

APPENDIX F. Sensitivity Analysis Calculations

This section includes the complete results from the sensitivity analysis calculations performed during the present research. Two preliminary analysis performed on the AGNPS and water quality component for WATFLOOD, and the full sensitivity analysis for the AGNPS model. The tables are:

Preliminary Sensitivity for the AGNPS Model

Preliminary Sensitivity for SP-Model (Water Quality Component)

Sensitivity Analysis for the AGNPS Model:

- Total Runoff Volume*
- Peak Runoff Rate*
- Total Sediment Yield*
- Nitrogen in Sediment*
- Nitrogen in Runoff*
- Soluble Nitrogen Concentration*
- Phosphorus in Sediment*
- Phosphorus in Runoff*
- Soluble Phosphorus Concentration*
- COD in Runoff*
- COD Concentration*

Table F1. Preliminary Sensitivity for the AGNPS Model

% Variation on Sediment Yield:											
ParVar	Rain	EI	CN	LS	FSL	CS	CSS	N	K	C	P
-50	-38	-50	-71	-49	-24	-11	-23	16	-50	-50	-50
-25	-15	-25	-30	-28	-11	-5	-10	7	-25	-25	-25
0	0	0	0	0	0	0	0	0	0	0	0
25	11	25	17	35	9	3	8	-5	25	25	0
50	20	50	20	69	17	6	14	-9	50	38	0
Normalized Sensitivity Non-Linear Gradients											
	0.92	1.00	1.64	0.84	0.52	0.24	0.52	-0.36	1.00	1.00	1.00
	0.60	1.00	1.20	1.12	0.44	0.20	0.40	-0.28	1.00	1.00	1.00
	0.44	1.00	0.68	1.40	0.36	0.12	0.32	-0.20	1.00	1.00	0.00
	0.36	1.00	0.12	1.36	0.32	0.12	0.24	-0.16	1.00	0.52	0.00
AGrad	0.58	1.00	0.91	1.18	0.41	0.17	0.37	-0.25	1.00	0.88	0.50
Ranked Sensitivity Gradients											
	LS	EI	K	CN	C	Rain	P	FSL	CSS	N	CS
	1.18	1.00	1.00	0.91	0.88	0.58	0.50	0.41	0.37	-0.25	0.17
% Variation on Sediment Associated Nutrients (N & P):											
ParVar	Rain	EI	CN	LS	FSL	CS	CSS	N	K	C	P
-50	-31	-42	-63	-42	-19	-9	-19	13	-42	-42	-42
-25	-12	-20	-25	-24	-9	-4	-8	5	-20	-20	-20
0	0	0	0	0	0	0	0	0	0	0	0
25	9	19	13	27	7	3	6	-4	19	19	0
50	15	38	16	52	13	5	11	-7	38	29	0
Normalized Sensitivity Non-Linear Gradients											
	0.76	0.88	1.52	0.72	0.40	0.20	0.44	-0.32	0.88	0.88	0.88
	0.48	0.80	1.00	0.96	0.36	0.16	0.32	-0.20	0.80	0.80	0.80
	0.36	0.76	0.52	1.08	0.28	0.12	0.24	-0.16	0.76	0.76	0.00
	0.24	0.76	0.12	1.00	0.24	0.08	0.20	-0.12	0.76	0.40	0.00
AGrad	0.46	0.80	0.79	0.94	0.32	0.14	0.30	-0.20	0.80	0.71	0.42
Ranked Sensitivity Gradients											
	LS	EI	K	CN	C	Rain	P	FSL	CSS	N	CS
	0.94	0.8	0.8	0.79	0.71	0.46	0.42	0.32	0.3	-0.2	0.14

Variable description: LS-land slope, EI-storm energy-intensity, K-soil erodibility factor, CN-SCS curve number, C-cropping or cover factor, Rain-storm rainfall, P-practice factor, FSL-field slope length, CSS-channel side slope, N-Manning's roughness coefficient, CS-channel slope

Table F2. Preliminary Sensitivity for SP-Model (Water Quality Component)**% Variation of Transport Capacity (Yc):**

ParVar	<i>Soil & Landuse Parameters</i>					<i>Watflood Variables</i>				
	SPG	D50	Erod	GC	CF	Rain	Slp2	Rf	Ql	HI
-20	102	0.6	0	34	0	-44	-30	-32	-16	-43
-10	37	0.3	0	16	0	-23	-15	-16	-8	-24
0	0	0	0	0	0	0	0	0	0	0
10	-24	-0.4	0	-13	0	26	16	19	7	22
20	-38	-0.8	0	-24	0	55	34	39	14	51
<i>Normalized Sensitivity Non-Linear Gradients</i>										
	-6.50	-0.03	0.00	-1.80	0.00	2.10	1.50	1.60	0.80	1.90
	-3.70	-0.03	0.00	-1.60	0.00	2.30	1.50	1.60	0.80	2.40
	-2.40	-0.04	0.00	-1.30	0.00	2.60	1.60	1.90	0.70	2.20
	-1.40	-0.04	0.00	-1.10	0.00	2.90	1.80	2.00	0.70	2.90
A Grad	-3.50	-0.04	0.00	-1.45	0.00	2.48	1.60	1.78	0.75	2.35
<i>Ranked Sensitivity Gradients</i>										
	SPG	D50	Erod	GC	CF	Rain	Slp2	Rf	Ql	HI
	-3.50	-0.04	0.00	-1.45	0.00	2.48	1.60	1.78	0.75	2.35

