RUSLE2 Results Matrix – EQIP.08.AreaIV.KISS Managements
USDA/NRCS, Tappahannock Service Center

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I. SUMMARY OF INPUT FACTORS & SCENARIOS ANALYZED

Input Factors	Number of Factors Analyzed	Description
Climates (counties)	1	King & Queen County (R = 220)
Soil types	1	Emporia sandy loam (K = 0.24, T = 5)
Topographies (slope length & steepness combinations)	4	Typical slopes from 2% to 8% – see Results Tables for details
Managements (crop rotation + tillage combinations)	62	All rotations provided in EQIP.08.AreaIV.KISS package – see Results Tables for details
Yield levels	1	Mid (base) yield levels – see Table III.C. for details.
Support practices	1	None (no credit for contouring, strips, etc.)
	248	***= Total number of scenarios analyzed***

Disclaimer

This document is intended only for conservation professionals experienced in use and interpretation of RUSLE2 inputs and outputs. Remember that RUSLE2 results are only one of a number of factors that a qualified planner must consider when making erosion estimates and conservation planning recommendations. This matrix shows RUSLE2 results for a limited range of scenarios. It does not cover many scenarios that planners may encounter and therefore should not be used as a substitute for running RUSLE2 in those cases.

II. RESULTS TABLES

EQIP08.AreaIV.KISS Rotations w/ Mid (Base) Yields							Avg. Annual STIR	King & Queen Co., Emporia sandy loam (K=.24, T=5)							
	Year 1 (and 4)		Year 2 (and 5)		Year 3 (and 6)			2%, 250 ft		4%, 200 ft		6%, 175 ft		8%, 150 ft	
	Summer	Winter	Summer	Winter	Summer	Winter		Soil loss	SCI	Soil loss	SCI	Soil loss	SCI	Soil loss	SCI
A. CORN GRAIN / SOYBEAN ROTATIONS															
1	CORN CT disk	FALLOW					**90**	2	0.09	4	-0.08	7	-0.25	9	-0.42
2	CORN NT	FALLOW					**3**	<1	0.63	<1	0.61	<1	0.59	1	0.57
3	CORN ST	COVER MT disk lite					**40**	1	0.52	2	0.44	3	0.37	4	0.30
4	CORN NT	COVER NT bcast					**3**	<1	0.80	<1	0.79	<1	0.78	<1	0.78
5	SOY FS CT disk	FALLOW					**100**	2	-0.21	5	-0.40	7	-0.58	9	-0.74
6	SOY FS NT sddr	FALLOW					**3**	<1	0.30	2	0.25	2	0.20	3	0.14
7	SOY FS NT fcdr	COVER MT disk lite					**30**	1	0.32	2	0.24	3	0.16	4	0.08
8	SOY FS NT sddr	COVER NT sddr					**5**	<1	0.52	<1	0.50	1	0.47	1	0.45
9	CORN CT disk	FALLOW	SOY FS CT disk	FALLOW			**100**	3	-0.08	5	-0.27	7	-0.45	10	-0.63
10	CORN NT	FALLOW	SOY FS NT sddr	FALLOW			**3**	<1	0.47	1	0.43	2	0.39	2	0.35
11	CORN ST	COVER MT disk lite	SOY FS NT fcdr	COVER MT disk lite			**40**	1	0.42	2	0.33	3	0.25	4	0.18
12	CORN NT	COVER NT bcast	SOY FS NT sddr	COVER NT sddr			**4**	<1	0.66	<1	0.64	<1	0.62	<1	0.61
B. CORN GRAIN / SOYBEAN / SMALL GRAIN ROTATIONS															
1	SOY FS CT disk	SG gr+strw CT disk	SOY DC NT fcdr	FALLOW			**100**	2	-0.06	4	-0.20	5	-0.33	7	-0.46
2	SOY FS NT sddr	SG gr+strw NT sddr	SOY DC NT sddr	FALLOW			**4**	<1	0.43	1	0.39	2	0.35	2	0.31
3	SOY FS NT fcdr	SG gr CT disk	SOY DC NT fcdr	COVER NT fcdr			**60**	1	0.34	2	0.27	3	0.20	4	0.14
4	SOY FS NT sddr	SG gr NT sddr	SOY DC NT sddr	COVER NT sddr			**5**	<1	0.64	<1	0.62	<1	0.61	1	0.59

