

# Appendix E STEPL Spreadsheet Results

## STEPL Spreadsheets for TMDL project area major drainage basins

**STEPL Input Sheet:** Values in RED are required input. Change worksheets by clicking on tabs at the bottom. You entered 3 subwatershed(s). This sheet is composed of eight input tables. The first four tables require users to change initial values. The next four tables (initially hidden) contain default values users may choose to change.

**Step 1:** Select the state and county where your watersheds are located. Select a nearby weather station. This will automatically specify values for rainfall parameters in Table 1 and USLE parameters in Table 4.

**Step 2:** (a) Enter land use areas in acres in Table 1; (b) enter total number of agricultural animals by type and number of months per year that manure is applied to croplands in Table 2; (c) enter values for septic system parameters in Table 3; and (d) if desired, modify USLE parameters associated with the selected county in Table 4.

**Step 3:** You may stop here and proceed to the BMPs sheet. If you have more detailed information on your watersheds, click the Yes button in row 10 to display optional input tables.

**Step 4:** (a) Specify the representative Soil Hydrologic Group (SHG) and soil nutrient concentrations in Table 5; (b) modify the curve number table by landuse and SHG in Table 6; (c) modify the nutrient concentrations (mg/L) in runoff in Table 7; and (d) specify the detailed land use distribution in the urban area in Table 8.

**Step 5:** Select BMPs in BMPs sheet. **Step 6:** View the estimates of loads and load reductions in Total Load and Graphs sheets.

Show optional input tables: Yes  No   Treat all the subwatersheds as parts of a single watershed  Groundwater load calculation

State: California County: Monterey Weather Station (for rain correction factors): CA SANTA MARIA VISO ARPT

**1. Input watershed land use area (ac) and precipitation (in)**

Watershed	Urban	Cropland	Pastureland	Forest	User Defined	Feedlots	Feedlot Percent Paved	Total	Rain correction factors		
									Annual Rainfall	Rain Days	Avg. Rain/Eve
Salinas	6244	5141	4828	4298	0	0	0-24%	148811	17.8	47	0.784
Rec Canal	13734	33634	33612	19810	0	0	0-24%	100630	17.8	47	0.784
Moro Cojo	1478	3185	487	4585	0	0	0-24%	9735	16.3	47	0.718

**2. Input agricultural animals**

Watershed	Beef Cattle	Dairy Cattle	Swine (Hog)	Sheep	Horse	Chicken	Turkey	Duck	months manure applied
W1	3250	0	81	110	1285	479	0	0	0
W2	3250	0	81	110	1285	479	0	0	0
W3	333	0	8	11	123	49	0	0	0
Total	6833	0	170	232	2702	1007	0	0	0

**3. Input septic system and illegal direct wastewater discharge data**

Watershed	No. of Septic Systems	Population per Septic System	Septic Failure Rate, %	Septic Discharge # of People	Discharge Reduction, %
W1	0	3.14	1	0	0
W2	63	3.14	1	0	0
W3	0	3.14	1	0	0

**4. Modify the Universal Soil Loss Equation (USLE) parameters**

Watershed	Cropland				Pastureland				Forest						
	R	K	LS	C	P	R	K	LS	C	P	R	K	LS	C	P
W1	44.230	0.276	13.861	0.200	0.338	44.230	0.276	13.861	0.040	1.000	44.230	0.276	13.861	0.003	1.000
W2	44.230	0.276	13.861	0.200	0.338	44.230	0.276	13.861	0.040	1.000	44.230	0.276	13.861	0.003	1.000
W3	44.230	0.276	13.861	0.200	0.338	44.230	0.276	13.861	0.040	1.000	44.230	0.276	13.861	0.003	1.000

**Optional Data Input:**

**5. Select average soil hydrologic group (SHG). SHG A = highest infiltration and SHG D = lowest infiltration**

Watershed	SHG A	SHG B	SHG C	SHG D	SHG Selected	Soil N conc. %	Soil P conc. %	Soil BOD conc. %
W1	0	0	0	0	B	0.100	0.031	0.200
W2	0	0	0	0	B	0.100	0.031	0.200
W3	0	0	0	0	C	0.100	0.031	0.200

