

April 1944  
TECHNICAL BULLETIN No. 860 • ~~February 1943~~

# Investigations in Erosion Control and the Reclamation of Eroded Land at the Palouse Conservation Experiment Station, Pullman, Wash. 1931-42

BY  
GLENN M. HORNER  
Project Supervisor  
A. G. McCALL  
Senior Soil Conservationist  
and  
F. G. BELL  
Chief, Erosion Control Practices Division  
Research, Soil Conservation Service



DEPARTMENT OF AGRICULTURE, WASHINGTON, D. C.  
IN COOPERATION WITH THE  
WASHINGTON AGRICULTURAL EXPERIMENT STATION

## FOREWORD

Back of every great achievement is knowledge. Back of every successful human undertaking must be exact data for proper guidance of the enterprise.

Farmers of America have undertaken the gigantic task of producing more foods, fats, and fibres than America has ever produced before—vital crops needed for war. These crops—oils and fats, milk and cheese, meat and eggs, and many others—are as essential to winning the war as are tanks, planes, warships, and ammunition. Food is a first weapon of war. And our production goals will likely have to be even higher in order to feed the people of the world made hungry by war.

This puts a tremendous responsibility upon American farmers and a burden on their equipment. But American farmers know how to farm and how to get good crop yields.

It puts a strain on our farm lands, too. We do not have enough good land left under cultivation in America to do this job, *unless we use every means at our disposal to increase yields and to protect the soil while we are doing so.* And even then, we may have to bring some new land into cultivation—by irrigation, perhaps, or by drainage. Even some of the older erosion-impoverished lands may have to be put back into use through application of intensive measures for control of erosion.

Unless we take these precautions we must face such unpleasant alternatives as these: (1) We may fail to meet our war crop-production goals, and thereby prolong the conflict, or (2) much land may be laid waste by hazardous overcropping, and in this case the devastation, while less spectacular, would be no less real than that caused by bombs and shells.

These considerations put a premium on knowledge: That special kind of knowledge which will enable farmers to meet the vital war goals without so impoverishing their land that it cannot produce the even greater crops which the next succeeding year of war may demand.

This knowledge, supplementing the training and experience of American farmers as a group, points the way to a successful carrying out of the vital war crop-production enterprise upon which they have embarked and upon which America and a great deal of the world depend, today and tomorrow.

This publication contains much especially significant knowledge as it has been developed through study and research for the Palouse region of the Pacific Northwest. Briefly, it is a report of technical advances in conservation farming over a period of more than 10 years, showing not only methods used, but also the basic factors involved. They are set down clearly and they are authenticated by figures, plates, tables, and other data, concisely presented.

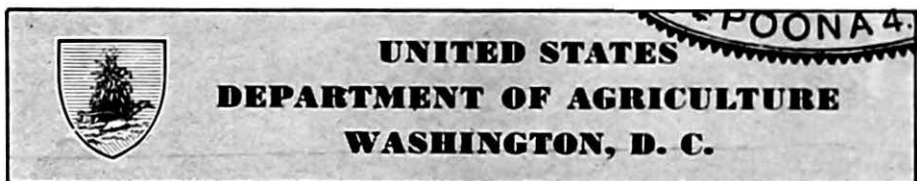
In effect, this report is a manual or handbook for technicians and for technicians only. Any soil and water conservation technician working in this region has in his copy of this report a handy pocket guide for determining degrees of slope for terrace channels on certain soils, the vertical fall between terrace crests, the expectancy of protection to be derived from various kinds of cover crops on different soils and slopes, the amount of water likely to be conserved from the average rains for crop use under various conditions of slope and soil treatment, and so on. Other reports are planned to provide the same useful data for technicians in other important farming regions.

They will contain a very large amount of quantitative data that will be particularly useful to agricultural engineers and crop specialists. In these hundreds of measurements, engineers have for the first time available data for computing the probable amount of water that will be delivered by various types of rains falling on the more common surface conditions over large areas of land in the Palouse wheat region of the Pacific Northwest. And by interpolation, the same data, considered coordinately with similar data from other regions' experiments can be used in making estimates of considerable reliability for many intervening land conditions.

These reports are not for general distribution, but in the hands of the technicians who work with the farmers they will be the means of putting into effect on the land more rapidly and more effectively than ever the essential measures to increase production for war.

H. H. BENNETT,

*Chief, Soil Conservation Service.*



# Investigations in Erosion Control and Reclamation of Eroded Land at the Palouse Conservation Experiment Station, Pullman, Wash., 1931-42<sup>1</sup>

By GLENN M. HORNER, *project supervisor*, A. G. McCALL, *senior*  
and F. G. BELL, *chief, Erosion Control Practices*  
*Research, Soil Conservation Service*<sup>2</sup>

The United States Department of Agriculture, *Soil Conservation Service*  
in cooperation with the Washington Agricultural Experiment Station

## CONTENTS

	Page	Results of experiments—Continued.	Page
Summary .....	1	Effect of plant cover .....	23
Introduction .....	4	Effect of crop rotations .....	27
The problem area .....	5	Soil erodibility .....	34
Erosion and runoff history .....	9	Moisture studies .....	36
The station .....	9	Tillage practices .....	40
Description .....	10	Terracing studies .....	44
Purpose and plan of experiments .....	13	Watershed areas .....	53
Measurement of erosion losses .....	13	Discussion of results .....	56
Other investigations .....	19	Literature cited .....	59
Contributing records .....	20	Appendix .....	60
Results of experiments .....	20	Observational data describing important	
Rainfall characteristics and erosion .....	21	seasonal and daily conditions .....	81

## SUMMARY

The Palouse region, where most of the results of this station are applicable, has a steeply rolling, dunelike topography. The hills have south and southwest slopes which are longer and not as steep as the north and northeast slopes. Silt loam soils are dominant in the area, the most important of which is the Palouse series. The average annual precipitation at Pullman is 20.54 inches of which a large part occurs during the period from November to March. Rainfall intensities are relatively low in comparison with other sections of the country.

The most serious erosion has occurred on the hilltops, where the soils are shallow, and on the upper parts of south slopes. Climatic factors most closely related to the erosion problem are: (1) Prolonged winter rains falling on wet or saturated soil, (2) melting snow with or

<sup>1</sup> Submitted for publication May 1943.

<sup>2</sup> Former members of the station staff who contributed to the planning and development of the research program are W. A. Rockie, P. C. McGrew, C. E. Deardorff, and S. J. Mech. L. M. Nafziger and O. A. Leonard, who have been on the station staff continuously since the work was inaugurated, have contributed much to the accuracy of the work.

## APPENDIX

In order to avoid an excess of tabular material throughout the text, the data of the individual tables necessary for deriving the summary tables and figures used in the text have been placed in this appendix as tables 24 to 33.

The data presented in this appendix probably will be of only minor interest to the casual reader, but, as they give specific records of the results of experimentation from year to year, they will be of practical value and interest to technical workers in the field of soil conservation. Observational data briefly describing important seasonal and daily conditions are also appended.

**TABLE 24.—Precipitation at 5 locations in the problem area tabulated as 3-year moving averages for the period 1893-1941**

Date	Pullman, Wash.	Average of 5 <sup>1</sup> locations	Date	Pullman, Wash.	Average of 5 <sup>1</sup> locations
	<i>Inches</i>	<i>Inches</i>		<i>Inches</i>	<i>Inches</i>
1893-95	20.04	20.56	1917-19	18.53	17.34
1894-96	21.14	20.37	1918-20	18.12	17.54
1895-97	23.52	21.32	1919-21	20.03	19.46
1896-98	23.76	21.97	1920-22	19.06	17.63
1897-99	24.43	22.93	1921-23	18.18	17.67
1898-1900	25.16	22.61	1922-24	15.75	15.71
1899-1901	24.61	23.19	1923-25	15.74	16.49
1900-1902	22.86	22.43	1924-26	15.32	17.26
1901-3	19.96	20.65	1925-27	23.84	21.38
1902-4	21.70	20.47	1926-28	24.53	21.19
1903-5	21.03	19.03	1927-29	21.29	18.32
1904-6	22.34	20.27	1928-30	17.29	14.73
1905-7	22.15	20.77	1929-31	18.38	16.01
1906-8	21.30	19.53	1930-32	20.42	18.57
1907-9	21.65	19.47	1931-33	23.00	21.25
1908-10	20.90	19.06	1932-34	22.77	20.94
1909-11	20.73	18.56	1933-35	20.11	18.54
1910-12	19.31	18.48	1934-36	16.11	15.21
1911-13	20.65	19.58	1935-37	17.73	16.97
1912-14	20.54	20.41	1936-38	17.79	17.43
1913-15	19.58	19.23	1937-39	18.01	17.34
1914-16	19.84	19.25	1938-40	17.56	18.13
1915-17	21.55	20.04	1939-41	20.41	20.74
1916-18	20.78	18.63			

<sup>1</sup> Pullman, Colfax, Rosalia, and Walla Walla, Wash.; and Moscow, Idaho. Annual averages for 49-year period: Pullman, 20.54 inches; Colfax, 20.12 inches; Rosalia, 18.31 inches; Walla Walla, 16.24 inches; Moscow, 21.80 inches.

**TABLE 25.—Precipitation by months for the period Jan. 1, 1931, to Dec. 31, 1941. Gage in field 3**

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
	<i>In.</i>	<i>In.</i>	<i>In.</i>	<i>In.</i>	<i>In.</i>	<i>In.</i>	<i>In.</i>	<i>In.</i>	<i>In.</i>	<i>In.</i>	<i>In.</i>	<i>In.</i>	<i>In.</i>
1931	2.27	1.28	3.38	1.07	0.60	1.24	0.05	0	0.81	1.80	2.34	3.30	18.24
1932	3.50	2.84	4.53	1.31	2.07	.28	.78	.15	.15	2.24	4.35	2.43	24.63
1933	4.43	2.76	1.84	.56	.85	1.01	.22	.48	1.55	4.42	1.66	8.23	28.01
1934	2.66	.47	2.65	.79	1.17	2.67	.20	.03	.54	2.76	2.31	3.42	19.67
1935	2.93	1.08	2.23	2.13	.25	.62	.25	.60	.26	.74	.97	2.52	14.58
1936	5.14	1.50	1.65	.62	1.08	.71	.09	.00	1.33	.27	.12	1.98	14.46
1937	3.73	3.39	2.03	3.14	.57	3.76	.90	.49	.26	1.21	3.34	4.32	27.14
1938	1.73	2.19	2.28	1.03	.89	1.06	.28	.06	.87	1.84	2.37	1.49	16.09
1939	1.33	3.98	2.91	.26	.72	.24	.57	.00	.24	.97	.36	4.04	15.62
1940	1.75	4.83	2.65	1.98	.37	.29	1.04	.00	2.76	3.93	3.74	2.51	25.85
1941	2.30	1.23	1.06	1.99	4.22	4.02	.27	1.09	1.84	1.00	2.73	3.46	25.21
Average	2.89	2.32	2.47	1.35	1.16	1.45	.42	.26	.96	1.94	2.21	3.43	20.86
Average, 1893-1941	2.72	2.11	2.19	1.49	1.48	1.29	.47	.55	1.18	1.68	2.76	2.72	20.54

TABLE 26.—Runoff and soil loss by months from south control plot 13 (bare hard fallow) for the period July 1, 1931, to June 30, 1942