	EQIP08.AreaIV.KISS Rotations w/ Mid (Base) Yields						Avg. Annual STIR	King & Queen Co., Emporia sandy loam (K=.24, T=5)							
	Year 1 (and 4)		Year 2 (and 5)		Year 3 (and 6)			2%, 250 ft		4%, 200 ft		6%, 175 ft		8%, 150 ft	
	Summer	Winter	Summer	Winter	Summer	Winter		Soil loss	SCI	Soil loss	SCI	Soil loss	SCI	Soil loss	SCI
5	CORN CT disk	SG gr+strw CT plow	SOY DC NT fcdr	FALLOW			100	2	0.00	4	-0.16	6	-0.32	8	-0.48
6	CORN NT	SG gr+strw NT sddr	SOY DC NT sddr	FALLOW			4	<1	0.59	<1	0.55	1	0.52	2	0.49
7	CORN NT	SG gr CT disk	SOY DC NT fcdr	FALLOW			50	<1	0.45	2	0.40	2	0.34	3	0.28
8	CORN NT	SG gr NT sddr	SOY DC NT sddr	FALLOW			4	<1	0.74	<1	0.73	<1	0.72	<1	0.71
9	CORN NT	SG gr NT fcdr	SOY DC NT fcdr	COVER NT fcdr			10	<1	0.69	1	0.65	2	0.61	2	0.57
10	CORN NT	SG gr NT sddr	SOY DC NT sddr	COVER NT sddr			5	<1	0.77	<1	0.76	<1	0.74	<1	0.73
11	CORN CT disk	FALLOW	SOY FS CT disk	SG gr+strw CT disk	SOY DC NT fcdr	FALLOW	100	2	-0.01	4	-0.17	6	-0.32	8	-0.46
12	CORN NT	FALLOW	SOY FS NT sddr	SG gr+strw NT sddr	SOY DC NT sddr	FALLOW	4	<1	0.50	1	0.46	2	0.43	2	0.39
13	CORN NT	COVER NT fcdr	SOY FS NT fcdr	SG gr NT fcdr	SOY DC NT fcdr	COVER NT fcdr	10	<1	0.60	1	0.55	2	0.50	3	0.46
14	CORN NT	COVER NT bcast	SOY FS NT sddr	SG gr NT sddr	SOY DC NT sddr	COVER NT sddr	5	<1	0.70	<1	0.69	<1	0.68	<1	0.66
C. COTTON / GRAIN ROTATIONS															
1	COTTON, CT plow	FALLOW	SOY FS, CT disk	FALLOW			100	6	-0.52	11	-0.97	17	-1.40	20	-1.70
2	COTTON, NT	FALLOW	SOY FS, NT sddr	FALLOW			3	1	0.28	2	0.20	3	0.12	4	0.04
3	COTTON, ST	COVER, MT disk lite	SOY FS, NT fcdr	COVER, MT disk lite			40	1	0.31	3	0.21	4	0.11	5	0.02
4	COTTON, NT	COVER, NT sddr	SOY FS, NT sddr	COVER, NT sddr			5	<1	0.53	<1	0.50	1	0.47	2	0.44
5	COTTON, CT plow	FALLOW	CORN, NT	SG gr, CT plow	SOY DC, NT fcdr	FALLOW	90	4	-0.02	7	-0.30	11	-0.57	13	-0.76
6	COTTON, NT	FALLOW	CORN, NT	SG gr, NT sddr	SOY DC, NT sddr	FALLOW	4	<1	0.60	<1	0.57	1	0.54	2	0.51
7	COTTON, ST	COVER, MT disk lite	CORN, ST	SG gr, CT disk	SOY DC, NT fcdr	COVER, MT disk lite	60	1	0.36	2	0.27	3	0.19	4	0.11
8	COTTON, NT	COVER, NT sddr	CORN, NT	SG gr, NT sddr	SOY DC, NT sddr	COVER, NT sddr	5	<1	0.68	<1	0.66	1	0.64	1	0.62