% Variation of Sediment Supply (Ys):

ParVar	<i>Soil & Landuse Parameters</i>					<i>Watflood Variables</i>				
	SPG	D50	Erod	GC	CF	Rain	Slp2	Rf	Ql	HI
-20	0	0	-20	3.5	-18	-22	-1.5	-1.5	-1.5	0
-10	0	0	-10	1.6	-9	-11	-0.7	-0.7	-0.9	0
0	0	0	0	0	0	0	0	0	0	0
10	0	0	10	-1.6	9	11	0.7	0.7	0.5	0
20	0	0	20	-3.3	18	22	1.4	1.4	1.2	0
<i>Normalized Sensitivity Non-Linear Gradients</i>										
	0.00	0.00	1.00	-0.19	0.90	1.10	0.08	0.08	0.06	0.00
	0.00	0.00	1.00	-0.16	0.90	1.10	0.07	0.07	0.09	0.00
	0.00	0.00	1.00	-0.16	0.90	1.10	0.07	0.07	0.05	0.00
	0.00	0.00	1.00	-0.17	0.90	1.10	0.07	0.07	0.07	0.00
A Grad	0.00	0.00	1.00	-0.17	0.90	1.10	0.07	0.07	0.07	0.00
<i>Ranked Sensitivity Gradients</i>										
	SPG	D50	Erod	GC	CF	Rain	Slp2	Rf	Ql	HI
	0.00	0.00	1.00	-0.17	0.90	1.10	0.07	0.07	0.07	0.00

Variable description: SP-Model: SpG-specific weight, D50-median particle size, Erod-soil erodibility, GC-ground cover, CF-cover factor, WATFLOOD: Rain-precipitation intensity, Slp2-overland slope, Rf-runoff amount, Ql-unit flow discharge, HI-runoff depth

Table F3. Sensitivity Analysis for the AGNPS Model (Total Runoff Volume)

OUTPUT = Total Runoff Volume				0.19			
OutletCell = 57,000							
Parameter	Base	Parameter Value		Output Value		Sensitivity	
		Low	High	Low	High	Low	High
Initial Data							
Precipitation	1.75	1.58	1.93	0.14	0.26	-26.3	36.8
Nitrog_Rain	1.00	0.90	1.10	0.19	0.19	0	0
EI_Rfactor	17.52	15.77	19.27	0.19	0.19	0	0
KCoeff_PerRunoff	37.50	33.75	41.25	0.19	0.19	0	0
General Cell Data (min-max)							
SCS_No	39-92	35-82	42-100	0.08	0.39	-57.9	105.3
LandSlope	0-5.4	0-4.8	0-5.9	0.19	0.19	0	0
SlopeLength	150	135	165	0.19	0.19	0	0
Mannings_n	0.051-0.513	0.05-0.46	0.06-0.56	0.19	0.19	0	0
K_Factor	0.15-0.37	0.14-0.34	0.17-0.41	0.19	0.19	0	0
C_Factor	0.035-0.373	0.03-0.34	0.04-0.41	0.19	0.19	0	0
P_Factor	1	0.9	1	0.19	0.19	0	0
SurfCond	0.03-0.29	0.03-0.26	0.03-0.32	0.19	0.19	0	0
COD_Factor	24-138	21-124	26-151	0.19	0.19	0	0
Soil Related Data							
Soil_Nitro	0.001	0.0009	0.0011	0.19	0.19	0	0
Soil_Phos	0.0005	0.0005	0.0006	0.19	0.19	0	0
PoreW_Nitro	5	4.50	5.50	0.19	0.19	0	0
PoreW_Phos	2	1.80	2.20	0.19	0.19	0	0
ExtR_Nitro	0.05	0.045	0.055	0.19	0.19	0	0
ExtR_Phos	0.025	0.023	0.028	0.19	0.19	0	0
ExtL_Nitro	0.25	0.23	0.28	0.19	0.19	0	0
ExtL_Phos	0.25	0.23	0.28	0.19	0.19	0	0
Per_OMS	20	18	22	0.19	0.19	0	0
Fertilizer Related Data							
Applied_Nitro	50-200	45-180	55-220	0.19	0.19	0	0
Applied_Phos	20-80	18-72	22-88	0.19	0.19	0	0
AvFac_Nitro	50	45	55	0.19	0.19	0	0
AvFac_Phos	50	45	55	0.19	0.19	0	0
Channel Related Data							
Chan_Slope	0-2.7	0-2.8	0-2.9	0.19	0.19	0	0
Chan_SideSlope	0-0.27	0-0.28	0-0.29	0.19	0.19	0	0
Chan_ManningN	0.4	0.36	0.44	0.19	0.19	0	0
Decay_Nitro	50	45	55	0.19	0.19	0	0
Decay_Phos	50	45	55	0.19	0.19	0	0
Decay_COD	50	45	55	0.19	0.19	0	0

Variable description: For the full variable description and units, refer to Appendix A.