**6. Reference runoff curve number (may be modified)**

SHG	A	B	C	D
Urban	83	83	92	93
Cropland	67	78	85	83
Pastureland	49	63	73	84
Forest	39	60	73	73
User Defined	50	70	80	85

**6a. Detailed urban reference runoff curve number (may be modified)**

Urban SHG	A	B	C	D
Commercial	83	92	94	95
Industrial	81	88	91	93
Institutional	81	88	91	93
Transportation	38	38	38	38
Multi-Family	71	85	90	92
Single-Family	97	92	81	86
Urban-Culture	67	78	85	83
Vacant-Develop	77	85	90	92
Open Space	49	63	73	84

**7. Nutrient concentration in runoff (mg/L)**

Land use	N	P	BOD
1. I-Crop	11.4	0.64	4
1a. w/ manure	0	0	12.3
2. M-Crop	11.4	0.64	6.1
2a. w/ manure	0	0	18.5
3. H-Crop	11.4	0.64	9.2
3a. w/ manure	0	0	24.6
4. Pasture	0.25	0.21	13
5. Forest	0.2	0.1	0.5
6. User Def	0	0	0

**7a. Nutrient concentration in shallow groundwater (mg/L) (may be modified)**

Landuse	N	P	BOD
Urban	1.8	0.03	0
Cropland	10.3	0.03	0
Pastureland	0.47	0.03	0
Forest	6	0.03	0
Feedlot	6	0.03	0
User-Defined	0	0	0

**8. Input or modify urban land use distribution**

Watershed	Urban Area	Commercial %	Industrial %	Institutional %	Transportation %	Multi-Family %	Single-Family %	Urban-Culture %	Vacant-Develop %	Open Space %	Total %
W1	6244	15	10	10	10	10	30	5	5	5	100
W2	13734	15	10	10	10	10	30	5	5	5	100
W3	1478	15	10	10	10	10	30	5	5	5	100

**2. Total load by land uses (with BMP)**

Sources	N Load (lb/yr)	P Load (lb/yr)	BOD Load (lb/yr)	Sediment Load (t/yr)
Urban	114698.36	15197.53	250185.32	1486.67
Cropland	1608557.32	266408.05	1717491.16	174802.79
Pastureland	143733.75	54201.94	930727.79	32717.14
Forest	14205.22	5561.14	31498.80	2007.13
Feedlots	0.00	0.00	0.00	0.00
User Defined	0.00	0.00	0.00	0.00
Septic	25.31	9.91	103.34	0.00
Gully	0.00	0.00	0.00	0.00
Streambank	0.00	0.00	0.00	0.00
Groundwater	1017165.01	7556.67	0.00	0.00
Total	2,898,384.97	348,935.24	2,930,006.41	211,013.73

# STEPL Spreadsheets for TMDL project area subwatersheds

**STEP 1: Input Sheet.** Values in RED are required input. Change worksheets by clicking on tabs at the bottom. You entered 19 subwatershed(s)

This sheet is composed of eight input tables. The first four tables require users to change initial values. The next four tables (initially hidden) contain default values users may choose to change.

**Step 1:** Select the state and county where your watersheds are located. Select a nearby weather station. This will automatically specify values for rainfall parameters in Table 1 and USLE parameters in Table 4.

**Step 2:** (a) Enter land use areas in acres in Table 1; (b) enter total number of agricultural animals by type and number of months per year that manure is applied to croplands in Table 2; (c) enter values for septic system parameters in Table 3; and (d) if desired, modify USLE parameters associated with the selected county in Table 4.

**Step 3:** You may stop here and proceed to the BMPs sheet. If you have more detailed information on your watersheds, click the Yes button in row 10 to display optional input tables.

