

KK-5 TMDL Allocation Example
5/27/2016

TP Allocations, Example Month: March

Step	Description	Value	Notes
A	4th lowest flow year	1996	Based on assessment of monthly average flows from HSPF model
B	Smoothed background TP load for 4th lowest flow year (lbs/month)	0.50	Set-aside load; smoothed using a three-month moving average. See Section 5.2.1.
C	Smoothed non-permitted urban TP load for 4th lowest flow year (lbs/month)	-	No non-permitted urban area in TMDL subbasin
D	Non-NCCW general permit TP load (lbs/month) [0.05*C]	-	Set-aside load
E	Smoothed ag proportion of baseline TP (%)	-	These are averages of month/year values; Baseline in this calc does not include set-aside loads.
F	Smoothed non-permitted urban proportion of baseline TP (%)	-	These are averages of month/year values; Baseline in this calc does not include set-aside loads.
G	Smoothed NCCW general permit proportion of baseline TP (%)	16.77%	These are averages of month/year values; Baseline in this calc does not include set-aside loads.
H	Smoothed MS4 proportion of baseline TP (%)	73.08%	These are averages of month/year values; Baseline in this calc does not include set-aside loads.
I	Smoothed individual permit proportion of baseline TP (%)	10.14%	These are averages of month/year values; Baseline in this calc does not include set-aside loads.
J	Smoothed 4th lowest cumulative flow (cfs)	2.35	
K	Smoothed 4th lowest cumulative flow for upstream reaches (cfs)	-	KK-5 is headwater reach.
L	TP concentration target for KK-5 (mg/L)	0.075	
M	TP concentration target for upstream reaches (mg/L)	N/A	KK-5 is headwater reach.
N	Total TP allowable load for KK-5 (lbs/month) [L*J*164.058]	28.93	164.058 is conversion factor to convert mg/L*cfs to lbs/month.
O	Total TP allowable load for upstream reaches (lbs/month) [M*K*164.058]	-	
P	TP incremental allowable load for KK-5 (lbs/month) [N-O]	28.93	
Q	Remaining allowable TP load (lbs/month) [P-B-D]	28.44	
R	TP reserve capacity (lbs/month) [0.05*Q]	1.42	
S	Allocable TP load (lbs/month) [Q-R]	27.02	
T	Ag TP allocation (lbs/month) [E*S]	-	
U	Non-permitted urban TP allocation (lbs/month) [F*S]	-	
V	NCCW general permit TP allocation (lbs/month) [G*S]	4.53	
W	MS4 TP allocation (lbs/month) [H*S]	19.74	
X	Individual permit TP allocation (lbs/month) [I*S]	2.74	
Y	MS4 "A" portion of total MS4 area in TMDL subbasin (%)	100%	
Z	MS4 "A" TP allocation (lbs/month) [Y*W]	19.74	
AA	NCCW "A" proportion of baseline NCCW TP load (%)	0.21%	
AB	NCCW "B" proportion of baseline NCCW TP load (%)	83.75%	
AC	NCCW "C" proportion of baseline NCCW TP load (%)	16.04%	
AD	Individual Permit "A" proportion of baseline individual permit TP load (%)	100%	
AE	NCCW "A" TP allocation (lbs/month) [AA*V]	0.01	
AF	NCCW "B" TP allocation (lbs/month) [AB*V]	3.80	
AG	NCCW "C" TP allocation (lbs/month) [AC*V]	0.73	
AH	Individual Permit "A" TP allocation (lbs/month) [AD*X]	2.74	
TMDL Allocations (load per day)			
	Total TP Loading Capacity (lbs/day) [P/30.4]	0.95	30.4 is conversion factor to convert monthly to daily loads (average value used for all months).
	TP Reserve Capacity (lbs/day) [R/30.4]	0.05	30.4 is conversion factor to convert monthly to daily loads (average value used for all months).
	Background TP Load Allocation (lbs/day) [B/30.4]	0.02	30.4 is conversion factor to convert monthly to daily loads (average value used for all months).
	Agricultural TP Load Allocation (lbs/day) [T/30.4]	-	30.4 is conversion factor to convert monthly to daily loads (average value used for all months).
	Non-Permitted Urban TP Load Allocation (lbs/day) [U/30.4]	-	30.4 is conversion factor to convert monthly to daily loads (average value used for all months).
	MS4 "A" TP Wasteload Allocation (lbs/day) [Z/30.4]	0.65	30.4 is conversion factor to convert monthly to daily loads (average value used for all months).
	NCCW "A" TP Wasteload Allocation (lbs/day) [2.39*AE/31]	7.31E-04	Daily WLA for point source dischargers = 2.39*(Monthly WLA/n) where n is the number of days in the month. See Section 6.4.1.
	NCCW "B" TP Wasteload Allocation (lbs/day) [2.39*AF/31]	0.29	Daily WLA for point source dischargers = 2.39*(Monthly WLA/n) where n is the number of days in the month. See Section 6.4.1.
	NCCW "C" TP Wasteload Allocation (lbs/day) [2.39*AG/31]	0.06	Daily WLA for point source dischargers = 2.39*(Monthly WLA/n) where n is the number of days in the month. See Section 6.4.1.
	Individual Permit "A" TP Wasteload Allocation (lbs/day) [2.39*AH/31]	0.21	Daily WLA for point source dischargers = 2.39*(Monthly WLA/n) where n is the number of days in the month. See Section 6.4.1.

