

REPORT OF 1966 SURVEY OF SEDIMENT BASINS BELOW STREAM GAGE SITES
1, 2, and 3 ON THE H. J. ANDREWS EXPERIMENTAL FOREST

By Ross Mersereau and Al Levno

The survey report for 1966 includes measurement notes from (1) measurement of sediment from watersheds 1 and 2, in August 1966, (2) the initial survey of watershed 3 basin after its construction in December 1965, and (3) measurement of the watershed basin before remodeling in April 1966.

Treatment on the watersheds was limited this year to completion of the skyline logging on watershed 1, which included the removal of the remaining one million board feet near the divide ridge between watershed 1 and 2. The watershed was not burned this year, and the creek remained uncleaned.

On watershed 3 one winter has passed since the catastrophic slide of December 1964. It has been 4 years since logging, and 7 years since road construction. Watershed 2 remains undisturbed.

Measurements

Elevation measurement techniques were consistent with those used in previous years.

The December 1964 slide in watershed 3 required the construction of a new sediment basin below the gaging station. The construction of the new basin was accomplished in December 1965 by installing two cedar logs across the stream and fastening 3x12 inch planks in a vertical position to the upstream side of the logs. Initial measurement of the bottom elevation was performed the same month.

In April 1966 it was decided that the steep sides of the basin allowed too much raveling of debris into the basin. The basin was remeasured and retaining walls were built along the sides and another layer of 3x12 inch planks were nailed across the face of the dam. A sheet of plastic was laid along the bottom of the basin and up the backside of the dam providing a better sediment trap. In August the basin was again measured to provide a comparison for the 1967 measurement.

Calculations

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

The elevations of the auxiliary spikes at both watershed 1 and 3 were referenced to the benchmarks at their respective gage houses.

The watershed 2 basin was cleaned and remeasured in 1965. However, the initial measurement, as it appeared in the 1965 report, required some alteration as a log installed at the intake to the basin was washed out changing the pond area. Comparison of accumulation between the years 1965 and 1966 required a decrease of measuring points from 234 to 229 and a correction of average bottom elevation data from the 1965 report. Changes were made in the 1965 survey and a new pond area was computed to be 1887 square feet.

This year's survey notes were thoroughly checked for errors. Addition of the line elevations were done with an adding machine and the machine tape was checked against the survey elevations to insure correct totals. All computations were double checked with a desk calculator.

Calculations on Table 1 for watershed 1 were computed in a subsequent method to accommodate a benchmark error. The rather large difference in benchmark readings between the start of line 5 and the end of line 1 was prorated over this survey period. The entire accumulation for this section was recalculated and the end result increased the change of bottom elevation by .001 foot.

Discussion

The period of accumulation of sediment from watershed 1 and 2 was from August 1965 to August 1966. Accumulation of sediment from watershed 3 is from December 1965 to April 1966; sediment accumulation from April 1966 to August 1966 was assumed to be negligible. Data for the fall period on watershed 3, when the heaviest accumulation is possible, is missing. The difference in time of accumulation of sediment should, therefore, be taken into account when comparison is made between watersheds.

Sediment amounts seem higher than would normally be expected for such a relatively dry year. The watershed 2 increase seems to be particularly high. This may be due to accumulated effects of channel disturbance from the 1964 flood and the inability to obtain an accurate initial reading in the disturbed basin after cleaning in August 1965. Accumulation in watershed 3 (820 cubic feet) between December and April came as a direct result of the 1964 flood. Most of the watershed 3 stream flowed through a still unhealed channel and could be expected to pick up large amounts of sediment during normal winter flows.

