

REPORT OF 1961 SURVEY OF SEDIMENT BASINS AT STREAM
GAGE SITES 1, 2, and 3 ON THE H. J. ANDREWS
EXPERIMENTAL FOREST

By

A. G. Wollum, II

The sediment basins below the stream gages of watersheds 1, 2, and 3 were remeasured for the 6th consecutive year on July 28 and 31, 1961, by Fredriksen, Rothacher, and Wollum. This was the second year since access roads had been constructed into watershed 3, while each of the other two watersheds have remained under an undisturbed condition.

MEASUREMENT:

The technique used for measurement of the basins has previously been outlined, with successive refinements, in the reports from 1956 through 1960. A check with a U. S. Geological Survey benchmark at watershed 3 showed no change in elevation of the spike in the hemlock from 1960.

CALCULATIONS:

Sediment accumulation was determined by the procedure outlined by Sturges in 1959. Some difficulty was experienced in reading the rod at the benchmark for watershed 2 basin, and a difference of 0.06' was noted between the original reading and the final check. A check on several fixed points in the basin revealed no change in rod readings from the original ones. It was therefore assumed that the original reading on the benchmark was in error; consequently the check reading was used to determine the average bottom elevation.

DISCUSSION:

A summary of the sediment accumulation for each of the 3 watersheds for the 6 year period of measurements has been presented in Table 1. Upon examination two facts are readily evident: sediment accumulation fluctuates widely within any single watershed basin, and sediment accumulation varies greatly from year to year.

The ratio of sediment accumulation in watershed 2 to watershed 3 appears to be useful in comparing the preconstruction period to the postconstruction period. Based on a three year average, the yearly ratio of sediment accumulation, prior to construction was 1.85, while immediately following construction of the access roads, this ratio dropped to 0.55. This would indicate a large increase in sediment in watershed 3. During the second year after disturbance, the ratio had risen to 1.12 and would appear to be heading towards normal. The conclusion is, sediment accumulation increases immediately following road construction disturbance and gradually approaches normal in the ensuing years.

Table 1: Summary of Sediment Accumulation Data for 1956-1961
H.I. Andrews Expt. For.

	Year	Ave Bottom Elev.	Change in Bottom Elev.	Ave Accn ft/acre	% of Ave Annual	Ave Accum 2/3
Watershed #1						
	1956	105.577	—	—	—	
	1957	105.832	+0.255	2.30	298.7	
	1958	105.987	+0.155	1.40	181.8	
	1959	105.969	-0.018	-0.16		
	1960	105.978	+0.009	0.08	10.4	
	1961	106.002	+0.024	0.21	27.3	
			total	3.83		
			Ave annual (Syn basis)	0.77		
Watershed #2						
	1956	101.003	—	—	—	
	1957	101.192	+0.189	2.56	146.3	1.58
	1958	101.452	+0.260	3.52	201.1	1.54
	1958*	101.402	—	—	—	
	1959	101.447	+0.045	0.61	34.9	2.34
	1960	101.464	+0.017	0.23	13.1	.55
	1961	101.598	+0.134	1.82	104.0	1.12
			total	8.74		
			Ave annual (Syn basis)	1.75		
Watershed #3						
	1956	88.921	—	—	—	
	1957	89.152	+0.231	1.52	112.6	
	1958	89.498	+0.343	2.28	168.9	
	1958**	89.263	—	—	—	
	1959***	89.303	+0.040	0.26	19.3	
	1959	89.288	—	—	—	
			total	4.06		
			Ave annual (3 yr basis)	1.35		
	1960	89.351	+0.063	0.42	31.1	
	1961	89.599	+0.248	1.63	120.7	

* Remasured after removal of some sediment from the basin.

