

Technical Appendix A

Application of BEFs to TCDD TEQ Results

All TCDD TEQ results in the BMP Subarea Evaluation Analysis include congener detected but not quantified (DNQ), or estimated, results as well as bioaccumulation equivalency factors (BEFs). The use of BEFs is consistent with NPDES reporting requirements (LARWQCB, 2011 and SFRWQCB, 2010) and the SSFL Stormwater Expert Panel's Dioxin Memorandum (2010).

To demonstrate how the NPDES results change with the BEFs applied, a comparison of the TCDD TEQ results with and without BEFs are shown in Figure 1 and 2 for Outfalls 008 and 009, respectively. In general, applying the BEFs to the TCDD TEQ calculation reduces the TEQ by a factor ranging from 20x to 100x (corresponding to the BEFs for the hepta- and octa-chlorinated congeners which are the ones most often detected at SSFL) and results in less frequent exceedances of the NPDES permit limit (2.8×10^{-8} $\mu\text{g/L}$ TCDD TEQ without DNQs). A TEQ value of 1.0×10^{-10} $\mu\text{g/L}$ is plotted here for any sample with all congener results below the reporting limit, or a TEQ (without DNQ) result of ND.

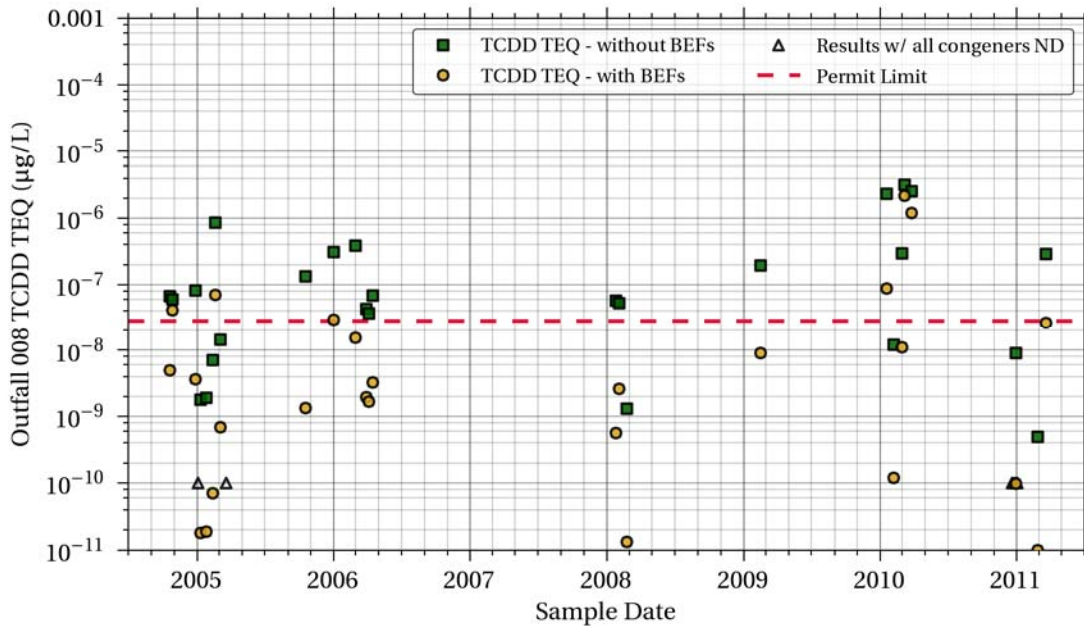


Figure 1. Comparison of TCDD TEQ, No DNQ results with and without BEFs at Outfall 008

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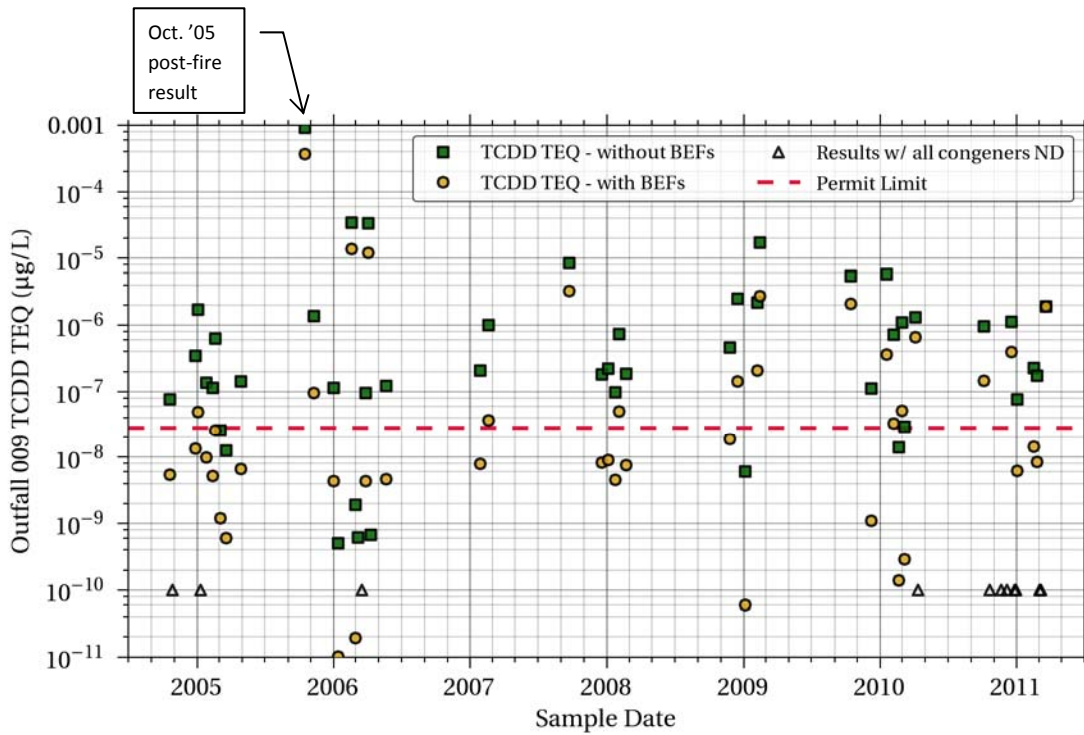


Figure 2. Comparison of TCDD TEQ, No DNQ results with and without BEFs at Outfall 009

REFERENCES

Los Angeles Regional Water Quality Control Board (LARWQCB), 2010. Order No. R4-2010-0090. NPDES No. CA0001309. Waste Discharge Requirements for The Boeing Company, Santa Susana Field Laboratory.

http://63.199.216.6/larwqcb_new/permits/docs/6027_R4-2010-0090_WDR_PKG.pdf

San Francisco Regional Water Quality Control Board (SFRWQCB), 2010. Order No. R2-2010-0054. Amendment of Waste Discharge Requirements for Municipal and Industrial Dischargers.

http://www.waterboards.ca.gov/sanfranciscobay/board_decisions/adopted_orders/2010/R2-2010-0054.pdf

SSFL Stormwater Expert Panel, 2010. *SSFL Stormwater Background Dioxin Report*. March 30.

http://www.boeing.com/aboutus/environment/santa_susana/water_quality/tech_reports_100427_dioxins_background_report.pdf

Technical Appendix B

Comparison of Potential BMP Subarea Monitoring Data with Background Thresholds

The following tables summarize BMP subarea monitoring data (which for the purpose of this analysis include ISRA and CM monitoring results for locations that are colocated with BMP monitoring locations), including a comparison of the median and max particulate strengths (or concentrations in the case of TSS) with the 75th and 95th percentile background levels. Particulate strength was calculated using the same methodology as described in Section 2 of the SSFL Watershed 008 and 009 BMP Site Ranking Analysis (June 10, 2011). However, it should be noted that the results summarized below were based on a more limited dataset than those in the June 10 memo, so results-specific assumptions (e.g., Table 5 or Table 6 summaries). The periods of record for data summarized for this analysis are as follows:

- ISRA and CM performance monitoring data: 12/2009 – 2/2011
- NPDES outfall monitoring data: 2/2005 – 3/2010
- Potential BMP subarea monitoring data: 12/2010 – 2/2011

It is acknowledged that some datasets are very small ($N < 4$), which diminishes the confidence of those comparisons. For TSS, the concentration triggers are calculated with background data from the watershed in which the BMP monitoring site is located, since each watershed has different sediment yield per acre characteristics. Locations are listed below in order of degree of exceedances (purple to white, see Table 1) and decreasing maximum concentration for TSS and 2,3,7,8-TCDD, and in order of maximum PS for the other POCs.

The rightmost column shows the number of samples in which the concentration is higher than the outfall NPDES permit limits. Note that for TSS and 2,3,7,8-TCDD, there is no permit limit, and this column is marked “NA” in those tables. Dark blue rows indicate that particulate strength of one or more samples exceeded the 75th percentile background levels and the concentration of one or more samples exceeded the NPDES permit limit. Purple rows indicate that the particulate strength of one or more samples exceeded the 95th percentile background level and the concentration of one or more samples exceeded the NPDES permit limit.

The highlighting of any given location row in Tables 2 through 7 is based on exceedances of the 75th percentile background particulate strength level, the 95th percentile background particulate strength level, and the permit limit. A legend for all highlighting patterns is included as Table 1.

Attachments B1 and B2 illustrate an alternative method of comparison, by visually comparing the median and maximum results at each site with both the background 75th and 95th percentiles and the NPDES Permit Limit.

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Table 1. Key to highlighting colors in BMP tables

Cu, Cd, Pb & TCDD TEQ	2,3,7,8-TCDD	TSS
No exceedances	No exceedances	No exceedances
> 75th pctile background	(not used)	TSS > 75th pctile background
> 95th pctile background	(not used)	TSS > 95th pctile background
> permit limit	(not used)	(not used)
> 75th pctile background & PL	(not used)	(not used)
> 95th pctile background & PL	One or more 2,3,7,8-TCDD detections	(not used)

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Table 2. Potential BMP subarea monitoring data, TSS results

Total Suspended Solids (mg/L)								
Subarea	# of samples	# of NDs	Median TSS	Max TSS	Watershed	# of Samples > 75th Percentile Background Level?	# of Samples > 95th Percentile Background Level?	# of Samples > Permit Limit?
A1SW0004*	14	3	10.5	180	Outfall 009	5 of 14	3 of 14	NA
Outfall 009*	24	14	< 10	4000	Outfall 009	8 of 24	5 of 24	NA
Outfall 008*	15	1	110	1300	Outfall 008	9 of 15	9 of 15	NA
A2SW0001*	7	0	17	890	Outfall 009	3 of 7	3 of 7	NA
HZBMP0003	11	2	13	840	Outfall 008	3 of 11	3 of 11	NA
B1BMP0001	1	0	650	650	Outfall 009	1 of 1	1 of 1	NA
HZBMP0001	9	0	23	320	Outfall 008	4 of 9	4 of 9	NA
LXBMP0002	1	0	300	300	Outfall 009	1 of 1	1 of 1	NA
BGBMP0006	7	1	3	250	Outfall 009	1 of 7	1 of 7	NA
LXBMP0003	3	0	17	140	Outfall 009	1 of 3	1 of 3	NA
LPBMP0001	2	0	92	130	Outfall 009	2 of 2	1 of 2	NA
B1BMP0002	3	0	33	52	Outfall 009	3 of 3	0 of 3	NA
B1SW0011*	2	0	33	43	Outfall 009	2 of 2	0 of 2	NA
EVBMP0002	3	0	14	34	Outfall 009	1 of 3	0 of 3	NA
A1BMP0001	3	0	11	22	Outfall 009	1 of 3	0 of 3	NA
ILBMP0002	1	0	12	12	Outfall 009	0 of 1	0 of 1	NA
HZBMP0002	2	0	6.5	12	Outfall 008	0 of 2	0 of 2	NA
EVBMP0001	1	0	10	10	Outfall 009	0 of 1	0 of 1	NA
ILBMP0003	2	0	3.5	4	Outfall 009	0 of 2	0 of 2	NA
Grand Total	111	21						

Notes

- 1) Potential BMP subareas sorted by shading (Table 7) and maximum TSS
- 2) No permit level exists for total suspended solids at Outfall 008 or Outfall 009.
- 3) RWQCB split sample results excluded
- 4) All data from 'PS_Trigger_Analysis041911.xlsx' and 'Trigger analysis - siting.xlsx'
- 5) # NDs reflect the number of non-detects in the total concentration.
- 6) "< 10" refers to non-detect with a detection limit of 10 mg/L.
- 7) (*) Starred site names are ISRA and NPDES monitoring sites being included for comparison and method testing purposes.