Table F4. Sensitivity Analysis for the AGNPS Model (Peak Runoff Rate)

OUTPUT = Peak Runoff Rate		1560.52					
<i>OutletCell = 57,000</i>		Parameter		Value		Sensitivity	
Parameter	Base	Low	High	Low	High	Low	High
Initial Data							
Precipitation	1.75	1.58	1.93	1150.10	2056.77	-26.3	31.8
Nitrog_Rain	1.00	0.90	1.10	1560.52	1560.52	0	0
EI_Rfactor	17.52	15.77	19.27	1560.52	1560.52	0	0
KCoeff_PerRunoff	37.50	33.75	41.25	1560.52	1560.52	0	0
General Cell Data (min-max)							
SCS_No	39-92	35-82	42-100	627.33	3099.19	-59.8	98.6
LandSlope	0-5.4	0-4.8	0-5.9	1560.52	1560.52	0	0
SlopeLength	150	135	165	1560.52	1560.52	0	0
Mannings_n	0.051-0.513	0.05-0.46	0.06-0.56	1560.52	1560.52	0	0
K_Factor	0.15-0.37	0.14-0.34	0.17-0.41	1560.52	1560.52	0	0
C_Factor	0.035-0.373	0.03-0.34	0.04-0.41	1560.52	1560.52	0	0
P_Factor	1	0.9	1	1560.52	1560.52	0	0
SurfCond	0.03-0.29	0.03-0.26	0.03-0.32	1560.52	1560.52	0	0
COD_Factor	24-138	21-124	26-151	1560.52	1560.52	0	0
Soil Related Data							
Soil_Nitro	0.001	0.0009	0.0011	1560.52	1560.52	0	0
Soil_Phos	0.0005	0.0005	0.0006	1560.52	1560.52	0	0
PoreW_Nitro	5	4.50	5.50	1560.52	1560.52	0	0
PoreW_Phos	2	1.80	2.20	1560.52	1560.52	0	0
ExtR_Nitro	0.05	0.045	0.055	1560.52	1560.52	0	0
ExtR_Phos	0.025	0.023	0.028	1560.52	1560.52	0	0
ExtL_Nitro	0.25	0.23	0.28	1560.52	1560.52	0	0
ExtL_Phos	0.25	0.23	0.28	1560.52	1560.52	0	0
Per_OMS	20	18	22	1560.52	1560.52	0	0
Fertilizer Related Data							
Applied_Nitro	50-200	45-180	55-220	1560.52	1560.52	0	0
Applied_Phos	20-80	18-72	22-88	1560.52	1560.52	0	0
AvFac_Nitro	50	45	55	1560.52	1560.52	0	0
AvFac_Phos	50	45	55	1560.52	1560.52	0	0
Channel Related Data							
Chan_Slope	0-2.7	0-2.8	0-2.9	1535.55	1583.93	-1.6	1.5
Chan_SideSlope	0-0.27	0-0.28	0-0.29	1560.52	1560.52	0	0
Chan_ManningN	0.4	0.36	0.44	1560.52	1560.52	0	0
Decay_Nitro	50	45	55	1560.52	1560.52	0	0
Decay_Phos	50	45	55	1560.52	1560.52	0	0
Decay_COD	50	45	55	1560.52	1560.52	0	0

Variable description: For the full variable description and units, refer to Appendix A.

Table F5. Sensitivity Analysis for the AGNPS Model (Total Sediment Yield)

OUTPUT = Total Sediment Yield				785.28			
OutletCell = 57,000							
Parameter	Base	Low	High	Low	High	Low	High
Initial Data							
Precipitation	1.75	1.58	1.93	711.46	857.53	-9.4	9.2
Nitrog_Rain	1.00	0.90	1.10	785.28	785.28	0	0
EI_Rfactor	17.52	15.77	19.27	727.17	843.39	-7.4	7.4
KCoeff_PerRunoff	37.50	33.75	41.25	839.46	634.51	6.9	-19.2
General Cell Data (min-max)							
SCS_No	39-92	35-82	42-100	579.54	976.89	-26.2	24.4
LandSlope	0-5.4	0-4.8	0-5.9	744.45	829.26	-5.2	5.6
SlopeLength	150	135	165	767.22	802.56	-2.3	2.2
Mannings_n	0.051-0.513	0.05-0.46	0.06-0.56	785.28	785.28	0	0
K_Factor	0.15-0.37	0.14-0.34	0.17-0.41	728.74	844.18	-7.2	7.5
C_Factor	0.035-0.373	0.03-0.34	0.04-0.41	727.17	843.39	-7.4	7.4
P_Factor	1	0.9	1	727.17	785.28	-7.4	0
SurfCond	0.03-0.29	0.03-0.26	0.03-0.32	785.28	785.28	0	0
COD_Factor	24-138	21-124	26-151	785.28	785.28	0	0
Soil Related Data							
Soil_Nitro	0.001	0.0009	0.0011	785.28	785.28	0	0
Soil_Phos	0.0005	0.0005	0.0006	785.28	785.28	0	0
PoreW_Nitro	5	4.50	5.50	785.28	785.28	0	0
PoreW_Phos	2	1.80	2.20	785.28	785.28	0	0
ExtR_Nitro	0.05	0.045	0.055	785.28	785.28	0	0
ExtR_Phos	0.025	0.023	0.028	785.28	785.28	0	0
ExtL_Nitro	0.25	0.23	0.28	785.28	785.28	0	0
ExtL_Phos	0.25	0.23	0.28	785.28	785.28	0	0
Per_OMS	20	18	22	785.28	785.28	0	0
Fertilizer Related Data							
Applied_Nitro	50-200	45-180	55-220	785.28	785.28	0	0
Applied_Phos	20-80	18-72	22-88	785.28	785.28	0	0
AvFac_Nitro	50	45	55	785.28	785.28	0	0
AvFac_Phos	50	45	55	785.28	785.28	0	0
Channel Related Data							
Chan_Slope	0-2.7	0-2.8	0-2.9	780.57	789.21	-0.6	0.5
Chan_SideSlope	0-0.27	0-0.28	0-0.29	783.71	786.85	-0.2	0.2
Chan_ManningN	0.4	0.36	0.44	822.97	754.65	4.8	-3.9
Decay_Nitro	50	45	55	785.28	785.28	0	0
Decay_Phos	50	45	55	785.28	785.28	0	0
Decay_COD	50	45	55	785.28	785.28	0	0

