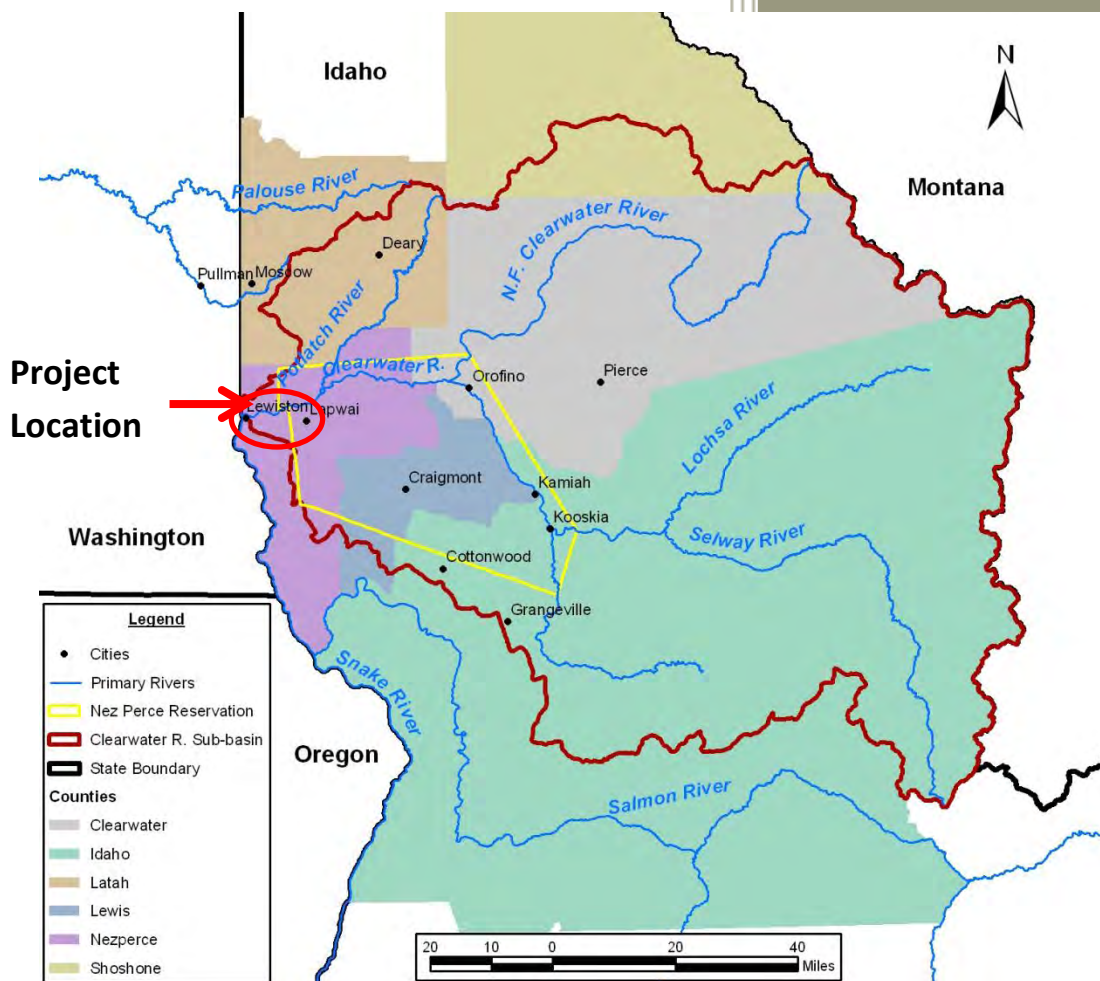


Nez Perce County Lower River Tributaries Appendix 4 Daily and Monthly RUSLE2 Erosion



12-digit HUC's:
170601030306 (Tammany Creek),
1706010305 (TenMile Canyon),
170603061307 (Lindsay Creek),
1706013061308 (Hidden Canyon),
170603061308 (unnamed tributary)

Nez Perce County Lower River Tributaries Appendix 4 Daily and Monthly RUSLE2 Erosion

Prepared for the:
National Water Quality Initiative
USDA Natural Resources Conservation Service
Boise, Idaho

Prepared by:

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District Conservation Engineer

March 2023



1. Objective

Evaluate and summarize the daily and monthly erosion rates output by the RUSLE2 program for example soils and management scenarios in the Lewiston-Nez Perce County NWQI watersheds.

