				
24		6.35		6.32		6.40		6.78		6.74				
27		6.62		6.52		6.58		7.01		7.11				
30		7.00		6.69		6.79		7.19	on dam	5.36				5.24
33		7.10		6.56		6.23		6.48	on dam	6.00		5.16		6.20
36		6.70		6.47		6.22		6.24		5.75		5.35		6.34
39		6.85		6.59		6.26		6.18		6.48		6.72		6.64
42		7.05		6.50		6.33		6.29		6.48		6.96		6.83
45		6.61		6.34		6.31		6.44		6.57		6.80		6.81
48		6.33		6.38		6.35		6.02		5.91		6.12		6.21
51		5.92		5.83		5.63		5.58		5.70		5.93		5.70
54		5.84		5.73		5.60		5.65		5.64		5.85		5.51
57		5.70		5.66		5.66		5.67		5.66		6.16		4.99
60		5.67		5.64		5.70		5.64		5.84		5.64		4.11
63		5.71		5.78		5.76		5.82		5.81		5.08		
66		5.81		5.88		5.80	Rock	5.63		5.33		4.09		
69		5.99		6.09		6.10		5.80		4.60		2.03		
72		6.03		5.85		5.58		4.73						
75		6.13	Rock	5.53		5.48								
		(22)		(21)		(21)		(19)		(12)		(9)		(9)
		140.92		132.49		131.36		119.69		108.92		55.26		55.23

Red on BM start of line #8 = 2.058
 Red on BM End of line #8 = 2.058
 Red on BM start line #9 = 2.059
 Red on BM End line 14 = 2.057

Line of sight for this survey is equal to the assumed elevation of 100.000 plus elevation of auxiliary spike (12.640) plus Rod reading at the time of survey of each line

al
age

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

7.980

7.967

Benchmark:

H.I.
Elev.



Experimental Area: HJA

Basin Location: WS #2

Date: 7-24-67

Party: Level Levno

Rod Merserway, 6

Notes Merserway, R

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				3.89		4.50		4.67		5.33		5.80		5.79
06			7.918	4.89		5.96		6.52 Log		6.81		6.56		6.34
09				6.03		6.93		7.86		7.84		7.57		7.34
12				6.58		7.52		7.98		8.05		7.74		7.75
15				7.01		8.02		8.06		7.75		7.63		7.63
18				6.63		8.32		7.80		7.45		7.42		7.53
21		5.32	7.970	7.28		8.16		7.45		7.61		7.17		7.73
24		6.03		7.73		8.06		7.45		7.94		7.81		7.91
27	7.961	6.85		7.89		7.95		7.58		7.92		7.87		7.89
30		6.34		7.62		7.79		7.51		7.95		7.81		7.88
33		5.76		6.95		7.55		7.42		7.87		7.90		7.88
36			7.971	6.36		7.83		7.59		7.85		7.78		7.85
39				6.58		7.89		7.92		7.66		7.66		7.70
42				6.85		7.82		8.25		7.86		7.51		7.62
45			7.972	6.42		7.23		8.01		7.78		7.46		7.45
48				5.69		6.99		7.39		7.07		6.65		6.98
51				5.73	Rock	5.32		6.34 W.E.		6.08		6.20		6.04
54				4.14		5.09		Bottom of wall top wall		5.69		5.58		5.72
57										4.82		4.71		4.39
60		(-3)		(17)		(17)		(10)		(17)		(17)		(17)
		18.95		110.18		124.43		121.13		126.82		124.89		124.71

Rod on B.M. Start line "1" = 7.969
 " " " " "3" = 7.972
 " " " " "End" "5" = 7.972
 Rod on B.M. start line 6 = 7.969 - 7.25.67

spike assumed to be 100,000

Line of sight = 100.000 + Rod Reading ^{on bench mark} each line.

tal
erage

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

Elev.

Notes & messages

Basin Location: WS #2

[illegible]

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

Elev.

Date: 7-25-67
Party: Level Levna
Rod P. mexicana
Notes G. mexicana

Experimental Area: HJA
Basin Location: WS # 2

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

-- NW
 L STABILIZATION
 ersheds

ELEVATIONS OF SEDIMENT ACCUMULATED
IN CATCHMENT BASINS

FORM RI-2

Benchmark:
 H.I.
 Elev.

