# Mercury and PCBs Control Measures Implementation Status Report

**Vallejo Sanitation & Flood Control District**
and the **City of Vallejo**

Submitted in Compliance with
Provision C.11.a.iii.(1) and C.12.a.iii.(1)
Municipal Regional Stormwater Permit
NPDES Permit No. CAS612008
Order No. R2-2015-0049

**April 1, 2016**

## INTRODUCTION

This Watersheds and Management Areas Plan for Polychlorinated Biphenyls (PCBs) and Mercury (Hg) is being submitted to the San Francisco Bay Regional Water Quality Control Board (Regional Board) by the Vallejo Sanitation & Flood Control District (VSFCD) and the City of Vallejo (COV) as required by Provisions C.11.a.iii.(1) and C.12.a.iii.(1) of the Municipal Regional Stormwater NPDES Permit (MRP) (Order R2-2015-049) adopted on November 19, 2015.

The intent of the submittal is for reporting progress toward the development of a list of watershed and management areas where mercury and PCBs control measures are currently being implemented and those in which control measures will be implemented during the term of this permit. The report includes monitoring and other information used to select watersheds and management areas for TMDL implementation to date.

The approach is based on lessons learned about PCB controls from pilot projects implemented throughout the San Francisco Bay Area, through past studies and a regional project implemented by the Bay Area Stormwater Management Agencies Association during the first permit term of the MRP. Lessons learned were derived from pilot projects in all participating counties.

The Solano Permittees (City of Fairfield, City of Suisun City, City of Vallejo, and the Vallejo Sanitation and Flood Control District) constitute approximately 4.7% of the population total for all cities named on the MRP. Larger programs have had the advantage to pool additional resources to provide further information to by the Regional Board. Some information needed by the Regional Board to assess the regional progress toward MRP 2 provisions may not be provided here. With the lack of a truly regional Watersheds and Management Areas Plan, additional information needs can be located in the four large (Contra Costa, Alameda, Santa Clara and San Mateo) program Watersheds and Management Areas Reports

### Background[1]

PCBs were manufactured in the United States from 1929 to 1977. They were widely used by many industries because of their low electrical conductivity, high boiling point, chemical stability and flame retardant properties. The largest use of PCBs was in electrical equipment, including transformers and capacitors, but they were also widely found in a variety of other applications, including hydraulic fluids, dust control, flame retardants, lubricants, paints, sealants, wood preservatives, inks, dyes and plasticizers (Abbot 1993, Binational Toxics Strategy 1998 and 1999, EIP Associates 1997). PCBs have also been found in a variety of non-liquid materials, including construction materials such as insulation, roofing, and siding materials (64 CFR Part 761). In 1979, the US EPA banned the manufacture of PCBs in the United States.
Their import, export, and distribution in commerce were also banned and PCBs uses were restricted to totally enclosed applications. The US EPA has authorized other minor uses since that time, but the unavailability of PCBs and health and safety concerns effectively ended their use in new applications.

[1] Taken from: Review of Potential Measures to Reduce Urban Runoff Loads of PCBs to San Francisco Bay, by EOA, Inc. for Santa Clara Valley Urban Runoff Pollution Prevention Program, March 2004.

PCBs are often referred to as a “legacy” pollutant, meaning there are relatively few current uses, but past uses have left large amounts in the environment. Based on sediment chemical analysis data, the widespread historic uses of PCBs apparently resulted in releases to soils and storm drains in the Bay Area. Since PCBs are highly persistent and associate with particulate matter, soils and accumulated storm drain sediments potentially contain PCBs released many years ago.

**Mercury and PCBs Total Maximum Daily Loads**

Fish tissue monitoring in San Francisco Bay (Bay) has revealed bioaccumulation of PCBs, mercury, and other pollutants. The levels found are thought to pose a health risk to people consuming fish caught in the Bay. As a result of these findings, California has issued an interim advisory on the consumption of fish from the Bay. The advisory led to the Bay being designated as an impaired water body on the Clean Water Act "Section 303(d) list" due to PCBs, mercury, and other pollutants. In response, the San Francisco Bay RWQCB has developed Total Maximum Daily Load (TMDL) water quality restoration programs targeting PCBs and mercury in the Bay. The general goals of the TMDLs are to identify sources of PCBs and mercury to the Bay and implement actions to control the sources and restore water quality.

Municipal separate storm sewer systems (MS4s) are one of the PCBs and mercury source/pathways identified in the TMDL plans. Local public agencies (i.e., Permittees) subject to requirements via National Pollutant Discharge Elimination System (NPDES) permits are required to implement control measures in an attempt to reduce PCBs and mercury from entering stormwater runoff and the Bay. These control measures, also referred to as best management practices (BMPs), are the tools that Permittees can use to assist in restoring water quality in the Bay.

**Municipal Regional Permit**

NPDES permit requirements associated with Phase I municipal stormwater programs and Permittees in the Bay area are included in the Municipal Regional Permit (MRP), which was issued to 76 cities, counties and flood control districts in 2009 and revised in 2015. Consistent with the TMDL plans, provisions C.11.a. and C.12.a. of the MRP require the implementation of source and treatment control measures and pollution prevention strategies to reduce mercury and PCBs in urban stormwater runoff to achieve specified load reductions throughout the permit area. Specifically, the MRP requires the Permittees to:

1. Identify the watersheds or portions of watersheds (management areas) in which PCBs control measures are currently being implemented and those in which new control measures will be implemented during the term of this permit;
2. Identify the control measures that are currently being implemented and those that will be implemented in each watershed and management area;
3. Submit a schedule of control measure implementation; and
4. Implement sufficient control measures to achieve the mercury and PCBs load reductions stated in the permit.