Table 3. Potential BMP subarea monitoring data, cadmium results

Cadmium (mg/kg)							
Subarea	# of samples	# of NDs	Median Cd PS	Max Cd PS	# of Samples > 75th Percentile Background Level?	# of Samples > 95th Percentile Background Level?	# of Samples > Permit Limit?
EVBMP0002	3	0	7.4	32	3 of 3	1 of 3	0 of 3
LXBMP0003	3	2	ND	30	1 of 3	1 of 3	0 of 3
HZBMP0003	3	2	ND	14	1 of 3	0 of 3	0 of 3
A1BMP0001	3	0	8.6	10	2 of 3	0 of 3	0 of 3
Outfall 009*	12	8	ND	4.9	4 of 12	0 of 12	1 of 24
B1BMP0002	3	1	2.1	4.3	2 of 3	0 of 3	0 of 3
LPBMP0001	2	0	2.5	2.9	2 of 2	0 of 2	0 of 2
HZBMP0001	2	1	0.37	0.73	0 of 2	0 of 2	0 of 2
A1SW0004*	1	0	0.7	0.7	0 of 1	0 of 1	0 of 14
LXBMP0002	1	0	0.3	0.3	0 of 1	0 of 1	0 of 1
Outfall 008*	5	3	ND	0.18	0 of 5	0 of 5	0 of 15
BGBMP0006	1	1	ND	ND	0 of 1	0 of 1	0 of 1
EVBMP0001	1	1	ND	ND	0 of 1	0 of 1	0 of 1
HZBMP0002	2	2	ND	ND	0 of 2	0 of 2	0 of 2
ILBMP0002	1	1	ND	ND	0 of 1	0 of 1	0 of 1
ILBMP0003	2	2	ND	ND	0 of 2	0 of 2	0 of 2
B1SW0011*	1	1	ND	ND	0 of 1	0 of 1	0 of 2
Grand Total	46	25					

Notes

- 1) Potential BMP subareas sorted by shading (Table 7) and maximum cadmium particulate strength
- 2) Permit limit = 4 µg/L for cadmium at Outfall 008 and Outfall 009.
- 3) RWQCB split sample results excluded
- 4) All data from 'PS_Trigger_Analysis041911.xlsx' and 'Trigger analysis - siting.xlsx'
- 5) Number of NDs reflect the number of non-detects in the total concentration.
- 6) Particulate strength computation: $PS = (Total\ concentration - Dissolved\ concentration) / Total\ Suspended\ Solids$
- 7) (*) Starred site names are ISRA and NPDES monitoring sites being included for comparison and method testing purposes.
- 8) Number of samples in rightmost column may not equal number of samples shown immediately to the left because all other columns reflect particulate strength measurements, which require a TSS value to be computed. Because of the lack of dissolved cadmium NPDES data (see Section 2 above), a dissolved cadmium result was also required to compute particulate strength.

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Table 4. Potential BMP subarea monitoring data, copper results

Copper (mg/kg)							
Subarea	# of samples	# of NDs	Median Cu PS	Max Cu PS	# of Samples > 75th Percentile Background Level?	# of Samples > 95th Percentile Background Level?	# of Samples > Permit Limit?
A1SW0004*	14	1	123	1760	6 of 14	3 of 14	1 of 14
HZBMP0003	11	1	79	3450	4 of 11	4 of 11	1 of 11
Outfall 008*	15	0	36	201	1 of 15	0 of 15	1 of 25
Outfall 009*	24	1	77	133	0 of 24	0 of 24	3 of 45
LPBMP0001	2	0	76	92	0 of 2	0 of 2	0 of 2
LXBMP0002	1	0	28	28	0 of 1	0 of 1	0 of 1
B1BMP0001	1	0	13	13	0 of 1	0 of 1	1 of 1
HZBMP0001	9	0	55	1274	1 of 9	1 of 9	0 of 9
LXBMP0003	3	0	53	2967	1 of 3	1 of 3	0 of 3
ILBMP0003	2	0	146	267	1 of 2	0 of 2	0 of 2
EVBMP0002	3	0	121	320	1 of 3	0 of 3	0 of 3
B1BMP0002	3	0	75	82	0 of 3	0 of 3	0 of 3
EVBMP0001	1	0	60	60	0 of 1	0 of 1	0 of 1
ILBMP0002	1	0	50	50	0 of 1	0 of 1	0 of 1
B1SW0011*	2	0	36	39	0 of 2	0 of 2	0 of 2
HZBMP0002	2	1	33	33	0 of 2	0 of 2	0 of 2
BGBMP0006	1	0	5.6	6	0 of 1	0 of 1	0 of 1
A1BMP0001	3	2	0	91	0 of 3	0 of 3	0 of 3
Grand Total	98	6					

Notes

- 1) Potential BMP subareas sorted by shading (Table 7) and maximum copper particulate strength
- 2) Permit limit = 14 µg/L for copper at Outfall 008 and Outfall 009.
- 3) RWQCB split sample results excluded
- 4) All data from 'PS_Trigger_Analysis041911.xlsx' and 'Trigger analysis - siting.xlsx'
- 5) Number of NDs reflect the number of non-detects in the total concentration.
- 6) Particulate strength computation: $PS = (Total\ concentration - Dissolved\ concentration) / Total\ Suspended\ Solids$
- 7) (*) Starred site names are ISRA and NPDES monitoring sites being included for comparison and method testing purposes.
- 8) Number of samples in final column may not equal number of samples in other columns because all other columns reflect particulate strength measurements, which require a TSS value for the calculation.

Table 5. Potential BMP subarea monitoring data, lead results

Lead (mg/kg)							
Subarea	# of samples	# of NDs	Median Pb PS	Max Pb PS	# of Samples > 75th Percentile Background Level?	# of Samples > 95th Percentile Background Level?	# of Samples > Permit Limit?
BGBMP0006	7	1	87	1260	2 of 7	1 of 7	1 of 7
A2SW0001*	7	0	252	571	5 of 7	2 of 7	3 of 7
HZBMP0003	11	5	13	383	1 of 11	1 of 11	2 of 11
A1SW0004*	14	3	94	2686	4 of 14	0 of 14	3 of 14
Outfall 009*	24	3	68	266	5 of 24	0 of 24	13 of 45
LPBMP0001	2	0	94	112	0 of 2	0 of 2	1 of 2
HZBMP0001	9	1	15	106	0 of 9	0 of 9	1 of 9
Outfall 008*	15	0	42	104	0 of 15	0 of 15	11 of 25
B1BMP0002	3	0	48	103	0 of 3	0 of 3	1 of 3
LXBMP0002	1	0	22	22	0 of 1	0 of 1	1 of 1
B1BMP0001	1	0	14	14	0 of 1	0 of 1	1 of 1
EVBMP0002	3	0	284	430	2 of 3	1 of 3	0 of 3
ILBMP0002	1	0	225	225	1 of 1	0 of 1	0 of 1
EVBMP0001	1	0	161	161	1 of 1	0 of 1	0 of 1
A1BMP0001	3	2	51	102	0 of 3	0 of 3	0 of 3
ILBMP0003	2	0	56	70	0 of 2	0 of 2	0 of 2
LXBMP0003	3	0	41	70	0 of 3	0 of 3	0 of 3
HZBMP0002	2	1	29	58	0 of 2	0 of 2	0 of 2
B1SW0011*	2	0	34	45	0 of 2	0 of 2	0 of 2
Grand Total	111	16					

Notes

- 1) Potential BMP subareas sorted by shading (Table 7) and maximum lead particulate strength
- 2) Permit limit = 5.2 µg/L for lead at Outfall 008 and Outfall 009.
- 3) RWQCB split sample results excluded
- 4) All data from 'PS_Trigger_Analysis041911.xlsx' and 'Trigger analysis - siting.xlsx'
- 5) Number of NDs reflect the number of non-detects in the total concentration.
- 6) Particulate strength computation: PS = (Total concentration – Dissolved concentration) / Total Suspended Solids
- 7) (*) Starred site names are ISRA and NPDES monitoring sites being included for comparison and method testing purposes.
- 8) Number of samples in final column may not equal number of samples in other columns because all other columns reflect particulate strength measurements, which require a TSS value for the calculation.

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Table 6. Potential BMP subarea monitoring data, TCDD TEQ (No DNQ) results

TCDD TEQ (no DNQ) (mg/kg)							
Subarea	# of samples	# of NDs	Median TCDD TEQ PS	Max TCDD TEQ PS	# of Samples > 75th Percentile Background Level?	# of Samples > 95th Percentile Background Level?	# of Samples > Permit Limit?
Outfall 009*	23	7	1.19E-08	9.01E-05	8 of 23	4 of 23	6 of 23
A2SW0001*	7	0	9.60E-06	2.88E-05	6 of 7	6 of 7	6 of 7
A1SW0004*	6	0	1.60E-06	2.10E-05	5 of 6	3 of 6	1 of 6
EVBMP0002	3	0	4.01E-06	9.15E-06	3 of 3	3 of 3	3 of 3
LPBMP0001	2	0	2.02E-06	3.69E-06	2 of 2	1 of 2	2 of 2
B1BMP0002	3	0	1.64E-08	1.47E-06	1 of 3	0 of 3	1 of 3
B1BMP0001	1	0	4.51E-07	4.51E-07	1 of 1	0 of 1	1 of 1
Outfall 008*	12	1	ND	1.33E-07	0 of 12	0 of 12	0 of 12
LXBMP0002	1	0	1.16E-07	1.16E-07	0 of 1	0 of 1	1 of 1
BGBMP0006	6	0	1.40E-07	8.65E-06	3 of 6	2 of 6	0 of 6
HZBMP0003	5	0	3.45E-08	2.20E-06	1 of 5	1 of 5	0 of 5
HZBMP0001	5	0	1.21E-09	1.80E-06	1 of 5	0 of 5	0 of 5
A1BMP0001	3	0	ND	1.70E-08	0 of 3	0 of 3	0 of 3
B1SW0011*	2	0	6.70E-09	7.40E-09	0 of 2	0 of 2	0 of 2
HZBMP0002	2	0	ND	ND	0 of 2	0 of 2	0 of 2
ILBMP0003	2	0	ND	ND	0 of 2	0 of 2	0 of 2
LXBMP0003	2	0	ND	ND	0 of 2	0 of 2	0 of 2
EVBMP0001	1	0	ND	ND	0 of 1	0 of 1	0 of 1
ILBMP0002	1	0	ND	ND	0 of 1	0 of 1	0 of 1
Grand Total	87	8					

Notes

- 1) Potential BMP subareas sorted by shading (Table 7) and maximum TCDD TEQ no DNQ particulate strength
- 2) Permit limit = 2.8E-8 µg/L for TCDD TEQ at Outfall 008 and Outfall 009.
- 3) RWQCB split sample results excluded
- 4) All data from 'PS_Trigger_Analysis041911.xlsx' and 'Trigger analysis - siting.xlsx'
- 5) Number of NDs reflect the number of non-detects in the total concentration.
- 6) Particulate strength computation: PS = (Total concentration – Dissolved concentration) / Total Suspended Solids. Dissolved concentration assumed to be zero due to extremely low solubility.
- 7) (*) Starred site names are ISRA and NPDES monitoring sites being included for comparison and method testing purposes.
- 8) Number of samples in final column may not equal number of samples in other columns because all other columns reflect particulate strength measurements, which require a TSS value for the calculation.

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Table 7. Potential BMP subarea monitoring data, 2,3,7,8-TCDD results

2,3,7,8-TCDD (µg/L)							
Subarea	# of samples	# of NDs	Median 2,3,7,8-TCDD Conc.	Maximum 2,3,7,8-TCDD Conc.	# of Samples > 75th Percentile Background Level?	# of Samples > 95th Percentile Background Level?	# of Samples > Permit Limit?
Outfall 009*	43	40	< 9.0E-07	3.40E-05	NA	NA	NA
A2SW0001*	7	6	< 6.6E-07	2.30E-06	NA	NA	NA
B1SW0011*	2	1	< 3.7E-07	< 1.2E-06	NA	NA	NA
LPBMP0001	2	1	< 3.2E-07	9.80E-07	NA	NA	NA
LXBMP0002	1	0	6.90E-07	6.90E-07	NA	NA	NA
ILBMP0002	1	0	5.40E-07	5.40E-07	NA	NA	NA
B1BMP0001	1	1	< 8.8E-06	< 8.8E-06	NA	NA	NA
Outfall 008*	25	25	< 9.5E-07	< 4.7E-06	NA	NA	NA
HZBMP0003	11	11	< 6.4E-07	< 3.7E-06	NA	NA	NA
HZBMP0001	9	9	< 9.7E-07	< 2.5E-06	NA	NA	NA
BGBMP0006	7	7	< 6.2E-07	< 1.8E-06	NA	NA	NA
A1BMP0001	3	3	< 3.1E-07	< 1.1E-06	NA	NA	NA
HZBMP0002	2	2	< 7.9E-07	< 1.0E-06	NA	NA	NA
EVBMP0002	3	3	< 7.3E-07	< 1.0E-06	NA	NA	NA
A1SW0004*	7	7	< 5.5E-07	< 1.0E-06	NA	NA	NA
LXBMP0003	3	3	< 5.6E-07	< 8.8E-07	NA	NA	NA
B1BMP0002	3	3	< 3.9E-07	< 8.2E-07	NA	NA	NA
ILBMP0003	2	2	< 4.1E-07	< 4.7E-07	NA	NA	NA
EVBMP0001	1	1	< 3.1E-07	< 3.1E-07	NA	NA	NA
Grand Total	133	125					

Notes

- 1) Potential BMP subareas sorted by shading (Table 7) and maximum 2,3,7,8-TCDD concentration
- 2) No permit limit for 2,3,7,8-TCDD at Outfall 008 and Outfall 009.
- 3) RWQCB split sample results excluded
- 4) All data from 'Trigger analysis - siting.xlsx'
- 5) Number of NDs reflect the number of non-detects in the total concentration.
- 6) (*) Starred site names are ISRA and NPDES monitoring sites being included for comparison and method testing purposes.

