



## FAIRFIELD-SUISUN SEWER DISTRICT

1010 CHADBOURNE ROAD • FAIRFIELD, CALIFORNIA 94534 • (707) 429-8930 • WWW.FSSD.COM  
GREGORY G. BAATRUP, GENERAL MANAGER

September 30, 2016

Mr. Bruce Wolfe, Executive Officer  
San Francisco Bay Regional Water Quality Control Board  
1515 Clay Street, Suite 1400  
Oakland, CA 94612

Attention: Ms. Selina Louie, Water Resources Control Engineer

Reference: Fairfield-Suisun Urban Runoff Management Program - FY 2015-2016 Annual Report

Dear Mr. Wolfe:

The attached FY 2015-2016 Annual Report represents the Fairfield-Suisun Urban Runoff Management Program's responses to the items requested per Provision C.17 of NPDES Permit No. CAS612008 (Permit) as adopted on November 18, 2015 via Order No. R2-2015-0049. This letter also transmits by reference the BASMAA Regional Supplements to the Annual Report for FY 2015-2016.

I certify under penalty of law that this document was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Sincerely,

Kevin A. Cullen, P.E.  
Senior Environmental Engineer

Attachment

**FY 2015-2016 Annual Report**

**Permittee Name: Fairfield-Suisun Urban Runoff Management Program**

**ATTACHMENT B**

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Section 1 – Permittee Information

Background Information				
<b>Permittee Name:</b>	Fairfield-Suisun Urban Runoff Management Program			
<b>Population:</b>	141,728 (combined)			
<b>NPDES Permit No.:</b>	CAS612008			
<b>Order Number:</b>	R2-2015-0049			
<b>Reporting Time Period (month/year):</b>	July 2015 through June 2016			
<b>Name of the Responsible Authority:</b>	Fairfield-Suisun Urban Runoff Management Program	<b>Title:</b>	Program Manager	
<b>Mailing Address:</b>	1010 Chadbourne Road			
<b>City:</b>		<b>Zip Code:</b>	94534	<b>County:</b> Solano
<b>Telephone Number:</b>	707-428-9129	<b>Fax Number:</b>	707-429-1280	
<b>E-mail Address:</b>	<a href="mailto:KCullen@fssd.com">KCullen@fssd.com</a>			
<b>Name of the Designated Stormwater Management Program Contact (if different from above):</b>	Kevin Cullen	<b>Title:</b>	Fairfield Suisun Urban Runoff Program Manager	
<b>Department:</b>	Fairfield-Suisun Sewer District			
<b>Mailing Address:</b>	1010 Chadbourne Road			
<b>City:</b>	Fairfield	<b>Zip Code:</b>	94534	<b>County:</b> Solano
<b>Telephone Number:</b>	707-428-9129	<b>Fax Number:</b>	707-429-1280	
<b>E-mail Address:</b>	KCullen@fssd.com			

Section 2 - Provision C.2 Reporting Municipal Operations

**Program Highlights and Evaluation**  
 Highlight/summarize activities for reporting year:

Summary:  
 Program members participated in monthly Program Management meetings. Program Manager partook regularly in BASMAA's monthly committee meetings for the BASMAA Board of Directors. The cities participated in the CalRecycle Used Oil Grant Project in an effort to provide as much full trash capture treatment area as will be allowed by that grant program. Fairfield has been awarded and has received grant monies through that program, while the city of Suisun has been granted money and are working through the minutia and attempting to optimize monies.

**C.2.a. ► Street and Road Repair and Maintenance**

Place a **Y** in the boxes next to activities where applicable BMPs were implemented. If not applicable, type **NA** in the box and provide an explanation in the comments section below. Place an **N** in the boxes next to activities where applicable BMPs were not implemented for one or more of these activities during the reporting fiscal year, then in the comments section below provide an explanation of when BMPs were not implemented and the corrective actions taken.

<b>NA</b>	Control of debris and waste materials during road and parking lot installation, repaving or repair maintenance activities from polluting stormwater
<b>NA</b>	Control of concrete slurry and wastewater, asphalt, pavement cutting, and other street and road maintenance materials and wastewater from discharging to storm drains from work sites.
<b>NA</b>	Sweeping and/or vacuuming and other dry methods to remove debris, concrete, or sediment residues from work sites upon completion of work.

Comments:  
 Please see individual city reports, as these activities are implemented at the city level.

**C.2.b. ► Sidewalk/Plaza Maintenance and Pavement Washing**

Place a **Y** in the boxes next to activities where applicable BMPs were implemented. If not applicable, type **NA** in the box and provide an explanation in the comments section below. Place an **N** in the boxes next to activities where applicable BMPs were not implemented for one or more of these activities during the reporting fiscal year, then in the comments section below provide an explanation of when BMPs were not implemented and the corrective actions taken.

<b>NA</b>	Control of wash water from pavement washing, mobile cleaning, pressure wash operations at parking lots, garages, trash areas, gas station fueling areas, and sidewalk and plaza cleaning activities from polluting stormwater
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<b>NA</b>	Implementation of the BASMAA Mobile Surface Cleaner Program BMPs
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Comments:

Please see individual city reports as these activities are implemented at the city level.

**C.2.c. ► Bridge and Structure Maintenance and Graffiti Removal**

Place a **Y** in the boxes next to activities where applicable BMPs were implemented. If not applicable, type **NA** in the box and provide an explanation in the comments section below. Place an **N** in the boxes next to activities where applicable BMPs were not implemented for one or more of these activities during the reporting fiscal year, then in the comments section below provide an explanation of when BMPs were not implemented and the corrective actions taken.

<b>NA</b>	Control of discharges from bridge and structural maintenance activities directly over water or into storm drains
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<b>NA</b>	Control of discharges from graffiti removal activities
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<b>NA</b>	Proper disposal for wastes generated from bridge and structure maintenance and graffiti removal activities
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<b>NA</b>	Implementation of the BASMAA Mobile Surface Cleaner Program BMPs for graffiti removal
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<b>NA</b>	Employee training on proper capture and disposal methods for wastes generated from bridge and structural maintenance and graffiti removal activities.
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<b>NA</b>	Contract specifications requiring proper capture and disposal methods for wastes generated from bridge and structural maintenance and graffiti removal activities.
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Comments:

Please see individual city reports as these activities are implemented at the city level.

Permittee Name: Fairfield-Suisun Urban Runoff Management Program

C.2.e. ► Rural Public Works Construction and Maintenance			
Does your municipality own/maintain rural <sup>1</sup> roads:		<input type="checkbox"/>	<input checked="" type="checkbox"/> <b>No</b>
If your answer is <b>No</b> then skip to <b>C.2.f.</b>			
Place a <b>Y</b> in the boxes next to activities where applicable BMPs were implemented. If not applicable, type <b>NA</b> in the box and provide an explanation in the comments section below. Place an <b>N</b> in the boxes next to activities where applicable BMPs were not implemented for one or more of these activities during the reporting fiscal year, then in the comments section below provide an explanation of when BMPs were not implemented and the corrective actions taken.			
<b>NA</b>	Control of road-related erosion and sediment transport from road design, construction, maintenance, and repairs in rural areas		
<b>NA</b>	Identification and prioritization of rural road maintenance based on soil erosion potential, slope steepness, and stream habitat resources		
<b>NA</b>	No impact to creek functions including migratory fish passage during construction of roads and culverts		
<b>NA</b>	Inspection of rural roads for structural integrity and prevention of impact on water quality		
<b>NA</b>	Maintenance of rural roads adjacent to streams and riparian habitat to reduce erosion, replace damaging shotgun culverts and excessive erosion		
<b>NA</b>	Re-grading of unpaved rural roads to slope outward where consistent with road engineering safety standards, and installation of water bars as appropriate		
<b>NA</b>	Inclusion of measures to reduce erosion, provide fish passage, and maintain natural stream geomorphology when replacing culverts or design of new culverts or bridge crossings		
Comments including listing increased maintenance in priority areas:			
This type of maintenance work is handled at the city level. However, neither city in the Program has rural roads within its jurisdiction.			