The MRP requires the Permittees to report progress toward developing a list of the watersheds and management areas where mercury and PCBs control measures are currently being implemented and those in which control measures will be implemented during the term of the permit, as well as the monitoring data and other information used to select these watersheds and management areas. This list should include watersheds containing contaminated sites referred to the Water Board as well.

There have been no sites referred to the Water Board for discharging or potentially discharging PCBs to the environment. The program will continue to investigate the potential and refer any sites as appropriate.

**Characterization of PCBs Distribution**

The Solano Programs collaborated with several other Bay Area stormwater management agencies to measure concentrations of PCBs and other pollutants of concern in embedded sediments collected from stormwater conveyances throughout the Bay Area (KLI 2002). This two-year field study is referred to as the Joint Stormwater Agency Project (JSAP). The primary study Goal was to characterize the distribution of pollutants among land uses in watersheds draining to the Bay. A total of about 150 samples were collected during the fall of 2000 and 2001. More than six of the samples were collected within the Solano Program's jurisdiction in residential/commercial, industrial, open space and mixed land uses.

An analysis of the complete project data set revealed that median PCBs concentrations normalized to fines (less than 62.5 microns) were over 100 times higher in samples from urban sites compared to open space sites. Concentrations of PCBs were highly variable in urban samples, with relatively elevated concentrations found in some samples. Statistically significant differences in normalized concentrations of PCBs were not found between industrial and residential/commercial sites.

In 2014, Source Area Maps were developed by EOA. Inc. for the purposes of describing PCB distribution throughout the Bay Area cities and counties permitted on the MRP. Armed with historical information, EOA utilized GIS layers from land use and facility types located in the Bay area during the time period between the late 1920s to the late 1970s. This window of time represents the era when PCB and mercury production was greatest in the United States.

**Vallejo Permittees POC Source Area Mapping**

The City of Vallejo has been delineated into four areas for the purpose of compliance with C11 & C12 of the previous MRP. (See Figure 1).

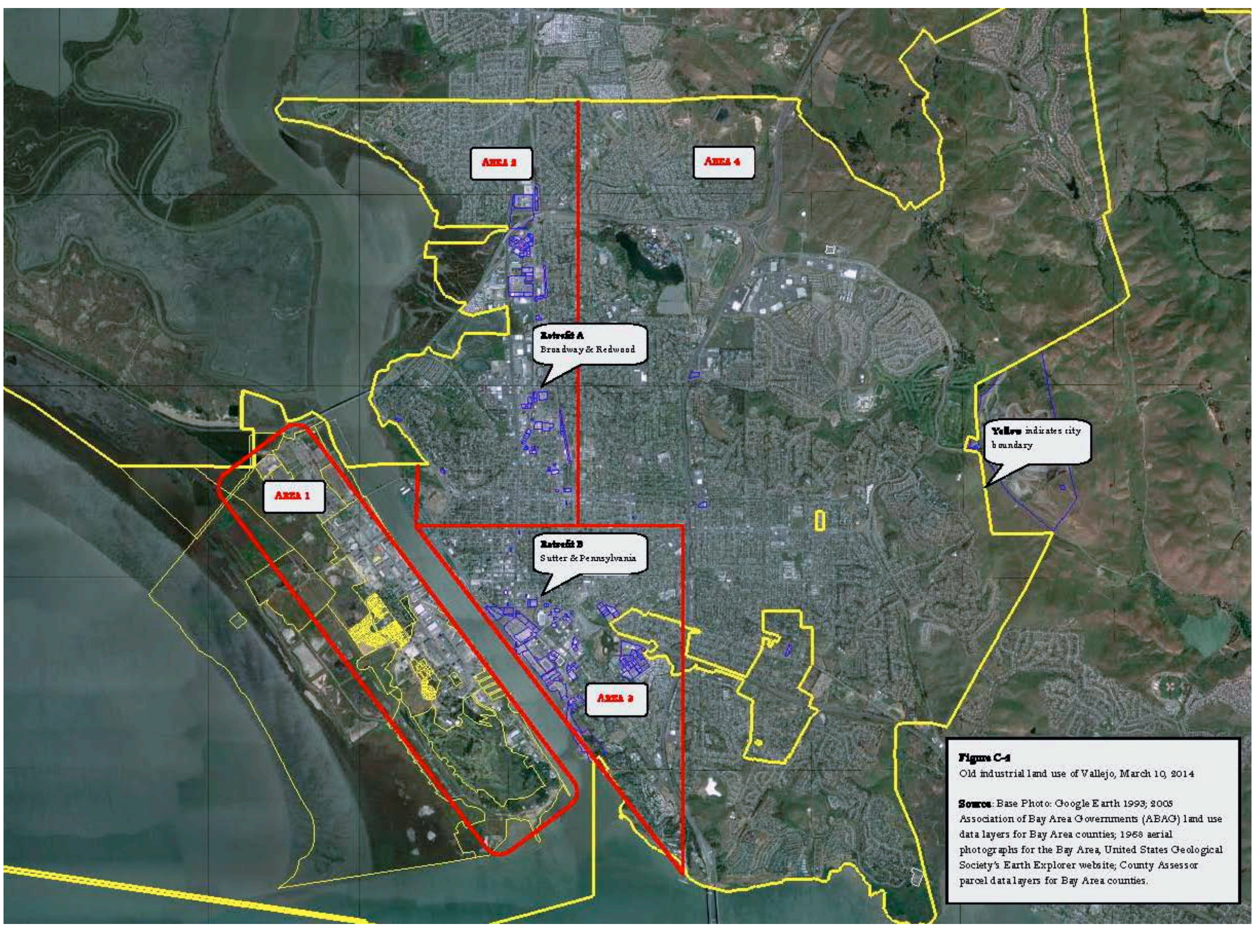
Area 1 is on Mare Island, a former Navy base, now consisting of commercial land use typically on the east side of the island with the west side containing newly developed residential areas. The older industrial areas of the island are devoid of curbing making increased street sweeping an unlikely candidate for PCB removal. Retrofits based on the success of the planned installations in Area 2 and Area 3 will be examined for potential similar installations in this area.

