BALLONA FRESHWATER WETLANDS

Annual Report of Monitoring, Operation, and Maintenance

October 1, 2010 – September 30, 2011

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SUMMARY

This report is the third of five annual reports that are required to describe monitoring results for the entire 51.1–acre Ballona Freshwater Wetland System ("System"). This System has two components: a 26.1-acre Freshwater Marsh ("Marsh") and a 25-acre Riparian Corridor ("Corridor"). Previous reports (2003-2008) discussed monitoring results as each phase of the System was completed. Construction of 23.8 acres of the Marsh was completed in February, 2003. Construction of the Corridor was completed in 2007. Construction of the remaining 2.3 acres of the Marsh and hydrologic connection of the Marsh to the Corridor under Lincoln Boulevard were completed in 2008. At that point, the entire Ballona Freshwater Wetland System was fully connected and monitoring of all parameters (biology, water quality, sediment quality) for the entire System began in 2009. The first and second monitoring reports for the entire System were submitted in 2009 and 2010, respectively.

The activities described in this report are conducted in compliance with conditions specified in Permit No. 90-426-EV from the U.S. Army Corps of Engineers ("USACE") under Section 404 of the federal Clean Water Act, Coastal Development Permit No. 5-91-463 from the California Coastal Commission ("CCC") under the California Coastal Act, a Water Quality Certification (File No. T576) from the State Water Resources Control Board ("SWRCB") under Section 401 of the federal Clean Water Act, and Streambed Alteration Agreement No. 5-639-93 from the California Department of Fish and Game ("CDFG") under Sections 1600, *et seq*., of the Fish and Game Code. All of the permits incorporate, by reference, the Habitat Mitigation and Monitoring Plan ("HMMP") for the Ballona Freshwater Wetland System.

Comparison of biological performance criteria specified in the HMMP to progress of the Freshwater Wetland System shows that the entire system has exceeded the 5-year and final (10+ years) criteria for bird diversity, with a total of 32 breeding species recorded in 2011. As in 2010, breeding bird species in 2011 included a Federal/State listed endangered species, least Bell's vireo. This species nested in the western third of the Corridor.

As in previous years, water and sediment monitoring data collected in 2011 indicate the Marsh continues to function successfully as a treatment system. Across all parameters, water quality and sediment quality data did not show trends of accumulation or build-up that would signal the need for sediment removal or pose a potential threat to aquatic life.

Collectively, monitoring results indicate the Marsh and Corridor continue to provide a functioning freshwater wetland ecosystem that plays a significant role in increasing biodiversity of the region and in enhancing quality of runoff into Ballona Creek and Santa Monica Bay.

1.0 INTRODUCTION

The 51.1–acre Ballona Freshwater Wetland System has two components: a 26.1-acre Freshwater Marsh ("Marsh") and a 25-acre Riparian Corridor ("Corridor"). Construction of 23.8 acres of the Marsh was initiated in November 2001 and completed in February 2003. The Corridor was completed in 2007. Construction of the remaining 2.3 acres of the Marsh and hydrologic connection of the Marsh to the Corridor under Lincoln Boulevard were completed in 2008. This is the third of five reports required by permitting agencies to address the entire Freshwater Wetlands System.

The activities described in this report are conducted in compliance with conditions specified in Permit No. 90-426-EV from the U.S. Army Corps of Engineers ("USACE") under Section 404 of the federal Clean Water Act, Coastal Development Permit No. 5-91-463 from the California Coastal Commission ("CCC") under the California Coastal Act, a Water Quality Certification (File No. T576) from the State Water Resources Control Board ("SWRCB") under Section 401 of the federal Clean Water Act, and Streambed Alteration Agreement No. 5-639-93 from the California Department of Fish and Game ("CDFG") under Sections 1600, *et seq*., of the Fish and Game Code.

In order to provide a comprehensive and unified approach to operation, maintenance, and monitoring of the 51.1-acre Ballona Freshwater Wetland System (System), conditions and specifications from all of the agency permits were compiled into a single Operations, Maintenance, and Monitoring Manual ("Manual"). The Manual serves as the basis for management of the System. This Manual was issued in October 2001. In addition to compiling all agency permit conditions, the Manual incorporates (by reference) the Habitat Mitigation and Monitoring Plan ("HMMP") and its appendices. Collectively, all of these documents and the permits provide the framework under which the System is operated, maintained, and monitored.

2.0 HABITAT

2.1 Operation and Maintenance

2.1.1 Tasks

Regular habitat maintenance tasks consist of the following:

- Removal of non-native vegetation;
- Control of aquatic vegetation to the extent necessary for maintaining water quality;
- Inspection and repair (as necessary) of the irrigation system;
- Adjustment of the outlet weir as necessary to manage water levels;
- Trash removal and cleaning of trash nets;
- Regular replacement of booms used to catch floating material, oil, and grease.

Other maintenance tasks which are specified in the Manual include mosquito abatement and non-native rodent control. Mosquito abatement is conducted by the Los Angeles County West Vector Control District. No non-native rodents or predators such as red fox were observed during this reporting period.

2.1.2 Status Summary

Weed Management. English plantain (*Plantago lanceolata*) and pampas grass (*Cortaderia selloana*) were the most persistent non-native plant species in 2011. As in previous years, weeds were removed manually and herbicide is avoided except where absolutely necessary in cases of persistent perennial weeds such as Bermuda grass (*Cynodon dactylon*), castor bean (*Ricinus communis*), and fennel (*Foeniculum vulgare*), which cannot be eradicated by any other means. No herbicide was applied where it might come in contact with or be washed into the aquatic environment of the Marsh.

Aquatic Vegetation Control. Growth of algae on the surface of open water was not significant in 2005-2011. Substantial growth of pondweed (*Potamogeton pectinatus*), a native aquatic plant with the appearance of a grass, appeared across the majority of shallow open water habitat of the Marsh during the warmer summer months of 2003 and 2004, but since then has not been abundant. Significant growth of water fern (*Azolla* cf. *filiculoides*) and duckweed (*Lemna* sp.) occurred across open water areas in the summers of 2009, 2010, and 2011. These species are native and did not cause any water or habitat quality problems.

Vector and Rodent Control. Mosquito fish are stocked by the Los Angeles County West Vector Control District. Rodents observed thus far include native squirrels and gophers. While some damage to planted vegetation from gophers has occurred over time since the Marsh was constructed, there are no plans to remove these species because they provide a natural food source for native predators such as hawks and gopher snakes, which have been observed on the site.

Irrigation and Water Level Management. The irrigation regime is focused on vegetation that is not yet using groundwater as a summer water source within the System. Emergent species such as cattails and bulrushes are not irrigated but are sustained by surface water within the System and natural rainfall. Water level management is discussed further in Section 3.

Trash Removal and Inlet Maintenance. Trash removal is an ongoing part of System maintenance. Trash nets were installed in November 2008 as part of Caltrans' improvement project for Lincoln Boulevard; they augment the trash racks that were installed with construction of the Marsh.

2.2 Monitoring

2.2.1 Summary of Permit Requirements

Table 2-1 summarizes the habitat parameters required by the permitting agencies to be monitored. The table shows that monitoring requirements for biological resources vary by agency. As in previous years, the methods described below combine all of the agency requirements into a single approach in which data collected from vegetation and bird surveys satisfies all requirements.

2.2.2 Methods

VEGETATION

Acreages of habitat types were updated in the field using aerial photographs taken in September of 2011. Classification of habitat types was based on classifications described in the HMMP and field observations.

The permit conditions, Manual, and HMMP specify a variety of approaches for collecting the vegetation transect data. These various approaches were combined into a single methodology that would provide sufficient data for evaluating performance. In addition to collection of transect data in May and September, the vegetation in the Marsh and Corridor was evaluated for overall health and to identify additional species that were not recorded in transects. Appendix A provides representative photographs from designated photo points.

BIRDS

Bird monitoring is conducted by professional ornithologists as well as volunteer experts. Monitoring parameters required by the permits and HMMP consist of an annual census of bird species that establish breeding territories and quarterly censuses of bird usage of the System by habitat type. Breeding bird censuses are required to be conducted at least once annually from the last week in March through the first week in June. The quarterly censuses of bird species by habitat type are required to be conducted in December, March, June, and September. Appendix B provides a complete list of all bird species observed as of September 30, 2011, and indicates those that established breeding territories.

Table 2-1. Summary of Monitoring Requirements for Biological Resources			
	Agency[1]		
	Notes: 1) SWRCB permit conditions focus on water quality only, so this agency is not listed here; 2) The permits incorporate the HMMP by reference. Monitoring requirements stated in this table reflect permit conditions. Additional requirements and performance standards are in the HMMP and discussed in Results.		
Parameter	**CCC**	**CDFG**	**CORPS**
Vegetation	Survey in May and September using transects 100 feet apart	Document survival, percent cover, and height of tree and shrub species	Progress toward documented structural complexity and habitat functional values, as compared to other existing freshwater wetland systems. Values will include species diversity, structural diversity, plant growth and reproduction, presence of indicator species representing diverse feeding guilds, and/or other appropriate objective criteria.
	Map communities during the Fall vegetation survey	Take photographs from designated points during late summer to early fall.	
	Evaluate progress toward goals		
Wildlife	Quarterly census of bird use by habitat	Document use by birds and wildlife consistent with methods and criteria in the HMMP, which include surveys of breeding birds in addition to quarterly censuses of habitat use.	
	Evaluate progress toward goals		

[1] SWRCB = State Water Resources Control Board; CCC = California Coastal Commission; CDFG = California Department of Fish and Game; CORPS = U.S. Army Corps of Engineers, Los Angeles District.

2.2.3 Results and Comparison to Performance Criteria

SUMMARY

As documented in the following sections, comparisons of the 2011 data to performance goals show that the Western Corridor met all 5-year performance goals for habitat. Riparian vegetation planted in the Western Corridor also provided habitat for the least Bell's vireo, a Federal and State listed endangered species that nested and fledged young for the first time in the recorded history of the Ballona Valley. The Marsh, Central Corridor, and Eastern Corridor met some but not all performance goals. These latter results are attributable to impacts of mosquito abatement and, for the Central Corridor, relative immaturity of the vegetation. One management task for 2011 will be to develop an approach for reducing impacts of the mosquito abatement activities, especially disturbance associated with trimming of emergent marsh vegetation.

VEGETATION

Figure 2-1 provides a wetland plant community map for the Marsh, as observed with an aerial photograph taken in September of 2001. Figures 2-2, 2-3, and 2-4 provide similar maps for the Corridor. Tables 2-2 and 2-3 summarize vegetation monitoring results for the Marsh and Corridor, respectively. The figures and tables are provided at the end of the text for this section. The Marsh and Corridor components of the wetlands system are discussed separately because they have slightly different performance goals defined in the HMMP.

<u>Freshwater Marsh</u>

The goal for average tree height, which is "trees mostly 9 to 20 feet tall", was attained well ahead of schedule beginning in 2006 for the cohort of trees that were planted at the time of the first phase of Marsh construction (23.8 acres), but inclusion of the newly planted 2.3 acres of the Marsh and seedlings from established plants reduced the average tree height for the entire Marsh. Presence of tree seedlings is a positive indicator of recruitment and long-term sustainability of the habitat, although there are no numeric goals for recruitment specified in the HMMP.

The Marsh met an additional three of the six "final" (post-Year 10) vegetation goals in 2011. These achieved goals consisted of target acreages for riparian and open water habitats, and no more than 10 percent cover of non-native plant species. With relatively high rainfall in 2010-2011 there was a slight trend upward in non-native species, which will be a management priority in 2012.

The two goals that have not yet been met, i.e. the goals of 7.2 acres of emergent marsh and 90 percent cover by native species, would likely be met if trimming of the Marsh vegetation was not required by the Los Angeles West Vector Control District for mosquito abatement. The thinning is expected to continue in the future.

<u>Corridor</u>

Figure 2-2, 2-3, and 2-4 show wetland plant community maps, respectively, for the Western Corridor, Central Corridor, and Eastern Corridor. Table 2-3 summarizes statistics for the vegetation in comparison to performance criteria. Data collected in the fall of each year are used and provide conservative estimates of vegetation cover.

The performance goals for target habitat acreages are defined for the Corridor as a whole rather than for individual phases. For the Corridor as a whole in 2011, the acreage goals for riparian and emergent marsh vegetation were met.

Performance goals for native and non-native plant cover, and for tree height, are specified for each of the three phases of the Corridor. Comparisons of 2011 data to these goals are as follows:

- The Western Corridor met all 5-year goals in 2010 and 2011, i.e., goals for native plant cover, minimal non-native vegetation cover, and tree height were all met.

- The Central Corridor met two of the three performance goals in 2011, i.e., goals for tree height and minimal cover of non-native plant species were met. The goal for native cover has not yet been met. There was an average of 78 percent cover of native vegetation in 2011 compared to the goal of 90 percent.

- The Eastern Corridor met two of the three performance goals in 2011, i.e., goals for tree height and minimal cover of non-native plant species were met. There was an average of 87.5 percent cover of native vegetation in 2011 compared to the goal of 90 percent.

BIRDS

Performance goals for bird species are divided into two categories: 1) habitat use; and 2) breeding species, defined as species that establish at least one breeding territory. Goals for breeding species are further divided by construction phase of the wetland system. Observations for 2011 are discussed in these categories below. Appendix B provides the current bird list for the wetland system.

Habitat Use

As of September 30, 2011, the cumulative list of native birds observed using the System since 2003 totaled 209 species (an increase of one over 2010). This number is more than twice the final (10+ years) success criterion for habitat use specified in the HMMP for the System as a whole.

Breeding Species – Whole Freshwater Wetland System

The System as a whole supported at least 32 breeding bird species in 2011, double the long term (10+ years) performance criterion of 16 breeding bird species and exceeding the number of 25 species recorded in 2010.

While there are no performance goals for special status species, the number of breeding bird species for 2011 included several species that are of Federal, State, or regional conservation concern as follows:

- Least Bell's Vireo (State and Federal listed Endangered) – breeding in the Western Corridor;
- Least Bittern (California State Species of Special Concern) – breeding and

foraging in the Marsh;

- Common Moorhen, Cinnamon Teal (regional species of conservation concern) – breeding and foraging in the Marsh;
- Virginia Rail (regional species of conservation concern) – observed in the central and east sections of the Corridor.

Breeding Species – By Phase of Wetland System Completion

Numbers of bird species that established territories in 2011 for each phase of the wetland system are listed below. The HMMP and permits do not have performance standards for later stages of breeding, such as nests or fledged young. However, such observations were documented where possible during the surveys and are listed in parentheses.

- Marsh: 23 (20)
- Western Corridor: 18 (15)
- Central Corridor: 12 (10)
- Eastern Corridor: 8 (8)

The above numbers show that all except the Eastern phase met the final (10.5-years) performance standard of 12 bird species that established at least one breeding territory. By any measure (either number of territories or observations of nests/young), all except the Eastern phase met the 5-year performance standard of at least 10 breeding species. The decline in number of breeding species in the Eastern phase, compared to 2010, appears to have been associated with dense growth of reedbeds, which is less favored by waterfowl such as mallard. Waterfowl were more abundant in the Western phase of the Corridor, which had more open water in 2011 compared to the other phases.

Figure 2-1. Wetland Plant Communities of the Freshwater Marsh, 2011

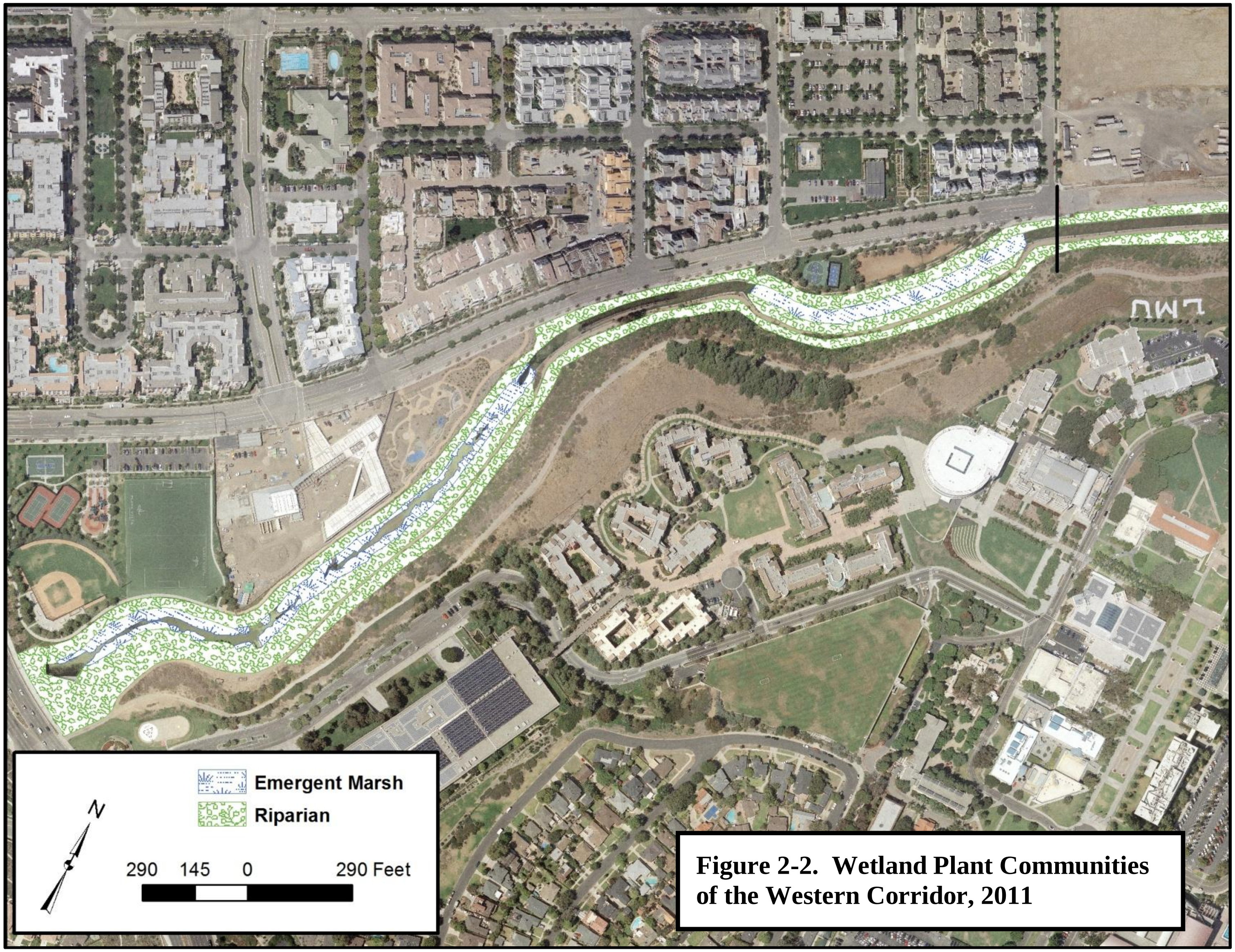


Figure 2-2. Wetland Plant Communities of the Western Corridor, 2011

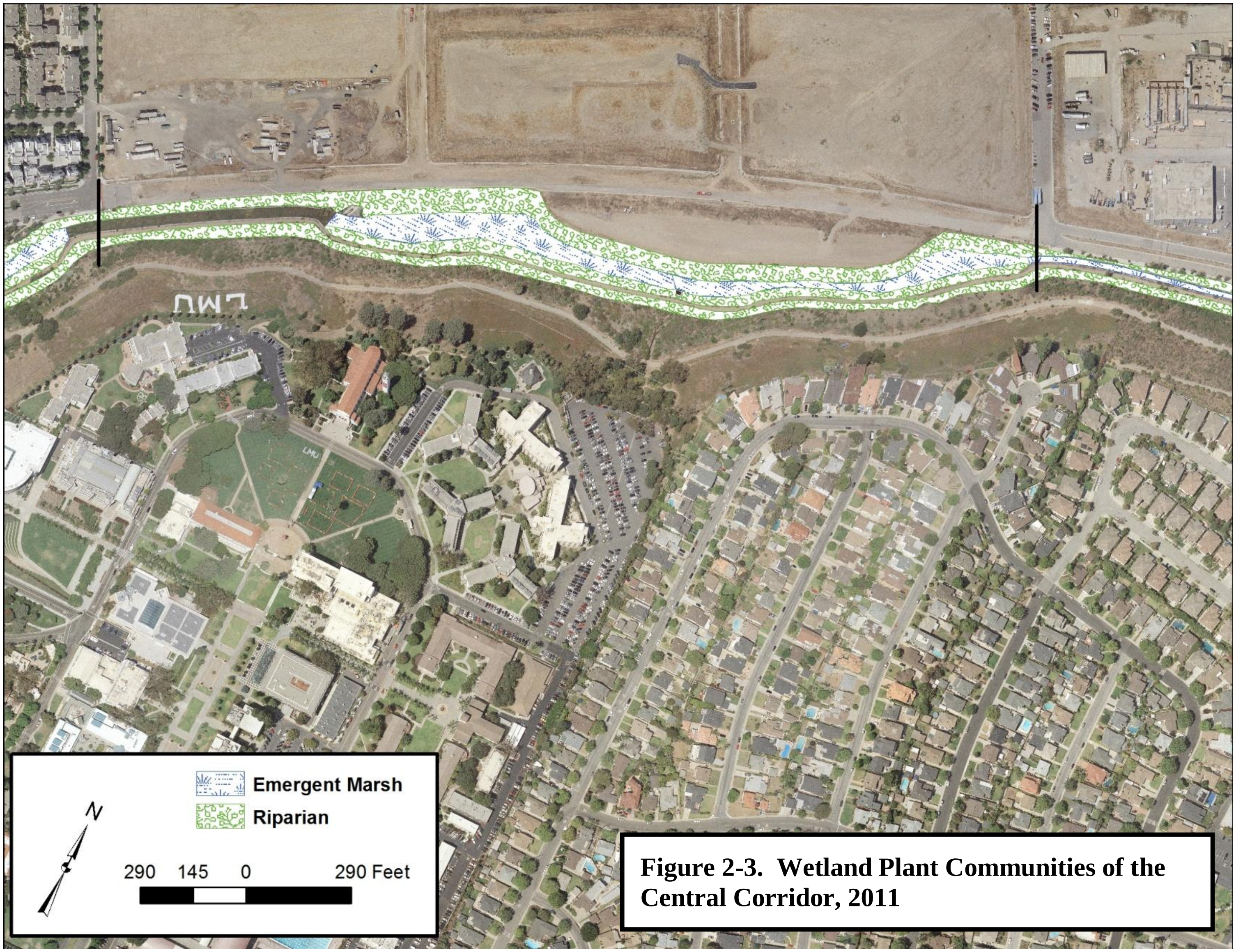


Figure 2-3. Wetland Plant Communities of the Central Corridor, 2011

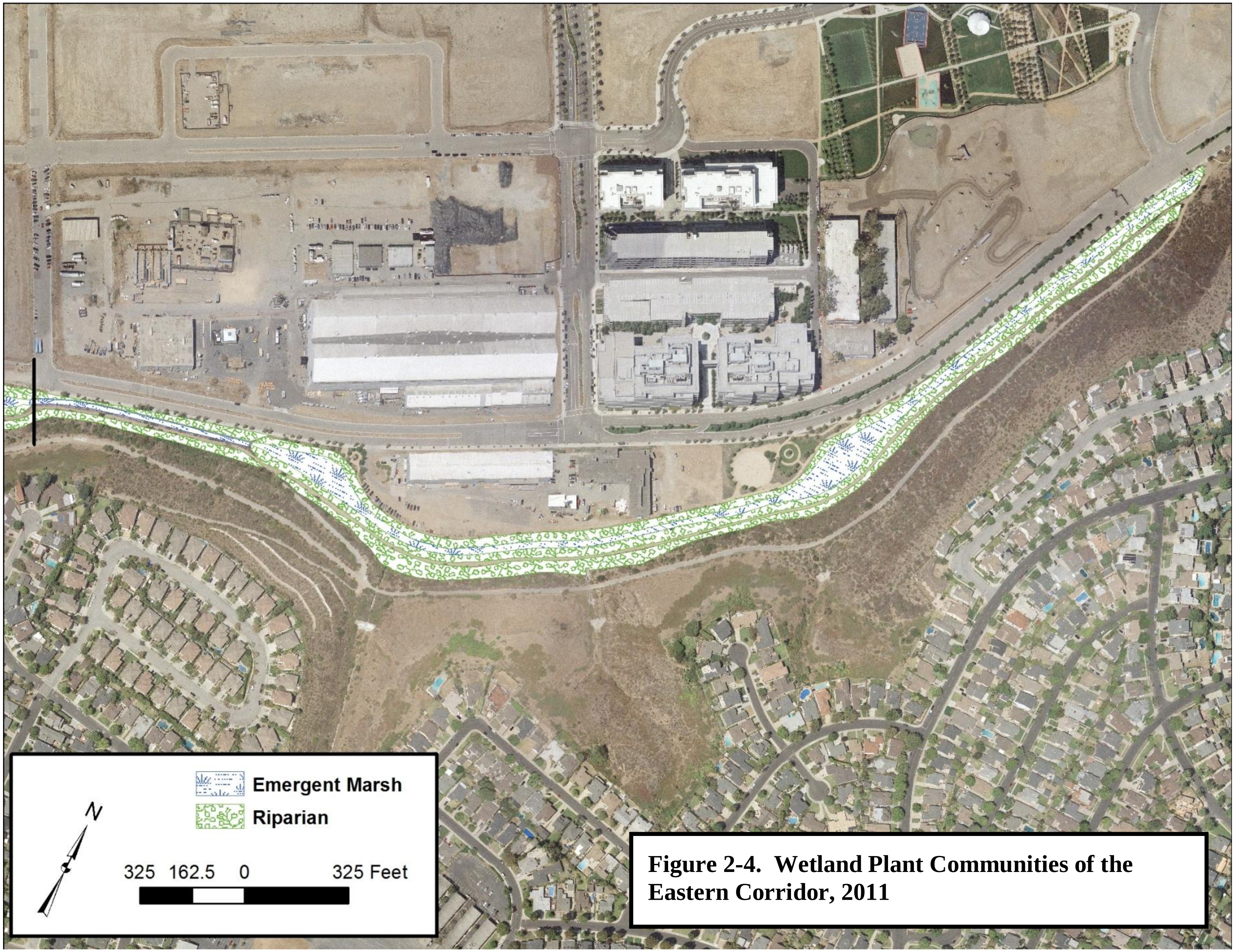


Figure 2-4. Wetland Plant Communities of the Eastern Corridor, 2011

Table 2-2. Summary of Fall Vegetation Monitoring Results for the Freshwater Marsh

Note: Statistics for 2008 – 2011 include 2.3 acres at the south end of the Marsh which were completed in 2008.

	2003	2004	2005	2006	2007	2008	2009	2010	2011	Comparison to Performance Criteria
Habitat Acres										
Emergent Marsh	3.4	6.0	8.6	8.8	4.6	4.1	5.0	5.5	6.2	Target acreage for Freshwater Marsh is 7.2 acres.
Riparian	8.8	8.7	8.7	9.0	10.2	11.4	11.0	11.2	11.2	Final target acreage of 9.2 acres for Freshwater Marsh is exceeded.
Open Water	10.6	8.7	6.1	5.6	8.8	12.5	11.3	10.9	10.2	Final target acreage of 9.7 acres for Freshwater Marsh is exceeded.
Cover, % [2]										
Non-Natives	4.1 ± 0.8	3.7 ± 0.6	10.2 ± 1.8	14.0 ± 2.0	9.7 ± 1.6	9.0 ± 1.6	6.2 ± 1.4	3.3 ± 0.9	12.7 ± 2.3	HMMP goal is no more than 10 percent non-native cover. Value for 2011 meets this goal within a margin of statistical variability.
Natives	29.2 ± 1.9	49.4 ± 3.9	48.6 ± 3.7	42.2 ± 3.7	39.7 ± 3.3	42.2 ± 3.1	47.8 ± 3.5	48.9 ± 3.9	72.7 ± 4.0	HMMP goal is 90 percent cover by native species; no final goal is specified. Cover values for natives and non-natives do not add up to 100 percent due to presence of bare ground and leaf litter.
Tree Ht, ft										
Average	6.1± 0.5	7.6± 0.5	10.7± 0.6	11.8± 0.6	12.6± 0.7	12.7 ± 0.9	11.1 ± 0.7	10.1 ± 1.1	13.2 ± 1.3	HMMP final (year 10+) goal is "trees mostly 9 to 20 feet" in height. Inclusion of the newly-planted south end of the Marsh and young seedlings from established trees reduced the median and first quartile values for tree height in 2008-2011.
Median	6.25	7.7	10.6	12.25	13.5	12.1	10.0	10.0	10.0	
1st Quartile	3.8	5.3	8.4	9.3	9.8	6.1	5.25	6.0	6.5	
Height range	0.8 – 14.7	2.5 – 18.0	4.6 – 21.5	3.0 – 23.0	2.9 – 23.3	2.0 – 35.0	0.5-27.0	0.5-40.0	0.5-40.0	

[2] Fall data (as compared to Spring data) are used to provide a more conservative cover estimate for native species. Values are averages for sample sizes of 56 to 66 transects (depending on year), ± one standard error.

Table 2-3. Summary of Fall Vegetation Monitoring Results for the Riparian Corridor

Parameter	Year	Corridor Section				Comparison to Performance Criteria
		Western Corridor	Central Corridor	Eastern Corridor	Combined	
Habitat Acres						
Emergent Marsh	2008	1.6	2.4	2.4	6.4	Target acreage for Riparian Corridor as a whole is 6.8 acres.
	2009	1.6	2.2	2.4	6.2	
	2010	1.8	2.2	2.4	6.4	
	2011	2.2	2.4	2.4	7.0	
Riparian	2008	5.5	3.9	5.0	14.4	Target acreage for Riparian Corridor as a whole is 18.2 acres. This criterion was met in 2009-2011.
	2009	7.5	5.0	6.2	18.7	
	2010	7.5	5.2	6.2	18.9	
	2011	7.5	5.2	6.2	18.9	
Cover, %						
Non-Natives	2008	7.1 ± 2.5	2.6 ± 1.0	1.7 ± 1.0	3.6 ± 1.2	HMMP Year 5 goal is no more than 10 percent cover. The entire Corridor had significantly less than this value in 2009, 2010, and 2011.
	2009	3.1 ± 2.4	2.2 ± 1.0	0.2 ± 0.1	1.6 ± 0.8	
	2010	0.0 ± 0.0	2.1 ± 2.1	0.3 ± 0.3	0.4 ± 0.3	
	2011	less than 1%	less than 1%	less than 1%	less than 1%	
Natives	2008	58.7 ± 5.0	51.5 ± 5.7	58.5 ± 4.5	56.9 ± 2.8	HMMP Year 5 goal is 90 percent cover by native species. Western third of the Corridor exceeded this goal in 2010 and 2011.
	2009	84.0 ± 7.2	53.7 ± 13.0	69.8 ± 6.0	71.2 ± 4.6	
	2010	94.4 ± 6.7	77.2 ± 25.5	81.8 ± 7.6	86.1 ± 4.9	
	2011	95.3 ± 4.2	78.0 ± 8.4	87.5 ± 5.5	87.7 ± 3.5	

Table 2-3. Summary of Fall Vegetation Monitoring Results for the Riparian Corridor (continued)

Parameter	Year	Corridor Section				
Tree Ht, feet		**Western Corridor**	**Central Corridor**	**Eastern Corridor**	**Combined**	
Average	2008	11.9 ± 0.54	9.0 ± 0.7	9.0 ± 1.1	10.1 ± 0.6	HMMP 5-Year performance goal for each phased section of the Corridor is "trees mostly 8 to 15 feet" in height. All Corridor sections met this criterion in 2010 and 2011, based on the first quartile statistic. Differences in average values between 2010 and 2011 are not statistically significant.
	2009	15.4 ± 0.98	12.6 ± 1.14	11.8 ± 0.86	13.5 ± 0.6	
	2010	22.3 ± 1.9	19.7 ± 5.0	12.9 ± 6.8	18.4 ± 1.3	
	2011	20.9 ± 2.6	15.4 ± 2.0	14.8 ± 1.7	17.4 ± 1.3	
1st Quartile	2008	9.5	6.0	6.0	8.0	
	2009	12.0	8.5	8.75	10.0	
	2010	14.0	12.5	8.25	10.0	
	2011	10.0	12.0	12.0	10.0	
Height range	2008	3 – 20	3 – 16	4 – 20	3 – 20	
	2009	4 – 30	6 – 25	2 – 20	2 – 30	
	2010	10-40	12-40	2-25	2-40	
	2011	8-40	10-40	3-40	3-40	

3.0 WATER AND SEDIMENT MANAGEMENT

3.1 Summary of Requirements

Monitoring parameters that inform management of water and sediment consist of flow and water level measurements, mapping inundation patterns, and measuring sediment accumulation.

3.2 Methods and Results

3.2.1 Flow, Water Level, and Precipitation

Flows entering the Marsh are measured at the Jefferson Inlet, Central Inlet, and Riparian Inlet. Flow measurement at the inlet where the Corridor enters the Marsh began in October of 2008, after the hydrologic connection (culvert under Lincoln Boulevard) between the Corridor and the Marsh was completed by Caltrans. The measurement device at each inlet is an Argonaut SL velocity sensor mounted to the side wall of each culvert and powered with a solar panel. Each device records velocity to a resolution of one centimeter per second. Readings are taken every 15 minutes. Flow rates for each inlet are calculated from the velocity data, culvert dimensions, and marsh water level obtained from the outlet data. The Argonauts at the Jefferson and Central Inlets were upgraded with software and new solar panels in September of 2008. Concurrently with those upgrades, a third Argonaut was installed at the Riparian Inlet in preparation for monitoring that began in October of 2008.

Water levels are measured using one Global Water Level Logger installed on the wetland side of the Marsh outlet, and a second Global Water Level Logger installed on the culvert side of the outlet weir. Due to the expected sporadic frequency of large storm events that may result in flows at the spillway that occur only occasionally, water level and flow at the spillway are not monitored with instrumentation, but by direct observation of inundation level following large storm events. Precipitation data are collected from a gauge located at the outlet of the Marsh.

Flows at the Jefferson, Central, and Riparian Inlets for the 2010-2011 monitoring period are shown in Figure 3-1. One year of data is shown; data for previous years were provided in reports for those years. Inlet flows generally follow rainfall events, with "noise" readings (i.e. readings at or below zero) during dry periods.

Water levels at the Marsh outlet are shown in Figure 3-2. Table 3-1 shows total precipitation for 2010-2011 compared to previous years. A total of 17.1 inches of rainfall was recorded for the 2010-2011 winter season, an amount comparable to 2005-2006. Seasonal patterns of water level change at the outlet were similar to previous years. On average, water levels in the Marsh at the outlet location have been maintained at +4 MSL in summer, consistent with the operational design of the System. In the winter of 2010-2011, water levels in the Marsh peaked up to about +5 MSL with larger storm events, but on average remain in the range of +2 MSL to +4.5 MSL.

