Heal the Bay

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Public Comment
Dft. Construction Gen. Permit
Deadline: 6/24/09 by 5:00 p.m.

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June 24, 2009

Mr. Hoppin, Chair and Board Members
State Water Resources Control Board
1001 I Street
Sacramento, CA 95814
Via Email commentletters@waterboards.ca.gov

Re: Draft NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities dated April 22, 2009.

Dear Chair Hoppin and State Board Members:

On behalf of Heal the Bay, we submit the following comments on the April 22, 2009, Draft National Pollutant Discharge Elimination system (NPDES) General Permit for Storm Water Discharges Associated Construction and Land Disturbance Activities NPDES Permit No. CAR000002. The importance of this permit cannot be underestimated. For 17 years, the construction industry has operated under inadequate General Construction permits that have largely failed to stem the sedimentation, erosion and pollution impacts caused by development without adequate stormwater management and BMPs. We appreciate the Board's efforts to significantly overhaul the existing out-dated permit. Renewal of the permit is long overdue.

In general, we are concerned that the permit is overly complex and will be extremely difficult, if not impossible, to administer in a manner which is protective of receiving water quality. Because of the permit's reliance on numeric action levels (NALs), this permit is largely unenforceable and will be ineffective unless a significant amount of limited regional board resources are redirected to construction stormwater. In lieu of that, the ultimate result of this permit will be continuation of a largely self-regulating scheme that is based on risk levels calculated by dischargers themselves and on likely minimal actions triggered by a NAL exceedance.

We applaud the Regional Board for introducing numeric limits into the permit, however, we strongly object to the high value of the turbidity limit and the wide allowable pH range: neither is set at a level protective of the state's receiving waters, nor are they based on achievable BMP performance. Putting in limits simply to have limits is not protective of water quality. We are also very concerned about the post-construction stormwater section of the draft permit as written. Using the "pre-project" condition as opposed to the pre-development condition to calculate the water volume to be retained onsite is not protective of water quality. These issues and other concerns and comments are discussed in greater detail below.

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I. Numeric Effluent Limits and Numeric Action Levels

A. The turbidity NEL/NAL is set far too high to be protective of receiving waters and will not promote the use of effective BMPs.

The backstop in this NAL permitting scheme is the enforceable NEL; however, the turbidity NEL is not set to be protective of receiving water quality. As presented at the June 4, 2008 hearing, nearly all of the state's streams, creeks, and lakes have turbidity levels much lower than 500 NTUs, more typically around 20 NTU. Discharges with levels of turbidity orders of magnitude above the quality of the receiving water will likely cause harmful impacts to aquatic life and habitat. Heal the Bay's Stream Team has monitored the Malibu Creek watershed for a decade and we have documented numerous circumstances where hillside development and development with inadequate BMPs have caused devastating sedimentation and erosion impacts to the watershed resulting in loss of stream banks and smothering of riparian habitat. In fact, the watershed was added to the 303(d) list of impaired waters for the state because of sedimentation impacts on riparian habitat. The Stream Team rarely finds creek turbidity levels above 10 NTUs, and there's no question that turbidity levels in the hundreds of NTUs, let alone the preposterous level of 500 NTUs, would cause devastating impacts to the Malibu Creek watershed and smother the cobble habitat so critical for endangered Southern steelhead population success. A discharge with NTUs readings in the hundreds will cause significant impact to these streams and others throughout the state.

Moreover, there is ample data available that shows that common BMPs can easily achieve turbidity levels much lower than 500 NTUs. As several presenters noted during the June 4, 2008 hearing in Sacramento, there are many technologies available that can ensure turbidity levels in discharges at or below 20 NTUs (or 10 NTUs as a daily flow-weighted average).

To put the NEL of 500 NTUs into some perspective, we used a recent Geosyntec analysis of the ASCE/EPA stormwater BMP database of effluent quality.[1] (Summary tables are included as Exhibit 1). This analysis summarizes effluent total suspended solids (TSS) concentrations for various types of BMPs by percentile (of the number of BMPs tested) measured mg/l. To loosely compare these result to the proposed NEL, we used a rough rule-of-thumb conversion of 1.5 NTU for 1 mg/l of TSS[2]. Using this conservative conversion, we find that 95% of all the different types of BMPs tested achieved turbidity levels far below 500 NTUs. At the 50th percentile, the different BMPs achieved turbidity levels ranging from 43 NTUs (hydrodynamic devices) down to 7 NTUs (wetland basins). Obviously, some of these BMPs may not be appropriate for a construction site, however, the point of this comparison is to reinforce that the

[1] The Geosyntec study was an internally funded document on BMP performance. Heal the Bay's use of this information does not imply any agreement or disagreement by Geosyntec with the conclusions advanced by Heal the Bay.