To allow a visual comparison of the available data sets, the following data plots (Figures 1 – 9) summarize the concentration and PS data sets, as well as the 75th and 95th percentile background thresholds defined previously. Data are grouped into the following categories: background, BMP subarea, CM upgradient, ISRA upgradient, Outfall 008, and Outfall 009. Non-detected results were set equal to the detection limit (or 1×10^{-10} µg/L for TCDD TEQ, detected, but not quantified, DNQ observations) for plotting purposes. Detected and non-detected samples are plotted with two different symbols. Horizontal dashed lines represent the 75th and 95th percentile background levels.

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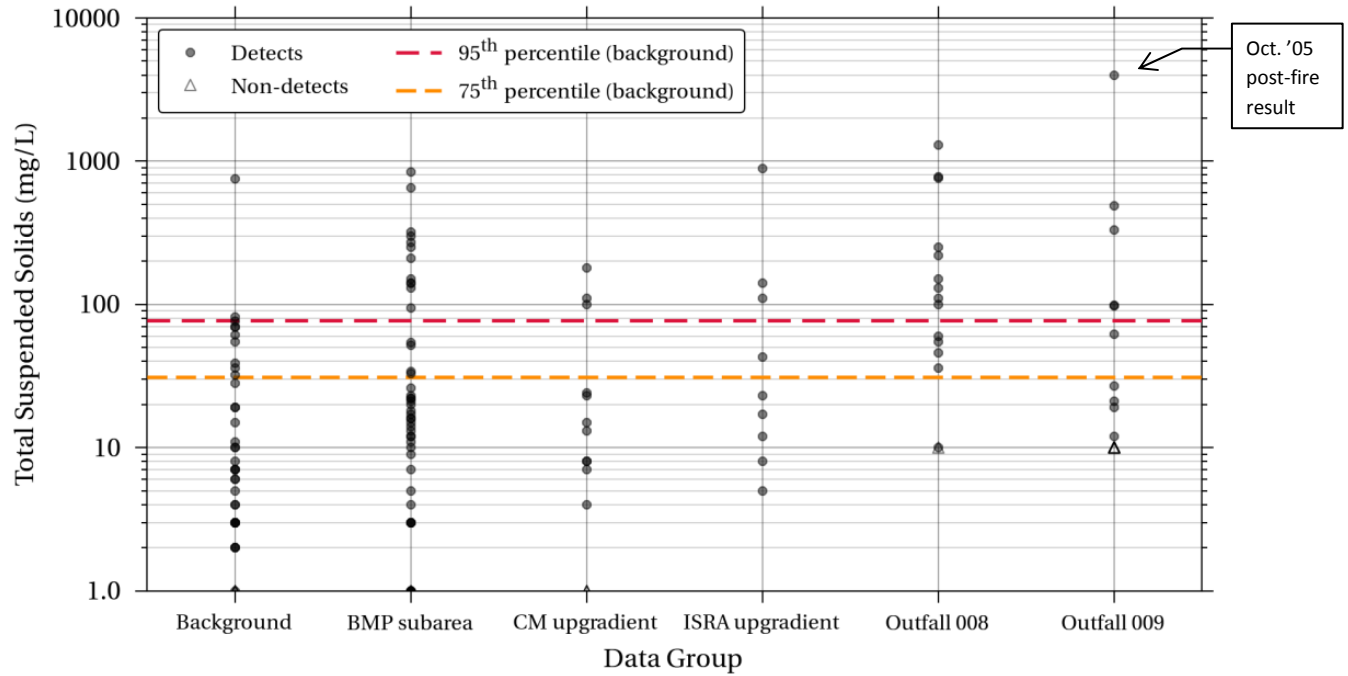