Figure 3-1. Inlet Flow Rates and Precipitation: October 1, 2010 - September 30, 2011

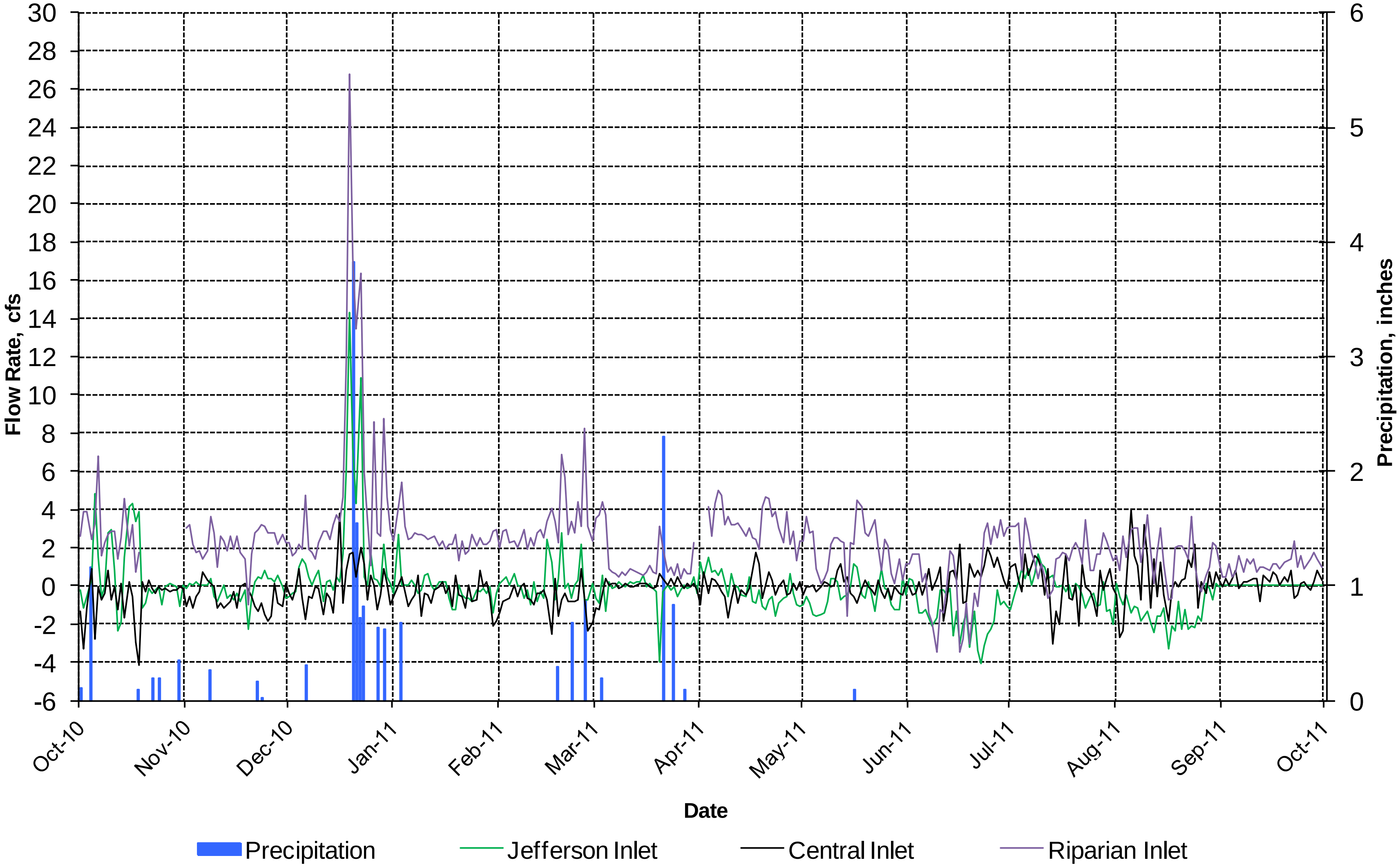


Figure 3-2. Water Levels At Outlet: October 1, 2010 - September 30, 2011

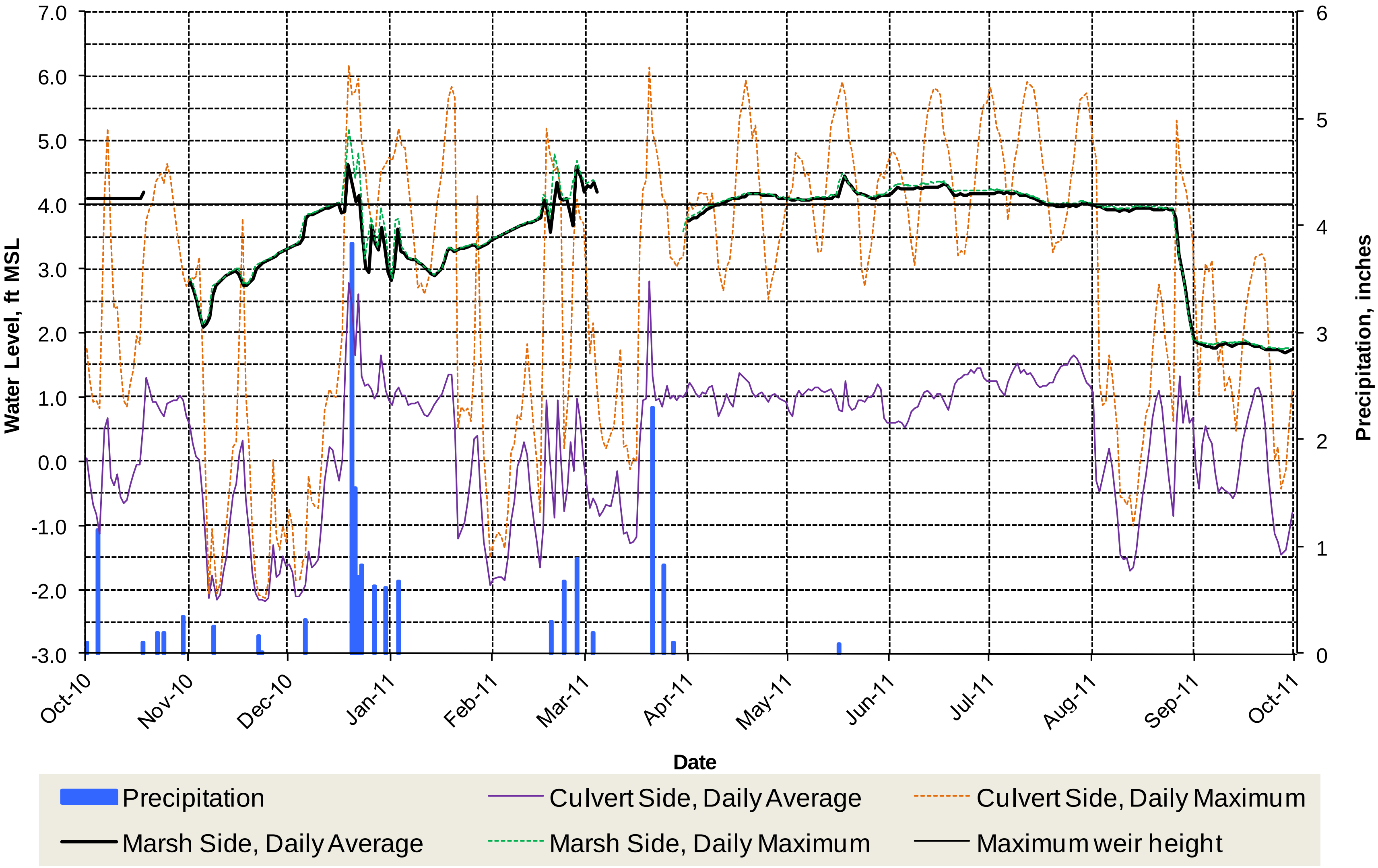


Table 3-1. Precipitation Totals, 2003-2011

Note: water years are October 1 – September 30

YEAR	TOTAL PRECIPITATION, INCHES
2003-2004	8.0
2004-2005	33.6
2005-2006	16.2
2006-2007	3.5
2007-2008	13.7
2008-2009	5.3
2009-2010	11.2
2010-2011	17.1

3.2.2 Inundation Pattern

As in previous years and required by the permits, inundation pattern was measured quarterly for the Marsh. For the 2010-2011 monitoring period the months of measurement were as follows: October 2010, February 2011, May 2011, and August 2011. Mapping was conducted based on a combination of aerial photography, water level data, and field observations.

The average inundation pattern for the 2010-2011 period was the same as in 2010 (Figure 3-3), except for late August when the water level of the Marsh was lowered to +2.0 MSL to facilitate installation of water quality sampling devices in some of the storm drains within Playa Vista. As in previous years, inundation boundaries were consistent with water levels measured at the Marsh outlet. Average water levels of the Marsh for the periods of inundation measurement were as follows: +4.1 MSL in October 2010, + 3.8 MSL in February 2011, + 4.1 MSL in May 2011, and +2.6 MSL when water levels were lowered in late August 2011. For presentation purposes, the inundation pattern shown in Figure 3-3 for October 2010 –May 2011 represents an average for that period; small changes in water level on the order of tenths of a foot do not have any measureable effect on inundation pattern.

3.2.3 Sedimentation

Sediment monitoring was initiated in 2004, following field testing of methods in 2003, and continued through 2011. No methods were specified in the permits or HMMP, therefore the methods described here were based on field evaluation of the most efficient approach. Monitoring locations were selected initially to include all of the water and sediment quality monitoring stations. Other locations were added later based on flow patterns in the Marsh and estimation of where sediment would most likely accumulate, if at all. Please refer to the next section (Figure 4-1) for the locations of the monitoring stations and which stations also correspond to sampling stations for water quality.

Measurement methods consisted of a combination of water level data recorded at the Marsh outlet, field measurements of water depth at each monitoring station, and a grading contour map of the Marsh when it was constructed. At each monitoring station, water depth measured in the field was compared to an estimate of expected water depth based on the contour map and water level data collected at the outlet on the day of monitoring.

Results from sedimentation monitoring are summarized below for each group of stations. A couple of points are worth noting when reviewing these data. First, as discussed in previous annual reports, the methods for sedimentation monitoring are estimated to have a resolution limit of 0.5 foot, meaning that "changes" observed which are on the order of about 0.5 foot or less should be considered "noise" and not significant. Second, it can be expected that the contour map used in the calculations, obtained from the engineering drawings, may not correspond exactly to actual contours due to slight movement and settling of sediment within the first several months after the Marsh was constructed. Therefore, sedimentation monitoring is focused on detecting significant trends of sediment accumulation or loss over time since monitoring began in early 2004.

Figure 3-3. Inundation Boundaries, 2010-2011

JEFFERSON INLET TREATMENT AREA

Figure 3-4 shows data collected from Jefferson Inlet treatment area monitoring stations 3 and 7. There has been no overall trend of sediment accumulation or loss since monitoring began in 2004.

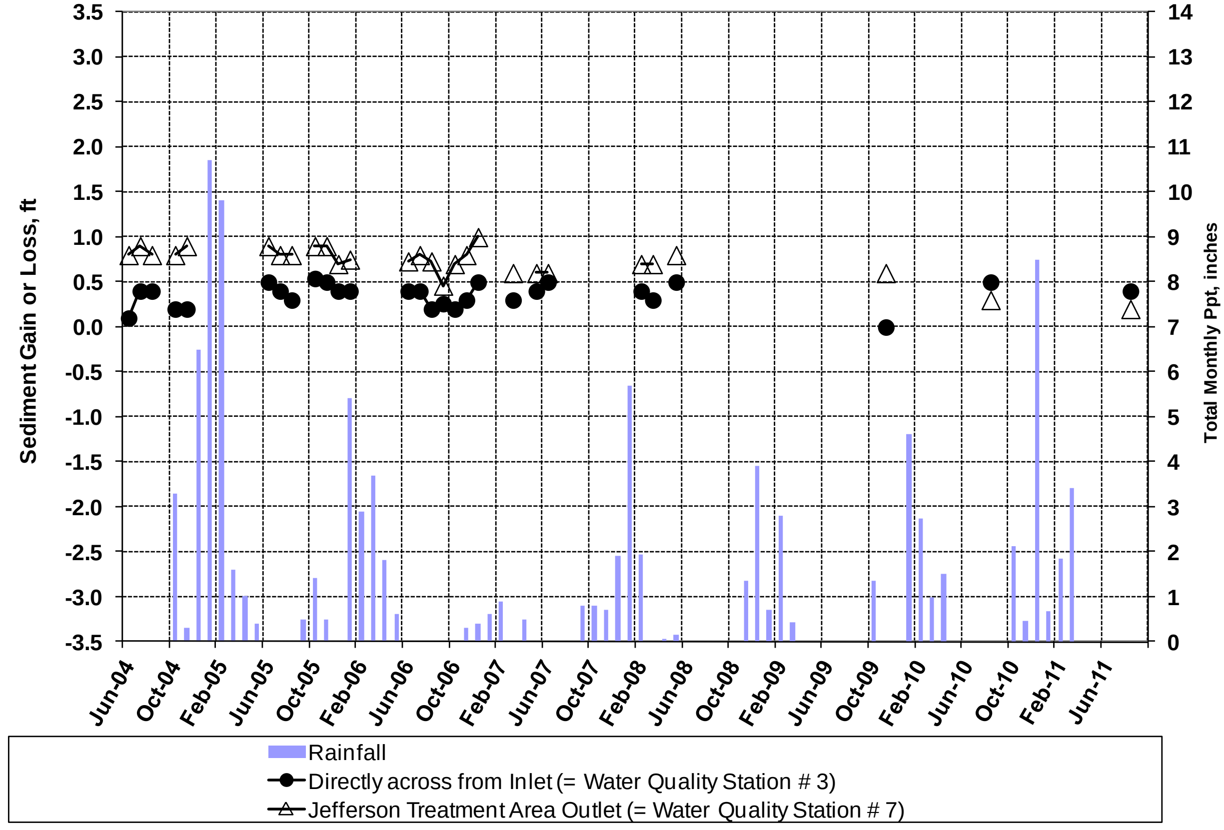


Figure 3-4. Sedimentation Monitoring Results – Jefferson Inlet Treatment Area

CENTRAL INLET TREATMENT AREA

Figure 3-5 shows data collected at stations 2 and 6, located across from the Central Inlet. For the area generally, there has been minor temporal variability but no persistent trend of sediment accumulation or loss.

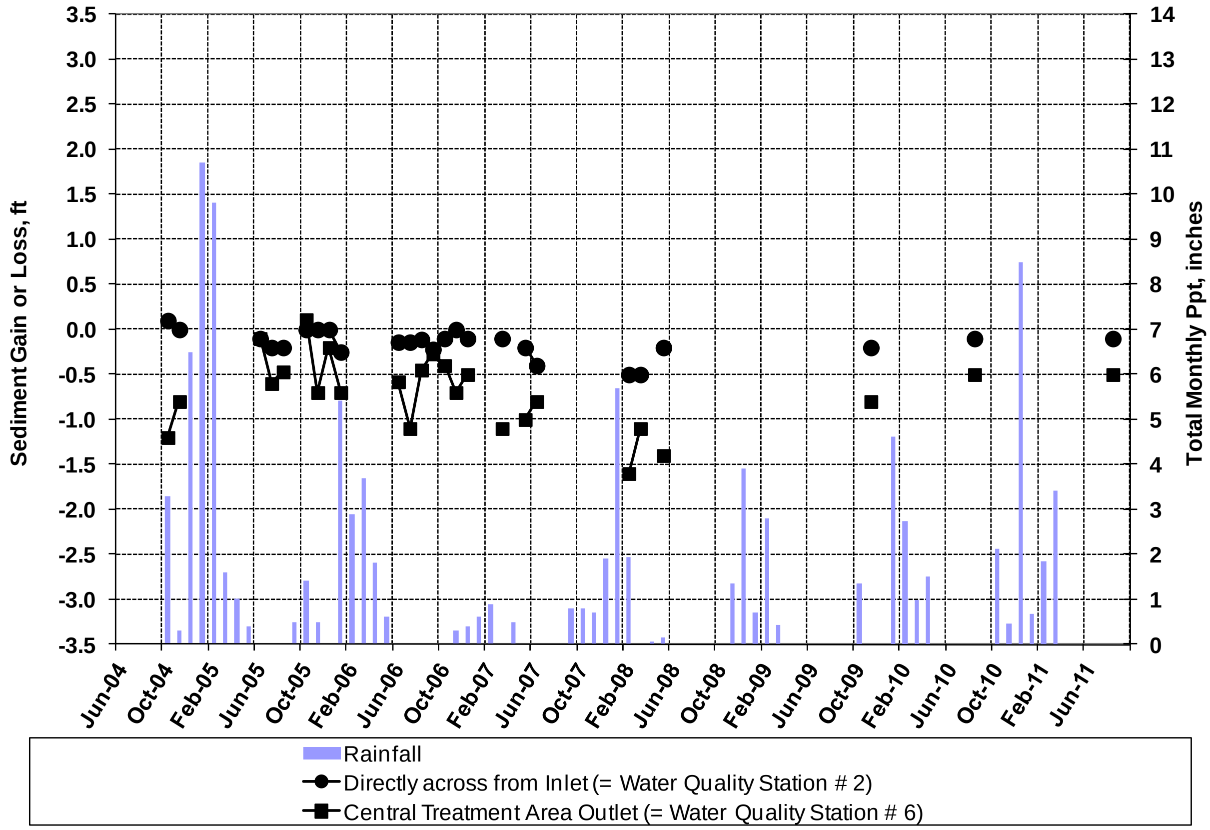
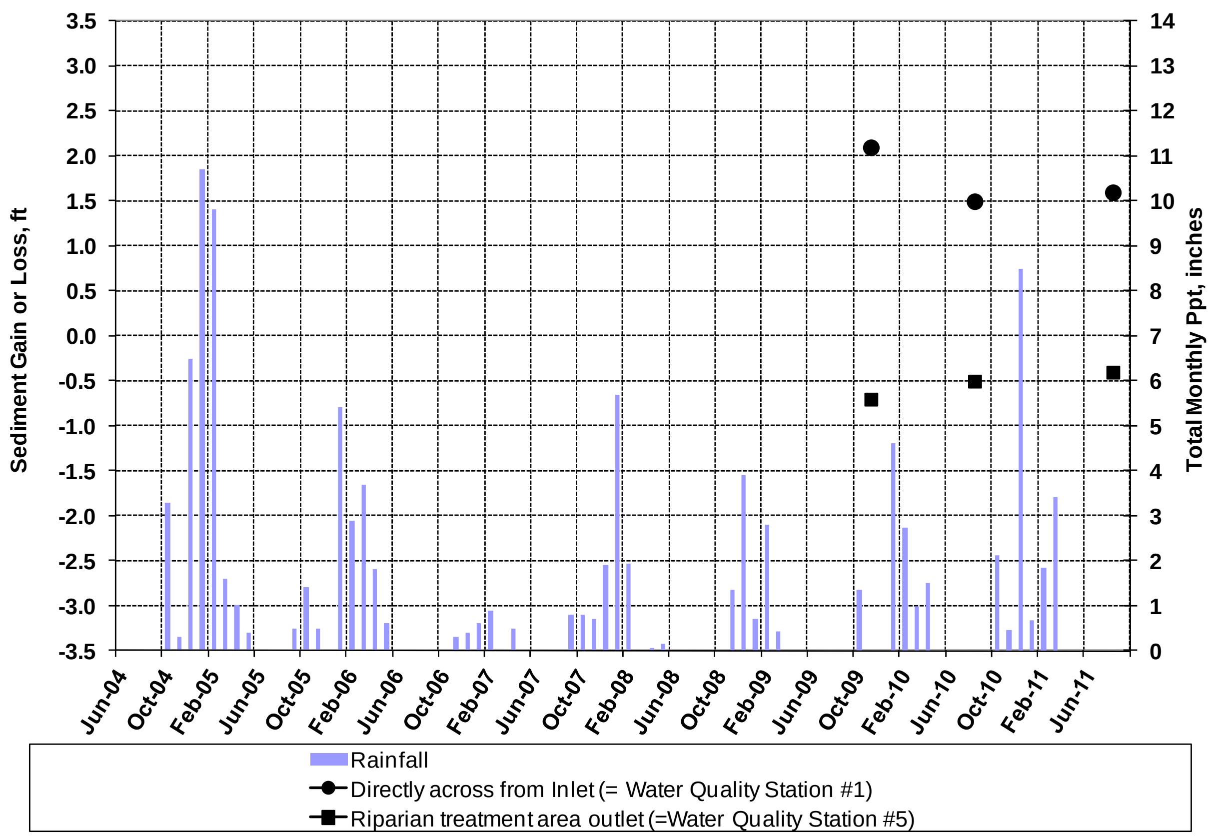


Figure 3-5. Sedimentation Monitoring Results – Central Inlet Treatment Area

RIPARIAN INLET TREATMENT AREA

Monitoring of the Riparian Inlet treatment area for sediment accumulation was not initiated until late in 2009 in order to allow sufficient time for settling after construction of the south tip of the Marsh was completed in 2008. This schedule is consistent with the methods used for the rest of the Marsh, wherein monitoring was not initiated until 2004, about a year after construction was completed. Results of monitoring for sediment accumulation in the Riparian Inlet treatment area are shown in Figure 3-6. The 2009 data indicate some initial sediment accumulation across from the inlet (Station #1) within a year after the Corridor was connected to the Marsh. The data for 2011 indicate a slight increase, possibly associated with relatively high rainfall in the 2010-2011 winter season.

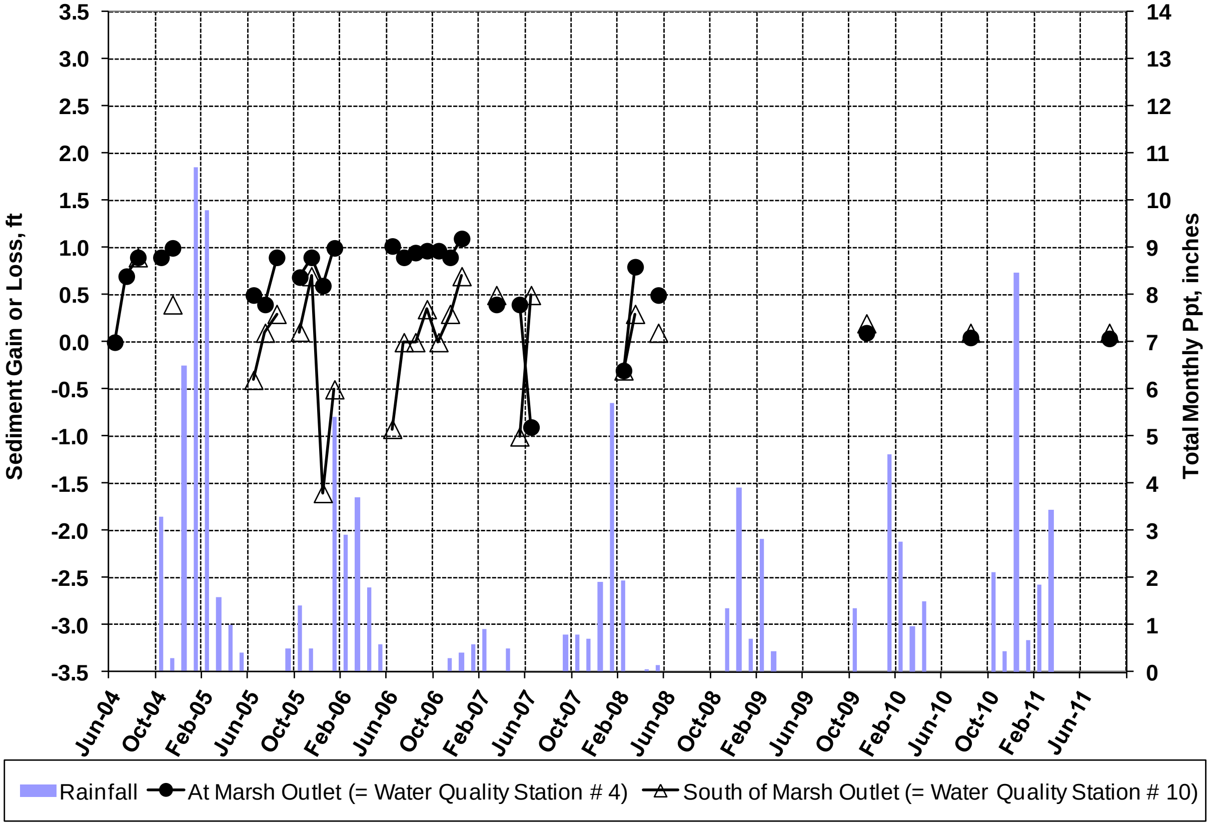
Figure 3-6. Sedimentation Monitoring Results – Riparian Inlet



MARSH OUTLET

Figure 3-7 shows data for the Marsh outlet area for stations 1 and 10. Similar to other monitored locations, the Marsh outlet area does not exhibit an overall long-term trend of sediment accumulation or loss.

Figure 3-7. Sedimentation Monitoring Results – Marsh Outlet



CONCLUSIONS

Data collected through 2011 do not show any persisting trend of sediment accumulation or loss at any one location. Despite relatively high rainfall in the 2010-2011 winter season, there is no evidence that sediment removal is warranted or that capacity for storm water should be increased by dredging.

4.0 WATER AND SEDIMENT QUALITY

4.1 Introduction

The SWRCB, CCC, USACE, and CDFG imposed a number of monitoring requirements for the System as conditions of their respective permits. The requirements of each agency differ in terms of parameters to be monitored, sample locations, and sampling frequency. The full list of water and sediment parameters is provided along with sample dates and test results in Appendix E. Figure 4-1 shows the array of sampling locations at the Marsh, and one location at the eastern inlet to the Corridor, selected to meet all of the agency requirements. This section discusses water quality and sediment quality data from samples collected from the start of monitoring in April 2003 through September 30, 2011 for the 23.8 acres of Marsh that were completed in 2003 (i.e. stations 2,3,4,6,7,8,9, and 10), and an additional three locations (1,5, and the Eastern Corridor), which were sampled beginning in October of 2008.

4.2 Methods

For the quarterly monitoring requirements, wet chemistry samples for laboratory analysis were collected at locations 2, 3, 4, 6, and 7 shown on Figure 4-1. Parameters referred to in this report as "field" are those that are measured directly in the field with the appropriate equipment. Field measurements were taken for dissolved oxygen, temperature, pH, conductivity, and turbidity. The field parameters were measured at all locations. The field parameters, as well as certain other parameters (e.g. hardness) that are measured in samples collected for laboratory analysis, are not considered "pollutants" but rather characterize the aquatic environment and are relevant to evaluation of wetland functions as well as overall water quality.

All measurements and water sample collections were made consistently during a morning time period (generally 6:30 a.m. to 10:30 a.m.). This consistency reduces the potential for measurement variability in certain parameters that are known to fluctuate diurnally, such as dissolved oxygen and temperature. Field data and water samples were typically collected on two separate days due to the number of stations. Field data were collected on the day prior to collection of water samples.

4.3 Results and Discussion

Figures cited in the following subsections are provided at the end of Section 4.

4.3.1 Water Quality

The system is monitored for 154 water quality parameters. Of the 154 parameters, 133 are elements or chemical compounds, such as metals or nutrients. The remaining 21 parameters consist of physical properties of water samples such as hardness and salinity. Results are summarized in the following sections. Water quality enhancement is one of three goals for the System and must be considered in relation to the other two goals: habitat and storm water management. Therefore agency requirements do not specify performance standards for water quality. Rather, Condition 11(d) of the SWRCB Certification requires an evaluation of pollutant removal efficiency, Special Condition 2(c) of the USACE permit requires an evaluation of progress toward wetland functional values, and Special Condition A(8) of the CCC permit requires an evaluation of progress toward fulfillment of the goals of the System. An analysis of these functions and goals is provided in Section 5.

Figure 4-1. Water and Sediment Quality Monitoring Stations

OVERVIEW

Most of the monitored elements and chemical compounds, 121 constituents or about 91 percent, have either not been detected at the Marsh or detected sporadically at extremely low concentrations which are at or near the limit of laboratory detection. These constituents are not discussed further here.

Bacteria were monitored as enterococci, fecal coliforms, and total coliforms. Bacteria concentrations have shown high variability since monitoring began in 2003 (see Appendix C). The monitored bacteria are a natural part of a wetland system, and occurrence of enterococci and coliforms can be expected in a wetland heavily used by birds and other organisms.

Acute and chronic biological toxicities of water samples collected at the Marsh were measured in the laboratory using standard EPA protocols which address potential toxicity to invertebrates and fish. The water flea was used as representative of invertebrates and the fathead minnow as representative of fish. As can be seen from the data shown in Appendix C, survivorship of both organisms was 100 percent in most samples. A few anomalous survivorship values of less than 100 percent have been observed in previous monitoring years (e.g., April 2010), but these data were not correlated with other parameters and have shown no consistent or significant trends over time.

The following subsections summarize results for certain remaining parameters that were measured or detected, and are relevant to wetland function, in four broad categories: 1) environmental parameters, i.e., parameters which are not considered “pollutants” but characterize aquatic habitat in general (e.g. temperature); 2) particulates; 3) nutrients; and 4) metals.

ENVIRONMENTAL PARAMETERS

Numerous studies have shown that each species in the aquatic environment can have ranges of tolerance for various parameters that differ from other species, and can even occupy different portions of the water column at various times of day depending on their requirements. Examples are discussed in Thorp and Covich (2001) and Kadlec and Knight (1996). Therefore, the following subsections focus on broad patterns rather than isolated values.

<u>Temperature, pH, and Dissolved Oxygen</u>

Temperature, hydrogen ion concentration (pH), and dissolved oxygen are relevant to biological functions of the Marsh because they potentially affect the growth of aquatic organisms and many biochemical processes in wetlands (Kadlec and Knight, 1996, p. 281).

As can be seen from the upper graph in Figure 4-2, water temperature in the Marsh has changed with the summer and winter seasons, from a minimum of about 50 degrees Fahrenheit in winter to nearly 80 degrees Fahrenheit maximum in summer. Temperatures for the 2010-2011 reporting period were similar to previous years.

Hydrogen ion concentration is measured as pH on a scale that ranges from 1 (extremely acidic) to 14 (extremely basic). At the Marsh, pH has shown little seasonal fluctuation or variability between measurement locations, but from year to year winter values have gradually trended from a “basic” pH of about 8.0 shortly after Marsh construction to a more neutral range of about 7.0 (Figure 4-2, bottom graph). Average pH values in the summer of 2011 trended upward toward 8.0. A range in pH between 7.0 and 8.0 is optimal for nitrifying bacteria in treatment wetlands, which are important for transforming ammonia nitrogen to nitrite and nitrate (Kadlec and Knight, 1996, p. 308).

While oxygen is abundant in the atmosphere, its solubility in water increases as water temperature becomes colder (Wetzel, 2001, p. 151). Because of its variable solubility according to environmental conditions, and continual flux between oxygen generators (plants, chemical processes) and oxygen consumers (bacteria, invertebrates, fish, chemical processes), oxygen can be one of the most dynamically fluctuating parameters measured in a wetland. Fortunately, due to consistent sampling in the morning hours, short-term diurnal effects of temperature and sunlight on variability in oxygen data from the System have been minimized, and therefore this analysis can focus on longer-term, seasonal changes and spatial diversity of the data. Figure 4-3 shows the dissolved oxygen data. Beginning in the summer of 2005, dissolved oxygen concentrations exhibited greater consistency, both seasonally and from location to location within the Marsh. However, variability between locations increased again in 2009, after the hydrologic connection was established between the Corridor and the Marsh. Values at most locations were especially high in the summer season of 2011, exceeding all previous years except at stations near the Jefferson Inlet, where summer values in 2011 were within the range of previous years.

Specific Conductance and Salinity

Specific conductance is a function of the total quantity of ionized materials in a water sample. Specific conductance is readily measured in the field and is often used as a field indicator of salinity, which is less readily measured in the field and represents the *dissolved* fraction of ions in the water sample. In the monitoring program for the Marsh, in compliance with permit requirements, specific conductance is measured in the field with a meter during every sampling event and at all sample stations. Measurement of salinity is not a permit requirement but is part of a standard suite of laboratory test parameters for water samples collected from a subset of stations. Figure 4-4 shows that specific conductance followed similar seasonal patterns from 2003 to 2008, with peaks in summer of up to about 1400 umhos/cm and lows in winter of about 250 umhos/cm. These patterns show a high degree of correlation with seasonal variability in water temperature. However, conductivity values in the summers of 2009, 2010, and 2011 were about 2000 umhos/cm at the Marsh sample stations. Conductivity at the sample station in the Corridor shows a different seasonal pattern from the other stations, generally in the opposite direction. For example, conductivity at the Corridor station decreased to about 1155 umhos/cm in the summer of 2011, while the average for all other stations increased to the 1600-2000 range.

Salinity data are provided in Appendix E. A salinity value of 500 mg/L generally defines the difference between a wetland classified as "freshwater" from a wetland classified as "brackish" (Cowardin, et al., 1979). Brackish conditions in summer are not unusual and were anticipated in the design of the wetlands system to provide a natural mechanism for limiting growth of emergent vegetation. From the beginning of monitoring in April of 2003 through 2006, average salinity values typically remained below 500 mg/L or 0.5 parts per thousand. In the summer of 2007, values began trending upward and reached about 1100 mg/L at the marsh outlet in 2009, then decreased to about 800 mg/L in the summer of 2010 and 1000 mg/L in the summer of 2011.

Particulates: Total Suspended Solids and Turbidity

Total suspended solids ("TSS") is a laboratory measure of the filterable inorganic material in a water sample (Kadlec and Knight, 1996, p. 836). Turbidity is a measure of the ability of light to pass through water. It can be measured with a field probe and can sometimes provide a rough indication of the total suspended inorganic and organic materials. However, dissolved materials (such as tannins common to wetlands) can also cause a reduction in light transmission and therefore an increase in turbidity. One major function provided by wetland ecosystems is the removal of suspended sediments. The Marsh was designed with islands of native vegetation situated across from the inlets, in a manner that reduces flow velocities and allows suspended sediment to settle. However, due to the urbanized condition of the watershed (e.g. minimal area of surface soils that can be eroded), large loads of suspended sediment would not be expected.

Data shown in Figure 4-4 indicates that TSS and turbidity vary primarily in association with winter rainfall, particularly the first rain event of the season and peak rain events.

Nutrients

For the purpose of laboratory analysis, constituents in the "nutrients" category include compounds containing nitrogen and phosphorus. Metals are placed in a separate category for analysis and are discussed in the next section, although it is recognized that many metals are essential for plant growth.

Nutrient data are provided in Appendix C. With one exception, nutrient inputs into the System have been extremely low. The one exception is total phosphorus, shown in Figure 4-5. With hydrologic connection to the Corridor, total phosphorus levels began increasing in the Marsh in 2009. The highest values in the Marsh, detected in summer, have stabilized in the range of 1.0 mg/L. Phosphorus concentrations may lead to abundance of aquatic vegetation, first observed in the Marsh in 2009, with positive habitat benefits (see Section 3).