2. RUSLE2 Science Template

The RUSLE2 science template (Version 2.6.8.4) has tabs for the output of daily erosion and sediment. The results can be copied into a spreadsheet for further analysis.

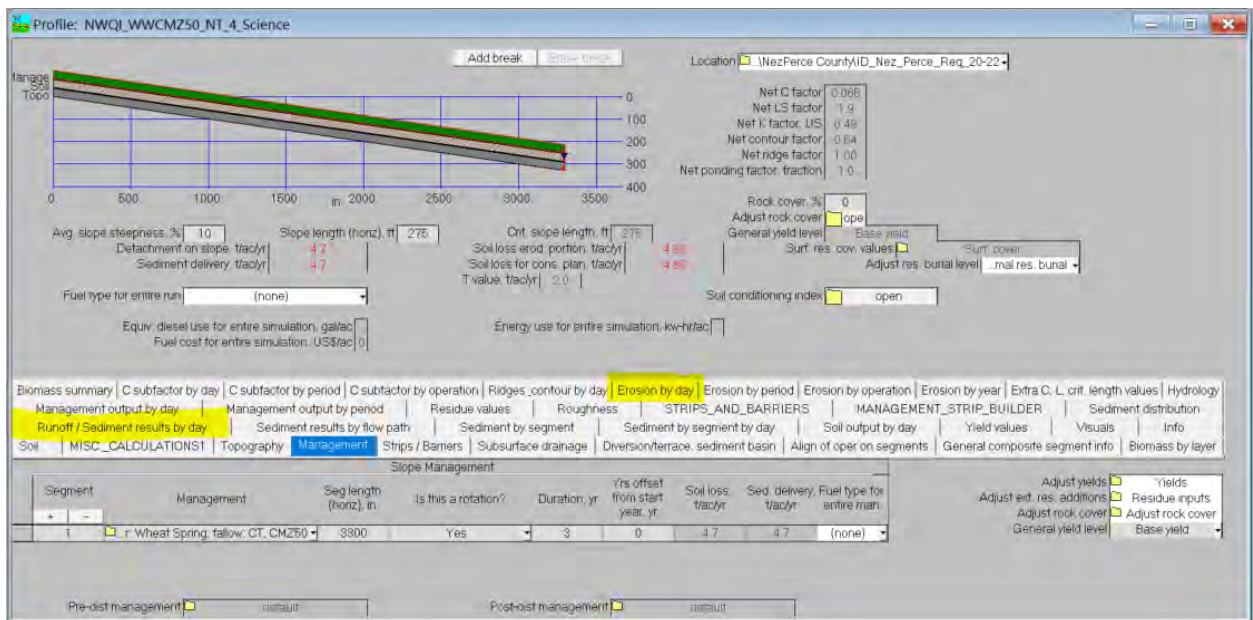


Figure 1. RUSLE2 science template.

3. Management and Soil Scenarios

The following management and soil scenarios are evaluated.

ID	RUSLE2 Management and Soil Scenario
1	CMZ 50\b.Mullti-year Rotation Templates\Wheat, winter; Wheat Spring; fallow; CT, CMZ50 USA\Idaho\NezPerce County\ID_Nez_Perce_Req_20-22 SSURGO\Lewis and Nez Perce Counties, Idaho\37 Endicott-Bryden complex, 2 to 6 percent slopes\Bryden Silt loam 30% Slope length, ft 300 Slope gradient, % 5
2	CMZ 50\b.Mullti-year Rotation Templates\Wheat, winter; Wheat Spring; fallow; CT, CMZ50 USA\Idaho\NezPerce County\ID_Nez_Perce_Req_20-22 SSURGO\Lewis and Nez Perce Counties, Idaho\37 Endicott-Bryden complex, 2 to 6 percent slopes\Bryden Silt loam 30% Slope length, ft 275 Slope gradient, % 10
3	CMZ 50\b.Mullti-year Rotation Templates\Wheat, winter; Wheat Spring; fallow; no till USA\Idaho\NezPerce County\ID_Nez_Perce_Req_20-22 SSURGO\Lewis and Nez Perce Counties, Idaho\37 Endicott-Bryden complex, 2 to 6 percent slopes\Bryden Silt loam 30% Slope length, ft 300 Slope gradient, % 5
4	CMZ 50\b.Mullti-year Rotation Templates\Wheat, winter; Wheat Spring; fallow; no till USA\Idaho\NezPerce County\ID_Nez_Perce_Req_20-22 SSURGO\Lewis and Nez Perce Counties, Idaho\16 Broadax-Hatwai complex, 1 to 8 percent slopes\Broadax Silt loam 45% Slope length, ft 300 Slope gradient, % 5
5	CMZ 50\b.Mullti-year Rotation Templates\Wheat, winter; Wheat Spring; fallow; no till USA\Idaho\NezPerce County\ID_Nez_Perce_Req_20-22 SSURGO\Lewis and Nez Perce Counties, Idaho\16 Broadax-Hatwai complex, 1 to 8 percent slopes\Broadax Silt loam 45% Slope length, ft 275 Slope gradient, % 10
6	CMZ 50\b.Mullti-year Rotation Templates\Wheat, winter; Wheat Spring; fallow; CT, CMZ50 USA\Idaho\NezPerce County\ID_Nez_Perce_Req_20-22 SSURGO\Lewis and Nez Perce Counties, Idaho\16 Broadax-Hatwai complex, 1 to 8 percent slopes\Broadax Silt loam 45% Slope length, ft 275 Slope gradient, % 10