Year	Runoff												Total		
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.			
	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.			
1931													0.267	0.473	0.740
1932	1.620	1.549	1.824	0.042	0.087					0.091	1.696	1.400	8.309	8.309	
1933	2.127	.952	.840			0.004			0.006	.654	.701	4.007	9.291	9.291	
1934	1.179		.254	.031	.025	.219				.437	.164	.554	2.803	2.803	
1935	.956	.023	.061	.099								.073	1.212	1.212	
1936	1.313	1.117	.132	.004	.010							.222	2.708	2.708	
1937		.802	.435	1.123		.883	0.079	0.062		.011	.698	.641	4.734	4.734	
1938	.487	.604	1.020							.150	.411	.173	2.845	2.845	
1939	.159	1.354	2.045	.003								.567	3.928	3.928	
1940	.796	2.461	.760	.325					.860	1.351	.728	.044	6.823	6.823	
1941	.301	.063	.069	.222	.051	.189		.165	.170	.080	.921	.996	3.277	3.277	
1942	.150	.473	.141										.764	.764	
Average runoff	.826	.854	.689	.168	.016	.118	.007	.021	.049	.252	.508	.822	4.330	4.330	
Runoff <sup>1</sup>	30.15	37.96	31.61	12.54	1.31	8.25	1.79	8.40	5.21	13.19	23.96	24.91	21.57	21.57	
Soil loss per acre															
	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	
1931															
1932	18.711	0.298	22.754	0.212	1.278					0.886	2.128	0.836	2.964	2.964	
1933	3.580	.065	6.599			0.038			0.038	4.557	3.789	19.544	38.190	38.190	
1934	8.456		1.295	.031	.328	.654				1.758	.153	6.492	19.167	19.167	
1935	.346	.010	.002	.509								.070	.937	.937	
1936	6.920	.279	1.712	.002	.164							1.264	10.341	10.341	
1937		.144	5.994	11.947		6.169	2.136	1.043		.043	1.804	2.926	32.206	32.206	
1938	5.326	2.502	6.939							1.303	2.288	2.780	21.138	21.138	
1939	1.907	.536	3.063	.001								3.159	8.666	8.666	
1940	.401	35.319	4.437	2.004					3.591	2.185	1.985	.067	50.039	50.039	
1941	.755	.604	4.76	1.092	.081	2.470		5.176	1.465	.350	3.138	9.460	24.973	24.973	
1942	.368	4.265	.720										5.353	5.353	
Average	4.25	3.99	4.91	1.44	.17	.85	.19	.57	.46	1.01	2.14	4.29	24.27	24.27	

<sup>1</sup> Runoff in percentage of the precipitation. Precipitation (inches): January, 2.74; February, 2.25; March, 2.18; April, 1.34; May, 1.22; June, 1.43; July, 0.39; August, 0.25; September, 0.94; October, 1.91; November, 2.12; December, 3.30; 11-year annual average, 20.07.

TABLE 27.—Summary of storms which caused soil losses in excess of 0.50 ton per acre from south control plot 13 (bare hard fallow) during the period July 1, 1931, to June 30, 1942

Date	Storm characteristics						Runoff in percentage of total rain	Soil loss per storm per acre	Soil condition when storm began
	Maximum rate per hour for —			Amount	Runoff in percentage of total rain	Soil loss per storm per acre			
	5-minute period	15-minute period	30-minute period						
<b>1933</b>									
Mar. 24		Inches	Inches	Inches	Inches	Percent	Tons	Very wet.	
Mar. 27-28		0.46	0.24	0.18	0.18	67.6	9.23	Do.	
May 21		.81	.48	.24	.24	52.0	7.11	Dry.	
Nov. 16		.70	1.08	.36	.20	12.4	1.28	Very wet.	
		.82	.12	.12	.12	88.9	7.57		
<b>1933</b>									
Oct. 21		.76	.24	.16	.14	26.1	1.00	Moist.	
Oct. 28		1.21	.36	.32	.32	25.0	2.28	Do.	
Nov. 2-3		1.00	.36	.24	.18	59.3	3.40	Very wet.	
Dec. 5-6		2.20	.48	.28	.20	46.7	9.19	Moist.	
Dec. 8-10		2.00	.24	.20	.20	66.3	3.16	Very wet.	
Dec. 14		.09	.12	.12	.06	41.1	.61	Do.	
Dec. 21-23		.97	.54	.32	.16	83.9	4.97	Do.	

TABLE 27.—Summary of storms which caused soil losses in excess of 0.50 ton per acre from south control plot 13 (bare hard fallow) during the period July 1, 1931, to June 30, 1942—Continued.

Date	Storm characteristics				Runoff in percentage of total rain	Soil loss per storm per acre	Soil condition when storm began
	Amount	Maximum rate per hour for —					
		5-minute period	15-minute period	30-minute period			
<b>1934</b>							
Jan. 2-3	Inches 0.58	Inches 0.24	Inches 0.20	Inches 0.16	Percent 40.0	Tons 1.43	Moist.
Jan. 16-17	.39	.24	.16	.10	30.0	1.32	Do.
Jan. 22-23	.96	.15	.15	.15	76.6	5.28	Very wet.
June 26	1.66	.36	.32	.32	12.3	.57	Dry.
Oct. 23-24	1.22	.24	.24	.22	35.8	1.76	Moist.
Dec. 21	.64	.48	.24	.16	68.8	6.46	Very wet.
<b>1936</b>							
Jan. 10-11	.65	.18	.10	.10	20.5	2.17	Do.
Jan. 12-13	1.08	.24	.12	.12	48.8	3.19	Do.
Mar. 27	.46	.20	.16	.16	11.7	1.13	Moist.
<b>1937</b>							
Mar. 2	.29	.96	.48	.26	64.6	5.13	Do.
Apr. 4	.42	.48	.32	.16	47.9	2.65	Do.
Apr. 12-13	.57	.36	.28	.24	57.4	6.05	Do.
Apr. 14-15	.43	.18	.12	.10	57.7	1.29	Very wet.
June 10	.75	.54	.36	.28	27.6	3.48	Moist.
June 18	.21	.60	.48	.30	50.0	1.18	Do.
June 22	.68	.96	.48	.30	46.9	.50	Do.
July 28	.28	1.68	.76	.48	28.2	2.14	Dry.
Aug. 13	.23	1.08	.48	.32	27.0	1.04	Do.
Nov. 13	.46	.18	.16	.12	35.7	.53	Moist.
Dec. 10-11	.69	.36	.28	.28	16.2	1.28	Do.
<b>1938</b>							
Jan. 22	.21	.18	.14	.08	69.0	.80	Very wet.
Feb. 1	.22	.30	.24	.18	14.5	.57	Moist.
Mar. 5	.22	.36	.16	.14	30.5	2.34	Do.
Mar. 14	.27	.18	.06	.06	30.4	1.76	Do.
Mar. 15-16	.22	.18	.06	.06	67.3	1.27	Very wet.
Oct. 10-11	.55	.84	.32	.16	15.5	1.05	Moist.
Nov. 3	.10	.84	.32	.16	65.0	.95	Very wet.
Dec. 2	.53	.30	.16	.10	7.5	1.58	Moist.
Dec. 5	.14	.21	.15	.12	40.0	1.19	Do.
<b>1939</b>							
Dec. 15-16	.59	.24	.20	.20	16.8	.51	Do.
Dec. 16-17	.61	.84	.60	.35	37.0	2.54	Do.
<b>1940</b>							
Feb. 5-6	1.24	.24	.16	.14	51.0	8.04	Very wet.
Feb. 9	.20	.12	.08	.06	54.0	1.48	Do.
Feb. 25-28	1.27	.36	.20	.18	77.9	14.74	Do.
Feb. 28	.23	.36	.20	.16	94.6	2.49	Do.
Mar. 1-2	.31	.12	.08	.06	42.6	.53	Do.
Mar. 4	.07	.18	.08	.04	87.1	.47	Do.
Mar. 7	.88	.24	.20	.20	63.1	3.47	Do.
Apr. 9	.21	.24	.24	.20	49.5	.59	Moist.
Apr. 9	.19	.48	.36	.26	63.8	1.08	Do.
Sept. 13	.49	.60	.52	.38	16.0	1.52	Dry.
Sept. 18	.71	.24	.16	.16	29.2	1.78	Moist.
Oct. 3-4	1.46	.24	.24	.18	44.3	1.38	Do.
Nov. 28-29	1.12	.24	.20	.18	31.5	1.80	Very wet.
<b>1941</b>							
Jan. 25	.29	.24	.24	.22	39.0	.67	Moist.
Apr. 9-10	1.17	.72	.36	.26	17.5	1.05	Dry.
June 4-8	1.13	1.44	.84	.60	40.0	2.26	Do.
Aug. 26	.50	1.92	1.68	.58	32.6	5.17	Do.
Sept. 2-3	.44	.60	.24	.22	7.3	.50	Moist.
Dec. 2-3	1.14	.36	.20	.18	27.5	6.29	Do.
Dec. 5-6	.28	.24	.16	.12	46.8	1.26	Very wet.
Dec. 16	.33	.12	.08	.06	51.2	1.03	Do.
<b>1942</b>							
Feb. 1	.46	.12	.08	.08	38.5	2.79	Moist.
Feb. 2	.49	.18	.12	.10	52.8	1.43	Very wet.

TABLE 28.—Runoff and soil losses from the south control plots,<sup>1</sup> July 1, 1931, to June 30, 1942. Palouse silt loam soil, 30-percent south slope

JULY 1, 1931 TO JUNE 30, 1932—PRECIPITATION, 22.93 INCHES

Plot No.	Crop condition	Crop yield per acre	Runoff		Soil loss per acre
			Inches	Percent	
1	Winter wheat stubble	<i>Bushels</i>	0.174	0.76	<i>Tons</i> 0.017
2	do		.138	.60	.042
3	do		.732	3.19	.509
4	Sweetclover	<i>Tons</i> 16.4	.791	3.45	1.111
5	Winter wheat	<i>Bushels</i> 31.3	1.740	7.59	16.603
6	Grass		1.992	8.69	5.128
7	Summer wheat stubble	28.3	.960	4.19	2.226
8	Winter wheat	31.9	3.476	15.16	36.367
9	Sweetclover	<i>Tons</i> 1.7	3.449	15.04	23.802
10	Winter wheat	<i>Bushels</i> 30.0	3.629	15.83	30.690
11	Winter wheat stubble	24.8	.799	3.48	1.565
12	Summer wheat stubble		2.625	11.45	5.299
13	Bare, untilled		5.862	25.56	46.217
14	Winter wheat stubble		4.974	21.69	10.929
15					

JULY 1, 1932, TO JUNE 30, 1933—PRECIPITATION, 21.54 INCHES

1	Winter wheat	42.0	0.398	1.85	0.055
2	do	36.2	.114	.53	.037
3	do	44.4	2.134	9.91	1.099
4	do	50.8	1.981	9.20	1.036
5	Winter wheat stubble		2.953	13.71	1.268
6	Grass		1.309	6.08	.764
7	Summer wheat stubble	23.2	.693	3.22	.451
8	Winter wheat stubble		4.476	20.78	.487
9	Winter wheat	38.9	3.272	15.19	3.133
10	Winter wheat stubble	16.3	5.247	24.36	1.040
11	Summer wheat stubble	16.4	1.610	7.47	.710
12	Sweetclover	<i>Tons</i> 6.6	4.276	19.85	2.431
13	Bare	<i>Bushels</i>	7.200	33.43	20.004
14	Winter wheat	8.9	2.740	12.72	.586
15	do	37.9	.058	.27	.009

JULY 1, 1933, TO JUNE 30, 1934—PRECIPITATION, 27.04 INCHES

1	Winter wheat stubble		0.003	0.01	0.011
2	do		.000	.00	.000
3	do		.063	.31	.080
4	do	15.6	.243	.90	.572
5	Winter wheat	31.7	5.073	18.76	27.792
6	Grass	<i>Tons</i> 1.5	.002	.01	.001
7	Summer wheat stubble	<i>Bushels</i> 13.3	1.225	4.53	3.960
8	Winter wheat	22.9	5.299	19.49	29.581
9	Winter wheat stubble	12.0	.774	2.86	1.600
10	Summer wheat stubble	21.5	1.480	5.47	9.235
11	Sweetclover	<i>Tons</i> 4.7	4.471	16.53	21.865
12	Winter wheat	<i>Bushels</i> 41.5	3.656	13.52	23.192
13	Bare		7.076	26.17	38.690
14	Winter wheat stubble		1.893	7.00	4.498
15	do		.298	1.10	.183

See footnote at end of table.