Metals

Metals that are monitored at the Marsh occur naturally in the environment, but excessive levels can indicate an anthropogenic origin. The definition of "excessive", in terms of relationship to aquatic life and wetland function, is complicated by several factors. Some metals serve as essential nutrients for animals or plants (Kadlec and Knight, 1996, p. 491; Wetzel, 2001 p. 305). These metals include chromium, copper, iron, manganese, nickel, selenium, and zinc. Certain metals can be toxic to aquatic organisms at relatively low concentrations. These metals include arsenic, cadmium, copper, mercury, nickel, lead, selenium, silver, and zinc. Lastly, a value for metal concentration alone does not necessarily mean that the metal is available for uptake by an organism. Bio-availability and toxicity of some metals are affected by hardness of the water, pH, and other physical parameters.

In order to at least partially address these complexities, the U.S. Environmental Protection Agency developed criteria for potential toxicities to aquatic life, based on laboratory studies (USEPA 2000, 2004). The criteria are divided into two categories: 1) Maximum Concentration (Acute), equal to the highest concentration to which aquatic life can be exposed for a short time without deleterious effects; and 2) Continuous Concentration (Chronic), equal to the highest concentration to which aquatic life can be exposed for four days without deleterious effects. Both sets of criteria were developed for dissolved concentrations rather than total recoverable concentrations, because of the bio-availability of the dissolved state. The criteria are interpreted as guidelines, rather than regulatory standards, because field conditions are not the same as controlled laboratory conditions and actual bio-availability of metals may vary in the field due to the complexity of issues described above. Typically, dry-weather concentrations of these parameters are evaluated against the chronic criteria and wet-weather concentrations are evaluated against the acute criteria.

Figures 4-6 through 4-8 show data for metals that have reference criteria for aquatic life: arsenic, chromium, copper, lead, nickel, and zinc. For simplicity, the graphs show EPA criteria for freshwater aquatic life assuming water hardness (as calcium carbonate) of 100 mg/L in all cases. These criteria should be considered conservative (low) because hardness values of water samples collected from the Marsh are generally higher than 100 mg/L (Appendix C). Values for dissolved arsenic, chromium, lead, nickel, and zinc have been below EPA criteria for short-term and continuous exposure since monitoring began in 2003, and continued to be below those thresholds in 2011. Values for dissolved copper at all locations except the Jefferson Inlet also have been below thresholds. Dissolved copper in the Jefferson Inlet treatment area exceeded the criterion for continuous concentration during the rainy seasons of 2007 and 2009, but was at or below this criterion in 2008, 2010, and 2011.

4.3.2 Sediment Quality

Sediment quality data are provided in Appendix C following the water quality data. The primary purpose of this sampling and analysis program is to evaluate trends in sediment concentrations over time.

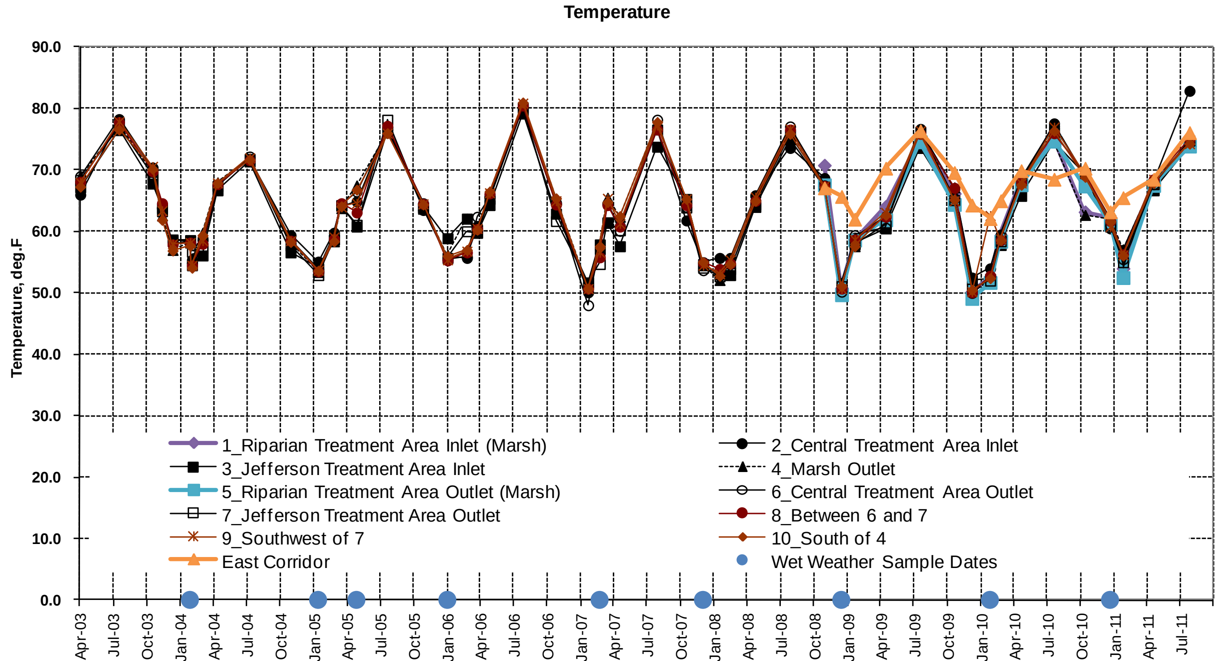
Currently, there are no EPA criteria for sediment comparable to those available for water quality and discussed in the previous section. However, the Coastal Protection and Restoration Division of the National Oceanic and Atmospheric Administration ("NOAA") has developed "screening values" for sediment quality for some of the parameters analyzed in this sampling effort. These values were developed to evaluate whether elements or chemicals in sediments may be elevated to levels potentially toxic to organisms. It is pertinent to note that these values were developed for "internal" screening purposes only; they do not represent official NOAA policy and do not constitute criteria, standards, or clean-up levels. Although not required by regulatory agencies, the sediment quality data presented in this section were compared with probable effects level ("PEL") values from the NOAA Screening Quick Reference Tables ("SQuiRT"; Buchman,1999). The PELs are used as thresholds, above which adverse effects are frequently expected (Buchman, 1999 p. 12).

Sediment samples collected at the Riparian Inlet to the Marsh, the Jefferson Inlet, Central Inlet, and Marsh Outlet are tested for a total of 126 elements and chemical compounds, in addition to grain size analysis and moisture content. Out of the total of 126 elements and chemical compounds, 87 percent were either not detected in any sample or detected at low concentrations near the laboratory detection limit. The non-detected constituents included pesticides. Of the remaining 13 percent of constituents tested, metals are most meaningful to discuss because of their potential effects on aquatic life, and the fact that PEL guidelines are available as a frame of reference for evaluating the data.

Evaluation of metal concentrations in sediments in terms of potential effects on aquatic life or wetland functions is even more complicated than described previously for metals in the water column (Section 5.3.1, Water Quality). As in water, metals in sediments can have beneficial or adverse effects, depending on their concentrations, concentrations of other constituents, and chemical processes. Metals, such as iron and manganese, are not only essential nutrients, but play an important role in chemical reactions and nutrient cycles (for example, see Wetzel, 2001 pp. 302-305). Other naturally occurring elements, such as arsenic, have no known role in biological processes and are acutely and chronically toxic to aquatic organisms, but under natural conditions are mostly insoluble in water with low potential to concentrate in biota (Kadlec and Knight, 1996, p. 499). For these reasons, the rest of this discussion focuses on the subset of metals for which PEL criteria have been established for actual test organisms, i.e., criteria that are based on freshwater benthic community metrics and toxicity tests (Buchman, 1999 p. 12), as opposed to theoretical extrapolations.

Figures 4-9 through 4-12 show results from the nine August sample periods (2003-2011) compared to PEL criteria. As in previous years, most values in 2011 were well below the criteria, and in some cases metals were not detected. Across all parameters, water quality and sediment quality data did not show trends of accumulation or build-up that would signal the need for sediment removal, or pose a potential threat to aquatic life at this time. Levels of chromium and nickel in the sediments at the Jefferson and Central Inlets increased slightly in 2009, which were still well below the PEL criteria, and not unusual for their locations adjacent to Lincoln Boulevard. This trend did not persist into 2010 or 2011. An elevated concentration of lead above the PEL was observed at the Jefferson Inlet in August of 2010, but decreased below the PEL in 2011. Lead concentrations at the Central and Riparian inlets to the Marsh and at the Marsh outlet have been significantly lower than the PEL and show no trend of accumulation.

In the cases of nickel and mercury, the data indicate slightly higher concentrations at the outlet compared to the inlets, although still significantly lower than the PEL. Water level data from the culvert side of the outlet (Figures 3-2A and B) indicate periodic maximum levels that exceed the weir height. Therefore, occasional slightly higher metal concentrations at the outlet may be related to periodic inflows from Ballona Creek rather than water quality enhancement functions of the Marsh. These inflows from Ballona Creek are attributable to debris becoming lodged in the flap gates. This debris is removed when it can be done safely during the day at low tide.



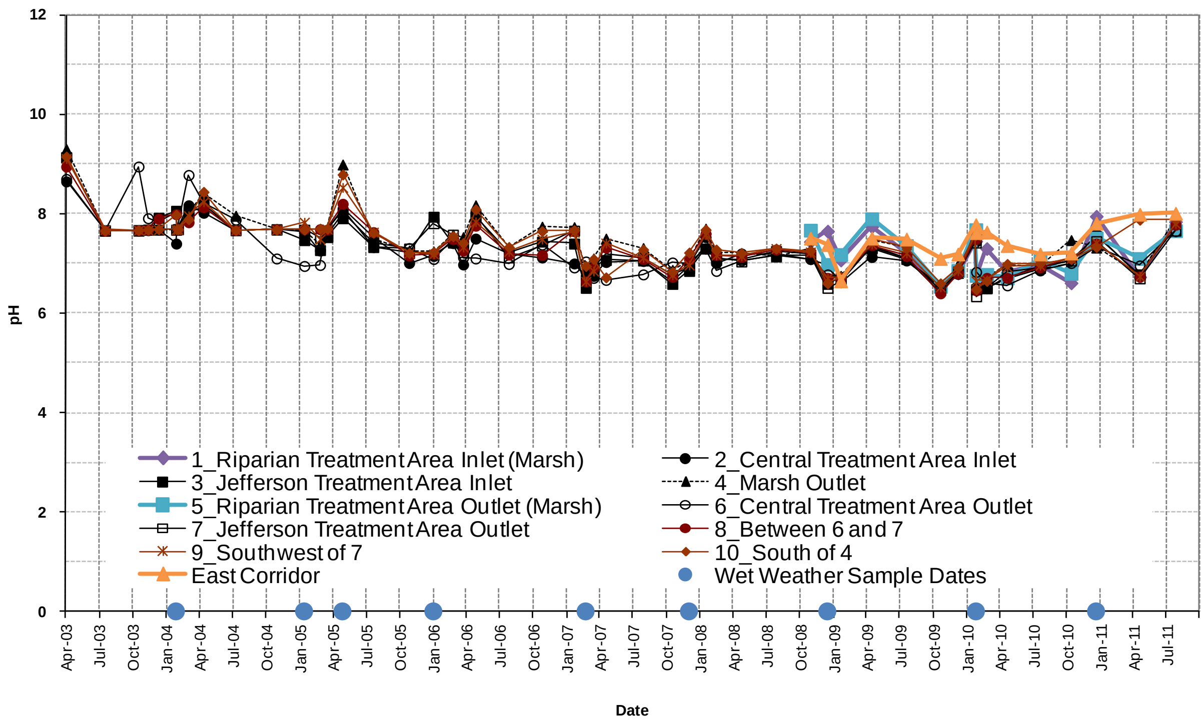
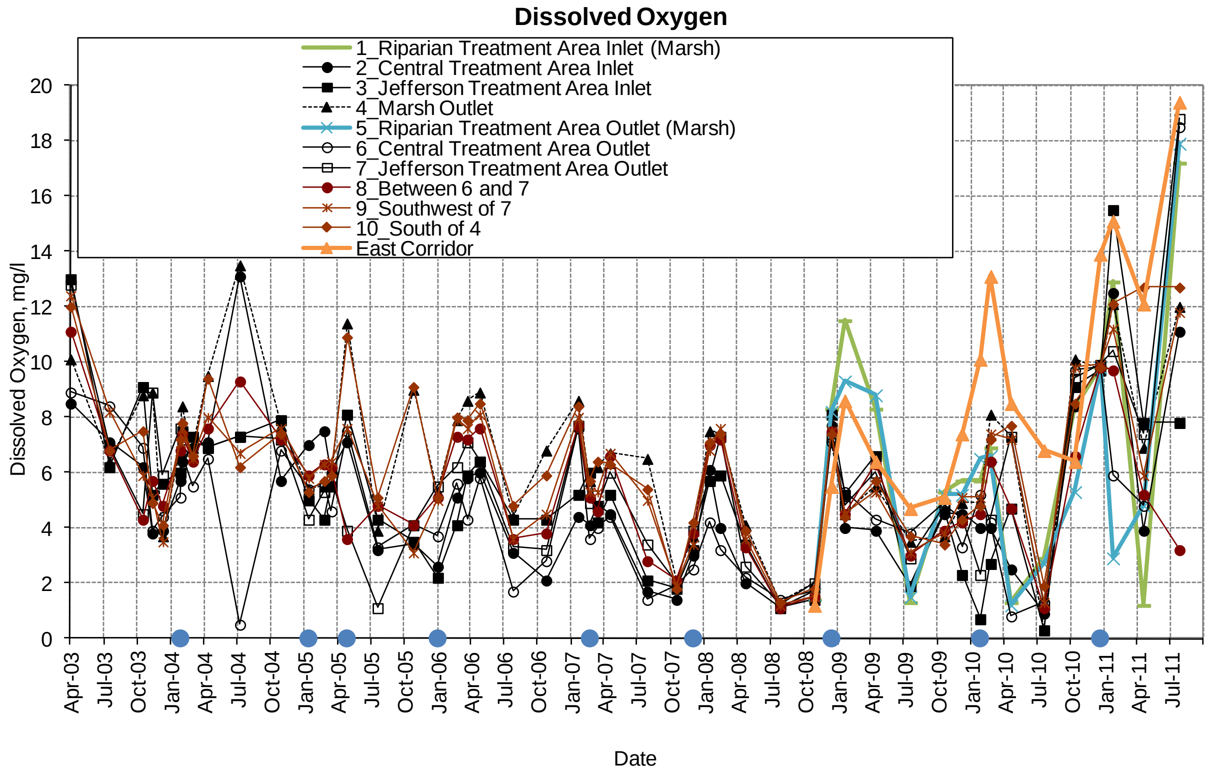


Figure 4-2. Water Sampling Results: Temperature and pH



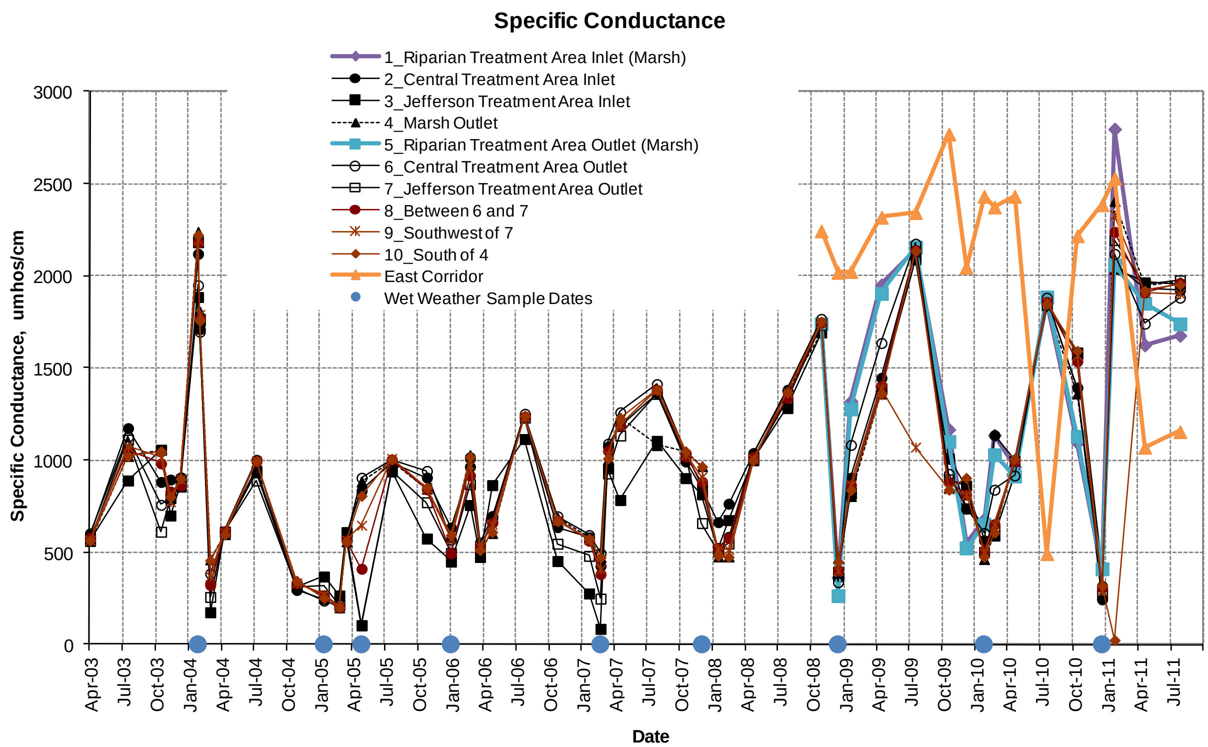


Figure 4-3. Water Sampling Results: Dissolved Oxygen and Specific Conductance

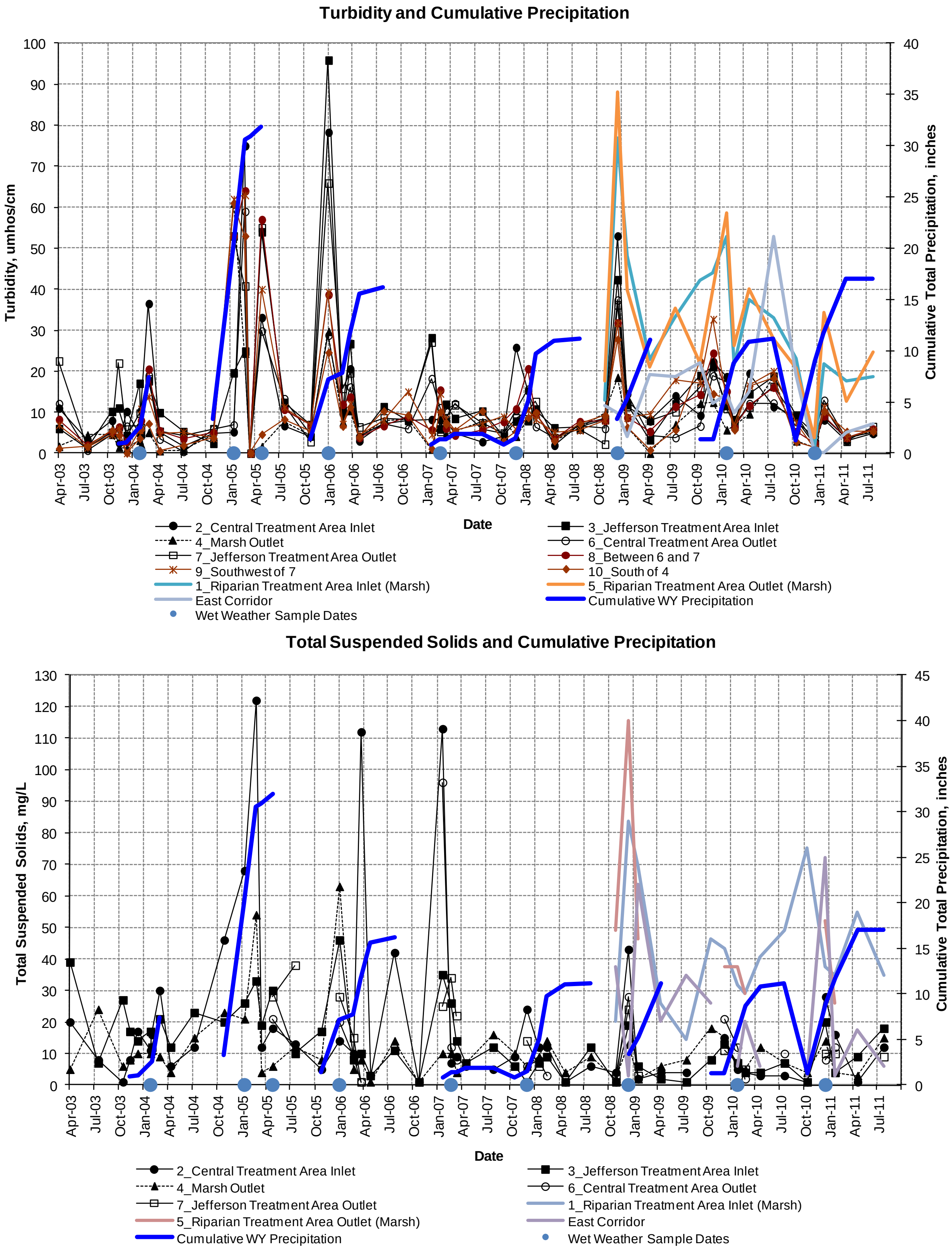


Figure 4-4. Water Sampling Results: Turbidity and Total Suspended Solids

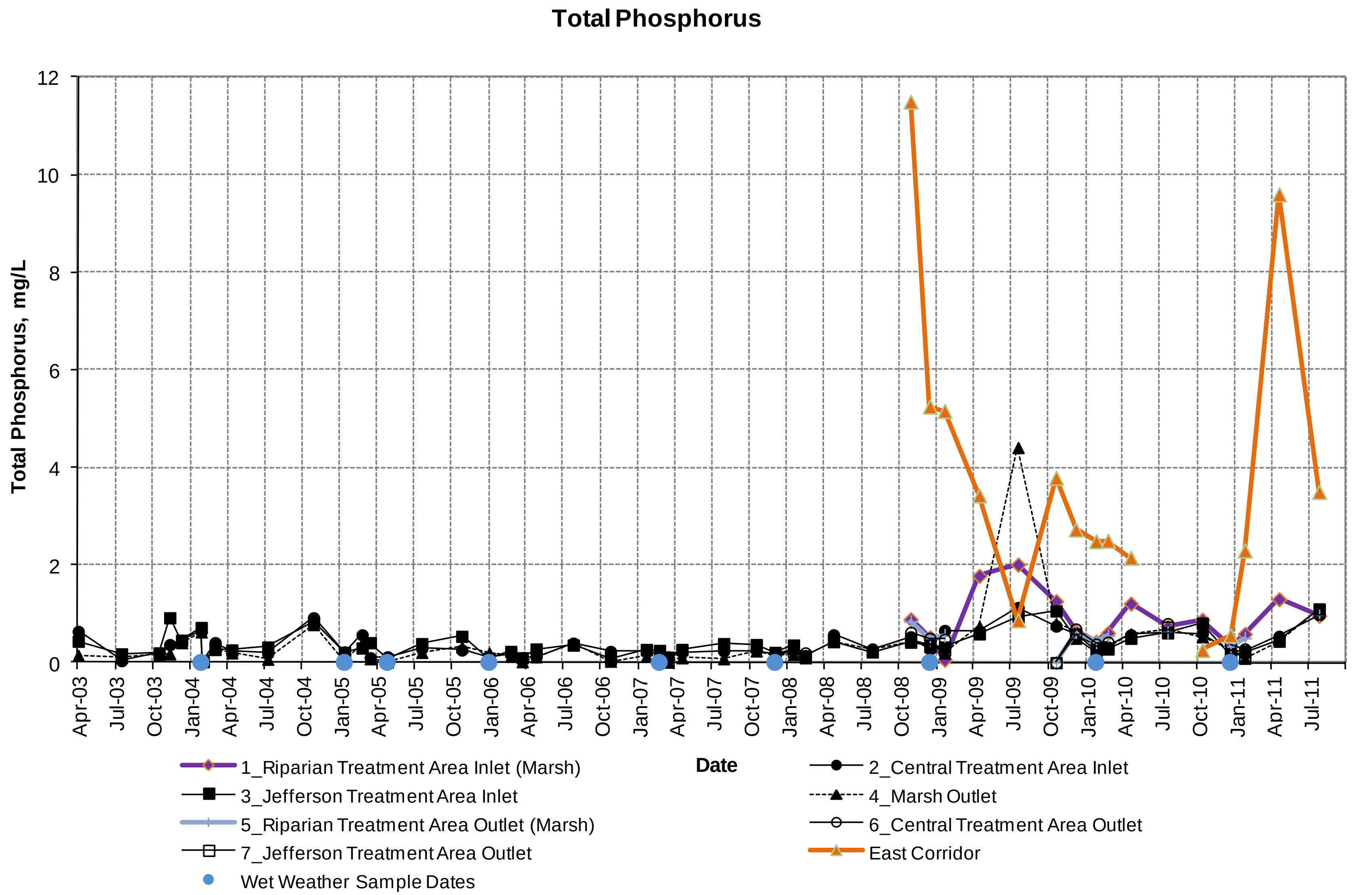
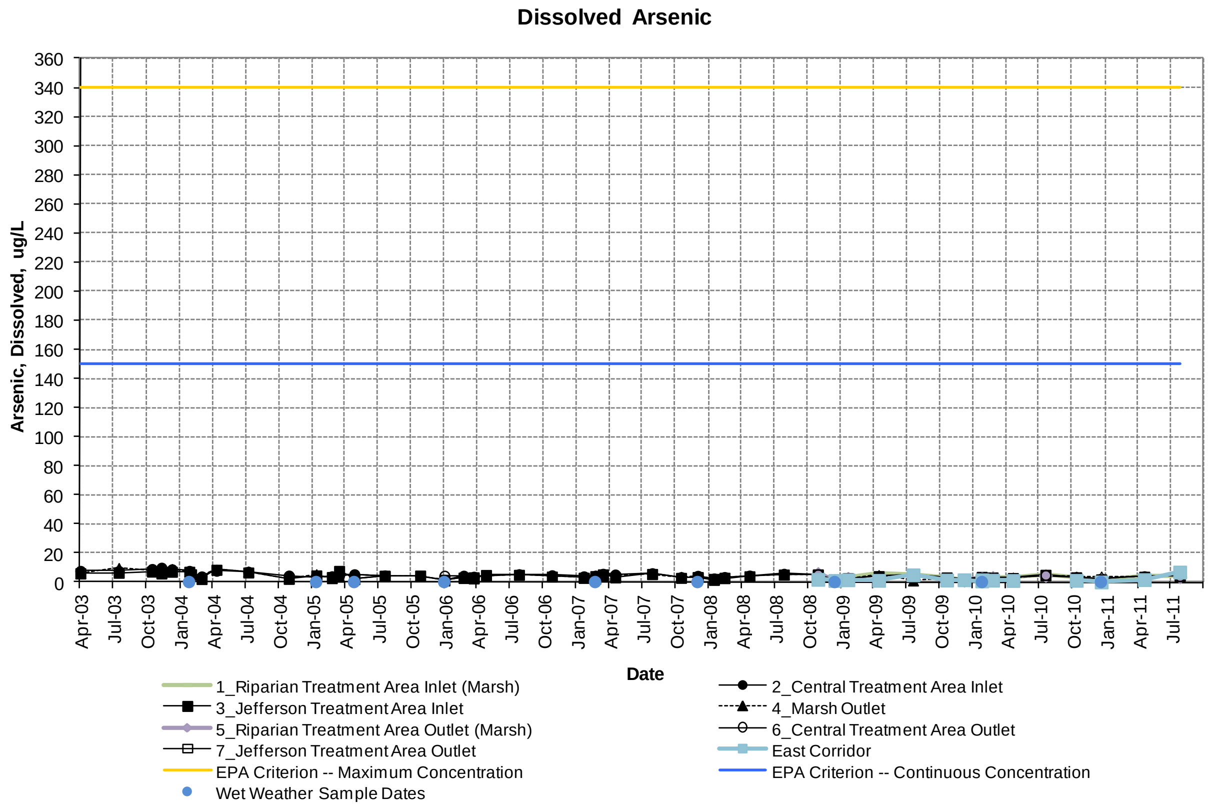


Figure 4-5. Water Sampling Results: Total Phosphorus



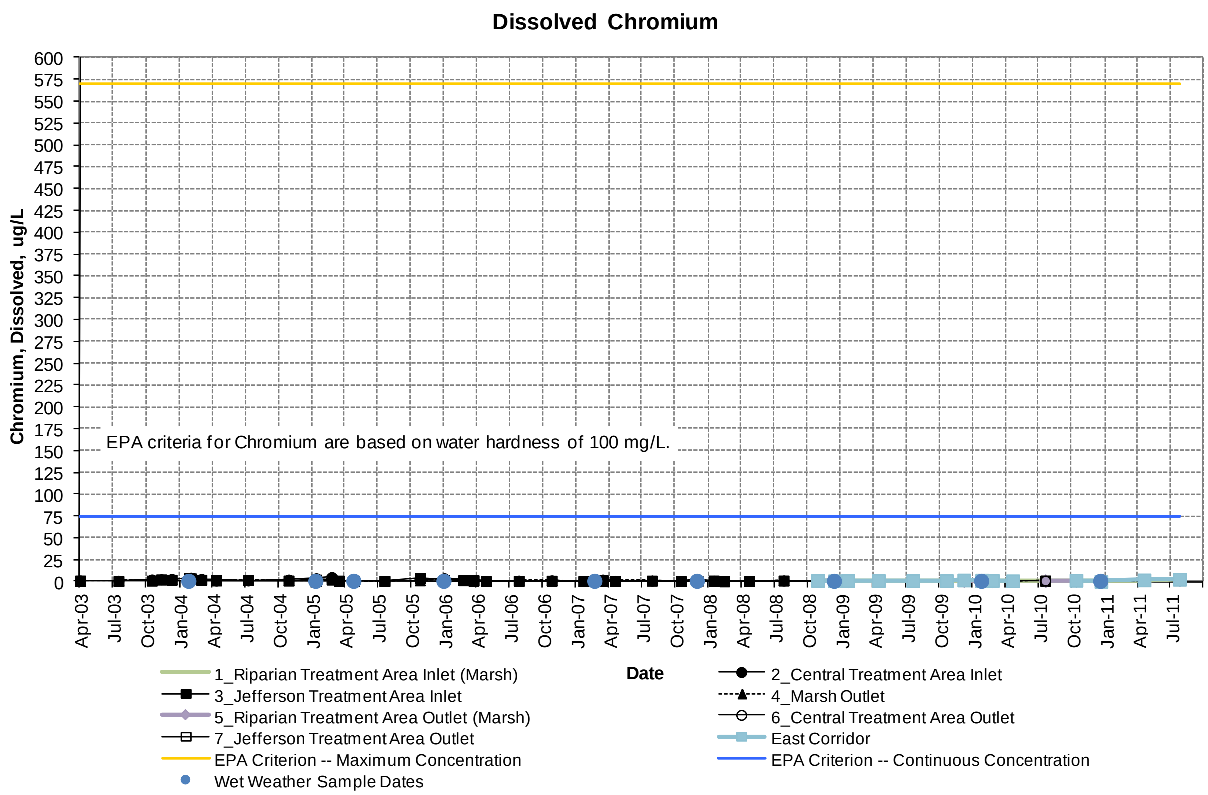
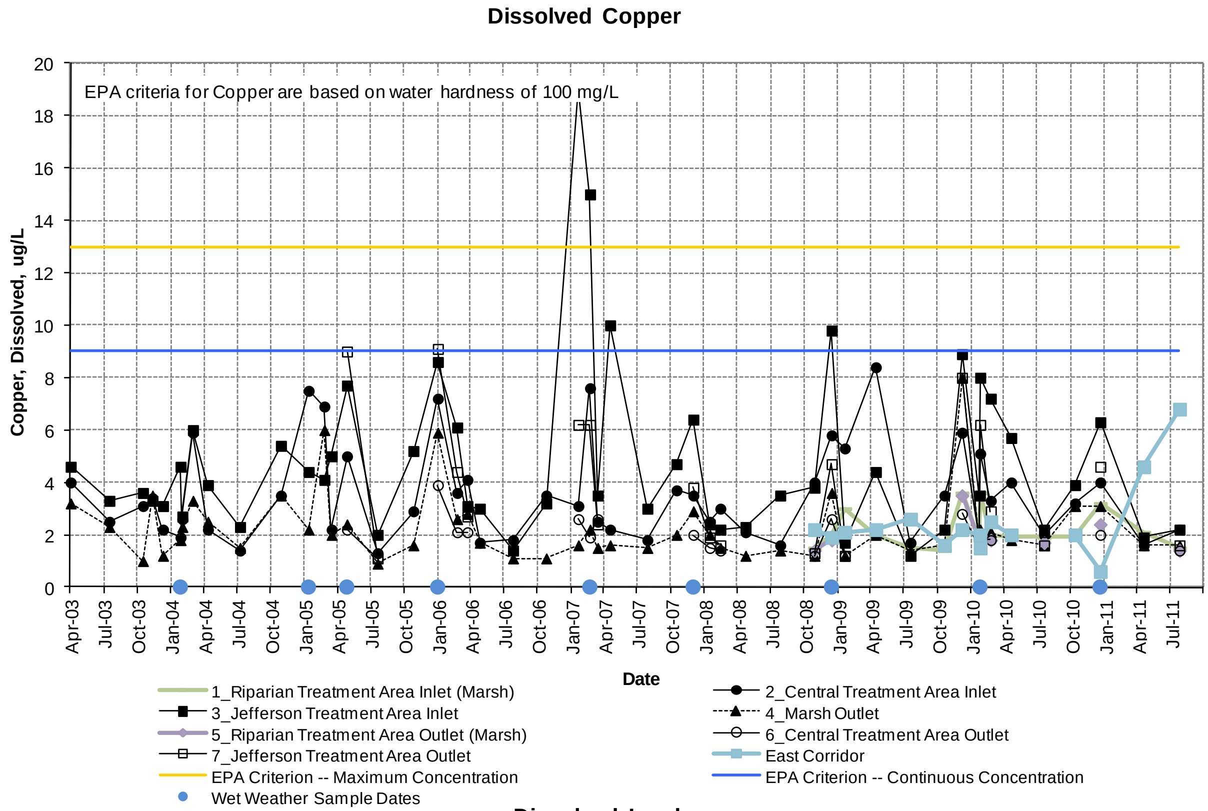