Table 1. RUSLE2 Management and Soil Scenarios.

4. Erosion by Day

Copy and paste the Slope Daily Erosion Values table from the Erosion by Day tab into a spreadsheet.

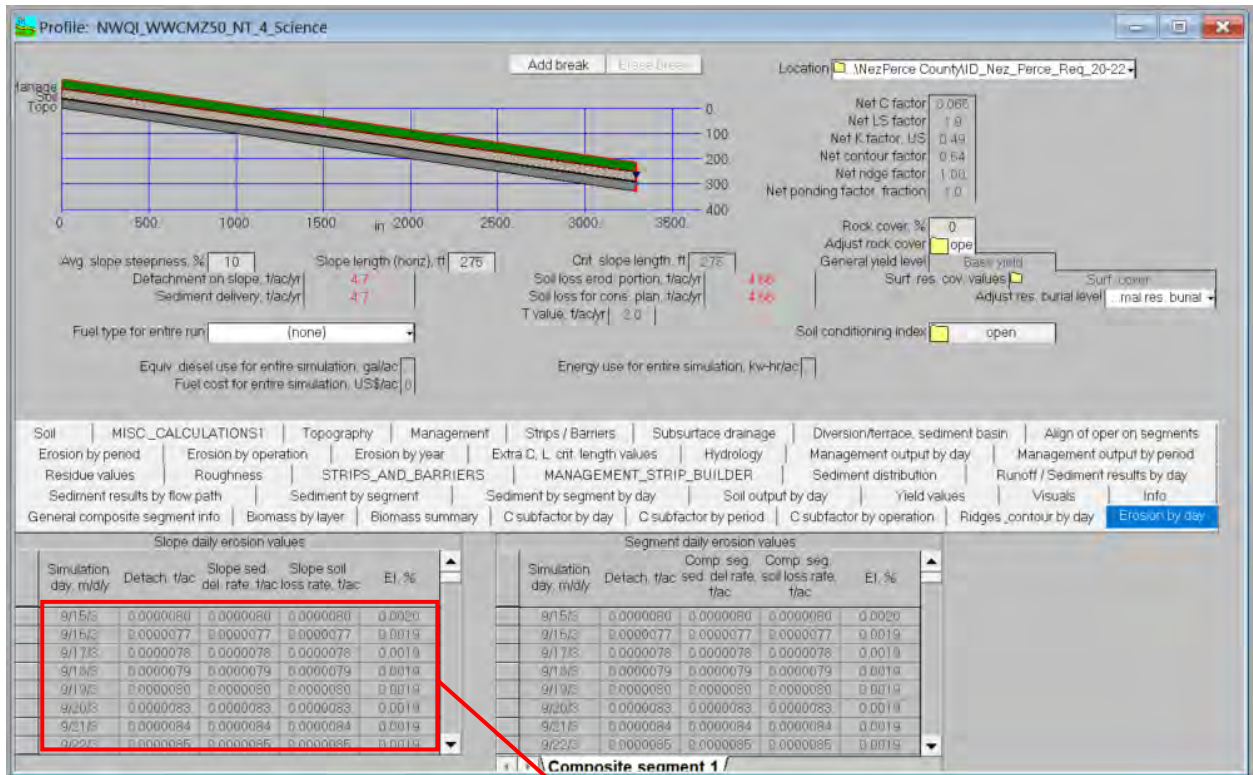


Figure 2. RUSLE2 Erosion by Day.