Area 2 is located in the northwest area of Vallejo. Area 2 is largely commercial with some residential land use and some older unused commercial areas. The majority of this area contains intact curbing and gutters so the potential for enhanced street sweeping as a method of contaminant reduction exists. This area is regularly swept by the City of Vallejo with a typical frequency of once per month. This is also the location of the vegetative swale identified in Figure 1 as Retrofit A.

Area 3 is located in the southwest corner of the City. This area consists of older commercial areas dispersed within residential land use. Some areas contain viable curb and gutter so increased street sweeping may be investigated as a potential enhancement method. As in Area 2, this area is regularly swept by the City of Vallejo. Area 3 is the location of the Contech storm filter installation.

Area 4 is located on the eastern side of the City. This area contains mostly residential land use with very few older commercial areas. Typically the curb and gutters in these areas are intact. Increased street sweeping will be the main consideration in this area for the duration of the current permit cycle. As with areas 2 and 3, this area is regularly swept by the City of Vallejo.

**Figure 1**



In compliance with the previous Municipal Regional Stormwater permit provisions C11 and C12, two stormwater treatment retrofits have been installed as part of the Clean Watersheds for a Clean Bay project in Solano County. The project consists of an initial screening phase and a BMP assessment phase. The initial screening phase will gather data on pollutant concentrations, including pollutant concentrations associated with <25 micron particle size fraction. After the screening phase the BMP assessment will be conducted.

**PCBs Source Area Identification Screening Program**

VSFCD staff has been conducting the PCBs Source Area Identification Screening Program in order to identify areas where PCBs control measures would be the most beneficial for consideration in focused implementation planning for PCBs and mercury load reductions. This program consists of screening potential PCBs source areas and properties (identified as “Old Industrial” land use and other relevant historical land uses) using multiple lines of evidence (e.g., institutional knowledge, records review, windshield surveys and facility inspections). Areas and properties are being systematically categorized as High, Moderate, or Low/No Likelihood to be a source of PCBs into the storm drain system for the purposes of identifying and prioritizing control measure implementation.

Parcels that have been redeveloped or did not meet criteria outlined in the screening guidance document were characterized as moderate or low/no likelihood and saved for tracking purposes.

At the beginning of the PCBs Source Area Identification Screening Program, VSFCD, in coordination with BASMAA’s Monitoring and Pollutant of Concern Committee (MPC), developed the following general approach for identifying potential source properties:

Starting Place:

- Assume that all Old Industrial parcels are Moderate Likelihood Sources unless there is a reason to change this assumption (see lists below).
- If a parcel is borderline between Moderate Likelihood and Low Likelihood, it is preferred to keep the Moderate designation.
- If a parcel is borderline between Moderate Likelihood and High Likelihood, it is preferred to keep the High designation.
- The High Likelihood Source parcels will be revisited and may be reassigned with future efforts, but parcels with Moderate and Low Likelihood designations are unlikely to be revisited.

Change to High Likelihood Source if:

- The parcel has significant unpaved areas.
- The parcel has rail lines that have not been paved over.
- Site is dirty, poorly maintained, or the pavement is deteriorating.
- Parcel has sediment erosion or track out.
- The parcel has a history of PCBs-related activities. These include Metals Manufacturing, Transportation/Shipping, Cement, Recycling (metals, auto, waste, and drums), Cremation, Electrical, or Remediation Site (Envirostor, GeoTracker, EPA, or other database).

The following factors may not be sufficient on their own, but combinations of these observations can lead to a High Likelihood Source designation:

- Presence of containers/trucks/debris/stockpiling/machinery/equipment (especially hydraulic equipment).
- Adjacent monitoring that indicates a PCB concentration ≥ 0.5 mg/kg.
- Proximity to remediation site (Envirostor, GeoTracker, EPA).