Figure 4-6. Water Sampling Results: Dissolved Arsenic and Chromium



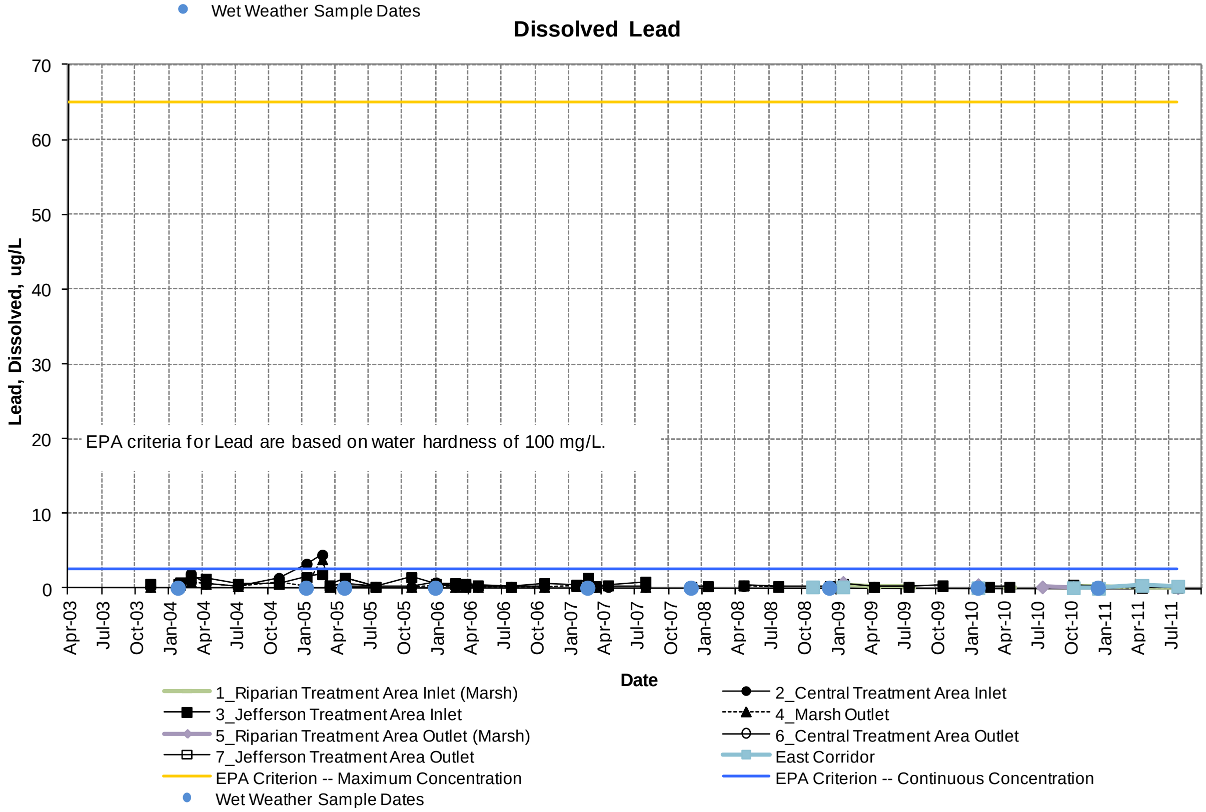
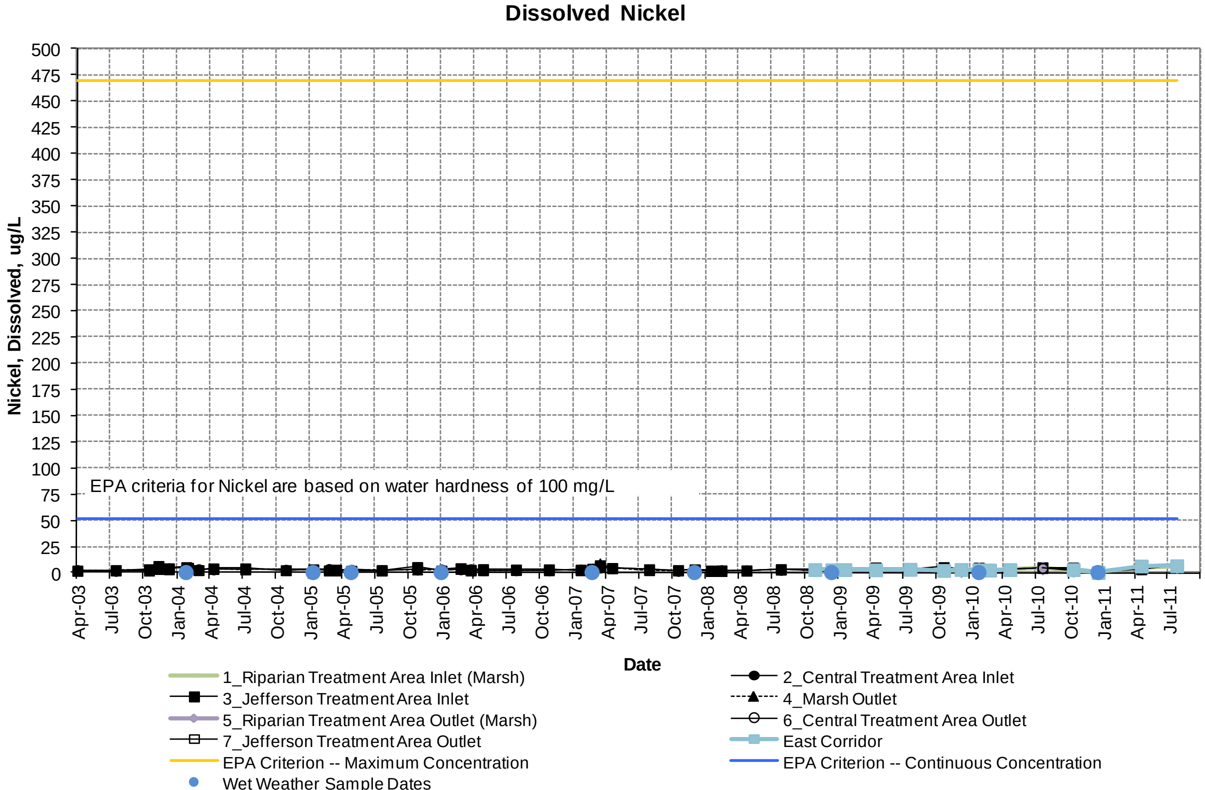


Figure 4-7. Water Sampling Results: Dissolved Copper and Lead



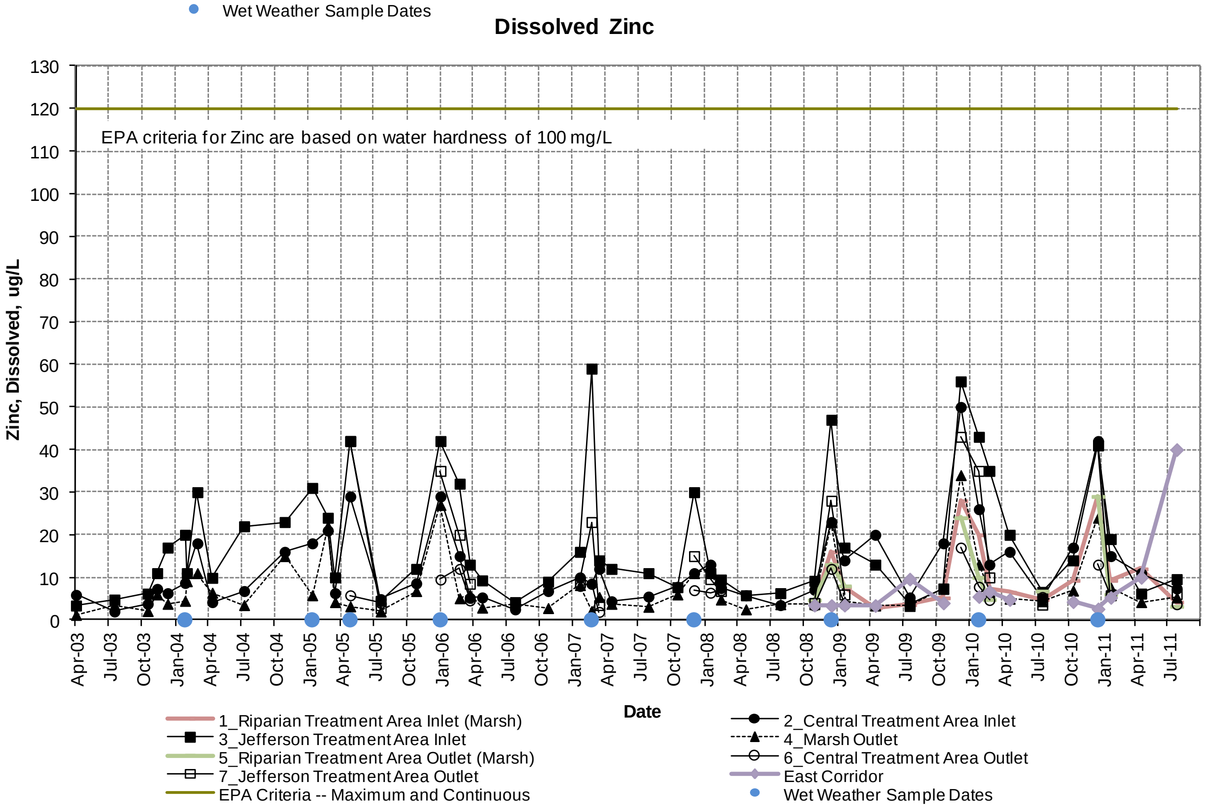
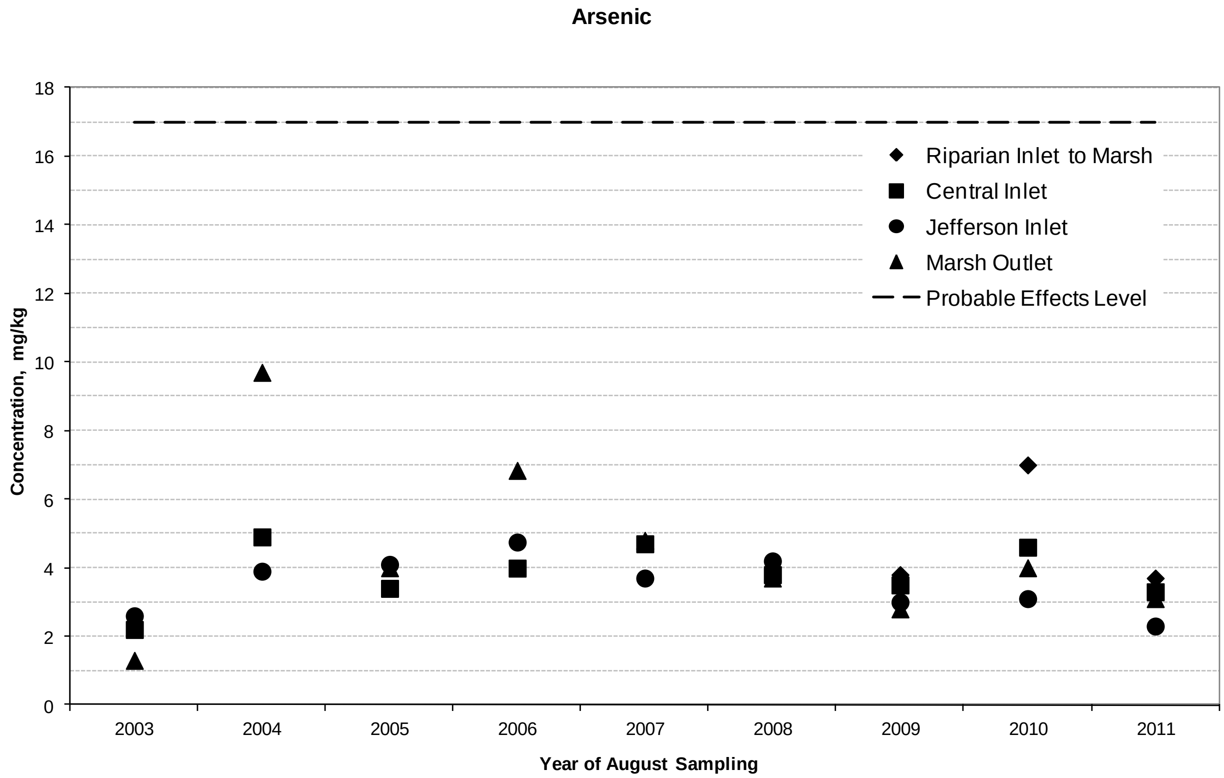


Figure 4-8. Water Sampling Results: Dissolved Nickel and Zinc



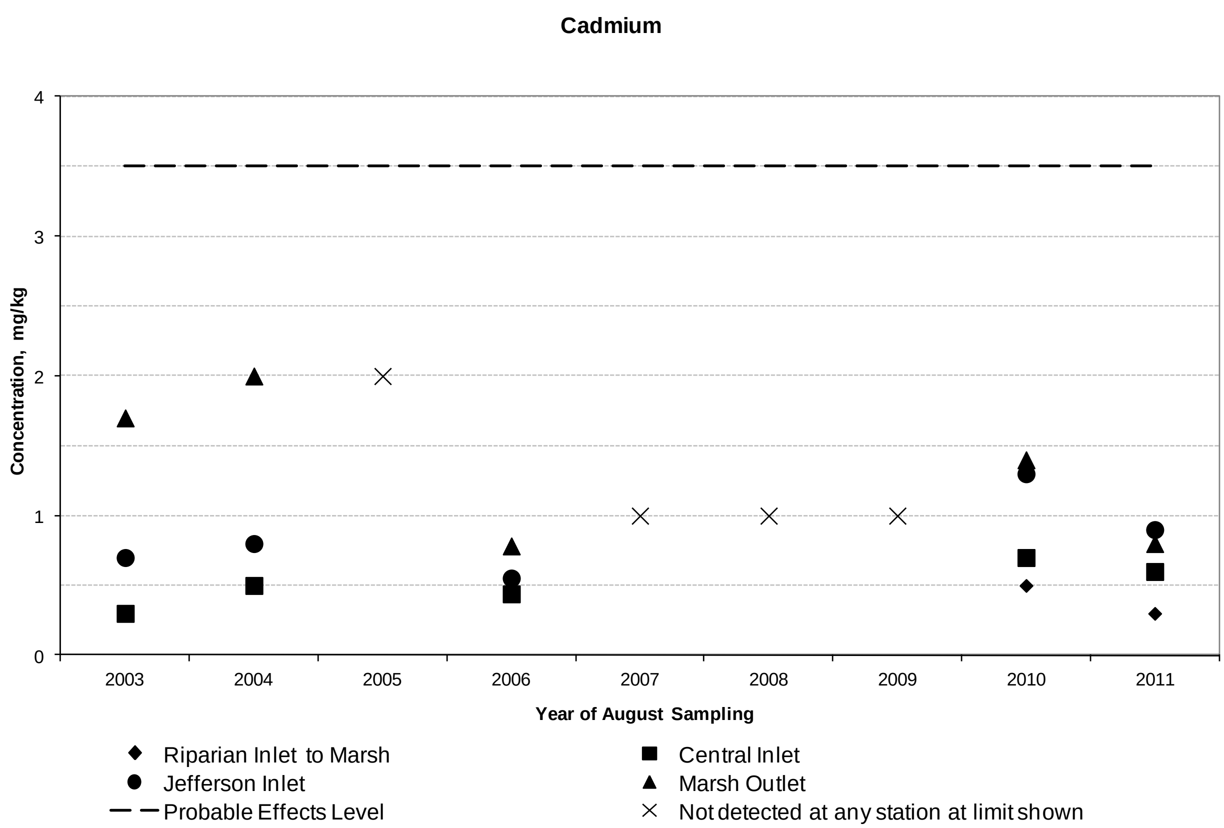
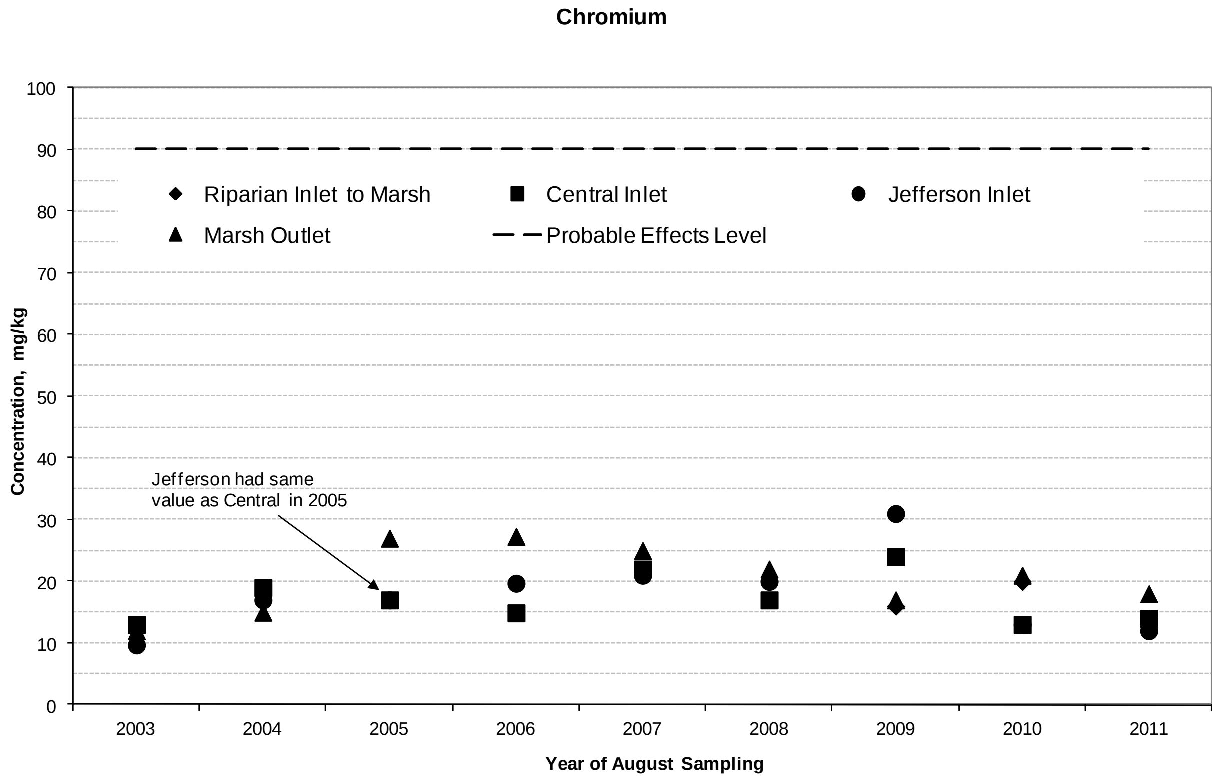


Figure 4-9. Sediment Quality Sampling Results: Arsenic and Cadmium



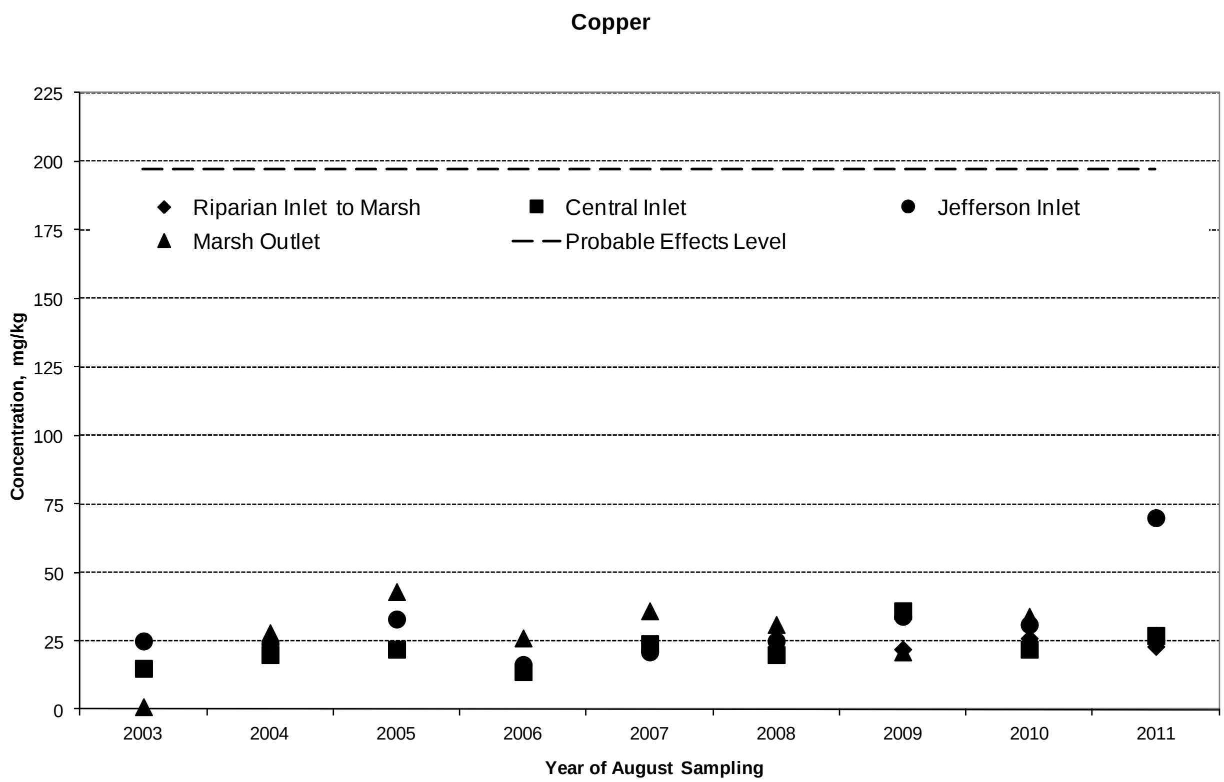
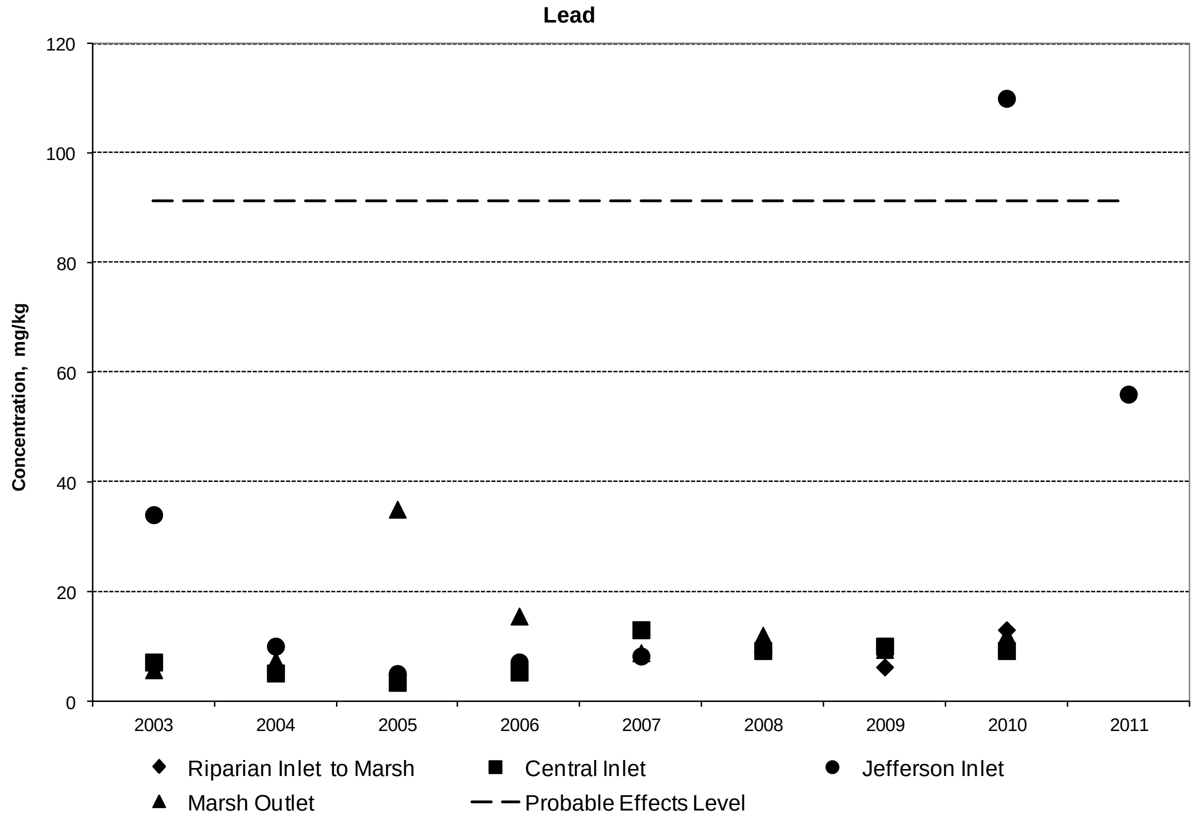


Figure 4-10. Sediment Quality Sampling Results: Chromium and Copper



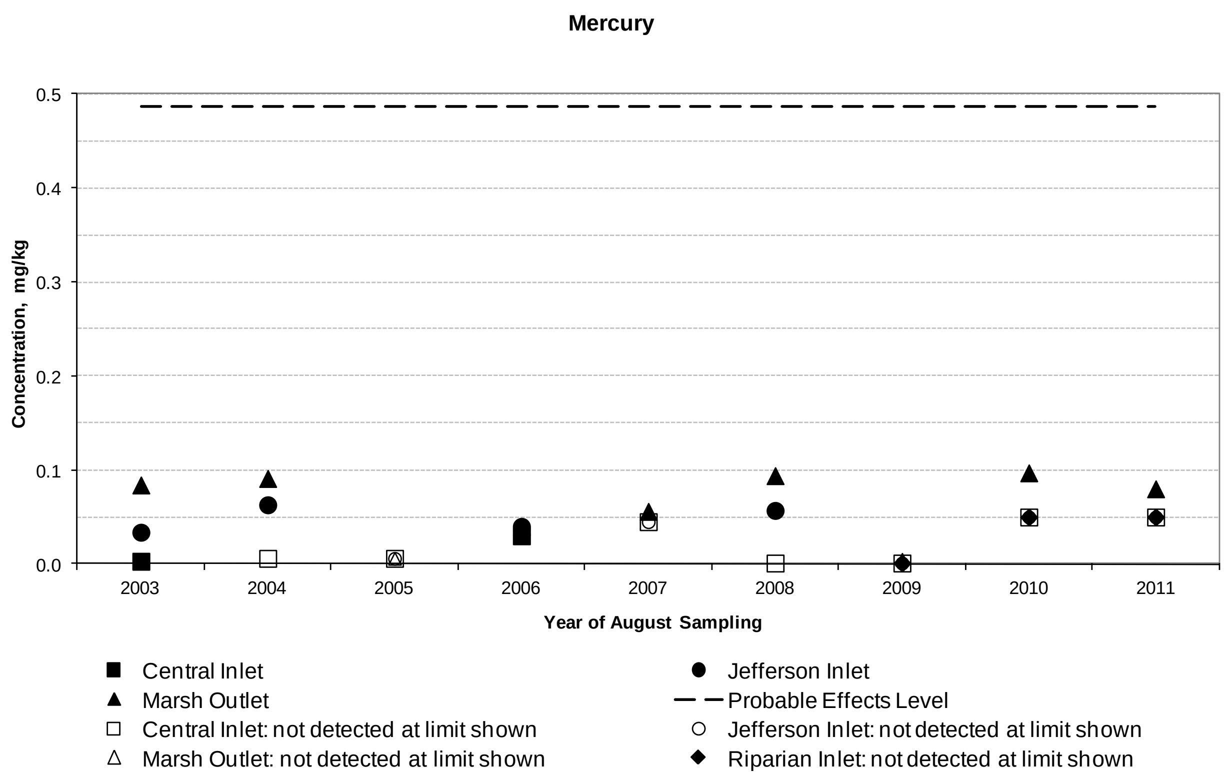


Figure 4-11. Sediment Quality Sampling Results: Lead and Mercury

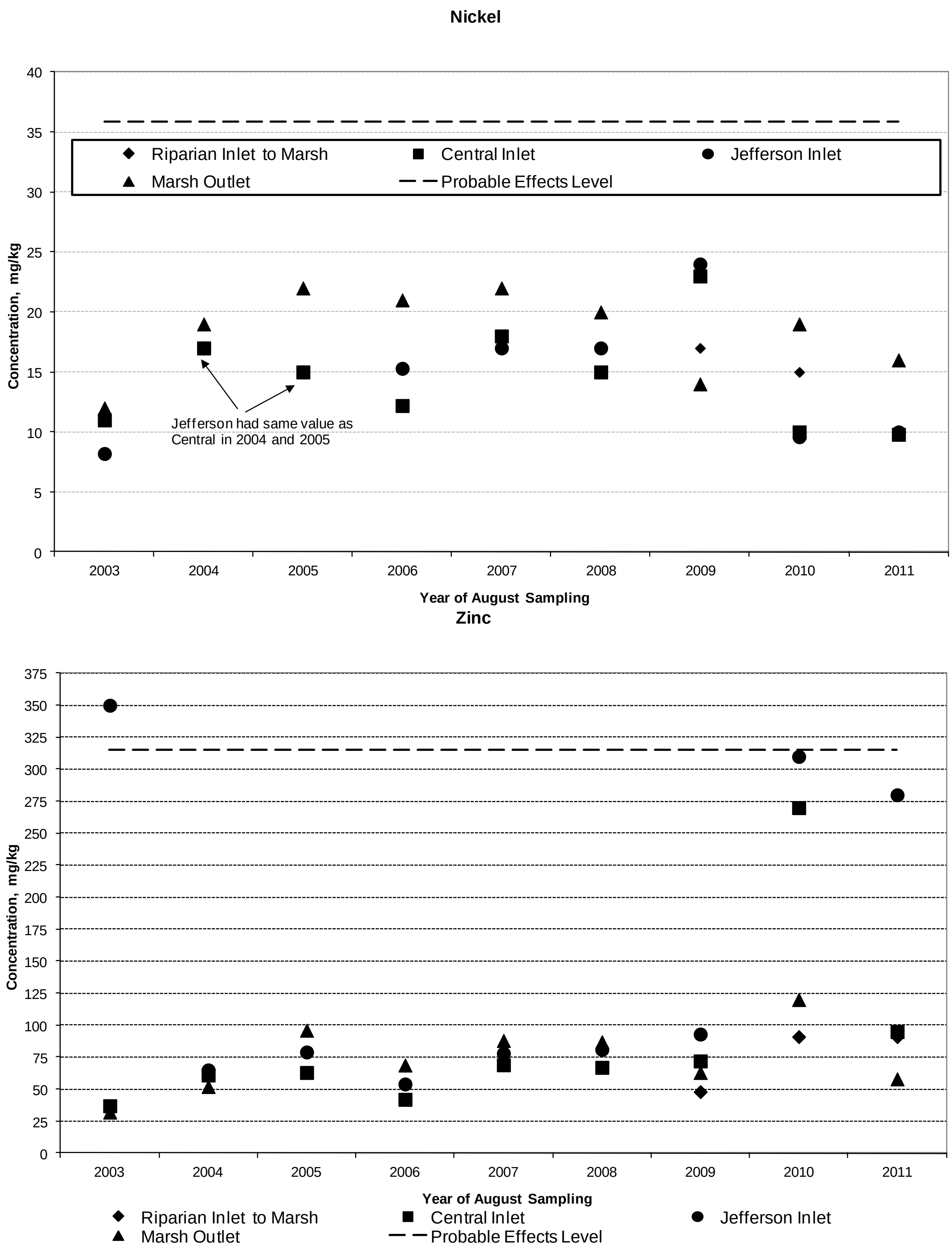


Figure 4-12. Sediment Quality Sampling Results: Nickel and Zinc

5.0 ANALYSIS OF WETLAND FUNCTIONS AND GOALS

Condition 11(d) of the SWRCB Certification requires an evaluation of pollutant removal efficiency, Special Condition 2(c) of the USACE permit requires an evaluation of progress toward wetland functional values, and Special Condition A(8) of the CCC permit requires an evaluation of progress toward fulfillment of the goals of the System. Therefore to address all of these conditions, this section discusses pollutant removal efficiency, wetland functions, and goals.

Pollutant Removal Efficiency

As discussed in Section 4, water quality data collected to date indicate low input levels of most monitored constituents that are well below EPA threshold criteria for potential biological effects. Considering such low levels, an analysis of removal efficiency has not been considered meaningful in prior annual reports, and remains so at this time. In addition, since the Marsh was modeled and the Environmental Impact Report (EIR) approved in 1992, the removal efficiency standard protocol for reporting BMP performance has been found to have several shortcomings (WWE and Geosyntec, 2007; Jones et al., 2008) and the U.S. EPA currently does not support the use of this metric (U.S. EPA, 2009). An assessment of effluent concentrations is believed to provide a much better indicator of the effectiveness/pollutant removal performance.

As in previous reports, an analysis of the year's data was prepared that compares average modeled versus average measured wet-weather effluent concentrations from the Marsh (Geosyntec 2011; copy provided as Appendix D to this report). The analysis shows that the average measured concentrations for all of the modeled metals (total copper (TCu), total lead (TPb), and total zinc (TZn)) are below the EIR predicted concentrations. The modeled averages for total suspended solids (TSS), total phosphorus (TP), dissolved phosphorus (DP), total nitrogen (TN) and nitrate (NO_3-N) were predicted to be lower than observed in the average sample concentrations at the Marsh outlet. However, most of the modeled concentrations fall within the range of observed concentrations. The exception is the modeled TN concentration, which is slightly lower than the minimum observed. Because Santa Monica Bay is considered nutrient poor, the slightly higher observed TN concentrations are not considered to be a concern.

In addition to comparing observed to modeled concentrations, comparisons were made to retention pond (wet ponds with significant wet pool volumes) effluent concentrations reported in the International BMP Database. The averages of observed concentrations in the effluent of the Marsh are very similar to the range of effluent quality values reported in the International BMP Database and the Marsh appears to perform better than the average retention pond for TSS, TCu, TPb, and TZn. This indicates the System is performing as well or better than other similarly designed BMPs with respect to these modeled constituents.

Wetland Functions

Wetland functions have been defined by various authors (Marble 1992, Novitsky et al. 1997, EPA 2001) to include the following:

- Water storage
- Nutrient removal and transformation
- Sediment retention
- Biological productivity and diversity

Previous sections of this report provide detailed analyses of the above functions in terms of measured indicators. Results of these analyses can be summarized as follows for the Marsh component of the System. A more detailed analysis will be conducted in future, when five years of data for the entire system has been collected.

Water Storage. Consistent with design of the System, additional water storage occurs during the summer months, with water levels maintained to an elevation of +4.0 above mean sea level.

Nutrient Removal and Transformation. Nutrient inputs into the Marsh are low. Therefore, as stated above and considering such low levels, an analysis of removal efficiency is not considered meaningful. Sediment data for metals indicate possible uncontrolled inputs from Ballona Creek at the outlet of the Marsh, but these levels are still well below potential for biological effects and show no trend of accumulation.

Sediment Retention. Sediment inputs to the Marsh are low due to the urbanized condition of the watershed. The data do not indicate any consistent trends of sediment accumulation.