SEDIMENT ACCUMULATION 1965-66

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
<u>Watershed 1</u>					<u>237 Acres</u>			
1965	<u>237</u>	--	--	106.477				
(Aug.)								
1966	<u>74</u>	114.209	8.123	106.086				
(Aug.)	<u>154</u>	114.210	7.524	106.686				
	<u>9</u>	114.206	5.847	108.359				
				<u>106.562</u>				
				<u>Wt. Avg.</u>	.085	2133	181.305	.765
<u>Watershed 2</u>					<u>149 Acres</u>			
1965	152	108.075	7.542	100.533				
(Aug.)	77	108.010	6.866	<u>101.144</u>				
				100.738 =				
				Wt. Avg.				
1966	20	108.190	6.565	101.625				
(Aug.)	17	108.191	7.403	100.788				
	16	108.192	7.739	100.453				
	17	108.193	7.588	100.605				
	34	108.194	7.581	100.613				
	32	108.193	7.721	100.472				
	31	108.192	7.574	100.618				
	14	108.191	7.522	100.669				
	13	108.190	7.072	101.118				
	10	108.189	6.914	101.275				
	10	108.188	6.308	101.880				
	15	108.187	6.025	<u>102.162</u>				
	229			100.901	.163	1887	307.583	2.064
				<u>Wt. Avg.</u>				

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			.43	.26
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/}	.74	1.59 ^{3/}	.37

* Significant at the 95% level.

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

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

RI - NW
SOIL STABILIZATION
Watersheds

ELEVATIONS OF SEDIMENT ACCUMULATED IN CATCHMENT BASINS

FORM RI-2

Date: Aug. 23/66
Party: Level Scholar
Rod Leung
Notes Dynasty

Benchmarks:

H. I.
Elev.

Experimental Area: _____
Basin Location: WS. 1

[illegible]

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

H.I.
Elev.

ELEVATIONS OF SEDIMENT ACCUMULATED IN CATCHMENT BASINS.

FORM RI-2

Date: Aug. 23/66
Party: Level Zebur
Rod LEUHO
Notes DYRNES

Experimental Area: _____
Basin Location: WS 1

[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

Date: 8-24-66

Party: Level

Rod

Notes

Benchmark:

H.I.

Elev.

Experimental Area:

Basin Location: WS #2

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			4.16		4.77		4.89		5.51		5.82	
06			5.16		5.95		6.67		6.82		6.42	
09			6.06		7.14		7.66		7.71		7.98	
12			6.29		7.53		7.82		7.90		7.89	
15			6.74		7.94		7.80		7.88		7.88	
18			7.22		7.98		7.84		7.92		7.91	
21	5.92		7.45		7.94		7.89		7.81		8.09	
24	6.70		7.88		7.96		7.88		8.03		8.20	
27	6.94		7.89		8.00		7.87		8.08		8.11	
30	6.72 ^{approx}		7.77		8.02		7.87		8.05		8.08	
33	5.90		7.35		7.97		7.92		8.02		8.09	
36			6.76		7.96		7.92		8.08		8.00	
39			6.92		8.02		7.97		7.84		7.84	
42	(3)		6.71		7.84		8.28		8.01		7.77	
45	19.56		6.39		7.64		8.05		8.01		7.68	
48			5.65		7.12		7.49		6.75		6.91	
51			5.18		5.54 ^{approx}		6.86		6.38		6.53	
54			4.32		5.29							
57												
60			(17)		(17)		(16)		(17)		(17)	
			111.74									
					125.85		123.83		129.00		129.20	
					Rod on K.M. -	8.170			Start of Trans. 1			
					End line 26	8.194						
Total												
Average												

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

RI' - NW'

ELEVATIONS OF SEDIMENT ACCUMULATED IN CATCHMENT BASINS

FORM RI-2

Benchmark:

H. I.

Elev.

Experimental Area:

Basin Location:

Date: 8/24/66

Party: Level Zehbur

Rod Leuno

Notes D. Y. H. C. S.

[illegible]

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

Transect Nos.