TABLE 28.—Runoff and soil losses from the south control plots,<sup>1</sup> July 1, 1931, to June 30, 1942. Palouse silt loam soil, 30-percent south slope—Continued

JULY 1, 1934, TO JUNE 30, 1935—PRECIPITATION, 18.57 INCHES

Plot No.	Crop condition	Crop yield per acre	Runoff		Soil loss per acre
			Inches	Percent	
		<i>Bushels</i>			<i>Tons</i>
1	Winter wheat	47.5	0.192	1.03	0.423
2	do	40.8	.134	.72	1.407
3	do	51.3	.203	1.09	.102
4	Summer wheat stubble		.023	.12	.004
5	Winter wheat stubble		.050	.27	.011
6	Grass	.9	.025	.13	.002
		<i>Bushels</i>			
7	Summer wheat stubble	16.5	.015	.08	.019
8	Winter wheat stubble		.033	.18	.012
9	Summer wheat stubble	26.8	.003	.02	.000
10	Sweetclover	9.0	.009	.05	.000
		<i>Bushels</i>			
11	Winter wheat	41.9	.094	.51	.038
12	Winter wheat stubble	13.4	.007	.04	.003
13	Bare		2.294	12.35	9.271
14	Winter wheat	20.0	.725	3.90	1.048
15	do	22.9	.753	4.05	.575

JULY 1, 1935, TO JUNE 30, 1936—PRECIPITATION, 16.02 INCHES

1	Winter wheat stubble		0.070	0.44	0.003
2	do		.017	.11	0
3	do		.023	.14	.001
4	Sweetclover	9.4	.260	1.62	.245
		<i>Tons</i>			
5	Winter wheat	33.2	.283	1.77	1.126
		<i>Bushels</i>			
6	Grass	.9	.208	1.30	.005
		<i>Tons</i>			
7	Summer wheat stubble	32.9	.458	2.86	2.174
8	Winter wheat	37.1	.377	2.35	1.405
		<i>Bushels</i>			
9	Sweetclover	1.5	.911	5.69	8.166
		<i>Tons</i>			
10	Winter wheat	46.7	.097	.61	.001
11	Winter wheat stubble	17.6	.092	.57	.002
12	Summer wheat stubble	27.7	.109	.68	.112
13	Bare		2.649	16.54	9.148
14	Winter wheat stubble		.089	.56	.003
15	do		.091	.57	.003

JULY 1, 1936, TO JUNE 30, 1937—PRECIPITATION, 30.12 INCHES

1	Winter wheat	48.6	0.488	2.43	0.022
2	do	38.0	.738	3.67	.075
3	do	48.0	.885	3.40	.077
4	do	45.3	.428	2.13	.114
5	Winter wheat stubble		.118	.59	.003
6	Grass	1.1	.178	.88	.004
		<i>Tons</i>			
7	Summer wheat stubble	26.6	.021	.10	.001
8	Winter wheat stubble		.198	.98	.005
9	Winter wheat	45.7	.509	2.53	.946
10	Winter wheat stubble	18.8	.132	.66	.003
11	Summer wheat stubble	31.5	.147	.73	.012
12	Sweetclover	13.01	.344	1.71	.105
		<i>Tons</i>			
13	Bare		3.465	17.22	25.517
14	Winter wheat	22.3	.970	4.82	2.599
15	do	14.5	3.06	1.52	.047

See footnote at end of table.



TABLE 28.—Runoff and soil losses from the south control plots,<sup>1</sup> July 1, 1931, to June 30, 1942. Palouse silt loam soil, 50-percent south slope—Continued

JULY 1, 1937, TO JUNE 30, 1938—PRECIPITATION, 18.56 INCHES

Plot No.	Crop condition	Crop yield per acre	Runoff		Soil loss per acre
			Inches	Percent	
1	Winter wheat stubble	<i>Bushels</i>	0	0	0
2	do		0	0	0
3	do		.014	.08	.001
4	do	21.7	.005	.03	.001
5	Winter wheat	35.8	.249	1.34	.114
6	Grass	<i>Tons</i>	1.4	.009	.05
7	Summer wheat stubble	<i>Bushels</i>	22.0	.001	.01
8	Winter wheat	34.9	.329	1.77	.118
9	Winter wheat stubble	15.0	.002	.01	0
10	Summer wheat stubble	7.6	.007	.04	.004
		<i>Tons</i>	3.60	1.94	1.063
11	Sweetclover	5.9	.131	.71	.013
12	Winter wheat	54.6			
13	Bare		3.601	19.40	22.721
14	Winter wheat stubble		.106	1.06	.241
15	do		.007	.04	0

JULY 1, 1938, TO JUNE 30, 1939—PRECIPITATION, 15.38 INCHES

1	Winter wheat	42.5	0.012	0.08	0.001
2	do	29.1	.054	.35	.006
3	do	39.5	.645	4.19	.803
4	Summer wheat stubble		.128	.83	.002
5	Winter wheat stubble		.057	.37	.001
6	Grass	<i>Tons</i>	.8	.149	.97
7	Summer wheat stubble	<i>Bushels</i>	32.3	.046	.30
8	Winter wheat stubble		.210	1.37	.003
9	Summer wheat stubble	23.1	.074	.48	.001
10	Sweetclover	<i>Tons</i>	13.9	.077	.50
11	Winter wheat	<i>Bushels</i>	42.0	.268	1.74
12	Winter wheat stubble	20.2	.060	.39	.001
13	Bare		4.295	27.93	11.877
14	Winter wheat	18.4	.845	5.49	5.152
15	do	13.3	.089	.58	.002

JULY 1, 1939 TO JUNE 30, 1940—PRECIPITATION, 16.35 INCHES

1	Winter wheat stubble		0.007	0.04	0.002
2	do		.002	.01	0
3	do		.013	.08	.004
4	Sweetclover	<i>Tons</i>	18.8	.004	.02
5	Winter wheat	<i>Bushels</i>	27.0	.977	5.96
6	Grass	<i>Tons</i>	.8	.021	.13
7	Summer wheat stubble	<i>Bushels</i>	11.9	0	0
8	Winter wheat	19.5	.808	5.31	6.909
9	Sweetclover	<i>Tons</i>	9.8	.708	4.33
10	Winter wheat	<i>Bushels</i>	52.7	.504	3.08
11	Winter wheat stubble	11.9	.017	.10	0
12	Summer wheat stubble	13.5	.015	.09	.001
13	Bare		4.710	28.81	45.370
14	Winter wheat stubble		.113	.69	.295
15	do		.002	.01	.001

See footnote at end of table.

TABLE 28.—Runoff and soil losses from the south control plots,<sup>1</sup> July 1, 1931, to June 30, 1942. Palouse silt loam soil, 30-percent south slope—Continued

JULY 1, 1940 TO JUNE 30, 1941—PRECIPITATION, 26.59 INCHES

Plot No.	Crop condition	Crop yield per acre	Runoff		Soil loss per acre
			Inches	Percent	
1.	Winter wheat	Bushels 53.0	0.284	1.07	Tons 1.297
2.	do	37.3	.059	.22	.123
3.	do	46.3	.183	.69	.396
4.	do	63.2	.002	.01	.001
5.	Winter wheat stubble		0	0	0
6.	Grass	Tons 1.2	.001	0	0
7.	Summer wheat stubble	Bushels 31.0	.222	.83	.150
8.	Winter wheat stubble		.026	.10	.110
9.	Winter wheat	58.2	.074	.28	.252
10.	Winter wheat stubble	16.0	.169	.64	.153
11.	Summer wheat stubble	27.8	0	0	0
12.	Sweetclover	Tons 23.6	.018	.07	.004
			3.377	12.70	12.206
13.	Bare	Bushels			
14.	Winter wheat	23.3	.809	3.04	2.941
15.	do	20.2	.001	0	0

JULY 1, 1941, TO JUNE 30, 1942—PRECIPITATION, 17.58 INCHES

1.	Winter wheat stubble		0.058	0.33	0.002
2.	do		.053	.30	.009
3.	do		.019	.11	.005
4.	do		0	0	0
5.	Winter wheat		.112	.64	4.043
6.	Grass		0	0	0
7.	Summer wheat stubble		0	0	0
8.	Winter wheat		.221	1.26	5.694
9.	Winter wheat stubble		.039	.22	.002
10.	Summer wheat stubble		.039	.22	.016
11.	Sweetclover		.263	1.50	.315
12.	Winter wheat		.021	.12	.257
13.	Bare, untilled		3.097	17.62	24.949
14.	Winter wheat stubble		.122	.69	.131
15.	do		0	0	0

<sup>1</sup> Plot 1, half length  $\frac{1}{2}$  acre; plot 2, double length,  $\frac{1}{2}$  acre; plots 1, 2, 3, 5, 8, winter wheat-summer fallow; plot 7, spring wheat fertilized; plot 4, 4-year rotation (sweetclover, sweetclover under in June, winter wheat, spring wheat); plot 5, subsoiled; plots 9, 10, 11, 12, 4-year rotation (peas and sweetclover, clover under in June, winter wheat, spring wheat); plots 14 and 15, desurfaced, winter wheat-summer fallow.

TABLE 29.—Runoff and soil losses from the crop rotation plots, July 1, 1938, to June 30, 1942. Palouse silt loam soil, 30-percent south slope

JULY 1, 1938 TO JUNE 30, 1939—PRECIPITATION, 15.38 INCHES

Plot No.	Crop condition	Rotation <sup>1</sup> No.	Runoff		Soil loss per acre
			Inches	Percent	
3.	Summer wheat stubble	2	0.058	0.38	Tons 0.001
4.	Rough plowing	6	.015	.10	.001
6.	do	8	.066	.43	.002
7.	Winter wheat stubble	7	.061	.40	0
9.	Winter wheat	1	.058	.38	.028
10.	Winter wheat stubble	3	.095	.62	.002
12.	Summer wheat stubble	4	.045	.29	.002
14.	Winter wheat	5	.169	1.10	.023
16.	Summer fallow	2	.133	.86	.018
18.	Summer wheat stubble	6	.023	.15	.002
19.	do	8	.156	1.01	.002
21.	Winter wheat stubble	5	.092	.60	.003
22.	do	1	.260	1.69	.017
25.	Rough plowing	4	.183	1.19	.072
28.	Winter wheat	7	.357	2.32	.046
29.	do	3	.507	3.30	.088

See footnotes at end of table.