Biological Productivity and Diversity. Bird monitoring data indicate an active, functioning marsh system. Diversity of breeding birds in the System as a whole has exceeded long-term performance criteria. Breeding species in 2011 included one Federal/State endangered species (least Bell's vireo) and four species of State and regional conservation concern (least bittern, common moorhen, cinnamon teal, and Virginia rail). Thus, the System is not only a significant "hotspot" of bird diversity in the region, it is also significant in its contribution toward recovery of endangered species and restoring the diversity of wetland bird species that were known to breed at the Ballona Wetlands historically.

Goals

Results of data analysis in comparison to performance criteria established for the System show the following:

- The System meets the 5-year criterion for minimal cover (less than 10 percent) by non-native plant species;
- The System meets the 5-year and final (10+ years) criteria for diversity of birds using the habitat for foraging or resting, and for breeding;
- The Western Corridor meets all 5-year biological success criteria; and
- The Marsh exceeds 5-year acreage goals for riparian and open water habitats.

6.0 PUBLIC EDUCATION AND OUTREACH

6.1 Summary of Permit Requirements

Requirements for management of the System include an education program for the community and homeowners. The purpose of the program is to familiarize the public with the wetlands, with the wetlands' relationship to the surrounding watershed, and recommend practices that are environmentally friendly, such as alternatives to caustic household cleaning chemicals and pesticides.

6.2 Education and Outreach Activities

Education and outreach activities are conducted on an ongoing basis. These activities include distribution of educational brochures, updated bird species lists for visitors who are bird watchers, and tour schedules, all of which are available free of charge in an information box located at the entrance to the Marsh.

Also as in previous years, general observations by the Marsh Manager and tour docents indicate that the Marsh is visited often by the general public and bird watchers. The Marsh has become known as a prime location for birding and noteworthy bird observations. Docents from the Friends of Ballona Wetlands conduct tours of the Marsh twice monthly, and a group of volunteer bird watchers conduct monthly censuses of bird species and abundance.

7.0 REFERENCES

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APPENDIX A

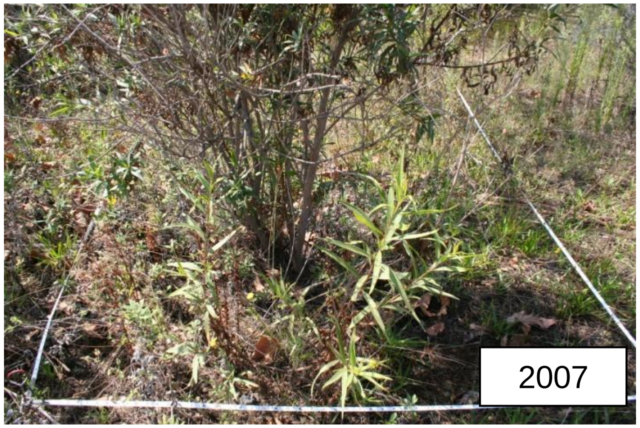
Site Photographs

2003

2004

2005

2006



2007

2008

2009

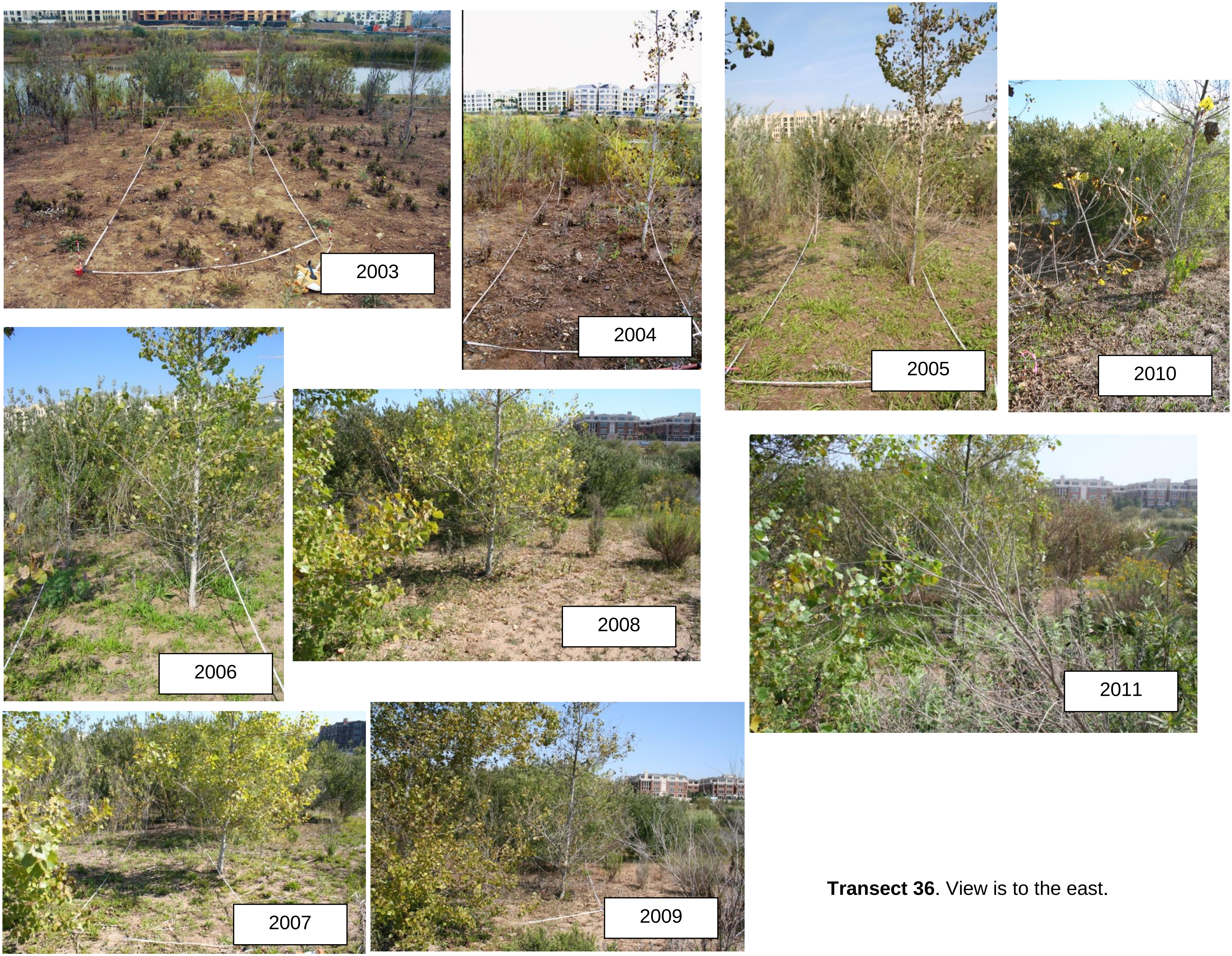
2010

2011

Transect 11

Transect 17. View is to the south.

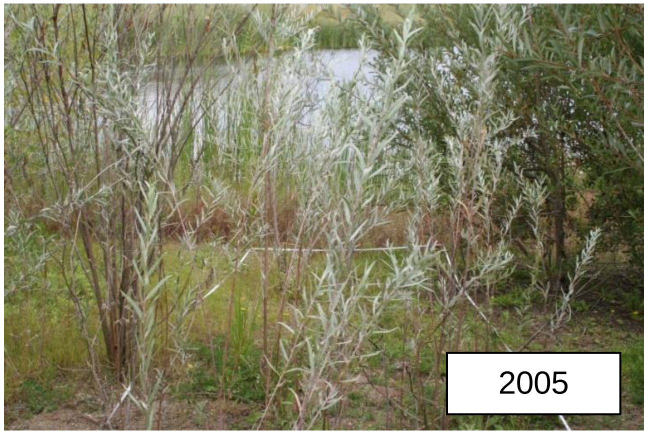
Transect 21. View is to the southwest. Sycamore is prominently in view in 2003 and 2004, but this view was obscured by significant willow growth in 2005 that continued through 2011.



Transect 36. View is to the east.


2003

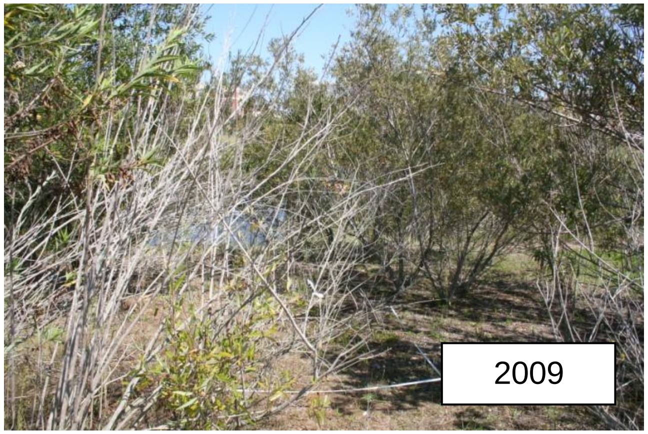

2004

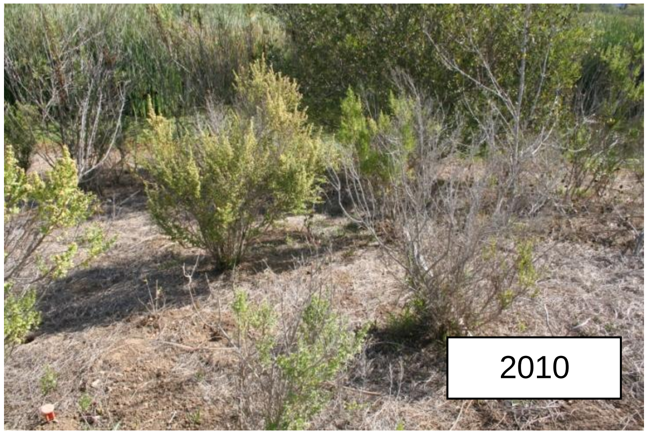

2005


2006


2007

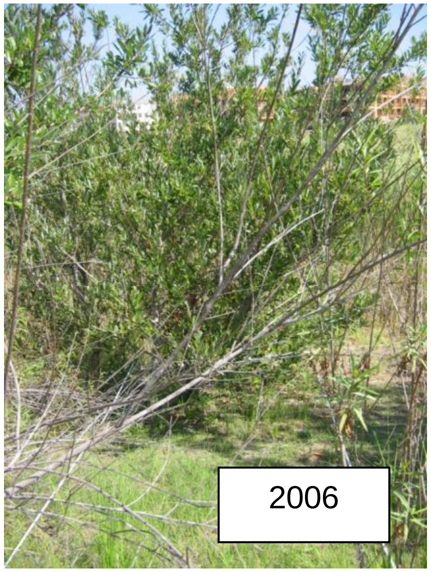

2008


2009

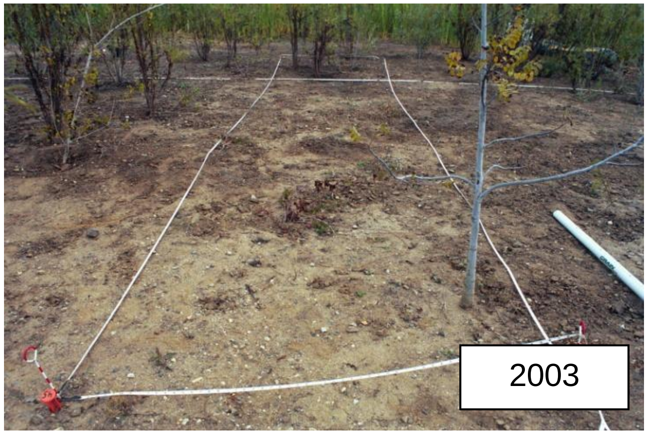

2010

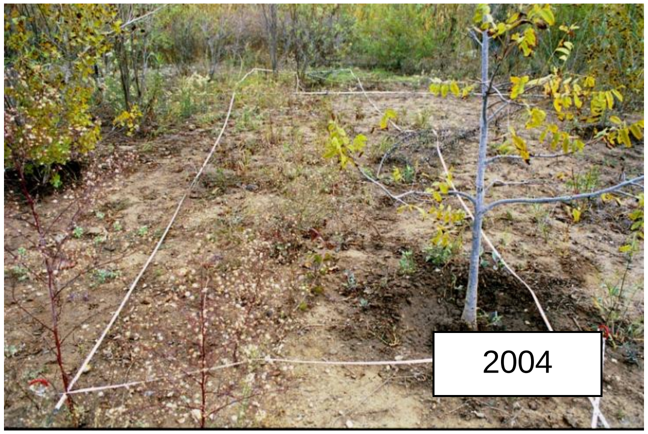

2011

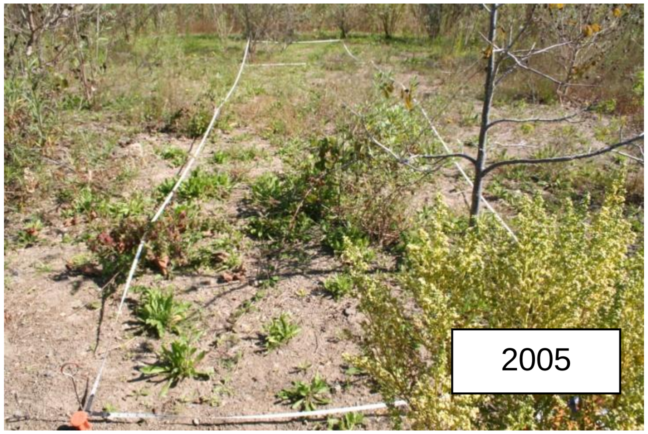
Transect 41. View is to the northeast.

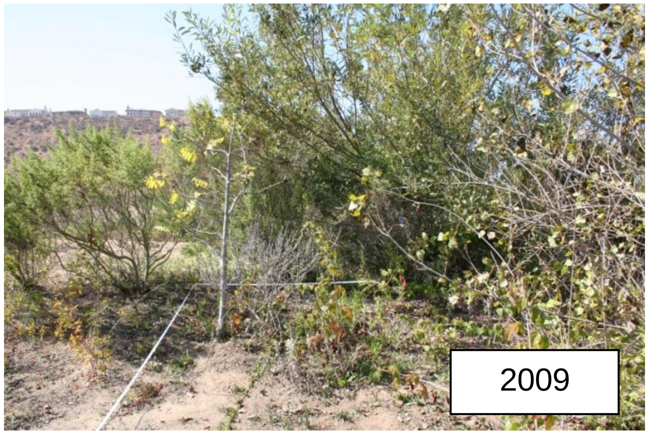


Transect 43. View is from west side of Marsh looking east toward Lincoln Boulevard.

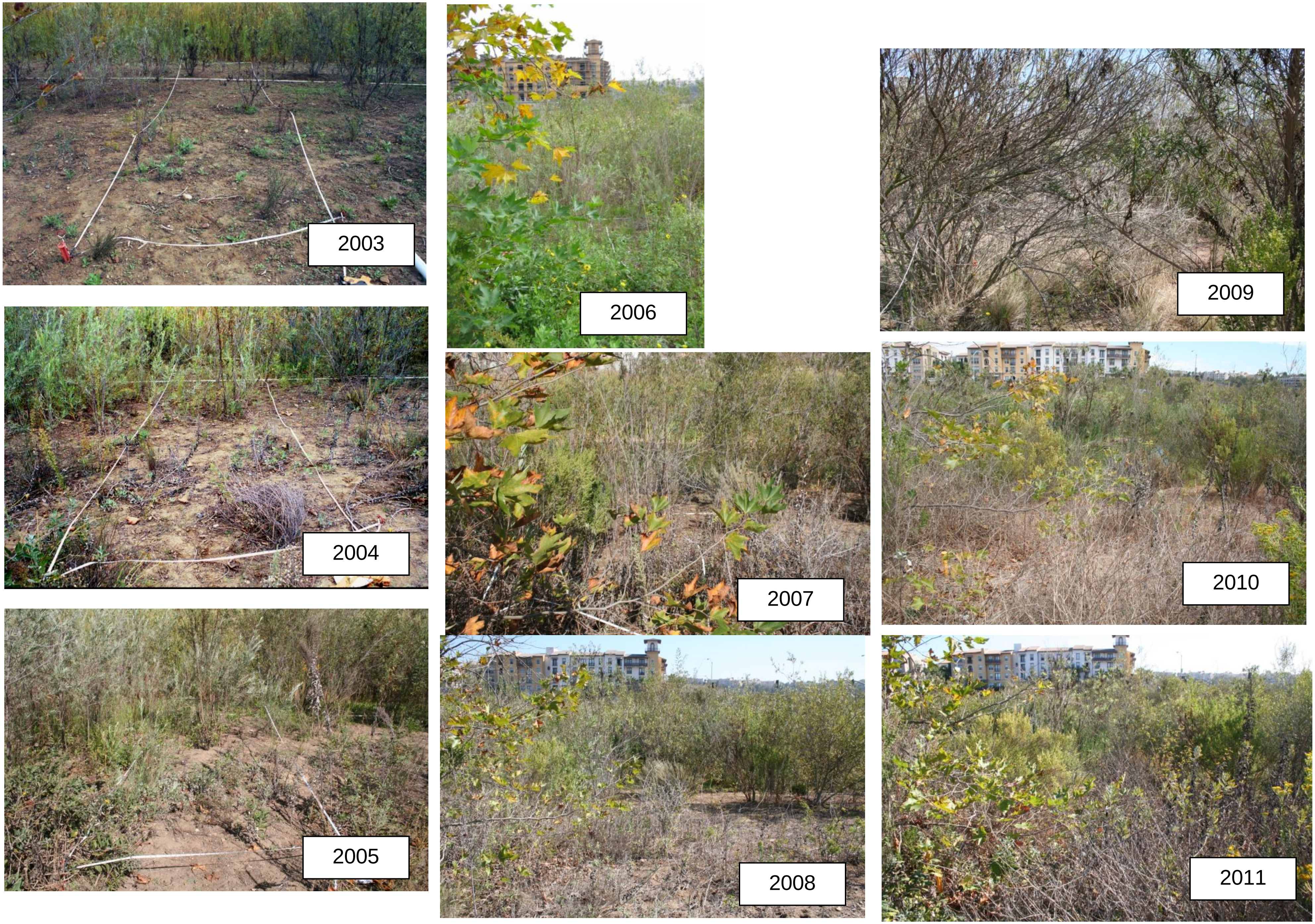








Transect 45. View is to the east.



Transect 48. View is from southwest side of Marsh looking east..

South end of Freshwater Marsh, completed in 2008. Transect J in September of 2009 (top), 2010 (middle), and 2011 (bottom).

Representative photographs of vegetation transects in the Riparian Corridor, September 2008 - 2011. All views are toward the north.

APPENDIX B

Bird Species List

BALLONA FRESHWATER WETLANDS BIRD LIST

Updated November 20, 2011

Includes all species observed utilizing habitat in the Freshwater Marsh and Riparian Corridor. Species confirmed or strongly suspected of nesting, attempting to nest, or establishing a breeding territory in a given year are indicated in parentheses. Unusual species are marked with an asterisk (*) and reports of sightings would be appreciated (see contact information below). This is a screened list. Only reliable observations of species utilizing the marsh in some manner (resting, foraging, and/or nesting) are counted. Errors or additions should be reported to the Preserve Manager, Edith Read (marshmistress@msn.com).

SWANS, GEESE, AND DUCKS
Mute Swan (introduced)*
Tundra Swan*
Brant*
Greater White-fronted Goose*
Ross's Goose
Canada Goose (2006-2011)
Cackling Goose*
Wood Duck*
Mandarin Duck (introduced)
Green-winged Teal
Mallard (2003-2011)
Northern Pintail
Blue-winged Teal
Cinnamon Teal (2008-2011)
Northern Shoveler
Gadwall (2005-2011)
American Wigeon
Canvasback
Redhead
Ring-necked Duck
Greater Scaup
Lesser Scaup
Common Goldeneye
Bufflehead
Common Merganser
Hooded Merganser
Red-breasted Merganser*
Ruddy Duck (2003-2011)

NEW WORLD QUAIL
California Quail*

LOONS
Red-throated Loon*
Pacific Loon*
Common Loon*

GREBES
Pied-billed Grebe (2003-2011)
Horned Grebe*
Eared Grebe
Western Grebe

CORMORANTS
Double-crested Cormorant

PELICANS
American White Pelican*
Brown Pelican*

BITTERNS AND HERONS
American Bittern*
Least Bittern (2005-2011)
Great Blue Heron
Little Blue Heron*
Great Egret
Snowy Egret
Cattle Egret*
Green Heron (2005, 2008-2011)
Black-crowned Night-Heron

IBISES
White-faced Ibis

NEW WORLD VULTURES
Turkey Vulture

OSPREY
Osprey

KITES, EAGLES, HAWKS AND ALLIES
White-tailed Kite
Northern Harrier
Sharp-shinned Hawk
Cooper's Hawk
Ferruginous Hawk*
Red-shouldered Hawk
Red-tailed Hawk

FALCONS
American Kestrel
Peregrine Falcon
Merlin

RAILS, GALLINULES, AND COOTS
Virginia Rail (2009-2011)
Sora
Common Moorhen (2008-2011)
American Coot (2003-2011)

PLOVERS AND LAPWINGS
Black-bellied Plover
Semipalmated Plover
Killdeer (2004-2011)

STILTS AND AVOCETS
Black-necked Stilt ('03,'07,'08,'11; attempted 2009, 2010)
American Avocet

SANDPIPERS, PHALAROPES, AND ALLIES
Greater Yellowlegs
Lesser Yellowlegs*
Solitary Sandpiper*
Willet
Spotted Sandpiper
Whimbrel
Long-billed Curlew*
Marbled Godwit*
Western Sandpiper
Least Sandpiper
Baird's Sandpiper*
Pectoral Sandpiper*
Sanderling*
Dunlin*
Short-billed Dowitcher
Long-billed Dowitcher
Wilson's Snipe
Wilson's Phalarope
Red-necked Phalarope

GULLS AND TERNS
Bonaparte's Gull
Mew Gull*
Ring-billed Gull
California Gull
Herring Gull
Western Gull
Glaucous-winged Gull
Caspian Tern
Elegant Tern*
Forster's Tern
Least Tern

PIGEONS AND DOVES
Rock Pigeon (introduced)
White-winged Dove*
Mourning Dove (2003-2011)
Eurasian Collared Dove*

BARN OWLS
Barn Owl*

TYPICAL OWLS
Short-eared Owl*

GOATSUCKERS
Lesser Nighthawk*

SWIFTS
Black Swift*
Vaux's Swift
White-throated Swift

HUMMINGBIRDS
Black-chinned Hummingbird
Anna's Hummingbird (2006-2011)
Allen's Hummingbird (2006-2011)
Rufous Hummingbird*

Cliff Swallow
Barn Swallow (2003-2010)

KINGFISHERS

Belted Kingfisher

WOODPECKERS AND ALLIES

Acorn Woodpecker*
Downy Woodpecker
Nuttall's Woodpecker*
Northern Flicker

TYRANT FLYCATCHERS

Olive-sided Flycatcher
Western Wood-Pewee
Willow Flycatcher
Hammond's Flycatcher
Dusky Flycatcher
Gray Flycatcher*
Pacific-slope Flycatcher
Black Phoebe (2003-2011)
Say's Phoebe
Eastern Phoebe*
Vermilion Flycatcher*
Ash-throated Flycatcher
Tropical Kingbird*
Cassin's Kingbird
Western Kingbird

SHRIKES

Loggerhead Shrike

VIREOS

Least Bell's Vireo*(2010-2011)
Cassin's Vireo
Warbling Vireo

JAYS, MAGPIES, AND CROWS

American Crow
Common Raven

SWALLOWS

Purple Martin*
Tree Swallow (FWM nest boxes 2004-2011)
Violet-green Swallow
Northern Rough-winged Swallow
Bank Swallow*

BUSHTITS

Bushtit (2006-2011)

WRENS

Bewick's Wren*
House Wren
Marsh Wren

GNATCATCHERS

Blue-gray Gnatcatcher

KINGLETS

Ruby-crowned Kinglet

THRUSHES

American Robin
Swainson's Thrush
Hermit Thrush

MOCKINGBIRDS AND THRASHERS

Northern Mockingbird (2006-2011)
Sage Thrasher*
California Thrasher*

STARLINGS

European Starling (introduced; 2010)

WAGTAILS AND PIPITS

Red-throated Pipit*
American Pipit

WAXWINGS

Cedar Waxwing*

SILKY-FLYCATCHERS

Phainopepla*

WOOD WARBLERS

Northern Parula*
Orange-crowned Warbler (suspected 2010)
Nashville Warbler
Virginia's Warbler
Yellow Warbler
Chestnut-sided Warbler*
Yellow-rumped Warbler
"Audubon's" Warbler
"Myrtle" Warbler
Black-throated Gray Warbler
Townsend's Warbler
Hermit Warbler
Palm Warbler*
Blackpoll Warbler*
Prothonotary Warbler*
Northern Waterthrush*
MacGillivray's Warbler
Common Yellowthroat (2003-2011)
Virgina's Warbler*
Wilson's Warbler
Yellow-breasted Chat

NEW WORLD SPARROWS

California Towhee (2009-2011)
Spotted Towhee*
American Tree Sparrow*
Chipping Sparrow
Clay-colored Sparrow*
Brewer's Sparrow*
Vesper Sparrow*
Lark Sparrow*
Savannah Sparrow
Fox Sparrow
Song Sparrow (2003-2011)
Lincoln's Sparrow
Swamp Sparrow*
Golden-crowned Sparrow
White-crowned Sparrow
White-throated Sparrow*
Dark-eyed Junco*

CARDINALS AND ALLIES

Western Tanager
Black- headed Grosbeak
Blue Grosbeak (2011)
Lazuli Bunting

BLACKBIRDS AND ALLIES

Bobolink*
Red-winged Blackbird (2003-2011)
Tricolored Blackbird*
Western Meadowlark
Yellow-headed Blackbird
Great-tailed Grackle (2003-2011)
Brown-headed Cowbird (2007, 2010-2011)
Hooded Oriole
Bullock's Oriole

FINCHES AND ALLIES

House Finch (2006-2011)
Lesser Goldfinch (2006-2011)
American Goldfinch (2010, 2011)

OLD WORLD SPARROWS

House Sparrow (introduced)

WEAVERS

Orange Bishop (introduced)

ESTRILDID FINCHES

Nutmeg Mannikin (introduced)