Figure 1. TSS data plot

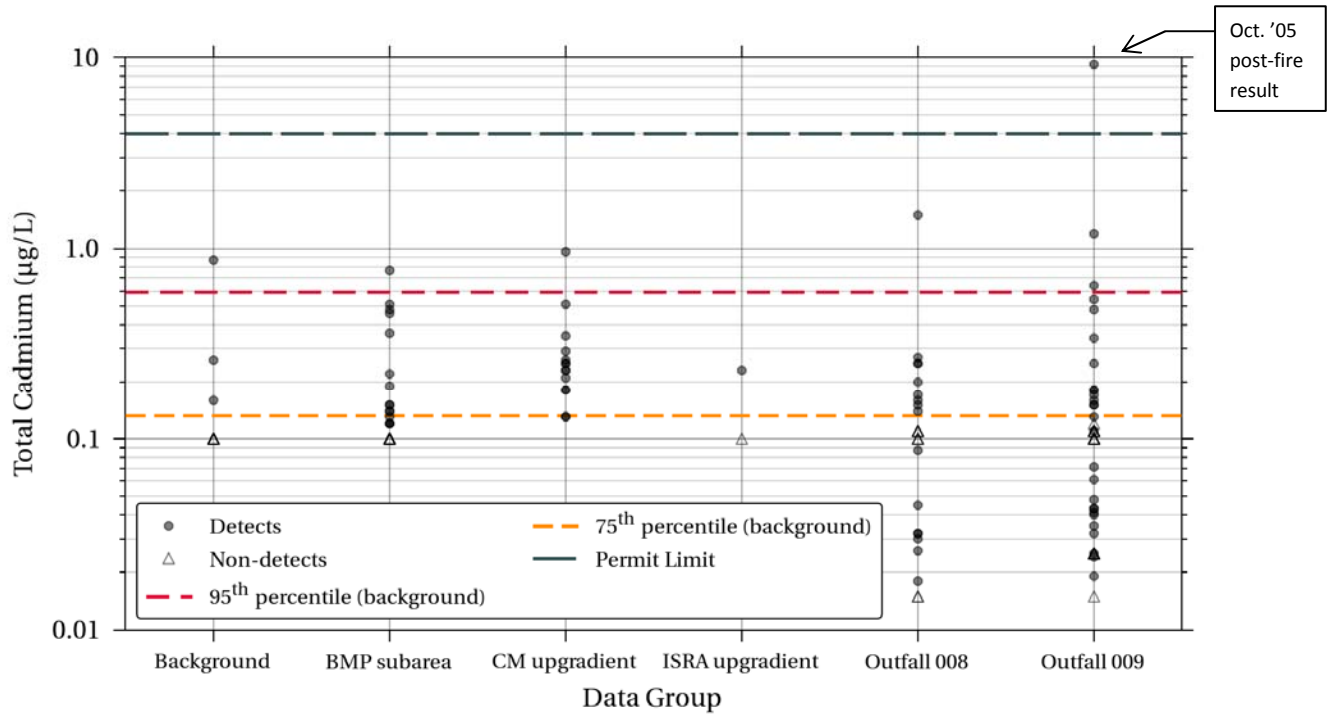


Figure 2. Cadmium concentration data plot

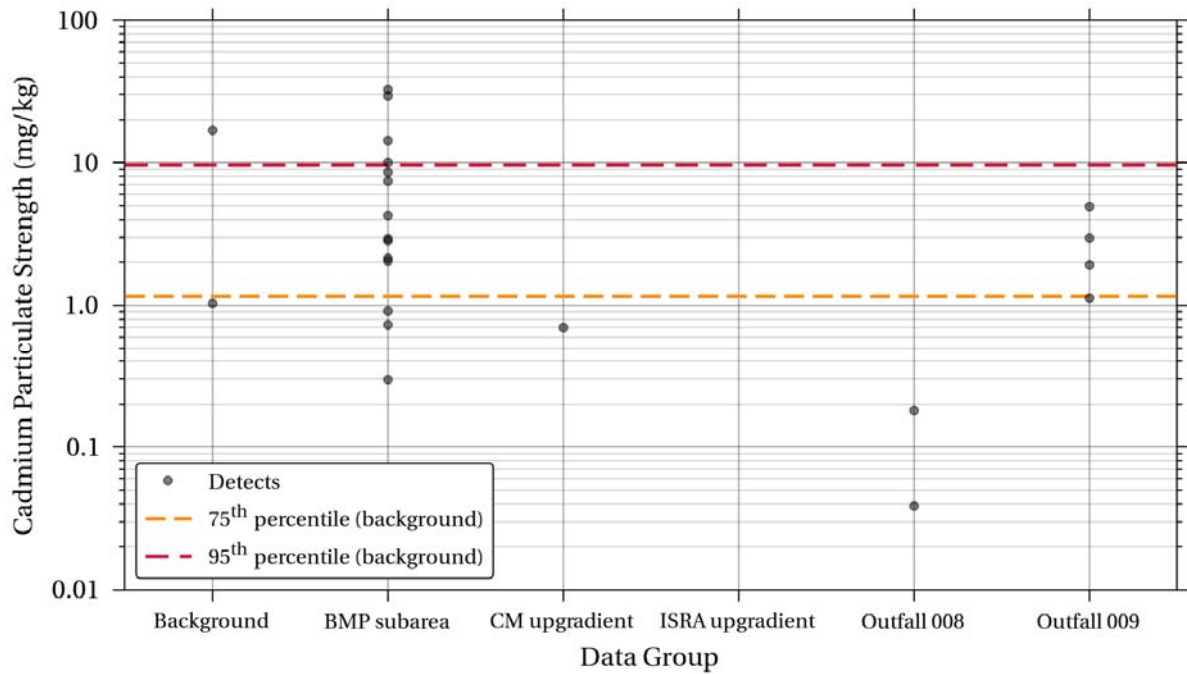


Figure 3. Cadmium particulate strength data plot

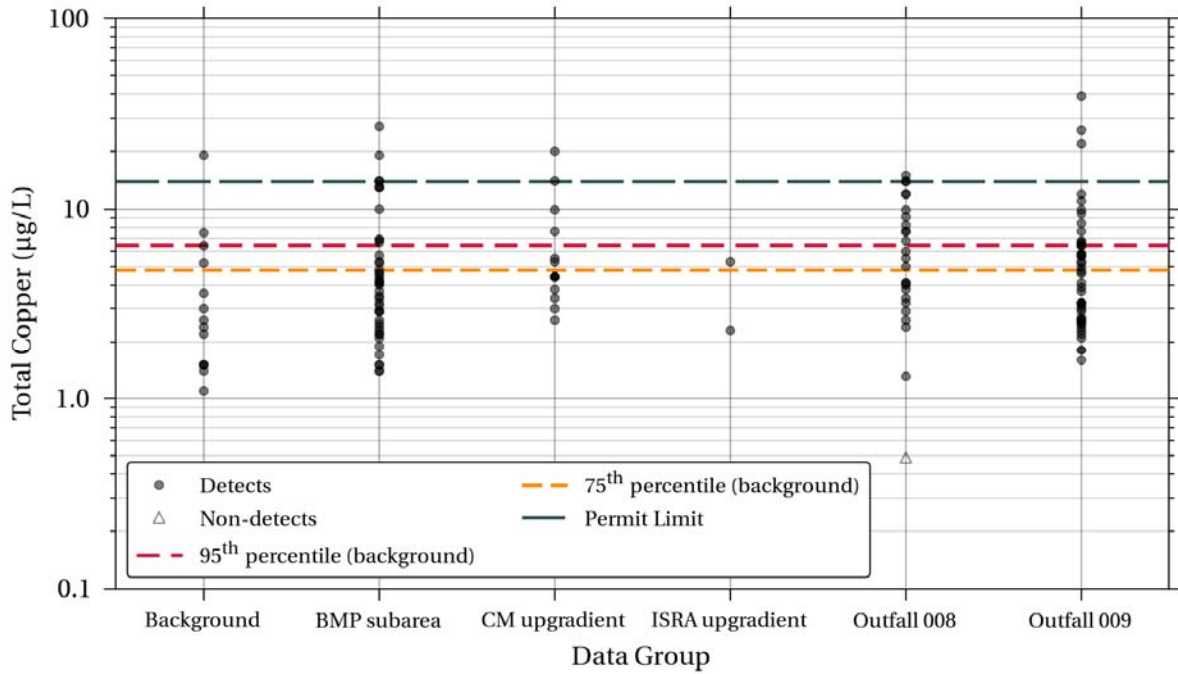


Figure 4. Copper concentration data plot

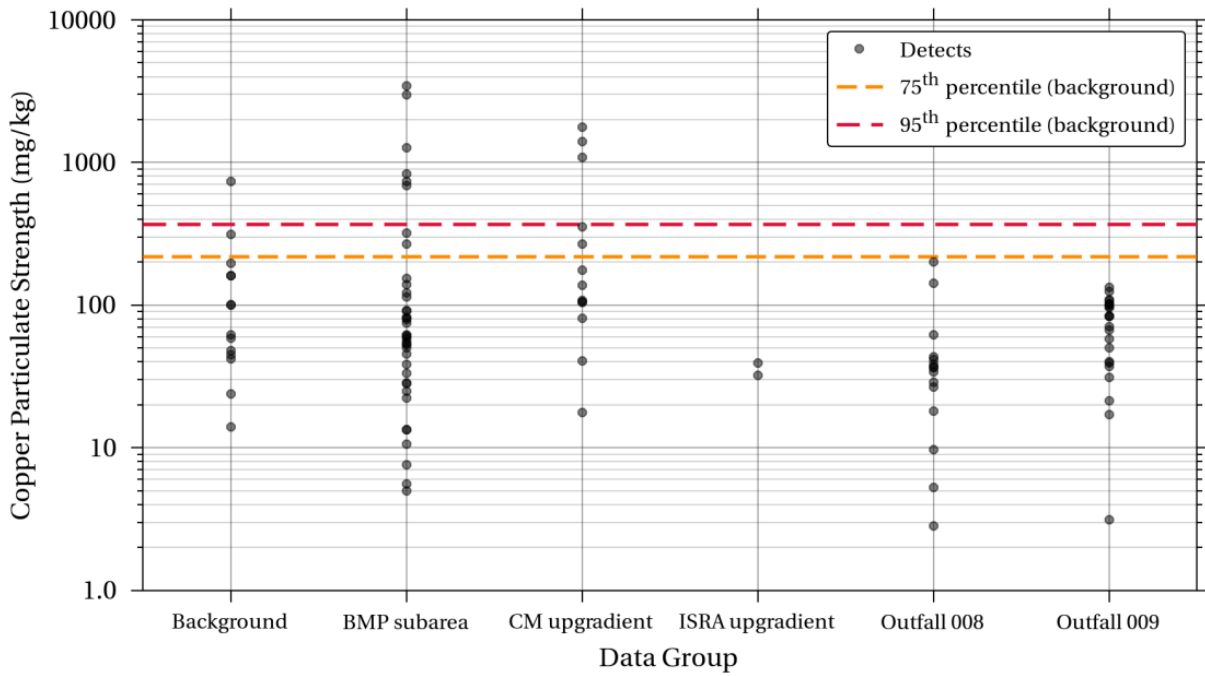


Figure 5. Copper particulate strength data plot

TECHNICAL APPENDIX B / SSFL WATERSHED 008 AND 009 BMP SITE RANKING ANALYSIS

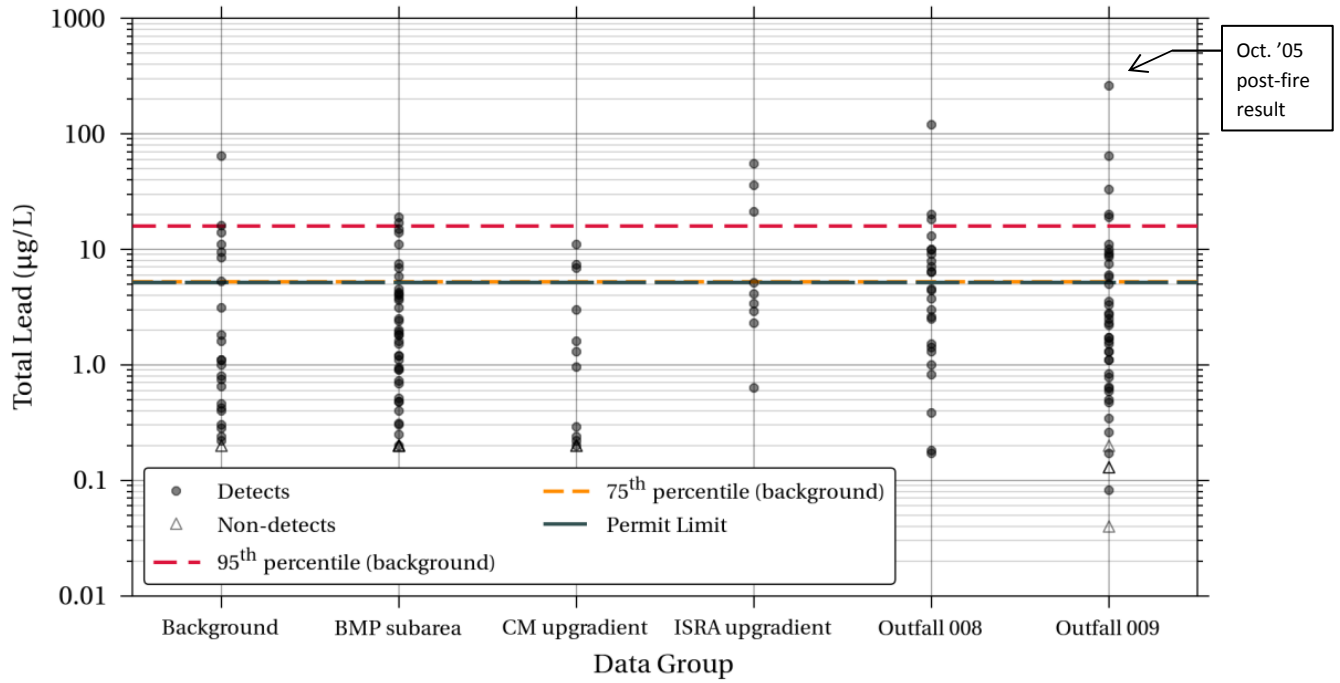


Figure 6. Lead concentration data plot

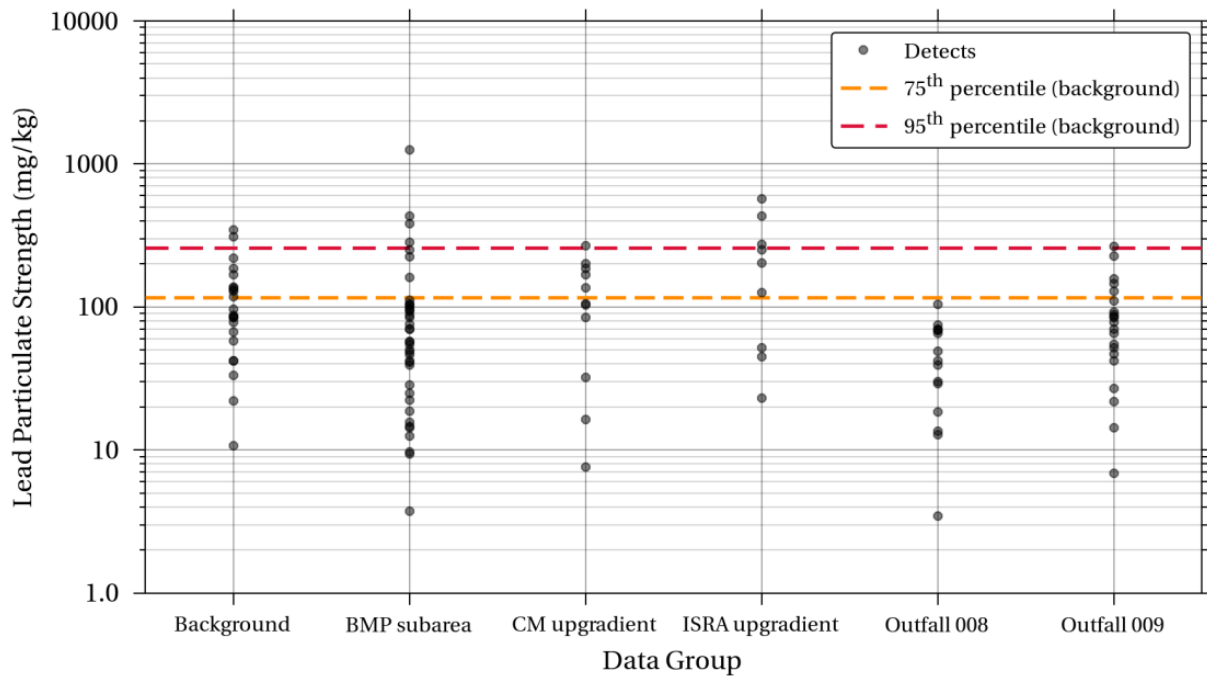


Figure 7. Lead particulate strength data plot

TECHNICAL APPENDIX B / SSFL WATERSHED 008 AND 009 BMP SITE RANKING ANALYSIS

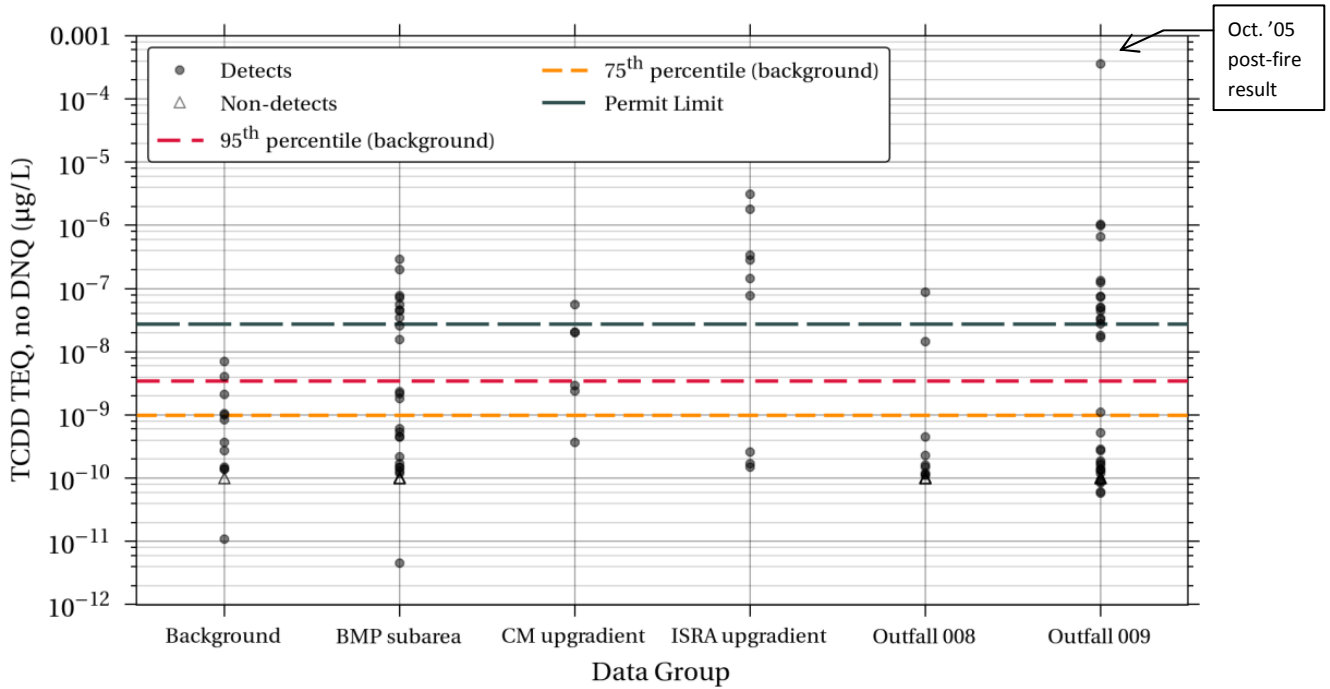


Figure 8. TCDD TEQ, no DNQ concentration data plot

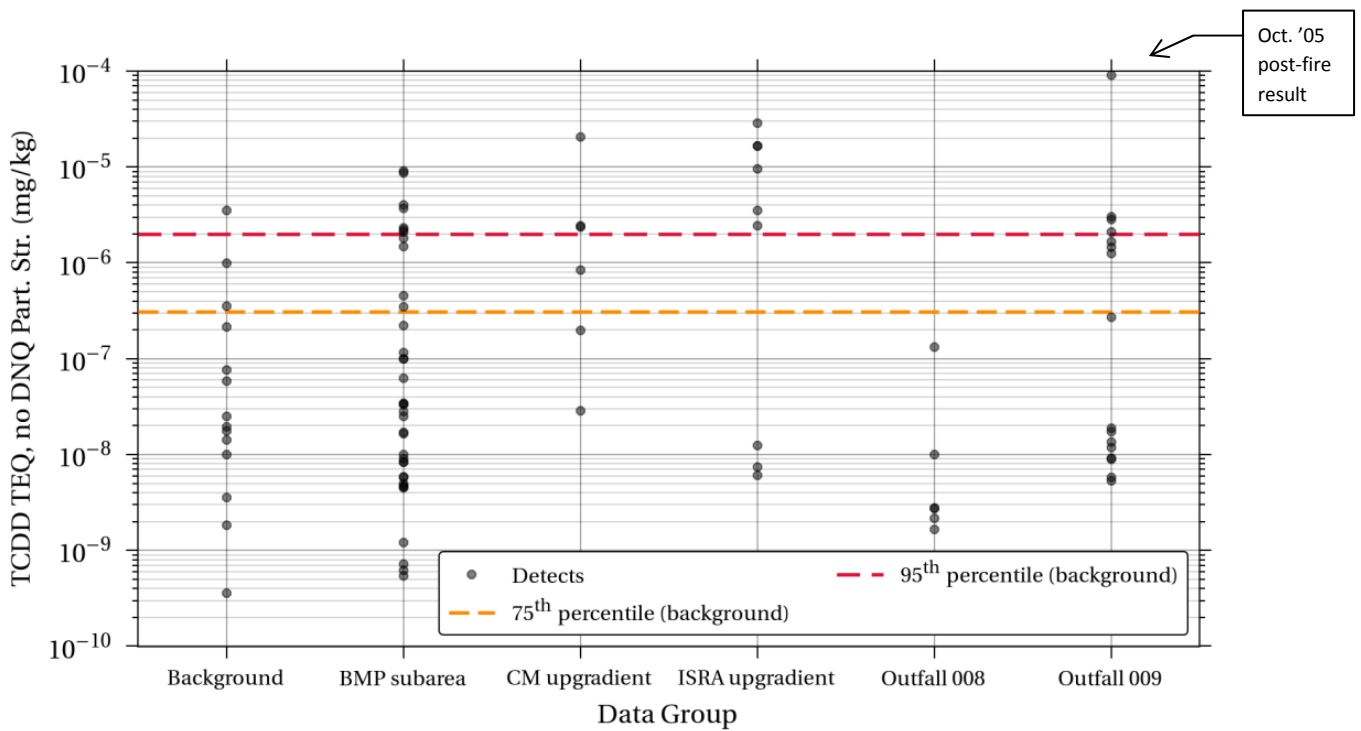
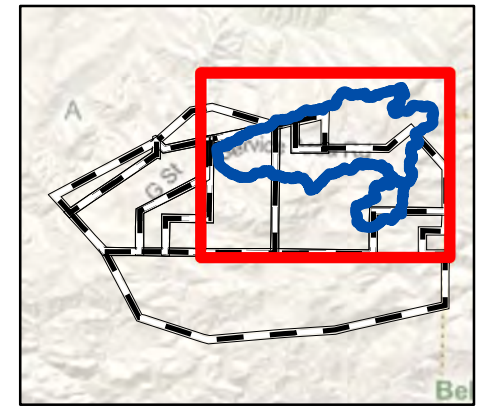
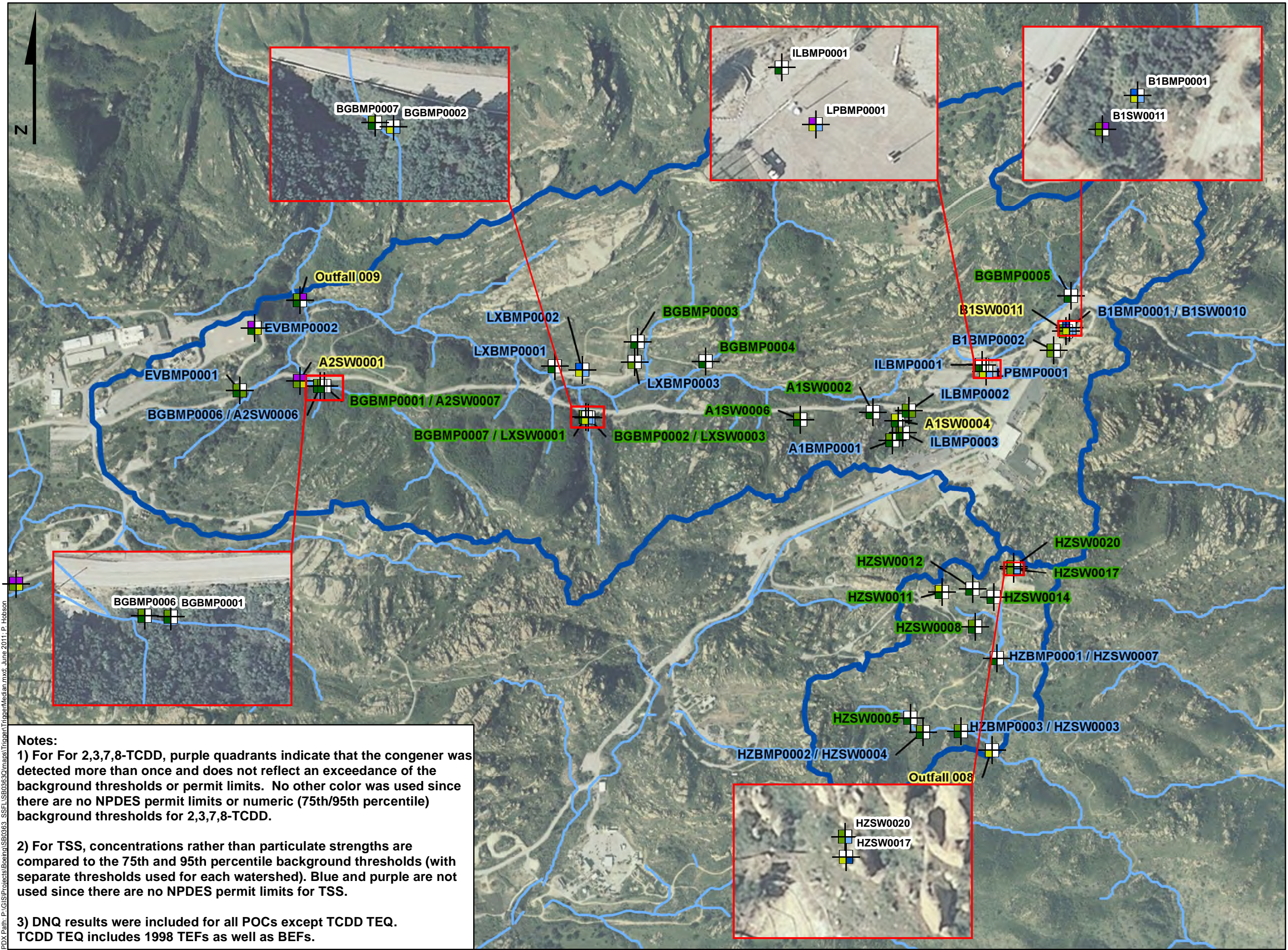


Figure 9. TCDD TEQ, no DNQ particulate strength data plot

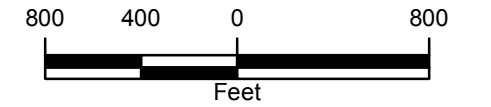


Exceedance and Base Legend

- No Exceedances
- Med PS > 75th Background
- Med PS > 95th Background
- Med Conc. > Permit Limit (PL)
- Med Conc > PL and PS > 75th
- Med Conc > PL and PS > 95th
- Stream
- Outfall watershed boundary

POC and Site Legend

- TCDD TEQ
- 2,3,7,8-TCDD
- TSS
- Lead
- BMP subarea site
- Other sites for comparison
- Background site



Notes:

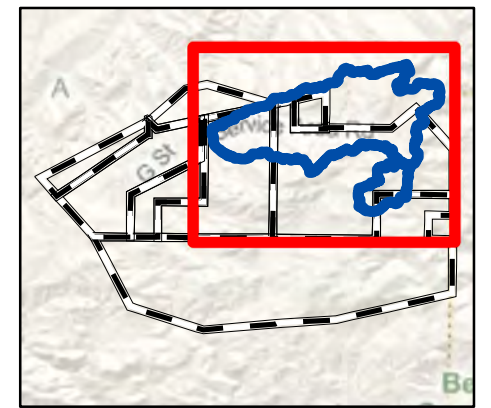
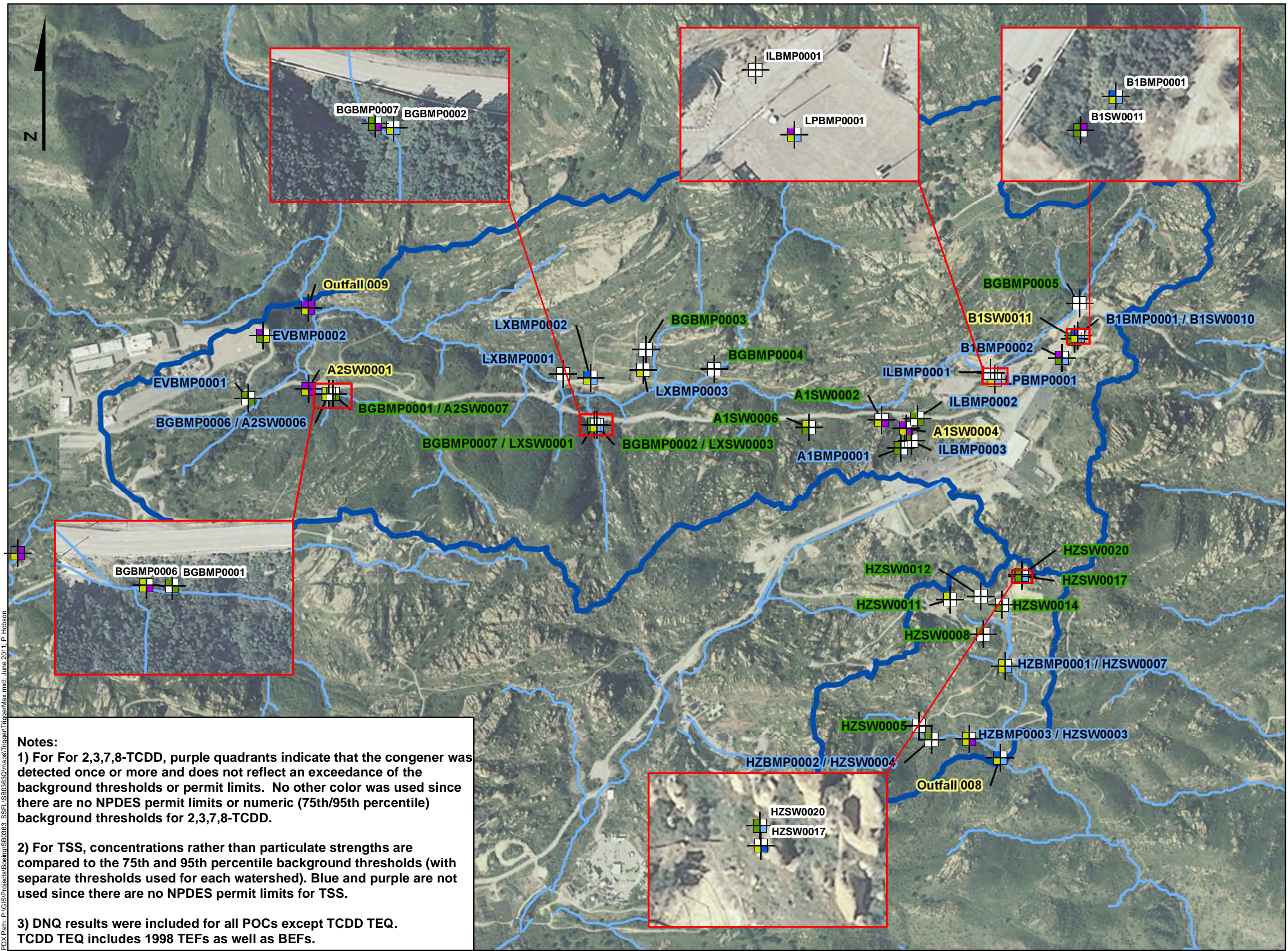
- 1) For For 2,3,7,8-TCDD, purple quadrants indicate that the congener was detected more than once and does not reflect an exceedance of the background thresholds or permit limits. No other color was used since there are no NPDES permit limits or numeric (75th/95th percentile) background thresholds for 2,3,7,8-TCDD.