** Recalculated after deleting 14 pts found to be unnecessary in final calculations for ave elevation of bottom.

*** Recalculated after deleting pt 48 - line 11, after it was found missing from 1960 measurements.

2.23
1.82
2.05
1.02

2.05
1.02

SEDIMENT ACCUMULATION 1960-1961

YEAR	No. Points	Line of Sight	Ave. rod. reading	Ave Bottom Elev.	Change Bottom Elev.	Basin area in sq. ft.	Total accum. ft ³	Ave accum. ft ³ /acre
Watershed #1: 237 acres								
1960	76	113.200	6.121	107.079				
	161	112.890	7.432	105.458				
wt. ave.	237			105.978				
					+0.024	2133	51.192	0.21
1961	237	112.980	6.978	106.002				
Watershed #2: 149 acres								
1960	224	106.780	5.316	101.464				
					+0.134	2016	270.144	1.82
1961	224	106.720	5.122	101.598				
Watershed #3: 250 acres								
1960	168	98.200	8.849	89.351				
					+0.248	1647	408.456	1.63
1961	136	98.890	9.378	89.512				
	32	98.960	8.960	89.940				
wt. ave.				89.599				

3

H.I.

Date 7/31/61

Party: Level Wollum
Red Patchaker
Notes Wollum

Station	Line 1 H.I.	Line 2 H.I.	Line 3 H.I.	Line 4 H.I.	Line 5 H.I.	Line 6 H.I.
00						
03						
06	2.99	from line 2 3.74	3.56	3.43	3.50	3.46
09	4.91 WE 5.0	5.64 WE 6.8	5.79 WE 7.6	5.13 WE 9.0	5.82 WE 7.9	5.26 WE 8.0
12	6.39 WE 5.7	7.36	7.71	7.90	7.56	7.60
15	7.30 WE 5.3	8.94	9.36	9.06	9.20	9.18
18	7.09 WE 5.7	9.18	10.10	10.54	10.35	10.08
21	7.26 WE 6.7	9.20	10.03	10.03	9.54	9.26
24	7.20 WE 7.2	9.31	9.64	9.29	8.71	8.42
27	6.94 WE 5.0	8.85	9.06	8.78	8.09	8.09
30	6.48 WE 5.2	8.20	8.70	8.52	8.09	8.02
33	WE 3.6	7.69	8.26	8.20	8.24	8.41
36	WE 2.8	7.12	8.78	7.94	8.46	8.54
39	WE 2.7	6.72	7.26	7.46	8.30	8.72
42	WE 1.7	5.79	7.02	7.02	7.92	8.55
45	WE 0.7	5.34	6.39	6.95	7.68	8.14
48	WE 1.9	5.04	5.29	6.64	7.40	7.78
51	WE 0.6	4.92	6.10	6.23	6.83	7.34
54	WE 1.1	4.87 WE 5.45	6.31	6.58	6.08	6.63
57			4.75 WE 5.65	5.65	5.47 59.0	6.32
60			3.38	4.81	4.74	6.67
63	(1)	(10)		4.31	4.15	5.99
66				3.86	4.11 WE	5.75
69				3.79	4.04	5.24 WE 7.16
72		(16)			4.05	4.65
75				(19)	3.94	
Red on BM - 12.98 check on BM 12.985						
assumed elev 100.00						
L.S. 112.98 (22) (27)						
48.66	81.49	125.80	140.94	154.83	164.14	