APPENDIX C

Water and Sediment Quality Data

Table 1
Freshwater Marsh Sampling
Summary of 2010-2011 Water Quality Results

Analyte	Method	Units	Total/ Dissolved	Riparian Corridor Outlet (SP-1)									Central Drain Inlet (SP-2)									Jefferson Inlet (SP-3)									Jefferson Outlet (SP-4)			
				Wet Weather 1/27/2010	2/25/2010	4/22/2010	7/21/2010	10/14/2010	Wet Weather 12/22/2010	1/26/2011	4/20/2011	7/27/2011	Wet Weather 1/27/2010	2/25/2010	4/22/2010	7/21/2010	10/14/2010	Wet Weather 12/22/2010	1/26/2011	4/20/2011	7/27/2011	Wet Weather 1/27/2010	2/25/2010	4/22/2010	7/21/2010	10/14/2010	Wet Weather 12/22/2010	1/26/2011	4/20/2011	7/27/2011	Wet Weather 1/27/2010	2/25/2010	4/22/2010	7/21/2010
FIELD PARAMETERS																																		
Dissolved oxygen	Field	mg/l	T	5.7	6.9	1.3	2.9	8.3	9.8	13	1.2	17	4.0	4.0	2.5	0.90	8.4	9.9	13	3.9	11	0.70	2.7	4.7	0.30	9.1	9.7	16	7.8	7.8	4.9	8.1	7.3	0.30
pH	Field	pH Units	T	6.7	7.3	6.8	7.0	6.6	8.0	7.5	6.7	7.8	6.5	6.5	6.7	6.9	7.0	7.6	7.4	6.7	7.8	6.5	6.5	6.7	6.9	7.0	7.6	7.5	6.8	7.7	6.5	6.7	7.0	6.9
Specific conductance	Field	umhos/cm	T	680	1136	964	1853	1095	405	2797	1625	1677	565	1136	1002	1874	1394	245	2064	1934	1922	653	591	924	1837	1585	408	2038	1965	1951	464	596	1009	1837
Temperature	Field	F	T	53	59	68	75	63	62	54	68	74	54	60	68	78	69	61	57	68	83	52	58	66	75	70	62	55	67	74	52	59	67	75
Turbidity	Field	NTU	T	21	8.7	15	13	9.2	0.27	8.7	7.0	7.5	19	6.5	20	11	8.9	4.9	8.1	3.0	4.8	12	8.2	15	19	9.3	2.4	8.8	3.7	5.2	5.7	6.7	9.6	19
BACTERIA																																		
ENTEROCOCCI	SM 9230B	MPN/100 m	T	980	NA	1.0	17	>2419	NA	48	19	2419	866	NA	17	50	47	NA	1120	517	2419	1046	NA	365	102	273	NA	110	18	2419	33	NA	26	45
FECAL COLIFORMS	SM 9221	MPN/100 m	T	1600	NA	200	400	900	NA	200	80	8000	1600	NA	5000	2 U	300	NA	140	200	2300	1600	NA	17000	200	300	NA	500	30	500	34	NA	50	200
TOTAL COLIFORMS	SM 9221	MPN/100 m	T	1600	NA	2300	1100	900	NA	3000	300	50000	1600	NA	90000	800	>1600	NA	2300	400	30000	1600	NA	160000	400	>1600	NA	2300	240	>1600	1600	NA	130	400
TOXICITY																																		
96-HOUR ACUTE AQUATIC TOXICITY (FATHEAD MINNOW)	EPA/821/R-02-012	% Survival	T	100	NA	100	100	100	NA	100	100	100	100	NA	100	100	100	NA	100	100	100	100	NA	100	100	100	NA	100	100	100	100	NA	100	100
CHRONIC AQUATIC TOXICITY (FATHEAD MINNOW LARVAE SURVIVAL BIOASSAY)	EPA 821-R-02-013	NOEC %	T	100	NA	100	100	100	NA	100	100	100	100	NA	100	100	100	NA	100	100	100	100	NA	100	100	100	NA	100	100	100	100	NA	100	100
CHRONIC AQUATIC TOXICITY (FATHEAD MINNOW LARVAE GROWTH BIOASSAY)	EPA 821-R-02-013	NOEC %	T	100	NA	100	100	100	NA	100	100	100	100	NA	100	100	100	NA	100	100	100	100	NA	100	100	100	NA	100	100	100	100	NA	100	100
96-HOUR ACUTE AQUATIC TOXICITY (WATER FLEA)	EPA/821/R-02-012	% Survival	T	100	NA	100	100	100	NA	100	100	100	100	NA	100	100	100	NA	100	100	100	100	NA	100	100	100	NA	100	100	100	100	NA	100	100
CHRONIC AQUATIC TOXICITY (WATER FLEA SURVIVAL BIOASSAY)	EPA 821-R-02-013	NOEC %	T	100	NA	100	100	100	NA	100	100	100	100	NA	100	100	100	NA	100	100	100	100	NA	100	100	100	NA	100	100	100	100	NA	100	100
CHRONIC AQUATIC TOXICITY (WATER FLEA REPRODUCTION BIOASSAY)	EPA 821-R-02-013	NOEC %	T	100	NA	<100	100	100	NA	100	100	100	100	NA	<100	100	100	NA	100	100	100	100	NA	100	100	100	NA	100	100	100	100	NA	<100	100
NUTRIENTS																																		
AMMONIA (AS N)	EPA 350.2	mg/l	T	0.26	0.18	0.26	0.18	0.32	0.070	0.18	0.27	0.35	0.31	0.24	0.90	0.43	0.47	0.090	0.56	0.11	0.28	0.29	0.54	0.11	0.44	0.70	0.080	0.69	0.27	0.40	0.25	0.070	0.050	0.30
NITRATE (AS N)	EPA 300.0	mg/l	T	0.69	0.1 U	0.05 J	0.02 J	0.007 U	0.62	0.64	0.05 J	0.007 U	1.5	0.61	1.1	0.47	0.55	2.3	0.57	0.05 J	0.98	1.4	0.40	0.44	0.22	0.35	0.68	1.9	0.29	0.46	0.84	0.1 U	0.005 J	0.06 J
NITRITE (AS N)	EPA 300.0	mg/l	T	0.1 U	0.1 U	0.04 J	0.02 J	0.005 U	0.02 J	0.05 J	0.005 U	0.005 U	0.1 U	0.1 U	0.09 J	0.05 J	0.03 J	0.04 J	0.03 J	0.005 U	0.03 J	0.1 U	0.1 U	0.07 J	0.04 J	0.03 J	0.02 J	0.11	0.005 U	0.04 J	0.1 U	0.1 U	0.03 J	0.03 J
ORTHOPHOSPHATE (AS P)	EPA 365.2	mg/l	D	0.33	0.35	1.0	0.55	0.51	0.25	0.36	0.78	0.67	0.28	0.21	0.53	0.51	0.37	0.17	0.15	0.44	0.74	0.16	0.18	0.39	0.54	0.48	0.090	0.20	0.39	0.83	0.26	0.18	0.49	0.54
TOTAL KJELDAHL NITROGEN	EPA 351.2	mg/l	T	1.7	1.3	1.6	1.2	2.5	0.78	1.4	1.4	2.1	1.4	1.2	2.5	1.8	2.3	0.71	2.2	0.98	2.2	1.8	1.9	1.2	1.7	3.1	0.53	2.4	0.74	2.6	1.5	1.1	1.4	1.3
TOTAL PHOSPHORUS	EPA 365.4	mg/l	T	0.43	0.61	1.2	0.74	0.88	0.33	0.59	1.3	0.96	0.32	0.32	0.57	0.62	0.60	0.25	0.25	0.54	0.98	0.22	0.28	0.50	0.61	0.81	0.13	0.22	0.46	1.1	0.32	0.30	0.59	0.67
GENERAL/MISCELLANEOUS																																		
BICARBONATE ALKALINITY (AS CAC	EPA 310.1	mg/l	T	146	268	NA	358	NA	72	400	NA	352	114	168	NA	342	NA	76	266	NA	370	92	122	NA	340	NA	32	282	NA	378	84	146	NA	340
BOD 5 DAY	EPA 405.1	mg/l	T	10	5.0	NA	2 U	NA	2 U	4 J	NA	8.0	5 U	5.0	NA	5 U	NA	2 J	6.0	NA	16	9.0	5 U	NA	5 U	NA	2 J	4 J	NA	20	5 U	6.0	NA	5 U
CARBONATE ALKALINITY (AS CACO	EPA 310.1	mg/l	T	1 U	1 U	NA	1 U	NA	0.9 U	0.9 U	NA	0.9 U	1 U	1 U	NA	1 U	NA	0.9 U	0.9 U	NA	0.9 U	1 U	1 U	NA	1 U	NA	0.9 U	0.9 U	NA	0.9 U	1 U	1 U	NA	1 U
CHEMICAL OXYGEN DEMAND	EPA 410.4	mg/l	T	57	33	NA	34	NA	11	15	NA	42	56	10	NA	40	NA	16	20	NA	48	79	15	NA	45	NA	16	22	NA	54	49	17	NA	39
CHLORIDE	EPA 300.0	mg/l	T	81	414	NA	229	NA	32	192	NA	211	86	105	NA	254	NA	38	335	NA	275	70	60	NA	254	NA	17	302	NA	275	116	58	NA	251
HARDNESS (AS CACO3)	EPA 130.2	mg/l	T	236	440	376	648	359	144	670	520	564	182	256	294	584	440	160	478	328	566	174	174	184	580	486	86	450	320	568	146	212	312	588
HYDROXIDE ALKALINITY (AS CACO:	EPA 310.1	mg/l	T	1 U	1 U	NA	1 U	NA	0.9 U	0.9 U	NA	0.9 U	1 U	1 U	NA	1 U	NA	0.9 U	0.9 U	NA	0.9 U	1 U	1 U	NA	1 U	NA	0.9 U	0.9 U	NA	0.9 U	1 U	1 U	NA	1 U
SALINITY	SM 2520	mg/l	T	100	NA	NA	800	NA	NA	800	NA	800	100	NA	NA	800	NA	NA	800	NA	900	100	NA	NA	800	NA	NA	800	NA	900	0.1 U	NA	NA	800
TOTAL ALKALINITY (AS CACO3)	EPA 310.1	mg/l	T	146	268	NA	358	NA	72	400	NA	352	114	168	NA	342	NA	76	266	NA	370	92	122	NA	340	NA	32	282	NA	378	84	146	NA	340
TOTAL DISSOLVED SOLIDS	EPA 160.1	mg/l	T	392	728	644	1276	676	204	1244	1040	1140	252	460	624	1196	908	226	1124	608	1260	284	332	516	1176	936	0.2 U	716	608	1244	228	376	660	1192
TOTAL ORGANIC CARBON	EPA 415.1	mg/l	T	6.1	10	NA	91	NA	22	96	NA	9.4	6.8	8.8	NA	89	NA	19	72	NA	13	9.9	13	NA	90	NA	28	61	NA	14	6.0	9.4	NA	90
TOTAL SUSPENDED SOLIDS	EPA 160.2	mg/l	T	11	10	14	17	26	13	12	19	12	5.0	4.0	3.0	3.0	1 U	28	16	1.0	12	7.0	4.0	4.0	7.0	1 U	20	4.0	9.0	18	6.0	5.0	12	7.0
HYDROCARBONS																																		
OIL AND GREASE	EPA 1664	mg/l	T	1.0	1 U	1.0	1 U	0.9 U	0.9 U	0.9 U	0.9 U	7.0	1 U	1 U	1 U	1 U	1.0	0.9 U	0.9 U	1.0	0.9 U	2.0	1 U	1 U	1 U	0.9 U	1.0	0.9 U	1.0	1.0	1.0	1 U	1 U	1 U
TPH-EXTRACTABLE	EPA 8015DRO	ug/l	T	100	50 U	75	50 U	180	86	63	22 U	22 U	140	50 U	100	50 U	65	97	120	140	22 U	270	50 U	140	50 U	100	140	120	22 U	22 U	81	50 U	93	50 U
TPH-RECOVERABLE (TRPH)	EPA 418.1	mg/l	T	0.80	0.1 U	0.70	0.30	0.30	0.05 U	0.05 U	0.20	3.0	0.50	0.20	0.1 U	0.40	0.60	0.10	0.05 U	0.90	0.30	1.0	0.10	0.1 U	0.1 U	0.90	0.50	0.05 U	0.30	0.10	0.90	0.20	0.1 U	0.20
TPH-VOLATILE (C4-C12)	EPA 8015M	ug/l	T	50 U	50 U	50 U	50 U	22.5 U	22.5 U	22.5 U	22.5 U	22.5 U	50 U	50 U	50 U	50 U	22.5 U	22.5 U	22.5 U	22.5 U	22.5 U	50 U	50 U	50 U	50 U	22.5 U	22.5 U	22.5 U	22.5 U	22.5 U	50 U	50 U	50 U	50 U
METALS																																		
ARSENIC	EPA 200.8	ug/l	D	2.3	3.4	2.9	4.8	3.1	1.7	3.2	4.2	3.8	2.9	3.4	2.9	4.7	3.5	2.5	3.1	4.1	4.6	2.6	3.3	2.9	5.1	3.4	2.0	3.7	3.8	4.7	2.1	2.9	3.2	4.7
	EPA 200.8	ug/l	T	2.8	3.8	3.2	5.2	3.4	2.1	3.8	4.6	4.0	3.3	3.7	3.2	5.2	4.0	2.9	4.0	4.4	5.0	3.2	3.6	3.2	5.6	3.6	2.4	4.2	4.4	5.0	2.5	3.2	3.5	5.4
CADMIUM	EPA 200.8	ug/l	D	0.2 U	0.2 U	0.2 U	0.2 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U	0.2 U	0.2 U	0.2 U
	EPA 200.8	ug/l	T	0.2 U	0.2 U	0.2 U	0.2 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.1 U	0.1 J	0.1 U	0.1 U	0.1 U	0.2 U	0.2 U	0.2 U	0.2 U
CHROMIUM	EPA 200.8	ug/l	D	1.1	0.70	0.70	1.1	1.2	1.0	0.70	1.0	2.0	1.3	0.80	0.70	1.1	1.0	1.6	1.3	0.70	2.7	1.4	0.90	0.70	1.0	1.2	0.90	1.4	0.70	2.7	0.70	0.50	0.60	1.1
	EPA 200.8	ug/l	T	2.4	1.0	0.80	1.4	1.2	2.6	1.3	1.5	2.3	2.2	1.1	0.90	1.1	1.3	4.0	2.5	1.0	2.9	3.0	1.3	1.0	1.4	1.5	2.6	1.9	1.0	3.1	1.7	0.70	0.80	1.6
COPPER	EPA 200.8	ug/l	D	3.6	2.0	1.9	1.9	1.9	3.2	1.8	2.1	1.5	5.1	3.3	4.0	2.0	3.2	4.0	1.9	1.6	2.2	8.0	7.2	5.7	2.2	3.9	6.3	3.5	1.9	2.2	2.2	2.1	1.8	1.6
	EPA 200.8	ug/l	T	6.5	3.0	2.4	2.6	3.4	8.2	3.0	4.5	1.7	8.4	4.9	6.2	2.3	4.2	11	5.5	2.3	2.9	17	15	9.0	3.8	5.6	16	9.1	3.5	2.9	5.3	2.9	2.4	2.4
HEXAVALENT CHROMIUM	EPA 218.6	ug/l	T	0.50	NA	NA	0.05 U	NA	NA	0.04 U	NA	0.04 U	0.44	NA	NA	0.05 U	NA	NA	0.04 U	NA	0.04 U	0.78	NA	NA	0.05 U	NA	NA	0.04 U	NA	0.04 U	0.18	NA	NA	0.05 U
IRON	EPA 200.7	ug/l	D	20 U	21	92	22	75	27	13.1 J	32	14.3 J	45	20 U	73	34	41	23	13 U	35	13 U	37	98	110	39	64	21	17.8 J	49	13 U	20 U	20 U	70	26
	EPA 200.7	ug/l	T	955	335	270	226	236	1040	434	469	87	693	251	150	94	107	2230	774	195	62	828	417	250	206	237	1200	503	223	96	765	231	200	306
LEAD	EPA 200.8	ug/l	D	0.2 U	0.2 U	0.20	0.2 U	0.20	0.20	0.60	0.1 J	0.1 J	0.2 U	0.2 U	0.1 J	0.2 U	0.20	0.20	0.08 J	0.1 J	0.08 U	0.2 U	0.20	0.20	0.1 J	0.50	0.20	0.1 J	0.20	0.20	0.2 U	0.2 U	0.1 J	0.1 J
	EPA 200.8	ug/l	T	1.2	0.40	0.30	0.20	0.40	1.9	0.40	0.80	1.0	1.0	0.30	0.20	0.1 J	0.30	2.2	0.80	0.30	0.1 J	2.6	1.0	0.60	0.60	1.1	5.1	1.5	0.70	0.30	0.90	0.30	0.30	0.40
MANGANESE	EPA 200.8	ug/l	D	110	120	310	120	440	27	120	240	110	73	98	180	190	270	30	82	160	27	63	130	110	200	230	7.3	92	100	170	46	54	150	250
	EPA 200.8	ug/l	T	150	160	360	210	590	47	160	290	240	100	140	230	230	360	68	210	190	200	83	140	130	230	360	24	120	130	280	73	79	180	290
MERCURY @	EPA 7471A	ug/l	D	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.07 J	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.08 J	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
	EPA 245.1	ug/l	T	0.01 U	0.01 U	0.018 J	0.01 U	0.05 U	0.05 U	0.05 U	0.085 J	0.05 U	0.01 U	0.01 U	0.017 J	0.01 U	0.05 U	0.05 U	0.05 U	0.064 J	0.05 U	0.01 U	0.01 U	0.014 J	0.01 U	0.05 U	0.05 U	0.05 U	0.055 J	0.05 U	0.01 U	0.01 U	0.014 J	0.01 U

Table 1
Freshwater Marsh Sampling
Summary of 2010-2011 Water Quality Results

				Riparian Corridor Outlet (SP-1)									Central Drain Inlet (SP-2)									Jefferson Inlet (SP-3)									Jefferson Outlet (SP-4)			
Analyte	Method	Units	Total/ Dissolved	Wet Weather 1/27/2010	2/25/2010	4/22/2010	7/21/2010	10/14/2010	Wet Weather 12/22/2010	1/26/2011	4/20/2011	7/27/2011	Wet Weather 1/27/2010	2/25/2010	4/22/2010	7/21/2010	10/14/2010	Wet Weather 12/22/2010	1/26/2011	4/20/2011	7/27/2011	Wet Weather 1/27/2010	2/25/2010	4/22/2010	7/21/2010	10/14/2010	Wet Weather 12/22/2010	1/26/2011	4/20/2011	7/27/2011	Wet Weather 1/27/2010	2/25/2010	4/22/2010	7/21/2010
NICKEL	EPA 200.8	ug/l	D	2.2	2.6	2.7	4.3	2.6	1.3	3.1	4.0	6.3	2.4	2.4	3.2	4.8	3.4	1.6	2.8	3.5	7.0	3.0	3.6	3.6	5.2	4.9	1.2	4.8	3.7	7.4	1.7	2.1	2.9	4.9
	EPA 200.8	ug/l	T	2.8	3.0	3.0	4.9	3.1	2.2	3.6	4.6	6.5	2.9	2.7	3.5	5.3	4.3	3.3	4.0	4.0	7.7	4.0	3.9	3.8	5.9	5.4	2.3	5.4	4.4	7.8	2.2	2.2	3.5	5.6
SELENIUM	EPA 200.8	ug/l	D	2 U	2.2	1.9 J	4.2	1.8 J	1.8 U	3.7	3.0	4.5	2 U	2 U	1.8 U	3.4	2.2	1.8 U	3.8	2.4	4.8	2 U	2 U	1.8 U	3.6	2.4	1.8 U	4.2	2.1	5.0	2 U	2 U	1.8 U	3.4
	EPA 200.8	ug/l	T	2 U	2.3	2.2	4.5	2.1	1.8 U	4.0	3.2	4.6	2 U	2 U	1.8 U	4.0	2.9	1.8 U	4.5	2.5	5.2	2 U	2 U	1.8 U	3.8	2.5	1.8 U	4.5	2.6	5.0	2 U	2 U	1.9 J	4.0
SILVER	EPA 200.8	ug/l	D	0.2 U	0.2 U	0.09 U	0.2 U	0.09 U	0.09 U	0.09 U	0.1 J	0.09 U	0.2 U	0.2 U	0.09 U	0.2 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.2 U	0.2 U	0.09 U	0.2 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.2 U	0.2 U	0.09 U	0.2 U
	EPA 200.8	ug/l	T	0.2 U	0.2 U	0.09 U	0.2 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.2 U	0.2 U	0.09 U	0.2 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.2 U	0.2 U	0.09 U	0.2 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.2 U	0.2 U	0.09 U	0.2 U
SODIUM	EPA 200.7	mg/l	D	70	116	NA	225	NA	29	173	NA	181	69	66	NA	221	NA	35	225	NA	202	54	50	NA	212	NA	12	235	NA	202	46	58	NA	223
	EPA 200.7	mg/l	T	73	120	NA	230	NA	30	209	NA	188	70	72	NA	242	NA	36	246	NA	219	59	52	NA	236	NA	12	273	NA	215	48	63	NA	243
ZINC	EPA 200.8	ug/l	D	20	7.2	6.5	4.8	9.3	29	9.3	12	4.2	26	13	16	4.9	17	42	15	11	7.4	43	35	20	6.6	14	41	19	6.2	9.6	13	6.6	5.0	4.4
	EPA 200.8	ug/l	T	27	7.9	11	4.9	19	53	9.8	27	6.0	37	16	17	5.3	22	88	27	17	9.7	69	51	24	10	19	83	33	10	15	20	6.4	5.9	6.3
PCBs @																																		
PCB-1016 (AROCLOR 1016)	EPA 8082	ug/l	T	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
PCB-1221 (AROCLOR 1221)	EPA 8082	ug/l	T	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
PCB-1232 (AROCLOR 1232)	EPA 8082	ug/l	T	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
PCB-1242 (AROCLOR 1242)	EPA 8082	ug/l	T	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
PCB-1248 (AROCLOR 1248)	EPA 8082	ug/l	T	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
PCB-1254 (AROCLOR 1254)	EPA 8082	ug/l	T	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
PCB-1260 (AROCLOR 1260)	EPA 8082	ug/l	T	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
PESTICIDES @																																		
4,4'-DDD	EPA 8081A	ug/l	T	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
4,4'-DDE	EPA 8081A	ug/l	T	0.004 U	0.004 U	0.004 U	0.004 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.004 U	0.004 U	0.004 U	0.004 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.004 U	0.004 U	0.004 U	0.004 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.004 U	0.004 U	0.004 U	0.004 U
4,4'-DDT	EPA 8081A	ug/l	T	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.006 U	0.006 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.006 U	0.006 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.006 U	0.006 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
ALDRIN	EPA 8081A	ug/l	T	0.001 U	0.001 U	0.001 U	0.001 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.001 U	0.001 U	0.001 U	0.001 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.001 U	0.001 U	0.001 U	0.001 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.001 U	0.001 U	0.001 U	0.001 U
ALPHA - CHLORDANE	EPA 8081A	ug/l	T	0.001 U	0.001 U	0.001 U	0.001 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.001 U	0.001 U	0.001 U	0.001 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.001 U	0.001 U	0.001 U	0.001 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.001 U	0.001 U	0.001 U	0.001 U
ALPHA-BHC	EPA 8081A	ug/l	T	0.002 U	0.002 U	0.002 U	0.002 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.002 U	0.002 U	0.002 U	0.002 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.002 U	0.002 U	0.002 U	0.002 U
BETA-BHC	EPA 8081A	ug/l	T	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U
DELTA-BHC	EPA 8081A	ug/l	T	0.001 U	0.001 U	0.001 U	0.001 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.001 U	0.001 U	0.001 U	0.001 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.001 U	0.001 U	0.001 U	0.001 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.001 U	0.001 U	0.001 U	0.001 U
DIELDRIN	EPA 8081A	ug/l	T	0.004 U	0.004 U	0.004 U	0.004 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.004 U	0.004 U	0.004 U	0.004 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.004 U	0.004 U	0.004 U	0.004 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.004 U	0.004 U	0.004 U	0.004 U
ENDOSULFAN I	EPA 8081A	ug/l	T	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
ENDOSULFAN II	EPA 8081A	ug/l	T	0.004 U	0.004 U	0.004 U	0.004 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.004 U	0.004 U	0.004 U	0.004 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.004 U	0.004 U	0.004 U	0.004 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.004 U	0.004 U	0.004 U	0.004 U
ENDOSULFAN SULFATE	EPA 8081A	ug/l	T	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U
ENDRIN	EPA 8081A	ug/l	T	0.005 U	0.005 U	0.005 U	0.005 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.005 U	0.005 U	0.005 U	0.005 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.005 U	0.005 U	0.005 U	0.005 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.005 U	0.005 U	0.005 U	0.005 U
ENDRIN ALDEHYDE	EPA 8081A	ug/l	T	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U
ENDRIN KETONE	EPA 8081A	ug/l	T	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U
GAMMA - CHLORDANE	EPA 8081A	ug/l	T	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
GAMMA-BHC (LINDANE)	EPA 8081A	ug/l	T	0.001 U	0.001 U	0.001 U	0.001 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.001 U	0.001 U	0.001 U	0.001 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.001 U	0.001 U	0.001 U	0.001 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.001 U	0.001 U	0.001 U	0.001 U
HEPTACHLOR	EPA 8081A	ug/l	T	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U
HEPTACHLOR EPOXIDE	EPA 8081A	ug/l	T	0.001 U	0.001 U	0.001 U	0.001 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.001 U	0.001 U	0.001 U	0.001 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.001 U	0.001 U	0.001 U	0.001 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.001 U	0.001 U	0.001 U	0.001 U
METHOXYCHLOR	EPA 8081A	ug/l	T	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
TOXAPHENE	EPA 8081A	ug/l	T	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
PAHs and SVOCs@																																		
2-CHLORONAPHTHALENE	EPA 8270	ug/l	T	1.2 U	1.2 U	1.2 U	1.2 U	6 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	6 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
2-METHYLNAPHTHALENE	EPA 8270	ug/l	T	1.2 U	1.2 U	1.2 U	1.2 U	6 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	6 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
ACENAPHTHENE	EPA 8310	ug/l	T	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
ACENAPHTHYLENE	EPA 8310	ug/l	T	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
ANTHRACENE	EPA 8310	ug/l	T	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
BENZO(A)ANTHRACENE	EPA 8310	ug/l	T	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
BENZO(A)PYRENE	EPA 8310	ug/l	T	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
BENZO(B)FLUORANTHENE	EPA 8310	ug/l	T	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
BENZO(G,H,I)PERYLENE	EPA 8310	ug/l	T	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
BENZO(K)FLUORANTHENE	EPA 8310	ug/l	T	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
BIS(2-CHLOROISOPROPYL)ETHER	EPA 8270	ug/l	T	2 U	2 U	2 U	2 U	10 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
CHRYSENE	EPA 8310	ug/l	T	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
DIBENZO(A,H)ANTHRACENE	EPA 8310	ug/l	T	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
FLUORANTHENE	EPA 8310	ug/l	T	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
FLUORENE	EPA 8310	ug/l	T	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
INDENO(1,2,3-CD)PYRENE	EPA 8310	ug/l	T	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
NAPHTHALENE	EPA 8310	ug/l	T	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
PHENANTHRENE	EPA 8310	ug/l	T	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
PYRENE	EPA 8310	ug/l	T	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
VOCs																																		
1,1,1,2-TETRACHLOROETHANE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-TRICHLOROETHANE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.5 U	0.5 U	0.5 U	0.5 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.5 U	0.5 U	0.5 U	0.5 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-TETRACHLOROETHANE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-TRICHLOROETHANE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U

Table 1
Freshwater Marsh Sampling
Summary of 2010-2011 Water Quality Results

				Riparian Corridor Outlet (SP-1)									Central Drain Inlet (SP-2)									Jefferson Inlet (SP-3)									Jefferson Outlet (SP-4)			
Analyte	Method	Units	Total/ Dissolved	Wet Weather 1/27/2010	2/25/2010	4/22/2010	7/21/2010	10/14/2010	Wet Weather 12/22/2010	1/26/2011	4/20/2011	7/27/2011	Wet Weather 1/27/2010	2/25/2010	4/22/2010	7/21/2010	10/14/2010	Wet Weather 12/22/2010	1/26/2011	4/20/2011	7/27/2011	Wet Weather 1/27/2010	2/25/2010	4/22/2010	7/21/2010	10/14/2010	Wet Weather 12/22/2010	1/26/2011	4/20/2011	7/27/2011	Wet Weather 1/27/2010	2/25/2010	4/22/2010	7/21/2010
1,1-DICHLOROETHANE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-DICHLOROETHENE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-DICHLOROPROPANE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-TRICHLOROBENZENE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-TRICHLOROPROPANE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-TRICHLOROBENZENE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-TRIMETHYLBENZENE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DIBROMOETHANE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DICHLOROBENZENE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DICHLOROETHANE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DICHLOROPROPANE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-TRIMETHYLBENZENE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-DICHLOROBENZENE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.5 U	0.5 U	0.5 U	0.5 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.5 U	0.5 U	0.5 U	0.5 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-DICHLOROPROPANE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.5 U	0.5 U	0.5 U	0.5 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.5 U	0.5 U	0.5 U	0.5 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-DICHLOROBENZENE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U
2,2-DICHLOROPROPANE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U
2-CHLOROETHYL VINYL ETHER	EPA 8260B	ug/l	T	10 U	10 U	10 U	10 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	10 U	10 U	10 U	10 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	10 U	10 U	10 U	10 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	10 U	10 U	10 U	10 U
2-CHLOROTOLUENE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.5 U	0.5 U	0.5 U	0.5 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.5 U	0.5 U	0.5 U	0.5 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.5 U	0.5 U	0.5 U	0.5 U
4-CHLOROTOLUENE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U
BENZENE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U
BROMOBENZENE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U
BROMODICHLOROMETHANE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U
BROMOFORM	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U
BROMOMETHANE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U
CARBON TETRACHLORIDE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U
CHLOROBENZENE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U
CHLOROETHANE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U
CHLOROFORM	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	1.2	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U
CHLOROMETHANE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U
CIS-1,2-DICHLOROETHENE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U
CIS-1,3-DICHLOROPROPENE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U
DIBROMOCHLOROMETHANE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U
DIBROMOMETHANE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U
DICHLORODIFLUOROMETHANE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U
ETHYLBENZENE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U
HEXACHLOROBUTADIENE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ISOPROPYLBENZENE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U
M,P-XYLENE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U
METHYLENE CHLORIDE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U
NAPHTHALENE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U
N-BUTYLBENZENE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U
N-PROPYLBENZENE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U
O-XYLENE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U
P-ISOPROPYLTOLUENE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U
SEC-BUTYLBENZENE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U
STYRENE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U
TERT-BUTYLBENZENE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U
TETRACHLOROETHENE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U
TOLUENE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U
TRANS-1,2-DICHLOROETHENE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U
TRANS-1,3-DICHLOROPROPENE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.5 U	0.5 U	0.5 U	0.5 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.5 U	0.5 U	0.5 U	0.5 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.5 U	0.5 U	0.5 U	0.5 U
TRICHLOROETHENE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U
TRICHLOROFLUOROMETHANE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U
VINYL CHLORIDE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U

Notes:
U = Not detected at a concentration greater than the reporting limit shown
T = Total concentration
D = Dissolved (filtered) concentration
J = Detected at an estimated concentration between the method detection and laboratory reporting limits
ug/l = micrograms per liter; mg/l = milligrams per liter; ml/l = milliliters per liter
NA = Not analyzed
@ = Mercury, PCB, pesticide, PAH and SVOC data are reported down to the method detection limit; all other results are reported to the laboratory reporting limit
SVOC = Semi-volatile organic compound
PAH = Polynuclear aromatic hydrocarbon
NOEC = "No Observed Effect Concentration " or concentration without observable effect. It is about the highest concentration tested for which the effect is significantly not different from controls

Table 1
Freshwater Marsh Sampling
Summary of 2010-2011 Water Quality Results

Analyte	Method	Units	Total/ Dissolved	Jefferson Outlet (SP-4) 10/14/2010	Wet Weather 12/22/2010	1/26/2011	4/20/2011	7/27/2011	Interim Treatment Area (SP-5) Wet Weather 1/27/2010	2/25/2010	7/21/2010	Wet Weather 12/22/2010	1/26/2011	7/27/2011	Interim Treatment Area (SP-6) Wet Weather 1/27/2010	2/25/2010	7/21/2010	Wet Weather 12/22/2010	1/26/2011	7/27/2011	Interim Treatment Area (SP-7) Wet Weather 1/27/2010	2/25/2010	7/21/2010	Wet Weather 12/22/2010	1/26/2011	7/27/2011	Riparian Corridor - East Wet Weather 1/27/2010	2/25/2010	4/22/2010	10/14/2010	Wet Weather 12/22/2010	1/26/2011	4/20/2011	7/27/2011
FIELD PARAMETERS																																		
Dissolved oxygen	Field	mg/l	T	10	9.7	12	6.9	12	6.5	6.6	2.7	9.8	2.9	18	5.2	4.2	1.3	9.8	5.9	19	2.3	4.3	1.2	9.9	10	19	10	13	8.5	6.4	14	15	12	19
pH	Field	pH Units	T	7.5	7.3	7.6	6.8	7.9	6.8	6.8	7.1	7.5	7.7	7.7	6.8	6.6	6.9	7.3	7.6	7.7	6.3	6.5	6.9	7.5	7.4	7.7	7.6	7.6	7.4	7.2	7.8	7.8	8.0	8.0
Specific conductance	Field	umhos/cm	T	1362	325	2407	1948	1965	653	1030	1886	411	2060	1740	605	840	1882	317	2120	1882	502	631	1844	274	2195	1976	2432	2374	2432	2218	2386	2530	1070	1155
Temperature	Field	F	T	63	62	57	68	74	52	58	75	61	53	74	53	59	77	61	56	75	52	58	76	61	55	75	62	65	70	70	63	66	69	76
Turbidity	Field	NTU	T	3.0	1.4	9.1	3.6	5.3	23	10	11	1.5	14	9.9	17	6.1	12	4.0	13	5.8	11	7.1	16	2.3	11	6.5	5.8	3.9	6.0	7.6	0.20	0.0	2.0	2.9
BACTERIA																																		
ENTEROCOCCI	SM 9230B	MPN/100 m	T	145	NA	22	46	2419	NA	NA	11	NA	NA	228	NA	NA	41	NA	NA	2419	NA	NA	30	NA	NA	2419	89	NA	9.7	11	NA	3.1	25	2419
FECAL COLIFORMS	SM 9221	MPN/100 m	T	300	NA	200	130	1300	NA	NA	200	NA	NA	500	NA	NA	200	NA	NA	240	NA	NA	200	NA	NA	2300	9.0	NA	2 U	2.0	NA	4.0	2 U	5000
TOTAL COLIFORMS	SM 9221	MPN/100 m	T	300	NA	900	240	13000	NA	NA	200	NA	NA	900	NA	NA	1300	NA	NA	500	NA	NA	800	NA	NA	30000	140	NA	900	>1600	NA	30	500	14000
TOXICITY																																		
96-HOUR ACUTE AQUATIC TOXICITY (FATHEAD MINNOW)	EPA/821/R-02-012	% Survival	T	100	NA	100	100	100	NA	NA	NA	NA	NA	100	NA	NA	NA	NA	NA	100	NA	NA	NA	NA	NA	100	100	NA	100	100	NA	100	100	100
CHRONIC AQUATIC TOXICITY (FATHEAD MINNOW LARVAE SURVIVAL BIOASSAY)	EPA 821-R-02-013	NOEC %	T	100	NA	100	100	100	NA	NA	NA	NA	NA	100	NA	NA	NA	NA	NA	100	NA	NA	NA	NA	NA	100	100	NA	100	100	NA	100	100	100
CHRONIC AQUATIC TOXICITY (FATHEAD MINNOW LARVAE GROWTH BIOASSAY)	EPA 821-R-02-013	NOEC %	T	100	NA	100	100	100	NA	NA	NA	NA	NA	<100	NA	NA	NA	NA	NA	100	NA	NA	NA	NA	NA	100	100	NA	100	100	NA	100	100	100
96-HOUR ACUTE AQUATIC TOXICITY (WATER FLEA)	EPA/821/R-02-012	% Survival	T	100	NA	100	100	100	NA	NA	NA	NA	NA	100	NA	NA	NA	NA	NA	100	NA	NA	NA	NA	NA	100	100	NA	100	100	NA	100	100	100
CHRONIC AQUATIC TOXICITY (WATER FLEA SURVIVAL BIOASSAY)	EPA 821-R-02-013	NOEC %	T	100	NA	100	100	100	NA	NA	NA	NA	NA	100	NA	NA	NA	NA	NA	100	NA	NA	NA	NA	NA	100	100	NA	100	100	NA	100	100	100
CHRONIC AQUATIC TOXICITY (WATER FLEA REPRODUCTION BIOASSAY)	EPA 821-R-02-013	NOEC %	T	100	NA	100	100	100	NA	NA	NA	NA	NA	100	NA	NA	NA	NA	NA	100	NA	NA	NA	NA	NA	100	100	NA	<100	<100	NA	<100	<100	100
NUTRIENTS																																		
AMMONIA (AS N)	EPA 350.2	mg/l	T	0.18	0.15	0.11	0.12	0.40	0.26	0.12	0.31	0.10	0.25	0.20	0.38	0.12	0.20	0.15	1.2	0.24	0.22	0.080	0.23	0.13	0.27	0.11	0.47	0.080	0.01 U	0.005 U	0.19	0.11	0.57	0.61
NITRATE (AS N)	EPA 300.0	mg/l	T	0.007 U	1.4	0.007 U	0.007 U	0.007 U	0.54	0.1 U	0.10	0.59	0.35	0.007 U	0.54	0.1 U	0.01 J	0.79	0.007 U	0.05 J	1.3	0.1 U	0.03 J	1.1	0.03 J	0.04 J	1.1	1.2	1.2	1.7	0.57	1.0	0.61	0.57
NITRITE (AS N)	EPA 300.0	mg/l	T	0.005 U	0.04 J	0.007 J	0.005 U	0.005 U	0.1 U	0.1 U	0.03 J	0.03 J	0.03 J	0.005 U	0.1 U	0.1 U	0.02 J	0.03 J	0.005 U	0.01 J	0.1 U	0.1 U	0.02 J	0.03 J	0.009 J	0.009 J	0.1 U	0.1 U	0.03 J	0.02 J	0.02 J	0.06 J	0.09 J	0.03 J
ORTHOPHOSPHATE (AS P)	EPA 365.2	mg/l	D	0.29	0.22	0.040	0.38	0.82	0.29	0.27	0.50	0.24	0.24	0.64	0.30	0.25	0.59	0.29	0.090	0.74	0.18	0.20	0.50	0.11	0.060	0.83	0.94	0.92	0.90	0.16	0.31	0.99	1.7	1.5
TOTAL KJELDAHL NITROGEN	EPA 351.2	mg/l	T	1.6	0.86	1.3	0.72	1.7	0.82	1.1	1.5	0.43	2.4	1.8	0.96	1.0	1.3	0.72	1.8	1.6	1.8	1.1	1.4	0.96	1.2	2.0	1.1	0.58	0.79	0.37	1.2	1.2	2.2	1.7
TOTAL PHOSPHORUS	EPA 365.4	mg/l	T	0.53	0.30	0.090	0.44	1.1	0.42	0.55	0.63	0.33	0.50	0.98	0.38	0.42	0.80	0.37	0.28	1.0	0.24	0.30	0.73	0.16	0.14	1.1	2.5	2.5	2.2	0.26	0.56	2.3	9.6	3.5
GENERAL/MISCELLANEOUS																																		
BICARBONATE ALKALINITY (AS CAC	EPA 310.1	mg/l	T	NA	86	224	NA	378	136	256	344	72	374	356	100	196	370	88	288	374	104	142	348	48	232	378	416	424	NA	NA	74	428	NA	320
BOD 5 DAY	EPA 405.1	mg/l	T	NA	2 J	3 J	NA	21	5 U	6.0	2 U	2 U	3 J	17	5 U	5.0	2 U	2 J	7.0	24	5 U	5 U	2 J	2 J	4 J	18	5 U	5 U	NA	NA	2 J	2 U	NA	11
CARBONATE ALKALINITY (AS CACO	EPA 310.1	mg/l	T	NA	0.9 U	0.9 U	NA	0.9 U	1 U	1 U	1 U	0.9 U	0.9 U	0.9 U	1 U	1 U	1 U	0.9 U	0.9 U	0.9 U	1 U	1 U	1 U	0.9 U	0.9 U	0.9 U	1 U	1 U	NA	NA	0.9 U	0.9 U	NA	0.9 U
CHEMICAL OXYGEN DEMAND	EPA 410.4	mg/l	T	NA	11	24	NA	57	52	26	45	11	18	42	52	23	37	11	26	49	69	26	59	11	23	48	51	5 U	NA	NA	12	2 J	NA	28
CHLORIDE	EPA 300.0	mg/l	T	NA	67	464	NA	268	75	212	251	31	192	218	71	89	231	15	297	249	78	96	241	29	416	270	224	248	NA	NA	20	240	NA	198
HARDNESS (AS CACO3)	EPA 130.2	mg/l	T	482	144	458	352	596	212	420	582	142	776	556	180	310	634	194	538	584	178	222	624	90	468	584	892	954	1004	968	178	942	978	756
HYDROXIDE ALKALINITY (AS CACO:	EPA 310.1	mg/l	T	NA	0.9 U	0.9 U	NA	0.9 U	1 U	1 U	1 U	0.9 U	0.9 U	0.9 U	1 U	1 U	1 U	0.9 U	0.9 U	0.9 U	1 U	1 U	1 U	0.9 U	0.9 U	0.9 U	1 U	1 U	NA	NA	0.9 U	0.9 U	NA	0.9 U
SALINITY	SM 2520	mg/l	T	NA	NA	1100	NA	1000	NA	NA	800	NA	NA	800	NA	NA	800	NA	NA	900	NA	NA	800	NA	NA	900	1200	NA	NA	NA	NA	1200	NA	500
TOTAL ALKALINITY (AS CACO3)	EPA 310.1	mg/l	T	NA	86	224	NA	378	136	256	344	72	374	356	100	196	370	88	288	374	104	142	348	48	232	378	416	424	NA	NA	74	428	NA	320
TOTAL DISSOLVED SOLIDS	EPA 160.1	mg/l	T	984	236	1184	620	1256	290	728	1220	120	1280	1160	328	504	1256	260	1176	1196	312	212	1228	92	1216	1316	1492	1408	1880	1724	126	1648	1848	1404
TOTAL ORGANIC CARBON	EPA 415.1	mg/l	T	NA	15	79	NA	14	6.6	9.4	6.7	15	97	9.9	6.3	9.5	92	0.98	82	12	8.7	9.9	93	0.72	65	13	2.8	4.8	NA	NA	15	90	NA	8.6
TOTAL SUSPENDED SOLIDS	EPA 160.2	mg/l	T	4.0	14	4.0	3.0	15	13	10	13	18	9.0	15	12	2.0	10	8.0	12	12	7.0	5.0	7.0	10	10	9.0	2.0	7.0	2.0	1 U	25	1 U	6.0	2.0
HYDROCARBONS																																		
OIL AND GREASE	EPA 1664	mg/l	T	0.9 U	0.9 U	0.9 U	0.9 U	8.0	2.0	1 U	1 U	0.9 U	1.0	0.9 U	1 U	1 U	2.0	0.9 U	0.9 J	0.9 U	1 U	1 U	1 U	0.9 U	0.9 U	5.0	1 U	1 U	1 U	0.9 U	0.9 U	0.9 U	1.0	0.9 U
TPH-EXTRACTABLE	EPA 8015DRC	ug/l	T	87	86	110	22 U	22 U	110	50 U	50 U	120	57	22 U	81	50 U	50 U	73	77	22 U	160	50 U	50 U	96	110	22 U	50 U	50 U	26 J	25 U	75	30 J	69	22 U
TPH-RECOVERABLE (TRPH)	EPA 418.1	mg/l	T	0.05 U	0.20	0.05 U	0.50	0.70	2.0	0.60	0.1 U	0.05 U	0.80	0.50	0.30	0.30	0.20	0.05 U	0.05 U	0.05 U	0.40	0.50	0.30	0.05 U	0.05 U	0.30	0.1 U	0.10	0.10	0.05 U	0.20	0.05 U	0.40	0.05 U
TPH-VOLATILE (C4-C12)	EPA 8015M	ug/l	T	22.5 U	22.5 U	22.5 U	22.5 U	22.5 U	50 U	50 U	50 U	22.5 U	22.5 U	22.5 U	50 U	50 U	50 U	22.5 U	22.5 U	22.5 U	50 U	50 U	50 U	22.5 U	22.5 U	22.5 U	50 U	50 U	50 U	22.5 U	22.5 U	22.5 U	22.5 U	22.5 U
METALS																																		
ARSENIC	EPA 200.8	ug/l	D	3.8	3.9	3.1	4.0	4.5	2.2	3.3	4.7	1.6	3.0	3.7	2.4	3.2	5.0	2.0	3.2	4.2	2.8	2.9	5.0	1.8	3.3	4.1	1.7	1.4	1.2	1.3	0.20	0.90	1.8	7.0
	EPA 200.8	ug/l	T	6.4	4.0	3.6	4.6	5.0	3.0	3.7	5.5	2.0	3.7	4.1	2.8	3.5	5.0	2.5	3.7	4.6	3.4	3.2	5.2	2.4	3.9	4.4	2.1	1.4	1.4	1.5	0.40	0.90	1.9	8.2
CADMIUM	EPA 200.8	ug/l	D	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U	0.2 U	0.2 U	0.1 U	0.1 U	0.1 U	0.2 U	0.2 U	0.2 U	0.1 U	0.1 U	0.1 U	0.2 U	0.2 U	0.2 U	0.1 U	0.1 U	0.1 U	0.2 U	0.2 U	0.2 U	0.1 U	0.02 U	0.1 U	0.1 U	0.1 U
	EPA 200.8	ug/l	T	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U	0.2 U	0.2 U	0.1 U	0.1 U	0.1 U	0.2 U	0.2 U	0.2 U	0.1 U	0.1 U	0.1 U	0.2 U	0.2 U	0.2 U	0.1 U	0.1 U	0.1 U	0.2 U	0.2 U	0.2 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
CHROMIUM	EPA 200.8	ug/l	D	1.5	2.2	1.7	0.70	2.2	0.70	0.60	0.90	1.2	0.80	2.2	0.70	0.60	1.1	0.80	1.1	2.7	1.3	0.50	1.0	0.80	1.9	2.4	1.6	1.2	0.80	1.4	0.10	0.80	1.8	2.6
	EPA 200.8	ug/l	T	3.8	2.8	2.4	0.90	3.1	2.8	1.2	1.5	2.4	1.3	2.4	2.1	0.70	1.4	2.0	1.6	2.7	2.6	0.80	1.2	2.0	2.3	3.1	4.6	1.6	1.2	1.7	0.80	1.2	2.2	3.1
COPPER	EPA 200.8	ug/l	D	3.1	3.1	1.8	1.6	1.6	2.0	1.8	1.7	2.4	1.8	1.4	1.8	1.8	2.1	2.0	1.5	1.4	6.2	2.9	1.6	4.6	1.7	1.6	1.5	2.5	2.0	2.0	0.60	2.0	4.6	6.8
	EPA 200.8	ug/l	T	3.2	9.6	2.8	2.1	2.6	7.0	3.6	3.2	8.0	3.1	1.8	4.7	2.3	2.6	5.8	2.5	1.7	14	4.7	1.8	12	3.7	2.3	15	3.1	2.4	2.9	1.6	2.2	5.0	10
HEXAVALENT CHROMIUM	EPA 218.6	ug/l	T	NA	NA	0.04 U	NA	0.04 U	NA	NA	0.05 U	NA	NA	0.04 U	NA	NA	0.05 U	NA	NA	0.04 U	NA	NA	0.05 U	NA	NA	0.04 U	0.81	NA	NA	NA	NA	0.04 U	NA	0.04 U
IRON	EPA 200.7	ug/l	D	28	28	13 U	13 U	37	25	31	26	31	13 U	13 U	20 U	20	18.6 J	41	26	13 U	27	42	38	30	13 U	13 U	51	20 U	46	13 U	21	38	21	28
	EPA 200.7	ug/l	T	185	1130	424	155	206	1560	496	379	997	546	148	1030	140	263	853	634	66	681	204	109	673	501	84	1670	273	100	120	3950	157	37	156
LEAD	EPA 200.8	ug/l	D	0.1 J	0.1 J	0.08 U	0.08 U	0.08 J	0.2 U	0.2 U	0.20	0.1 J	0.50	0.08 U	0.2 U	0.2 U	0.1 J	0.1 J	0.08 U	0.08 J	0.2 U	0.2 U	0.1 J	0.20	0.08 U	0.20	0.2 U	0.2 U	0.09 J	0.09 J	0.01 J	0.08 U	0.40	0.30
	EPA 200.8	ug/l	T	0.30	1.8	0.50	0.30	0.30	1.7	0.50	0.60	2.5	0.60	0.20	1.0	0.2 U	0.30	1.2	0.40	0.1 J	1.8	0.40	0.20	2.2	0.80	0.20	1.7	0.2 U	0.20	0.1 J	0.40	0.1 J	0.30	0.70
MANGANESE	EPA 200.8	ug/l	D	160	43	17	110	64	100	100	210	31	110	22	59	110	170	54	34	71	58	100	230	18	29	89	8.2	1.7	4.6	14	0.40	5.1	420	250
	EPA 200.8	ug/l	T	240	84	92	140	310	160	140	260	54	170	210	92	130	220	73	150	260	88	120	270	39	120	270	26	4.4	6.8	21	12	7.0	460	330
MERCURY @	EPA 7471A	ug/l	D	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.08 J	0.05 U
	EPA 245.1	ug/l	T	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.05 U	0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.05 U	0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.05 U	0.05 U	0.01 U	0.01 U	0.01 J	0.05 U	0.05 U	0.05 U	0.093 J	0.05 U