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The values from the Slope Daily Erosion table are summarized with a pivot table. A plot of the daily rainfall erosivity distribution from the table is shown in Figure 3. The plot shows that most of the erosion in the NWQI project watersheds occurs during winter and early spring (December – March). The rainfall erosivity distribution is the same for each year in a multi-year rotation. Monthly and annual erosion rates for the management and soil scenarios are summarized in Table 2 through Table 7. Monthly erosion as a percent

of the total annual erosion for the scenarios is summarized in Table 8. The monthly percentages are about the same in each scenario. The greatest amount of erosion occurs in January (27 percent) followed by February (25 percent), December (20 percent), and March (10 percent). In the three year conservation till and no-till rotations, most of the erosion (75 percent) occurs in the second year of the rotation when winter wheat is planted after fallow.

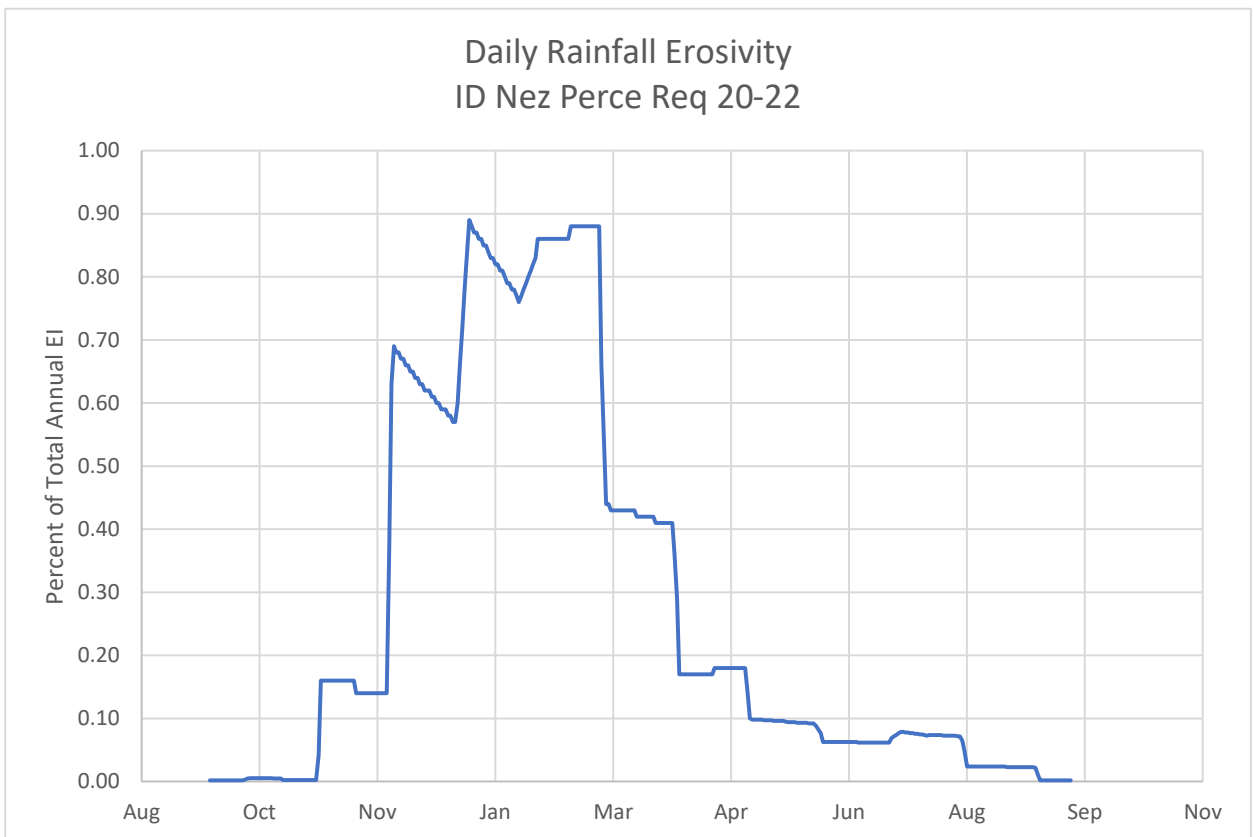


Figure 3. Daily rainfall erosivity distribution for the NWQI watershed area.