<sup>1</sup>Rural means any watershed or portion thereof that is developed with large lot home-sites, such as one acre or larger, or with primarily agricultural, grazing or open space uses.

Permittee Name: Fairfield-Suisun Urban Runoff Management Program

**C.2.f. ► Corporation Yard BMP Implementation**

Place an **X** in the boxes below that apply to your corporations yard(s):

<input checked="" type="checkbox"/>	We do not have a corporation yard
<input type="checkbox"/>	Our corporation yard is a filed NOI facility and regulated by the California State Industrial Stormwater NPDES General Permit
<input type="checkbox"/>	We have a <b>Stormwater Pollution Prevention Plan (SWPPP)</b> for the Corporation Yard(s)

Place an **X** in the boxes below next to implemented SWPPP BMPs to indicate that these BMPs were implemented in applicable instances. If not applicable, type **NA** in the box. If one or more of the BMPs were not adequately implemented during the reporting fiscal year then indicate so and explain in the comments section below:

<b>NA</b>	Control of pollutant discharges to storm drains such as wash waters from cleaning vehicles and equipment
<b>NA</b>	Routine inspection prior to the rainy seasons of corporation yard(s) to ensure non-stormwater discharges have not entered the storm drain system
<b>NA</b>	Containment of all vehicle and equipment wash areas through plumbing to sanitary or another collection method
<b>NA</b>	Use of dry cleanup methods when cleaning debris and spills from corporation yard(s) or collection of all wash water and disposing of wash water to sanitary or other location where it does not impact surface or groundwater when wet cleanup methods are used
<b>NA</b>	Cover and/or berm outdoor storage areas containing waste pollutants

Comments:  
  
Please see individual city reports as these activities are implemented at the city level.

If you have a corporation yard(s) that is not an NOI facility, complete the following table for inspection results for your corporation yard(s) or attach a summary including the following information:

Corporation Yard Name	Inspection Date (1x/year required)	Inspection Findings/Results	Follow-up Actions
NA	NA	NA	NA

**Section 3 - Provision C.3 Reporting New Development and Redevelopment**

**C.3.a. ► New Development and Redevelopment Performance Standard Implementation Summary Report**

*(For FY 15-16 Annual Report only)* Provide a brief summary of the methods of implementation of Provisions C.3.a.i.(1)-(8).

Summary:

Please see individual city reports as these activities are implemented at the city level. The Program has recreated its New Development Guidance Document to include the regionally developed LID Worksheets, and Biotreatment Soil Specifications. The Program utilized Contra Costa Clean Water Programs C3 Guidance Document as a model for the Fairfield Suisun Urban Runoff Program New Development Guidance Document.

Please see each cities' table C.3.b.v. (2) for specific information on regulated projects approved during FY 15-16.

**C.3.b.iv.(2) ► Regulated Projects Reporting**

Fill in attached table **C.3.b.iv.(2)** or attach your own table including the same information.

Please see individual city reports as these activities are implemented at the city level. The Program has recreated its New Development Guidance Document to include the regionally developed LID Worksheets, Biotreatment Soil Specifications and Green Roof Specifications. The Program utilized Contra Costa Clean Water Programs C3 Guidance Document as a model for the Fairfield Suisun Urban Runoff Program New Development Guidance Document.

Please see each cities' table C.3.b.v. (1) for specific information on regulated projects approved during FY 15-16.

**C.3.c.ii ► Design Specifications for Pervious Pavement Systems**

*(For FY 2015-16 Annual Report only)*. Submit design specifications for pervious pavement systems that have been developed and adopted on a regional or countywide basis. If design specifications have been adopted and are contained in a Countywide stormwater handbook, include a reference to the handbook.

Summary:

Please see individual city reports as these activities are implemented at the city level. The Program has recreated its New Development Guidance Document to include the regionally developed Pervious Pavement fact sheet.

**C.3.e.iv. ► Alternative or In-Lieu Compliance with Provision C.3.c.**

Is your agency choosing to require 100% LID treatment onsite for all Regulated Projects and not allow alternative compliance under Provision C.3.e.?	<input checked="" type="checkbox"/>	<b>Yes</b>	<input type="checkbox"/>	<b>No</b>
Comments (optional):				

**C.3.e.v ► Special Projects Reporting**

1. In FY 2015-16, has your agency received, but not yet granted final discretionary approval of, a development permit application for a project that has been identified as a potential Special Project based on criteria listed in MRP Provision C.3.e.ii(2) for any of the three categories of Special Projects (Categories A, B or C)?	<input type="checkbox"/>	<b>Yes</b>	<input checked="" type="checkbox"/>	<b>No</b>
2. In FY 2015-16, has your agency granted final discretionary approval to a Special Project? If yes, include the project in both the <b>C.3.b.iv.(2)</b> Table, and the <b>C.3.e.v.</b> Table.	<input type="checkbox"/>	<b>Yes</b>	<input checked="" type="checkbox"/>	<b>No</b>
If you answered "Yes" to either question, 1) Complete Table C.3.e.v. 2) Attach narrative discussion of 100% LID Feasibility or Infeasibility for each project.  <b>NA</b>				

**C.3.h.v.(2) ► Reporting Newly Installed Stormwater Treatment Systems and HM Controls (Optional)**

On an annual basis, before the wet season, provide a list of newly installed (installed within the reporting year) stormwater treatment systems and HM controls to the local mosquito and vector control agency and the Water Board. The list shall include the facility locations and a description of the stormwater treatment measures and HM controls installed.

Please see individual city reports as these activities are implemented at the city level.

**C.3.h.v.(3)(a) –(c) and (f) ► Installed Stormwater Treatment Systems Operation and Maintenance Verification Inspection Program Reporting**

Option 1 – Reporting Site Inspections	Number/Percentage
Total number of Regulated Projects (including offsite projects, and Regional Projects) in your agency's database or tabular format at the end of the previous fiscal year (FY14-15)	NA
Total number of Regulated Projects (including offsite projects, and Regional Projects) in your agency's database or tabular format at the end of the reporting period (FY 15-16)	NA
Total number of Regulated Projects (including offsite projects, and Regional Projects) for which O&M verification inspections were conducted during the reporting period (FY 15-16)	NA
Percentage of the total number of Regulated Projects (including offsite projects, and Regional Projects) inspected during the reporting period (FY 15-16)	NA
Option 2 – Reporting Stormwater Treatment System Inspections	Number/Percentage
Total number of stormwater treatment and HM systems in your agency's database or tabular format at the end of the previous fiscal year (FY 14-15)	NA
Total number of stormwater treatment systems in your agency's database or tabular format at the end of the reporting period (FY 15-16)	NA

**FY 2015-2016 Annual Report**

**Permittee Name: Fairfield-Suisun Urban Runoff Management Program**

**C.3 – New Development and Redevelopment**

Total number of stormwater treatment and HM systems inspected in the reporting period (FY 15-16)	NA
Percentage of stormwater treatment and HM systems inspected in the reporting period (FY 15-16)	NA

**C.3.h.v.(3)(d)-(e) ► Installed Stormwater Treatment Systems Operation and Maintenance Verification Inspection Program Reporting**

Provide a discussion of the inspection findings for the year and any common problems encountered with various types of treatment systems and/or HM controls. This discussion should include a general comparison to the inspection findings from the previous year.