TABLE 29.—Runoff and soil losses from the crop rotation plots, July 1, 1938, to June 30, 1942. Palouse silt loam soil, 30-percent south slope—Continued

JULY 1, 1939 TO JUNE 30, 1940—PRECIPITATION, 16.35 INCHES

Plot No.	Crop condition	Rotation <sup>1</sup> No.	Runoff		Soil loss per acre
			Inches	Percent	Tons
3.....	Summer fallow.....	2	1.001	6.12	14.085
4.....	Summer wheat stubble.....	6	0	0	0
6.....	do.....	8	0	0	0
7.....	Winter wheat.....	7	.744	4.55	6.851
9.....	Winter wheat stubble.....	1	0	0	0
10.....	Winter wheat.....	3	1.443	8.83	13.953
12.....	Rough plowing <sup>2</sup> .....	4	1.321	8.08	19.540
14.....	Winter wheat stubble.....	5	.006	.04	.003
16.....	Summer wheat stubble.....	2	0	0	0
18.....	Rough plowing <sup>2</sup> .....	6	.941	5.70	10.511
19.....	do.....	8	.613	3.75	6.524
21.....	Winter wheat.....	5	1.469	8.98	15.612
22.....	do.....	1	1.836	11.23	19.155
25.....	Summer wheat stubble.....	4	.104	.64	.121
28.....	Winter wheat stubble.....	7	0	0	0
29.....	do.....	3	.062	.38	.050

JULY 1, 1940, TO JUNE 30, 1941—PRECIPITATION, 26.59 INCHES

3.....	Summer wheat stubble.....	2	0.002	0.01	0.002
4.....	Rough plowing.....	6	0	0	0
6.....	do.....	8	.001	0	0
7.....	Winter wheat stubble.....	7	0	0	0
9.....	Winter wheat.....	1	.049	.18	.064
10.....	Winter wheat stubble.....	3	.006	.02	0
12.....	Summer wheat stubble.....	4	.005	.02	.001
14.....	Winter wheat.....	5	.009	.03	.009
16.....	Summer fallow.....	2	.121	.46	.208
18.....	Summer wheat stubble.....	6	0	0	0
19.....	do.....	8		0	0
21.....	Winter wheat stubble.....	5	.003	.01	.001
22.....	do.....	1	.111	.42	.024
25.....	Rough plowing.....	4	.004	.02	.001
28.....	Winter wheat.....	7	.066	.25	.079
29.....	do.....	3	.154	.58	.142

JULY 1, 1941, TO JUNE 30, 1942—PRECIPITATION, 47.58 INCHES

3.....	Summer fallow.....	2	0.967	5.50	15.771
4.....	Summer wheat stubble.....	6	.034	.19	.014
6.....	do.....	8	.012	.07	.004
7.....	Winter wheat.....	7	.034	.19	.042
9.....	Winter wheat stubble.....	1	.010	.06	.002
10.....	Winter wheat.....	3	.103	.59	.343
12.....	Rough plowing <sup>2</sup> .....	4	.037	.21	.103
14.....	Winter wheat stubble.....	5	.014	.08	.004
16.....	Summer wheat stubble.....	2	.020	.16	.007
18.....	Rough plowing <sup>2</sup> .....	6	.242	1.38	.647
19.....	do.....	8	.245	1.39	.742
21.....	Winter wheat.....	5	.081	.46	.244
22.....	do.....	1	.614	3.49	6.961
25.....	Summer wheat stubble.....	4	.033	.19	.011
28.....	Winter wheat stubble.....	7	.007	.04	.001
29.....	do.....	3	.010	.06	.003

<sup>1</sup> Rotation No. 1, winter wheat-summer fallow; No. 2, spring wheat-summer fallow; No. 3, winter wheat-peas; No. 4, spring wheat-peas; No. 5, winter-wheat-peas and spring wheat under; No. 6, spring wheat-peas and spring wheat under; No. 7, winter wheat-Hubam clover under; No. 8, spring wheat-Hubam clover under.

<sup>2</sup> The furrows were placed at right angles to the contour when the pea land in rotation 4 and the green-manure land in rotations 6 and 8 were plowed in 1938 and 1939. It is believed that the high erosion losses on these plots in the spring of 1940 were caused, to a large degree, by this practice. Contour tillage was practiced in 1940 and 1941.

TABLE 30.—Surface runoff and soil loss in runoff from graded terraces<sup>1</sup> with different vertical spacings, 1932-38

Date	Average rate of rainfall for period of—			Total rainfall	Total runoff				Soil loss per acre				Crop
	5 minutes	15 minutes	30 minutes		Terrace 3'	Terrace 3A'	Terrace 4'	Terrace 5'	Terrace 3'	Terrace 3A'	Terrace 4'	Terrace 5'	
	In. per hour	In. per hour	In. per hour	In.	In.	In.	In.	Tons	Tons	Tons	Tons		
<b>1932</b>													
Jan. 9	0.16	0.16	0.15	0.49	0	0	0	0	0	0	0		
Jan. 11	.33	.33	.30	.69	0.02	0.02	0.03	0.100	0	0.078	0.096		
Jan. 18	.16	.16	.16	.66	.14	0	.05	.11	.025	.015	.030		
Feb. 21-22				.09	.03	0	.01	.01	.004	.002	.001		
Feb. 23				.08	0	0	.04	.01	.011	.009	.001		
Feb. 24				.12	.10	0	.09	.07	.057	.053	.004		
Feb. 25				.08	.04	0	.06	.09	.023	.035	.045		
Feb. 26				.04	0	0	0	.01	0	0	.006		
Feb. 27-28				.21	0	0	0	0	0	0	0		
Mar. 5-6				.26	.02	0	.01	.03	.046	.022	.100		
Mar. 17	.18	.17	.14	.55	.01	0	.01	.04	.034	.022	.102		
Mar. 18				.41	.05	0	.04	.08	.170	.274	.205		
Mar. 19				.14	.02	0	.02	.03	.052	.066	.092		
Mar. 20				.11	.01	0	.01	.01	.025	.034	.030		
Mar. 21				.16	.01	0	.01	.02	.025	.042	.054		
Mar. 24	.30	.24	.21	.45	.17	0	.16	.17	.686	.716	.664		
Mar. 27-28	.42	.32	.24	.73	.45	0	.40	.32	3.070	2.455	.910		
Apr. 2				.16	.01	0	.02	.01	.054	.096	.048		
<b>Total</b>					1.16		.95	1.04	4.382	3.919	2.388		
Apr. 3 to Nov. 15					( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )					
Nov. 16	.13	.13	.13	.71	0	0	0	.01	0	0	.002		
Dec. 19	.12	.12	.12	4.64	.16	0	.07	.13	.16	.003	.005		
Dec. 20				0	0	0	.01	.02	0	0	.001		
Dec. 23				0	.01	0	0	.02	0	0	.001		
Dec. 26	.16	.16	.15	.27	.51	0	.48	.62	.33	.015	.040		
Dec. 27				4.04	.03	0	.04	.02	.001	0	.002		
Dec. 29				4.30	.05	.03	.06	.04	0	.002	.004		
<b>Total</b>					.76	.58	.86	.60	.019	.047	.022		
<b>Total for year</b>							1.81	1.64		3.941	2.406		
<b>1933</b>													
Jan. 4				4.10	0	.28	.02	0		.019	0		
Jan. 5				.07	.05	.59	.03	.02	.002	.040	0		
Jan. 7	.12	.12	.12	.55	.06	.17	.03	.07	.006	.023	.002		
Jan. 8	.16	.16	.08	.26	0	.14	0	.01		.019			
Jan. 9				.08	0	.01	0	0		.019			
Feb. 21				0	0	.01	0	0	0	0			
Feb. 22	.12	.08	.07	.22	.17	.21	.57	.40	.005	.009	.015		
Feb. 23				4.66	0	.01	.14	0	0	0	.004		
Mar. 1				.11	.20	.27	.03	.009	.205	.034	.003		
Mar. 2	.24	.20	.16	.30	.06	.06	.08	.06	.005	.118	.010		
Mar. 3				.02	.03	.01	.02	.002	.059	.002	.005		
<b>Total</b>					.47	1.71	1.15	.61	.029	.511	.067		
Mar. 4 to Oct. 28					( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )					
Oct. 29				0	0	0.01	0	0		.004			
Nov. 2	.30	.22	.18	.91	.05	.10	0	0	.068	.039			
Nov. 3	.48	.28	.22	.50	.12	.38	.02	.06	.102	.220	.021		
Nov. 8	.48	.32	.20	1.82	.46	.64	.19	.15	.931	1.087	.286		
Dec. 8				.20	.04	0	0	0	.044				
Dec. 9	.21	.18	.18	1.53	.83	.87	.53	.33	.925	.951	.400		
Dec. 10	.12	.08	.08	.31	.12	.18	.10	.04	.134	.197	.082		
Dec. 11	.20	.12	.10	.16	.03	.07	.02	.01	.002	.080	.004		
Dec. 12				.17	.05	.02	.03	0	.004	.009	.006		
Dec. 13				.13	.07	.05	.04	.03	.125	.042	.054		
Dec. 14	.12	.08	.06	.10	.04	.05	.02	.02	.035	.021	.010		
Dec. 18	.18	.10	.10	.65	.27	.38	.19	.10	.122	.142	.072		
Dec. 19	.03	.03	.02	.13	.10	.16	.09	.04	.064	.064	.034		
Dec. 20				.25	.15	.17	.09	.04	.238	.064	.034		
Dec. 21	.24	.18	.16	.18	.14	.13	.10	.06	.230	.050	.122		
Dec. 22	.72	.28	.14	.79	.47	.57	.40	.33	1.210	1.22	.770		
Dec. 24				0	.05	.21	.04	.03	.209	.471	.158		
Dec. 25-31				0	0	.10	0	0		.022			
<b>Total</b>				4.60	0	.14	0	0		.014			
<b>Total for year</b>					2.99	4.23	1.86	1.24	4.533	4.599	2.053	1.203	
					3.46	5.94	3.01	1.85	4.562	5.110	2.120	1.230	

Winter wheat following peas. No vegetative cover.

Winter wheat stubble.

Ground cover of winter wheat stubble.

Winter wheat on summer fallow.

See footnotes at end of table.