[2] http://duluthstreams.org/understanding/param_turbidity.html. It is important to note that this conversion is only a rough estimate since turbidity measurement in NTUs is measuring the amount of scattered light from the solids present in the sample, while the total suspended solids in mg/l is a mass per volume measurement. The conversion we used of 1.5 NTU/1 mg/l of TSS is at the high end of the scale. If we used the 1:1 conversion, the achievable quality in NTUs would be even lower.

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NEL of 500 NTUs is far too high, and with reasonably simple BMPs, a much lower turbidity level is achievable.

We urge the State Board to set a NEL based on the performance of commonly-used sediment control BMPs. The Blue Ribbon panel, a panel of storm water experts convened by the State Board to examine the feasibility of developing numeric limits for storm water permits, reached a consensus that "active treatment technologies make Numeric Limits technically feasible for pollutants commonly associated with stormwater discharges from construction sites (i.e. TSS and turbidity) for larger construction sites."[3] The draft permit somewhat reflects this finding by including a NEL of 20 NTU for any single sample at sites employing an Active Treatment System. (Of note, we believe that setting a much lower NEL for a certain BMP will dissuade dischargers from using this BMP.) Dr. Richard Horner's letter to the State Board dated May 4, 2007 summarizes studies that could be used to develop NELs based on best conventional technology (BCT) for turbidity from construction sites. His summary indicates that blanket products and mulch can achieve effluent turbidity levels much lower than 500 NTU. Dr. Horner, a nationally renowned stormwater engineering expert, states his own research shows that blanket materials and mulch greatly reduce influent turbidity and achieve effluent turbidity with mean and maximum turbidity levels of 21 and of 73 NTUs, respectively. Dr. Horner also states that studies completed by Caltrans and the Texas Transportation Institute can be used to evaluate BCT and set a NEL based on this evaluation. Thus, we urge the State Board to set a performance-based turbidity based on existing studies on BMP effluent quality. At a minimum, the State Board should set a NEL that is no greater than 73 NTUs.

B. The range of the pH NELs is too great.

The pH NEL is also set inappropriately. The range of 6.0 to 9.0 for pH is too great, and again, is not set to be protective of receiving waters. As written, the Permit further weakens the NEL for pH by applying this limit only to those project phases defined by the State Board where there is a "high risk of pH discharge". The State Board should not weaken requirements just because the risk may be somewhat lowered during certain phases of a project. We urge the board to revise the NEL pH range to 6.5 – 8.5, which is consistent with Regional Basins Plans such as Regions II and IV, and to require that this NEL be met during all phases of a construction project.

C. NELs should apply to Risk 2 and Risk 3 sites, at a minimum.

The Draft Permit only requires enforceable action once the NEL for turbidity or pH is exceeded, and these numeric effluent limits are only applicable to Risk 3 sites. It is arbitrary to exempt Risk Level 2 and Risk Level 1 dischargers from the NELs in the Draft Permit. While a Risk Level 1 or 2 discharger may present less risk to receiving waters, it does not present zero risk. Whether there is a relative, self-identified risk of discharge is irrelevant to the question of the appropriate effluent limitation for a pollutant. If the NEL for turbidity or pH is appropriate when

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[3] The Feasibility of Number Effluent Limits Applicable to Discharges of Storm Water Associated with Municipal, Industrial and Construction Activities, Storm Water Panel Recommendations to the California State Water Resources control Board, June 19, 2006, page 15.

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there is a high risk of turbidity or pH discharge, then the same NEL should apply when there is a medium or low risk of discharge. Thus, State Board staff should revise the draft permit to apply NELs to Risk 2 and 3 sites at a minimum.

D. The State Board should require follow-up for NAL exceedances.

To reduce stormwater pollution the NAL strategy relies exclusively on dischargers taking appropriate action when the NAL is exceeded. However, the permit includes no specific enforcement mechanism to ensure this follow-up occurs. In fact, as currently drafted, the permit requires an "evaluation" of the site's conditions in which the discharger can determine no action is needed[4]. Since the exceedance would be measured in the effluent discharged from the site, it is difficult to understand what sources other than activity from the site could cause the NAL exceedance. (Run-on could be a source, but the permit requires dischargers to manage run-on[5].) So, if a NAL is exceeded, the obvious conclusion is that BMPs at the site are not sufficient, and immediate action should clearly be required by the permit. As the permit is drafted, there appears to be no incentive for dischargers to do anything other than paperwork when an NAL is exceeded. The only way to make this NAL feedback loop effective is if the regional boards are prepared to develop a prompt and comprehensive program to follow-up reported NAL exceedances with site inspections.