Summary:

Please see individual city reports as these activities are implemented at the city level.

Provide a discussion of the effectiveness of the O&M Program and any proposed changes to improve the O&M Program (e.g., changes in prioritization plan or frequency of O&M inspections, other changes to improve effectiveness program).

Summary:

Please see individual city reports as these activities are implemented at the city level.

**C.3.i. ► Required Site Design Measures for Small Projects and Detached Single Family Home Projects**

On an annual basis, discuss the implementation of the requirements of Provision C.3.i, including ordinance revisions, permit conditions, development of standard specifications and/or guidance materials, and staff training.

Summary:

BASMAA prepared standard specifications in four fact sheets regarding the site design measures listed in Provision C.3.i, as a resource for Co-permittees. We have modified local procedures and forms/checklists to require all applicable projects approved after December 1, 2012 to implement at least one of the site design measures listed in Provision C.3.i. The Program cities are using BASMAA's site design fact sheets for compliance with this requirement.

- BASMAA's site design fact sheets

**C.3.j.i.v.(d) ► Green Infrastructure Outreach**

On an annual basis, provide a summary of your agency's outreach and education efforts pertaining to Green Infrastructure planning and implementation.

Summary:

Program staff have been given Guidelines for Green Infrastructure Model Staff Reports. In addition guidelines have been circulated for capital improvement project review for green infrastructure possibilities.

See attachments at the end of section is for guideline contents.

**C.3.j.ii.(2) ► Early Implementation of Green Infrastructure Projects**

On an annual basis, submit a list of green infrastructure projects, public and private, that are already planned for implementation during the permit term and infrastructure projects planned for implementation during the permit term that have potential for green infrastructure measures. Include the following information:

- A summary of planning or implementation status for each public and private green infrastructure project that is not also a Regulated Project as defined in Provision C.3.b.ii. (see C.3.j.ii.(2) Table B - Planned Green Infrastructure Projects).
- A summary of how each public infrastructure project with green infrastructure potential will include green infrastructure measures to the maximum extent practicable during the permit term. For any public infrastructure project where implementation of green infrastructure measures is not practicable, submit a brief description of the project and the reasons green infrastructure measures were impracticable to implement (see C.3.j.ii.(2) Table A - Public Projects Reviewed for Green Infrastructure).

Background Information:

Describe how this provision is being implemented by your agency, including the process used by your agency to identify projects with potential for green infrastructure, if applicable.

The Program has shared BASMAA's guidance for the review of CIPs for the potential of incorporating Green Infrastructure (see attached) with Program Permittees. Monthly meetings are held with Program Permittees in which GI potential is discussed.

Summary of Planning or Implementation Status of Identified Projects:

Please see individual city reports as these activities are implemented at the city level.

**C.3.j.iii.(2) ▶ Participate in Processes to Promote Green Infrastructure**

On an annual basis, report on the goals and outcomes during the reporting year of work undertaken to participate in processes to promote green infrastructure.

Permittee staff have been given Guidelines for Green Infrastructure Model Staff Reports. In addition the Program assisted and participated in the development of guidelines for capital improvement project review for green infrastructure possibilities.

**C.3.j.iv.(2) ▶ Tracking and Reporting Progress**

On an annual basis, report progress on development and implementation of methods to track and report implementation of green infrastructure measures and provide reasonable assurance that wasteload allocations for TMDLs are being met.

The Program is in the development phase of a Green Infrastructure Plan and is working on the decision as to which software and contractor to use to provide reasonable assurance that the Program and the Program's cities will meet wasteload allocations.

**C.3.b.iv.(2) ► Regulated Projects Reporting Table (part 1) – Projects Approved During the Fiscal Year Reporting Period**

Project Name Project No.	Project Location <sup>8</sup> , Street Address	Name of Developer	Project Phase No. <sup>9</sup>	Project Type & Description <sup>10</sup>	Project Watershed <sup>11</sup>	Total Site Area (Acres)	Total Area of Land Disturbed (Acres)	Total New Impervious Surface Area (ft <sup>2</sup> ) <sup>12</sup>	Total Replaced Impervious Surface Area (ft <sup>2</sup> ) <sup>13</sup>	Total Pre- Project Impervious Surface Area <sup>14</sup> (ft <sup>2</sup> )	Total Post- Project Impervious Surface Area <sup>15</sup> (ft <sup>2</sup> )
<b>Private Projects</b>											
Please see individual city reports											
<b>Public Projects</b>											
Please see individual city reports											
Comments:											
Please see individual city reports as these activities are implemented at the city level.											

<sup>8</sup>Include cross streets

<sup>9</sup>If a project is being constructed in phases, indicate the phase number and use a separate row entry for each phase. If not, enter "NA".

<sup>10</sup>Project Type is the type of development (i.e., new and/or redevelopment). Example descriptions of development are: 5-story office building, residential with 160 single-family homes with five 4-story buildings to contain 200 condominiums, 100 unit 2-story shopping mall, mixed use retail and residential development (apartments), industrial warehouse.

<sup>11</sup>State the watershed(s) in which the Regulated Project is located. Downstream watershed(s) may be included, but this is optional.

<sup>12</sup>All impervious surfaces added to any area of the site that was previously existing pervious surface.

<sup>13</sup>All impervious surfaces added to any area of the site that was previously existing impervious surface.

<sup>14</sup>For redevelopment projects, state the pre-project impervious surface area.

<sup>15</sup>For redevelopment projects, state the post-project impervious surface area.

**C.3.b.iv.(2) ► Regulated Projects Reporting Table (part 2) –  
 Projects Approved During the Fiscal Year Reporting Period  
 (private projects)**

Project Name Project No.	Application Deemed Complete Date <sup>16</sup>	Application Final Approval Date <sup>17</sup>	Source Control Measures <sup>18</sup>	Site Design Measures <sup>19</sup>	Treatment Systems Approved <sup>20</sup>	Type of Operation & Maintenance Responsibility Mechanism <sup>21</sup>	Hydraulic Sizing Criteria <sup>22</sup>	Alternative Compliance Measures <sup>23/24</sup>	Alternative Certification <sup>25</sup>	HM Controls <sup>26/27</sup>
<b>Private Projects</b>										
Please see individual city reports										

<sup>16</sup>For private projects, state project application deemed complete date. If the project did not go through discretionary review, report the building permit issuance date.

<sup>17</sup>For private projects, state project application final discretionary approval date. If the project did not go through discretionary review, report the building permit issuance date.

<sup>18</sup>List source control measures approved for the project. Examples include: properly designed trash storage areas; storm drain stenciling or signage; efficient landscape irrigation systems; etc.

