Case Study Investigating PCBs in Storm Drain Sediments from Colma Creek Colma, California

San Mateo Countywide Stormwater Pollution Prevention Program

Prepared for the

San Mateo Countywide Stormwater Pollution Prevention Program

by

EOA, Inc.
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BACKGROUND

Fish tissue monitoring in San Francisco Bay has revealed bioaccumulation of polychlorinated biphenyls (PCBs) and other pollutants. Scientists believe the levels found are high enough to pose a health risk to people consuming fish caught in the Bay. As a result of these findings, the Office of Environmental Health Hazard Assessment issued an interim advisory on the consumption of fish from the Bay (OEHHA 1997, 1999). The advisory led to the Bay being designated an impaired water body on the 2002 Clean Water Act 303(d) list due to PCBs and other pollutants. In response, the California Regional Water Quality Control Board, San Francisco Bay Region (Regional Board) is developing Total Maximum Daily Load (TMDL) programs addressing PCBs and other pollutants found in the Bay. The general goal of the TMDLs is to identify and control sources of pollutants to the Bay and improve water quality.

Bay Area stormwater management agencies, including the San Mateo Countywide Stormwater Pollution Prevention Program (STOPPP), are gathering data to assist with the PCBs TMDL effort. One example is a collaborative project referred to as the Joint Stormwater Agency Project (JSAP). This field survey of watersheds surrounding the Bay during the fall of 2000 and 2001 revealed urban areas with relatively elevated levels of PCBs in stormwater conveyance sediments (KLI 2001a and 2002). Some agencies subsequently performed case studies at selected elevated areas to follow-up on the results of the JSAP. The case studies generally focused on attempting to identify PCBs sources and develop controls.

During FYs 2001/02 and 2002/03, STOPPP completed PCBs case study work in four areas. The studies investigated the Bradford and Broadway pump station drainages in Redwood City, the South Maple pump station drainage in South San Francisco and the Pulgas Creek pump station drainage in San Carlos (STOPPP 2002a and 2003).

This report presents the results of additional PCBs case study work performed by STOPPP during FY 2003/04 in the vicinity of Colma Creek in the Town of Colma (Appendix, Figure 1). The JSAP field survey found a relatively elevated level of total PCBs[1] (16,810 ug/Kg) in a bedded sediment sample collected during September 2001 from this area. The sample also contained mercury at 1,310 ug/Kg (KLI 2002).

This study was designed to provide data useful to the Bay PCBs TMDL effort and also contributes to compliance with Provision C.2 of STOPPP's National Pollutant Discharge Elimination System permit.

[1] In this report, "total PCBs" refers to the sum of 54 PCBs congeners (see the Appendix).

FIELD SAMPLING AND CHEMICAL ANALYSIS METHODS

Kinnetic Laboratories, Inc. (KLI) of Santa Cruz, California collected stormwater conveyance sediment samples during October 2003, under the direction of EOA, Inc. of Oakland, California. The field team used storm drain maps provided by the Town of Colma to help select appropriate sampling locations. The general strategy of the field program was to try to narrow potential source areas by collecting storm drain sediment samples from various branches of the storm drain system upstream of the September 2001 JSAP sample location with elevated PCBs. However, because the field team found very few accessible sampling locations in the study area where sediments accumulated, the spatial extent of sampling was limited.

The sediment samples were shipped to Columbia Analytical Services, Inc. of Kelso, Washington and analyzed for PCB congeners, mercury, particle size (Puget Sound Protocol with hydrogen peroxide digestion), percent moisture and total organic carbon. The Appendix contains a letter report prepared by KLI documenting the fieldwork, chemical analysis methods and results. The fieldwork and laboratory analysis were performed in accordance with the Quality Assurance Project Plan prepared for the JSAP (KLI 2001b).

RESULTS AND DISCUSSION

Chemical Analysis Results

Total PCBs were detected at concentrations ranging from 2 to 53 ug/Kg in the samples collected during this study (Table 1). The Appendix, Figure 2 shows the sample locations.