Change to Low Likelihood Source if:

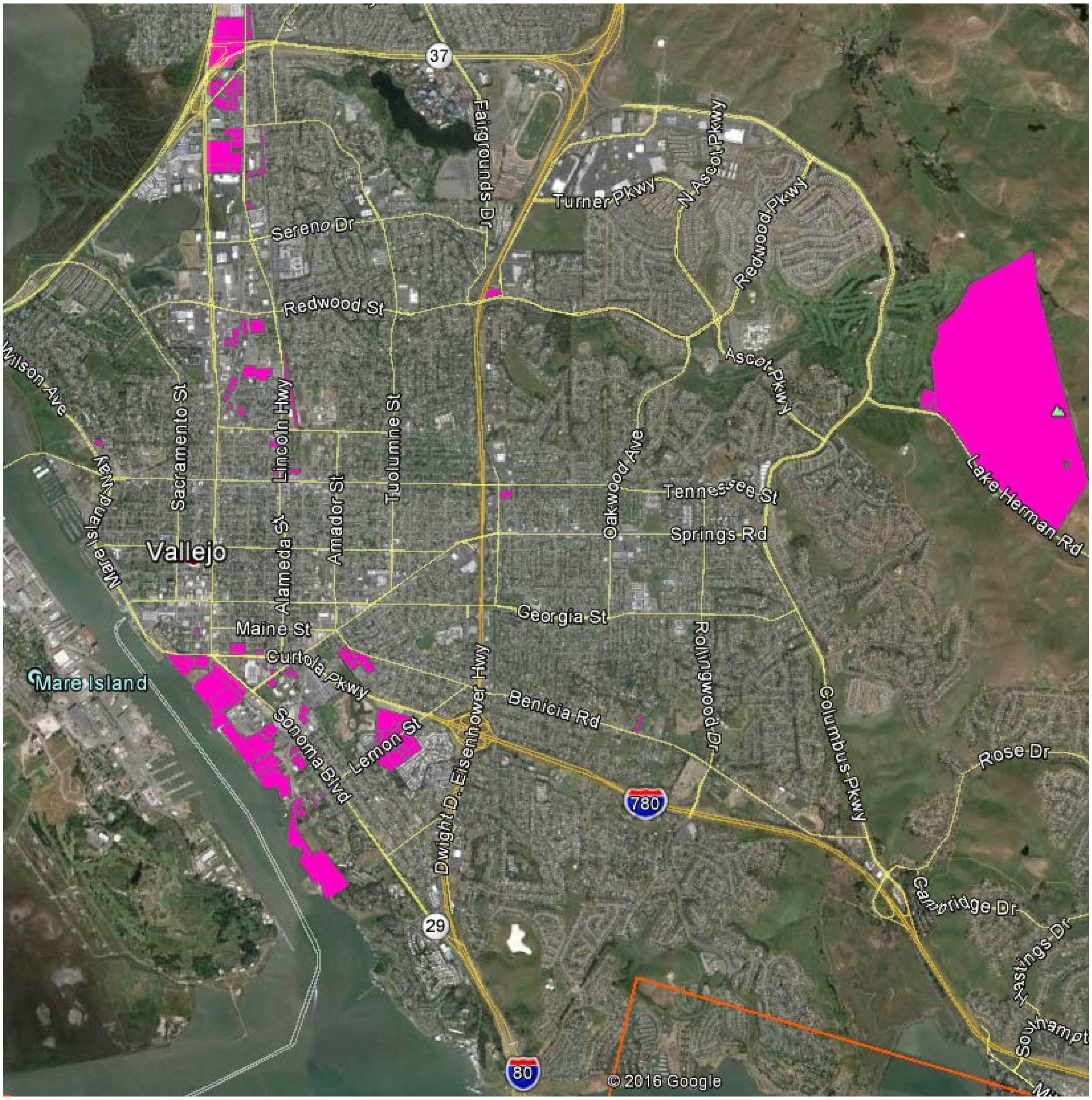
- Site has been redeveloped or is currently undergoing redevelopment.
- Land use designation is incorrect.

The following factors may not be sufficient on their own, but when all or most of the following conditions are met, the site may be designated as Low Likelihood Source:

- Site including pavement and rooftop are exceptionally well maintained.
- No outdoor storage or operations are occurring on the site.
- No unpaved areas besides well-tended landscaping occur on the site.
- No indication of industrial activity on the site (e.g., clearly a commercial or office building).

**Figure 2**

**191 Old Industrial sites within VSFCD/City of Vallejo service area.**



As a first step, the parcels were carefully reviewed through a desktop screening process which allowed staff to bring printed aerial images of the properties with them into the field. Staff then conducted windshield surveys of all Old Industrial mapped areas within the Vallejo service area. Further research will be conducted by the end of FY 2016 to ensure that any areas outside of the Old Industrial mapped areas are also considered and added to the list if found to be High Likelihood areas. If a parcel met the High Likelihood criteria, it was put on a list to sample.

Sample locations are aimed at track-out or erosion of sediment from an individual property and where there was enough sediment present to sample. If these conditions did not exist at the site, the site remained on the list to be tracked for a future opportunity to sample.

Ongoing screening will consider sites that may not have been included in the preliminary database or have other evidence pointing to potential high concentration of PCBs in sediment that may migrate off the parcel into the municipal storm drain system. Ongoing screening may also include site inspection where possible.