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TSS Allocations, Example Month: March

Step	Description	Value	Notes
A	4th lowest flow year	1996	Based on assessment of monthly average flows from HSPF model
B	Smoothed background TSS load for 4th lowest flow year (lbs)	61.59	Set-aside load; smoothed using a three-month moving average. See Section 5.2.1.
C	Smoothed non-permitted urban TSS load for 4th lowest flow year (lbs)	-	No non-permitted urban area in TMDL subbasin
D	Non-NCCW general permit TSS load (lbs) [0.05*C]	-	Set-aside load
E	Smoothed ag proportion of baseline TSS (%)	-	These are averages of month/year values; Baseline in this calc does not include set-aside loads.
F	Smoothed non-permitted urban proportion of baseline TSS (%)	-	These are averages of month/year values; Baseline in this calc does not include set-aside loads.
G	Smoothed NCCW general permit proportion of baseline TSS (%)	-	These are averages of month/year values; Baseline in this calc does not include set-aside loads.
H	Smoothed MS4 proportion of baseline TSS (%)	91.43%	These are averages of month/year values; Baseline in this calc does not include set-aside loads.
I	Smoothed individual permit proportion of baseline TSS (%)	8.57%	These are averages of month/year values; Baseline in this calc does not include set-aside loads.
J	Smoothed 4th lowest cumulative flow (cfs)	2.35	
K	Smoothed 4th lowest cumulative flow for upstream reaches (cfs)	-	KK-5 is headwater reach.
L	TSS concentration target for KK-5 (mg/L)	12	
M	TSS concentration target for upstream reaches (mg/L)	N/A	KK-5 is headwater reach.
N	Total TSS allowable load for KK-5 (lbs/month) [L*J*164.058]	4629.48	164.058 is conversion factor to convert mg/L*cfs to lbs/month.
O	Total TSS allowable load for upstream reaches (lbs/month) [M*K*164.058]	-	
P	TSS incremental allowable load for KK-5 (lbs/month) [N-O]	4629.48	
Q	Remaining allowable TSS load (lbs/month) [P-B-D]	4567.89	
R	TSS reserve capacity (lbs/month) [0.05*Q]	228.39	
S	Allocable TSS load (lbs/month) [Q-R]	4339.49	
T	Ag TSS allocation (lbs/month) [E*S]	-	
U	Non-permitted urban TSS allocation (lbs/month) [F*S]	-	
V	NCCW general permit TSS allocation (lbs/month) [G*S]	-	
W	MS4 TSS allocation (lbs/month) [H*S]	3967.76	
X	Individual permit TSS allocation (lbs/month) [I*S]	371.73	
Y	MS4 "A" portion of total MS4 area in TMDL subbasin (%)	100%	
Z	MS4 "A" TSS allocation (lbs/month) [Y*W]	3967.76	
AA	NCCW "A" proportion of baseline NCCW TSS load (%)	-	
AB	NCCW "B" proportion of baseline NCCW TSS load (%)	-	
AC	NCCW "C" proportion of baseline NCCW TSS load (%)	-	
AD	Individual Permit "A" proportion of baseline individual permit TSS load (%)	100%	
AE	NCCW "A" TSS allocation (lbs/month) [AA*V]	-	
AF	NCCW "B" TSS allocation (lbs/month) [AB*V]	-	
AG	NCCW "C" TSS allocation (lbs/month) [AC*V]	-	
AH	Individual Permit "A" TSS allocation (lbs/month) [AD*X]	371.73	
TMDL Allocations (load per day)			
	Total TSS Loading Capacity (lbs/day) [P/30.4]	152.29	30.4 is conversion factor to convert monthly to daily loads (average value used for all months).
	TSS Reserve Capacity (lbs/day) [R/30.4]	7.51	30.4 is conversion factor to convert monthly to daily loads (average value used for all months).
	Background TSS Load Allocation (lbs/day) [B/30.4]	2.03	30.4 is conversion factor to convert monthly to daily loads (average value used for all months).
	Agricultural TSS Load Allocation (lbs/day) [T/30.4]	-	30.4 is conversion factor to convert monthly to daily loads (average value used for all months).
	Non-Permitted Urban TSS Load Allocation (lbs/day) [U/30.4]	-	30.4 is conversion factor to convert monthly to daily loads (average value used for all months).
	MS4 "A" TSS Wasteload Allocation (lbs/day) [Z/30.4]	130.52	30.4 is conversion factor to convert monthly to daily loads (average value used for all months).
	NCCW "A" TSS Wasteload Allocation (lbs/day) [2.39*AE/31]	-	Daily WLA for point source dischargers = 2.39*(Monthly WLA/n) where n is the number of days in the month. See Section 6.4.1.
	NCCW "B" TSS Wasteload Allocation (lbs/day) [2.39*AF/31]	-	Daily WLA for point source dischargers = 2.39*(Monthly WLA/n) where n is the number of days in the month. See Section 6.4.1.
	NCCW "C" TSS Wasteload Allocation (lbs/day) [2.39*AG/31]	-	Daily WLA for point source dischargers = 2.39*(Monthly WLA/n) where n is the number of days in the month. See Section 6.4.1.
	Individual Permit "A" TSS Wasteload Allocation (lbs/day) [2.39*AH/31]	28.66	Daily WLA for point source dischargers = 2.39*(Monthly WLA/n) where n is the number of days in the month. See Section 6.4.1.