Table 1
Freshwater Marsh Sampling
Summary of 2010-2011 Water Quality Results

Analyte	Method	Units	Total/ Dissolved	Jefferson Outlet (SP-4) 10/14/2010	Jefferson Outlet (SP-4) Wet Weather 12/22/2010	Jefferson Outlet (SP-4) 1/26/2011	Jefferson Outlet (SP-4) 4/20/2011	Jefferson Outlet (SP-4) 7/27/2011	Interim Treatment Area (SP-5) Wet Weather 1/27/2010	Interim Treatment Area (SP-5) 2/25/2010	Interim Treatment Area (SP-5) 7/21/2010	Interim Treatment Area (SP-5) Wet Weather 12/22/2010	Interim Treatment Area (SP-5) 1/26/2011	Interim Treatment Area (SP-5) 7/27/2011	Interim Treatment Area (SP-6) Wet Weather 1/27/2010	Interim Treatment Area (SP-6) 2/25/2010	Interim Treatment Area (SP-6) 7/21/2010	Interim Treatment Area (SP-6) Wet Weather 12/22/2010	Interim Treatment Area (SP-6) 1/26/2011	Interim Treatment Area (SP-6) 7/27/2011	Interim Treatment Area (SP-7) Wet Weather 1/27/2010	Interim Treatment Area (SP-7) 2/25/2010	Interim Treatment Area (SP-7) 7/21/2010	Interim Treatment Area (SP-7) Wet Weather 12/22/2010	Interim Treatment Area (SP-7) 1/26/2011	Interim Treatment Area (SP-7) 7/27/2011	Riparian Corridor - East Wet Weather 1/27/2010	Riparian Corridor - East 2/25/2010	Riparian Corridor - East 4/22/2010	Riparian Corridor - East 10/14/2010	Riparian Corridor - East Wet Weather 12/22/2010	Riparian Corridor - East 1/26/2011	Riparian Corridor - East 4/20/2011	Riparian Corridor - East 7/27/2011
NICKEL	EPA 200.8	ug/l	D	3.6	1.7	3.0	3.3	6.7	2.0	2.6	4.4	1.3	3.6	6.0	1.8	2.2	4.6	1.5	3.1	6.5	2.9	2.3	4.5	1.4	3.1	6.3	2.8	2.5	3.0	3.0	0.20	2.6	6.4	6.7
	EPA 200.8	ug/l	T	4.1	2.8	3.8	3.7	7.8	3.3	3.0	5.4	2.2	4.3	6.3	2.6	2.5	4.9	2.3	3.7	6.9	3.8	2.6	4.8	2.3	4.0	7.9	4.5	2.7	3.3	3.5	0.60	3.0	7.2	8.3
SELENIUM	EPA 200.8	ug/l	D	2.4	1.8 U	4.8	2.5	5.0	2 U	2.0	3.4	1.8 U	3.7	4.3	2 U	2 U	4.3	1.8 U	4.1	4.8	2 U	2 U	4.0	1.8 U	4.9	3.7	4.2	3.6	3.2	3.5	0.3 U	2.9	6.7	5.0
	EPA 200.8	ug/l	T	2.6	1.8 U	5.3	3.0	5.3	2 U	2.2	4.0	1.8 U	4.1	4.5	2 U	2 U	4.3	1.8 U	4.7	5.1	2 U	2 U	4.3	1.8 U	5.5	4.2	4.9	3.7	3.6	4.2	1.8 U	3.3	7.2	5.8
SILVER	EPA 200.8	ug/l	D	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.2 U	0.2 U	0.2 U	0.09 U	0.09 U	0.09 U	0.2 U	0.2 U	0.2 U	0.09 U	0.09 U	0.09 U	0.2 U	0.2 U	0.2 U	0.09 U	0.09 U	0.09 U	0.2 U	0.2 U	0.09 U	0.09 U	0.02 U	0.09 U	0.09 U	0.09 U
	EPA 200.8	ug/l	T	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.2 U	0.2 U	0.2 U	0.09 U	0.09 U	0.09 U	0.2 U	0.2 U	0.2 U	0.09 U	0.09 U	0.09 U	0.2 U	0.2 U	0.2 U	0.09 U	0.09 U	0.09 U	0.2 U	0.2 U	0.09 U	0.09 U	0.09 U	0.1 J	0.09 U	0.09 U
SODIUM	EPA 200.7	mg/l	D	NA	50	299	NA	208	65	111	217	31	193	177	60	77	219	44	230	197	57	58	200	24	263	198	227	230	NA	NA	30	220	NA	190
	EPA 200.7	mg/l	T	NA	49	306	NA	225	70	120	229	30	214	191	67	85	238	45	248	218	60	59	215	25	296	217	239	238	NA	NA	30	261	NA	191
ZINC	EPA 200.8	ug/l	D	6.9	24	7.6	4.2	5.3	10	4.8	6.8	29	6.0	3.2	7.8	4.7	5.4	13	5.9	3.7	35	10	3.6	41	5.8	6.1	5.5	6.7	4.8	4.3	2.6	5.3	10	40
	EPA 200.8	ug/l	T	11	54	7.9	4.2	9.3	24	7.6	8.6	54	9.2	4.2	16	5.4	5.6	40	8.0	4.3	55	14	5.2	69	12	9.5	21	6.7	6.8	4.6	7.3	5.9	12	45
PCBs @																																		
PCB-1016 (AROCLOR 1016)	EPA 8082	ug/l	T	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
PCB-1221 (AROCLOR 1221)	EPA 8082	ug/l	T	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
PCB-1232 (AROCLOR 1232)	EPA 8082	ug/l	T	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
PCB-1242 (AROCLOR 1242)	EPA 8082	ug/l	T	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
PCB-1248 (AROCLOR 1248)	EPA 8082	ug/l	T	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
PCB-1254 (AROCLOR 1254)	EPA 8082	ug/l	T	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
PCB-1260 (AROCLOR 1260)	EPA 8082	ug/l	T	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
PESTICIDES @																																		
4,4'-DDD	EPA 8081A	ug/l	T	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
4,4'-DDE	EPA 8081A	ug/l	T	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.004 U	0.004 U	0.004 U	0.005 U	0.005 U	0.005 U	0.004 U	0.004 U	0.004 U	0.005 U	0.005 U	0.005 U	0.004 U	0.004 U	0.004 U	0.005 U	0.005 U	0.005 U	0.004 U	0.004 U	0.004 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
4,4'-DDT	EPA 8081A	ug/l	T	0.005 U	0.006 U	0.006 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.006 U	0.006 U	0.005 U	0.005 U	0.005 U	0.005 U	0.006 U	0.006 U	0.005 U	0.005 U	0.005 U	0.005 U	0.006 U	0.006 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.006 U	0.006 U	0.005 U	0.005 U
ALDRIN	EPA 8081A	ug/l	T	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.001 U	0.001 U	0.001 U	0.002 U	0.002 U	0.002 U	0.001 U	0.001 U	0.001 U	0.002 U	0.002 U	0.002 U	0.001 U	0.001 U	0.001 U	0.002 U	0.002 U	0.002 U	0.001 U	0.001 U	0.001 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
ALPHA - CHLORDANE	EPA 8081A	ug/l	T	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.001 U	0.001 U	0.001 U	0.004 U	0.004 U	0.004 U	0.001 U	0.001 U	0.001 U	0.004 U	0.004 U	0.004 U	0.001 U	0.001 U	0.001 U	0.004 U	0.004 U	0.004 U	0.001 U	0.001 U	0.001 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
ALPHA-BHC	EPA 8081A	ug/l	T	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.002 U	0.002 U	0.002 U	0.003 U	0.003 U	0.003 U	0.002 U	0.002 U	0.002 U	0.003 U	0.003 U	0.003 U	0.002 U	0.002 U	0.002 U	0.003 U	0.003 U	0.003 U	0.002 U	0.002 U	0.002 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U
BETA-BHC	EPA 8081A	ug/l	T	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U
DELTA-BHC	EPA 8081A	ug/l	T	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.001 U	0.001 U	0.001 U	0.002 U	0.002 U	0.002 U	0.001 U	0.001 U	0.001 U	0.002 U	0.002 U	0.002 U	0.001 U	0.001 U	0.001 U	0.002 U	0.002 U	0.002 U	0.001 U	0.001 U	0.001 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
DIELDRIN	EPA 8081A	ug/l	T	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.004 U	0.004 U	0.004 U	0.006 U	0.006 U	0.006 U	0.004 U	0.004 U	0.004 U	0.006 U	0.006 U	0.006 U	0.004 U	0.004 U	0.004 U	0.006 U	0.006 U	0.006 U	0.004 U	0.004 U	0.004 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U
ENDOSULFAN I	EPA 8081A	ug/l	T	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
ENDOSULFAN II	EPA 8081A	ug/l	T	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.004 U	0.004 U	0.004 U	0.006 U	0.006 U	0.006 U	0.004 U	0.004 U	0.004 U	0.006 U	0.006 U	0.006 U	0.004 U	0.004 U	0.004 U	0.006 U	0.006 U	0.006 U	0.004 U	0.004 U	0.004 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U
ENDOSULFAN SULFATE	EPA 8081A	ug/l	T	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U
ENDRIN	EPA 8081A	ug/l	T	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.005 U	0.005 U	0.005 U	0.006 U	0.006 U	0.006 U	0.005 U	0.005 U	0.005 U	0.006 U	0.006 U	0.006 U	0.005 U	0.005 U	0.005 U	0.006 U	0.006 U	0.006 U	0.005 U	0.005 U	0.005 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U
ENDRIN ALDEHYDE	EPA 8081A	ug/l	T	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U
ENDRIN KETONE	EPA 8081A	ug/l	T	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U
GAMMA - CHLORDANE	EPA 8081A	ug/l	T	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
GAMMA-BHC (LINDANE)	EPA 8081A	ug/l	T	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.001 U	0.001 U	0.001 U	0.003 U	0.003 U	0.003 U	0.001 U	0.001 U	0.001 U	0.003 U	0.003 U	0.003 U	0.001 U	0.001 U	0.001 U	0.003 U	0.003 U	0.003 U	0.001 U	0.001 U	0.001 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U
HEPTACHLOR	EPA 8081A	ug/l	T	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U
HEPTACHLOR EPOXIDE	EPA 8081A	ug/l	T	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.001 U	0.001 U	0.001 U	0.002 U	0.002 U	0.002 U	0.001 U	0.001 U	0.001 U	0.002 U	0.002 U	0.002 U	0.001 U	0.001 U	0.001 U	0.002 U	0.002 U	0.002 U	0.001 U	0.001 U	0.001 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
METHOXYCHLOR	EPA 8081A	ug/l	T	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
TOXAPHENE	EPA 8081A	ug/l	T	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
PAHs and SVOCs@																																		
2-CHLORONAPHTHALENE	EPA 8270	ug/l	T	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
2-METHYLNAPHTHALENE	EPA 8270	ug/l	T	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
ACENAPHTHENE	EPA 8310	ug/l	T	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
ACENAPHTHYLENE	EPA 8310	ug/l	T	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
ANTHRACENE	EPA 8310	ug/l	T	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
BENZO(A)ANTHRACENE	EPA 8310	ug/l	T	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
BENZO(A)PYRENE	EPA 8310	ug/l	T	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
BENZO(B)FLUORANTHENE	EPA 8310	ug/l	T	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
BENZO(G,H,I)PERYLENE	EPA 8310	ug/l	T	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
BENZO(K)FLUORANTHENE	EPA 8310	ug/l	T	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
BIS(2-CHLOROISOPROPYL)ETHER	EPA 8270	ug/l	T	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
CHRYSENE	EPA 8310	ug/l	T	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
DIBENZO(A,H)ANTHRACENE	EPA 8310	ug/l	T	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
FLUORANTHENE	EPA 8310	ug/l	T	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
FLUORENE	EPA 8310	ug/l	T	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
INDENO(1,2,3-CD)PYRENE	EPA 8310	ug/l	T	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
NAPHTHALENE	EPA 8310	ug/l	T	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
PHENANTHRENE	EPA 8310	ug/l	T	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
PYRENE	EPA 8310	ug/l	T	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
VOCs																																		
1,1,1,2-TETRACHLOROETHANE	EPA 8260B	ug/l	T	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,1-TRICHLOROETHANE	EPA 8260B	ug/l	T	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.5 U	0.5 U	0.5 U	0.09 U	0.09 U	0.09 U	0.5 U	0.5 U	0.5 U	0.09 U	0.09 U	0.09 U	0.5 U	0.5 U	0.5 U	0.09 U	0.09 U	0.09 U	0.5 U	0.5 U	0.5 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U
1,1,2,2-TETRACHLOROETHANE	EPA 8260B	ug/l	T	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2-TRICHLOROETHANE	EPA 8260B	ug/l	T	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U

Table 1
Freshwater Marsh Sampling
Summary of 2010-2011 Water Quality Results

				Jefferson Outlet (SP-4)					Interim Treatment Area (SP-5)						Interim Treatment Area (SP-6)						Interim Treatment Area (SP-7)						Riparian Corridor - East							
Analyte	Method	Units	Total/ Dissolved	10/14/2010	Wet Weather 12/22/2010	1/26/2011	4/20/2011	7/27/2011	Wet Weather 1/27/2010	2/25/2010	7/21/2010	Wet Weather 12/22/2010	1/26/2011	7/27/2011	Wet Weather 1/27/2010	2/25/2010	7/21/2010	Wet Weather 12/22/2010	1/26/2011	7/27/2011	Wet Weather 1/27/2010	2/25/2010	7/21/2010	Wet Weather 12/22/2010	1/26/2011	7/27/2011	Wet Weather 1/27/2010	2/25/2010	4/22/2010	10/14/2010	Wet Weather 12/22/2010	1/26/2011	4/20/2011	7/27/2011
1,1-DICHLOROETHANE	EPA 8260B	ug/l	T	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,1-DICHLOROETHENE	EPA 8260B	ug/l	T	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,1-DICHLOROPROPANE	EPA 8260B	ug/l	T	0.2 U	0.2 U	0.2 U	NA	NA	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	NA	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	NA	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	NA	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	NA	NA
1,2,3-TRICHLOROBENZENE	EPA 8260B	ug/l	T	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2,3-TRICHLOROPROPANE	EPA 8260B	ug/l	T	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2,4-TRICHLOROBENZENE	EPA 8260B	ug/l	T	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,2,4-TRIMETHYLBENZENE	EPA 8260B	ug/l	T	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,2-DIBROMO-3-CHLOROPROPANE	EPA 8260B	ug/l	T	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,2-DIBROMOETHANE	EPA 8260B	ug/l	T	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-DICHLOROBENZENE	EPA 8260B	ug/l	T	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,2-DICHLOROETHANE	EPA 8260B	ug/l	T	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,2-DICHLOROPROPANE	EPA 8260B	ug/l	T	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,3,5-TRIMETHYLBENZENE	EPA 8260B	ug/l	T	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3-DICHLOROBENZENE	EPA 8260B	ug/l	T	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.5 U	0.5 U	0.5 U	0.06 U	0.06 U	0.06 U	0.5 U	0.5 U	0.5 U	0.06 U	0.06 U	0.06 U	0.5 U	0.5 U	0.5 U	0.06 U	0.06 U	0.06 U	0.5 U	0.5 U	0.5 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U
1,3-DICHLOROPROPANE	EPA 8260B	ug/l	T	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.5 U	0.5 U	0.5 U	0.3 U	0.3 U	0.3 U	0.5 U	0.5 U	0.5 U	0.3 U	0.3 U	0.3 U	0.5 U	0.5 U	0.5 U	0.3 U	0.3 U	0.3 U	0.5 U	0.5 U	0.5 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
1,4-DICHLOROBENZENE	EPA 8260B	ug/l	T	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2,2-DICHLOROPROPANE	EPA 8260B	ug/l	T	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2-CHLOROETHYL VINYL ETHER	EPA 8260B	ug/l	T	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	10 U	10 U	10 U	0.4 U	0.4 U	0.4 U	10 U	10 U	10 U	0.4 U	0.4 U	0.4 U	10 U	10 U	10 U	0.4 U	0.4 U	0.4 U	10 U	10 U	10 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
2-CHLOROTOLUENE	EPA 8260B	ug/l	T	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.5 U	0.5 U	0.5 U	0.07 U	0.07 U	0.07 U	0.5 U	0.5 U	0.5 U	0.07 U	0.07 U	0.07 U	0.5 U	0.5 U	0.5 U	0.07 U	0.07 U	0.07 U	0.5 U	0.5 U	0.5 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
4-CHLOROTOLUENE	EPA 8260B	ug/l	T	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
BENZENE	EPA 8260B	ug/l	T	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
BROMOBENZENE	EPA 8260B	ug/l	T	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
BROMODICHLOROMETHANE	EPA 8260B	ug/l	T	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
BROMOFORM	EPA 8260B	ug/l	T	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
BROMOMETHANE	EPA 8260B	ug/l	T	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CARBON TETRACHLORIDE	EPA 8260B	ug/l	T	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CHLOROBENZENE	EPA 8260B	ug/l	T	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CHLOROETHANE	EPA 8260B	ug/l	T	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CHLOROFORM	EPA 8260B	ug/l	T	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	6.2
CHLOROMETHANE	EPA 8260B	ug/l	T	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CIS-1,2-DICHLOROETHENE	EPA 8260B	ug/l	T	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CIS-1,3-DICHLOROPROPENE	EPA 8260B	ug/l	T	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
DIBROMOCHLOROMETHANE	EPA 8260B	ug/l	T	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
DIBROMOMETHANE	EPA 8260B	ug/l	T	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
DICHLORODIFLUOROMETHANE	EPA 8260B	ug/l	T	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ETHYLBENZENE	EPA 8260B	ug/l	T	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
HEXACHLOROBUTADIENE	EPA 8260B	ug/l	T	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ISOPROPYLBENZENE	EPA 8260B	ug/l	T	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
M,P-XYLENE	EPA 8260B	ug/l	T	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
METHYLENE CHLORIDE	EPA 8260B	ug/l	T	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
NAPHTHALENE	EPA 8260B	ug/l	T	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
N-BUTYLBENZENE	EPA 8260B	ug/l	T	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
N-PROPYLBENZENE	EPA 8260B	ug/l	T	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
O-XYLENE	EPA 8260B	ug/l	T	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
P-ISOPROPYLTOLUENE	EPA 8260B	ug/l	T	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
SEC-BUTYLBENZENE	EPA 8260B	ug/l	T	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
STYRENE	EPA 8260B	ug/l	T	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
TERT-BUTYLBENZENE	EPA 8260B	ug/l	T	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
TETRACHLOROETHENE	EPA 8260B	ug/l	T	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
TOLUENE	EPA 8260B	ug/l	T	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
TRANS-1,2-DICHLOROETHENE	EPA 8260B	ug/l	T	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
TRANS-1,3-DICHLOROPROPENE	EPA 8260B	ug/l	T	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.5 U	0.5 U	0.5 U	0.09 U	0.09 U	0.09 U	0.5 U	0.5 U	0.5 U	0.09 U	0.09 U	0.09 U	0.5 U	0.5 U	0.5 U	0.09 U	0.09 U	0.09 U	0.5 U	0.5 U	0.5 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U
TRICHLOROETHENE	EPA 8260B	ug/l	T	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
TRICHLOROFLUOROMETHANE	EPA 8260B	ug/l	T	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
VINYL CHLORIDE	EPA 8260B	ug/l	T	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U

Notes:
U = Not detected at a concentration greater than the reporting limit shown
T = Total concentration
D = Dissolved (filtered) concentration
J = Detected at an estimated concentration between the method detection and
ug/l = micrograms per liter; mg/l = milligrams per liter; ml/l = milliliters per liter
NA = Not analyzed
@ = Mercury, PCB, pesticide, PAH and SVOC data are reported down to the n
SVOC = Semi-volatile organic compound
PAH = Polynuclear aromatic hydrocarbon
NOEC = "No Observed Effect Concentration " or concentration without observa

Table 1
Freshwater Marsh Sampling
Summary of Sediment Quality Results

Group / Analyte	Units	Method	Riparian Corridor Outlet (SP-1)			Central Drain Inlet (SP-2)								
			8/19/2009	8/19/2010	8/18/2011	8/4/2003	8/12/2004	8/11/2005	8/25/2006 [2]	8/30/2007	8/15/2008	8/19/2009	8/19/2010	8/18/2011
METALS														
ARSENIC	mg/kg	EPA 200.8	3.80	7.00	3.70	2.20	4.90	3.40	3.99	4.70	3.80	3.50	4.60	3.30
CADMIUM	mg/kg	EPA 200.8	1 U	0.50	0.30	0.30	0.50	2 U	0.44 J	1 U	1 U	1 U	0.70	0.60
CHROMIUM	mg/kg	EPA 200.8	16.0	20.0	14.0	13.0	19.0	17.0	14.9	22.0	17.0	24.0	13.0	14.0
COPPER	mg/kg	EPA 200.8	22.0	26.0	23.0	15.0	20.0	22.0	13.8	24.0	20.0	36.0	22.0	27.0
IRON	mg/kg	EPA 200.7	17600	18100	9540	5780	9850	11000	15000	17300	18000	20700	13000	10200
LEAD	mg/kg	EPA 200.8	6.20	13.0	12.0	7.10	5.10	3.40	5.27	13.0	9.20	10.0	9.20	10.0
MANGANESE	mg/kg	EPA 200.8	420	220	130	380	560	370	501	380	320	470	280	190
MERCURY	ug/kg	EPA 7471A	1 U	50 U	50 U	2.90	50 U	50 U	30 J	50 U	50 U	1 U	50 U	50 U
NICKEL	mg/kg	EPA 200.8	17.0	15.0	10.0	11.0	17.0	15.0	12.2	18.0	15.0	23.0	10.0	9.80
SELENIUM	mg/kg	EPA 200.8	5 U	2 U	1 U	0.20	1 U	10 U	1.85	5 U	5 U	5 U	2 U	1 U
SILVER	mg/kg	EPA 200.8	1 U	20 U	10 U	0.5 U	0.2 U	2 U	0.5 U	1 U	1 U	1 U	20 U	10 U
SODIUM	mg/kg	EPA 200.7	666	436	265	699	740	676	856	1030	961	1110	1780	518
ZINC	mg/kg	EPA 200.8	48.0	91.0	91.0	37.0	61.0	63.0	42.0	69.0	67.0	72.0	270	95.0
PESTICIDES														
4,4'-DDD	ug/kg	EPA 8081A	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	0.8 U	0.5 U	2.5 U	2 U	16.7 U	3.3 U
4,4'-DDE	ug/kg	EPA 8081A	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	0.7 U	0.5 U	2.5 U	2 U	16.7 U	3.3 U
4,4'-DDT	ug/kg	EPA 8081A	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	0.7 U	0.5 U	2.5 U	2 U	16.7 U	3.3 U
ALDRIN	ug/kg	EPA 8081A	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	0.4 U	0.5 U	2.5 U	2 U	16.7 U	3.3 U
ALPHA - CHLORDANE	ug/kg	EPA 8081A	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	0.3 U	0.5 U	2.5 U	2 U	16.7 U	3.3 U
ALPHA-BHC	ug/kg	EPA 8081A	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	0.4 U	0.5 U	2.5 U	2 U	16.7 U	3.3 U
BETA-BHC	ug/kg	EPA 8081A	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	1.3 U	0.5 U	2.5 U	2 U	16.7 U	3.3 U
CHLORDANE	ug/kg	EPA 8081A	100 U	833 U	167 U	25 U	25 U	50 U	0.5 U	25 U	125 U	100 U	833 U	167 U
DELTA-BHC	ug/kg	EPA 8081A	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	2.5 U	2 U	16.7 U	3.3 U
DIELDRIN	ug/kg	EPA 8081A	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	0.9 U	0.5 U	2.5 U	2 U	16.7 U	3.3 U
ENDOSULFAN I	ug/kg	EPA 8081A	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	0.7 U	0.5 U	2.5 U	2 U	16.7 U	3.3 U
ENDOSULFAN II	ug/kg	EPA 8081A	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	0.9 U	0.5 U	2.5 U	2 U	16.7 U	3.3 U
ENDOSULFAN SULFATE	ug/kg	EPA 8081A	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	1.2 U	0.5 U	2.5 U	2 U	16.7 U	3.3 U
ENDRIN	ug/kg	EPA 8081A	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	0.9 U	0.5 U	2.5 U	2 U	16.7 U	3.3 U
ENDRIN ALDEHYDE	ug/kg	EPA 8081A	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	1.1 U	0.5 U	2.5 U	2 U	16.7 U	3.3 U
ENDRIN KETONE	ug/kg	EPA 8081A	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	1 U	0.5 U	2.5 U	2 U	16.7 U	3.3 U
GAMMA - CHLORDANE	ug/kg	EPA 8081A	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	--	0.5 U	2.5 U	2 U	16.7 U	3.3 U
GAMMA-BHC (LINDANE)	ug/kg	EPA 8081A	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	0.4 U	0.5 U	2.5 U	2 U	16.7 U	3.3 U
HEPTACHLOR	ug/kg	EPA 8081A	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	0.7 U	0.5 U	2.5 U	2 U	16.7 U	3.3 U
HEPTACHLOR EPOXIDE	ug/kg	EPA 8081A	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	2.5 U	2 U	16.7 U	3.3 U
METHOXYCHLOR	ug/kg	EPA 8081A	2 U	16.7 U	16.7 U	0.5 U	0.5 U	1 U	4 U	0.5 U	2.5 U	2 U	16.7 U	16.7 U
TOXAPHENE	ug/kg	EPA 8081A	100 U	833 U	167 U	25 U	25 U	50 U	250 U	25 U	125 U	100 U	833 U	167 U
PCBs														
PCB-1016 (AROCLOR 1016)	ug/kg	EPA 8081A	100 U	833 U	167 U	25 U	25 U	50 U	3 U	25 U	125 U	100 U	833 U	167 U
PCB-1221 (AROCLOR 1221)	ug/kg	EPA 8081A	100 U	833 U	167 U	25 U	25 U	50 U	6 U	25 U	125 U	100 U	833 U	167 U
PCB-1232 (AROCLOR 1232)	ug/kg	EPA 8081A	100 U	833 U	167 U	25 U	25 U	50 U	4 U	25 U	125 U	100 U	833 U	167 U
PCB-1242 (AROCLOR 1242)	ug/kg	EPA 8081A	100 U	833 U	167 U	25 U	25 U	50 U	2 U	25 U	125 U	100 U	833 U	167 U
PCB-1248 (AROCLOR 1248)	ug/kg	EPA 8081A	100 U	833 U	167 U	25 U	25 U	50 U	8 U	25 U	125 U	100 U	833 U	167 U
PCB-1254 (AROCLOR 1254)	ug/kg	EPA 8081A	100 U	833 U	167 U	25 U	25 U	50 U	1 U	25 U	125 U	100 U	833 U	167 U
PCB-1260 (AROCLOR 1260)	ug/kg	EPA 8081A	100 U	833 U	167 U	25 U	25 U	50 U	2 U	25 U	125 U	100 U	833 U	167 U
PAHs [1]														
ACENAPHTHENE	ug/kg	EPA 8310	0.8 U	42.8 U	25 U	0.2 U	6.6 U	0.4 U	40 U	0.2 U	0.2 U	0.8 U	42.8 U	25 U
ACENAPHTHYLENE	ug/kg	EPA 8310	0.8 U	40.6 U	25 U	0.2 U	14.6 U	0.5 U	88 U	0.2 U	0.2 U	0.8 U	40.6 U	25 U
ANTHRACENE	ug/kg	EPA 8310	0.6 U	37.8 U	25 U	0.2 U	0.6 U	0.5 U	3 U	0.2 U	0.2 U	0.6 U	37.8 U	25 U
BENZO(A)ANTHRACENE	ug/kg	EPA 8310	0.8 U	26.8 U	25 U	0.2 U	0.2 U	0.9 U	2 U	0.2 U	0.2 U	0.8 U	26.8 U	25 U
BENZO(A)PYRENE	ug/kg	EPA 8310	1 U	35.2 U	25 U	0.2 U	0.6 U	1 U	5 U	0.2 U	0.2 U	1 U	35.2 U	25 U
BENZO(B)FLUORANTHENE	ug/kg	EPA 8310	0.8 U	30.2 U	25 U	0.2 U	0.8 U	1.2 U	3 U	0.2 U	0.2 U	0.8 U	30.2 U	25 U
BENZO(G,H,I)PERYLENE	ug/kg	EPA 8310	0.9 U	37.2 U	25 U	0.2 U	0.6 U	1.2 U	4 U	0.2 U	0.2 U	0.9 U	37.2 U	25 U
BENZO(K)FLUORANTHENE	ug/kg	EPA 8310	1 U	38.2 U	25 U	0.2 U	0.2 U	1.2 U	5 U	0.2 U	0.2 U	1 U	38.2 U	25 U
CHRYSENE	ug/kg	EPA 8310	0.9 U	28 U	25 U	0.2 U	0.2 U	1.3 U	2 U	0.2 U	0.2 U	0.9 U	28 U	25 U
DIBENZO(A,H)ANTHRACENE	ug/kg	EPA 8310	1 U	35.8 U	25 U	0.2 U	0.9 U	1.7 U	3 U	0.2 U	0.2 U	1 U	35.8 U	25 U
FLUORANTHENE	ug/kg	EPA 8310	0.6 U	37.5 U	25 U	0.2 U	1.1 U	1.7 U	4 U	0.2 U	0.2 U	0.6 U	37.5 U	25 U
FLUORENE	ug/kg	EPA 8310	0.7 U	41.8 U	25 U	0.2 U	1.7 U	2.2 U	8 U	0.2 U	0.2 U	0.7 U	41.8 U	25 U
INDENO(1,2,3-CD)PYRENE	ug/kg	EPA 8310	0.8 U	44.2 U	25 U	0.2 U	0.4 U	3.5 U	3 U	0.2 U	0.2 U	0.8 U	44.2 U	25 U
PHENANTHRENE	ug/kg	EPA 8310	0.4 U	43 U	25 U	0.2 U	0.6 U	13.2 U	5 U	0.1 U	0.1 U	0.4 U	43 U	25 U
PYRENE	ug/kg	EPA 8310	0.7 U	41 U	25 U	0.2 U	0.5 U	29.2 U	3 U	0.2 U	0.2 U	0.7 U	41 U	25 U
NAPHTHALENE	ug/kg	EPA 8310	0.1 U	0.1 U	0.2 U	0.2 U	5.9 U	0.6 U	1.7 U	0.2 U	0.2 U	0.1 U	0.1 U	0.2 U
VOCs														
1,1,1-TRICHLOROETHANE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.43 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,1,1,2-TETRACHLOROETHANE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.4 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,1,2,2-TETRACHLOROETHANE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.48 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,1,2-TRICHLOROETHANE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.45 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,1-DICHLOROETHANE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.38 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,1-DICHLOROETHENE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.72 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,1-DICHLOROPROPANE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.47 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,2,3-TRICHLOROBENZENE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	1.2 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,2,3-TRICHLOROPROPANE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.76 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,2,4-TRICHLOROBENZENE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.86 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,2,4-TRIMETHYLBENZENE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	1.1 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.89 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,2-DIBROMOETHANE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.36 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,2-DICHLOROBENZENE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.46 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,2-DICHLOROETHANE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.43 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,2-DICHLOROPROPANE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.57 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,3,5-TRIMETHYLBENZENE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.46 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,3-DICHLOROBENZENE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.39 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,3-DICHLOROPROPANE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.47 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,4-DICHLOROBENZENE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.4 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
2,2-DICHLOROPROPANE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.95 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U