Table 1 – Chemical Analysis Results Summary

Sample Number	Description[1]	Date Collected	Percent Fines[2]	Total Organic Carbon (TOC)	Total PCBs[3,4]	Total Hg[3]
SMC-024	Colma Cr. at culvert exit	09-06-01	60.03	13.1	16,810	1,310
SMC-024	Colma Cr. at culvert exit	10-16-03	2.19	0.63	2.0	16.1
SMC-024FR[5]	Colma Cr. at culvert exit	10-16-03	2.76	0.78	2.8	13.9
SMC-048	Collins Avenue manholes	10-16-03	9.35	1.33	3.3	15.4
SMC-049	Colma Cr. upstream of culvert exit	10-16-03	30.57	5.94	53	242

[1]See the Appendix, Figures 1 and 2 for sample locations.
[2]Percent fines indicates the organic-free fraction less than 62.5 microns.
[3]All concentrations in ug/Kg (dry weight basis).
[4]Sum of 54 PCBs congeners (see the Appendix, Table 1). A value of zero was assigned to congeners not detected when summing congener concentrations.
[5]FR – Field Replicate.

Sample SMC-024 was collected at approximately the same location sampled in September 2001 during the JSAP field survey. This location is where Colma Creek exits from a culvert near Collins Avenue in Colma (Photograph 1 and Appendix, Figure 2). A field replicate (SMC-024FR) was also collected at this location. Total PCBs were detected at 2.0 and 2.8 ug/Kg, concentrations much lower than the JSAP sample (16,810 ug/Kg).

Photograph 1 – Sample location SMC-024 at Colma Creek culvert exit downstream of Collins Avenue outfall (looking upstream).

Photograph 2 – Sample location SMC-049 upstream of culvert exit and Collins Avenue outfall (looking downstream).

Sample SMC-048 was collected from a storm drain line that runs under Collins Avenue and drains to Colma Creek inside the culvert. This sample was a composite of samples collected at two manholes located near the point where the storm drain line exits into the Colma Creek culvert. Water was flowing from the Collins Ave. outfall at the time of sampling (Photograph 1). Total PCBs were detected at 3.3 ug/Kg.

Sample SMC-049 was collected upstream of the Colma Creek culvert exit and the Collins Avenue outfall (Photograph 2). Total PCBs were detected at 53 ug/Kg in this sample.

Distribution of PCBs Homologs

The Appendix, Figure 3 illustrates the distribution of PCB homologs in the samples collected to date from the study area. The high proportions of tetra-, penta-, and hexachlorobiphenyls found in sample SMC-024 collected in September 2001 suggest a large contribution of Aroclor 1254.[2] It should be noted that attempts to compare distributions of PCBs homologs in environmental samples to Arochlors may be confounded by factors such as weathering of PCBs in the environment and the possibility of multiple sources. Lower concentrations of PCBs in the samples collected during this study (October 2003) make interpretation of the homolog data less meaningful.

Research on Potential PCBs Sources

STOPPP previously researched known PCBs use and/or release sites in San Mateo County. This research revealed two apparently minor spills in the late 1990s at locations that potentially drain to the study area (STOPPP 2002b):

- 90th and Junipero Serra Blvd. in Daly City – an overhead PG&E transformer failure resulted in the release of about two quarts of 210 parts-per-million PCBs oil to an area including the wall of a large building during May 1997.

[2]Aroclors are commercial mixtures of PCBs congeners with varying percent chlorine. PCBs were primarily marketed as Aroclors in the United States.

- 146 2nd Avenue in Daly City – lightning damage to a PG&E transformer resulted in the release of 0.5 gallons of mineral oil on pavement and four cars during September 1999. Mineral oil in PG&E's dielectric equipment may contain PCBs.

In addition, before the fieldwork for this study was performed, STOPPP General Program staff asked staff from the Town of Colma, City of Daly City and San Mateo County Environmental Health Division whether they were aware of any potential PCBs sources upstream of the study area. Three sites were identified, based on potential use or disposal of PCBs: a PG&E maintenance yard at 450 Eastmoor Ave in Daly City, a PG&E substation at Chester St. and Orange St. in Daly City, and a former landfill that has been built over at Junipero Serra and Colma Blvd. in Colma (current location of the Metro Shopping Center)(Donnelley, personal communication, September 22, 2003). In general, because of the widespread and unregulated historic use of PCBs, the identity and location of most PCBs sites may be unknown.

NEXT STEPS

STOPPP does not plan to perform any follow-up actions at the study area at this time, given the relatively low concentrations of total PCBs detected during this study. However, STOPPP is committed to working with the Regional Board and other Bay Area agencies to improve water quality in San Francisco Bay and reduce impairments by PCBs. On the near term, STOPPP will continue to support preparation of the implementation plan for the Bay PCBs TMDL, through its participation in the Bay Area Stormwater Management Agencies Association, the Clean Estuary Partnership and the Regional Monitoring Program. During FY 2004/05, STOPPP plans to prepare new stormwater pollution prevention and control plans for PCBs and other pollutants of concern.