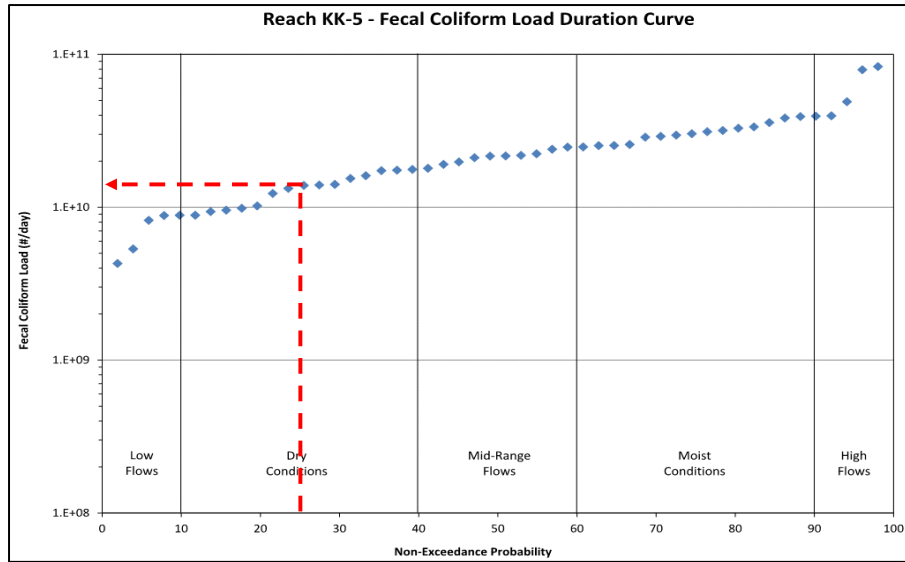
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FC Allocations, Example Flow Condition: Dry Flow Regime