E. If the NAL/ NEL system is maintained in the permit, dischargers should be required to report NAL violations within 2 days (just like NEL violations).

The purpose of the NAL scheme is to provide feedback to the discharger that will result in action to reduce pollution from the site[6], thus it is imperative that quick action is taken if a NAL is violated. This is particularly important during the raining season, when multiple storm events can occur or rain occurs on consecutive days. Clearly, to allow the discharger 10 days just to report the NAL exceedance does not provide any incentive for the discharger to quickly implement corrective action. Instead, NAL exceedances must be elevated to a similar level of concern as a NEL violation; otherwise, there is little motivation for the discharger to promptly improve BMP implementation and performance. Since there measurements are typically taken with in-the-field equipment, reporting within two days is possible. Thus, NAL violations should be reported to the Regional Board within 2 days.

II. <u>Post- Construction Requirements</u>

A. The Post-Construction Requirements should be strengthened to ensure that receiving waters are adequately protected.

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[4] Draft Permit at 30.
[5] Id.
[6] Id.

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The draft permit includes a post-construction requirement that calls for all construction sites to match pre-project hydrology. The draft permit states that the "'runoff reduction' approach is analogous in principle to Low Impact Development (LID) and will serve to protect related watersheds and waterbodies from both hydrologic-based and pollution impacts associated with the post-construction landscape."[7] While we commend the State Board for including post-construction requirements, we believe that the drafted requirements are seriously flawed.

First, the draft permit calls for the discharger to "...replicate the *pre-project* water balance (for this permit, defined as the volume of rainfall that ends up as runoff) for the smallest storms up to the 85th percentile storm event...."[8] Using the pre-project conditions in this calculation is extremely problematic and is contrary to all of the LID work that is progressing around the state. The pre-project calculation will often not capture the true runoff volume resulting from development. For example, the pre-project condition could be completely built-out already. In this scenario under the draft permit as written, the new development project regulated by the permit would likely not need to infiltrate or capture any runoff. Thus, the requirements are not protective of water quality. Instead, the State Board should look towards the difference in the undeveloped condition and the post-construction condition when calculating the water balance. This is the same concept that has been used in MS4 permits and local ordinances such as the Ventura County MS4, North Orange County MS4, and the Los Angeles County LID Ordinance.

The draft permit appropriately calls for nonstructural practices to be prioritized over structural practices. The permit states that "[v]olume that cannot be addressed using nonstructural practices shall be captured in structural practices and approved by the Regional Water Board."[9] The State Board should specify that the captured water will be slated for reuse. As currently written, the discharger could simply capture and release, thereby not significantly reducing pollutant loads to receiving waters. In addition, the State Board should require that the infeasibility of using a non-structural device be demonstrated before a structural device is substituted. The State Board should add clarifying language to this section.

Also, the draft permit states that "[a]ll dischargers shall comply with the following runoff reduction requirements unless they are located within an area subject to postconstruction standards of an active Phase I or II municipal separate storm sewer system (MS4) permit that has an approved Storm Water Management Plan."[10] This is inappropriate as some MS4 permits may have weaker post-construction requirements than the draft permit. Instead, where a potential conflict arises, the State Board must require the discharger to comply with the more stringent (*i.e.*, more protective of water quality) provisions.

Finally, the post-construction requirements call for the discharger to preserve the "pre-construction drainage density" which is defined as the miles of stream length per square mile of drainage area. The State Board must clarify how this requirement is to be implemented. The

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[7] Draft Permit at 12.
[8] Draft Permit at 35. Emphasis added.
[9] Id.
[10] Id.

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stream length should be constant, so it is unclear what the State Board is intending and how this will be implemented.