<sup>19</sup>List site design measures approved for the project. Examples include: minimize impervious surfaces; conserve natural areas, including existing trees or other vegetation, and soils; construct sidewalks, walkways, and/or patios with permeable surfaces, etc.

<sup>20</sup>List all approved stormwater treatment system(s) to be installed onsite or at a joint stormwater treatment facility (e.g., flow through planter, bioretention facility, infiltration basin, etc.).

<sup>21</sup>List the legal mechanism(s) (e.g., O&M agreement with private landowner; O&M agreement with homeowners' association; O&M by public entity, etc...) that have been or will be used to assign responsibility for the maintenance of the post-construction stormwater treatment systems.

<sup>22</sup>See Provision C.3.d.i. "Numeric Sizing Criteria for Stormwater Treatment Systems" for list of hydraulic sizing design criteria. Enter the corresponding provision number of the appropriate criterion (i.e., 1.a., 1.b., 2.a., 2.b., 2.c., or 3).

<sup>23</sup>For Alternative Compliance at an offsite location in accordance with Provision C.3.e.i.(1), on a separate page, give a discussion of the alternative compliance site including the information specified in Provision C.3.b.v.(1)(m)(i) for the offsite project.

<sup>24</sup>For Alternative Compliance by paying in-lieu fees in accordance with Provision C.3.e.i.(2), on a separate page, provide the information specified in Provision C.3.b.v.(1)(m)(ii) for the Regional Project.

<sup>25</sup>Note whether a third party was used to certify the project design complies with Provision C.3.d.

<sup>26</sup>If HM control is not required, state why not.

<sup>27</sup>If HM control is required, state control method used (e.g., method to design and size device(s) or method(s) used to meet the HM Standard, and description of device(s) or method(s) used, such as detention basin(s), bioretention unit(s), regional detention basin, or in-stream control).

**C.3.b.iv.(2) ► Regulated Projects Reporting Table (part 2) – Projects Approved During the Fiscal Year Reporting Period (public projects)**

Project Name	Approval Date <sup>28</sup>	Date Construction Scheduled to Begin	Source Control Measures <sup>29</sup>	Site Design Measures <sup>30</sup>	Treatment Systems Approved <sup>31</sup>	Operation & Maintenance Responsibility Mechanism <sup>32</sup>	Hydraulic Sizing Criteria <sup>33</sup>	Alternative Compliance Measures <sup>34/35</sup>	Alternative Certification <sup>36</sup>	HM Controls <sup>37/38</sup>
<b>Public Projects</b>										
Please see individual city reports										
Comments:  Please see individual city reports as these activities are implemented at the city level.										

<sup>28</sup>For public projects, enter the plans and specifications approval date.

<sup>29</sup>List source control measures approved for the project. Examples include: properly designed trash storage areas; storm drain stenciling or signage; efficient landscape irrigation systems; etc.

<sup>30</sup>List site design measures approved for the project. Examples include: minimize impervious surfaces; conserve natural areas, including existing trees or other vegetation, and soils; construct sidewalks, walkways, and/or patios with permeable surfaces, etc.

<sup>31</sup>List all approved stormwater treatment system(s) to be installed onsite or at a joint stormwater treatment facility (e.g., flow through planter, bioretention facility, infiltration basin, etc.).

<sup>32</sup>List the legal mechanism(s) (e.g., maintenance plan for O&M by public entity, etc...) that have been or will be used to assign responsibility for the maintenance of the post-construction stormwater treatment systems.

<sup>33</sup>See Provision C.3.d.i. "Numeric Sizing Criteria for Stormwater Treatment Systems" for list of hydraulic sizing design criteria. Enter the corresponding provision number of the appropriate criterion (i.e., 1.a., 1.b., 2.a., 2.b., 2.c., or 3).

<sup>34</sup>For Alternative Compliance at an offsite location in accordance with Provision C.3.e.i.(1), on a separate page, give a discussion of the alternative compliance site including the information specified in Provision C.3.b.v.(1)(m)(i) for the offsite project.

<sup>35</sup>For Alternative Compliance by paying in-lieu fees in accordance with Provision C.3.e.i.(2), on a separate page, provide the information specified in Provision C.3.b.v.(1)(m)(ii) for the Regional Project.

<sup>36</sup>Note whether a third party was used to certify the project design complies with Provision C.3.d.

<sup>37</sup>If HM control is not required, state why not.

<sup>38</sup>If HM control is required, state control method used (e.g., method to design and size device(s) or method(s) used to meet the HM Standard, and description of device(s) or method(s) used, such as detention basin(s), bioretention unit(s), regional detention basin, or in-stream control).

**C.3.h.v.(2). ► Table of Newly Installed<sup>39</sup> Stormwater Treatment Systems and Hydromodification Management (HM) Controls (Optional)**

Fill in table below or attach your own table including the same information.

Please see individual city reports as these activities are implemented at the city level.

Name of Facility	Address of Facility	Party Responsible <sup>40</sup> For Maintenance	Type of Treatment/HM Control(s)
Please see individual city reports as these activities are implemented at the city level.			

<sup>39</sup> "Newly Installed" includes those facilities for which the final installation inspection was performed during this reporting year.

<sup>40</sup>State the responsible operator for installed stormwater treatment systems and HM controls.

C.3.e.v.Special Projects Reporting Table												
Reporting Period – July 1 2015 - June 30, 2016												
Project Name & No.	Permittee	Address	Application Submittal Date <sup>41</sup>	Status <sup>42</sup>	Description <sup>43</sup>	Site Total Acreage	Gross Density DU/Acre	Density FAR	Special Project Category <sup>44</sup>	LID Treatment Reduction Credit Available <sup>45</sup>	List of LID Stormwater Treatment Systems <sup>46</sup>	List of Non-LID Stormwater Treatment Systems <sup>47</sup>
Name of the Special Project and Project No. (if applicable)	Name of the Permittee in whose jurisdiction the Special Project will be built	Address of the Special Project; if no street address, state the cross streets	See footnote	See footnote	See footnote	Total site area in acres	Number of dwelling units per acre.	Floor Area Ratio	Category A: Category B: Category C: Location: Density: Parking:	Category A: Category B: Category C: Location: Density: Parking:  See footnote	Indicate each type of LID treatment system and % of total runoff treated.  See footnote	Indicate each type of non-LID treatment system and % of total runoff treated. Indicate whether minimum design criteria met or certification received  See footnote
Please see individual city reports as these activities are implemented at the city level.												

<sup>41</sup>Date that a planning application for the Special Project was submitted.

<sup>42</sup> Indicate whether final discretionary approval is still pending or has been granted, and provide the date or version of the project plans upon which reporting is based.

<sup>43</sup>Type of project (commercial, mixed-use, residential), number of floors, number of units, type of parking, and other relevant information.

<sup>44</sup> For each applicable Special Project Category, list the specific criteria applied to determine applicability. For each non-applicable Special Project Category, indicate n/a.

<sup>45</sup>For each applicable Special Project Category, state the maximum total LID Treatment Reduction Credit available. For Category C Special Projects also list the individual Location, Density, and Minimized Surface Parking Credits available.

<sup>46</sup>: List all LID stormwater treatment systems proposed. For each type, indicate the percentage of the total amount of runoff identified in Provision C.3.d. for the Special Project's drainage area.