	EQIP08.AreaIV.KISS Rotations w/ Mid (Base) Yields						Avg. Annual STIR	King & Queen Co., Emporia sandy loam (K=.24, T=5)							
	Year 1 (and 4)		Year 2 (and 5)		Year 3 (and 6)			2%, 250 ft		4%, 200 ft		6%, 175 ft		8%, 150 ft	
	Summer	Winter	Summer	Winter	Summer	Winter		Soil loss	SCI	Soil loss	SCI	Soil loss	SCI	Soil loss	SCI
D. CORN SILAGE ROTATIONS															
1	CORN sil CT disk	FALLOW					**90**	5	-0.46	10	-0.87	16	-1.30	20	-1.60
2	CORN sil NT Hi manure	COVER NT sddr					**6**	<1	0.41	2	0.35	2	0.29	3	0.23
3	CORN sil CT disk	FALLOW	SOY FS CT disk	FALLOW			**100**	4	-0.34	8	-0.64	11	-0.93	15	-1.20
4	CORN sil MT disk lite Hi manure	SG sil MT disk lite Hi manure	SOY FS NT fcdr	COVER NT fcdr			**40**	2	0.14	4	-0.01	6	-0.16	8	-0.31
5	CORN sil NT Hi manure	COVER NT sddr	SOY FS NT sddr	COVER NT sddr			**5**	<1	0.46	1	0.42	2	0.38	2	0.34
6	CORN sil CT disk	SG gr+strw CT disk	SOY DC NT fcdr	FALLOW			**100**	3	-0.13	5	-0.33	8	-0.52	10	-0.71
7	CORN sil NT Hi manure	SG gr+strw NT sddr Lo manure	SOY DC NT sddr	FALLOW			**4**	<1	0.42	1	0.37	2	0.32	3	0.27
E. HAY & HAY ROTATIONS															
1	HAY grass permanent	HAY grass permanent					**0**	<1	1.20	<1	1.20	<1	1.20	<1	1.20
2	CORN CT plow	FALLOW	PEANUT CT plow	COVER MT disk lite	COTTON CT disk	FALLOW	**80**	2	0.38	4	0.23	6	0.08	7	-0.02
	HAY grass CT disk	HAY grass	HAY grass	HAY grass	HAY grass	HAY grass									
3	CORN NT	COVER NT fcdr	PEANUT CT plow	COVER NT bcast	COTTON ST	FALLOW	**30**	1	0.69	2	0.62	3	0.54	4	0.48
	HAY grass NT fcdr	HAY grass	HAY grass	HAY grass	HAY grass	HAY grass									
4	CORN CT plow	SG gr+strw CT disk	SOY DC NT fcdr	FALLOW	HAY grass CT disk	HAY grass	**50**	<1	0.73	1	0.69	2	0.64	2	0.60
	HAY grass	HAY grass	HAY grass	HAY grass	HAY grass	HAY grass									
5	CORN NT	SG gr+strw NT sddr	SOY DC NT sddr	FALLOW	HAY grass NT sddr	HAY grass	**2**	<1	1.00	<1	1.00	<1	0.99	<1	0.98
	HAY grass	HAY grass	HAY grass	HAY grass	HAY grass	HAY grass									

EQIP08.AreaIV.KISS Rotations w/ Mid (Base) Yields							Avg. Annual STIR	King & Queen Co., Emporia sandy loam (K=.24, T=5)							
	Year 1 (and 4)		Year 2 (and 5)		Year 3 (and 6)			2%, 250 ft		4%, 200 ft		6%, 175 ft		8%, 150 ft	
	Summer	Winter	Summer	Winter	Summer	Winter		Soil loss	SCI	Soil loss	SCI	Soil loss	SCI	Soil loss	SCI
6	CORN sil CT plow + Hi manure	COVER MT disk lite	CORN sil NT + Hi manure	HAY alfalfa CT disk	HAY alfalfa	HAY alfalfa	**40**	2	0.35	3	0.24	4	0.13	6	0.02
	HAY alfalfa	HAY alfalfa	HAY alfalfa	HAY alfalfa	HAY alfalfa	HAY alfalfa									
7	CORN sil NT + Hi manure	COVER NT sddr	CORN sil NT + Hi manure	HAY alfalfa NT sddr	HAY alfalfa	HAY alfalfa	**2**	<1	0.60	<1	0.57	1	0.54	2	0.51
	HAY alfalfa	HAY alfalfa	HAY alfalfa	HAY alfalfa	HAY alfalfa	HAY alfalfa									

III. BACKGROUND DATA & DEFINITIONS

Table III.A. Start and End Dates for Individual Crops in EQIP.08.AreaIV.KISS Managements