- 2) For TSS, concentrations rather than particulate strengths are compared to the 75th and 95th percentile background thresholds (with separate thresholds used for each watershed). Blue and purple are not used since there are no NPDES permit limits for TSS.
- 3) DNQ results were included for all POCs except TCDD TEQ. TCDD TEQ includes 1998 TEFs as well as BEFs.

ATTACHMENT B1
 Exceedance of Median Values
 Trigger Analysis for
 Outfall 008/009 Watersheds
 Santa Susana Field Laboratory
 Ventura County, CA

Geosyntec
 consultants

Portland, OR June 2011

PDX Path: P:\GIS\Projects\Boeing\GIS\030303\maps\Trigger\TriggerMedian.mxd; June 2011; P. Hobson

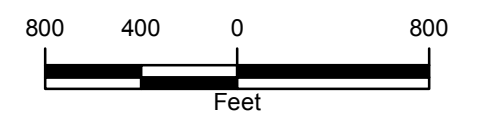


Exceedance and Base Legend

- No Exceedances
- Max PS > 75th Background
- Max PS > 95th Background
- Max Conc. > Permit Limit (PL)
- Max Conc > PL and PS > 75th
- Max Conc > PL and PS > 95th
- Stream
- Outfall watershed boundary

POC and Site Legend

- TCDD TEQ
- 2,3,7,8-TCDD
- TSS
- Lead
- BMP subarea site
- Other sites for comparison
- Background site



Notes:

- 1) For For 2,3,7,8-TCDD, purple quadrants indicate that the congener was detected once or more and does not reflect an exceedance of the background thresholds or permit limits. No other color was used since there are no NPDES permit limits or numeric (75th/95th percentile) background thresholds for 2,3,7,8-TCDD.
- 2) For TSS, concentrations rather than particulate strengths are compared to the 75th and 95th percentile background thresholds (with separate thresholds used for each watershed). Blue and purple are not used since there are no NPDES permit limits for TSS.
- 3) DNQ results were included for all POCs except TCDD TEQ. TCDD TEQ includes 1998 TEFs as well as BEFs.