TABLE 30.—Surface runoff and soil loss in runoff from graded terraces<sup>1</sup> with different vertical spacings, 1932-38—Continued

Date	Average rate of rainfall for period of—			Total rain fall	Total runoff					Soil loss per acre				Crop
	5 minutes	15 minutes	30 minutes		Terrace 3 <sup>2</sup>	Terrace 3A <sup>3</sup>	Terrace 4	Terrace 5	Terrace 3 <sup>2</sup>	Terrace 3A <sup>3</sup>	Terrace 4	Terrace 5		
	In. per hour	In. per hour	In. per hour		In.	In.	In.	In.	Tons	Tons	Tons	Tons		
1934														
Jan. 2	0.12	0.10	0.08	0.21	0	0.03	0.01	0	0	0.007	0.007	0	0	Winter wheat on summer fallow.
Jan. 3	.24	.20	.18	.37	0.23	.24	.12	0.11	0.470	.372	.149	0.127		
Jan. 4				.04	.01	.08	0	0	.002	.009	0	0		
Jan. 5					.01	.03	.01	.01	.002	.004	.002	.002		
Jan. 11				0	.02	.02	0	0	0	.006	0	0		
Jan. 13	.24	.18	.18	.31	.02	.11	.03	.03	.002	.045	.006	.013		
Jan. 14				0	.03	0	0	0	0	.010	0	0		
Jan. 16	.18	.12	.10	.25	.09	.13	.06	.04	.156	.020	.044	.020		
Jan. 17	.48	.20	.12	.14	.07	.11	.05	.05	.118	.018	.036	.026		
Jan. 18-21				.19	.04	.30	0	0	.028	.049	0	.004		
Jan. 22	.24	.16	.14	.74	.28	.36	.15	.11	.728	.684	.318	.328		
Jan. 23	.24	.18	.16	.26	.18	.22	.13	.09	.472	.419	.276	.260		
Jan. 24-27				.06	0	.08	0	0	0	.013	0	0		
Mar. 1	.30	.28	.20	.68	.04	.03	.07	.07	.044	.031	.078	.107		
Mar. 2				.12	.01	.01	.04	.05	.004	.004	.044	.077		
Mar. 5	.30	.20	.20	.69	.24	.18	.17	.14	.157	.104	.200	.158		
Mar. 6					.01	.03	.01	.01	.002	.004	.004	.004		
Mar. 7 to June 30				0	0	0	0	0	0	0	0	0	Winter wheat disk-ed after harvest.	
July 1 to Dec. 31				0	0	0	0	0	0	0	0	0		
Total for year					1.23	2.10	.85	.73	2.185	1.799	1.170	1.135		
Jan. 1 to Dec. 31, 1935					(3)	(3)	(3)	(3)						
1936														Winter wheat following summer fallow. No vegetative cover until April. Wheat stubble disked after harvest.
Jan. 1-2	.24	.16	.14	.90	0	.022	0	.016	0	.002	0	.001		
Jan. 3-4	.24	.24	.18	1.17	.005	.046	.008	.017	.001	.003	0	.001		
Jan. 9	.24	.16	.12	.43	.017	0	0	.013	.002	0	0	.001		
Jan. 10-12	.24	.12	.12	1.76	.219	.645	.011	.316	.122	.166	.003	.078		
Jan. 14	.06	.06	.04	.07	0	.043	0	0	0	.003	0	0		
Jan. 19				.28	0	.018	0	0	0	.001	0	0		
Feb. 24-29	.06	.06	.05	.40	.385	.436	.047	.807	.047	.047	.008	.088		
Mar. 2					.027	.004	.005	.020	.002	.003	.001	.010		
Mar. 30					.004	0	0	.010	.001	0	0	.002		
Mar. 31 to Dec 31					(?)	(?)	(?)	(?)						
Total for year					.657	1.214	.071	1.199	.175	.225	.012	.181		
1937														Disked wheat stubble until May. Summer fallowed and seeded to winter wheat in October.
Jan. 1 to Dec. 10					(?)	(?)	(?)	(?)						
Dec. 11	.24	.24	.22	.38	0	0	0	.002	.005	0	0	.004	.002	
Dec. 17	.24	.12	.12	.23	.616	0	0	.007	.015	.017	0	.002	.003	
Total for year					.616	0	0	.009	.020		.017	0.006	.005	
1938														Winter wheat following summer fallow. No vegetative cover.
Jan. 10-15	.24	.18	.12	.67	.027	0	0	.027	.013	0	0	.023		
Jan. 18-23				.41	.033	.025	.010	.030	.036	.012	.012	.046		
Feb. 23-26					.029	0	0	.007	.001	0	0	.000		
Feb. 26-28					.016	0	0	.009	.017	.000	0	.000	.001	
Feb. 28-Mar. 2					.027	0	0	.013	.013	.007	0	.009	.001	
Mar. 2-3	.12	.08	.06	.11	0	0	.004	.011	0	0	0	.007	.003	
Mar. 3-5	.24	.15	.14	.25	.011	.005	.005	.016	.005	.002	.003	.005		
Mar. 14-15	.12	.12	.08	.44	.011	.003	.007	.017	.004	.001	.003	.004		
Mar. 15-16	.12	.08	.08	.25	.017	.008	.013	.009	.007	.003	.005	.002		
Mar. 16-22				.04	.016	.006	.010	.020	.024	.001	.007	.005		
Mar. 22-24				.02	.021	.015	.030	.091	.001	.001	.003	.016		
Mar. 24-26					.006	0	0	0	.000	0	0	0		
Total (Jan. to June)					.214	.062	.101	.258	.098	.020	.049	.106		

<sup>1</sup> See table 2 for description of terraces.

<sup>2</sup> In October 1932 terrace 3A was constructed to reduce vertical spacing of terrace 3 from 35 to 20 feet.

<sup>3</sup> No runoff for following periods: Apr. 3-Nov. 15, 1932; Mar. 4-Oct. 28, 1933; Jan. 1-Dec. 31, 1935; Mar. 31-Dec. 31, 1936; Jan. 1-Dec. 10, 1937.

<sup>4</sup> Snow.

TABLE 31.—Surface runoff and soil loss in runoff from graded terraces <sup>1</sup> of different lengths, 1932-33

Date	Average rate of rainfall for period of—			Total rainfall	Total runoff			Soil loss per acre			Crop
	5 minutes	15 minutes	30 minutes		Terrace 2	Terrace 5	Terrace 6	Terrace 2	Terrace 5	Terrace 6	
	Inch per hour	Inch per hour	Inch per hour	Inch	Inch	Inch	Inch	Tons	Tons	Tons	
<b>1932</b>											
Jan. 9	0.16	0.16	0.15	0.49	0	0	0.01				} Winter wheat following peas. No vegetative cover.
Jan. 11	.33	.33	.30	.69	0.24	0.03	.02	0.762	0.096	0.031	
Jan. 18	.16	.16	.16	.66	.03	.11	.09	.005	.030	.025	
Feb. 21-22				.09	.07	.01	.01	.010	.001	0	
Feb. 23					.08	.01	.01	.011	.001	0	
Feb. 24				.12	.15	.07	.05	.021	.004	.001	
Feb. 25				.08	.08	.09	.08	.011	.045	.004	
Feb. 26				.04	.03	.01	.03	.004	.006	.004	
Feb. 27-28				.21	0	0	.05			.091	
Mar. 5-6				.26	.03	.03	.18	.087	.100	.038	
Mar. 17	.18	.17	.14	.55	0	.04	.01		.102	.019	
Mar. 18				.41	0	.08	.08		.205	.154	
Mar. 19				.14	0	.03	.03		.092	.053	
Mar. 20				.11	0	.01	.01		.030	.200	
Mar. 21				.16	0	.02	.02		.054	.102	
Mar. 24	.30	.24	.21	.45	.04	.17	.14	.116	.664	1.006	
Mar. 27-28	.42	.32	.24	.73	.23	.32	.52	.666	.910	3.873	
Apr. 2				.16	0	.01	.01		.048	.038	
Total					.98	1.04	1.35	1.693	2.388	5.639	
Apr. 3 to Nov. 12					( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )				
Nov. 13					0	0	.05			.033	
Nov. 15	.15	.15	.14	.47	0	0	.07			.013	
Nov. 16	.13	.13	.13	.71	0	.01	.15		.002	.040	
Dec. 19	.12	.12	.12	1.64	.11	.16	.21	.002	.004	.010	
Dec. 20					.07	.02	.08	.002	.001	.002	
Dec. 21					0	.02	.05		0	.001	
Dec. 26	.16	.16	.15	1.27	.18	.33	.74	.006	.007	.020	
Dec. 27				.04	0	.02	.05		.001	.001	
Dec. 29				1.30	0	.04	.06		.001	.001	
Total					.36	.60	1.46	.010	.016	.121	
Total for year					1.34	1.64	2.81	1.703	2.404	5.760	
<b>1933</b>											
Jan. 4				1.10	.03	0	.14	.001		.003	
Jan. 5				.07	.22	.02	.21	.008	0	.004	
Jan. 7	.12	.12	.12	.55	.12	.07	.18	.005	.004	.006	
Jan. 8	.16	.16	.08	.26	.01	.01	.07	0	.001	.002	
Jan. 9				.08	0	0	.04			.001	
Feb. 21					.02	0	.03	0		0	
Feb. 22	.12	.08	.07	.22	.25	.40	.26	.005	.009	.005	
Feb. 23				1.66	0	0	.02			0	
Feb. 26					0	0	.01			0	
Feb. 28				.12	.05	0	0		.001	0	
Mar. 1					.06	.03	.15	.007	.003	.004	
Mar. 2	.24	.20	.16	.30	.05	.06	.29	.007	.005	.008	
Mar. 3					.03	.02	.20	.003	.005	.005	
Mar. 4					0	0	.04			.003	
Mar. 5					0	0	.03			.002	
Mar. 7				1.25	0	0	.02			.001	
Mar. 8					0	0	.03			.002	
Mar. 9-12				1.37	0	0	.05			.012	
Total					.84	.61	1.77	.037	.027	.058	
Mar. 13 to Nov. 2					( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )				

See footnotes at end of table.

TABLE 31.—Surface runoff and soil loss in runoff from graded terraces<sup>1</sup> of different lengths, 1932-38—Continued

Date	Average rate of rainfall for period of—			Total rainfall	Total runoff			Soil loss per acre			Crop
	5 min-utes	15 min-utes	30 min-utes		Terrace 2	Terrace 5	Terrace 6	Terrace 2	Terrace 5	Terrace 6	
	Inch per hour	Inch per hour	Inch per hour	Inch	Inch	Inch	Inch	Tons	Tons	Tons	
<b>1933</b>											
Nov. 3	0.48	0.28	0.22	0.50	0.04	0.06	0.01	0.009	0.042	0.009	} Winter wheat on summer fallow.
Dec. 6	.48	.32	.20	1.82	.15	.15	.25	.212	.222	.354	
Dec. 9	.21	.18	.18	1.53	.48	.33	.80	.734	.191	.866	
Dec. 10	.12	.08	.08	.31	.09	.04	.10	.043	.023	.108	
Dec. 11	.20	.12	.10	.16	.03	.01	.02	.009	.005	.010	
Dec. 12				.17	.02	0	0	.004			
Dec. 13				.13	.03	.03	.03	.024	.028	.028	
Dec. 14	.12	.08	.06	.10	.04	.02	.02	.016	.008	.006	
Dec. 18	.18	.10	.10	.65	.35	.10	.08	.038	.021	.021	
Dec. 19	.03	.03	.02	.13	.26	.04	.03	.068	.008	.008	
Dec. 20				.25	.21	.04	.04	.233	.013	.013	
Dec. 21	.24	.18	.16	.18	.07	.06	.10	.078	.102	.102	
Dec. 22	.72	.28	.14	.79	.55	.33	.39	.842	.476	.476	
Dec. 23					.08	.03	.03	.192	.064	.064	
Total					2.40	1.24	1.90	2.002	1.203	2.065	
Total for year					3.24	1.85	3.67	2.039	1.230	2.123	
<b>1934</b>											
Jan. 2	.12	.10	.08	.21	.03	0	0	.028			} Winter wheat on summer fallow.
Jan. 3	.24	.20	.18	.37	.24	.11	.13	.305	.127	.128	
Jan. 4				.04	.01	0	0	0			
Jan. 5					.02	.01	0	.006	.002		
Jan. 13	.24	.18	.18	.31	0	.03	.01		.013	.001	
Jan. 16	.18	.12	.10	.25	.01	.04	.01	.009	.020	.006	
Jan. 17	.48	.20	.12	.14	.06	.05	.01	.090	.026	.006	
Jan. 19	.12	.10	.06	.15	.01	.01	.01	.009	.002	.003	
Jan. 21				.04	.01	.01	0	.009	.002		
Jan. 22	.24	.16	.14	.74	.11	.11	.17	.226	.328	.310	
Jan. 23	.24	.18	.16	.26	.12	.09	.12	.244	.269	.219	
Mar. 1	.30	.28	.20	.68	.01	.07	.05	0	.107	.040	
Mar. 2				.12	.01	.05	.01	.001	.077	.004	
Mar. 5	.30	.20	.20	.69	.02	.14	.19	.003	.158	.098	
Mar. 6					0	.01	0		.004		
Mar. 7 to June 30					0	0	0				
July 1 to Dec. 31					0	0	0				
Total					.66	.73	.71	.930	1.135	.815	
Jan. 1 to Dec. 31, 1935					(?)	(?)	(?)				
<b>1936</b>											
Jan. 1-2	.24	.16	.14	.90		.016	.007		.001	0	} Winter wheat following summer fallow. No vegetative cover until April. Wheat stubble disked after harvest.
Jan. 3-4	.24	.24	.18	1.17	.012	.017	.009	0	.001	.001	
Jan. 9	.24	.16	.12	.43		.013			.001		
Jan. 10-12	.24	.12	.12	1.76	.047	.316		.005	.078		
Jan. 13-Feb. 29				2.78	.044	.807	1.853	.002	.088	1.046	
Mar. 2						.020			.010		
Mar. 30						.010			.002		
Mar. 31-Dec. 31					(?)	(?)	(?)				
Total					.103	1.199	.869	.007	.181	.047	
Jan. 1 to Dec. 10, 1937					(?)	(?)	(?)				
Dec. 11	.24	.24	.22	.38		.005			.002		
Dec. 17	.24	.12	.12	.23		.015	.002		.003	.001	
Total						.020	.002		.005	.001	

See footnotes at end of table.