**Results**

Out of a total of 191 parcels surveyed, 30 are now categorized as High Likelihood Source parcels. These sites are currently being assessed for sampling suitability using sampling protocols provided by BASMAA. Parcels that did not meet the criteria for High Likelihood Source were placed into a Moderate or Low opportunity category.

**2016 Implementation – Sampling**

In FY 2016 VSFCD will attempt to sample sediments at all High Likelihood Source parcels from which sediment is available. Each sediment sample will be analyzed for PCBs (method 8082), Mercury, TOC and Grain Size. VSFCD will reanalyze all samples with a concentration above 0.1 ppm PCBs with method 1668 for confirmation. Sediment that had confirmed concentrations above 1 mg/kg, along with other lines of evidence that sediment had very likely originated from a given parcel are considered source properties.

These source properties will be documented and considered for future referral to the RWQCB. Prior to referral, VSFCD will attempt to engage the source property owner to address the onsite contamination and sediment that is migrating into the storm drain system and will assess the need for interim enhanced operation and maintenance (O&M) measures (e.g., street sweeping, drain inlet cleaning, and/or storm drain cleanout) in the right-of-way and/or storm drain infrastructure adjacent to the source property during the source property pollutant abatement process.

**Other Potential Urban Runoff Controls for PCBs**

Existing Solano Program components include illicit discharge controls, industrial/commercial facility inspections and public outreach. Typical facets of these components that have some potential to reduce PCBs discharges include:

- Responding to reports of illicit discharges, conducting illicit discharge field investigations and performing enforcement activities.
- Inspecting industrial and commercial facilities and performing enforcement activities as needed.
- Sponsoring and/or promoting household hazardous waste collection programs.
- Educating the public and businesses about stormwater pollution prevention and control and encouraging participation in related efforts.

The potential for these activities to control PCBs may be limited, since the current use of PCBs is limited and strictly regulated by the U.S. EPA.

The controls described below are selected potential PCBs stormwater control options and the advantages, limitations and cost factors are qualitatively discussed below, without attempting to quantify costs or benefits. Eight options have been identified and placed in three categories: soil/sediment cleanup, pollution prevention/source control, and stormwater treatment.

Soil/Sediment Cleanup

- Cleanup of Sites with PCBs in Erodible Soils
- Increased Removal of Sediments During Routine Maintenance of Storm Drain Systems
- Non-routine Removal of Sediments Containing PCBs from Stormwater Conveyances
- Natural Attenuation

Pollution Prevention/Source Control

- Voluntary Replacement of PCBs-containing Equipment
- Outreach to Parties Performing

Demolition Stormwater Treatment

- Stormwater Runoff Treatment Retrofits
- Diversion of Stormwater Flows to Wastewater Treatment Plants

Selected options are described in detail in the following sections,

1. Increased Removal of Sediments During Routine Municipal Maintenance Activities

   As discussed earlier, some mass of sediment and associated particle-bound pollutants, including PCBs, is removed during routine municipal maintenance practices such as inlet/catch basin cleaning, street sweeping and channel desilting. This control option requires modification of maintenance practices to increase removal of sediment and associated particle-bound pollutants. Potential modifications include increasing the frequency of storm drain inlet/catch basin and pump station sump cleaning, street sweeping and channel desilting.

   This approach would have the advantage of building on established practices already implemented in the Bay Area. In addition, it would potentially reduce loadings of other pollutants of concern. One limitation is that most potential modifications would not reduce new inputs of PCBs to storm drains.

   Potential costs to implement this control option would include additional labor, maintenance and depreciation of equipment (e.g., street sweepers), and testing and disposal of sediments. When appropriate data are available, the Program is estimating some associated additional costs with the additional pollutant mass removed.

2. Non-routine Removal of Sediments Containing PCBs from Stormwater Conveyances

   Storm drain systems are generally designed to efficiently convey stormwater and associated sediments away from urban areas to surface waters. Sediments typically accumulate, however, at depositional areas within a system, including flood control channels in low lying areas and low areas in storm drain system pipes caused by settlement. Sediments also accumulate by design in structures such as pump station wet wells and detention basins. Sediments are removed from storm drain conveyances to some extent during routine maintenance practices.

   The enhanced sediment management practice being evaluated in the pilot watersheds is street sweeping. As described in IMR Part B Section B.5, pilot street sweeping studies are currently being conducted, and final results will be reported at a later date. However, initial findings of a literature review of the subject (EOA and Geosyntec Consultants) are consistent with field observations during the first enhanced street sweeping studies conducted in 2014 in the pilot watersheds: key factors affecting the efficiency of street sweepers include the condition of the roads, the type of street sweeper, and the skill and care of the operator.

   Some practical lessons resulted from specific changes to street sweeping practices recently implemented by Permittees (see IMR Part B Appendix B.5.B). In Richmond, a section of Hoffman Boulevard adjacent to the metal recycler was not previously on the regular street sweeper logs. In North Richmond, a section of Market Avenue that previously had no paved shoulders or curbs was reconfigured, allowing street sweeping where it had not previously occurred.