B. Performance-based criteria should be utilized for post-construction BMP selection.

The post-construction standards section requires that dischargers implement BMPs to reduce storm water pollution after the project is completed. We support this requirement; however, the State Board should link this to performance-based criteria. One of the most effective ways to ensure the success of stormwater programs and the attainment of water quality standards is to require performance-based criteria. Flow-based design criteria are simply not adequate to ensure that water quality standards are consistently met because flow, and corresponding BMP size, is but one factor determining BMP effectiveness. The Board must include scientifically supported, performance-based design criteria in the Permit to move the Region more quickly toward attaining water quality standards for receiving waters. The recent Geosyntec analysis of the ASCE/EPA stormwater BMP database (summary tables are attached) paves the way for the development of scientifically sound water quality performance criteria. This analysis contains effluent concentration percentiles for certain parameters and BMPs. The Board should require that BMPs installed at construction sites perform as well or better than 75% of the BMPs in the ASCE/EPA database for 303(d) listed waters. The Board should require that BMPs in sub-watersheds that have no demonstrated water quality impairments (i.e., not on the 303(d) list as impaired) or that are not on the list of SUSMP development categories meet *at least* the 50th percentile performance (median) for the term of this permit. Although, some of the BMPs in the analysis may not be appropriate for a construction site, no discharger can reasonably refute that it should have to meet median performance criteria. Obviously, this proposal concentrates on performance and should be accompanied by a design storm component as well.

III. <u>Monitoring and Reporting</u>

A. The general permit should include receiving water sampling for all risk levels, as this is the only measure of the permit's effectiveness.

The draft permit requires receiving water monitoring for only those Risk 3 sites that have an exceedance of an NEL. Of note, there is no requirement for Risk 3 sites to collect receiving water samples if an NAL is exceeded. Receiving water monitoring is the only true measure of the permit's effectiveness and thus should be monitored regularly for all sites. The calculated risk levels are all relative so Risk 1 and Risk 2 sites also have risk of impacting receiving waters. Clearly, given the fact that the permit does not contain protective numeric limits, it is imperative that receiving waters for all construction sites are monitored to ensure that pollutant discharges are not resulting in, or contributing to, exceedances of water quality standards. We recommend that receiving water monitoring be required on a regular basis at all Risk level 2 and 3 sites, regardless of a noted effluent exceedance. At a minimum, receiving water monitoring should be conducted at all sites, regardless of risk level, if a NAL is exceeded. In addition, we recommend that the list of constituents monitored be expanded to include TSS and metals.

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B. The general permit should include bioassessment monitoring for all Risk 3 sites.

Bioassessment monitoring is critical to determine if there has been degradation to the receiving water's biota due to construction activities. However, the draft permit requires bioassessment monitoring at far too few sites. Bioassessment monitoring is only required at Risk Level 3 sites that have a greater than 30 acres of ground disturbance and discharge to a stream that is listed as impaired due to sediment, and/or is tributary to any downstream water that is impaired and/or has the beneficial use SPAWN & COLD & MIGRATORY. In other words, many high risk sites will not be required to do bioassessment monitoring. This is inappropriate, as much smaller sites have the potential to impact stream biota. Instead, we recommend that the State Board at a minimum require bioassessment monitoring for *all* Risk 3 sites, as was the case in the last iteration of the draft permit.

C. The permit should require Regional Board approval of submitted plans prior to the permittee receiving coverage under the permit.

Again, since the permit does not have protective numeric limits, review of the SWPPPs and other required documents is critical to the success of this permit. No coverage should be granted until all required documents have been reviewed and approved by regional board staff. With the proposed permit, we have not come far from this problem of self-regulating because dischargers calculated their own site risk category, and the permit requires no check or review of these calculations by the regional boards. Thus, the Regional Board should at a minimum confirm that SWPPPs are complete and appropriate.

Polluted runoff continues to be the largest source of pollution to California's receiving waters. The lack of success of the state's polluted runoff abatement programs has been well documented, and implementation of the current General Construction Permit has not resulted in the elimination of construction caused runoff pollution problems. Although board staff has spent considerable time and effort in developing a new regulatory scheme to reduce construction site runoff, the draft permit has many noticeable pitfalls as discussed above. *Although we have numerous concerns with the draft permit, at a minimum, two critical areas of the draft permit must be modified: set performance based NELs that are protective of receiving waters and require runoff reductions equivalent to flows from pre-development conditions for the post-construction requirements.*

If you have any questions, please contact us at 310-451-1500.