Variable description: For the full variable description and units, refer to Appendix A.

Table F6. Sensitivity Analysis for the AGNPS Model (Nitrogen in Sediment)

OUTPUT = Nitrogen Amount in Sediment				0.1			
<i>OutletCell = 57,000</i>							
Parameter	Base	Parameter Value		Output Value		Sensitivity	
		Low	High	Low	High	Low	High
Initial Data							
Precipitation	1.75	1.58	1.93	0.10	0.11	0	10
Nitrog_Rain	1.00	0.90	1.10	0.10	0.10	0	0
EI_Rfactor	17.52	15.77	19.27	0.10	0.11	0	10
KCoeff_PerRunoff	37.50	33.75	41.25	0.11	0.08	10	-20
General Cell Data (min-max)							
SCS_No	39-92	35-82	42-100	0.08	0.12	-20	20
LandSlope	0-5.4	0-4.8	0-5.9	0.10	0.11	0	10
SlopeLength	150	135	165	0.10	0.11	0	10
Mannings_n	0.051-0.513	0.05-0.46	0.06-0.56	0.10	0.10	0	0
K_Factor	0.15-0.37	0.14-0.34	0.17-0.41	0.10	0.11	0	10
C_Factor	0.035-0.373	0.03-0.34	0.04-0.41	0.10	0.11	0	10
P_Factor	1	0.9	1.0	0.10	0.10	0	0
SurfCond	0.03-0.29	0.03-0.26	0.03-0.32	0.10	0.10	0	0
COD_Factor	24-138	21-124	26-151	0.10	0.10	0	0
Soil Related Data							
Soil_Nitro	0.001	0.0009	0.0011	0.09	0.11	-10	10
Soil_Phos	0.0005	0.0005	0.0006	0.10	0.10	0	0
PoreW_Nitro	5	4.50	5.50	0.10	0.10	0	0
PoreW_Phos	2	1.80	2.20	0.10	0.10	0	0
ExtR_Nitro	0.05	0.045	0.055	0.10	0.10	0	0
ExtR_Phos	0.025	0.023	0.028	0.10	0.10	0	0
ExtL_Nitro	0.25	0.23	0.28	0.10	0.10	0	0
ExtL_Phos	0.25	0.23	0.28	0.10	0.10	0	0
Per_OMS	20	18	22	0.10	0.10	0	0
Fertilizer Related Data							
Applied_Nitro	50-200	45-180	55-220	0.10	0.10	0	0
Applied_Phos	20-80	18-72	22-88	0.10	0.10	0	0
AvFac_Nitro	50	45	55	0.10	0.10	0	0
AvFac_Phos	50	45	55	0.10	0.10	0	0
Channel Related Data							
Chan_Slope	0-2.7	0-2.8	0-2.9	0.10	0.10	0	0
Chan_SideSlope	0-0.27	0-0.28	0-0.29	0.10	0.10	0	0
Chan_ManningN	0.4	0.36	0.44	0.11	0.10	10	0
Decay_Nitro	50	45	55	0.10	0.10	0	0
Decay_Phos	50	45	55	0.10	0.10	0	0
Decay_COD	50	45	55	0.10	0.10	0	0

Variable description: For the full variable description and units, refer to Appendix A.

Table F7. Sensitivity Analysis for the AGNPS Model (Nitrogen in Runoff)