REFERENCES

Donnelly, W., personal communication, City of Daly City. September 22, 2003.

KLI, 2001a. *Final Report, Joint Stormwater Agency Project to Study Urban Sources of Mercury and PCBs.* Kinnetic Laboratories, Inc. April 2001.

KLI, 2001b. *Quality Assurance Project Plan, Joint Stormwater Agency Project – Year Two, Investigation of Urban Sources of Mercury, PCBs and Organochlorine Pesticides.* Kinnetic Laboratories, Inc. September 2001.

KLI, 2002. *Final Report, Joint Stormwater Agency Project to Study Urban Sources of Mercury, PCBs, and Organochlorine Pesticides.* Kinnetic Laboratories, Inc. April 2002.

OEHHA, 1997. *Health Advisory on Catching and Eating Fish: Interim Sport Fish Advisory for San Francisco Bay.* Office of Environmental Health Hazard Assessment, California EPA, Sacramento California.

OEHHA, 1999. *Chemical Contamination in San Francisco Bay.* Office of Environmental Health Hazard Assessment, California EPA, Sacramento, California.

STOPPP, 2002a. *Case Study Investigating Elevated Levels of PCBs in Storm Drain Sediments in San Mateo County.* Prepared for the San Mateo Countywide Stormwater Pollution Prevention Program by EOA, Inc. April 15, 2002.

STOPPP, 2002b. *PCBs Use and/or Release Sites in San Mateo County.* Prepared for the San Mateo Countywide Stormwater Pollution Prevention Program by EOA, Inc. February 25, 2002.

STOPPP, 2003. *Case Study Investigating Elevated Levels of PCBs in Storm Drain Sediments in the Pulgas Creek Pump Station Drainage, San Carlos, California*. Prepared for the San Mateo Countywide Stormwater Pollution Prevention Program by EOA, Inc. June 2003.

APPENDIX

KINNETIC LABORATORIES INCORPORATED

OCEANOGRAPHIC & ENVIRONMENTAL CONSULTING

307 Washington Street, Santa Cruz, CA 95060
Tel: (831) 457-3950 Fax: (831) 426-0405

March 16, 2004

Mr. Jon Konnan
EOA, Inc.
1410 Jackson Street
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Re: County of San Mateo PCBs Case Study

Sediments were sampled from storm drainages associated with sample site SMC024 (Colma Creek at Collins Avenue) collected during year two (6 September 2001) of the "Joint Stormwater Agency Project to Study Urban Sources of Mercury, PCBs and Organochlorine Pesticides." An elevated PCB level of 16,810 ug/Kg was measured in bulk sediment from the sample collected in September 2001 at SMC024. On 16 October 2003, four samples, including one field replicate, were collected in association with the drainage of Colma Creek at Collins Avenue. Descriptions of the sampling locations, sampling site designations, and qualitative descriptions of the sediments are included in Attachment 1. Locations of each site are shown on Figures 1 through 2. Figure 1 shows the generalized location of the Colma Creek at Collins Avenue case study area. Figure 2 shows the sampling site locations for the Colma Creek at Collins Avenue case study area.

Data from this survey are summarized in Tables 1 and 2. Data tables include field replicates and laboratory duplicates. All QA/QC data were reviewed and found to meet overall program data quality objectives.

The concrete channel of Colma Creek, as it comes out from under Collins Avenue, appears to be split into two sources with the left bank (right side looking into culvert) coming from the northerly direction of El Camino Real (Highway 82) and the right bank (left side looking into culvert) coming from the northwesterly direction of Collins Avenue and Serramonte Boulevard. The largest fraction of flow always appears to be coming from the left side of the channel (right bank). In addition, there is a storm drain line that empties into the left side of the channel just under Collins Avenue. This storm drain line, appears to drain Collins Avenue, including the auto dealership lot on the northern side of Collins Avenue. The original sample (SMC024) collected in 2001 at this

site was collected from submerged sediment just inside the opening of the left channel (right bank).

The Colma Creek at Collins Avenue Station (SMC024) was re-sampled and had measurable PCB levels of 2.0 and 2.8 (field replicate) ug/Kg. This was considerably lower than the value measured in 2001 (16,810 ug/Kg). Two different source directions were investigated for the Colma Creek at Collins Avenue drainage area.