**Step 4:** (a) Specify the representative Soil Hydrologic Group (SHG) and soil nutrient concentrations in Table 5; (b) modify the curve number table by landuse and SHG in Table 6; (c) modify the nutrient concentrations (mg/L) in runoff in Table 7; and (d) specify the detailed land use distribution in the urban area in Table 8.

**Step 5:** Select BMPs in BMPs sheet. **Step 6:** View the estimates of loads and load reductions in Total Load and Graphs sheets.

**Optional input tables?** Yes No  Treat all the subwatersheds as parts of a single watershed  Groundwater load calculation

State: California County: Monterey Weather Station: (for rain correction factors) CA SANTAMARIA WSO ARPT

Watershed	Input watershed land use area (ac) and precipitation (in)				User Defined	Feedlots	Feedlot Percent Paved	Rain correction factors			
	Urban	Cropland	Grazing Lands	Forest				Total	Annual Rainfall	Rain Days	Rain/Eve nt
Alisal Creek/Upper Res Canal	3,796	10,135	12,124	3,000	0	0	0-24%	23655	17.8	47	0.784
Alisal Slough	705	3,884	0	32	0	0	0-24%	4621	17.8	47	0.784
Blanco Drain	64	4,374	0	1	0	0	0-24%	4439	17.8	47	0.784
Chualar Creek	123	7,137	13,511	4,051	0	0	0-24%	25422	17.8	47	0.784
El Toro Creek	1,333	26	15,566	10,137	0	0	0-24%	27062	17.8	47	0.784
Espereza Creek	0	2,322	2,252	513	0	0	0-24%	5687	17.8	47	0.784
Espinoza Slough	37	2,153	0	460	0	0	0-24%	2655	17.8	47	0.784
Gabilan Creek	1,705	2,437	14,638	3,117	0	0	0-24%	27957	17.8	47	0.784
Merritt Lake	2,457	3,707	1,461	5,611	0	0	0-24%	14236	17.8	47	0.784
Moro Cojo Slough	1,478	3,185	487	4,585	0	0	0-24%	9735	16.3	47	0.784
Natividad Creek	1,002	1,476	4,494	364	0	0	0-24%	7336	17.8	47	0.784
Old Salinas River	44	1,058	37	353	0	0	0-24%	1492	17.8	47	0.784
Quail Creek	114	2,105	3,103	4,510	0	0	0-24%	11098	17.8	47	0.784
Reclamation Canal Lower	2,544	3,124	13	48	0	0	0-24%	5723	17.8	47	0.784
Sal River w/ of Spreckels	2,444	23,244	4,444	4,224	0	0	0-24%	50423	17.8	47	0.784
Sal River d/ of Spreckels	2,444	4,444	4,444	4,224	0	0	0-24%	19352	17.8	47	0.784
Salinas River Lagoon	24	2,435	508	816	0	0	0-24%	3837	17.8	47	0.784
Santa Rita Creek	143	4,763	281	154	0	0	0-24%	6347	17.8	47	0.784
Tombadora Slough	345	1,784	1	24	0	0	0-24%	2154	17.8	47	0.784