02/15		03/25	03/30	04/01	04/20			06/22			09/01	09/05		10/15	10/16	10/17		11/10	11/12				04/01	04/10	04/20		06/20	06/21
			MANURE, SPRING (3/30)	**CORN GRAIN** Start 4/1, end 10/15											MANURE, FALL (10/16)	**COVER CROP** Start 10/17, end at next crop (any date)							*Any spring crop, including corn, can fit here.*					
				COTTON Start 4/20, end 10/15												**HAY, GRASS, FALL SEED** Start 10/17, end approx. two years later												
				PEANUT Start 4/20, end 10/15												**SMALL GRAIN, SILAGE** Start 10/17, end 4/10							*Cotton, Soybean FS, Peanut can fit here*					
				SOYBEAN FS Start 4/20, end 10/15												**SMALL GRAIN, GRAIN** Start 10/17, end 6/20												
Small grain, grain + straw can fit here								**SOYBEAN DC, EARLY HARVEST** Start 6/22, end 10/15								**SMALL GRAIN, GRAIN + STRAW** Start 10/17, end 6/21												
Small grain, grain + straw can fit here								**SOYBEAN DC, LATE HARVEST** Start 6/22, end 11/10											**COVER CROP, LATE** Start 11/12, end at next crop (any date)				*Any spring crop, including corn, can fit here.*					
				CORN SILAGE Start 4/1, end 9/1									**HAY, ALFALFA, FALL SEED** Start 9/5, end approx three years later																
		HAY, ALFALFA, SPRING SEED Start 03/25, end approx. three years later																											
HAY, GRASS, SPRING SEED Start 2/15, end approx. two years later																												

= Spring seeded crop

= Fall seeded crop

Table III.B. Summary of Soil Disturbing Operations in EQIP.08.AreaIV.KISS Managements

Description	Relevant crops	Full-width tillage?	Operations				Total STIR for ops	Total residue burial, by residue type		
			Tillage			Seeding		Soy	SG	Corn
CT plow+bed	cotton, peanut	Yes	plow, moldboard	disk, secondary	hipper, bedder	planter, conventional	126	100%	100%	100%
CT plow	soybean, small grain, cover crop, hay	Yes	plow, moldboard	disk, secondary	disk, finishing	drill, conventional	123	100%	100%	99%
CT plow	corn	Yes	plow, moldboard	disk, secondary	disk, finishing	planter, conventional	119	100%	100%	99%
CT disk+bed	cotton, peanut	Yes	disk, primary	disk, secondary	hipper, bedder	planter, conventional	100	100%	99%	98%
CT diskx3	soybean, small grain, cover crop, hay	Yes	disk, primary	disk, secondary	disk, finishing	drill, conventional	97	99%	97%	95%
CT diskx3	corn	Yes	disk, primary	disk, secondary	disk, finishing	planter, conventional	93	99%	97%	94%
Peanut harvest	peanut	Yes (?)					27	8%	2%	0%
MT disk lite	soybean, small grain, cover crop, hay	Yes			disk, finishing	drill, conventional	26	77%	65%	59%
MT disk lite	corn, cotton, peanut	Yes			disk, finishing	planter, conventional	22	72%	60%	54%
ST	corn, cotton, peanut	No				planter, in-row subsoiler	12	29%	26%	22%
NT fcdr	soybean, small grain, cover crop, hay	No				drill, NT double disk opnr w/ fluted couters	7	18%	13%	10%
NT	corn, cotton, peanut	No				planter, NT	2	4%	3%	2%
NT sddr	soybean, small grain, cover crop, hay	No				drill, NT single disk opnr	2	4%	3%	2%
NT bcast	cover crop	No				broadcast seeder	0	0%	0%	0%