The first sub-drainage area investigated was from the storm drain running southwest up Collins Avenue. As stated previously, flow in this sub-drainage enters Colma Creek through a pipe just inside the underground culvert where Colma Creek exits and begins to flow above ground. An equal amount of sediment was collected from the first two manholes upstream of Colma Creek and composited to form one sample. The concentration of PCBs measured in sediment collected at composite sample site SMC048 was 3.3 ug/Kg. Upon each visit to this site flow has been observed entering Colma Creek from this drainage. It was observed that the auto dealership may be allowing rinse water to enter the storm drain system in their car lot.

The second sub-drainage area investigated was the main source of input to Colma Creek from Serramonte Boulevard and beyond. The field crew observed several upstream manholes and grates none of which were accessible due to either one or a combination of the following: 1) traffic impacts; 2) deep inaccessible vaults; and 3) no embedded sediment. The field crew investigated the storm drainage area from Colma Creek, west on Serramonte Boulevard to the Serra Center shopping center and in the middle of Junipero Serrra Boulevard. The second sub-drainage sample was finally collected by walking up through the underground section of Colma Creek past the input from Collins Avenue and then past the barrier in the channel. The barrier was basically a metal pipe running from one side of the channel to the other side with a gap at the bottom. Water was prevented from completely flowing out from underneath the barrier by an accumulation of trash. This caused the water to back up behind the barrier but still allowed for a certain amount of flow to seep under the barrier and also flow over the top and sides. The sediment collected at this station (SMC049) had the highest measured level of PCBs (53.0 ug/Kg) during this case study investigation. This measured concentration was still several orders of magnitude lower than that measured in the original investigation (station SMC024 in 2001).

High concentrations of PCBs in the original sample SMC024 (2001) are most comparable to Arochlor 1254 (Figure 3). Lower concentration of total PCBs measured during the San Mateo case study performed for Colma Creek at Collins Avenue make interpretation of the homolog data inappropriate.

Total mercury was measured at a concentration of 1,310 ug/Kg in the original sample SMC024 (2001). Concentrations of total mercury in the sediment were similar for all samples collected in 2003 with the exception of SMC049 where the measured level was 242 ug/Kg. Measured levels at the other sampling locations were 13.9 ug/Kg (SMC024 field replicate), 15.4 ug/Kg (SMC048) and 16.1 ug/Kg (SMC024).

Please give me a call (831-457-3950) if you have any questions or need further information.

Sincerely,

Jonathan Toal

Attachments

Table 1. Summary of PCB Concentrations (ug/Kg-dry weight) in sediments from County of San Mateo Case Study Site.