OUTPUT = Nitrogen Amount in Runoff				0.01			
OutletCell = 57,000							
Parameter	Base	Parameter Value	Low	High	Output Value	Low	High
Initial Data							
Precipitation	1.75		1.58	1.93	0.01	0.01	0
Nitrog_Rain	1.00		0.90	1.10	0.01	0.01	0
EI_Rfactor	17.52		15.77	19.27	0.01	0.01	0
KCoeff_PerRunoff	37.50		33.75	41.25	0.01	0.01	0
General Cell Data (min-max)							
SCS_No	39-92		35-82	42-100	0.01	0.01	0
LandSlope	0-5.4		0-4.8	0-5.9	0.01	0.01	0
SlopeLength	150		135	165	0.01	0.01	0
Mannings_n	0.051-0.513		0.05-0.46	0.06-0.56	0.01	0.01	0
K_Factor	0.15-0.37		0.14-0.34	0.17-0.41	0.01	0.01	0
C_Factor	0.035-0.373		0.03-0.34	0.04-0.41	0.01	0.01	0
P_Factor	1		0.9	1.0	0.01	0.01	0
SurfCond	0.03-0.29		0.03-0.26	0.03-0.32	0.01	0.01	0
COD_Factor	24-138		21-124	26-151	0.01	0.01	0
Soil Related Data							
Soil_Nitro	0.001		0.0009	0.0011	0.01	0.01	0
Soil_Phos	0.0005		0.0005	0.0006	0.01	0.01	0
PoreW_Nitro	5		4.50	5.50	0.01	0.01	0
PoreW_Phos	2		1.80	2.20	0.01	0.01	0
ExtR_Nitro	0.05		0.045	0.055	0.01	0.01	0
ExtR_Phos	0.025		0.023	0.028	0.01	0.01	0
ExtL_Nitro	0.25		0.23	0.28	0.01	0.01	0
ExtL_Phos	0.25		0.23	0.28	0.01	0.01	0
Per_OMS	20		18	22	0.01	0.01	0
Fertilizer Related Data							
Applied_Nitro	50-200		45-180	55-220	0.01	0.01	0
Applied_Phos	20-80		18-72	22-88	0.01	0.01	0
AvFac_Nitro	50		45	55	0.01	0.01	0
AvFac_Phos	50		45	55	0.01	0.01	0
Channel Related Data							
Chan_Slope	0-2.7		0-2.8	0-2.9	0.01	0.01	0
Chan_SideSlope	0-0.27		0-0.28	0-0.29	0.01	0.01	0
Chan_ManningN	0.4		0.36	0.44	0.01	0.01	0
Decay_Nitro	50		45	55	0.01	0.01	0
Decay_Phos	50		45	55	0.01	0.01	0
Decay_COD	50		45	55	0.01	0.01	0

Variable description: For the full variable description and units, refer to Appendix A.

Table F8. Sensitivity Analysis for the AGNPS Model (Soluble Nitrogen Concentration)

OUTPUT = Soluble Nitrogen Concentration				0.15			
OutletCell = 57,000							
Parameter	Base	Parameter Value		Output Value		Sensitivity	
		Low	High	Low	High	Low	High
Initial Data							
Precipitation	1.75	1.58	1.93	0.17	0.14	13.3	-6.7
Nitrog_Rain	1.00	0.90	1.10	0.14	0.16	-6.7	6.7
EI_Rfactor	17.52	15.77	19.27	0.15	0.15	0	0
KCoeff_PerRunoff	37.50	33.75	41.25	0.15	0.15	0	0
General Cell Data (min-max)							
SCS_No	39-92	35-82	42-100	0.16	0.17	6.7	13.3
LandSlope	0-5.4	0-4.8	0-5.9	0.15	0.15	0	0
SlopeLength	150	135	165	0.15	0.15	0	0
Mannings_n	0.051-0.513	0.05-0.46	0.06-0.56	0.15	0.15	0	0
K_Factor	0.15-0.37	0.14-0.34	0.17-0.41	0.15	0.15	0	0
C_Factor	0.035-0.373	0.03-0.34	0.04-0.41	0.15	0.15	0	0
P_Factor	1	0.9	1.0	0.15	0.15	0	0
SurfCond	0.03-0.29	0.03-0.26	0.03-0.32	0.15	0.15	0	0
COD_Factor	24-138	21-124	26-151	0.15	0.15	0	0
Soil Related Data							
Soil_Nitro	0.001	0.0009	0.0011	0.15	0.15	0	0
Soil_Phos	0.0005	0.0005	0.0006	0.15	0.15	0	0
PoreW_Nitro	5	4.50	5.50	0.15	0.15	0	0
PoreW_Phos	2	1.80	2.20	0.15	0.15	0	0
ExtR_Nitro	0.05	0.045	0.055	0.15	0.16	0	6.7
ExtR_Phos	0.025	0.023	0.028	0.15	0.15	0	0
ExtL_Nitro	0.25	0.23	0.28	0.16	0.14	6.7	-6.7
ExtL_Phos	0.25	0.23	0.28	0.15	0.15	0	0
Per_OMS	20	18	22	0.15	0.15	0	0
Fertilizer Related Data							
Applied_Nitro	50-200	45-180	55-220	0.15	0.16	0	6.7
Applied_Phos	20-80	18-72	22-88	0.15	0.15	0	0
AvFac_Nitro	50	45	55	0.15	0.16	0	6.7
AvFac_Phos	50	45	55	0.15	0.15	0	0
Channel Related Data							
Chan_Slope	0-2.7	0-2.8	0-2.9	0.15	0.15	0	0
Chan_SideSlope	0-0.27	0-0.28	0-0.29	0.15	0.15	0	0
Chan_ManningN	0.4	0.36	0.44	0.15	0.15	0	0
Decay_Nitro	50	45	55	0.21	0.11	40	-26.7
Decay_Phos	50	45	55	0.15	0.15	0	0
Decay_COD	50	45	55	0.15	0.15	0	0

Variable description: For the full variable description and units, refer to Appendix A.