Table III.C. Recommended Yield Levels for EQIP.08.AreaIV.KISS Managements

Crop name	Description	Low	Mid / Base	High	Comments
Corn gr	Corn grain	100 bu/ac	125 bu/ac	150 bu/ac	
Corn sil	Corn silage	20 ton/ac	23 ton/ac	28 ton/ac	Yield units = ton/ac wet silage. Growth curves similar to 100/125/150 bu/ac grain corn. Use these values rather than directly inputting farmer yields due to % moisture adjustment issues.
Cotton	Cotton	550 lb/ac	750 lb/ac	950 lb/ac	Yield units = lb/ac lint.
Cover	Winter cover crop, all species	2,500 lb/ac	4,500 lb/ac	7,000 lb/ac	Use for all winter cover crop species (grasses or legumes). Yield units = lb/ac dry biomass at maturity (not necessarily on kill date). Adjust yields to properly represent species/biomass: • 2,500 lb/ac: All species, poor mgmt (late seed date, low seed rate, low fertility). Growth curve & biomass similar to 20 bu/ac small grain. • 4,500 lb/ac: All species, normal mgmt. Growth curve & biomass similar to 40 bu/ac small grain. Can also be used to represent rye under poor mgmt. • 7,000 lb/ac: All species, high mgmt – as if for harvest. Growth curve & biomass similar to 60 bu/ac small grain. Can also be used for rye under normal mgmt. • 10,000 lb/ac: Rye only, high mgmt– as if for harvest. Growth curve & biomass similar to 80 bu/ac small grain. • 12,000 lb/ac: Rye only, high mgmt– as if for harvest, killed late (5+ feet tall). Growth curve & biomass similar to 100 bu/ac small grain.
Peanut	Peanut	2,250 lb/ac	3,000 lb/ac	3,750 lb/ac	Yield units = lb/ac peanuts
S.G. gr	Small grain for grain	40 bu/ac	60 bu/ac	80 bu/ac	
S.G. sil	Small grain for silage or hay	7 ton/ac	10 ton/ac	13 ton/ac	Yield units = ton/ac wet silage. Growth curves similar to 40/60/80 bu/ac small grain. Use these values rather than directly inputting farmer yields due to % moisture adjustment issues.
Soy FS	Soybean full season (May seed)	30 bu/ac	40 bu/ac	50 bu/ac	
Soy DC	Soybean double crop (June seed)	20 bu/ac	30 bu/ac	40 bu/ac	
Hay grass	Perennial grass or grass/legume hay, all species	--	RUSLE2 default yields	--	Use base yields (same as RUSLE2 defaults) as much as possible. If yield increase or decrease is desired, use overall yield level adjustment in Worksheet or Profile only (+/- 20 to 30%).
Hay alfalfa	Alfalfa hay only	--	RUSLE2 default yields	--	Use base yields (same as RUSLE2 defaults) as much as possible. If yield increase or decrease is desired, use overall yield level adjustment in Worksheet or Profile screens only (+/- 20 to 30%).

Table III.D. Definitions of RUSLE2 Outputs	
Output	**Definition**
Soil loss	Soil loss for conservation planning in tons/acre/year. Values are rounded to the nearest whole ton, except that results less than 1 ton are all expressed as "<1". Estimate of average annual rainfall-induced sheet & rill erosion (detachment of soil particles & transport downhill) over the length of the modeled slope. This value represents a long-term (20- to 30-year) average, not a prediction of actual soil loss in any single year. This is the number to use for conservation planning and to compare with the field's "T" soil loss tolerance value. This number is a measure of the likelihood of degradation by erosion of the soil resource in upslope (steeper) areas of the field. It is not an estimate of the amount of soil that leaves the field.
SCI	Soil conditioning index score, an indicator of soil organic matter (SOM) or soil carbon (C) trend. If SCI is negative (less than zero), SOM and soil C and soil quality are predicted to decline over time on the modeled slope under the modeled management system. If SCI is positive (greater than zero), SOM and soil C and soil quality are predicted to stay the same or to increase over time. SCI scores usually range from -1 to +1 in typical VA situations, although more extreme values are possible. SCI is an index score (no units) designed solely for comparing the relative impact of different management alternatives on long-term soil quality trends. When calculating SCI, RUSLE2 considers three key factors: (1) amount of surface and subsurface biomass returned to the soil; (2) tillage-induced oxidation of soil carbon; and (3) predicted sheet & rill erosion.
Avg. annual STIR	Soil Tillage Intensity Rating expressed as an average annual value for the overall crop rotation. Index score (no units) designed solely for comparing the impact of different management alternatives on soil disturbance. STIR increases with increasing tillage and can range from 0 to 200+. Average annual STIR values as shown in the Results portion of this document reflect total amount of soil disturbance that occurs during the overall rotation, averaged across the number of years in the rotation. STIR values can also be calculated for individual crops or operations (see Summary of Soil Disturbing Operations Table). STIR values in the 5 to 20 range are typical for individual no-till crops or operations. Average annual STIR values in the 5 to 20 range are therefore typical of continuous no-till or low soil disturbance cropping systems. In long rotations with a mix of tilled and no-till and/or perennial crops, the average annual STIR for the overall rotation may be relatively low even if significant tillage occurs in individual years and STIR values for one or more crops in the rotation are relatively high.