5.108
 0.98
 12.32
 11.31

Experimental Area:

Basin Location:

W.S. # 3

Date: 8-24-66

Party: Level

Rod 7.067

Notes

2' off from line #1 measured by tape from

Transects (Designated in ft. starting at crest of dam)														
Station#	Line #1		Line 1A		Line 2		Line 3		Line 4		Line 5		Line 6	
	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.
00+00	A													
02+50	W.F. 14 Beam wall	12.39				12.38		12.33		12.24		12.33		12.25
04+00		12.42				12.19		12.40		12.32		12.38		12.19
06+00		12.48				12.44		12.39		12.39		12.30		12.31
08+00		12.49				12.55		12.47		12.45		12.43		12.35
10+00		12.57				12.53		12.51		12.39		12.40		12.42
12+00		12.48				12.55		12.54		12.35		12.37		12.23
14		12.46				12.46		12.43		12.35		12.31		12.11
16		12.22				12.22		12.19		12.28		12.29		12.19
18		12.09				11.81		12.12		12.21		12.20		12.26
20		11.88				11.97		11.99		12.13		12.11		12.16
22	11.75				11.76		11.85		12.01		11.99		12.00	
24	11.55				11.64		11.53		11.60		11.64		11.25	
26	11.27				11.36		11.04		11.12		11.24		10.91	
28	11.87				10.91		10.97		10.99		10.53		10.69	
30	10.40				10.48		10.61		10.45		10.21		10.28	
32	9.95				10.05		10.19		9.94		9.87		9.99	
34	W.F. 33	9.45	W.F.	9.28		9.73		9.50		9.54		9.55		
36		8.92		8.83		9.13		9.11		9.00		9.19		
38		8.76		8.64		8.88		8.69		8.66		8.69		
40		8.26		8.17		8.59		8.47		8.48				
42		7.93		7.69		8.12		8.11		7.87				
44		7.19		7.33		7.88		7.85		7.32				
46		7.12	W.F.	6.99		7.41		7.28		6.84				
48		6.78		6.55	W.F.	7.12		6.99		6.39				
		(34)		(8)		(24)		(24)		(24)		(19)		(16)
Ave		10.61		7.94		10.67		10.65		10.56		11.37		11.72
total		254.68		63.48		256.16		255.56		253.32		216.03		187.59

Rod on Spike 7.071
 Rod on Spike End of line #3 - 7.065
 Rod on Spike End of line #5 - 7.067

After
 cleaning

Spike assumed to be 100.000
 line of sight = 100.000 + Rod Reading

BS	Rod on B.M. in Flume	0.030	} Difference in elevation 17.131
FS	Rod downstream near basin	12.551	
BS2	"	0.778 (level near basin)	
FS-2	Rod on spike in basin wall	5.108	
total average			

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

12.571

RI - NW
SOIL STABILIZATION
Watersheds

ELEVATIONS OF SEDIMENT ACCUMULATED
IN CATCHMENT BASINS

FORM RI-2

Benchmark:

H.I.
Elev.

Experimental Area: N.J. Highlands
Basin Location: W.S. #3

Date: 8-24-66
Party: Level Trimess
Rod 7.6.66
Notes 1000

Station*	Transects (Designated in ft. starting at crest of dam)											
	line #7		line 8		line 9		line 10		line 11		line 12	
	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.
00+												
245		12.20		12.08		12.14		12.11		12.08	W.E. 8	11.91
4		12.11		12.09		12.05		12.11		11.97	W.E. 6	11.87
6		12.20		12.12		12.19		12.10		12.05	W.E. 4	11.94
8		11.98		12.18		12.15		12.16		12.06		
10		12.09		12.05		12.06		12.02		12.06	W.E. 12	
12		11.96		12.06		12.06		12.01		12.06		
14		12.02		12.02		12.02		11.94		11.99		
16		12.14		12.04		12.02		11.98		11.93		
18		12.22		12.05		11.67		12.01		11.90		
20		12.11		12.00		11.74	W.E.	12.85	W.E. 19			
22+00		11.22		11.72		11.69						
24+00		11.56		11.37	W.E.	11.34						
26+00		11.13		11.23								
28+00		10.71										
30+00		10.45										
W.F. 30												
		(15)		(13)		(12)		(10)		(9)		(3)
Ave		11.75		11.92		11.93		12.03		12.01		11.91
Total		176.17		155.01		143.13		120.29		108.10		35.72

Rod on Spike End of line 7.068

REFERENCE - FLUHE M. TO SPIKE IN DOUG FIR STUMP

54.6 slant dist.