	15	16	17	18
00			6.19	
03	4.59	5.77	6.12	
06	6.11	6.23	6.20	
09	6.41	6.47	6.11	
12	6.44	6.49	6.16	5.85
15	6.71	6.36	6.12	
18	6.95	6.29	5.86	
21	6.82	5.90	4.70	
24	6.65	5.66	4.54 TRAIL	
27	6.00	4.56		
30	5.85	4.62 TRAIL		
33	5.14			
	10	8	6	1

ROD ON B.M. - 8.187 At End of Line 18

Rod on Stump Spike - 5.303

(10)
63.08

(8)
47.96

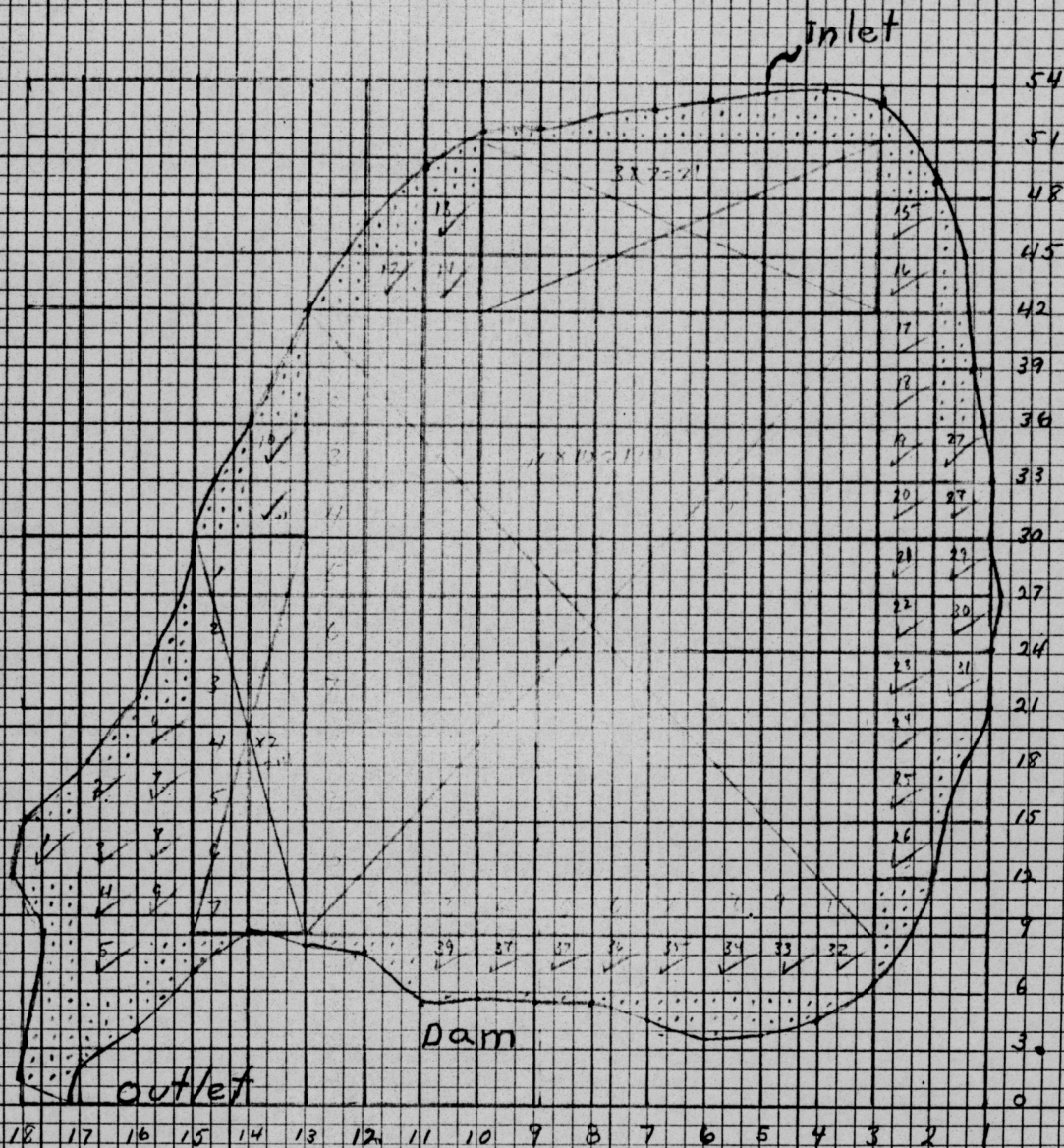
(6)
36.57

(1)
5.85

Watershed #2

Remeasurement

August, 1966



$$\text{Area} = (\# \text{ large squares} \times 9) + \# \text{ small squares} =$$

$$(194 \times 9) + 231 = 1887 \text{ ft}^2$$

RI NW
SOIL STABILIZATION
Watersheds

ELEVATIONS OF SEDIMENT ACCUMULATED IN CATCHMENT BASINS

FORM RI-2

Benchmark:

H.I. 4.86 (on dam)
Elev. .

Experimental Area:

Basin Location:

Date:

Party: Level

Rod Leamer

Notes

Station#	Transects (Designated in ft. starting at crest of dam)											
	Line 1		2		3		4		5			
	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.
0	Water Edge	4.14										
3		4.14		5.97		8.06		10.00		10.18		
6	WL	5.24		6.82	Rock	8.45		9.95		10.54		
9		5.95		7.22		9.23		10.19		10.34		
12		6.20		7.35		9.40		10.13		10.25		
15	Back of Rock 1.6	6.25		6.89		9.40		9.89		10.08		
18		5.97		7.94		9.01		9.86		9.80		
21		5.83		7.70		8.91		9.35		9.67		
24	WL	4.33		7.30		8.39		9.23		9.33		
27				5.53		7.33		8.84		8.84		
30		(6)		4.05		6.39		7.98		8.32		
33		35.44		(8)		5.65		7.26		8.03		
36				57.19		4.23		6.50		6.97		
39						3.25		5.91		6.34		
42								5.39		5.72		
45						(13)		4.70		5.26		
48								(14)		4.85		
						97.70		120.48		(16) 134.52 BS	FS	D. 11