ATTACHMENT B2
 Exceedance of Maximum Values
 Trigger Analysis for
 Outfall 008/009 Watersheds
 Santa Susana Field Laboratory
 Ventura County, CA

Geosyntec
 consultants

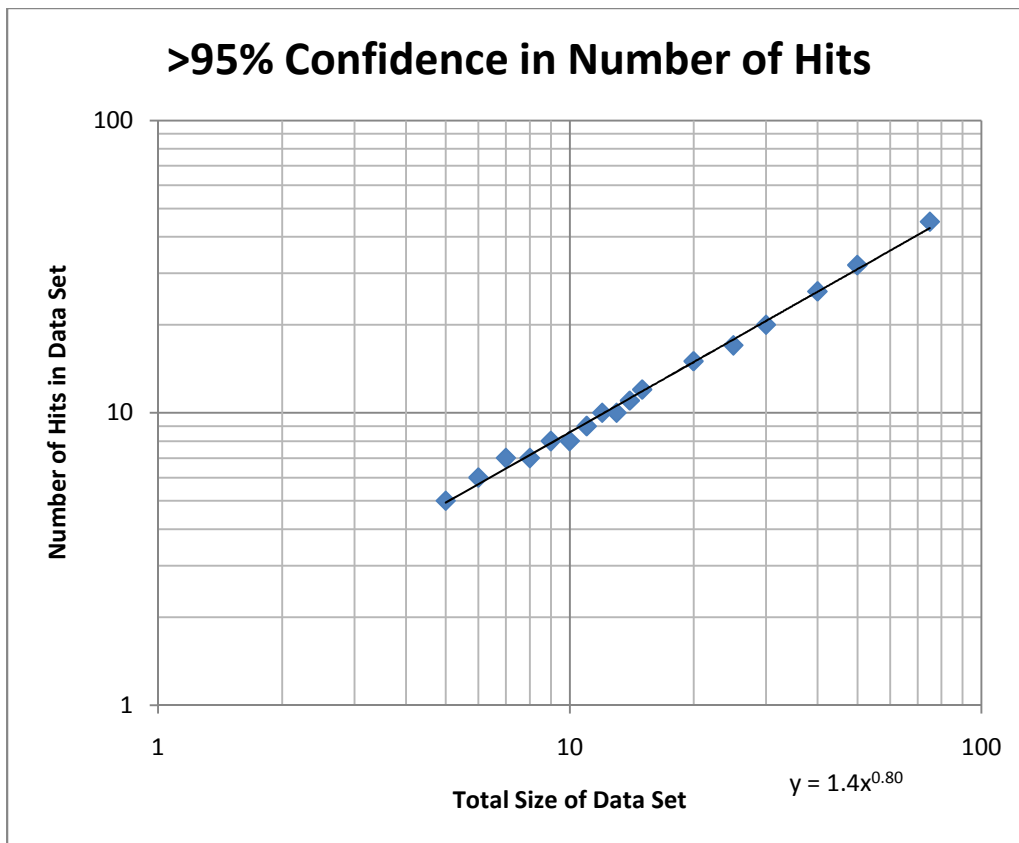
Portland, OR | June 2011

PDX Path: P:\GIS\Projects\Boeing\SSFL\SSFL030303\mapas\Trigger\TriggerMap.mxd; June 2011; P. Hobson

Technical Appendix C

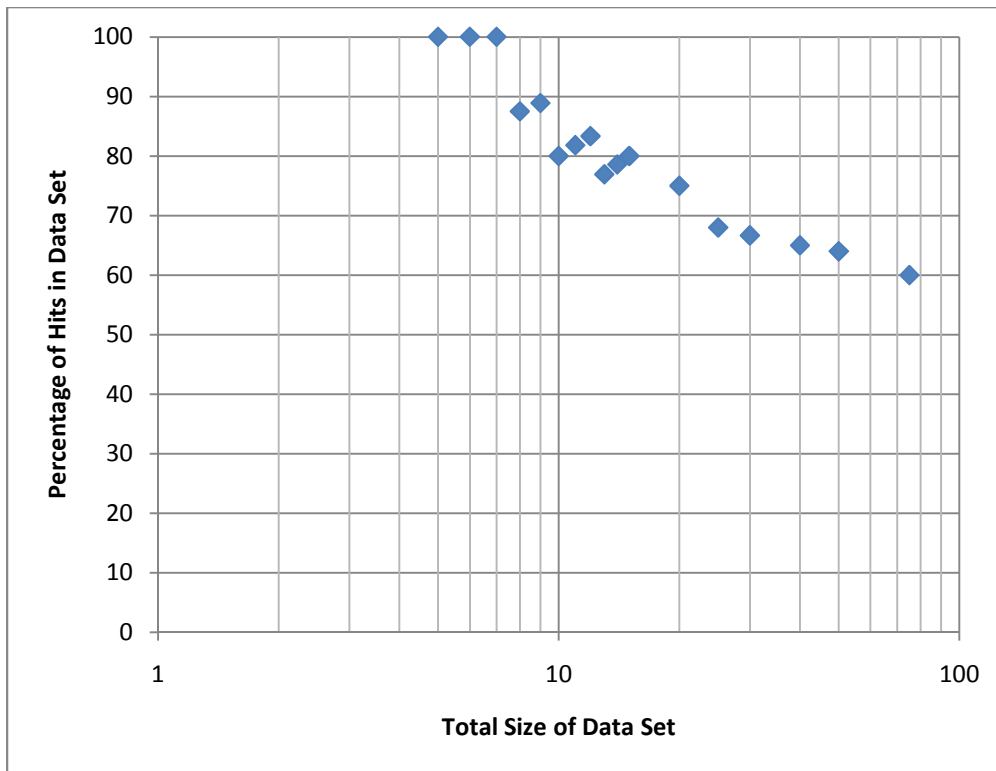
Data Reliability in Ranking Analyses

During our conference call this morning, I was thinking out loud on how to establish some measure of statistical relevance to the ranking (trigger) analysis, especially with few data observations for some of the locations. The following figure (similar to what I used in my Nov 21, 2010 memo, but reformatted), shows the number of hits out of the total data set for a 95% confidence level. This figure shows the relative change in required hits with increasing sample size. The first figure is a plot of the number of hits needed per sample size. 95% confidence levels cannot be reached until at least 5 observations are available (and then all would have to be critical). For small data sets (5 to 7 samples), all of the observations would need to be critical for the 95%, or higher, confidence level; as the number of observations increases, some data may not be critical for the high confidence levels.



TECHNICAL APPENDIX C / SSFL WATERSHED 008 AND 009 BMP SITE RANKING ANALYSIS

The next figure is a plot of the percentage of the total data set that would need to be critical, for different sample sizes, for the 95% confidence level to be reached. When the sample data set approaches 20 or 30 samples, only 65 to 75% of the samples would need to be critical, for example.



Therefore, as discussed this morning, with few data, almost all of the observations would have to indicate critical conditions; as the data numbers increase, larger fractions of the observations can be less critical.

The following table is the binomial distribution (single-tailed) and indicates the specific confidence levels for critical values for few data observations. Even though the confidence is not at the 95% level for the small data sets in many cases, they may be high enough to provide a suitable level of confidence for the ranking analyses. As an example, these confidence levels could be used as weighting factors during the ranking of the sites, based on the number of observations and the number of critical values observed. As an example, for three total observations and if all there were critical, the weighting factor would be 0.87, if two of the three were critical, then a weighting factor of 0.5 could be used; if 7 out of 9 were critical, then a weighting factor of 0.96 could be used.

TECHNICAL APPENDIX C / SSFL WATERSHED 008 AND 009 BMP SITE RANKING ANALYSIS

Other Confidence Levels for Small Sample Sets:

Total Number of Critical Values in Data Set:

Total Number of Observations	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	50													
2	50	75												
3	50	50	87											
4	31	50	69	94										
5	19	50	50	81	97									
6	11	34	50	66	89	98								
7	6	23	50	50	77	94	99							
8	4	14	36	50	64	86	98	99						
9	2	9	25	50	50	75	96	98	99					
10	1	5	17	38	50	63	83	95	99	99				
11	1	3	11	27	50	50	73	89	97	99	99			
12	0	2	7	19	39	50	63	81	93	98	99	99		
13	0	1	5	13	29	50	50	71	87	95	99	99	99	
14	0	1	3	9	21	40	50	61	79	91	97	99	99	99
15	0	0	2	6	15	30	50	50	70	85	94	98	99	99

Technical Appendix D

Santa Susana Field Laboratory BMP Trigger Assessment— Possible Regulator Precedents for 75th/95th Percentile Values

WWE
MEMORANDUM

To: Jon Jones

From: Wright Water Engineers, Inc.
Noah Greenberg

Date: April 26, 2011

Re: Santa Susana Field Laboratory BMP Trigger Assessment—Possible Regulator
Precedents for 75th/95th Percentile Values

The purpose of this memorandum is to identify regulatory analogues for the proposed Santa Susana Field Laboratory (SSFL) BMP triggers. The currently proposed BMP triggers are based on the NPDES permit limits and the 75th/95th percentiles for pollutants of concern (POC) at background reference sites at the SSFL. If a monitoring site has samples which exceed the NPDES permit limit or the 75th/95th thresholds for POC concentration or particulate strength, the site will be evaluated by panel for BMP feasibility.

The following regulations and guidance documents were identified that establish precedence for this type of approach:

- 2002. *Nutrient Criteria Technical Guidance Manual, Rivers and Streams*. U.S. Environmental Protection Agency.
 - a. In Chapter 7, this manual establishes a possible reference value range that is above the 75th percentile value for reference streams and below the 25th percentile for all streams.
 - b. Using the above method, a regulator may choose a single value as a numeric criterion that if exceeded by a stream, automatically triggers its designation as impaired. Alternatively, this method can be used to categorize streams as reference streams, acceptable quality streams or impaired streams.
- 2011. *Regulation No. 31—The Basic Standards and Methodologies For Surface Water*. Colorado Department of Public Health and Environment, Water Quality Control Commission.
 - a. On page 3 of this regulation, “Existing Quality” is identified as the 85th percentile of the data for ammonia, nitrate and dissolved metals, the 50th percentile of the data for total recoverable metals and the 15th percentile for dissolved oxygen.
 - b. On page 75, the rationale and defense for these thresholds is presented (e.g., why using a threshold above the 50th percentile will not necessarily result in an upward creeping mean).

- 2010. *Data Collection, Analysis and Nutrient Criteria Development—Progress Report*. Lower Salinas River Watershed Nutrient TMDL. California Water Boards.
 - a. The progress report identifies several different approaches to using reference site data to establish numeric guidelines for nutrients.
 - b. The 95th percentile of reference site data was used in 2006 to establish the nitrate guideline concentration.
- 2010. *An Assessment of Washington Lakes, Publication No., 10-03-029*. Department of Ecology, State of Washington.
 - a. This assessment uses reference lake nutrient levels to group lakes into “good,” “fair” and “poor” condition groups.
 - b. “Good” lakes had nutrient levels which were below the 75th percentile level for reference lakes.
 - c. “Fair” lakes had nutrient levels that were between the 75th and 95th percentile level for reference lakes.
 - d. “Poor” lakes had nutrient levels that exceeded the 95th percentile level for reference lakes.
- 2010. *Policy 10-1—Aquatic Life Use, Appendix E: Threshold Development—Technical Underpinnings*. Colorado Department of Public Health and Environment, Water Quality Control Division.
 - a. For biological condition, this document identifies the middle 90 – 95% of the reference site multi-metric index data range as the “normal operating” range.
 - b. The document establishes thresholds for sites that are “attaining,” “gray zone” or “impaired.”
 - c. Sites in the “gray zone” may be further evaluated to identify if they are designated as a Class 2 water (with lower expectations) or if they have Shannon Diversity or HBI scores that provide clarification of the site’s biological condition.
- 2009. *Waste Management Rules, Chapter 62-4, Permits*. Florida Department of Environmental Protection.
 - a. For the purposes of calculating dilutions for mixing zone requirements, this document identifies the “worst case effluent concentration” as the 95th percentile effluent concentration.

- 2006. *The Feasibility of Numeric Effluent Limits Applicable to Discharges of Storm Water Associated with Municipal, Industrial and Construction Activities*. Storm Water Panel Recommendations to the California State Water Resource Control Board.
 - a. The Panel identifies the Action Level as the 90th percentile of observed values. Thus, action (e.g., BMP installation) would be required at sites that are consistently in the uppermost 10th percentile of the distribution of observed effluent qualities.

Technical Appendix E

Summary of Results by Site

Note: All median and maximum values in µg/L except TSS, which is in mg/L.

Co-located site names are in parentheses.