The estimated load reduction benefit from these changes depends on the PCB concentration in source area sediments, among other factors. In the Richmond location, where sediment PCB concentrations are approximately 1,000 µg/kg, initiation of street sweeping along 0.3 miles of Hoffman Boulevard is estimated to reduce or avoid approximately 3 grams of PCBs annually. In contrast, sediments in the North Richmond watershed have approximately three- to fivefold lower PCB concentrations, with correspondingly lower PCB load reduction benefits from street sweeping. The load reduction estimates for the Hoffman location will be improved as a result of the pilot street sweeping study; however, based on literature reviews and practical assessments, the above estimates are not expected to change by an order of magnitude.

Other enhanced sediment management pilot projects are being evaluated and are documented in IMR Part B Section B.6. Those pilot projects include pump station cleaning, storm drain line cleaning / flushing, and street flushing. Pump station cleaning is not applicable to the Parr and Lauritzen watersheds, as there are no stormwater pump stations downstream of the affected area having high PCB concentrations in sediments. Storm drain line cleaning and flushing was evaluated as a potential pilot project in the Parr and Lauritzen watersheds; however, the confounding influences of tidal intrusion and aging infrastructure precluded conducting such a pilot study within the schedule and budget constraints of the pilot projects. The potential for maintenance and rehabilitation of the stormwater conveyance system in the Parr and Lauritzen watersheds to benefit PCB management will need to be evaluated in the future, in the context of rehabilitation of aging infrastructure.

A street washing and flushing pilot project was previously evaluated in Oakland, and another is being conducted in San Mateo. Using pressurized water to dislodge sediments from the nooks and crannies of city streets can be thought of as extremely high-efficiency street sweeping that generates liquid waste and costs substantially more than street sweeping alone. For context, the pilot study in the city of Oakland cost $100,000 and removed approximately 9 grams of PCBs from city streets. One of the significant challenges to both street and pipe flushing is disposal of the water; therefore, street and pipe flushing may be more implementable in conjunction with diversions to sanitary sewers (see Section 5 below), where the infrastructure allows such an approach. In the Parr and Lauritzen watersheds, the option to divert to sanitary sewers is not available, as the existing system is already susceptible to sanitary sewer overflows and upsets caused by stormwater inflow and infiltration.

The Alameda County Clean Water Program regional sediment surveys revealed that some urban stormwater conveyances contain reservoirs of sediments with PCBs and other pollutants of concern. Little is known about the spatial extent and residence time of such sediments in the system. This approach would initially use field investigations to identify conveyances with accumulated sediments containing PCBs (and potentially other pollutants of concern). These sites should be prioritized and targeted for dry season sediment removals with proper disposal implemented. In general, the fieldwork would not be associated with routine municipal maintenance practices and would require extra mobilization of labor and equipment.

An advantage to this approach is that it would directly remove PCBs and potentially other pollutants of concern from stormwater conveyances. A potential limitation is that periodic removal actions might be needed if there are ongoing inputs of PCBs to a storm drain conveyance. Thus identification and abatement of any ongoing inputs would be desirable before performing removal actions. On the other hand, removing sediments and then testing new sediments that accumulate would help determine whether there are continuing inputs to the system. Another potential limitation to this approach is that in some creeks and flood control channels removal of sediment would conflict with regulations designed to protect in-channel habitat. Parties performing projects that include substantial sediment removal are required to obtain Clean Water Act Section 401 water quality certifications from the Regional Board before work commences.

Costs associated with this control option would include identifying stormwater conveyances containing accumulated sediments with PCBs and sediment removal actions in selected areas. Sediment removal costs would depend on factors such as the type of conveyance, the extent and concentrations of PCBs (and other pollutants), and the cleanup standard chosen. The number of areas that would be cleaned out in association with the Bay PCBs TMDL is difficult to predict. More data is needed on the extent of stormwater conveyances that drain to the Bay with significant accumulations of sediments containing PCBs. Removal actions could be prioritized based on criteria such as costs, mass of PCBs present and whether a responsible party could be identified. Responsible parties would ideally perform sediment removal and disposal, but their identification would likely be infeasible in many cases.

3. Natural Attenuation

This approach allows PCBs in soils and accumulated stormwater conveyance sediments to naturally degrade or be flushed through the system. No actions would be taken except periodic monitoring. The principal advantage of this approach is that the only costs incurred would be for periodic monitoring to evaluate whether concentrations were declining in urban runoff. However, since PCBs degrade very slowly in the environment, a prohibitively long time period might be required for concentrations to attenuate to acceptable levels. In addition, this strategy does not address any new inputs to soils or stormwater conveyances, and does not reduce loadings to the Bay on the short term.

4. Voluntary Replacement of PCBs-containing Equipment

The U.S. EPA still allows the use of PCBs in limited applications. As discussed previously, a lack of availability and health and safety concerns have effectively ended the use of PCBs in new applications (EIP Associates 1997). However, PCBs may remain in some older equipment, including enclosed electrical applications such as transformers and capacitors.

This control option encourages identification and voluntary replacement of PCBs-containing equipment. Implementation actions include targeted outreach on identifying equipment with PCBs, obtaining suitable replacements and proper decommissioning methods. In addition, regulatory incentives could potentially be developed to make equipment replacement more attractive to facility owners. An advantage to this approach is that removing PCBs-containing equipment from service could potentially reduce new inputs of PCBs to the environment and storm drain conveyances.