<sup>47</sup>List all non-LID stormwater treatment systems proposed. For each type of non-LID treatment system, indicate: (1) the percentage of the total amount of runoff identified in Provision C.3.d. for the Special Project's drainage area, and (2) whether the treatment system either meets minimum design criteria published by a government agency or received certification issued by a government agency, and reference the applicable criteria or certification.

**Special Projects Narrative**

**C.3.j.ii.(2) ► Table A - Public Projects Reviewed for Green Infrastructure**

Project Name and Location <sup>42</sup>	Project Description	Status <sup>43</sup>	GI Included? <sup>44</sup>	Description of GI Measures Considered and/or Proposed or Why GI is Impracticable to Implement <sup>45</sup>
Please see individual city reports as these activities are implemented at the city level.				

**C.3.j.ii.(2) ► Table B - Planned Green Infrastructure Projects**

Project Name and Location <sup>46</sup>	Project Description	Planning or Implementation Status	Green Infrastructure Measures Included
Please see individual city reports as these activities are implemented at the city level.			

<sup>42</sup> List each public project that is going through your agency’s process for identifying projects with green infrastructure potential.

<sup>43</sup> Indicate status of project, such as: beginning design, under design (or X% design), projected completion date, completed final design date, etc.

<sup>44</sup> Enter “Yes” if project will include GI measures, “No” if GI measures are impracticable to implement, or “TBD” if this has not yet been determined.

<sup>45</sup> Provide a summary of how each public infrastructure project with green infrastructure potential will include green infrastructure measures to the maximum extent practicable during the permit term. If review of the project indicates that implementation of green infrastructure measures is not practicable, provide the reasons why green infrastructure measures are impracticable to implement.

<sup>46</sup> List each planned (and expected to be funded) public and private green infrastructure project that is not also a Regulated Project as defined in Provision C.3.b.ii. Note that funding for green infrastructure components may be anticipated but is not guaranteed to be available or sufficient.

**BASMAA Development Committee**  
**Guidance for Identifying Green Infrastructure Potential**  
**in Municipal Capital Improvement Projects**  
**(8 April 2016 DRAFT)**

**Background**

In MRP 2.0, Provisions C.11 and C.12 require the Permittees to reduce discharges of Mercury and PCBs, respectively. A portion of these load reductions must be achieved by implementing Green Infrastructure. Permittees, collectively, must implement Green Infrastructure to reduce mercury loading by 48 grams/year and PCB loading by 120 grams/year by 2020, and plan for substantially larger reductions in the following decades. Green Infrastructure on both public and private land can serve to achieve these load reduction requirements. Implementation on private land is achieved by implementing stormwater requirements for new development and redevelopment (Provision C.3.a. through Provision C.3.i.). These requirements were carried forward, largely unchanged, from MRP 1.0.

MRP 2.0 defines Green Infrastructure as:

Infrastructure that uses vegetation, soils, and natural processes to manage water and create healthier urban environments. At the scale of a city or county, green infrastructure refers to the patchwork of natural areas that provides habitat, flood protection, cleaner air, and cleaner water. At the scale of a neighborhood or site, green infrastructure refers to stormwater management systems that mimic nature by soaking up and storing water.

In practical terms, most green infrastructure will take the form of diverting runoff from existing streets, roofs, and parking lots to one of two stormwater management strategies:

1. Dispersal to vegetated areas, where sufficient landscaped area is available and slopes are not too steep.
2. LID (bioretention and infiltration) facilities, built according to criteria similar to those currently required for regulated private development and redevelopment projects under Provision C.3.

In some cases, the use of tree-box-type biofilters may be appropriate<sup>1</sup>. In other cases, where conditions are appropriate, existing impervious pavements may be removed and replaced with pervious pavements.

In MRP 2.0, Provision C.3.j. includes requirements for Green Infrastructure planning and implementation. Provision C.3.j. has two main elements to be implemented by municipalities:

1. Preparation of a Green Infrastructure Plan for the inclusion of LID drainage design into storm drain infrastructure, including streets, roads, storm drains, etc.
2. Early implementation of green infrastructure projects (“no missed opportunities”),

This guidance addresses the second of these requirements. The intent of the “no missed opportunities” requirement is to ensure that no major infrastructure project is built without assessing the opportunity for incorporation of green infrastructure features.

Provision C.3.j.ii. requires that each Permittee prepare and maintain a list of green infrastructure projects, public and private, that are already planned for implementation during the permit term, and infrastructure projects planned for implementation during the permit

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<sup>1</sup> Standard proprietary tree-box-type biofilters are considered to be non-LID treatment and will only be allowed under certain circumstances. Guidance on use and sizing of these facilities will be provided in a separate document.

term that have potential for green infrastructure measures. The list must be submitted with each Annual Report, including:

“... a summary of how each public infrastructure project with green infrastructure potential will include green infrastructure measures to the maximum extent practical during the permit term. For any public infrastructure project where implementation of green infrastructure measures is not practicable, submit a brief description for the project and the reasons green infrastructure measures were impracticable to implement”.

This requirement has no specified start date; “during the permit term” means beginning January 1, 2016 and before December 31, 2020. The first Annual Report submittal date will be September 30, 2016.

Note that this guidance primarily addresses the review of proposed or planned public projects for green infrastructure opportunities. The Permittee may also be aware of proposed or planned private projects, not subject to LID treatment requirements, that may have the opportunity to incorporate green infrastructure. These should be addressed in the same way as planned public projects, as described below.

### **Procedure for Review of Planned Public Projects and Annual Reporting**

The municipality’s Capital Improvement Program (CIP) project list provides a good starting point for review of proposed public infrastructure projects. Review of other lists of public infrastructure projects, such as those proposed within separately funded special districts (e.g., lighting and landscape districts, maintenance districts, and community facilities districts), may also be appropriate. This section describes a two-part procedure for conducting the review.

#### **Part 1 – Initial Screening**

The first step in reviewing a CIP or other public project list is to screen out certain types of projects from further consideration. For example, some projects (e.g., interior remodels, traffic signal replacement) can be readily identified as having no green infrastructure potential. Other projects may appear on the list with only a title, and it may be too early to identify whether green infrastructure could be included. Still others have already progressed past the point where the design can reasonably be changed (this will vary from project to project, depending on available budget and schedule).

Some “projects” listed in a CIP may provide budget for multiple maintenance or minor construction projects throughout the jurisdiction or a portion of the jurisdiction, such as a tree planting program, curb and sidewalk repair/upgrade, or ADA curb/ramp compliance. It is recommended that these types of projects not be included in the review process described herein. The priority for incorporating green infrastructure into these types of projects needs to be assessed as part of the Permittees’ development of Green Infrastructure Plans, and standard details and specifications need to be developed and adopted. During this permit term, Permittees will evaluate select projects, project types, and/or groups of projects as case studies and develop an approach as part of Green Infrastructure planning.

The projects removed through the initial screening process do not need to be reported to the Water Board in the Permittee’s Annual Report. However, the process should be documented and records kept as to the reason the project was removed from further consideration. Note that projects that were determined to be too early to assess will need to be reassessed during the next fiscal year’s review.

The following categories of projects may be screened out of the review process in a given fiscal year:

1. **Projects with No Potential** - The project is identified in initial screening as having no green infrastructure potential based on the type of project. For example, the project does not include any exterior work. Attachment 1 provides a suggested list of such projects that Permittees may use as a model for their own internal process.