4
ELEVATIONS OF SEDIMENT ACCUMULATED
IN CATCHMENT BASINS

Experimental Area H. I. 17
Basin Location WS 1

Date 7/31/61
Party: Level Wollum
Rod Rodmaster
Notes Wollum

Station	Line 7	Line 8	Line 9	Line 10	Line 11	Line 12
	H. I.	H. I.	H. I.	H. I.	H. I.	H. I.
00						
03						
06	3.52 WE 8.5	3.37 WE 9.3	2.90	2.92		
09	5.21	4.34	3.91 WE 10.4	3.41 WE 11.6	3.15 WE 13.3	
12	7.29	6.63	5.86	5.02	4.22	3.08
15	9.91	8.25	7.48	6.76	5.79	4.16 WE 5.8
18	10.06	9.31	7.04	8.59	7.55	5.80 WE
21	9.44	9.73	9.89	9.67	8.33	5.72 21.3
24	9.63	8.95	9.61	9.51	7.79	5.21
27	8.29	8.29	8.72	9.26	7.73	4.78
30	8.24	8.28	8.42	8.79	7.59	4.54 WE 30.2
33	8.32	8.31	8.32	8.20	7.25	4.07
36	8.62	8.49	8.04	7.98	6.69	3.89
39	8.81	8.65	8.22	7.54	6.45	4.57 WE 39.2
42	8.76	8.47	8.24	7.20	6.33	5.18
45	8.36	8.26	7.68	6.75	5.85	5.47
48	7.89	7.97	7.18	6.28	5.77	5.74
51	7.60	7.27	6.66	6.42	6.03	5.70
54	7.10	6.92	6.67	6.35	6.01	5.50
57	6.76	6.81	6.49	5.98	5.92	5.14
60	6.43	6.55	6.07	5.72	5.81	5.04
63	6.34	6.37	5.87	5.79	5.54	4.85 WE 63.6
66	6.14	6.28	6.17	5.47	5.11	4.03
69	5.74	6.06	5.64	5.14	4.71 WE 69.7	3.15
72	5.89 WE 72.7	4.87 WE 72.9	5.50 WE 73.5	4.86 WE 73.7	3.33	
75	4.35	3.64	4.02	4.06		
	(22)	(22)	(21)	(21)	(9)	(18)
	169.83	165.06	155.27	147.28	122.25	89.39

5
ELEVATIONS OF SEDIMENT ACCUMULATED
IN CATCHMENT BASINS

Experimental Area H-12
Basin Location WS Sta 1

Date 7/30/61
Party: Level Wallace
Rod Rotekader
Notes Wallace

Station	Line 13 H.I.	Line 14 H. I.	H. I.	H. I.	H. I.	H. I.	H. I.
00							
03							
06							
09							
12							
15							
18							
21							
24							
27		3.02					
30		3.68	WE 32.0				
33		4.68					
36	4.07	WE 37.8	5.18				
39	5.08		5.41				
42	5.54		5.12				
45	5.45		5.17				
48	5.33		5.02				
51	5.09		4.84				
54	5.04		4.70	WE 55.4			
57	4.85		3.97				
60	4.56	WE 61.0	3.54				
63	3.79		2.34				
66	2.61						
69							
72							
75							
	(9)		(9)				
	44.73		44.09				
			total: 1653.76	# points: 237		ave rod reading: 6.98	

ELEVATIONS OF SEDIMENT ACCUMULATED IN CATCHMENT BASINS

FORM RI-2

Benchmarks:

H. I.
Elev.

Experimental Area: H. J. Andrews
Basin Location: Watershed #2

Date: 7/28/61
Party: Level Wolham
Rod Ind. 100
Notes

[illegible]