	Rank	POC	Concentration					Particulate Strength					Weight	Both Criteria Exceeded?
			Number of Samples	Number of NDs	Median	Maximum	N > PL	Number of PS	Number of NDs	Median	Maximum	N > 95th		
A1BMP0001	1	Cadmium	5	0	0.48	0.5	0	4	0	9.3	50	4	0.5	no
	2	TCDD TEQ	5	1	0	<1e-10	1	5	1	0	0	1	0.05	yes
	3	Copper	5	0	4	5	0	5	0	91	300	0	0	no
	3	Lead	5	2	2.5E+00	<0.2	0	5	2	1.0E+02	2.3E+02	0	0	no
	3	2,3,7,8-TCDD	5	5	--	--	0	--	--	--	--	--	0	no
	3	Total Suspended Solids	5	0	11	22	0	--	--	--	--	--	0	no
A1SW0002	1	Total Suspended Solids	10	1	7	<1.0	0	--	--	--	--	--	0.01	no
	2	Lead	10	1	0.92	<0.2	3	10	1	115	304	1	0.006	yes
	3	Cadmium	0	0	--	--	0	0	0	--	--	0	0	no
	3	Copper	0	0	--	--	0	0	0	--	--	0	0	no
	3	TCDD TEQ	0	0	--	--	0	0	0	--	--	0	0	no
	3	2,3,7,8-TCDD	0	0	--	--	0	--	--	--	--	--	0	no
A1SW0004	1	Total Suspended Solids	15	3	23.00	<1.0	0	--	--	--	--	--	0.02	no
	2	TCDD TEQ	8	1	0	<1e-10	2	8	1	0	0	0	0.002	no
	3	Cadmium	15	0	0	1	0	1	0	1	1	1	0	no
	3	Copper	15	0	4.4E+00	2.0E+01	1	15	0	1.5E+02	1.9E+03	4	0	yes
	3	Lead	15	3	1.6	<0.2	3	15	3	103	261	0	0	no
	3	2,3,7,8-TCDD	8	8	<7e-07	<3.6e-06	0	--	--	--	--	--	0	no

TECHNICAL APPENDIX E / SSFL WATERSHED 008 AND 009 BMP SITE RANKING ANALYSIS

	Rank	POC	Concentration					Particulate Strength					Weight	Both Criteria Exceeded?
			Number of Samples	Number of NDs	Median	Maximum	N > PL	Number of PS	Number of NDs	Median	Maximum	N > 95th		
A1SW0006	1	TCDD TEQ	12	2	4.99123E-08	<1e-10	4	12	2	0	0	2	0.011	yes
	2	Cadmium	0	0	--	--	0	0	0	--	--	0	0	no
	2	Copper	0	0	--	--	0	0	0	--	--	0	0	no
	2	Lead	0	0	--	--	0	0	0	--	--	0	0	no
	2	2,3,7,8-TCDD	12	12	<5.4e-07	<2.8e-06	0	--	--	--	--	--	0	no
	2	Total Suspended Solids	12	2	9	<1.0	0	--	--	--	--	--	0	no
A2SW0001	1	TCDD TEQ	7	1	3.948E-06	<1e-10	5	7	1	0	0	2	0.5	yes
	1	Total Suspended Solids	7	0	17	890	0	--	--	--	--	--	0.5	no
	3	Lead	7	0	5	55	3	7	0	246	558	3.00	0.40	yes
	4	2,3,7,8-TCDD	7	6	<6.6e-07	<6.7e-06	1	--	--	--	--	--	0.06	no
	5	Cadmium	0	0	--	--	0	0	0	--	--	0.00	0	no
	5	Copper	0	0	--	--	0	0	0	--	--	0	0	no
B1BMP0001 (B1SW0010)	1	Total Suspended Solids	3	0	270.00	650.00	0	--	--	--	--	--	0.87	no
	2	Cadmium	3	0	1	1	0	3	0	1	1	3	0.5	no
	2	Lead	3	0	11	15	3	3	0	31	53	0	0.5	no
	4	Copper	3	0	1.6E+01	2.7E+01	2	3	0	2.3E+01	5.0E+01	0	0.34	no
	5	TCDD TEQ	3	0	1.95E-09	8.52E-07	1	3	0	0	0	0	0.11	no
	6	2,3,7,8-TCDD	3	3	<3.2e-06	<8.8e-06	0	--	--	--	--	--	0	no
B1BMP0002	1	TCDD TEQ	6	2	0.00	<1e-10	3	6	2	0.0	0.0	1	0.19	yes
	2	Total Suspended Solids	6	1	43	<1.0	0	--	--	--	--	--	0.11	no
	3	Cadmium	6	3	<0.1	<0.1	0	6	3	2	3	3	0.07	no
	4	Copper	6	0	3.5E+00	6.7E+00	0	5	0	4.7E+01	8.2E+01	0	0	no
	4	Lead	6	1	3	<0.2	1	6	1	48	117	0	0	no
	4	2,3,7,8-TCDD	6	6	<3e-06	<6.3e-06	0	--	--	--	--	--	0	no

TECHNICAL APPENDIX E / SSFL WATERSHED 008 AND 009 BMP SITE RANKING ANALYSIS

	Rank	POC	Concentration					Particulate Strength					Weight	Both Criteria Exceeded?
			Number of Samples	Number of NDs	Median	Maximum	N > PL	Number of PS	Number of NDs	Median	Maximum	N > 95th		
B1SW0011	1	TCDD TEQ	3	0	2.165E-07	6.03E-06	2	3	0	0	0	1	0.5	yes
	1	2,3,7,8-TCDD	3	2	<4.7e-07	<3.7e-06	1	--	--	--	--	--	0.5	no
	3	Cadmium	3	2	<0.1	<0.13	0	2	2	--	--	0	0	no
	3	Copper	3	0	3.2E+00	5.3E+00	0	3	0	4.3E+01	2.3E+02	0	0	no
	3	Lead	3	0	1.3E+00	2.3E+00	0	3	0	44	213	0	0	no
	3	Total Suspended Solids	3	1	43	<5.0	0	--	--	--	--	--	0	no
BGBMP0001 (A2SW0007)	1	Cadmium	4	3	<0.1	<0.1	0	4	3	8.4	8.4	1	0.04	no
	2	Copper	4	0	2	4	0	3	0	100	314	0	0	no
	2	Lead	4	1	1	<0.2	0	4	1	86	133	0	0	no
	2	TCDD TEQ	4	2	<1e-10	<1e-10	0	4	2	4.4E-09	7.9E-09	0	0	no
	2	2,3,7,8-TCDD	4	4	<8.7e-07	<2.1e-06	0	--	--	--	--	--	0	no
	2	Total Suspended Solids	4	1	7.5	<1.0	0	--	--	--	--	--	0	no
BGBMP0002 (LXSW0003)	1	Total Suspended Solids	3	0	22.00	750.00	0	--	--	--	--	--	0.5	no
	2	Copper	3	0	2	19	1	2	0	31	38	0	0.19	no
	3	Cadmium	3	2	<0.1	<0.1	0	3	2	1	1	1	0.11	no
	3	Lead	3	0	1.4E+00	64	1	3	0	5.5E+01	8.5E+01	0	0.11	no
	3	TCDD TEQ	3	1	1.02E-07	<1e-10	1	3	1	0	0	0	0.11	no
	6	2,3,7,8-TCDD	3	3	<9.9e-07	<3.4e-06	0	--	--	--	--	--	0	no
BGBMP0003	1	Cadmium	2	2	<0.1	<0.1	0	2	2	--	--	0	0	no
	1	Copper	2	0	2.25	2.7	0	1	0	120	120	0	0	no
	1	Lead	2	1	<0.2	<0.2	0	2	1	94	94	0	0	no
	1	TCDD TEQ	2	1	<1e-10	<1e-10	0	2	1	5.7E-08	5.7E-08	0	0	no
	1	2,3,7,8-TCDD	2	2	<4.7e-06	<4.7e-06	0	--	--	--	--	--	0	no
	1	Total Suspended Solids	2	1	<1.0	<1.0	0	--	--	--	--	--	0	no

TECHNICAL APPENDIX E / SSFL WATERSHED 008 AND 009 BMP SITE RANKING ANALYSIS

	Rank	POC	Concentration					Particulate Strength					Weight	Both Criteria Exceeded?
			Number of Samples	Number of NDs	Median	Maximum	N > PL	Number of PS	Number of NDs	Median	Maximum	N > 95th		
BGBMP0004	1	Cadmium	2	2	<0.1	<0.1	0	2	2	--	--	0	0	no
	1	Copper	2	0	2	2	0	1	0	47	47	0	0	no
	1	Lead	2	1	<0.2	<0.2	0	2	1	39	39	0	0	no
	1	TCDD TEQ	2	1	<1e-10	<1e-10	0	2	1	1.2E-07	1.2E-07	0	0	no
	1	2,3,7,8-TCDD	2	2	<4e-06	<4e-06	0	--	--	--	--	--	0	no
	1	Total Suspended Solids	2	0	10.5	17	0	--	--	--	--	--	0	no
BGBMP0005	1	Cadmium	1	1	<0.1	<0.1	0	1	1	--	--	0	0	no
	1	Copper	1	0	2.4	2.4	0	0	0	--	--	0	0	no
	1	Lead	1	0	0.84	0.84	0	0	0	--	--	0	0	no
	1	TCDD TEQ	1	0	2.8E-11	2.8E-11	0	1	0	2.5E-09	2.5E-09	0	0	no
	1	2,3,7,8-TCDD	1	1	<3.9e-06	<3.9e-06	0	--	--	--	--	--	0	no
	1	Total Suspended Solids	1	0	11	11	0	--	--	--	--	--	0	no
BGBMP0006 (A2SW0006)	1	Total Suspended Solids	7	1	16	<1.0	0	--	--	--	--	--	0.06	no
	2	TCDD TEQ	7	2	0.0	<1e-10	2	7	2	0.0	0.0	1	0.03	yes
	3	Lead	7	1	2	<0.2	1	7	1	92	1232	1	0.01	yes
	4	Cadmium	1	1	<0.1	<0.1	0	1	1	--	--	0	0	no
	4	Copper	1	0	2.9	2.9	0	1	0	6	6	0	0	no
	4	2,3,7,8-TCDD	7	7	<6.2e-07	<1.8e-06	0	--	--	--	--	--	0	no
BGBMP0007 (LXSW0001)	1	Lead	7	0	1	16	1	7	0	82	337	1	0.01	yes
	2	Cadmium	7	6	<0.1	<0.1	0	6	6	--	--	0	0	no
	2	Copper	7	0	2	8	0	7	0	68	176	0	0	no
	2	TCDD TEQ	7	3	1.0E-08	<1e-10	0	7	3	2.8E-07	3.5E-07	0	0	no
	2	2,3,7,8-TCDD	7	7	<8.1e-07	<5.4e-06	0	--	--	--	--	--	0	no
	2	Total Suspended Solids	7	0	7	39	0	--	--	--	--	--	0	no

TECHNICAL APPENDIX E / SSFL WATERSHED 008 AND 009 BMP SITE RANKING ANALYSIS

	Rank	POC	Concentration					Particulate Strength					Weight	Both Criteria Exceeded?
			Number of Samples	Number of NDs	Median	Maximum	N > PL	Number of PS	Number of NDs	Median	Maximum	N > 95th		
EVBMP0001	1	Cadmium	2	2	<0.1	<0.1	0	2	2	--	--	0	0	no
	1	Copper	2	0	2.4	2.5	0	1	0	60	60	0	0	no
	1	Lead	2	1	<0.2	<0.2	0	2	1	161	161	0	0	no
	1	TCDD TEQ	2	1	<1e-10	<1e-10	0	2	1	3.6E-07	3.6E-07	0	0	no
	1	2,3,7,8-TCDD	2	2	<9e-07	<9e-07	0	--	--	--	--	--	0	no
	1	Total Suspended Solids	2	0	6	10	0	--	--	--	--	--	0	no
EVBMP0002	1	TCDD TEQ	5	0	0.00	0.0	5	5	0	0	0	3	0.95	yes
	2	Cadmium	5	1	0	<0.1	0	5	1	10	30	4	0.38	no
	3	Lead	5	0	3	4	0	4	0	357	1090	3	0.25	no
	4	Copper	5	0	4.3E+00	5.2E+00	0	4	0	2.2E+02	6.0E+02	1	0.02	no
	5	2,3,7,8-TCDD	5	5	<1e-06	<4e-06	0	--	--	--	--	--	0	no
	5	Total Suspended Solids	5	0	10	34	0	--	--	--	--	--	0	no
HZBMP0001 (HZSW0007)	1	Total Suspended Solids	11	0	23.00	320.00	0	--	--	--	--	--	0.5	no
	2	Cadmium	4	3	<0.1	<0.1	0	4	3	4	4	1	0.04	no
	3	Copper	11	0	5	13	0	11	0	38	1054	1	0	no
	3	Lead	11	1	2.1E+00	<0.2	1	11	1	2.0E+01	1.0E+02	0	0	no
	3	TCDD TEQ	11	3	1.0988E-08	<1e-10	2	11	3	0	0	0	0	no
	3	2,3,7,8-TCDD	11	11	<1.8e-06	<3.1e-06	0	--	--	--	--	--	0	no
HZBMP0002 (HZSW0004)	1	Cadmium	4	4	<0.1	<0.1	0	3	3	--	--	0	0	no
	1	Copper	4	0	2	2	0	1	0	33	33	0	0	no
	1	Lead	4	2	<0.2	<0.2	0	3	2	58	58	0	0	no
	1	TCDD TEQ	4	3	<1e-10	<1e-10	0	3	2	6.5E-09	6.5E-09	0	0	no
	1	2,3,7,8-TCDD	4	4	<2.4e-06	<5.6e-06	0	--	--	--	--	--	0	no
	1	Total Suspended Solids	3	1	12	<1.0	0	--	--	--	--	--	0	no