TABLE 31.—Surface runoff and soil loss in runoff from graded terraces<sup>1</sup> of different lengths, 1932-38—Continued

Date	Average rate of rainfall for period of—			Total rainfall	Total runoff			Soil loss per acre			Crop
	5 minutes	15 minutes	30 minutes		Terrace 2	Terrace 5	Terrace 6	Terrace 2	Terrace 5	Terrace 6	
	Inch per hour	Inch per hour	Inch per hour	Inch	Inch	Inch	Inch	Tons	Tons	Tons	
1938											
Jan. 10-15	0.24	0.18	0.12	0.67		0.027	0.008	0.023	0.019		Winter wheat following summer fallow. No vegetative cover.
Jan. 18-23				1.30		.030	.009	.046	.013		
Feb. 24-25							.001		0		
Feb. 25-26						.007		0			
Feb. 26-28						.017		0			
Feb. 28-Mar. 2						.013	.005	.001	.002		
Mar. 2-3	.12	.08	.06	.18		.011		.003	.002		
Mar. 3-5	.24	.15	.14	.25		.016	.005	.005	.002		
Mar. 14-15	.12	.12	.08	.44		.017	.004	.004	.001		
Mar. 15-16	.12	.08	.08	.25		.009	.008	.003	.002		
Mar. 16-22				1.04		.020	.007	.005	.001		
Mar. 22-24				.02		.091	.008	.016	.001		
Total (Jan. to June).						.258	.055	.106	.041		

<sup>1</sup> See table 2 for description of terraces.<sup>2</sup> No runoff for following periods: Apr. 3-Nov. 12, 1932; Mar. 13-Nov. 2, 1933; Jan. 1-Dec. 31, 1935; Mar. 31-Dec. 31, 1936; Jan. 1-Dec. 10, 1937.<sup>3</sup> Snow.<sup>4</sup> Squirrel hole under terrace 1,500 feet from outlet was plugged at 9:30 a. m.<sup>5</sup> Squirrel hole under terrace 300 feet from outlet was plugged at 10:30 a. m.



TABLE 32.—Surface runoff and soil loss in runoff from terraces<sup>1</sup> with different grades, 1932-38

Date	Average rate of rainfall for period of—			Total rainfall	Total runoff					Soil loss per acre					Crop
	5 minutes	15 minutes	30 minutes		Terrace 13 <sup>1</sup>	Terrace 18	Terrace 17	Terrace 16	Terrace 15 <sup>1</sup>	Terrace 13 <sup>1</sup>	Terrace 18	Terrace 17	Terrace 16	Terrace 15 <sup>1</sup>	
	Inch per hour	Inch per hour	Inch per hour	Inch	Inch	Inch	Inch	Inch	Inch	Ton	Tons	Tons	Tons	Ton	
1932															
Jan. 9	0.16	0.16	0.15	0.49				0.02					0.001		
Jan. 11	.33	.33	.30	.69				0.02			0.045	0.030	1.032		
Jan. 18	.16	.16	.16	.66				.12				.001	.040		
Feb. 21-22				.09				0					.008		
Feb. 23-24				.12				0					.014		
Feb. 25				.08				.11			.002	.001	.010		
Feb. 26				.04				.08					.006		
Feb. 27								.07					.032		
Mar. 5								.02			.003	.004	.042		
Mar. 6								.11					.064		
Mar. 17	.18	.17	.14	.55				.09			.030	.104	.132		
Mar. 18				.41				.21			.195	.983	1.870		
Mar. 19				.14				.03			.010	.110	.211		
Mar. 20				.11				.02			.010	.110	.140		
Mar. 21				.16				.05			.056	.103	.210		
Mar. 24	.30	.24	.21	.45				.20			.568	1.086	1.768		
Mar. 27-28	.42	.32	.24	.73				.55			1.166	2.650	3.554		
Apr. 2				.16				.02			.045	.101	.092		
Total								.71			2.130	5.315	9.266		
Apr. 3 to Nov. 15					(*)	(*)	(*)	(*)	(*)						
Nov. 16	.13	.13	.13	.71	0	.08	.02	.04	.07		.014	.010	.013	.021	
Dec. 19	.12	.12	.12	.64	.01	.10	.02	.03	.05	.001	.004	.001	.001	.001	
Dec. 20				0	0	.01	.02	.03	.02		.001	.001	.001	.001	
Dec. 26	.16	.16	.15	.27	.21	.24	.22	.27	.49	.002	.003	.025	.025	.034	
Dec. 27				.04	.07	.01	.03	.05	.08	.002	.001	.001	.007	.008	
Dec. 28					0	.01	.05	0	.04		.001	.001	.004	.004	
Dec. 29				.30	.05	.02	.03	.04	.11	.002	.001	.002	.008	.015	
Total					.34	.47	.39	.46	.86	.007	.025	.018	.055	.084	
Total for year						1.18	1.48	2.61		2.155	5.333	9.321			

Winter wheat following peas. No vegetative cover.

Winter wheat stubble.

See footnotes at end of table.

TABLE 32.—Surface runoff and soil loss in runoff from terraces<sup>1</sup> with different grades, 1932-38—Continued

Date	Average rate of rainfall for period of—			Total rainfall	Total runoff					Soil loss per acre					Crop
	5 min-utes	15 min-utes	30 min-utes		Terr-ace 13 †	Terr-ace 18	Terr-ace 17	Terr-ace 16	Terr-ace 15 †	Terr-ace 13 †	Terr-ace 18	Terr-ace 17	Terr-ace 16	Terr-ace 15 †	
	Inch per hour	Inch per hour	Inch per hour	Inch	Inch	Inch	Inch	Inch	Inch	Tons	Tons	Tons	Tons	Tons	
<i>1933</i>															
Jan. 4				0.10	0.02	0.01	0.02	0.34	0.64	0	0	0.001	0.013	0.014	
Jan. 5				.07	.14	.01	.02	.34	.52	0.002	0.001	.001	.013	.010	
Jan. 6					0	0	0	0	.06					.910	
Jan. 7	0.12	0.12	0.12	.55	.02	.02	.05	.22	.21	0	.001	.003	.015	.027	
Jan. 8	.16	.16	.08	.26	.01	.01	0	.18	.25	0	0		.014	.633	
Jan. 9				.08	0	0	0	.04	.08				.003	.010	
Feb. 21					0	0	0	.05	0				.006		
Feb. 22	.12	.08	.07	.22	.02	.01	.03	.17	.23	.001	0	.003	.021	.027	
Feb. 23				4.66	.03	0	0	0	.02	.001				.003	
Feb. 27-28				.12	0	0	0	0	.12					.013	
Mar. 1					.06	.01	.02	.18	.14	.005	.002	.007	.044	.017	
Mar. 2	.24	.20	.16	.30	.46	0	.01	.15	.16	.051	.003	.003	.038	.020	
Mar. 3				0	.17	0	0	.07	.09	.015			.017	.013	
Mar. 7-10				4.59	0	0	0	.03	0				.012		
Total					.93	.07	.15	1.77	2.52	.075	.004	.018	.196	.197	
Mar. 11 to Oct. 28					( <sup>2</sup> )	( <sup>3</sup> )	( <sup>2</sup> )	( <sup>4</sup> )	( <sup>5</sup> )						
Oct. 29					.01	0	0	.02	.01	.001			.010	.004	
Oct. 31				.73	0	.01	.01	.07	.03		.005	.014	.036	.014	
Nov. 2	.36	.22	.16	.01	0	.05	.16	.23	.17		.044	.218	.058	.041	
Nov. 3	.48	.28	.22	.50	.14	.08	.28	.28	.40	.010	.070	.378	.444	.786	
Nov. 4-5					0	0	0	.07	0				.014		
Dec. 6	.48	.32	.20	1.82	.54	.68	.63	.73	.91	.352	1.080	2.235	2.635	3.688	
Dec. 7-8				.20	0	.04	.06	.04	.01		.024	.240	.052	.016	
Dec. 9	.21	.18	.18	1.53	.80	.97	.85	.74	1.00	.220	.608	1.550	2.505	2.795	
Dec. 10	.12	.08	.08	.31	.14	.11	.20	.20	.15	.038	.069	.366	.471	.420	
Dec. 11	.20	.12	.10	.16	.03	.03	.08	.08	.08	.003	.016	.062	.058	.079	
Dec. 12				.17	.04	0	.06	.10	.11	.004		.040	.078	.109	
Dec. 13				.13	.06	.03	.06	.15	.10	.008	.035	.142	.335	.310	
Dec. 14	.12	.08	.06	.10	.03	.02	.03	.11	.03	.003	.008	.020	.072	.047	
Dec. 15-16				4.50	0	0	0	.04	0				.004		
Dec. 17				4.15	.02	.01	0	.05	.13	.002	.002		.004	.042	
Dec. 18	.18	.10	.10	.65	.32	.25	.24	.29	.61	.050	.092	.150	.224	.268	
Dec. 19	.03	.03	.02	.13	.17	.09	.10	.17	.26	.026	.038	.046	.151	.121	
Dec. 20				.25	.35	.07	.05	.20	.16	.138	.090	.022	.181	.073	
Dec. 21	.24	.18	.16	.18	.12	.14	.03	.20	.24	.048	.129	.012	.181	.111	
Dec. 22	.72	.28	.14	.70	.52	.57	.84	.64	.81	.252	1.225	2.990	2.990	3.430	

Ground cover of winter wheat stubble.

Winter wheat on summer fallow.