Component	Units	Colma Creek at Collins Avenue Case Study				
		SMC024 (2001)	SMC024 (2003)	SMC024FR[1]	SMC048	SMC049
PCB 8	ug/Kg	**45**	ND	ND	ND	ND
PCB 18	ug/Kg	**27**	**0.083**	**0.074**	**0.17**	**0.52**
PCB 28	ug/Kg	**60**	ND	ND	ND	ND
PCB 31	ug/Kg	**47**	ND	ND	ND	ND
PCB 33	ug/Kg	**24**	ND	ND	ND	ND
PCB 44	ug/Kg	**600**	ND	ND	ND	**2.9**
PCB 49	ug/Kg	**250**	ND	**0.067**	**0.1**	ND
PCB 52	ug/Kg	**1100**	ND	ND	**0.23**	ND
PCB 56	ug/Kg	**100**	ND	ND	ND	ND
PCB 60	ug/Kg	ND	ND	ND	ND	ND
PCB 66	ug/Kg	**170**	ND	**0.06**	ND	ND
PCB 70	ug/Kg	**500**	ND	ND	**0.47**	ND
PCB 74	ug/Kg	**90**	ND	ND	ND	ND
PCB 77	ug/Kg	ND	ND	ND	ND	ND
PCB 81	ug/Kg	ND	ND	ND	ND	ND
PCB 87	ug/Kg	**770**	ND	ND	ND	**8.4**
PCB 90 + PCB 101	ug/Kg	**1339**	**0.34**	**0.19**	**0.38**	**9.2**
PCB 95	ug/Kg	**1100**	**0.34**	**0.19**	**0.23**	**5.6**
PCB 97	ug/Kg	**610**	**0.11**	**0.11**	ND	ND
PCB 99	ug/Kg	**610**	ND	ND	**0.11**	**2**
PCB 105	ug/Kg	**920**	ND	ND	ND	ND
PCB 110	ug/Kg	**2300**	**0.39**	**0.24**	**0.42**	**8.2**
PCB 114	ug/Kg	ND	ND	ND	ND	ND
PCB 118	ug/Kg	**770**	**0.41**	**0.3**	**0.32**	ND
PCB 123	ug/Kg	ND	ND	ND	ND	ND
PCB 126	ug/Kg	ND	ND	ND	ND	ND
PCB 128	ug/Kg	**340**	ND	ND	ND	ND
PCB 132	ug/Kg	**940**	ND	ND	ND	ND
PCB 138	ug/Kg	**1400**	ND	**0.22**	ND	**6.8**
PCB 141	ug/Kg	**190**	**0.063**	ND	ND	ND
PCB 149	ug/Kg	**810**	ND	ND	ND	**4**
PCB 151	ug/Kg	**150**	ND	ND	ND	ND
PCB 153	ug/Kg	**780**	ND	ND	**0.39**	ND
PCB 156	ug/Kg	**170**	ND	ND	ND	ND
PCB 157	ug/Kg	ND	ND	ND	**0.26**	ND
PCB 158	ug/Kg	ND	**0.31**	ND	ND	**0.83**
PCB 166	ug/Kg	ND	ND	ND	**0.19**	ND
PCB 167	ug/Kg	**48**	ND	ND	ND	ND
PCB 169	ug/Kg	ND	ND	ND	ND	ND
PCB 170	ug/Kg	**110**	ND	ND	ND	ND
PCB 174	ug/Kg	**86**	ND	ND	ND	ND
PCB 177	ug/Kg	**55**	ND	ND	ND	**1.1**
PCB 180	ug/Kg	**140**	ND	**0.26**	ND	ND
PCB 183	ug/Kg	ND	ND	ND	ND	ND
PCB 184	ug/Kg	ND	ND	ND	ND	ND
PCB 187	ug/Kg	**75**	ND	**0.099**	ND	**3.4**
PCB 189	ug/Kg	ND	ND	ND	ND	ND
PCB 194	ug/Kg	ND	ND	**0.98**	ND	ND
PCB 195	ug/Kg	ND	ND	ND	ND	ND
PCB 199	ug/Kg	-[2]	ND	ND	ND	ND
PCB 201	ug/Kg	**27**	-[2]	-[2]	-[2]	-[2]
PCB 203	ug/Kg	**24**	ND	ND	ND	ND
PCB 206	ug/Kg	ND	ND	ND	ND	ND
PCB 209	ug/Kg	**33**	ND	ND	ND	ND
Total PCB's:	ug/Kg	**16,810**	**2.0**	**2.8**	**3.3**	**53.0**
Normalized to fines	ug/FineFraction	**28,003**	**93**	**101**	**35**	**173**
Normalized to TOC	ug/TOCFraction	**128,321**	**325**	**358**	**246**	**891**

1. FR=Field Replicate (submitted blind to laboratory)
2. - = Congener not analyzed

Table 2. Summary of sediment particle size distributions, total mercury, percent solids and TOC in sediments from County of San Mateo Case Study Site.

Component	Units	SMC024 (2001)	SMC024 (2003)	SMC024FR[1]	SMC048	SMC049
Mercury, Total	ug/Kg	1,310	16.1	13.9	15.4	242
Solids, Total	%	26.5	75.3	75.0	81.7	31.4
Carbon, Total Organic (TOC)	%	13.1	0.63	0.78	1.33	5.94
Gravel	%	0.01	0.00	0.02	0.05	0.03
Sand, Very Coarse	%	1.48	3.07	3.65	7.95	4.20
Sand, Coarse	%	2.09	8.45	7.62	15.5	9.01
Sand, Medium	%	2.96	38.9	34.6	31.4	21.7
Sand, Fine	%	3.65	42.7	36.2	26.5	19.0
Sand, Very Fine	%	14.1	4.52	4.89	8.57	14.6
62.5 µm	%	13.4	1.04	1.36	6.29	11.7
31.3 µm	%	18.3	0.41	0.55	1.96	11.8
15.6 µm	%	21.8	0.30	0.33	0.46	2.45
7.8 µm	%	4.43	0.24	0.21	0.33	0.86
3.9 µm	%	0.19	0.00	0.11	0.00	0.55
1.95 µm	%	0.48	0.00	0.00	0.13	0.00
0.98 µm	%	1.43	0.20	0.20	0.18	3.21
Total Fines	%	**60.03**	**2.19**	**2.76**	**9.35**	**30.57**