Another advantage could be reducing potential liability to equipment owners associated with accidental PCBs releases and health and safety concerns. New equipment could also reduce facility operation and maintenance costs (e.g., modernizing electrical equipment could result in energy savings). On the other hand, given that the use of PCBs is currently limited and strictly regulated, the mass of PCBs that could potentially be released to the environment from PCBs-containing equipment may be relatively small. Replacement of such equipment may therefore have only a limited potential benefit. There is also a risk of releases to the environment and human exposure during equipment replacement.

Potential costs include developing and distributing outreach materials and developing and implementing regulatory incentives to replace PCB-containing equipment. Equipment owners would incur labor and capital costs for decommissioning old equipment and purchasing and installing replacement equipment. Decommissioning costs would likely include testing and disposing of PCBs-containing materials.

Equipment in the Bay Area that potentially contains PCBs includes PG&E electrical equipment with dielectric fluids, such as substation transformers. A letter from PG&E to Regional Board staff (Doss 2000a) indicates that the "vast majority of PCB-filled electrical equipment" was removed from its system during the mid-1980s. The letter also states: "Distribution line equipment and all other fluid-filled substation electric equipment contains mineral oil dielectric fluid.

The over 900,000 mineral oil-filled distribution line pieces of equipment in service are generally not tested for PCBs until fluid is removed at the time of servicing, or in the event of a spill or release of such fluid. PG&E's experience has been that, in general, approximately ten percent of such units contain PCBs at concentrations of 50 parts per million (ppm) or greater, and less than one percent of these units contain PCBs at concentrations of 500 ppm or greater." A follow-up letter (Doss 2000b) states: "The declining percentage of oil-filled units which contain PCBs reflects our efforts to remove such units during servicing, as well as the replacement programs PG&E conducted in the mid-1980s." Further evaluation of this control option should include additional documentation of the current status of PG&E's efforts to remove PCBs from their equipment.

5. Outreach to Parties Performing Demolition

PCBs were formerly used in paints, sealants, and wood preservatives (EIP Associates 1997) and have been found in construction materials such as insulation, roofing and siding materials (64 CFR Part 761). This strategy entails developing an outreach program to reduce potential releases of PCBs during demolition. Targeted outreach would help contractors identify construction materials potentially containing PCBs and implement proper testing, removal and disposal techniques.

This approach has the advantage of potentially reducing new inputs of PCBs to the environment and storm drains. In addition, this strategy could potentially be coordinated with other programs such as asbestos and lead abatement. Potential benefits, however, would be limited to reducing loads by the mass of PCBs in existing structures. Estimating this mass and the potential for its release to storm drains would likely be difficult. Further research on which specific construction materials contained PCBs and the general time period of their use could help target outreach efforts.

Costs to implement this option would include developing and distributing outreach materials. Property owners would potentially incur costs to test materials for PCBs before demolition, implement special removal procedures, and dispose of PCBs-containing materials.

6. Stormwater Runoff Treatment Retrofits

Solids removal is generally the most feasible option to treat PCBs and other sediment-bound pollutants in stormwater runoff. Stormwater treatment structures that remove solids commonly rely on filtration, sedimentation, flow through separation or some combination of these processes. Structures may be built in-place or proprietary manufactured devices may be installed. Examples include storm drain inlet inserts, manufactured flow through separation devices (e.g., vortex separator), vegetated filtration systems (e.g., grassy swale), infiltration trenches/basins, media filtration (e.g., sand filter), detention basins, wet ponds and constructed wetlands (CASQA 2003).

This approach requires retrofitting stormwater treatment structures such as the above into the urban landscape. Retrofits are potentially applicable at widely varying scales, ranging from, for example, a storm drain inlet filter in a small parking lot to a constructed wetland at the base of a watershed. An advantage to this approach is that stormwater treatment retrofit technologies are readily available and can effectively remove sediment and associated pollutants when designed, installed, operated and maintained properly. One limitation of this approach is that it would not reduce new inputs of PCBs to storm drain conveyances. In addition, siting of some technologies may be limited by factors such as soil types, groundwater elevation, slopes, insect breeding and space constraints. Treatment structures such as wet ponds and constructed wetlands would need to be designed to minimize mercury methylation.

Costs associated with stormwater treatment retrofits include facilitating public involvement, planning and siting (including field reconnaissance), design, permitting, installation/construction and operation and maintenance. For a variety of reasons, available data typically indicate variable treatment performance for a given type of treatment and pollutant, often making comparisons of cost-effectiveness among treatment technologies problematic (CASQA 2003).

In addition to other locations throughout the Bay Area, two pilot stormwater treatment retrofit projects have been constructed for the Solano Permittees. One of the retrofit projects is downstream from a PG&E substation located at the intersection of Sutter & Pennsylvania Streets in Vallejo. The retrofit consists of the installation of a new drainage inlet downstream from the substation. The new drainage inlet provides treatment by capturing pollutants in a replaceable media filter cartridge.

The second retrofit project for the Solano County Permittees is a vegetated swale. The project catchment is just under an acre. The treatment measure for the project consists of a vegetated swale in an existing ditch along a Southern Pacific railroad track and Broadway Street in Vallejo.