Dec. 23				0	.09	.05	.10	.16	.17	.052	.009	.535	.699	1.075
Dec. 24				0	0	0	0	.12	.10				.009	.006
Dec. 25				0	0	0	0	.05	.02				.004	.001
Dec. 26-27				.46	0	0	0	.01	.04				0	.002
Dec. 28				.07	.01	.03	0	.05	.07	.001	.002		.004	.005
Dec. 29				0	.04	.03	0	.08	.10	.002	.002		.004	.008
Dec. 30				.07	0	.01	0	.02	.10		0		.001	.008
Dec. 31				0	0	0	0	0	.10					.008
Total					3.43	3.27	3.78	4.90	5.91	1.210	3.648	9.026	11.224	13.467
Total for year					4.36	3.34	3.93	6.67	8.43	1.285	3.652	9.044	11.420	13.664
<i>1934</i>														
Jan. 1					0	0	.02	.02	.02			.002	.012	.011
Jan. 2	.12	.10	.08	.21	.02	.02	.05	.06	.13	.004	.009	.038	.039	.100
Jan. 3	.24	.20	.18	.37	.16	.17	.22	.23	.24	.032	.100	.394	.500	.845
Jan. 4				0	.01	.01	.01	.03	.02		.002	.006	.005	.003
Jan. 5				.01	0	.01	.01	.02	.01	.002		.006	.002	.002
Jan. 13	.24	.18	.18	.31	0	.01	.02	.02	.08		.006	.018	.082	.131
Jan. 14				0	0	0	0	0	.02					.009
Jan. 15				0	0	0	0	0	.02					.009
Jan. 16	.18	.12	.10	.25	.02	.05	.07	.03	.09	.005	.030	.039	.014	.042
Jan. 17	.48	.20	.12	.14	.05	.02	.03	.05	.11	.011	.012	.018	.023	.051
Jan. 18-21				.19	.02	.05	.13	.11	.21	.004	.018	.082	.048	.092
Jan. 22	.24	.16	.14	.74	.28	.34	.37	.28	.37	.117	.448	1.210	1.526	2.052
Jan. 23	.24	.18	.16	.26	.19	.19	.22	.13	.20	.084	.252	.720	.709	1.110
Jan. 24-27				.06	0	0	0	.05	.07				.010	.007
Mar. 1	.30	.28	.20	.68	.06	.18	.11	.09	.07	.019	.144	.259	.278	.113
Mar. 2				.12	.08	.05	.02	.06	.07	.031	.024	.012	.186	.113
Mar. 4				.06	0	.04	0	.02	.04		.012		.004	.028
Mar. 5	.30	.20	.20	.69	.23	.31	.22	.15	.25	.036	.188	.378	.388	.562
Mar. 6				.01	.02	.02	.02	.02	.03	.002	.006	.011	.004	.022
Mar. 7 to June 30				0	0	0	0	0	0					
July 1 to Dec. 31				0	0	0	0	0	0					
Total					1.13	1.46	1.82	1.37	2.05	.347	1.341	3.193	3.829	5.303
Jan. 1 to Dec. 31, 1935.					(?)	(?)	(?)	(?)	(?)					

} Winter wheat on summer fallow.

} Winter wheat disked after harvest.

See footnotes at end of table.

TABLE 32.—Surface runoff and soil loss in runoff from terraces<sup>1</sup> with different grades, 1932-38—Continued

Date	Average rate of rainfall for period of—			Total rain-fall	Total runoff				Soil loss per acre					Crop
	5 min-utes	15 min-utes	30 min-utes		Terr-ace 13 <sup>2</sup>	Terr-ace 18	Terr-ace 17	Terr-ace 16	Terr-ace 15 <sup>2</sup>	Terr-ace 13 <sup>2</sup>	Terr-ace 18	Terr-ace 17	Terr-ace 16	
	Inch per hour	Inch per hour	Inch per hour	Inch	Inch	Inch	Inch	Inch	Tons	Tons	Tons	Tons	Tons	
<i>1936</i>														
Jan. 1-2	0.24	0.16	0.14	0.90	0	0	0	0.287	0.316	0	0	0	0.045	0.068
Jan. 3-4	.24	.24	.18	1.17	0.021	0.021	0.014	.599	.300	0.001	0.003	0.001	.214	.358
Jan. 9	.24	.16	.12	.43	0	0	0	.048	.145	0	0	0	.003	.011
Jan. 10-12	.24	.12	.12	1.76	.367	.210	.114	.661	.557	.069	.069	.065	.364	.397
Jan. 14	.06	.06	.04	.07	0	0	0	.120	.201	0	0	0	.011	.018
Jan. 23				0	0	0	0	.043	.035	0	0	0	.005	.004
Jan. 27				1.16	0	0	0	.021	.011	0	0	0	.001	.000
Feb. 24-29	.06	.06	.04	.37	.738	.491	.443	.849	.029	.079	.046	.043	.111	.062
Mar. 2				0	0	0	.028	.074	1.069	0	0	.109	.015	.236
Mar. 8	.24	.12	.08	.34	0	0	0	.007	0	0	0	0	0	.000
Mar. 30				0	0	.007	0	0	0	0	.002	0	0	0
Mar. 31 to Dec. 31					( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	0	0	0	0	0
Total					1.126	.729	.599	2.682	2.670	.149	.120	.238	.769	1.124
<i>1937</i>														
Jan. to Dec. 10					( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )					
Dec. 11	.24	.24	.22	.38	0	.003	.024	.031	.028	0	.002	.010	.126	.058
Dec. 17	.24	.12	.12	.23	0	.008	.075	.261	.028	0	.004	.078	.235	.062
Dec. 20-30				2.32	.145	0	.366	2.088	.673	.042	0	.062	2.801	1.441
Total					.145	.011	.465	2.380	.729	.012	.006	.150	3.162	1.561
<i>1938</i>														
Jan. 10-15	.24	.18	.12	.07	0	0	.027	.093	.139	0	0	.127	.337	.149
Jan. 15-17				4.41	0	0	.014	.075	.028	0	0	.007	.014	.010
Jan. 18-23				4.30	0	.017	.072	.302	.477	0	.013	.216	.453	.394
Feb. 3	.12	.06	.04	.04	0	0	0	.024	.022	0	0	0	.000	.004
Feb. 4				4.06	0	0	0	0	.025	0	0	0	0	.004
Feb. 6				4.54	0	0	0	0	.005	0	0	0	0	.001
Feb. 8-10				4.08	0	0	.008	0	.010	0	0	.002	0	.000
Feb. 10-11				.02	0	0	.013	.031	.014	0	0	.002	.007	.001
Feb. 11-14				4.04	0	0	.014	.031	.137	0	0	.003	.008	.004
Feb. 14-15				0	0	0	.018	.019	0	0	0	.002	.001	0
Feb. 15-16				0	0	0	.008	.005	0	0	0	.001	.004	0
Feb. 21-23				0	0	.012	.027	.027	.028	0	.001	.002	.006	.004
Feb. 23-24				0	0	0	.027	.029	.028	0	0	.003	.002	.003
Feb. 24-25				0	0	.011	.027	.025	.025	0	.001	.002	.002	.003

Winter wheat following summer fallow. No vegetative cover until April. Wheat stubble disked after harvest.

Disked wheat stubble until May. Summer fallowed and seeded to winter wheat in October.

Feb. 25-26					0	0	.025	.024	.025	0	0	.006	.006	.058	} Winter wheat following summer fallow. No vegetative cover.
Feb. 26-28					.016	.013	.023	.025	.025	.001	.001	.003	.001	.031	
Feb. 28-Mar. 2					0	.002	.007	.019	.025	0	.000	.003	.004	.005	
Mar. 2-3	.12	.08	.06	.18	.016	.006	.014	.019	.015	.001	.002	.030	.008	.026	
Mar. 3-5	.24	.15	.14	.25	.005	.010	.024	.025	.018	.001	.003	.045	.037	.021	
Mar. 14-15	.12	.12	.08	.44	0	.014	.027	.029	.018	0	.009	.055	.100	.016	
Mar. 15-18	.12	.08	.08	.25	.016	.018	.027	.029	.027	.006	.007	.116	.059	.055	
Mar. 16-22				<sup>4</sup> 1.04	.260	.010	.236	.984	.697	.008	.006	.102	.791	.653	
Mar. 22-24				.02	.014	.017	.027	.299	.281	.001	.005	.037	.491	.337	
Mar. 24-26					0	0	.020	.022	.060	0	0	.006	.007	.020	
Total (Jan.-June)					.327	.130	.685	2.134	2.129	.018	.048	.770	2.338	1.799	

<sup>1</sup> See table 2 for description of terraces.

<sup>2</sup> This terrace not installed until after Apr. 2, 1932.

<sup>3</sup> No runoff for following periods: Apr. 3-Nov. 5, 1932; Mar. 11-Oct. 28, 1933; Jan. 1-Dec. 31, 1935; Mar. 31-Dec. 31, 1936; Jan.-Dec. 10, 1937.

<sup>4</sup> Snow.

<sup>5</sup> Squirrel hole 500 feet from outlet of terrace 17 was plugged at 9:30 a. m., and results are adjusted accordingly.

<sup>6</sup> Runoff and soil loss are for combined areas of terraces 12 and 13.

<sup>7</sup> Adjusted result based on incomplete record.

TABLE 33.—Surface runoff and soil loss from graded terraces<sup>1</sup> on different land slopes, 1932-33

Date	Average rate of rainfall for period of—			Total rainfall	Total runoff				Soil loss per acre				Crop	
	5 minutes	15 minutes	30 minutes		Terrace 7	Terrace 5	Terrace 17	Terrace 3A <sup>2</sup>	Terrace 7	Terrace 5	Terrace 17	Terrace 3A <sup>2</sup>		
	In. per hour	In. per hour	In. per hour		In.	In.	In.	In.	Tons	Tons	Tons	Tons		
1932														
Jan. 11	0.33	0.33	0.30	0.69	0.06	0.03	0.02	0.02	0.158	0.096	0.030	0.000		Winter wheat following peas. No vegetative cover.
Jan. 10	.16	.16	.16	.66	.15	.11	.02	.02	.032	.030	.001	.000		
Feb. 21-22				.09	0	.01	0	0	0	.001	0	0		
Feb. 23				0	0	.01	0	0	0	.001	0	0		
Feb. 24				.12	.23	.07	0	0	.004	.004	0	0		
Feb. 25				.08	.57	.09	.01	0	.040	.045	.001	0		
Feb. 26				.04	.54	.01	0	0	.138	.006	0	0		
Feb. 27				.12	0	0	.06	0	.040	0	.032	0		
Mar. 5				.29	.03	0	.02	0	.100	.100	.004	0		
Mar. 6				0	0	0	0	0	.024	0	0	0		
Mar. 17	.18	.17	.14	.55	0	.04	.06	0	0	.102	.104	0		
Mar. 18				.41	0	.08	.17	0	0	.205	.983	0		
Mar. 19				.14	0	.03	.03	0	0	.092	.110	0		
Mar. 20				.11	0	.01	.03	0	0	.030	.110	0		
Mar. 21				.16	0	.02	.03	0	0	.054	.103	0		
Mar. 24	.30	.24	.21	.45	.01	.17	.14	0	.024	.664	1.086	0		
Mar. 27-28	.42	.32	.24	.73	.09	.32	.48	0	.184	.910	2.650	0		
Apr. 2				.16	0	.01	.02	0	0	.048	.101	0		
Total					2.06	1.04	1.09		.744	2.388	5.315			
Apr. 3 to Nov. 15						( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )						
Nov. 16	.13	.13	.13	.71	0	.01	.02	0	0	.002	.010	0		Winter wheat stubble.
Dec. 10	.12	.12	.12	.64	.29	.16	.02	0	.007	.004	.001	0.005		
Dec. 20				0	.08	.02	.02	0	0	.002	.001	.001		
Dec. 21				0	.01	0	0	0	0	.001	0	0		
Dec. 23				0	.02	.02	0	0	0	.001	.001	0		
Dec. 26				0	.02	.02	0	0	0	.001	.001	0		
Dec. 28	.16	.16	.15	.47	1.31	.33	.22	.48	.039	.007	.002	.040		
Dec. 27				.04	.22	.02	.03	0	.005	.001	.001	0		
Dec. 28				0	0	0	.05	0	0	.002	.002	0		
Dec. 29				.30	.17	.04	.03	0	.002	.001	.002	.002		
Dec. 30				0	.07	0	0	0	.001	0	0	0		
Total					2.17	.60	.39	.58	.058	.017	.019	.047		
Total for year					4.23	1.64	1.48		.802	2.405	5.334			
1933														Ground cover of winter wheat stubble.
Jan. 4				.10	.28	0	.02	.28	.002	0	.001	.019		
Jan. 5				.07	.86	.02	.02	.59	.006	0	.001	.040		
Jan. 6				.18	0	0	0	0	0	0	0	0		
Jan. 7	.12	.12	.12	.55	1.13	.07	.05	.17	.020	.004	.003	.023		
Jan. 8	.16	.16	.08	.26	.73	.01	0	.14	.013	.001	0	.019		
Jan. 9				.08	.13	0	0	.01	0	0	0	.019		
Feb. 21				0	0	0	0	.01	0	0	0	0		
Feb. 22	.12	.08	.07	.22	.28	.40	0	.03	.21	.007	.009	.003	.009	
Mar. 1				.66	.02	0	0	.01	0	0	0	0		
Mar. 2				0	.06	.03	.02	.20	.001	.003	.007	.205		
Mar. 3	.24	.20	.16	.30	.18	.06	.01	.06	.012	.005	.003	.118		
Mar. 7				.14	.02	0	0	.03	.001	.005	0	.059		
Mar. 8				.25	.01	0	0	0	0	0	0	0		
Mar. 7				0	.08	0	0	0	0	0	0	0		
Mar. 9				.34	.03	0	0	0	.001	0	0	0		
Mar. 10-11				0	.14	0	0	0	0	0	0	0		
Total					4.25	.61	.15	1.71	.059	.027	.018	.511		