Sincerely,

Kirsten James
Water Quality Director

Mark Gold, D. Env
President

Effluent Statistics					Effluent Percentiles						
BMPID	Parameter	Count	NDCount	%ND	5th	10th	25th	50th	75th	90th	95th
Detention Basins	Cadmium, Dissolved (ug/L as Cd)	75	43	57%	0.012	0.020	0.050	0.144	0.566	1.830	2.167
Detention Basins	Cadmium,Total (ug/L as Cd)	97	29	30%	0.083	0.110	0.248	0.568	1.313	2.359	3.145
Detention Basins	Copper, Dissolved (ug/L as Cu)	152	0	0%	1.947	2.526	4.864	8.117	13.727	24.263	28.125
Detention Basins	Copper, Total (ug/L as Cu)	184	14	8%	2.870	3.697	7.180	13.016	21.922	32.357	42.223
Detention Basins	Lead, Dissolved (ug/L as Pb)	111	52	47%	0.061	0.093	0.185	1.031	3.353	5.731	7.519
Detention Basins	Lead, Total (ug/L as Pb)	146	18	12%	0.837	1.639	4.902	12.725	28.191	52.553	97.903
Detention Basins	Nitrate + Nitrite, Total (mg/L as N)	27	18	67%	0.002	0.003	0.010	0.048	0.142	0.575	1.020
Detention Basins	Nitrate Nitrogen, Total (mg/L as N)	103	10	10%	0.133	0.174	0.270	0.578	0.918	1.684	2.150
Detention Basins	Nitrogen, Ammonia Total (mg/L as N)	13	3	23%	0.016	0.019	0.029	0.048	0.098	0.208	0.289
Detention Basins	Nitrogen, Kjeldahl, Total (mg/L as N)	97	14	14%	0.436	0.542	0.781	1.242	1.951	3.162	3.918
Detention Basins	Nitrogen, Total (mg/L as N)	12	0	0%	0.528	0.575	0.775	1.272	2.431	3.856	4.495
Detention Basins	Phosphorous, Dissolved (mg/L as P)	49	12	24%	0.028	0.035	0.049	0.085	0.143	0.251	0.329
Detention Basins	Phosphorous, Total (mg/L as P)	174	20	11%	0.014	0.019	0.037	0.108	0.283	0.460	0.670
Detention Basins	Solids, Total Dissolved (mg/L)	81	1	1%	9.083	19.536	45.677	73.510	111.402	233.722	379.539
Detention Basins	Solids, Total Suspended (mg/L)	177	8	5%	2.114	3.043	9.192	21.958	43.145	76.742	117.692
Detention Basins	Zinc, Dissolved (ug/L as Zn)	153	1	1%	3.585	7.232	20.610	34.267	60.530	101.297	146.808
Detention Basins	Zinc, Total (ug/L as Zn)	207	2	1%	12.097	17.843	34.930	60.976	105.574	197.697	263.675
Biofilters	Cadmium, Dissolved (ug/L as Cd)	342	66	19%	0.079	0.096	0.199	0.200	0.200	0.303	0.464
Biofilters	Cadmium,Total (ug/L as Cd)	361	49	14%	0.081	0.149	0.200	0.206	0.424	0.840	1.258
Biofilters	Copper, Dissolved (ug/L as Cu)	399	4	1%	1.046	1.530	2.939	5.868	11.064	17.656	22.703
Biofilters	Copper, Total (ug/L as Cu)	468	9	2%	1.787	2.656	4.273	7.984	17.241	32.435	44.607
Biofilters	Lead, Dissolved (ug/L as Pb)	368	26	7%	0.293	0.471	1.000	1.000	2.959	6.677	11.700
Biofilters	Lead, Total (ug/L as Pb)	483	50	10%	0.824	1.000	1.345	4.157	14.028	43.513	66.517
Biofilters	Nitrate + Nitrite, Total (mg/L as N)	27	0	0%	0.138	0.174	0.311	0.611	0.955	1.641	2.215
Biofilters	Nitrate Nitrogen, Total (mg/L as N)	476	12	3%	0.052	0.095	0.165	0.375	0.748	1.601	2.486
Biofilters	Nitrogen, Ammonia Total (mg/L as N)	14	4	29%	0.007	0.009	0.017	0.031	0.066	0.142	0.173
Biofilters	Nitrogen, Kjeldahl, Total (mg/L as N)	395	4	1%	0.469	0.633	0.894	1.342	2.138	3.600	6.378
Biofilters	Nitrogen, Total (mg/L as N)	96	0	0%	0.128	0.205	0.396	0.643	1.560	2.329	2.855
Biofilters	Phosphorous, Dissolved (mg/L as P)	38	0	0%	0.136	0.151	0.197	0.283	0.483	1.039	1.417
Biofilters	Phosphorous, Total (mg/L as P)	539	8	1%	0.042	0.056	0.114	0.240	0.451	0.815	1.167
Biofilters	Solids, Total Dissolved (mg/L)	357	1	0%	11.444	23.210	46.397	76.845	114.831	164.080	201.933
Biofilters	Solids, Total Suspended (mg/L)	467	7	1%	1.255	3.043	8.371	20.027	49.854	115.978	233.464
Biofilters	Zinc, Dissolved (ug/L as Zn)	399	4	1%	5.000	5.000	8.732	19.485	35.696	52.821	71.794
Biofilters	Zinc, Total (ug/L as Zn)	533	51	10%	4.479	6.395	14.164	30.256	67.208	119.646	181.275