1. FR = Field Replicate (submitted blind to laboratory)

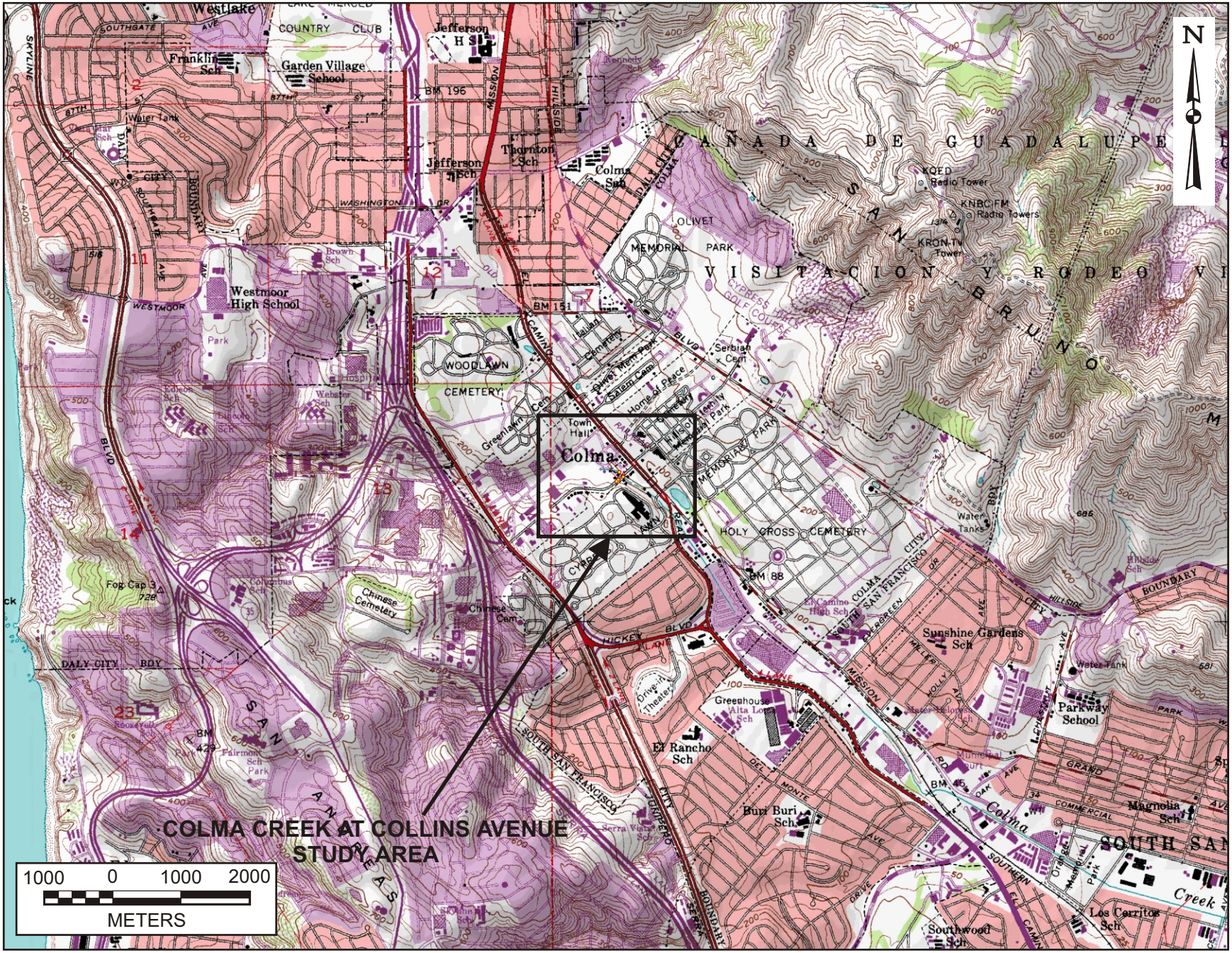


Figure 1. Colma Creek at Collins Avenue Case Study Area.