**4. Modify the Universal Soil Loss Equation (USLE) parameters**

Watershed	Cropland						Pastureland						Forest						
	R	K	LS	C	P	Q	R	K	LS	C	P	Q	R	K	LS	C	P	Q	
Alisal Creek/Upper Res Canal	44.230	0.276	13.861	0.200	0.398	44.230	0.276	13.861	0.040	1.000	44.230	0.276	13.861	0.003	1.000				
Alisal Slough	44.230	0.276	13.861	0.200	0.398	44.230	0.276	13.861	0.040	1.000	44.230	0.276	13.861	0.003	1.000				
Blanco Drain	44.230	0.276	13.861	0.200	0.398	44.230	0.276	13.861	0.040	1.000	44.230	0.276	13.861	0.003	1.000				
Chualar Creek	44.230	0.276	13.861	0.200	0.398	44.230	0.276	13.861	0.040	1.000	44.230	0.276	13.861	0.003	1.000				
El Toro Creek	44.230	0.276	13.861	0.200	0.398	44.230	0.276	13.861	0.040	1.000	44.230	0.276	13.861	0.003	1.000				
Espereza Creek	44.230	0.276	13.861	0.200	0.398	44.230	0.276	13.861	0.040	1.000	44.230	0.276	13.861	0.003	1.000				
Espinoza Slough	44.230	0.276	13.861	0.200	0.398	44.230	0.276	13.861	0.040	1.000	44.230	0.276	13.861	0.003	1.000				
Gabilan Creek	44.230	0.276	13.861	0.200	0.398	44.230	0.276	13.861	0.040	1.000	44.230	0.276	13.861	0.003	1.000				
Merritt Lake	44.230	0.276	13.861	0.200	0.398	44.230	0.276	13.861	0.040	1.000	44.230	0.276	13.861	0.003	1.000				
Moro Cojo Slough	44.230	0.276	13.861	0.200	0.398	44.230	0.276	13.861	0.040	1.000	44.230	0.276	13.861	0.003	1.000				
Natividad Creek	44.230	0.276	13.861	0.200	0.398	44.230	0.276	13.861	0.040	1.000	44.230	0.276	13.861	0.003	1.000				
Old Salinas River	44.230	0.276	13.861	0.200	0.398	44.230	0.276	13.861	0.040	1.000	44.230	0.276	13.861	0.003	1.000				
Quail Creek	44.230	0.276	13.861	0.200	0.398	44.230	0.276	13.861	0.040	1.000	44.230	0.276	13.861	0.003	1.000				
Reclamation Canal Lower	44.230	0.276	13.861	0.200	0.398	44.230	0.276	13.861	0.040	1.000	44.230	0.276	13.861	0.003	1.000				
Sal River w/ of Spreckels	44.230	0.276	13.861	0.200	0.398	44.230	0.276	13.861	0.040	1.000	44.230	0.276	13.861	0.003	1.000				
Sal River d/ of Spreckels	44.230	0.276	13.861	0.200	0.398	44.230	0.276	13.861	0.040	1.000	44.230	0.276	13.861	0.003	1.000				
Salinas River Lagoon	44.230	0.276	13.861	0.200	0.398	44.230	0.276	13.861	0.040	1.000	44.230	0.276	13.861	0.003	1.000				
Santa Rita Creek	44.230	0.276	13.861	0.200	0.398	44.230	0.276	13.861	0.040	1.000	44.230	0.276	13.861	0.003	1.000				
Tombadora Slough	44.230	0.276	13.861	0.200	0.398	44.230	0.276	13.861	0.040	1.000	44.230	0.276	13.861	0.003	1.000				

**Optional Data Input:**

**5. Select average soil hydrologic group (SHG). SHG A = highest infiltration and SHG D = lowest infiltration**

Watershed	SHG A	SHG B	SHG C	SHG D	SHG Selected	Soil N conc. %	Soil P conc. %	Soil BOD
Alisal Slough					B	0.100	0.031	0.200
Blanco Drain					B	0.100	0.031	0.200
Chualar Creek					B	0.100	0.031	0.200
El Toro Creek					B	0.100	0.031	0.200
Espereza Creek					B	0.100	0.031	0.200
Espinoza Slough					B	0.100	0.031	0.200
Gabilan Creek					B	0.100	0.031	0.200
Merritt Lake					B	0.100	0.031	0.200
Moro Cojo Slough					C	0.100	0.031	0.200
Natividad Creek					B	0.100	0.031	0.200
Old Salinas River					B	0.100	0.031	0.200
Quail Creek					B	0.100	0.031	0.200
Reclamation Canal Lower					B	0.100	0.031	0.200
Sal River w/ of Spreckels					B	0.100	0.031	0.200
Sal River d/ of Spreckels					B	0.100	0.031	0.200
Salinas River Lagoon					B	0.100	0.031	0.200
Santa Rita Creek					B	0.100	0.031	0.200
Tombadora Slough					B	0.100	0.031	0.200