Table F9. Sensitivity Analysis for the AGNPS Model (Phosphorus in Sediment)

OUTPUT = Phosphorus in Sediment				0.05			
OutletCell = 57,000							
Parameter	Base	Parameter Value Low High	Output Value Low High	Sensitivity Low High			
Initial Data							
Precipitation	1.75	1.58 1.93	0.05 0.06	0	20		
Nitrog_Rain	1.00	0.90 1.10	0.05 0.05	0	0		
EI_Rfactor	17.52	15.77 19.27	0.05 0.06	0	20		
KCoeff_PerRunoff	37.50	33.75 41.25	0.06 0.04	20	-20		
General Cell Data (min-max)							
SCS_No	39-92	35-82 42-100	0.04 0.06	-20	20		
LandSlope	0-5.4	0-4.8 0-5.9	0.05 0.05	0	0		
SlopeLength	150	135 165	0.05 0.05	0	0		
Mannings_n	0.051-0.513	0.05-0.46 0.06-0.56	0.05 0.05	0	0		
K_Factor	0.15-0.37	0.14-0.34 0.17-0.41	0.05 0.06	0	20		
C_Factor	0.035-0.373	0.03-0.34 0.04-0.41	0.05 0.06	0	20		
P_Factor	1	0.9 1.0	0.05 0.05	0	0		
SurfCond	0.03-0.29	0.03-0.26 0.03-0.32	0.05 0.05	0	0		
COD_Factor	24-138	21-124 26-151	0.05 0.05	0	0		
Soil Related Data							
Soil_Nitro	0.001	0.0009 0.0011	0.05 0.05	0	0		
Soil_Phos	0.0005	0.0005 0.0006	0.05 0.06	0	20		
PoreW_Nitro	5	4.50 5.50	0.05 0.05	0	0		
PoreW_Phos	2	1.80 2.20	0.05 0.05	0	0		
ExtR_Nitro	0.05	0.045 0.055	0.05 0.05	0	0		
ExtR_Phos	0.025	0.023 0.028	0.05 0.05	0	0		
ExtL_Nitro	0.25	0.23 0.28	0.05 0.05	0	0		
ExtL_Phos	0.25	0.23 0.28	0.05 0.05	0	0		
Per_OMS	20	18 22	0.05 0.05	0	0		
Fertilizer Related Data							
Applied_Nitro	50-200	45-180 55-220	0.05 0.05	0	0		
Applied_Phos	20-80	18-72 22-88	0.05 0.05	0	0		
AvFac_Nitro	50	45 55	0.05 0.05	0	0		
AvFac_Phos	50	45 55	0.05 0.05	0	0		
Channel Related Data							
Chan_Slope	0-2.7	0-2.8 0-2.9	0.05 0.05	0	0		
Chan_SideSlope	0-0.27	0-0.28 0-0.29	0.05 0.05	0	0		
Chan_ManningN	0.4	0.36 0.44	0.05 0.05	0	0		
Decay_Nitro	50	45 55	0.05 0.05	0	0		
Decay_Phos	50	45 55	0.05 0.05	0	0		
Decay_COD	50	45 55	0.05 0.05	0	0		

Variable description: For the full variable description and units, refer to Appendix A.

Table F10. Sensitivity Analysis for the AGNPS Model (Phosphorus in Runoff)

OUTPUT = Phosphorus in Runoff				0			
OutletCell = 57,000							
Parameter	Base	Parameter Value Low High	Output Value Low High	Sensitivity Low High			
Initial Data							
Precipitation	1.75	1.58 1.93	0.00 0.00	0 0			
Nitrog_Rain	1.00	0.90 1.10	0.00 0.00	0 0			
EI_Rfactor	17.52	15.77 19.27	0.00 0.00	0 0			
KCoeff_PerRunoff	37.50	33.75 41.25	0.00 0.00	0 0			
General Cell Data (min-max)							
SCS_No	39-92	35-82 42-100	0.00 0.00	0 0			
LandSlope	0-5.4	0-4.8 0-5.9	0.00 0.00	0 0			
SlopeLength	150	135 165	0.00 0.00	0 0			
Mannings_n	0.051-0.513	0.05-0.46 0.06-0.56	0.00 0.00	0 0			
K_Factor	0.15-0.37	0.14-0.34 0.17-0.41	0.00 0.00	0 0			
C_Factor	0.035-0.373	0.03-0.34 0.04-0.41	0.00 0.00	0 0			
P_Factor	1	0.9 1.0	0.00 0.00	0 0			
SurfCond	0.03-0.29	0.03-0.26 0.03-0.32	0.00 0.00	0 0			
COD_Factor	24-138	21-124 26-151	0.00 0.00	0 0			
Soil Related Data							
Soil_Nitro	0.001	0.0009 0.0011	0.00 0.00	0 0			
Soil_Phos	0.0005	0.0005 0.0006	0.00 0.00	0 0			
PoreW_Nitro	5	4.50 5.50	0.00 0.00	0 0			
PoreW_Phos	2	1.80 2.20	0.00 0.00	0 0			
ExtR_Nitro	0.05	0.045 0.055	0.00 0.00	0 0			
ExtR_Phos	0.025	0.023 0.028	0.00 0.00	0 0			
ExtL_Nitro	0.25	0.23 0.28	0.00 0.00	0 0			
ExtL_Phos	0.25	0.23 0.28	0.00 0.00	0 0			
Per_OMS	20	18 22	0.00 0.00	0 0			
Fertilizer Related Data							
Applied_Nitro	50-200	45-180 55-220	0.00 0.00	0 0			
Applied_Phos	20-80	18-72 22-88	0.00 0.00	0 0			
AvFac_Nitro	50	45 55	0.00 0.00	0 0			
AvFac_Phos	50	45 55	0.00 0.00	0 0			
Channel Related Data							
Chan_Slope	0-2.7	0-2.8 0-2.9	0.00 0.00	0 0			
Chan_SideSlope	0-0.27	0-0.28 0-0.29	0.00 0.00	0 0			
Chan_ManningN	0.4	0.36 0.44	0.00 0.00	0 0			
Decay_Nitro	50	45 55	0.00 0.00	0 0			
Decay_Phos	50	45 55	0.00 0.00	0 0			
Decay_COD	50	45 55	0.00 0.00	0 0			