Effluent Statistics											
					Effluent Percentiles						
BMPID	Parameter	Count	NDCount	%ND	5th	10th	25th	50th	75th	90th	95th
Hydrodynamic Devices	Cadmium, Dissolved (ug/L as Cd)	79	32	41%	0.011	0.017	0.042	0.199	0.785	1.793	2.239
Hydrodynamic Devices	Cadmium,Total (ug/L as Cd)	88	25	28%	0.024	0.038	0.102	0.382	1.261	3.035	5.047
Hydrodynamic Devices	Copper, Dissolved (ug/L as Cu)	89	15	17%	1.074	1.409	2.961	9.580	16.630	31.985	41.695
Hydrodynamic Devices	Copper, Total (ug/L as Cu)	99	0	0%	2.791	3.340	7.462	15.409	21.659	32.301	38.550
Hydrodynamic Devices	Lead, Dissolved (ug/L as Pb)	89	35	39%	0.123	0.201	0.434	1.184	3.769	7.376	8.733
Hydrodynamic Devices	Lead, Total (ug/L as Pb)	95	8	8%	0.887	1.351	2.691	6.297	13.428	23.845	42.576
Hydrodynamic Devices	Nitrate + Nitrite, Total (mg/L as N)	42	13	31%	0.062	0.078	0.117	0.226	0.359	0.506	0.707
Hydrodynamic Devices	Nitrate Nitrogen, Total (mg/L as N)	59	2	3%	0.073	0.098	0.152	0.306	0.680	1.299	2.120
Hydrodynamic Devices	Nitrogen, Ammonia Total (mg/L as N)	69	19	28%	0.009	0.014	0.041	0.090	0.313	0.814	1.103
Hydrodynamic Devices	Nitrogen, Kjeldahl, Total (mg/L as N)	77	4	5%	0.224	0.351	0.566	1.086	1.830	3.576	5.984
Hydrodynamic Devices	Nitrogen, Total (mg/L as N)	13	0	0%	0.902	0.988	1.335	2.101	3.633	5.233	5.939
Hydrodynamic Devices	Phosphorous, Dissolved (mg/L as P)	58	19	33%	0.000	0.001	0.002	0.019	0.088	0.172	0.253
Hydrodynamic Devices	Phosphorous, Total (mg/L as P)	170	5	3%	0.011	0.023	0.067	0.148	0.270	0.926	2.612
Hydrodynamic Devices	Solids, Total Dissolved (mg/L)	198	6	3%	3.905	6.206	19.175	60.768	422.937	7951.478	22415.772
Hydrodynamic Devices	Solids, Total Suspended (mg/L)	199	14	7%	2.977	5.543	17.995	43.173	99.360	190.249	303.150
Hydrodynamic Devices	Zinc, Dissolved (ug/L as Zn)	99	18	18%	3.357	5.113	12.784	34.762	76.530	156.734	334.604
Hydrodynamic Devices	Zinc, Total (ug/L as Zn)	174	13	7%	11.341	17.793	37.092	69.089	124.178	201.430	291.030
Media Filters	Cadmium, Dissolved (ug/L as Cd)	111	74	67%	0.009	0.014	0.033	0.097	0.290	0.680	1.261
Media Filters	Cadmium,Total (ug/L as Cd)	139	80	58%	0.035	0.053	0.109	0.257	0.764	1.401	1.778
Media Filters	Copper, Dissolved (ug/L as Cu)	258	7	3%	1.344	1.971	4.050	7.064	13.178	23.449	29.351
Media Filters	Copper, Total (ug/L as Cu)	294	19	6%	1.881	2.692	5.569	9.795	19.043	35.176	54.304
Media Filters	Lead, Dissolved (ug/L as Pb)	227	117	52%	0.055	0.088	0.195	0.550	1.641	3.681	5.916
Media Filters	Lead, Total (ug/L as Pb)	251	44	18%	0.426	0.609	1.397	4.376	13.378	23.679	39.362
Media Filters	Nitrate + Nitrite, Total (mg/L as N)	35	11	31%	0.170	0.213	0.301	0.951	1.763	2.859	3.926
Media Filters	Nitrate Nitrogen, Total (mg/L as N)	232	16	7%	0.181	0.253	0.424	0.690	1.151	2.029	2.643
Media Filters	Nitrogen, Ammonia Total (mg/L as N)	38	19	50%	0.003	0.006	0.022	0.102	0.728	1.919	2.931
Media Filters	Nitrogen, Kjeldahl, Total (mg/L as N)	229	12	5%	0.352	0.464	0.855	1.491	2.303	3.779	6.796
Media Filters	Nitrogen, Total (mg/L as N)	20	0	0%	1.921	2.077	2.530	3.472	4.695	6.024	6.682
Media Filters	Phosphorous, Dissolved (mg/L as P)	90	21	23%	0.019	0.025	0.038	0.085	0.142	0.238	0.407
Media Filters	Phosphorous, Total (mg/L as P)	280	25	9%	0.018	0.040	0.075	0.129	0.230	0.394	0.566
Media Filters	Solids, Total Dissolved (mg/L)	114	0	0%	12.216	24.105	41.104	56.574	85.506	137.169	230.416
Media Filters	Solids, Total Suspended (mg/L)	358	15	4%	1.317	2.762	6.321	14.784	37.784	87.741	148.957
Media Filters	Zinc, Dissolved (ug/L as Zn)	254	15	6%	3.212	5.915	14.843	30.677	76.394	143.497	266.374
Media Filters	Zinc, Total (ug/L as Zn)	383	19	5%	2.596	4.680	14.669	35.580	103.083	281.505	436.429