SHG	A	B	C	D
Urban	83	83	32	33
Cropland	67	78	85	83
Pastureland	43	63	79	84
Forest	39	60	73	79
User Defined	50	70	80	85

  

Urban Use	A	B	C	D
Commercial	83	32	34	35
Industrial	81	88	31	33
Institutional	81	88	31	33
Transportat	36	38	38	38
Multi-Family	77	85	30	32
Single-Family	57	72	81	86
Urban-Cultiv	67	78	85	83
Vacant-Devel	77	85	30	32
Open Space	43	63	73	84

  

Land use	N	P	BOD
1. L-Cropland	11.4	0.64	4
1a. w/ manure	0	0	12.3
2. M-Cropland	11.4	0.64	6.1
2a. w/ manure	0	0	18.5
3. H-Cropland	11.4	0.64	9.2
3a. w/ manure	0	0	24.6
4. Pastureland	0.25	0.27	13
5. Forest	0.2	0.1	0.5
6. User Defined	0	0	0

  

Landuse	N	P	BOD
Urban	1.8	0.03	0
Cropland	10.3	0.03	0
Pastureland	0.47	0.03	0
Forest	0.47	0.03	0
Feedlot	6	0.03	0
User-Defined	0	0	0

  

Watershed	Urban Area	Commercial %	Industrial %	Institutional %	Transportation %	Multi-Family %	Single-Family %	Urban-Cultivate	Vacant Develop	Open Space %	Total % Area
w/1	3796	15	10	10	10	10	30	5	5	5	100
w/2	705	15	10	10	10	10	30	5	5	5	100
w/3	64	15	10	10	10	10	30	5	5	5	100
w/4	123	15	10	10	10	10	30	5	5	5	100
w/5	1333	15	10	10	10	10	30	5	5	5	100
w/6	0	15	10	10	10	10	30	5	5	5	100
w/7	37	15	10	10	10	10	30	5	5	5	100
w/8	1705	15	10	10	10	10	30	5	5	5	100
w/9	2457	15	10	10	10	10	30	5	5	5	100
w/10	1478	15	10	10	10	10	30	5	5	5	100
w/11	1002	15	10	10	10	10	30	5	5	5	100
w/12	44	15	10	10	10	10	30	5	5	5	100
w/13	114	15	10	10	10	10	30	5	5	5	100
w/14	2544	15	10	10	10	10	30	5	5	5	100
w/15	2114	15	10	10	10	10	30	5	5	5	100
w/16	2418	15	10	10	10	10	30	5	5	5	100
w/17	34	15	10	10	10	10	30	5	5	5	100
w/18	1143	15	10	10	10	10	30	5	5	5	100
w/19	345	15	10	10	10	10	30	5	5	5	100