Group / Analyte	Jefferson Inlet (SP-3)									Jefferson Outlet (SP-4)								
	8/4/2003	8/12/2004	8/11/2005	8/25/2006 [2]	8/30/2007	8/15/2008	8/19/2009	8/19/2010	8/18/2011	8/4/2003	8/12/2004	8/11/2005	8/25/2006 [2]	8/30/2007	8/15/2008	8/19/2009	8/19/2010	8/18/2011
METALS																		
ARSENIC	2.60	3.90	4.10	4.75	3.70	4.20	3.00	3.10	2.30	1.30	9.70	4.00	6.84	4.80	3.70	2.80	4.00	3.10
CADMIUM	0.70	0.80	2 U	0.55	1 U	1 U	1 U	1.30	0.90	1.70	2.00	2 U	0.78	1 U	1 U	1 U	1.40	0.80
CHROMIUM	9.70	17.0	17.0	19.7	21.0	20.0	31.0	13.0	12.0	12.0	15.0	27.0	27.3	25.0	22.0	17.0	21.0	18.0
COPPER	25.0	24.0	33.0	16.4	21.0	25.0	34.0	31.0	70.0	18.0	28.0	43.0	26.1	36.0	31.0	21.0	34.0	27.0
IRON	5330	6700	11300	18800	18100	17600	25000	9290	6910	7120	9250	7760	22600	23100	21500	15600	30600	20900
LEAD	34.0	10.0	5.00	7.11	8.20	9.20	10.0	110	56.0	5.70	7.40	35.0	15.5	8.80	12.0	9.40	12.0	9.50
MANGANESE	120	340	240	303	250	280	300	130	95.0	350	1100	430	334	310	490	240	730	450
MERCURY	33.8	63.0	50 U	40 J	50 U	57.0	1 U	50 U	50 U	84.1	91.0	50 U	40 J	56.0	94.0	1 U	97.0	80.0
NICKEL	8.20	17.0	15.0	15.3	17.0	17.0	24.0	9.60	10.0	12.0	19.0	22.0	21.0	22.0	20.0	14.0	19.0	16.0
SELENIUM	0.30	1 U	10 U	1 U	5 U	5 U	5 U	2 U	1 U	0.3 U	1 U	10 U	1 U	5 U	5 U	5 U	2 U	1 U
SILVER	0.5 U	0.20	2 U	0.5 U	1 U	1 U	1 U	20 U	10 U	0.5 U	0.2 U	2 U	0.5 U	1 U	1 U	1 U	20 U	10 U
SODIUM	341	865	788	1200	1160	1200	1160	685	363	417	575	474	634	655	577	255	1180	568
ZINC	350	65.0	79.0	54.0	78.0	81.0	93.0	310	280	32.0	52.0	98.0	68.8	88.0	87.0	63.0	120	58.0
PESTICIDES																		
4,4'-DDD	0.5 U	0.5 U	1 U	0.8 U	0.5 U	2.5 U	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	0.8 U	0.5 U	2.5 U	2 U	3.3 U	3.3 U
4,4'-DDE	0.5 U	0.5 U	1 U	0.7 U	0.5 U	2.5 U	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	0.7 U	0.5 U	2.5 U	2 U	3.3 U	3.3 U
4,4'-DDT	0.5 U	0.5 U	1 U	0.7 U	0.5 U	2.5 U	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	0.7 U	0.5 U	2.5 U	2 U	3.3 U	3.3 U
ALDRIN	0.5 U	0.5 U	1 U	0.4 U	0.5 U	2.5 U	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	0.4 U	0.5 U	2.5 U	2 U	3.3 U	3.3 U
ALPHA - CHLORDANE	0.5 U	0.5 U	1 U	0.3 U	0.5 U	2.5 U	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	0.3 U	0.5 U	2.5 U	2 U	3.3 U	3.3 U
ALPHA-BHC	0.5 U	0.5 U	1 U	0.4 U	0.5 U	2.5 U	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	0.4 U	0.5 U	2.5 U	2 U	3.3 U	3.3 U
BETA-BHC	0.5 U	0.5 U	1 U	1.3 U	0.5 U	2.5 U	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	1.3 U	0.5 U	2.5 U	2 U	3.3 U	3.3 U
CHLORDANE	25 U	25 U	50 U	0.5 U	25 U	125 U	100 U	833 U	167 U	25 U	25 U	50 U	0.5 U	25 U	125 U	100 U	167 U	167 U
DELTA-BHC	0.5 U	0.5 U	1 U	0.5 U	0.5 U	2.5 U	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	2.5 U	2 U	3.3 U	3.3 U
DIELDRIN	0.5 U	0.5 U	1 U	0.9 U	0.5 U	2.5 U	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	0.9 U	0.5 U	2.5 U	2 U	3.3 U	3.3 U
ENDOSULFAN I	0.5 U	0.5 U	1 U	0.7 U	0.5 U	2.5 U	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	0.7 U	0.5 U	2.5 U	2 U	3.3 U	3.3 U
ENDOSULFAN II	0.5 U	0.5 U	1 U	0.9 U	0.5 U	2.5 U	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	0.9 U	0.5 U	2.5 U	2 U	3.3 U	3.3 U
ENDOSULFAN SULFATE	0.5 U	0.5 U	1 U	1.2 U	0.5 U	2.5 U	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	1.2 U	0.5 U	2.5 U	2 U	3.3 U	3.3 U
ENDRIN	0.5 U	0.5 U	1 U	0.9 U	0.5 U	2.5 U	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	0.9 U	0.5 U	2.5 U	2 U	3.3 U	3.3 U
ENDRIN ALDEHYDE	0.5 U	0.5 U	1 U	1.1 U	0.5 U	2.5 U	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	1.1 U	0.5 U	2.5 U	2 U	3.3 U	3.3 U
ENDRIN KETONE	0.5 U	0.5 U	1 U	1 U	0.5 U	2.5 U	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	1 U	0.5 U	2.5 U	2 U	3.3 U	3.3 U
GAMMA - CHLORDANE	0.5 U	0.5 U	1 U	--	0.5 U	2.5 U	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	--	0.5 U	2.5 U	2 U	3.3 U	3.3 U
GAMMA-BHC (LINDANE)	0.5 U	0.5 U	1 U	0.4 U	0.5 U	2.5 U	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	0.4 U	0.5 U	2.5 U	2 U	3.3 U	3.3 U
HEPTACHLOR	0.5 U	0.5 U	1 U	0.7 U	0.5 U	2.5 U	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	0.7 U	0.5 U	2.5 U	2 U	3.3 U	3.3 U
HEPTACHLOR EPOXIDE	0.5 U	0.5 U	1 U	0.5 U	0.5 U	2.5 U	2 U	16.7 U	3.3 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	2.5 U	2 U	3.3 U	3.3 U
METHOXYCHLOR	0.5 U	0.5 U	1 U	4 U	0.5 U	2.5 U	2 U	16.7 U	16.7 U	0.5 U	0.5 U	1 U	4 U	0.5 U	2.5 U	2 U	3.3 U	16.7 U
TOXAPHENE	25 U	25 U	50 U	250 U	25 U	125 U	100 U	833 U	167 U	25 U	25 U	50 U	250 U	25 U	125 U	100 U	167 U	167 U
PCBs																		
PCB-1016 (AROCLOR 1016)	25 U	25 U	50 U	3 U	25 U	125 U	100 U	833 U	167 U	25 U	25 U	50 U	3 U	25 U	125 U	100 U	167 U	167 U
PCB-1221 (AROCLOR 1221)	25 U	25 U	50 U	6 U	25 U	125 U	100 U	833 U	167 U	25 U	25 U	50 U	6 U	25 U	125 U	100 U	167 U	167 U
PCB-1232 (AROCLOR 1232)	25 U	25 U	50 U	4 U	25 U	125 U	100 U	833 U	167 U	25 U	25 U	50 U	4 U	25 U	125 U	100 U	167 U	167 U
PCB-1242 (AROCLOR 1242)	25 U	25 U	50 U	2 U	25 U	125 U	100 U	833 U	167 U	25 U	25 U	50 U	2 U	25 U	125 U	100 U	167 U	167 U
PCB-1248 (AROCLOR 1248)	25 U	25 U	50 U	8 U	25 U	125 U	100 U	833 U	167 U	25 U	25 U	50 U	8 U	25 U	125 U	100 U	167 U	167 U
PCB-1254 (AROCLOR 1254)	25 U	25 U	50 U	1 U	25 U	125 U	100 U	833 U	167 U	25 U	25 U	50 U	1 U	25 U	125 U	100 U	167 U	167 U
PCB-1260 (AROCLOR 1260)	25 U	25 U	50 U	2 U	25 U	125 U	100 U	833 U	167 U	25 U	25 U	50 U	2 U	25 U	125 U	100 U	167 U	167 U
PAHs [1]																		
ACENAPHTHENE	0.2 U	6.6 U	0.4 U	40 U	0.2 U	0.2 U	0.8 U	8.6 U	125 U	0.2 U	6.6 U	0.4 U	40 U	0.2 U	0.2 U	0.8 U	8.6 U	25 U
ACENAPHTHYLENE	0.2 U	14.6 U	0.5 U	88 U	0.2 U	0.2 U	0.8 U	8.1 U	125 U	0.2 U	14.6 U	0.5 U	88 U	0.2 U	0.2 U	0.8 U	8.1 U	25 U
ANTHRACENE	0.2 U	0.6 U	0.5 U	3 U	0.2 U	0.2 U	0.6 U	7.6 U	125 U	0.2 U	0.6 U	0.5 U	3 U	0.2 U	0.2 U	0.6 U	7.6 U	25 U
BENZO(A)ANTHRACENE	0.2 U	0.2 U	0.9 U	2 U	0.2 U	0.2 U	0.8 U	5.4 U	125 U	0.2 U	0.2 U	0.9 U	2 U	0.2 U	0.2 U	0.8 U	5.4 U	25 U
BENZO(A)PYRENE	0.2 U	0.6 U	1 U	5 U	0.2 U	0.2 U	1 U	7 U	125 U	0.2 U	0.6 U	1 U	5 U	0.2 U	0.2 U	1 U	7 U	25 U
BENZO(B)FLUORANTHENE	14.7	0.8 U	1.2 U	3 U	0.2 U	0.2 U	0.8 U	25.8	125 U	0.2 U	0.8 U	1.2 U	3 U	0.2 U	0.2 U	0.8 U	6 U	25 U
BENZO(G,H,I)PERYLENE	0.2 U	0.6 U	1.2 U	4 U	0.2 U	0.2 U	0.9 U	33.5	125 U	0.2 U	0.6 U	1.2 U	4 U	0.2 U	0.2 U	0.9 U	7.4 U	25 U
BENZO(K)FLUORANTHENE	0.2 U	0.2 U	1.2 U	5 U	0.2 U	0.2 U	1 U	7.6 U	125 U	0.2 U	0.2 U	1.2 U	5 U	0.2 U	0.2 U	1 U	7.6 U	25 U
CHRYSENE	11.1	0.2 U	1.3 U	2 U	0.2 U	0.2 U	0.9 U	5.6 U	125 U	0.2 U	0.2 U	1.3 U	2 U	0.2 U	0.2 U	0.9 U	5.6 U	25 U
DIBENZO(A,H)ANTHRACENE	0.2 U	0.9 U	1.7 U	3 U	0.2 U	0.2 U	1 U	7.2 U	125 U	0.2 U	0.9 U	1.7 U	3 U	0.2 U	0.2 U	1 U	7.2 U	25 U
FLUORANTHENE	0.2 U	1.1 U	1.7 U	4 U	0.2 U	0.2 U	0.6 U	61.7	125 U	0.2 U	1.1 U	1.7 U	4 U	0.2 U	0.2 U	0.6 U	7.5 U	25 U
FLUORENE	0.2 U	1.7 U	2.2 U	8 U	0.2 U	0.2 U	0.7 U	8.4 U	125 U	0.2 U	1.7 U	2.2 U	8 U	0.2 U	0.2 U	0.7 U	8.4 U	25 U
INDENO(1,2,3-CD)PYRENE	0.2 U	0.4 U	3.5 U	3 U	0.2 U	0.2 U	0.8 U	8.8 U	125 U	0.2 U	0.4 U	3.5 U	3 U	0.2 U	0.2 U	0.8 U	8.8 U	25 U
PHENANTHRENE	0.2 U	0.6 U	13.2 U	5 U	0.1 U	0.1 U	0.4 U	8.6 U	125 U	0.2 U	0.6 U	13.2 U	5 U	0.1 U	0.1 U	0.4 U	8.6 U	25 U
PYRENE	0.2 U	0.5 U	29.2 U	3 U	25.5	0.2 U	0.7 U	52.3	125 U	0.2 U	0.5 U	29.2 U	3 U	0.2 U	0.2 U	0.7 U	8.2 U	25 U
NAPHTHALENE	0.2 U	5.9 U	0.6 U	1.7 U	0.2 U	0.2 U	0.1 U	0.1 U	0.2 U	0.2 U	5.9 U	0.6 U	1.7 U	0.2 U	0.2 U	0.1 U	0.1 U	0.2 U
VOCs																		
1,1,1-TRICHLOROETHANE	0.5 U	0.5 U	1 U	0.43 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.43 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,1,1,2-TETRACHLOROETHANE	0.5 U	0.5 U	1 U	0.4 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.4 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,1,2,2-TETRACHLOROETHANE	0.5 U	0.5 U	1 U	0.48 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.48 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,1,2-TRICHLOROETHANE	0.5 U	0.5 U	1 U	0.45 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.45 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,1-DICHLOROETHANE	0.5 U	0.5 U	1 U	0.38 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.38 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,1-DICHLOROETHENE	0.5 U	0.5 U	1 U	0.72 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.72 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,1-DICHLOROPROPANE	0.5 U	0.5 U	1 U	0.47 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.47 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,2,3-TRICHLOROBENZENE	0.5 U	0.5 U	1 U	1.2 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	1.2 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,2,3-TRICHLOROPROPANE	0.5 U	0.5 U	1 U	0.76 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.76 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,2,4-TRICHLOROBENZENE	0.5 U	0.5 U	1 U	0.86 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.86 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,2,4-TRIMETHYLBENZENE	0.5 U	0.5 U	1 U	1.1 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	1.1 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,2-DIBROMO-3-CHLOROPROPANE	0.5 U	0.5 U	1 U	0.89 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.89 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,2-DIBROMOETHANE	0.5 U	0.5 U	1 U	0.36 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.36 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,2-DICHLOROBENZENE	0.5 U	0.5 U	1 U	0.46 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.46 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,2-DICHLOROETHANE	0.5 U	0.5 U	1 U	0.43 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.43 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,2-DICHLOROPROPANE	0.5 U	0.5 U	1 U	0.57 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.57 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,3,5-TRIMETHYLBENZENE	0.5 U	0.5 U	1 U	0.46 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.46 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,3-DICHLOROBENZENE	0.5 U	0.5 U	1 U	0.39 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.39 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,3-DICHLOROPROPANE	0.5 U	0.5 U	1 U	0.47 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.47 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,4-DICHLOROBENZENE	0.5 U	0.5 U	1 U	0.4 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.4 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
2,2-DICHLOROPROPANE	0.5 U	0.5 U	1 U	0.95 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.95 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U

Table 1
Freshwater Marsh Sampling
Summary of Sediment Quality Results

Grou	Analyte	Units	Method	Riparian Corridor Outlet (SP-1)			Central Drain Inlet (SP-2)									Jefferson Inlet (SP-3)									Jefferson Outlet (SP-4)								
				8/19/2009	8/19/2010	8/18/2011	8/4/2003	8/12/2004	8/11/2005	8/25/2006 [2]	8/30/2007	8/15/2008	8/19/2009	8/19/2010	8/18/2011	8/4/2003	8/12/2004	8/11/2005	8/25/2006 [2]	8/30/2007	8/15/2008	8/19/2009	8/19/2010	8/18/2011	8/4/2003	8/12/2004	8/11/2005	8/25/2006 [2]	8/30/2007	8/15/2008	8/19/2009	8/19/2010	8/18/2011
	2-CHLOROTOLUENE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.48 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.48 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.48 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
	4-CHLOROTOLUENE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.46 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.46 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.46 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
	BENZENE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.32 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.32 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.32 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
	BROMOBENZENE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.47 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.47 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.47 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
	BROMODICHLOROMETHANE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.47 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.47 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.47 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
	BROMOFORM	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.4 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.4 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.4 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
	BROMOMETHANE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	1.4 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	1.4 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	1.4 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
	CARBON TETRACHLORIDE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.57 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.57 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.57 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
	CHLOROBENZENE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.33 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.33 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.33 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
	CHLOROETHANE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	1.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	1.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	1.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
	CHLOROFORM	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.42 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.42 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.42 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
	CHLOROMETHANE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.58 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.58 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.58 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
	CIS-1,2-DICHLOROETHENE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.54 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.54 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.54 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
	CIS-1,3-DICHLOROPROPENE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.41 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.41 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.41 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
	DIBROMOCHLOROMETHANE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.43 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.43 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.43 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
	DIBROMOMETHANE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.57 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.57 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.57 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
	DICHLORODIFLUOROMETHANE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.36 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.36 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.36 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
	ETHYLBENZENE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.32 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.32 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.32 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
	HEXACHLOROBUTADIENE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.62 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.62 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.62 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
	ISOPROPYLBENZENE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.35 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.35 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.35 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
	M,P-XYLENE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.7 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.7 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.7 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
	METHYLENE CHLORIDE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	1.1 U	0.5 U	17.0	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	1.1 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	1.1 U	0.5 U	39.0	0.1 U	0.1 U	0.2 U
	NAPHTHALENE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	1.7 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	1.7 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	1.7 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
	N-BUTYLBENZENE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.57 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.57 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.57 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
	N-PROPYLBENZENE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.38 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.38 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.38 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
	O-XYLENE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.41 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.41 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.41 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
	P-ISOPROPYLTOLUENE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.53 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.53 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.53 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
	SEC-BUTYLBENZENE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
	STYRENE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.37 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.37 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.37 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
	TERT-BUTYLBENZENE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.53 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.53 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.53 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
	TETRACHLOROETHENE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.73 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.73 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.73 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
	TOLUENE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.38 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.38 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.38 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
	TRANS-1,2-DICHLOROETHENE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.43 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.43 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.43 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
	TRANS-1,3-DICHLOROPROPENE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.35 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.35 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.35 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
	TRICHLOROETHENE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.38 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.38 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.38 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
	TRICHLOROFLUOROMETHANE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.37 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.37 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.37 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
	VINYL CHLORIDE	ug/kg	EPA 8260B	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.51 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.51 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	1 U	0.51 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
MISCELLANEOUS PARAMETERS																																	
	CHLORIDE	mg/kg	EPA 300.0	39.9	37.0	51.7	769	458	532	255	102	134	171	1150	353	94.6	409	654	266	162	369	451	389	219	190	107	169	47.0	40.3	85.2	55.9	7.30	111
	NITRATE (AS N)	mg/kg	EPA 300.0	0.5 U	0.5 U	0.5 U	1.30	0.50	1 U	4.20	6.20	0.5 U	0.5 U	0.5 U	0.5 U	1.30	1.00	1 U	0.72 J	3.10	0.5 U	0.5 U	0.5 U	0.5 U	2.20	1.00	1 U	1.10	5.10	0.5 U	0.5 U	0.5 U	0.5 U
	NITRITE (AS N)	mg/kg	EPA 300.0	0.5 U	0.5 U	0.5 U	1 U	0.30	1 U	1 U	1.80	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.03 U	1 U	1.60	0.30	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1.40	1 U	0.57 J	0.70	0.5 U	0.5 U	0.5 U	0.5 U
	ORTHOPHOSPHATE (AS P)	mg/kg	EPA 300.0	1.80	1.60	0.5 U	4.20	17.3	0.03 U	4.49	1.40	4.40	4.00	2.30	4.90	0.20	9.20	0.03 U	2.16	0.80	3.50	4.10	1.90	2.60	8.60	9.20	1.10	5.98	1.70	3.90	4.40	3.60	6.30
	AMMONIA (AS N)	mg/kg	EPA 350.2	22.6	61.6	52.0	87.4	1.35	13.1	22.0	9.63	14.8	0.33 U	53.4	109	53.3	9.30	11.2	14.0	16.3	24.5	33.0	14.7	38.7	60.7	6.23	22.8	8.20	27.5	47.7	30.6	29.6	37.7
	TOTAL KJELDAHL NITROGEN	mg/kg	EPA 351.2	550	840	920	290	140	93.0	236	140	320	350	990	710	780	830	270	252	290	410	460	320	440	130	230	980	510	230	450	380	280	440
	TOTAL PHOSPHORUS	mg/kg	EPA 365.4	607	512	298	459	996	869	791	584	305	543	407	356	251	703	1120	883	613	977	608	364	317	385	752	733	612	700	427	382	465	449
	TPH-EXTRACTABLE	mg/kg	EPA 8015DRO	50 U	100	2.5 U	0.2 U	0.02 U	5 U	3 U	5 U	5 U	50 U	90.0	2.5 U	0.2 U	0.02 U	5 U	15 U	5 U	5 U	50 U	230	2.5 U	0.2 U	0.02 U	5 U	1 J	5 U	5 U	50 U	8.10	2.5 U
	TPH-VOLATILE (C4-C12)	mg/kg	EPA 8015M	0.12	0.05 U	0.05 U	1 U	0.01 U	0.01 U	3 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	1 U	0.01 U	0.01 U	3 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	1 U	0.01 U	0.01 U	3 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
	OIL AND GREASE	mg/kg	EPA 1664	1570	475	485	200	50 U	50 U	116	25 U	40.0	767	255	50 U	865	50 U	50 U	100 U	1380	65.0	1200	2660	195	5 U	50 U	50 U	100 U	975	35.0	900	40.0	50 U
PARTICLE SIZE ANALYSIS																																	
	MOISTURE CONTENT	%	ASTM D2937	60.6	61.2	103	65.5	53.5	142	74.4	43.7	116	41.5	52.3	65.5	41.1	46.0	39.2	46.9	53.5	48.4	42.4	52.1	49.9	52.4	48.5	179	39.4	43.1	106	154	53.0	212.5
	GRAVEL	%	ASTM D422	0.40	0.0	0.1	2.50	0.00	0.00	0.00	2.70	0.10	5.70	2.10	0.4	0.40	1.10	0.00	0.00	13.2	4.10	0.00	0.50	0.9	0.00	0.00	0.00	6.10	0.00	10.2	4.00	0.50	0.0
	SAND	%	ASTM D422	11.3	21.9	63.3	43.0	7.10	10.5	12.2	23.6	7.80	16.8	28.8	16.2	94.9	12.6	85.6	49.5	6.80	13.7	2.10	31.9	88.4	0.80	7.20	0.90	47.3	8.30	4.00	14.6	2.00	12.6
	FINES	%	ASTM D422	88.7	78.1	36.6	54.5	92.9	89.5	87.8	73.7	92.1	77.5	69.1	83.4	4.70	86.2	14.4	50.5	80.0	82.3	97.9	67.7	10.7	99.2	92.8	99.1	46.6	91.7	85.8	81.4	97.5	87.4

Notes:
U = Not detected at a concentration greater than the reporting limit shown
J = Detected at an estimated concentration below the laboratory reporting limit
mg/kg = milligrams per kilogram
ug/kg = micrograms per kilogram
% = percent
[1] Reported to method detection limit (MDL)
[2] Samples collected in 2006 were analyzed by Associated Laboratories (all other samples analyzed by Pat-Chem Laboratories). Results for pesticides, PCBs, PAHs and VOCs are reported to MDL.
-- = Analyte not reported

APPENDIX D

Technical Memorandum: Assessment of Freshwater Wetlands Performance

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TECHNICAL MEMORANDUM

Date: January 31, 2012
To: Marc Huffman, Playa Vista
From: Eric Strecker, Marc Leisenring, and Ken Lawler, Geosyntec Consultants
Subject: Post-Development Assessment of Freshwater Marsh Wet Weather Performance

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Condition 11(d) of the July 3, 1995 State Water Resources Control Board ("SWRCB") Water Quality Certification for the Freshwater Wetland System requires an evaluation of pollutant removal efficiency as compared to the estimated removal efficiencies obtained from the storage, treatment, and overflow runoff model (STORM) and the NURP study information contained in the Playa Vista Phase I EIR. This memorandum updates our February 11, 2011 memorandum regarding Post-Development Assessment of Freshwater Marsh Wet Weather Performance. This memo provides a revised analysis that includes the additional Freshwater Marsh ("FWM") effluent data collected over the 2010-2011 water year (October 1, 2010 to September 30, 2011) with a comparison of the estimated performance with the typical performance of stormwater retention pond systems.

Table 1 provides a comparison of average modeled versus measured effluent concentrations from the FWM along with comparisons with International BMP Database (BMPDB) observed effluent quality for similar systems. Modeled average concentrations were computed from the average annual loads and volumes reported in the Phase I EIR, as concentrations were not explicitly summarized in that report. Since only stormwater runoff was modeled, only grab samples collected during the wet weather events (1/28/2004, 1/13/2005, 4/28/2005, 1/2/2006, 2/23/2007, 12/16/2008, 1/27/2010, and 12/22/2010) were included for this comparison. Note that the 12/22/2010 sample was the wet weather sampling for the 2010-2011 water year. The individual grab sample concentrations are provided in Table 2.

As shown in Table 1, the measured average of the wet weather grab sample concentrations at the FWM outlet for all of the modeled metals (total copper (TCu), total lead (TPb), and total zinc (TZn)) are below the EIR predicted concentrations. The modeled averages for total suspended solids (TSS), total phosphorus (TP), dissolved phosphorus (DP), total nitrogen (TN) and nitrate (NO_3-N) were predicted to be lower than observed in the average grab sample concentrations at

Table 1: Comparison of Freshwater Marsh Modeled and Observed Effluent Concentration and BMP Database Effluent Concentrations.

Modeled Parameter	Units	EIR Phase I Modeled Average FWM Effluent Concentration[a]	Average (Range) of FWM Effluent Wet-Weather Grab Samples Only[b]	95% Confidence Interval of the Average Retention Pond Effluent Concentrations from International Stormwater BMP Database[f]	Interquartile Range (25th - 75th percentiles) of Retention Pond Effluent Concentrations from International BMP Database[f]
TSS	mg/L	10.2	17.9 (6.0 – 63)	21.9 – 27.6	5.0 – 28.3
TP	mg/L	0.06	0.25 (0.01 – 0.63)	0.20 – 0.40	0.06 – 0.22
DP	mg/L	0.03	0.11 (0.002 – 0.26)[c]	0.082 – 0.11	0.03 – 0.11
TN	mg/L	0.56	1.63 (0.80 – 2.44)[d]	1.32 – 1.49	0.85 – 1.77
TKN	mg/L	not modeled	1.15 (0.60 - 1.90)	1.15 – 1.29	0.77 – 1.60
NO_3	mg/L	0.23	0.40 (0.10 – 1.40)	0.36 – 0.50[e]	0.03 – 0.43[e]
TCu	ug/L	8.17	6.10 (1.8 – 11)	7.81 – 9.85	3.68 – 10.0
TPb	ug/L	23.86	1.24 (0.2 – 2.5)	8.91 – 12.2	2.0 – 10.0
TZn	ug/L	41.51	25.0 (3.5 – 54)	29.3 – 40.3	10.0 – 36.0

[a] Computed from modeled annual load and modeled annual runoff volume leaving the Freshwater Marsh as reported in Playa Vista Phase I EIR (CDM, 1992)
[b] Detection limits were substituted for all non-detects prior to computing summary statistics.
[c] DP is not monitored at the FWM, therefore orthophosphate (PO_4-P), which is the most bioavailable form of phosphorus and typically the largest component of dissolved phosphorus, has been compared with the modeled dissolved phosphorus value.
[d] TN is not monitored at the FWM, so the calculated sum of total Kjeldahl nitrogen (TKN), nitrate, and nitrite is compared to the modeled TN value.
[e] NO_3 was not summarized in the WERF (2010) technical paper, so NO_x (NO_2+NO_3) is reported in this table instead. NO_3 is generally an order of magnitude larger than NO_2.
[f] Summarized from International Stormwater BMP Database technical papers (http://www.bmpdatabase.org/BMPPerformance.htm). See WERF (2010, 2011a, 2011b) for more information.

Table 2: Wet Weather Grab Sample Concentrations at the Outlet of the Freshwater Marsh.

Water Year	Sample Date	TSS	TP	PO4-P	TKN	NO3-N	NO2-N	TCu	TPb	TZn
		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	ug/l
2003-2004	1/28/2004	10.0	0.63	0.07	1.90	0.1 U	0.1 U	1.8	0.2	6.3
2004-2005	1/13/2005	21.0	0.02	0.01	0.60	0.1 U	0.1 U	6.2	1.3	11
2004-2005	4/28/2005	6.0	0.01 U	0.002 U	0.70	0.1 U	0.1 U	2.4	0.3	3.5
2005-2006	1/2/2006	63.0	0.20	0.06	1.00	0.15	0.1 U	9.2	2.0	50
2006-2007	2/23/2007	10.0	0.11	0.002 U	1.00	0.1 U	0.11	3.3	0.9	11
2008-2009	12/16/2008	13.0	0.40	0.24	1.60	0.37	0.1 U	11.0	2.5	44
2009-2010	1/27/2010	6.0	0.32	0.26	1.50	0.84	0.1 U	5.3	0.9	20
2010-2011	12/22/2010	14.0	0.30	0.22	0.86	1.40	0.04 J	9.6	1.8	54

U = Constituent undetected at the detection limit shown.
J = Constituent detected; the reported value is the approximate concentration of the analyte in the sample.

the FWM outlet[1]. However, the modeled concentrations do fall within the range of observed individual grab sample concentrations, except the modeled TN concentration is slightly lower than the minimum observed. Because Santa Monica Bay is considered nutrient poor, the slightly higher observed TN concentrations are not considered to be a concern.

In addition to comparing observed to the EIR modeled concentrations, comparisons are made to effluent concentrations from retention ponds (wet ponds with significant wet pool volumes) reported in the recently completed technical papers summarizing BMP performance by pollutant category from data contained in the BMPDB (WERF, 2010; WERF, 2011a; WERF, 2011b). Confidence intervals of the average concentrations as well as the interquartile range of concentrations summarized in these technical papers are shown in the Table 1. As indicated, the observed concentrations in the effluent of the FWM are very similar to the range of effluent values reported for similar systems in the BMPDB and the FWM appears to perform better than the average retention pond for TSS, TCu, TPb, and TZn. The average observed effluent concentrations for TP, DP, TKN, and NO_3 for the FWM are within the 95% confidence intervals of the retention pond averages from the BMPDB. The average observed TN for the FWM effluent is within the inter-quartile range of retention ponds contained in the BMPDB. Therefore, the freshwater marsh appears to be providing effluent quality that is better than average for retention ponds for some of the more key pollutants of concern (heavy metals). Retention ponds are in general one of the better performing BMP categories in the BMP Database.

The results of this analysis indicate the FWM is meeting or exceeding the Phase 1 EIR performance expectations with respect to metals and sediment and it is achieving effluent nutrient concentrations that are equivalent to similarly designed BMPs. Mean effluent concentrations of copper, lead, and zinc, which are constituents of particular concern to the toxicity of Ballona Estuary sediments, are much lower than previously estimated by the Phase I EIR model and are lower than the mean effluent values reported in the BMPDB for retention ponds.

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[1] DP is not monitored at the FWM, therefore orthophosphate (PO_4-P), which is the most bioavailable form of phosphorus and typically the largest component of dissolved phosphorus, has been compared with the modeled dissolved phosphorus value. TN is also not monitored at the FWM, so the calculated sum of total Kjeldahl nitrogen (TKN), nitrate, and nitrite is compared to the modeled TN value.

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