Effluent Statistics					Effluent Percentiles						
BMPID	Parameter	Count	NDCount	%ND	5th	10th	25th	50th	75th	90th	95th
Retention Ponds	Cadmium,Total (ug/L as Cd)	200	89	45%	0.003	0.007	0.043	0.145	0.527	7.252	9.983
Retention Ponds	Copper, Dissolved (ug/L as Cu)	182	5	3%	1.744	2.473	3.224	4.358	5.976	9.829	12.865
Retention Ponds	Copper, Total (ug/L as Cu)	327	10	3%	1.122	1.891	3.140	5.367	8.958	28.112	49.725
Retention Ponds	Lead, Dissolved (ug/L as Pb)	153	53	35%	0.174	0.310	0.821	2.848	9.059	29.422	35.410
Retention Ponds	Lead, Total (ug/L as Pb)	404	78	19%	0.256	0.466	1.007	3.386	15.793	36.788	64.062
Retention Ponds	Nitrate + Nitrite, Total (mg/L as N)	247	18	7%	0.004	0.005	0.012	0.038	0.173	0.371	0.546
Retention Ponds	Nitrate Nitrogen, Total (mg/L as N)	142	2	1%	0.040	0.066	0.114	0.310	0.632	1.150	1.408
Retention Ponds	Nitrogen, Ammonia Total (mg/L as N)	265	21	8%	0.011	0.016	0.027	0.056	0.127	0.238	0.314
Retention Ponds	Nitrogen, Kjeldahl, Total (mg/L as N)	244	9	4%	0.463	0.577	0.772	1.043	1.571	2.258	3.202
Retention Ponds	Nitrogen, Total (mg/L as N)	239	0	0%	0.537	0.631	0.867	1.278	1.776	2.410	2.907
Retention Ponds	Phosphorous, Dissolved (mg/L as P)	204	5	2%	0.019	0.021	0.039	0.062	0.116	0.206	0.253
Retention Ponds	Phosphorous, Total (mg/L as P)	486	14	3%	0.018	0.035	0.063	0.142	0.283	0.714	1.198
Retention Ponds	Solids, Total Dissolved (mg/L)	79	0	0%	27.590	56.563	129.402	390.152	633.739	1389.317	1779.409
Retention Ponds	Solids, Total Suspended (mg/L)	469	3	1%	0.559	1.197	4.281	11.612	28.307	66.130	110.111
Retention Ponds	Zinc, Dissolved (ug/L as Zn)	158	6	4%	1.002	1.199	2.482	9.770	28.517	47.281	75.918
Retention Ponds	Zinc, Total (ug/L as Zn)	423	52	12%	1.426	2.172	7.183	19.601	37.214	70.121	121.125
Wetland Basins	Cadmium, Dissolved (ug/L as Cd)	7	4	57%	2.726	4.014	9.874	28.487	61.896	85.135	92.601
Wetland Basins	Cadmium,Total (ug/L as Cd)	50	1	2%	0.090	0.100	0.100	0.164	1.145	5.736	9.569
Wetland Basins	Copper, Dissolved (ug/L as Cu)	7	0	0%	4.772	4.956	5.538	6.522	7.389	7.724	7.793
Wetland Basins	Copper, Total (ug/L as Cu)	80	0	0%	1.087	1.578	2.257	3.091	5.404	8.409	10.310
Wetland Basins	Lead, Dissolved (ug/L as Pb)	11	1	9%	0.354	0.391	0.524	0.793	1.070	1.385	1.582
Wetland Basins	Lead, Total (ug/L as Pb)	91	0	0%	0.231	0.377	0.830	1.066	2.351	4.940	6.356
Wetland Basins	Nitrate + Nitrite, Total (mg/L as N)	144	0	0%	0.006	0.008	0.015	0.043	0.178	0.468	0.791
Wetland Basins	Nitrate Nitrogen, Total (mg/L as N)	91	4	4%	0.015	0.040	0.111	0.207	0.410	0.798	1.064
Wetland Basins	Nitrogen, Ammonia Total (mg/L as N)	188	1	1%	0.006	0.009	0.019	0.041	0.118	0.278	0.401
Wetland Basins	Nitrogen, Kjeldahl, Total (mg/L as N)	146	0	0%	0.640	0.717	0.888	1.146	1.376	1.691	2.073
Wetland Basins	Nitrogen, Total (mg/L as N)	201	0	0%	0.558	0.741	0.922	1.278	1.783	2.670	3.976
Wetland Basins	Phosphorous, Dissolved (mg/L as P)	114	0	0%	0.007	0.010	0.024	0.053	0.178	0.356	0.444
Wetland Basins	Phosphorous, Total (mg/L as P)	220	1	0%	0.014	0.024	0.040	0.070	0.183	0.405	0.522
Wetland Basins	Solids, Total Dissolved (mg/L)	25	0	0%	6.596	8.420	12.181	20.775	70.372	312.445	460.257
Wetland Basins	Solids, Total Suspended (mg/L)	211	0	0%	0.866	1.110	1.956	6.775	16.507	41.338	75.644
Wetland Basins	Zinc, Dissolved (ug/L as Zn)	7	0	0%	9.726	10.433	12.592	15.943	19.866	23.022	24.222
Wetland Basins	Zinc, Total (ug/L as Zn)	107	1	1%	8.342	9.903	12.884	19.005	40.343	124.055	227.030