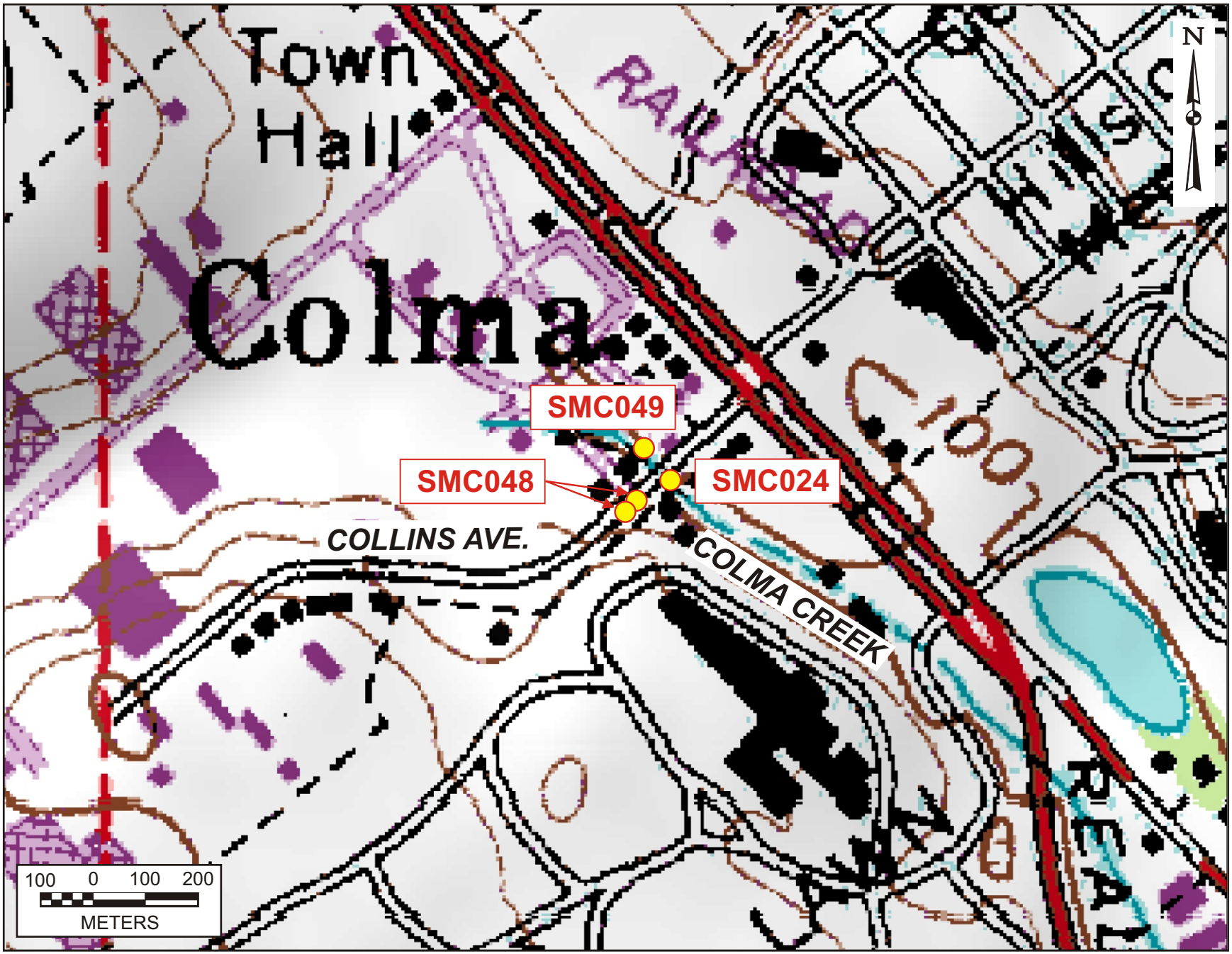
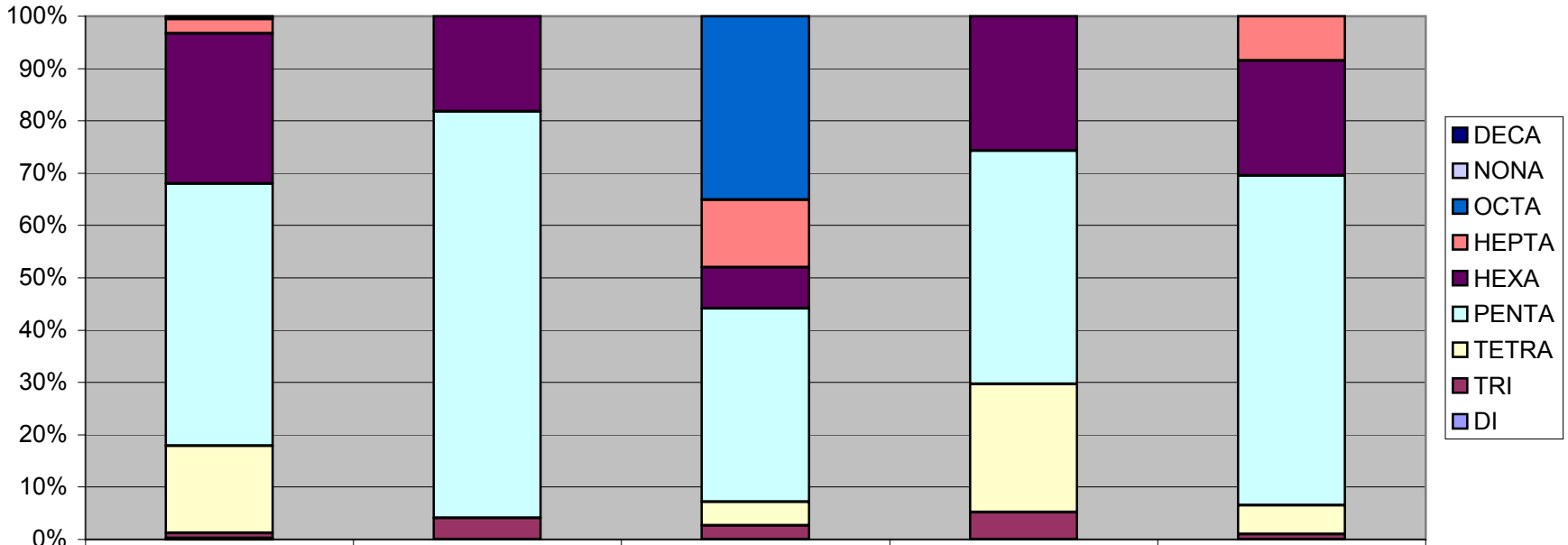