RUSLE2 Monthly Erosion - Scenario 1					
Month	Simulation Year			Total ton/ac/yr	Average Annual Percent
	1	2	3		
	Erosion tons/ac/year				
Sep	0.00	0.01	0.00	0.01	0.1%
Oct	0.00	0.02	0.00	0.02	0.2%
Nov	0.03	0.43	0.01	0.47	5.3%
Dec	0.18	1.60	0.05	1.84	20.6%
Jan	0.27	2.00	0.10	2.37	26.7%
Feb	0.27	1.78	0.13	2.18	24.5%
Mar	0.16	0.58	0.09	0.83	9.4%
Apr	0.08	0.15	0.10	0.33	3.7%
May	0.10	0.07	0.07	0.24	2.7%
Jun	0.17	0.03	0.03	0.23	2.6%
Jul	0.25	0.01	0.03	0.29	3.3%
Aug	0.09	0.00	0.00	0.09	1.1%
3-yr Total	1.62	6.68	0.61	8.90	100.0%
Average Annual	0.54	2.23	0.20	2.97	
Annual Percent	18.2%	75.0%	6.8%	100.0%	

Table 2. RUSLE2 Monthly Erosion - Scenario 1.

RUSLE2 Monthly Erosion - Scenario 2					
Month	Simulation Year			Total ton/ac/yr	Average Annual Percent
	1	2	3		
	Erosion tons/ac/year				
Sep	0.00	0.01	0.00	0.01	0.1%
Oct	0.00	0.03	0.00	0.03	0.2%
Nov	0.05	0.66	0.01	0.72	5.1%
Dec	0.27	2.50	0.08	2.85	20.4%
Jan	0.41	3.14	0.15	3.70	26.4%
Feb	0.41	2.84	0.19	3.44	24.6%
Mar	0.25	0.92	0.13	1.29	9.3%
Apr	0.12	0.23	0.15	0.51	3.6%
May	0.15	0.12	0.11	0.37	2.7%
Jun	0.30	0.05	0.05	0.39	2.8%
Jul	0.44	0.02	0.05	0.51	3.7%
Aug	0.17	0.00	0.00	0.17	1.2%
3-yr Total	2.56	10.51	0.91	13.98	100.0%
Average Annual	0.85	3.50	0.30	4.66	
Annual Percent	18.3%	75.2%	6.5%	100.0%	

Table 3. RUSLE2 Monthly Erosion - Scenario 2.

RUSLE2 Monthly Erosion - Scenario 3					
Month	Simulation Year			Total ton/ac/yr	Average Annual Percent
	1	2	3		
	Erosion tons/ac/year				
Sep	0.00	0.00	0.00	0.00	0.1%
Oct	0.00	0.00	0.00	0.00	0.2%
Nov	0.01	0.10	0.00	0.12	5.0%
Dec	0.07	0.39	0.02	0.48	20.6%
Jan	0.10	0.50	0.04	0.64	27.3%
Feb	0.09	0.46	0.05	0.60	25.7%
Mar	0.05	0.18	0.03	0.26	11.1%
Apr	0.02	0.06	0.02	0.10	4.1%
May	0.02	0.03	0.01	0.06	2.5%
Jun	0.02	0.01	0.01	0.03	1.5%
Jul	0.02	0.01	0.01	0.04	1.5%
Aug	0.01	0.00	0.00	0.01	0.4%
3-yr Total	0.42	1.73	0.18	2.33	100.0%
Average Annual	0.14	0.58	0.06	0.78	
Annual Percent	18.1%	74.3%	7.5%	100.0%	

Table 4. RUSLE2 Monthly Erosion - Scenario 3.