Effluent Statistics					Effluent Percentiles						
BMPID	Parameter	Count	NDCount	%ND	5th	10th	25th	50th	75th	90th	95th
Wetland Channel	Lead, Dissolved (ug/L as Pb)	11	0	0%	1.425	1.674	2.751	5.129	15.298	41.726	61.601
Wetland Channel	Lead, Total (ug/L as Pb)	41	0	0%	1.008	1.079	2.308	5.387	13.481	41.883	112.900
Wetland Channel	Nitrate Nitrogen, Total (mg/L as N)	41	0	0%	0.056	0.081	0.122	0.235	0.458	0.841	1.544
Wetland Channel	Nitrogen, Ammonia Total (mg/L as N)	10	0	0%	0.030	0.036	0.062	0.132	0.338	0.810	1.087
Wetland Channel	Nitrogen, Kjeldahl, Total (mg/L as N)	33	0	0%	0.657	0.717	0.868	1.285	1.576	1.926	2.198
Wetland Channel	Nitrogen, Total (mg/L as N)	42	0	0%	0.729	0.851	1.033	1.491	1.949	3.650	9.669
Wetland Channel	Phosphorous, Dissolved (mg/L as P)	41	0	0%	0.039	0.045	0.059	0.080	0.136	0.188	0.226
Wetland Channel	Phosphorous, Total (mg/L as P)	43	0	0%	0.073	0.083	0.118	0.190	0.315	0.502	0.997
Wetland Channel	Solids, Total Dissolved (mg/L)	9	0	0%	80.579	89.337	116.846	250.169	890.815	1588.032	1806.235
Wetland Channel	Solids, Total Suspended (mg/L)	41	0	0%	3.126	4.359	8.931	19.119	75.927	322.275	992.616
Wetland Channel	Zinc, Dissolved (ug/L as Zn)	9	0	0%	6.392	7.679	10.642	22.766	105.009	236.595	291.699
Wetland Channel	Zinc, Total (ug/L as Zn)	9	0	0%	20.242	22.827	30.856	54.025	207.935	545.748	713.850