Figure 2. Sampling Sites within the Colma Creek at Collins Avenue Case Study Area.

Figure 3 - Distribution of PCB Homologs



	SMC024 (2001)	SMC024 (2003)	SMC024FR	SMC048	SMC049
DECA	33	0	0	0	0
NONA	0	0	0	0	0
OCTA	51	0	0.98	0	0
HEPTA	466	0	0.359	0	4.5
HEXA	4828	0.373	0.22	0.84	11.63
PENTA	8419	1.59	1.03	1.46	33.4
TETRA	2810	0	0.127	0.8	2.9
TRI	158	0.083	0.074	0.17	0.52
DI	45	0	0	0	0

Concentration (ug/Kg) of PCB Homologs

ATTACHMENT 1

STATION AND SAMPLE DESCRIPTIONS
SAN MATEO COUNTY CASE STUDY

Sediment was collected from four locations to produce three samples and a duplicate sample. Two manholes were sampled along Collins Avenue and formed a composite sample. One sample was collected from an underground section of Colma Creek just upstream where it begins to flow above ground. In addition, a re-sampling of the Colma Creek at Collins Avenue Station was performed.

1.0 SMC024 – Colma Creek at Collins Avenue

This was a re-sampling of the originally investigated site. The concrete channel of Colma Creek, as it comes out from under Collins Avenue appears to be split into two sources with the left bank (right side looking into culvert) coming from the northerly direction of El Camino Real (Highway 82) and the right bank (left side looking into the culvert) coming from the northwesterly direction of Collins Avenue and Serramonte Boulevard. The largest fraction of flow always appears to be coming from the left side of the channel (right bank). In addition, there is a storm drain line that empties into the left side of the channel just under Collins Avenue. This storm drain line, appears to drain Collins Avenue, including the auto dealership lot on the northern side of Collins Avenue. Submerged sediment was collected from the left side of the channel (right bank - 37° 40.427'N; 122° 27.433'W) downstream of the input from Collins Avenue. The sediment sampled was composed of brown fine silty sand. The surface layer of sediment was collected with a Tefzel-coated spoon, lifted slowly through the overlying water and placed directly into the sampler jar.

2.0 SMC048 – Collins Avenue

Sediment was sampled from the first two manholes upstream from Collins Avenue and composited to produce a single sample (37° 40.443'N; 122° 27.435'W). The sediment sampled in the first manhole upstream was coarse sand with a considerable amount of fine brown silt. The sediment sampled from the second manhole upstream was composed of brown fine silty sand. The surface layer of sediment was collected with a Tefzel-coated spoon attached to a pole from each of the two storm drain vaults, composited in a Tefzel-coated bucket, and placed in the sample jar.

3.0 SMC049 – Colma Creek Culvert (Left Side)

Sediment was sampled upstream of the weir from the right bank (left side looking into the culvert) of the underground section of Colma Creek well past any input from Collins Avenue. GPS coordinates could not be taken from underground but it was estimated that sample was taken approximately 50 feet upstream from the sampling site SMC024 and the culvert opening. The sediment sampled was composed of loose silt overlying brownish-black fine silty sand. A heavy oil and grease sheen was observed being released upon collection. The surface layer of sediment was collected with a Tefzel-coated spoon and placed directly into the sample jar.