% ARNEY 52

BEARING: FLUHE TO SPIKE N42°E

VERTICAL DIST = 28.4

Total
Average

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

- NW
IL STABILIZATION
tersheds

ELEVATIONS OF SEDIMENT ACCUMULATED
IN CATCHMENT BASINS

FORM RI-2

Benchmark:

H.I.

Elev.

Experimental Area: AEF

Basin Location: WS#3

Date: 8-14-67

Party: Level KUNO

Rod MERSICAN

Notes

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

Station#	1B		1A		1		2		3		4		5	
	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.
00														
02						10.90		11.16		10.52		11.06		10.86
04						11.19		11.15		11.18		11.17		11.02
06						11.09		11.12		11.20		10.92		10.65
08						11.11		11.15		11.13		10.97		10.82
10						11.21		11.07		10.92		10.63		10.38
12						11.25		10.90		10.73		10.29		10.20
14						11.10		10.68		10.47		9.92		10.14
16						10.60		10.35		10.05		9.95		10.19
18						10.23		9.90		9.96		10.01		10.28
20						9.78		9.93		9.97		10.14		10.11
22						9.51		9.79		10.02		10.01		9.93
24						9.29		9.46		9.93		9.40		9.42
26						8.43		8.51		9.12		8.58		8.69
28						7.60		7.83		7.75		7.78		7.99
30						7.15		7.06		7.09		7.16		7.27
32						6.74		6.42		6.33		6.93		6.99
34		5.39		6.24		6.09		6.00		5.97		6.40		7.07
36		5.81		5.92		5.87		6.00		6.01		6.30		9.92
38		5.82		5.92		5.74		6.01		6.01		6.33		6.70
40		5.76		5.89		5.89		5.89		6.05		6.44		6.08
42		5.88		5.81		5.85		5.88		6.08		6.70		5.56
44		5.88		5.88		6.01		5.97		5.94		5.50		5.40
46		5.92		5.80		5.49		5.83		5.76		5.39		
48		5.62		5.78		5.69		5.83		5.54		5.32		
		(8)			(8)	(24)			(24)	(24)			(24)	(19)
		Ave			5.91	8.49			8.49	8.49			8.47	9.40
		46.08 total			47.19	203.81			203.79	203.79			203.30	178.68

Spike assumed to be 100.000

Line of sight = 100.000 + Rod Reading.

Rod on 1/4 mile B.M. = 2.223

FS = 13.475

BS = 1.042

Rod on spike at dam = 6.925

} Diff. in elevation 17.135 feet

" " " 17.131

" " " 0.004 foot difference

Rod on BM start line #12 = 6.005

" " " end line #7 = 6.003

" " " start line #6 = 6.005

" " " end line #4 = 6.004

" " " End survey 6.003

total
average

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

Benchmark:

H. I.

Elev.

Experimental Area: *AEF*

Basin Location: WS# 3

Date: 8-14-67

Party: Level *Leano*

Rod *Mexican*

Notes

Transects (Designated in ft. starting at crest of dam)														
Station#	6		7		8		9		10		11		12	
	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.
00														
22		11.12		11.05		11.02		11.05		10.98		10.90		10.67
04		11.02		11.02		11.01		11.00		10.95		10.83		10.71
06		10.60		11.64		10.70		10.65		10.80		10.90		10.66
08		10.45		11.28		10.14		10.02		10.39		10.78		10.77
10		10.33		10.12		9.96		9.83		10.14		10.61		10.68
12		10.34		10.05		9.82		9.62		9.29		10.37	WEN	10.56
14		10.24		9.96		9.74		9.46		9.61		10.09		
16		10.17		9.89		9.61		9.37		9.50		9.82		
18		10.06		9.79		9.61		9.32		9.29		9.53		
20		9.92		9.61		9.44		9.18		8.92				
22		9.65		9.17		8.84		8.42						
24		9.14		8.46		8.14		8.18						
26		8.47		7.93		7.93								
28		7.69		7.85										
30		7.24		7.38										
32		7.21												
34														
36														
		(16)		(12)		(13)		(12)		(10)		(9)		(3)
Ave		10.24		9.68		9.69		9.68		10.05		10.42		10.68
Total		153.65		145.20		125.96		116.10		100.47		93.80		32.04

tal
erage

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