The swale collects runoff from the sidewalk and northbound lanes of Broadway Street and flows north to its termination at Redwood Street. The bottom of the swale and the side slopes were planted with native bio swale sod for treatment and aesthetic purposes and was completed in December 2015. See part B of the IMR for further details on these projects. The design cost for both Solano projects totals $61,442 while the construction bids came in at nearly $98,000. Team Ghilotti Construction was the contractor for these projects.

7. Diversion of Stormwater Flows to Wastewater Treatment Plants

Sanitary sewer collection systems and wastewater treatment plants are often designed with capacity exceeding that needed to accommodate dry weather flows. The extra capacity is typically used to treat increased wet weather flows caused by inflow and infiltration into the collection system and to accommodate population growth in a community.

This strategy would divert dry weather urban runoff and first flush urban runoff flows to wastewater treatment plants for removal of PCBs and other pollutants (LWA 2002, Abu-Saba 2002). This practice has been implemented in Southern California during dry weather flows to reduce microorganism levels associated with beach closures. However, urban runoff typically only has significant concentrations of suspended solids and associated pollutants during wet weather, with the highest levels found during first flush storm events. Applying this strategy to reduce loads of particle-bound pollutants such as PCBs would therefore require diversion and treatment of first flush wet weather flows.

This approach includes identifying and quantifying conditions under which first flush flows could be diverted to wastewater treatment plants. It has the advantage of potentially using available treatment capacity of existing treatment works, rather than constructing new stormwater treatment facilities. A principal limitation is that the sanitary sewer system and wastewater treatment plants may not have sufficient available capacity to accept large additional flows or sediment-laden flows during wet weather. Available capacity in existing facilities was generally not designed and constructed to accept stormwater flows. Storage of urban runoff and subsequent treatment during lower sanitary system flows could potentially help address this issue but may be difficult to achieve in light of the quantity of stormwater leaving the urban environment during a given storm event and the required sizing of the storage facilities to accommodate these flows.

Another potential limitation is the ability of wastewater treatment plants accepting urban runoff to meet certain requirements of their current NPDES permits. Such requirements include removal of suspended solids and biological oxygen demand, meeting toxic pollutant effluent and biosolids limits (sometimes including mass limits), and complying with bypass prohibitions. Also, sanitary sewer ordinances typically contain prohibitions against the intentional introduction of flows other than wastewater into the sanitary sewer system. In addition, managers should consider the potential negative impacts of reducing flows and changing sediment deliveries to receiving waters before diverting stormwater flows.

The Solano County pilot diversion project is being implemented by the Fairfield-Suisun Urban Runoff Program (FSURMP) and Fairfield-Suisun Sewer District (FSSD). The project involves changes to the operation of an existing pump station so as to divert stormwater from the station to the FSSD wastewater treatment plant. The State Street pump station is located in the City of Fairfield just upstream of Suisun City. It serves a watershed area of approximately six acres. The contributing area is commercial, of which a significant portion is automotive repair. (See Part B for further details).

The pump station changes evaluated for this project include:

- Shutting off the stormwater pump station during dry weather;
- Removing standing water in the pump station wet well throughout the dry season and before the first flush; and
- Monitoring concentrations of pollutants and pollutant indicators in the diverted water

Normal discharges from the State Street Pump Station are terminated in mid-June, the contents of the pump station's wet well (approximately 825 gallons) are subsequently removed by FSSD staff using a Vactor truck. The contents were trucked and discharged to the FSSD treatment plant. As an in-house pilot project, there were no formal agreements needed for treatment plant's acceptance of the discharge. The wet well is continually vacuumed out during the dry weather and just before the wet season removing and diverting approximately 2,000 gallons of water.

**Discussion and Conclusion**

The regional sediment surveys and PCBs case studies performed to-date by Bay Area stormwater management agencies have relied on analysis of embedded sediment samples collected from stormwater conveyances. Pollutant loadings estimated using this data are highly uncertain, since a variety of chemical and geomorphic processes lead to high spatial and temporal variability in the concentrations of PCBs and other pollutants found in embedded sediments.

There are a variety of potential management measures that may reduce loads of PCBs associated with urban runoff. In the late 1970s, uses of PCBs were restricted and new uses effectively eliminated. It is therefore likely that new releases of PCBs to the environment have greatly diminished during the past few decades. As a result, pollution prevention/source control measures, such as replacing equipment that contains PCBs, may have less potential to reduce loads than intercepting existing reservoirs of PCBs in erodible soils and stormwater conveyance sediments before they reach the Bay.

One way to prioritize implementation of urban runoff controls for PCBs and other particle-bound pollutants of concern would be to focus efforts on watersheds discharging relatively high loads of pollutants. Characterization techniques better suited to estimating loads than embedded sediment sampling would allow for a more refined prioritization of watersheds and assessment of the effectiveness of new control measures. However, widely implementing such methods may be cost-prohibitive to Bay Area stormwater programs at this time.

Factors other than strict cost-effectiveness are also important in assessing feasibility, such as the likelihood of identifying responsible parties or obtaining state or federal funding for identification and cleanup of on-land PCBs sites. The benefit of implementing strategies that address multiple sediment-bound pollutants should also be taken into consideration. Bay Area stormwater management agencies plan to continue working with Regional Board staff in coordination with BASMAA, and the San Francisco Estuary Regional Monitoring Program to address controllable sources of PCBs.

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