Variable description: For the full variable description and units, refer to Appendix A.

Table F11. Sensitivity Analysis for the AGNPS Model (Soluble Phosphorus Concentration)

OUTPUT = Soluble Phosphorus Concentration				0.01			
OutletCell = 57,000							
Parameter	Base	Parameter Value		Output Value		Sensitivity	
		Low	High	Low	High	Low	High
Initial Data							
Precipitation	1.75	1.58	1.93	0.02	0.01	100	0
Nitrog_Rain	1.00	0.90	1.10	0.01	0.01	0	0
EI_Rfactor	17.52	15.77	19.27	0.01	0.01	0	0
KCoeff_PerRunoff	37.50	33.75	41.25	0.01	0.01	0	0
General Cell Data (min-max)							
SCS_No	39-92	35-82	42-100	0.01	0.02	0	100
LandSlope	0-5.4	0-4.8	0-5.9	0.01	0.01	0	0
SlopeLength	150	135	165	0.01	0.01	0	0
Mannings_n	0.051-0.513	0.05-0.46	0.06-0.56	0.01	0.01	0	0
K_Factor	0.15-0.37	0.14-0.34	0.17-0.41	0.01	0.01	0	0
C_Factor	0.035-0.373	0.03-0.34	0.04-0.41	0.01	0.01	0	0
P_Factor	1	0.9	1.0	0.01	0.01	0	0
SurfCond	0.03-0.29	0.03-0.26	0.03-0.32	0.01	0.01	0	0
COD_Factor	24-138	21-124	26-151	0.01	0.01	0	0
Soil Related Data							
Soil_Nitro	0.001	0.0009	0.0011	0.01	0.01	0	0
Soil_Phos	0.0005	0.0005	0.0006	0.01	0.01	0	0
PoreW_Nitro	5	4.50	5.50	0.01	0.01	0	0
PoreW_Phos	2	1.80	2.20	0.01	0.02	0	100
ExtR_Nitro	0.05	0.045	0.055	0.01	0.01	0	0
ExtR_Phos	0.025	0.023	0.028	0.01	0.02	0	100
ExtL_Nitro	0.25	0.23	0.28	0.01	0.01	0	0
ExtL_Phos	0.25	0.23	0.28	0.02	0.01	100	0
Per_OMS	20	18	22	0.01	0.01	0	0
Fertilizer Related Data							
Applied_Nitro	50-200	45-180	55-220	0.01	0.01	0	0
Applied_Phos	20-80	18-72	22-88	0.01	0.02	0	100
AvFac_Nitro	50	45	55	0.01	0.01	0	0
AvFac_Phos	50	45	55	0.01	0.02	0	100
Channel Related Data							
Chan_Slope	0-2.7	0-2.8	0-2.9	0.01	0.01	0	0
Chan_SideSlope	0-0.27	0-0.28	0-0.29	0.01	0.01	0	0
Chan_ManningN	0.4	0.36	0.44	0.01	0.01	0	0
Decay_Nitro	50	45	55	0.01	0.01	0	0
Decay_Phos	50	45	55	0.02	0.01	100	0
Decay_COD	50	45	55	0.01	0.01	0	0

Variable description: For the full variable description and units, refer to Appendix A.

Table F12. Sensitivity Analysis for the AGNPS Model (COD in Runoff)