Step	Description	Value	Notes
A	Background FC load for dry flow regime (cells)	3.02E+08	Set-aside load. See <i>Background FC Set-Aside Load Calculation Example</i> below.
B	Smoothed ag proportion of baseline FC (%)	-	These are averages of month/year values; Baseline in this calc does not include set-aside loads.
C	Smoothed non-permitted urban proportion of baseline FC (%)	-	These are averages of month/year values; Baseline in this calc does not include set-aside loads.
D	Smoothed NCCW general permit proportion of baseline FC (%)	-	These are averages of month/year values; Baseline in this calc does not include set-aside loads.
E	Smoothed MS4 proportion of baseline FC (%)	100%	These are averages of month/year values; Baseline in this calc does not include set-aside loads.
F	Smoothed individual permit proportion of baseline FC (%)	-	These are averages of month/year values; Baseline in this calc does not include set-aside loads.
G	Dry flow regime (25th percentile) incremental flow for KK-5 (cfs)	1.42	25th percentile of incremental reach flows for May through September, 1988-1997
H	FC concentration target (cfu/100mL)	400	
I	FC incremental allowable load for KK-5 (cells/month) [G*H*743754713.7]	4.23E+11	43754713.7 is conversion factor to convert colony forming units (cells)/100mL*cfs to cells/month.
J	Remaining allowable FC load (cells/month) [I-A]	4.23E+11	
K	FC reserve capacity (cells/month)	-	No reserve capacity for FC allocations
L	Ag FC allocation (cells/month) [B*J]	-	
M	Non-permitted urban FC allocation (cells/month) [C*J]	-	
N	NCCW general permit FC allocation (cells/month) [D*J]	-	
O	MS4 FC allocation (cells/month) [E*J]	4.23E+11	
P	Individual permit FC allocation (cells/month) [F*J]	-	
Q	MS4 "A" portion of total MS4 area in TMDL subbasin (%)	100%	
R	MS4 "A" FC allocation (cells/month) [V*T]	4.23E+11	
S	NCCW "A" proportion of baseline NCCW FC load (%)	-	
T	NCCW "B" proportion of baseline NCCW FC load (%)	-	
U	NCCW "C" proportion of baseline NCCW FC load (%)	-	
V	Individual Permit "A" proportion of baseline individual permit FC load (%)	-	
W	NCCW "A" FC allocation (cells/month) [S*N]	-	
X	NCCW "B" FC allocation (cells/month) [T*N]	-	
Y	NCCW "C" FC allocation (cells/month) [U*N]	-	
Z	Individual Permit "A" FC allocation (cells/month) [V*P]	-	
TMDL Allocations (load per day)			
	Total FC Loading Capacity (cells/day) [I/30.4]	1.39E+10	30.4 is conversion factor to convert monthly to daily loads (average value used for all months).
	FC Reserve Capacity (cells/day)	-	No reserve capacity for FC allocations
	Background FC Load Allocation (cells/day) [A/30.4]	9.94E+06	30.4 is conversion factor to convert monthly to daily loads (average value used for all months).
	Agricultural FC Load Allocation (cells/day) [L/30.4]	-	30.4 is conversion factor to convert monthly to daily loads (average value used for all months).
	Non-Permitted Urban FC Load Allocation (cells/day) [M/30.4]	-	30.4 is conversion factor to convert monthly to daily loads (average value used for all months).
	MS4 "A" FC Wasteload Allocation (cells/day) [R/30.4]	1.39E+10	30.4 is conversion factor to convert monthly to daily loads (average value used for all months).
	NCCW "A" FC Wasteload Allocation (cells/day) [2.39*W/30.4]	-	Daily WLA for point source dischargers = 2.39*(Monthly WLA/n) where n is 30.4, the average value of days per month. See Section 6.4.1.
	NCCW "B" FC Wasteload Allocation (cells/day) [2.39*X/30.4]	-	Daily WLA for point source dischargers = 2.39*(Monthly WLA/n) where n is 30.4, the average value of days per month. See Section 6.4.1.
	NCCW "C" FC Wasteload Allocation (cells/day) [2.39*Y/30.4]	-	Daily WLA for point source dischargers = 2.39*(Monthly WLA/n) where n is 30.4, the average value of days per month. See Section 6.4.1.
	Individual Permit "A" FC Wasteload Allocation (cells/day) [2.39*Z/30.4]	-	Daily WLA for point source dischargers = 2.39*(Monthly WLA/n) where n is 30.4, the average value of days per month. See Section 6.4.1.

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The Total FC Loading Capacity can also be Identified from the Load Duration Curves in Appendix D.



Background FC Set-Aside Load Calculation Example

Step	Description	Value
A	Dry flow regime (25th percentile) incremental flow for KK-5 (cfs)	1.42
B	Plot log modeled background FC loads versus log modeled flow	see graph below
C	Perform linear regression analysis to determine numeric relationship For KK-5, Background FC Load = $e^{(19.0211+1.4328*\ln(\text{Flow}))}$	
D	Solve for background FC load given flow	3.02E+08