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

H.J. Anderson Expt. For
Watershed #2

7/28/61
Level: Wollum
Rod: Friedrichson

Sta	Line 8 H.I. Elev	Line 9 H.I. Elev	Line 10 H.I. Elev	Line 11 H.I. Elev	Line 12 H.I. Elev	Line 13 H.I. Elev		
00								
03	3.18 WE 4.6	3.76 WE 4.2	3.31 WE 4.6	3.61 WE 5.0	2.66	2.65		
06	5.88 ✓	5.29 ✓	4.91 ✓	4.94 ✓	4.53 WE 6.0	3.92 WE 6.8		
09	5.81 ✓	6.04 ✓	5.75 ✓	5.62 ✓	5.10	5.02		
12	5.89 ✓	5.99 ✓	5.86 ✓	5.75 ✓	5.38 ✓	5.37 ✓		
15	5.87 ✓	5.64 ✓	5.47 ✓	5.43 ✓	5.43 or truck	5.40 ✓		
18	5.72 ✓	5.49 ✓	5.21 ✓	5.03 ✓	5.15 ✓	5.02 ✓		
21	5.70 ✓	5.69 ✓	5.20 ✓	5.01 ✓	4.95 ✓	4.98 ✓		
24	5.80 ✓	5.40 ✓	5.43 ✓	5.38 ✓	5.27 ✓	5.19 ✓		
27	5.86 ✓	5.67 ✓	5.80 ✓	5.58 ✓	5.27 ✓	5.41 ✓		
30	5.79 ✓	5.82 ✓	5.89 ✓	5.37 ✓	5.29 ✓	5.59 ✓		
33	5.81 ✓	5.73 ✓	5.59 ✓	5.39 ✓	5.43 ✓	5.42 ✓		
36	5.98 ✓	5.21 ✓	5.05 ✓	5.53 ✓	5.51 ✓	5.25 ✓		
39	5.80 ✓	5.00 ✓	4.84 WE 41.3	5.42 ✓	5.44 ✓	4.94 ✓		
42	4.31 WE 41.9	3.93 WE 41.1	4.32 ✓	4.65 WE 43.8	5.04 ✓	4.69 WE 43.3		
45	3.53 ✓	3.69 ✓	3.82 ✓	4.27 ✓	4.53 WE 45.4	3.18 ✓		
48	3.62 ✓	3.52 ✓	3.96 ✓	3.86 ✓	3.82	2.65 trail		
51	3.43 ✓	3.62	3.40	3.49	2.50			
54	3.48	3.57	3.32	3.11				
57								
	(16)	(15)	(15)	(15)	(14)	(13)		
	84.80	78.11	77.10	74.23	72.32	65.46		

total: 1147.30; # points: 224
ave rod reading: 5.122

9
ELEVATIONS OF SEDIMENT ACCUMULATED
IN CATCHMENT BASINS

Benchmark:
H.I. _____

Experimental Area H.S. Andrews
Basin Location W.S. #3

Date 7/31/61
Party: Level Fredricks
Rod Wolfe
Notes Fredricks

Station	Line 1 H.I.	Line 2 H.I.	Line 3 H.I.	Line 4 H.I.	Line 5 H.I.	Line 6 H.I.
00						
03	7.70 WE 0.6	9.48	9.88	10.81 AT 3.7	11.15 AT 3.9	11.07 AT 4.2
06	WE 1.3	9.56	10.06	10.56	11.14	10.98
09	WE 0.9	9.21	10.18	10.70	10.89	10.42
12	WE 2.0	9.26	10.61	10.72	10.53	10.05
15	WE 1.5.7 WE 0.6	9.45	10.47	10.34	10.10	9.63
18	WE -1.9	WE 1.84	10.10	9.95	9.76	9.56
21	WE -8.2	WE 1.20.1	9.68	9.74	9.82	9.73
24	WE 2.40 WE 0.0	8.98	9.50	9.65	9.94	10.05
27	WE 1.5	8.91	9.31	9.63	10.06	10.40
30	WE 0.7	8.83	9.05	9.54	10.08	10.24
33	WE 1.3	8.29	8.86	9.34	9.74	9.80
36	7.61 WE 2.7	8.06	8.45	8.89	9.05	8.80
39	7.91 WE 3.6	7.78	8.08	8.91 in channel	8.42	8.17 W.E. 41.4
42	8.09 WE 4.7	8.09	8.38 in channel	8.33	8.02	
45	7.88	8.07	7.79	7.78	WE 43.8	
48	7.28 WE	6.25 WE 48.7	7.28	WE 47.7		
51			W.E. 49.1			
54						(13)
57	(4)	(13)	TP check -2.91	(15)	TP check -2.91	
60			(16)		(14)	
	31.16	110.74	147.68	144.89	138.70	128.90
	RM					
	Spike - assumed		100.00			
	F.S. Spike	Rod	4.83			
		Elev.	104.83			
	B.S. Brass Plate	Rod	0.42			
		Elev.	104.41			
	BS. Spike	Rod	3.18			
		Elev.	103.18			
	F.S. T.P.	Rod	7.20			
		Elev.	95.98			
	B.S. TP	Rod	2.91			
		Elev.	98.89			
	Spillway	Rod	7.29			
		Elev.	91.60 (91.57)			
					Spillway -	7.30
						7.23
						7.31
						7.31
						7.31
						36.46
						7.29