OUTPUT = COD in Runoff				0.16			
OutletCell = 57,000							
Parameter	Base	Parameter Value Low High	Output Value Low High	Sensitivity Low High			
Initial Data							
Precipitation	1.75	1.58 1.93	0.13 0.20	-18.7	25		
Nitrog_Rain	1.00	0.90 1.10	0.16 0.16	0	0		
EI_Rfactor	17.52	15.77 19.27	0.16 0.16	0	0		
KCoeff_PerRunoff	37.50	33.75 41.25	0.16 0.16	0	0		
General Cell Data (min-max)							
SCS_No	39-92	35-82 42-100	0.08 0.31	-50	93.8		
LandSlope	0-5.4	0-4.8 0-5.9	0.16 0.16	0	0		
SlopeLength	150	135 165	0.16 0.16	0	0		
Mannings_n	0.051-0.513	0.05-0.46 0.06-0.56	0.16 0.16	0	0		
K_Factor	0.15-0.37	0.14-0.34 0.17-0.41	0.16 0.16	0	0		
C_Factor	0.035-0.373	0.03-0.34 0.04-0.41	0.16 0.16	0	0		
P_Factor	1	0.9 1.0	0.16 0.16	0	0		
SurfCond	0.03-0.29	0.03-0.26 0.03-0.32	0.16 0.16	0	0		
COD_Factor	24-138	21-124 26-151	0.15 0.18	-6.2	12.5		
Soil Related Data							
Soil_Nitro	0.001	0.0009 0.0011	0.16 0.16	0	0		
Soil_Phos	0.0005	0.0005 0.0006	0.16 0.16	0	0		
PoreW_Nitro	5	4.50 5.50	0.16 0.16	0	0		
PoreW_Phos	2	1.80 2.20	0.16 0.16	0	0		
ExtR_Nitro	0.05	0.045 0.055	0.16 0.16	0	0		
ExtR_Phos	0.025	0.023 0.028	0.16 0.16	0	0		
ExtL_Nitro	0.25	0.23 0.28	0.16 0.16	0	0		
ExtL_Phos	0.25	0.23 0.28	0.16 0.16	0	0		
Per_OMS	20	18 22	0.16 0.16	0	0		
Fertilizer Related Data							
Applied_Nitro	50-200	45-180 55-220	0.16 0.16	0	0		
Applied_Phos	20-80	18-72 22-88	0.16 0.16	0	0		
AvFac_Nitro	50	45 55	0.16 0.16	0	0		
AvFac_Phos	50	45 55	0.16 0.16	0	0		
Channel Related Data							
Chan_Slope	0-2.7	0-2.8 0-2.9	0.16 0.16	0	0		
Chan_SideSlope	0-0.27	0-0.28 0-0.29	0.16 0.16	0	0		
Chan_ManningN	0.4	0.36 0.44	0.16 0.16	0	0		
Decay_Nitro	50	45 55	0.16 0.16	0	0		
Decay_Phos	50	45 55	0.16 0.16	0	0		
Decay_COD	50	45 55	0.21 0.13	31.3	-18.7		

Variable description: For the full variable description and units, refer to Appendix A.

Table F13. Sensitivity Analysis for the AGNPS Model (COD Concentration)

OUTPUT = COD Concentration				3.74			
OutletCell = 57,000							
Parameter	Base	Parameter Value Low High	Output Value Low High	Sensitivity Low High			
Initial Data							
Precipitation	1.75	1.58 1.93	4.07 3.47	8.8 -7.2			
Nitrog_Rain	1.00	0.90 1.10	3.74 3.74	0 0			
EI_Rfactor	17.52	15.77 19.27	3.74 3.74	0 0			
KCoeff_PerRunoff	37.50	33.75 41.25	3.74 3.74	0 0			
General Cell Data (min-max)							
SCS_No	39-92	35-82 42-100	4.42 3.48	18.2 -7			
LandSlope	0-5.4	0-4.8 0-5.9	3.74 3.74	0 0			
SlopeLength	150	135 165	3.74 3.74	0 0			
Mannings_n	0.051-0.513	0.05-0.46 0.06-0.56	3.74 3.74	0 0			
K_Factor	0.15-0.37	0.14-0.34 0.17-0.41	3.74 3.74	0 0			
C_Factor	0.035-0.373	0.03-0.34 0.04-0.41	3.74 3.74	0 0			
P_Factor	1	0.9 1.0	3.74 3.74	0 0			
SurfCond	0.03-0.29	0.03-0.26 0.03-0.32	3.74 3.74	0 0			
COD_Factor	24-138	21-124 26-151	3.37 4.11	-9.9 9.9			
Soil Related Data							
Soil_Nitro	0.001	0.0009 0.0011	3.74 3.74	0 0			
Soil_Phos	0.0005	0.0005 0.0006	3.74 3.74	0 0			
PoreW_Nitro	5	4.50 5.50	3.74 3.74	0 0			
PoreW_Phos	2	1.80 2.20	3.74 3.74	0 0			
ExtR_Nitro	0.05	0.045 0.055	3.74 3.74	0 0			
ExtR_Phos	0.025	0.023 0.028	3.74 3.74	0 0			
ExtL_Nitro	0.25	0.23 0.28	3.74 3.74	0 0			
ExtL_Phos	0.25	0.23 0.28	3.74 3.74	0 0			
Per_OMS	20	18 22	3.74 3.74	0 0			
Fertilizer Related Data							
Applied_Nitro	50-200	45-180 55-220	3.74 3.74	0 0			
Applied_Phos	20-80	18-72 22-88	3.74 3.74	0 0			
AvFac_Nitro	50	45 55	3.74 3.74	0 0			
AvFac_Phos	50	45 55	3.74 3.74	0 0			
Channel Related Data							
Chan_Slope	0-2.7	0-2.8 0-2.9	3.74 3.74	0 0			
Chan_SideSlope	0-0.27	0-0.28 0-0.29	3.74 3.74	0 0			
Chan_ManningN	0.4	0.36 0.44	3.74 3.74	0 0			
Decay_Nitro	50	45 55	3.74 3.74	0 0			
Decay_Phos	50	45 55	3.74 3.74	0 0			
Decay_COD	50	45 55	4.74 2.94	26.7 -21.4			

Variable description: For the full variable description and units, refer to Appendix A.