RUSLE2 Monthly Erosion - Scenario 4					
Month	Simulation Year			Total ton/ac/yr	Average Annual Percent
	1	2	3		
	Erosion tons/ac/year				
Sep	0.00	0.00	0.00	0.00	0.1%
Oct	0.00	0.00	0.00	0.00	0.2%
Nov	0.01	0.09	0.00	0.10	5.0%
Dec	0.06	0.34	0.02	0.42	20.5%
Jan	0.09	0.44	0.03	0.56	27.4%
Feb	0.08	0.40	0.04	0.52	25.7%
Mar	0.05	0.15	0.03	0.23	11.2%
Apr	0.02	0.05	0.01	0.08	4.1%
May	0.02	0.03	0.01	0.05	2.5%
Jun	0.01	0.01	0.01	0.03	1.5%
Jul	0.02	0.00	0.01	0.03	1.5%
Aug	0.01	0.00	0.00	0.01	0.4%
3-yr Total	0.37	1.52	0.15	2.04	100.0%
Average Annual	0.12	0.51	0.05	0.68	
Annual Percent	18.1%	74.4%	7.5%	100.0%	

Table 5. RUSLE2 Monthly Erosion - Scenario 4

RUSLE2 Monthly Erosion - Scenario 5					
Month	Simulation Year			Total ton/ac/yr	Average Annual Percent
	1	2	3		
	Erosion tons/ac/year				
Sep	0.00	0.00	0.00	0.00	0.1%
Oct	0.00	0.00	0.00	0.01	0.2%
Nov	0.02	0.12	0.00	0.14	4.9%
Dec	0.09	0.49	0.03	0.61	20.4%
Jan	0.13	0.63	0.05	0.81	27.3%
Feb	0.12	0.58	0.06	0.77	25.8%
Mar	0.07	0.22	0.04	0.33	11.2%
Apr	0.03	0.07	0.02	0.12	4.1%
May	0.02	0.04	0.01	0.07	2.5%
Jun	0.02	0.02	0.01	0.04	1.5%
Jul	0.03	0.01	0.01	0.05	1.6%
Aug	0.01	0.00	0.00	0.01	0.4%
3-yr Total	0.56	2.18	0.23	2.97	100.0%
Average Annual	0.19	0.73	0.08	0.99	
Annual Percent	18.7%	73.6%	7.7%	100.0%	

Table 6. RUSLE2 Monthly Erosion - Scenario 5.

RUSLE2 Monthly Erosion - Scenario 6					
Month	Simulation Year			Total ton/ac/yr	Average Annual Percent
	1	2	3		
	Erosion tons/ac/year				
Sep	0.00	0.01	0.00	0.01	0.1%
Oct	0.00	0.02	0.00	0.02	0.2%
Nov	0.04	0.57	0.01	0.62	5.1%
Dec	0.24	2.18	0.07	2.49	20.4%
Jan	0.36	2.76	0.13	3.25	26.6%
Feb	0.36	2.46	0.17	2.99	24.5%
Mar	0.22	0.80	0.12	1.13	9.3%
Apr	0.11	0.20	0.13	0.44	3.6%
May	0.13	0.10	0.09	0.32	2.7%
Jun	0.26	0.04	0.04	0.34	2.8%
Jul	0.39	0.02	0.04	0.45	3.6%
Aug	0.15	0.00	0.00	0.15	1.2%
3-yr Total	2.24	9.18	0.80	12.22	100.0%
Average Annual	0.75	3.06	0.27	4.07	
Annual Percent	18.4%	75.1%	6.5%	100.0%	

Table 7. RUSLE2 Monthly Erosion - Scenario 6.

RUSLE2 Monthly Erosion as Percent of Total Annual							
Month	Scenario ID						Average
	1	2	3	4	5	6	
Sep	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0%
Oct	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0%
Nov	5.3%	5.1%	5.0%	5.0%	4.9%	5.1%	5%
Dec	20.6%	20.4%	20.6%	20.5%	20.4%	20.4%	20%
Jan	26.7%	26.4%	27.3%	27.4%	27.3%	26.6%	27%
Feb	24.5%	24.6%	25.7%	25.7%	25.8%	24.5%	25%
Mar	9.4%	9.3%	11.1%	11.2%	11.2%	9.3%	10%
Apr	3.7%	3.6%	4.1%	4.1%	4.1%	3.6%	4%
May	2.7%	2.7%	2.5%	2.5%	2.5%	2.7%	3%
Jun	2.6%	2.8%	1.5%	1.5%	1.5%	2.8%	2%
Jul	3.3%	3.7%	1.5%	1.5%	1.6%	3.6%	3%
Aug	1.1%	1.2%	0.4%	0.4%	0.4%	1.2%	1%
Annual	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100%

Table 8. Monthly erosion as a percent of the total annual erosion.