See footnotes at end of table.

TABLE 33.—Surface runoff and soil loss from graded terraces<sup>1</sup> on different land slopes, 1932-38—Continued

Date	Average rate of rainfall for period of—			Total rainfall	Total runoff				Soil loss per acre				Crop
	5 minutes	15 minutes	30 minutes		Terrace 7	Terrace 5	Terrace 17	Terrace 3A <sup>2</sup>	Terrace 7	Terrace 5	Terrace 17	Terrace 3A <sup>2</sup>	
	In. per hour	In. per hour	In. per hour	In.	In.	In.	In.	In.	Tons	Tons	Tons	Tons	
1933													
Mar. 12 to Oct. 28.....					( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )					
Oct. 29.....				0	0	0	0.01	0					0.004
Oct. 31.....	0.36	0.22	0.16	0.73	0	0	0.01	0				0.014	
Nov. 2.....	.30	.22	.18	.91	0	0	.16	.10				.218	.039
Nov. 3.....	.48	.28	.22	.50	0	.06	.28	.38		0.042	.378	.220	
Dec. 6.....	.48	.32	.20	1.82	0	.15	.63	.64		.222	2.235	1.087	
Dec. 7.....				0	0	0	.06	0				.240	
Dec. 9.....	.21	.18	.18	1.53	.34	.33	.85	.87	0.160	.191	1.550	.951	
Dec. 10.....	.12	.08	.08	.31	.02	.04	.20	.18	.009	.023	.366	.197	
Dec. 11.....	.20	.12	.10	.16	0	.01	.08	.07		.065	.062	.080	
Dec. 12.....				.17	0	0	.06	.02			.046	.009	
Dec. 13.....				.13	0	.03	.06	.05		.028	.142	.042	
Dec. 14.....	.12	.08	.06	.10	0	.02	.03	.05		.008	.020	.021	
Dec. 18.....	.18	.10	.10	.65	.04	.10	.24	.38	.003	.021	1.50	.142	
Dec. 19.....	.03	.03	.02	.13	.02	.04	.10	.16	.001	.008	.046	.064	
Dec. 20.....				.25	.02	.04	.05	.17	.001	.013	.022	.064	
Dec. 21.....	.24	.18	.16	.18	.03	.06	.03	.13	.009	.102	.012	.050	
Dec. 22.....	.72	.28	.14	.79	.24	.33	.34	.57	.088	.476	2.990	1.122	
Dec. 23.....				.01	.03	.10	.21	.004	.064	.735	.471	.014	
Dec. 24.....				0	0	0	.10					.022	
Dec. 25-31.....				.60	0	0	.14					.014	
Total.....					.72	1.24	3.78	4.23	.275	1.203	9.026	4.599	
Total for year.....					4.97	1.85	3.93	5.94	.334	1.230	9.044	5.110	
1934													
Jan. 1.....				.08	0	0	.02	0			.002		
Jan. 2.....	.12	.10	.08	.21	0	0	.05	.03			.038	.007	
Jan. 3.....	.24	.20	.18	.37	.08	.11	.22	.24	.033	.127	.394	.372	
Jan. 4.....				.04	0	0	.01	.08			.006	.009	
Jan. 5.....				0	0	.01	.01	.03		.002	.006	.004	
Jan. 11.....				0	0	0	.02	.02			.006	.006	
Jan. 13.....	.24	.18	.18	.31	0	.03	.02	.11		.013	.018	.045	
Jan. 14.....				0	0	0	.03					.010	
Jan. 16.....	.18	.12	.10	.25	0	.04	.07	.13		.020	.039	.020	
Jan. 17.....	.48	.20	.12	.14	0	.05	.03	.11		.026	.018	.018	
Jan. 18-21.....				.19	0	.02	.13	.30		.004	.082	.039	
Jan. 22.....	.24	.16	.14	.74	.02	.11	.37	.36	.008	.328	1.219	.684	
Jan. 23.....	.24	.18	.16	.26	.04	.09	.22	.22	.017	.269	.720	.419	
Jan. 24-27.....				.06	0	0	0	.04				.003	
Mar. 1.....	.30	.28	.20	.68	0	.07	.11	.03		.077	.250	.031	
Mar. 2.....				.12	0	.05	.02	.01		.077	.012	.004	
Mar. 5.....	.30	.20	.20	.69	.04	.14	.22	.18	.008	.158	.378	.104	
Mar. 6.....				0	0	.01	.02	.03		.004	.011	.004	
Mar. 7 to June 30.....				0	0	0	0	0					
July 1 to Dec 31.....				0	0	0	0	0					
Total.....					.18	.73	1.52	2.10	.066	1.135	3.193	1.799	
Jan. 1 to Dec. 31, 1935.....					( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )					

Winter wheat on summer fallow.

Winter wheat on summer fallow.

Winter wheat disked after harvest.

See footnotes at end of table.

TABLE 33.—Surface runoff and soil loss from graded terraces<sup>1</sup> on different land slopes, 1932-38—Continued

Date	Average rate of rainfall for period of—			Total rainfall	Total runoff				Soil loss per acre				Crop
	5 minutes	15 minutes	30 minutes		Terrace 7	Terrace 5	Terrace 17	Terrace 3A <sup>2</sup>	Terrace 7	Terrace 5	Terrace 17	Terrace 3A <sup>2</sup>	
	In. per hour	In. per hour	In. per hour		In.	In.	In.	In.	Tons	Tons	Tons	Tons	
<b>1936</b>													} Winter wheat following summer fallow. No vegetative cover until April. Wheat stubble disked after harvest.
Jan. 1-2	0.24	0.16	0.14	0.90	0.007	0.016	0	0.022	0	0.001	0	0.002	
Jan. 3-4	.24	.24	.18	1.17	.009	.017	0.014	.046	0.001	.001	0.001	.003	
Jan. 9	.24	.16	.12	.43	0	.013	0	0	0	.001	0	0	
Jan. 10-12	.24	.12	.12	1.76	0	.316	.114	.645	0	.078	.065	.166	
Jan. 13-Feb. 29				4.78	5.853	.807	.443	.497	5.046	.088	.063	.051	
Mar. 2				0	.020	.028	.004	0	0	.010	.109	.003	
Mar. 30				0	.01	0	0	0	0	.002	0	0	
Mar. 31 to Dec 31				( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )						
Total					.869	1.199	.599	1.214	.047	.181	.238	.225	
<b>1937</b>													} Disked wheat stubble until May. Summer-fallowed and seeded to winter wheat in October.
Jan. 1 to Dec. 10					( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )					
Dec. 11	.24	.24	.22	.38	0	.005	.024	0	0	.002	.010	0	
Dec. 17	.24	.12	.12	.24	0	.015	.075	0	0	.003	.078	0	
Dec. 20-30				2.32	0	0	.366	0	0	0	.062	0	
Total						.020	.465			.005	.150		
<b>1938</b>													} Winter wheat following summer fallow. No vegetative cover.
Jan. 10-15	.24	.18	.12	.67	0	.027	.027	0	0	.023	.127	0	
Jan. 15-17				4.41	0	.014	0	0	0	0	.007	0	
Jan. 18-23				4.30		.030	.072	.025	0	.046	.216	.013	
Feb. 8-10				4.08	0	.008	0	0	0	0	.002	0	
Feb. 10-11				4.02	0	.013	0	0	0	0	.002	0	
Feb. 11-14				4.04	0	.014	0	0	0	0	.003	0	
Feb. 14-15				0	0	.018	0	0	0	0	.002	0	
Feb. 15-16				0	0	.008	0	0	0	0	.001	0	
Feb. 21-23				0	0	.027	0	0	0	0	.002	0	
Feb. 23-24				0	0	.027	0	0	0	0	.003	0	
Feb. 24-25				0	0	.007	.027	0	0	0	.002	0	
Feb. 25-26				0	0	.017	.025	0	0	0	.006	0	
Feb. 26-28				0	0	.023	0	0	0	0	.003	0	
Feb. 28-2				0	0	.013	.007	0	0	.001	.003	0	
Mar. 2-3	.12	.08	.06	.18	0	.011	.014	0	0	.003	.030	0	
Mar. 3-5	.24	.15	.14	.25	0	.016	.024	.005	0	.005	.045	.002	
Mar. 14-15	.12	.12	.08	.44	0	.017	.027	.003	0	.004	.055	.001	
Mar. 15-16	.12	.08	.08	.25	0	.009	.027	.008	0	.003	.116	.003	
Mar. 16-22				1.04	.005	.020	.236	.006	.004	.005	.102	0	
Mar. 22-24				.02	0	.091	.027	.015	0	.016	.037	.001	
Mar. 24-26				0	0	.020	0	0	0	0	.006	0	
Total (Jan.-June)					.005	.258	.685	.062	.004	.106	.770	.020	

<sup>1</sup> See table 2 for description of terraces.  
<sup>2</sup> Terrace 3A was not constructed until October 1932.  
<sup>3</sup> No runoff for following periods: Apr. 3-Nov. 15, 1932; Mar. 12-Oct. 23, 1933; Jan. 1-Dec. 31, 1935; Mar. 31-Dec. 31, 1936; Jan. 1-Dec. 10, 1937.  
<sup>4</sup> Snow.  
<sup>5</sup> From Jan. 13 through March runoff from terrace 6 ran onto terrace 7 through a squirrel hole which was not plugged completely until Mar. 1. Records adjusted accordingly.  
<sup>6</sup> Value is high—includes some water from terrace 6 above.  
<sup>7</sup> Estimated from partial record.