	BM (rock spot near gate house) H.I. = 0.40											
	Temp TP #1 (in rock) 1.62 12.87 12.47											
	" TP #2 (Side of spillway) 21.86 6.28 4.57											
	17.06											
	Line of sight 104.8% for line # 1-8											
	Line of sight 106.05 for line 6-11											
Total Average												

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

RP. NW
SOIL STABILIZATION
Watersheds

ELEVATIONS OF SEDIMENT ACCUMULATED
IN CATCHMENT BASINS

FORM RI-2

Benchmark: W. Sheet 2 (Note change in H.I.)
H.I. 6.05 (Nail on dam) Experimental Area: WS #3
Elev. Basin Location: _____

Date: _____
Party: Level _____
Rod _____
Notes _____

Station*	Transects (Designated in ft. starting at crest of dam)											
	Line 6		7		8		9		10		11	
	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.
0												
3		12.00		12.03		11.26		9.73		7.69		5.01
6		11.59		11.84		11.74		10.57		8.25		5.61
9		11.56		11.63		11.56		10.45		7.91		5.72
12		11.42		11.43		11.43		10.28		7.20		5.56
15		11.22		11.30		11.29		9.42		6.57		5.02
18		11.13		11.16		11.07		8.81		6.36		4.53
21		10.95		10.74		10.39		8.39		5.65		3.72
24		10.52		10.47		9.78		7.73		5.39		3.95
27		10.33		10.42		9.16		7.41		5.42		3.62
30		9.95		9.83	Rec	8.34		7.41		5.19		3.32
33		9.12		9.15		8.69		7.23		4.89		3.07
36		8.47		8.42		8.24		7.45		4.95		2.74
39		7.72		7.63		7.89		7.32		4.94		3.10
42		7.03		7.03		7.28		6.02				
45		6.35		6.58		6.82		6.59		(13)		(13)
48		5.96		6.08		6.35		5.46				
51				5.74		6.25						
		(16)		(17)		(17)		(16)				
		155.32		161.48		157.54		130.29		80.41		55.16
Total												
Average												