2. **Projects Too Early to Assess** – There is not yet enough information to assess the project for green infrastructure potential, or the project is not scheduled to begin design within the permit term (January 2016 – December 2020). If the project is scheduled to begin within the permit term, an assessment will be conducted if and when the project moves forward to conceptual design.
3. **Projects Too Late to Change** – The project is under construction or has moved to a late design phase in which changes cannot be made.
4. **Projects Consisting of Maintenance or Minor Construction Work Orders** – The “project” includes budgets for multiple maintenance or minor construction work orders throughout the jurisdiction or a portion of the jurisdiction. These types of projects will not be individually reviewed for green infrastructure opportunity but will be considered as part of a municipality’s Green Infrastructure Plan.

## **Part 2 – Assessment of Green Infrastructure Potential**

After the initial screening, the remaining projects either already include green infrastructure or will need to go through an assessment process to determine whether or not there is potential to incorporate green infrastructure. A recommended process for conducting the assessment is provided later in this guidance. As a result of the assessment, the project will fall into one of the following categories with associated annual reporting requirements:

- **Yes – Project already includes green infrastructure and is funded.**

*Reporting:* List the project in “Table B-Planned Green Infrastructure Projects” in the Annual Report, indicate the planning or implementation status, and describe the green infrastructure measures to be included.

- **Yes – Project may have green infrastructure potential** pending further assessment of feasibility, incremental cost, and availability of funding. If the public infrastructure project is subject to stormwater requirements for new developments (Provision C.3), follow current C.3 guidance.

*Reporting:* a) If the feasibility assessment is not complete and/or funding has not been identified, list the project in “Table A-Public Projects Reviewed for Green Infrastructure” in the Annual Report. In the “GI Included?” column, state “TBD”. In the rightmost column, describe the green infrastructure measures considered and/or proposed, and note the funding and other contingencies for inclusion of Green Infrastructure in the project. b) If funding for the project has been identified, list the project in “Table B-Planned Green Infrastructure Projects” in the Annual Report, indicate the planning or implementation status, and describe the green infrastructure measures to be included.

- **No – A project-specific assessment has been completed, and Green Infrastructure is impracticable.**

*Reporting:* In the Annual Report, list the project in “Table A-Public Projects Reviewed for Green Infrastructure”. In the “GI Included?” column, state “No.” Briefly state the reasons for the determination in the rightmost column. If needed, prepare a more detailed statement of the reasons for the determination and keep in project files.

## Process for Assessing Green Infrastructure Potential of a Public Infrastructure Project

### Initial Assessment of Green Infrastructure Potential

Consider opportunities that may be associated with:

- Alterations to roof drainage from existing buildings
- New or replaced pavement or drainage structures (including gutters, inlets, or pipes)
- Concrete work
- Landscaping, including tree planting
- Streetscape improvements and intersection improvements (other than signals)

### Step 1: Information Collection/Reconnaissance

For projects that include alterations to building drainage, identify the locations of roof leaders and downspouts, and where they discharge or where they are connected to storm drains.

For street and landscape projects:

- Evaluate potential opportunities to substitute pervious pavements for impervious pavements.
- Identify and locate drainage structures, including storm drain inlets or catch basins.
- Identify and locate drainage pathways, including curb and gutter.

Identify landscaped areas and paved areas that are adjacent to, or down gradient from, roofs or pavement. These are potential facility locations. *If there are any such locations, continue to the next step.* Note that the project area boundaries may be, but are not required to be, expanded to include potential green infrastructure facilities.

### Step 2: Preliminary Sizing and Drainage Analysis

Beginning with the potential facility locations that seem most feasible, identify possible pathways to direct drainage from roofs and/or pavement to potential facility locations—by sheet flow, valley gutters, trench drains, or (where gradients are steeper) via pipes, based on existing grades and drainage patterns. Where existing grades constrain natural drainage to potential facilities, the use of pumps may be considered (as a less preferable option).

Delineate (roughly) the drainage area tributary to the potential facility location. Typically, this requires site reconnaissance, which may or may not include the use of a level to measure relative elevations.

Calculate a preliminary sizing factor (facility area/tributary area) for the potential facility location. Note the following guidelines (not strict rules, but targets):

- Sizing factor  $\geq 0.5$  for dispersal to landscape or pervious pavement<sup>2</sup> (i.e., a maximum 2:1 ratio of impervious area to pervious area)
- Sizing factor  $\geq 0.04$  for bioretention
- Sizing factor  $\geq 0.004$  (or less) for tree-box-type biofilters

For bioretention facilities requiring underdrains and tree-box-type biofilters, note if there are potential connections from the underdrain to the storm drain system (typically 2.0 feet below soil surface for bioretention facilities, and 3.5 feet below surface for tree-box-type biofilters).

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<sup>2</sup> Note that pervious pavement systems are typically designed to infiltrate only the rain falling on the pervious pavement itself, with the allowance for small quantities of runoff from adjacent impervious areas. If significant runoff from adjacent areas is anticipated, preliminary sizing considerations should include evaluation of the depth of drain rock layer needed based on permeability of site soils.

If, in this step, you have confirmed there may be feasible potential facility locations, *continue to the next step.*

### **Step 3: Barriers and Conflicts**

*Note that barriers and conflicts do not necessarily mean implementation is infeasible; however, they need to be identified and taken into account in future decision-making.*

Note issues such as:

- Confirmed or potential conflicts with subsurface utilities
- Known or unknown issues with property ownership, or need for acquisition or easements
- Availability of water supply for irrigation, or lack thereof
- Extent to which green infrastructure is an “add on” vs. integrated with the rest of the project

### **Step 4: Project Budget and Schedule**

Note any constraints on the project schedule, such as a regulatory mandate to complete the project by a specific date, grant requirements, etc., that could complicate aligning a separate funding stream for the green infrastructure element. Consider whether cost savings could be achieved by integrating the project with other planned projects, such as pedestrian or bicycle safety improvement projects, street beautification, etc.

### **Step 5: Assessment—Does the Project Have Green Infrastructure Potential?**

Consider the ancillary benefits of green infrastructure, including opportunities for improving the quality of public spaces, providing parks and play areas, providing habitat, urban forestry, mitigating heat island effects, aesthetics, and other valuable enhancements to quality of life.

Based on the information above, would it make sense to include green infrastructure into this project—*if funding were available for the potential incremental costs of including green infrastructure in the project?* Identify any additional conditions that would have to be met for green infrastructure elements to be constructed consequent with the project.

## **Attachment 1**

### **Examples of Projects with No Potential for Green Infrastructure**

- Projects with no exterior work (e.g., interior remodels)
- Projects involving exterior building upgrades or equipment (e.g., HVAC, solar panels, window replacement, roof repairs and maintenance)
- Projects related to development and/or continued funding of municipal programs or related organizations
- Projects related to technical studies, mapping, aerial photography, surveying, database development/upgrades, monitoring, training, or update of standard specs and details
- Construction of new streetlights, traffic signals or communication facilities
- Construction of or upgrades to fueling stations, chemical and waste storage facilities, landfills, recycling and waste transfer stations.
- Minor bridge and culvert repairs
- Non-stormwater utility projects (e.g., sewer or water main replacement, utility undergrounding, treatment plant upgrades)
- Equipment purchase or maintenance (including vehicles, street or park furniture, equipment for sports fields and golf courses, etc.)
- Irrigation system installation, upgrades or repairs

## **Model Text for Green Infrastructure Staff Report – Draft 11 March 2016**

The [City, Town, County] is one of 76 local agencies (Permittees) subject to the California Regional Water Quality Control Board, San Francisco Bay Region's Municipal Regional Stormwater NPDES Permit (MRP). The MRP was adopted in 2009 (MRP 1.0) and reissued in November 2015 (MRP 2.0).