Watershed	N Load (lb/yr)	P Load (lb/yr)	BOD Load (lb/yr)	Sediment Load (t/yr)	N Reduction %	P Reduction %	BOD Reduction %	Sediment Reduction %	N Load (with BMP)	P Load (with BMP)	BOD (with BMP)	Sediment Load (with BMP)	%N Reduction	%P Reduction	%BOD Reduction	%Sed Reduction
Miral Creek/0	346810.3	42748.3	386438.3	25511	0.0	0.0	0.0	0.0	346810.3	42748.3	386438.3	25511	0.0	0.0	0.0	0.0
Miral Creek/1	116706.0	12355.7	83783.8	7753.4	0.0	0.0	0.0	0.0	116706.0	12355.7	83783.8	7753.4	0.0	0.0	0.0	0.0
Blanca Drain	127018.3	13387.4	85872.7	8680.1	0.0	0.0	0.0	0.0	127018.3	13387.4	85872.7	8680.1	0.0	0.0	0.0	0.0
Chualar Creek	257900.8	33810.5	306455.8	20845.3	0.0	0.0	0.0	0.0	257900.8	33810.5	306455.8	20845.3	0.0	0.0	0.0	0.0
Elmer Creek	50687.5	12310.0	186448.1	8532.5	0.0	0.0	0.0	0.0	50687.5	12310.0	186448.1	8532.5	0.0	0.0	0.0	0.0
Escoceno Crk	83933.4	10523.3	82537.5	6706.0	0.0	0.0	0.0	0.0	83933.4	10523.3	82537.5	6706.0	0.0	0.0	0.0	0.0
Ermaera Slough	63029.4	6663.8	42675.0	4296.6	0.0	0.0	0.0	0.0	63029.4	6663.8	42675.0	4296.6	0.0	0.0	0.0	0.0
Gabilan Creek	121671.3	13953.7	237909.1	11601.0	0.0	0.0	0.0	0.0	121671.3	13953.7	237909.1	11601.0	0.0	0.0	0.0	0.0
Merritt Lake	123985.1	14820.6	120230.4	8300.1	0.0	0.0	0.0	0.0	123985.1	14820.6	120230.4	8300.1	0.0	0.0	0.0	0.0
Mesa Cajo Slough	32016.6	12010.7	31611.1	6754.8	0.0	0.0	0.0	0.0	32016.6	12010.7	31611.1	6754.8	0.0	0.0	0.0	0.0
Mesa Cajo Slough	53063.3	8359.3	31219.5	4730.8	0.0	0.0	0.0	0.0	53063.3	8359.3	31219.5	4730.8	0.0	0.0	0.0	0.0
Old Saline Riv	31232.9	3327.1	2175.3	2126.8	0.0	0.0	0.0	0.0	31232.9	3327.1	2175.3	2126.8	0.0	0.0	0.0	0.0
Oval Creek	30436.3	11405.2	37964.8	6383.5	0.0	0.0	0.0	0.0	30436.3	11405.2	37964.8	6383.5	0.0	0.0	0.0	0.0
Reclamation C	105734.7	11366.2	30511.5	6378.6	0.0	0.0	0.0	0.0	105734.7	11366.2	30511.5	6378.6	0.0	0.0	0.0	0.0
Sal River w/2	725953.8	81129.1	586534.2	50778.9	0.0	0.0	0.0	0.0	725953.8	81129.1	586534.2	50778.9	0.0	0.0	0.0	0.0
Sal River w/3	216848.4	25190.4	204396.4	14336.4	0.0	0.0	0.0	0.0	216848.4	25190.4	204396.4	14336.4	0.0	0.0	0.0	0.0
Saline River L	73852.4	8045.8	54871.5	5157.3	0.0	0.0	0.0	0.0	73852.4	8045.8	54871.5	5157.3	0.0	0.0	0.0	0.0
Santa Rita Crk	14574.5	15608.0	109662.0	9654.3	0.0	0.0	0.0	0.0	14574.5	15608.0	109662.0	9654.3	0.0	0.0	0.0	0.0
Trinidad Slough	53647.1	5733.5	33161.1	3563.4	0.0	0.0	0.0	0.0	53647.1	5733.5	33161.1	3563.4	0.0	0.0	0.0	0.0
Total	2838567.3	349006.3	2300743.5	211013.0	0.0	0.0	0.0	0.0	2838567.3	349006.3	2300743.5	211013.0	0.0	0.0	0.0	0.0

  

Source	N Load (lb/yr)	P Load (lb/yr)	BOD Load (lb/yr)	Sediment Load (t/yr)
Urban	114638.36	15197.53	250185.32	1486.67
Cropland	1608556.17	266407.70	1717488.86	174802.50
Pastureland	143731.79	54201.21	330716.07	32716.63
Forest	14205.62	5561.23	31439.63	2007.18
Feedlots	0.00	0.00	0.00	0.00
User Defined	0.00	0.00	0.00	0.00
Septic	210.50	82.45	853.54	0.00
Gully	0.00	0.00	0.00	0.00
Streambank	0.00	0.00	0.00	0.00
Groundwater	101765.50	7556.70	0.00	0.00
Total	2838567.34	349006.33	2300743.47	211013.04