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

Watershed #3

April 1966.



$$\text{Area} = (\# \text{ large squares} \times 9) + \# \text{ small squares} =$$

$$(137 \times 9) + 87 = 1320 \text{ ft}^2$$

RI - NW
SOIL STABILIZATION
Watersheds

ELEVATIONS OF SEDIMENT ACCUMULATED
IN CATCHMENT BASINS

FORM RI-2

Benchmark:

H.I. 5.40
Elev.

Experimental Area: 1/5 #3

Basin Location: H.I.A.

Date: 4/1/66

Party: Level Rothacker

Rod Leons

Notes

Station*	Transects (Designated in ft. starting at crest of dam)											
	Line 1		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.
0												
3		6.54			8.93		9.56		7.78		10.09	
6	5.84	7.45			8.94		8.89		9.30		9.13	
9	6.56	7.62			8.77		8.80		8.70		8.50	
12	6.89	8.04			8.66		8.79		8.32		8.36	
15	6.90	7.90			8.57		8.69		8.32		8.62	
18	6.01	7.66			8.24		8.35		8.34		8.68	
21	5.26	7.11			8.07		8.18		8.24		8.68	
24		6.69			8.12		8.07		8.00		8.33	
27					7.57		7.76		7.74		7.95	
30	(6)	(8)			6.52		8.02		7.43		7.47	
33	37.46											
33		59.01			5.98		7.46		7.75		7.29	
36					5.13		7.15		7.15		7.36	
39					4.06		6.29		6.86		7.08	
42							5.36		6.23		6.90	
45					(13)				5.83		6.42	
48					9.256		(14)					
							11.37		5.07		5.53	
									(16)		(16)	
									123.06		126.39	
									B.S.		F.S.	D.B.
	B.M. (Red spot on rock nr. Gage House) H.I. = 0.08											
	Temp. TP #1 (in reach) 1.68 12.80 12.72											
	Temp. TP #2 (Half S end of Spillway) (5.40) 6.05 4.37											
	1 17.09											
Total									H.I.			
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: 4/1/66
Party: Level Roller
Rod W
Notes

Benchmark:

H.I. 5.40 *check at end of*
Elev.

Experimental Area: WS #3
Basin Location: AVA

Station#	Transects (Designated in ft. starting at crest of dam)											
	Line 7		8		Line 9		Line 10		11			
	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.	H.I.	Elev.
3	10.48		10.22		9.35		8.76		4.29			
6	9.10		9.24		9.16		7.77		4.89			
9	8.60		9.12		8.98		7.50		4.92			
12	8.81		8.94		8.58		6.58		4.85			
15	9.14		8.83		8.22		6.00		4.19			
18	8.88		8.26		8.15		5.76		3.86			
21	8.75		8.39		7.65		5.11		3.02			
24	8.21		8.22		6.85		4.96		3.27			
27	8.25		8.03		6.77		4.87		2.95			
30	7.87		7.68		6.77		4.64		2.56			
33	6.86		7.68		6.48		4.45		2.41			
36	7.16		7.17		6.75		4.24		2.30			
39	7.47		7.07		6.08		4.41		2.47			
42	6.90		7.24		5.37							
45	5.64		6.96		5.23							
48	5.40		5.83		4.75							
51	6.08		5.85									
	(17)		(17)		(16)		(12)		(13)			
	133.60		134.73		115.14		75.21		45.98		1105.9	510.149 = 2111
Line of Sight 105.40 for entire survey												
Total												
Average												

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