In MRP 2.0, Provisions C.11 and C.12 require the Permittees to reduce discharges of Mercury and PCBs, respectively.

A portion of these load reductions must be achieved by retrofitting existing impervious surfaces with Green Infrastructure.

MRP 2.0 defines Green Infrastructure:

Infrastructure that uses vegetation, soils, and natural processes to manage water and create healthier urban environments. At the scale of a city or county, green infrastructure refers to the patchwork of natural areas that provides habitat, flood protection, cleaner air, and cleaner water. At the scale of a neighborhood or site, green infrastructure refers to stormwater management systems that mimic nature by soaking up and storing water.

Contra Costa Permittees, collectively, must implement Green Infrastructure to reduce—from 2014 levels—mercury loading by 9 grams/year and PCB loading by 23 grams/year by 2020. Permittees must plan for substantially larger reductions in the following decades.

Green Infrastructure on both public and private land can serve to achieve these load reduction requirements. Implementation on private land is achieved by implementing stormwater requirements for new development and redevelopment (Provision C.3.a. through Provision C.3.i.), which were carried forward, largely unchanged, from MRP 1.0.

In MRP 2.0, Provision C.3.j. includes requirements for Green Infrastructure planning and implementation. Provision C.3.j. has two main elements to be implemented by municipalities:

1. Preparation of a Green Infrastructure Plan for the inclusion of Low Impact Development (LID) drainage design into storm drain infrastructure, including streets, roads, storm drains, etc.
2. Early implementation of Green Infrastructure Projects

### **Green Infrastructure Plan**

The Green Infrastructure Plan requirements and deadlines are:

- Prepare a framework or workplan to be approved by the [Board or Council] by June 30, 2017.
- Submit a Green Infrastructure Plan with the 2019 Annual Report.

The Green Infrastructure Plans are intended to describe how each jurisdiction will, in the coming decades, shift their impervious surfaces and storm drain infrastructure from gray, or conventional, storm drain infrastructure where runoff flows directly in to the storm drain and then to creeks and the Bay, to a more resilient, sustainable system that slows runoff by dispersing it to vegetated areas, harvests and uses runoff, promotes infiltration and evapotranspiration, and uses bioretention to detain, retain, and treat stormwater.

Among the specific requirements is to summarize other planning documents that are updated or modified to incorporate green infrastructure requirements. These may include:

- General Plans
- Specific Plans
- Complete Streets Plans
- Active Transportation Plans
- Storm Drain Master Plans
- Pavement Work Plans
- Urban Forestry Plans

or other plans that may affect the future alignment, configuration or design of impervious surfaces such as streets, parking lots, sidewalks, and roofs.

Staff is coordinating with other Contra Costa municipalities, through the Contra Costa Clean Water Program (CCCWP), to develop a model framework or workplan. This model will be adapted to meet the [City's, Town's, County's] needs and brought to the [Council or Board] during FY 2016-2017.

### **Early Implementation (No Missed Opportunities)**

Provision C.3.j.ii. requires that each Permittee review current infrastructure (capital improvement) projects, prepare a list of infrastructure projects planned for implementation during the permit term that have potential for green infrastructure measures, and submit the list with each Annual Report, including:

... a summary of how each public infrastructure project with green infrastructure potential will include green infrastructure measures to the maximum extent practical during the permit term. For any public infrastructure project where implementation of green infrastructure measures is not practicable, submit a brief description for the project and the reasons green infrastructure measures were impracticable to implement.

Staff is coordinating with other Contra Costa municipalities, through the Contra Costa Clean Water Program (CCCWP), to develop model guidance for reviewing capital improvement programs and projects, identifying green infrastructure potential, advancing planning and design of potential green infrastructure features, and documenting decisions regarding implementation of green infrastructure. The model guidance will be adapted to meet the [City's, Town's, County's] needs and will be implemented by the [Public Works, Engineering] Department during the current fiscal year.



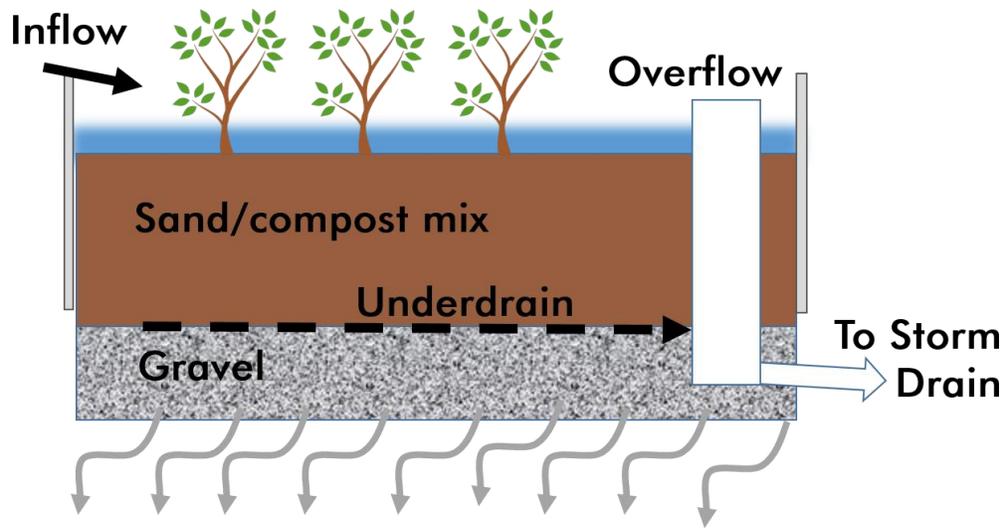
Green Infrastructure: Bioretention facility with active and passive landscape uses (El Cerrito)



Green Infrastructure: Bioretention facilities treating street runoff.



Green Infrastructure: Bioretention treating runoff from residences and a private street (Contra Costa County)



Green Infrastructure: Illustrative cross-section of Bioretention Facility

**Section 4 – Provision C.4 Industrial and Commercial Site Controls**

**Program Highlights and Evaluation**

Highlight/summarize activities for reporting year:

Summary:

The Program contracts with the Solano County Department of Resource Management to conduct stormwater inspections of industrial, commercial and food handling businesses within the Program area. The Program updates the Business Inspection Plan as necessary to keep the document current. Changes are made to facilities lists upon observations of facilities closing or a change in compliance status resulting in a reduction or increase in inspection frequency. Specific information on the number of facilities inspected, types of violations incurred and resolution of violations within reasonable time periods is included in each city's 2015-2016 Annual Report as required by the Water Board.

Three training events for the Industrial and Commercial Inspectors were held this fiscal year. The Solano Health Inspector training was performed on February 12, 2016. The focus of the training was consistency in enforcement levels, enforcement authority; trash hot spots and outreach; city stormwater ordinances; high-priority facilities needed to be inspected during the fiscal year and enforcement levels associated with illegal discharges.