5. Runoff/Sediment Results by Day

Copy and paste the Sediment Daily Results table from the Runoff/Sediment Results by Day tab into a spreadsheet. The proportion of clay, silt, and sand in the eroded sediment for each scenario is summarized in Table 9. The sediment averages 70 percent silt, 18 percent clay, and 12 percent sand. The computational area of the hillslope is the slope length multiplied by the unit width (slope length in feet x 1 foot).

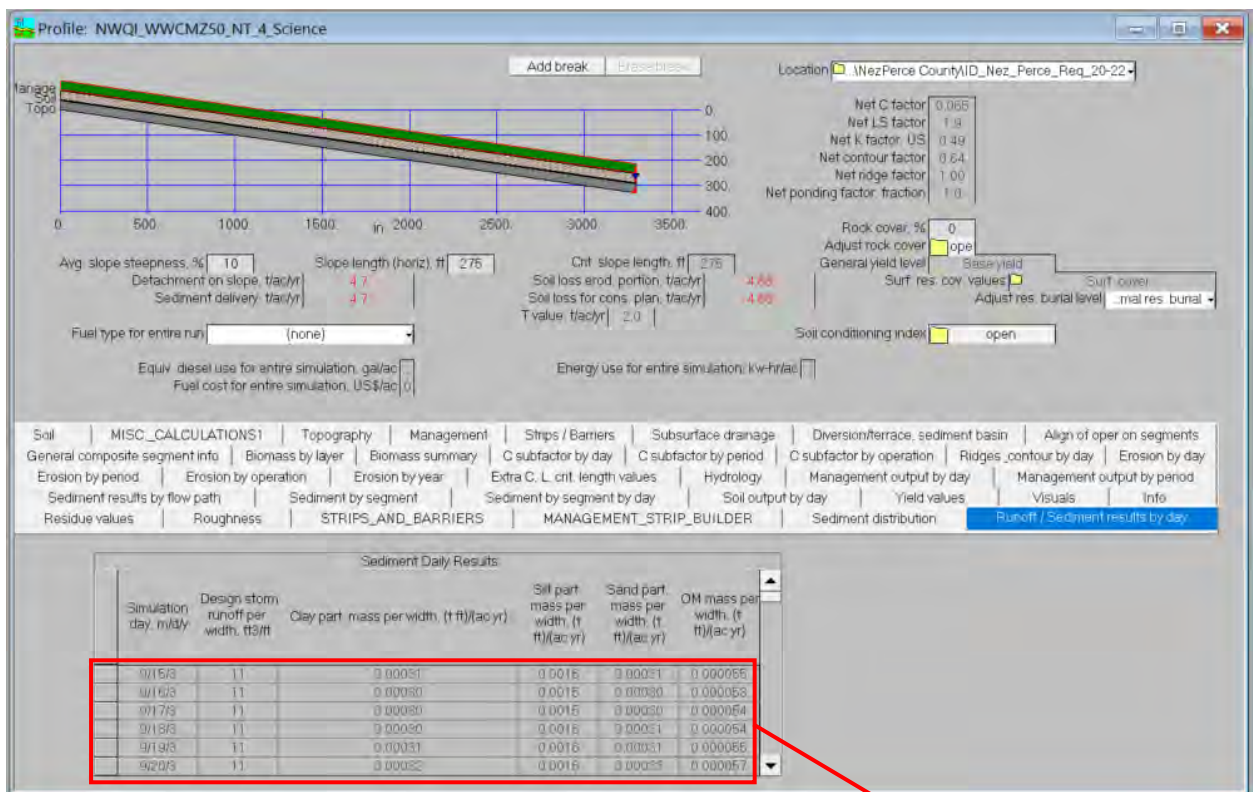


Figure 4. RUSLE2 Runoff/Sediment Results by Day.

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RUSLE2 Sediment Distribution				
Scenario	Sediment tons/ac/year			Total
	Clay	Silt	Sand	ton/ac/yr
1	0.41	2.14	0.42	2.97
2	0.65	3.35	0.66	4.66
3	0.11	0.56	0.11	0.78
4	0.14	0.46	0.08	0.68
5	0.21	0.67	0.11	0.99
6	0.86	2.76	0.46	4.08
Annual Percent	17.5%	69.8%	12.7%	100.0%

Table 9. RUSLE2 Sediment Distribution.