Elevations of sediment Accumulated in Catchment Basins

Benchmark:

H.I. _____

Experimental Area

Basin Location

H.J. Andrews
W.S. #2

Date

 Party: Level Frederickson
 Rod Wellman
 Notes Frederickson

Station	Line 7	Line 8	Line 9	Line 10	Line 11	Line 12
H.I.	H.I.	H.I.	H.I.	H.I.	H.I.	H.I.
00						
03	10.98 ^{AT. 4.4}	10.47 ^{AT 4.2}	10.04 ^{AT. 3.8}	9.45 ^{AT 4.1}	9.18 ^{AT 4.6}	9.36 ^{AT 4.9}
06	10.64	10.11	9.70	9.17	9.04	9.84
09	9.94	9.69	9.37	9.03	8.99	9.73
12	9.51	9.36	9.24	8.98 ^{island}	9.15	10.22
15	9.39	9.58	9.15	9.13	9.87	10.27
18	9.36	9.43	8.89 ^{island}	9.27	10.18	10.21
21	9.72	9.22	8.81	10.77	10.53	9.88
24	9.83	9.06	9.37	10.44	10.42	9.28
27	10.04	9.95	10.40	10.31	9.46	8.84
30	10.06	9.96	10.02	9.88	9.07 ^{S side of road}	8.74
33	9.68	9.74	9.10	7.33 ^{on 100}	9.06	8.68
36	8.77	8.47	7.95	8.43 ^{W.E. 37.8}	8.82	7.94 ^{W.E. 34.0}
39	7.37 ^{W.E. 39.2}	7.20 ^{WE 38.0 WE 39.0}	7.40 ^{W.E. 39.4}	W.E. 42.7	8.48	7.48 ^{38.1}
42		7.18 ^{W.E. 42.7}			8.29	W.E. 41.0
45				8.11	7.71 ^{47.9 W.E.}	
48				7.61		
51				49.6 W.E.		
54						
57						
60						
check on TP					check on TP	
2.91					2.91 ^{should probably use 2.92 from here on}	
(13)	(14)	(12)	(12)	(10)		
125.29	129.42	112.04	110.70	95.89		
				(5)	(13)	
total:	1275.41 ; # points: 136			42.36	120.97	
	ave rod reading: 9.378					

11

ELEVATIONS OF SEDIMENT ACCUMULATED IN CATCHMENT BASINS

Benchmark:
H.I. _____

Experimental Area H. J. Bohlen
Basin Location W.S. #2

Date _____
Party: Level Fredrickson
Rod William
Notes Fredrickson

Station	Line 13 H.I.	Line 14 H.I.	H.I.	H.I.	H.I.	H.I.
00						
03	9.12 ✓	7.47 ✓	W.E. 09			
06	9.45 ✓	8.26 ✓	W.E. 1.3			
09	9.81 ✓	8.36 ✓	W.E. 2.2			
12	10.05 ✓	8.73 ✓	W.E. 2.6			
15	9.83 ✓	8.58 ✓	W.E. 2.4			
18	9.26 ✓	7.67 ✓	W.E. 2			
21	8.66 ✓					
24	8.18 ✓					
27	7.64 ✓					
30						
33						
36						
39						
42						
45						
48						
51						
54						
57						
60						
	⑦	⑤				
	82.00	41.40				
			total: 286.73 ; # points: 32			
			are rod reading: 8.960			