TECHNICAL APPENDIX E / SSFL WATERSHED 008 AND 009 BMP SITE RANKING ANALYSIS

	Rank	POC	Concentration					Particulate Strength					Weight	Both Criteria Exceeded?
			Number of Samples	Number of NDs	Median	Maximum	N > PL	Number of PS	Number of NDs	Median	Maximum	N > 95th		
HZBMP0003 (HZSW0003)	1	Total Suspended Solids	13	3	21	<1.0	0	--	--	--	--	--	0.05	no
	2	Cadmium	5	4	<0.1	<0.1	0	5	4	72	72	1	0.01	no
	3	Copper	13	0	2	19	1	11	0	51	3450	3	0.001	yes
	4	Lead	14	7	<0.2	<0.2	2	13	6	4.6E+01	3.8E+02	1	0	yes
	4	TCDD TEQ	13	3	2.1922E-09	<1e-10	3	13	3	0	0	0	0	no
	4	2,3,7,8-TCDD	13	13	<1e-06	<3.7e-06	0	--	--	--	--	--	0	no
HZSW0005	1	Cadmium	0	0	--	--	0	0	0	--	--	0	0	no
	1	Copper	0	0	--	--	0	0	0	--	--	0	0	no
	1	Lead	0	0	--	--	0	0	0	--	--	0	0	no
	1	TCDD TEQ	1	0	5.6E-09	5.6E-09	0	1	0	1.1E-06	1.1E-06	0	0	no
	1	2,3,7,8-TCDD	1	1	<4e-07	<4e-07	0	--	--	--	--	--	0	no
	1	Total Suspended Solids	1	0	5	5	0	--	--	--	--	--	0	no
HZSW0008	1	Cadmium	0	0	--	--	0	0	0	--	--	0	0	no
	1	Copper	0	0	--	--	0	0	0	--	--	0	0	no
	1	Lead	1	0	0.4	0.4	0	1	0	11	11	0	0	no
	1	TCDD TEQ	1	0	2.1E-09	2.1E-09	0	1	0	7.6E-08	7.6E-08	0	0	no
	1	2,3,7,8-TCDD	1	1	<6.2e-07	<6.2e-07	0	--	--	--	--	--	0	no
	1	Total Suspended Solids	1	0	28	28	0	--	--	--	--	--	0	no
HZSW0011	1	Copper	2	0	2.7	3	0	2	0	385	608	1	0.31	no
	2	Cadmium	0	0	--	--	0	0	0	--	--	0	0	no
	2	Lead	0	0	--	--	0	0	0	--	--	0	0	no
	2	TCDD TEQ	2	0	3.5E-09	7.0E-09	0	2	0	1.8E-06	3.5E-06	0	0	no
	2	2,3,7,8-TCDD	2	2	<5.2e-06	<5.2e-06	0	--	--	--	--	--	0	no
	2	Total Suspended Solids	2	0	4	6	0	--	--	--	--	--	0	no

TECHNICAL APPENDIX E / SSFL WATERSHED 008 AND 009 BMP SITE RANKING ANALYSIS

	Rank	POC	Concentration					Particulate Strength					Weight	Both Criteria Exceeded?
			Number of Samples	Number of NDs	Median	Maximum	N > PL	Number of PS	Number of NDs	Median	Maximum	N > 95th		
HZSW0012	1	Cadmium	0	0	--	--	0	0	0	--	--	0	0	no
	1	Copper	0	0	--	--	0	0	0	--	--	0	0	no
	1	Lead	1	1	<0.2	<0.2	0	1	1	--	--	0	0	no
	1	TCDD TEQ	0	0	--	--	0	0	0	--	--	0	0	no
	1	2,3,7,8-TCDD	0	0	--	--	0	--	--	--	--	--	0	no
	1	Total Suspended Solids	1	0	7	7	0	--	--	--	--	--	0	no
HZSW0014	1	Cadmium	0	0	--	--	0	0	0	--	--	0	0	no
	1	Copper	2	0	6	6	0	2	0	36	37	0	0	no
	1	Lead	2	0	2	3	0	2	0	27	33	0	0	no
	1	TCDD TEQ	0	0	--	--	0	0	0	--	--	0	0	no
	1	2,3,7,8-TCDD	0	0	--	--	0	--	--	--	--	--	0	no
	1	Total Suspended Solids	2	0	66	70	0	--	--	--	--	--	0	no
HZSW0017	1	Lead	1	0	14	14	1	1	0	137	137	0	0.5	no
	1	Total Suspended Solids	1	0	76	76	0	--	--	--	--	--	0.5	no
	3	Cadmium	0	0	--	--	0	0	0	--	--	0	0	no
	3	Copper	0	0	--	--	0	0	0	--	--	0	0	no
	3	TCDD TEQ	1	0	5.0444E-09	5.0444E-09	0	1	0	0	0	0	0	no
	3	2,3,7,8-TCDD	1	1	<2.6e-06	<2.6e-06	0	--	--	--	--	--	0	no
HZSW0020	1	Lead	1	0	5.3	5.3	1	1	0	57	57	0	0.5	no
	2	Cadmium	0	0	--	--	0	0	0	--	--	0	0	no
	2	Copper	0	0	--	--	0	0	0	--	--	0	0	no
	2	TCDD TEQ	1	0	4.0E-09	4.0E-09	0	1	0	5.8E-08	5.8E-08	0	0	no
	2	2,3,7,8-TCDD	1	1	<6.4e-07	<6.4e-07	0	--	--	--	--	--	0	no
	2	Total Suspended Solids	1	0	69	69	0	--	--	--	--	--	0	no

TECHNICAL APPENDIX E / SSFL WATERSHED 008 AND 009 BMP SITE RANKING ANALYSIS

	Rank	POC	Concentration					Particulate Strength					Weight	Both Criteria Exceeded?
			Number of Samples	Number of NDs	Median	Maximum	N > PL	Number of PS	Number of NDs	Median	Maximum	N > 95th		
ILBMP0001	1	Cadmium	2	0	0.4	0.4	0	2	0	12	21	2	0.5	no
	1	Lead	2	0	4.15	5.4	1	2	0	277	517	1	0.5	yes
	1	TCDD TEQ	2	0	0	0	1	2	0	0	0	1	0.5	yes
	4	Copper	2	0	7.7E+00	1.10E+01	0	1	0	1.1E+02	1.1E+02	0	0	no
	4	2,3,7,8-TCDD	2	2	<7.9e-06	<7.9e-06	0	--	--	--	--	--	0	no
	4	Total Suspended Solids	2	0	19	29	0	--	--	--	--	--	0	no
ILBMP0002	1	Cadmium	2	2	<0.1	<0.1	0	2	2	--	--	0	0	no
	1	Copper	2	0	3.3	3.4	0	1	0	50	50	0	0	no
	1	Lead	2	0	2.4	3.8	0	1	0	225	225	0	0	no
	1	TCDD TEQ	2	0	1.2E-08	2.2E-08	0	2	0	1.1E-06	1.8E-06	0	0	no
	1	2,3,7,8-TCDD	2	2	<2.2e-06	<2.2e-06	0	--	--	--	--	--	0	no
	1	Total Suspended Solids	2	0	10	12	0	--	--	--	--	--	0	no
ILBMP0003	1	Cadmium	4	4	<0.1	<0.1	0	4	4	--	--	0	0	no
	1	Copper	4	0	3.9	5	0	3	0	100	267	0	0	no
	1	Lead	4	0	0.67	1	0	3	0	70	133	0	0	no
	1	TCDD TEQ	4	0	2.5E-09	2.686E-08	0	4	0	6.3E-07	9.0E-06	0	0	no
	1	2,3,7,8-TCDD	4	4	<1.7e-06	<6.7e-06	0	--	--	--	--	--	0	no
	1	Total Suspended Solids	4	0	4	10	0	--	--	--	--	--	0	no
LPBMP0001	1	Cadmium	2	0	0.32	0.48	0	2	0	2.0	2.9	2	0.5	no
	1	TCDD TEQ	2	0	0	0	2	2	0	0	0	0	0.5	no
	1	Total Suspended Solids	2	0	92	130	0	--	--	--	--	--	0.5	no
	4	Lead	2	0	9.8E+00	1.5E+01	1	2	0	9.4E+01	1.1E+02	0	0.31	no
	5	Copper	2	0	9.25	14	0	2	0	76	92	0	0	no
	5	2,3,7,8-TCDD	2	2	<5.2e-07	<5.2e-07	0	--	--	--	--	--	0	no

TECHNICAL APPENDIX E / SSFL WATERSHED 008 AND 009 BMP SITE RANKING ANALYSIS

	Rank	POC	Concentration					Particulate Strength					Weight	Both Criteria Exceeded?
			Number of Samples	Number of NDs	Median	Maximum	N > PL	Number of PS	Number of NDs	Median	Maximum	N > 95th		
LXBMP0001	1	Cadmium	0	0	--	--	0	0	0	--	--	0	0	no
	1	Copper	0	0	--	--	0	0	0	--	--	0	0	no
	1	Lead	0	0	--	--	0	0	0	--	--	0	0	no
	1	TCDD TEQ	0	0	--	--	0	0	0	--	--	0	0	no
	1	2,3,7,8-TCDD	0	0	--	--	0	--	--	--	--	--	0	no
	1	Total Suspended Solids	0	0	--	--	0	--	--	--	--	--	0	no
LXBMP0002	1	Total Suspended Solids	2	0	155.50	300.00	0	--	--	--	--	--	0.5	no
	2	Lead	2	0	4	7	1	2	0	32	41	0	0.31	no
	2	TCDD TEQ	2	1	<1e-10	<1e-10	1	2	1	0	0	0	0.31	no
	4	Cadmium	2	1	<0.1	<0.1	0	2	1	1.5E-01	1.5E-01	0	0	no
	4	Copper	2	0	9.65	14	0	2	0	46	64	0	0	no
	4	2,3,7,8-TCDD	2	2	<5.1e-06	<5.1e-06	0	--	--	--	--	--	0	no
LXBMP0003	1	Total Suspended Solids	5	0	17.0	230.0	0	--	--	--	--	--	0.5	no
	2	TCDD TEQ	5	3	<1e-10	<1e-10	2	5	3	0	0	0	0.05	no
	3	Copper	5	0	3	10	0	4	0	32	2967	1	0.02	no
	4	Cadmium	5	4	<0.1	<0.1	0	5	4	1.5E+01	1.5E+01	1	0.01	no
	5	Lead	5	1	0.9	<0.2	0	5	1	26	68	0	0	no
	5	2,3,7,8-TCDD	5	5	<8.8e-07	<8.3e-06	0	--	--	--	--	--	0	no
Outfall 008	1	Total Suspended Solids	21	1	100.00	<10.0	0	--	--	--	--	--	0.5	no
	2	Lead	31	0	4	120	13	21	0	44	309	1	0.001	yes
	3	Cadmium	25	9	0	<0.11	0	5	3	0	1	1	0	no
	3	Copper	31	1	5.5E+00	<0.49	1	21	0	3.7E+01	1.7E+02	0	0	no
	3	TCDD TEQ	31	5	4.936E-09	<1e-10	6	18	4	0	0	0	0	no
	3	2,3,7,8-TCDD	31	31	<9.52e-07	<4.7e-06	0	--	--	--	--	--	0	no

TECHNICAL APPENDIX E / SSFL WATERSHED 008 AND 009 BMP SITE RANKING ANALYSIS

	Rank	POC	Concentration					Particulate Strength					Weight	Both Criteria Exceeded?
			Number of Samples	Number of NDs	Median	Maximum	N > PL	Number of PS	Number of NDs	Median	Maximum	N > 95th		
Outfall 009	1	Cadmium	58	28	5.20	<0.12	1	22	18	1	2	4	0	yes
	1	Copper	58	0	4	212	4	36	0	92	3940	4	0	yes
	1	Lead	58	7	3	<0.2	17	37	5	89	2436	6	0	yes
	1	TCDD TEQ	58	11	3.4E-08	<1e-10	19	36	8	8.2E-07	9.2E-05	3	0	yes
	1	2,3,7,8-TCDD	58	54	<8.56e-07	<3.16e-06	3	--	--	--	--	--	0	no
	1	Total Suspended Solids	37	15	99	<10.0	0	--	--	--	--	--	0	no