Additionally, in an attempt to increase efficiencies, the responsibility for follow up inspections has been transferred to city staff. As a result of this change two additional training sessions occurred during the year. On April 5, 2016, the City of Suisun's Chief of Police and the Code Enforcement Division were trained for follow inspections. Subsequently, on May 31, 2016 the Fairfield Public Works Department and a member of the Code Enforcement Division were trained for follow up inspections.

The Program Management team meets on a monthly basis to discuss important Program issues including commercial, industrial and restaurant inspections. The Program also participates in the Municipal Operations Committee meeting on a regional level, which was originally intended to discuss Industrial and Commercial Site Controls.

**C.4.b.iii ► Potential Facilities List**

List below or attach your list of industrial and commercial facilities in your Inspection Plan to inspect that could reasonably be considered to cause or contribute to pollution of stormwater runoff.

The Potential Facilities List was generated at the Program level and distributed to the cities for submittal in their Annual Report. See individual city reports for this list.

Permittee Name: Fairfield-Suisun Urban Runoff Management Program

**C.4.d.iii.(1)(a) ► Facility Inspections**

Fill out the following table or attach a summary of the following information. Indicate your violation reporting methodology below.

		Permittee reports multiple discrete violations on a site as one violation.
	x	Permittee reports the total number of discrete violations on each site.

	Number	Percent
Number of businesses inspected		
Total number of inspections conducted		
Number of violations (excluding verbal warnings)		
Sites inspected in violation		
Violations resolved within 10 working days or otherwise deemed resolved in a longer but still timely manner		

Comments:

1. Violation Explanation:

The Program industrial-commercial and restaurant inspection forms have been designed so that when a facility is seen as being free of violations and without threat to the environment, all of the inspection form line items are checked "yes" and the "In Compliance With Pollution Control Requirements?" box is also checked "yes".

Inspection reports where the "no" box is marked in the checklist area and the facility is seen as not being "In Compliance With Pollution Control Requirements?" are incorporated into the "Number of violations" totaled above. The level of enforcement of the offense is delineated in an annual training given to the inspectors and as described in the Program ERP.

2. Violations not resolved within 10 days or otherwise deemed resolved in a longer but still timely manner:

This data is different for each city, see individual city reports for this information.

**C.4.d.iii.(1)(b) ► Frequency and Types/Categories of Violations Observed**

Fill out the following table or attach a summary of the following information.

Type/Category of Violations Observed - see individual city reports.	Number of Violations
Actual discharge (e.g. active non-stormwater discharge or clear evidence of a recent discharge)	
Potential discharge and other	

Permittee Name: Fairfield-Suisun Urban Runoff Management Program

<p>Comments:</p> <p>See individual city reports for this information.</p>	
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**C.4.d.iii.(1)(b) ► Frequency and Type of Enforcement Conducted**

Fill out the following table or attach a summary of the following information.

	Enforcement Action (as listed in ERP) <sup>47</sup>	Number of Enforcement Actions Taken	% of Enforcement Actions Taken <sup>48</sup>
Level 1			
Level 2			
Level 3			
Level 4			
<b>Total</b>	See individual city reports for this information.		

<sup>47</sup>Agencies to list specific enforcement actions as defined in their ERPs.

<sup>48</sup>Percentage calculated as number of each type of enforcement action divided by the total number of enforcement actions.

**C.4.d.iii.(1)(c) ▶ Types of Violations Noted by Business Category**

Fill out the following table or attach a summary of the following information. **Do not leave any cells blank.**

Business Category <sup>49</sup>	Number of Actual Discharge Violations	Number of Potential/Other Discharge Violations
See individual city reports for this information.		

**C.4.d.iii.(1)(d) ▶ Non-Filers**

List below or attach a list of the facilities required to have coverage under the Industrial General Permit but have not filed for coverage:

See individual city reports for this information.

**C.4.e.iii ▶ Staff Training Summary**

Training Name	Training Dates	Topics Covered	No. of Industrial/ Commercial Site Inspectors in Attendance	Percent of Industrial/ Commercial Site Inspectors in Attendance	No. of IDDE Inspectors in Attendance	Percent of IDDE Inspectors in Attendance
Solano County Annual Refresher Training for Storm and Sewer	2/23/2016	Enforcement authority; city stormwater ordinances; high-priority facilities needed to be inspected this fiscal year; enforcement levels associated with illegal discharges, High Priority Areas for Trash (see attached training sign-in sheet).	12	92	12	~50
Suisun City Code Enforcement Training	4/5/2016	Enforcement authority; city stormwater ordinances; high-priority facilities needed to be inspected this fiscal year; enforcement levels	5	62	5	~50

<sup>49</sup>List your Program's standard business categories.

**FY 2015-2016 Annual Report**

**C.4 – Industrial and Commercial Site Controls**

**Permittee Name: Fairfield-Suisun Urban Runoff Management Program**

		associated with illegal discharges, High Priority Areas for Trash (see attached training sign-in sheet).				
Fairfield Code Enforcement Training	5/31/2016	Enforcement authority; city stormwater ordinances; high-priority facilities needed to be inspected this fiscal year; enforcement levels associated with illegal discharges, High Priority Areas for Trash (see attached training sign-in sheet).	6	67	6	~50

Comments:

The responsibility for follow up inspections has been transferred to city staff. As a result of this change two additional training sessions occurred during the year. On April 5, 2016, the City of Suisun's Chief of Police and the Code Enforcement Division were trained for follow inspections. Subsequently, on May 31, 2016 the Fairfield Public Works Department and a member of the Code Enforcement Division were trained for follow up inspections.







Section 5 – Provision C.5 Illicit Discharge Detection and Elimination

**Program Highlights and Evaluation**  
**Highlight/summarize activities for reporting year:**

Provide background information, highlights, trends, etc.

Summary:

The Program Manager participates in BASMAA's Municipal Maintenance and Commercial/ Industrial Controls meetings. Additionally, monthly Stormwater Management meetings are held at the Program level to discuss illicit discharge detection and elimination and screening protocol. Both cities utilize the Program's Illicit Discharge Detection and Elimination Program Manual to assist them in identification, detection and elimination of illicit discharges throughout both cities.

On April 5, 2016 and May 31, 2016 the Program performed training with Code Enforcement officers from both Program cities. The training covered Enforcement authority; city stormwater ordinances; enforcement levels associated with illegal discharges, High Priority Areas for Trash.

**C.5.c.iii ► Complaint and Spill Response Phone Number**

List below or attach your complaint and spill response phone number

Fairfield - 717-428-7300, Suisun City - 707-421-7373

Provide your complaint and spill response web address, if used

Not used

Is a screen shot of your website showing the central contact point attached?  Yes  No

If No, explain:

Provide a discussion of how the central contact point (complaint and spill response phone number and, if used, web address) is being publicized to your staff and the public.

See individual city reports for complaint and spill response in those cities. The public is exposed to illegal dumping response/reporting through the programs You Are the Solution to Water Pollution trifold. This catchy brochure is distributed at farmers markets and at all other public outreach events. Brochure is attached to the end of this section.

**C.5.d.iii.(1), (2), (3) ▶ Spill and Discharge Complaint Tracking**

Spill and Discharge Complaint Tracking (fill out the following table or include an attachment of the following information)

	Number	Percentage
Discharges reported (C.5.d.iii.(1))		
Discharges reaching storm drains and/or receiving waters (C.5.d.iii.(2))		
Discharges resolved in a timely manner (C.5.d.iii.(3))		
Comments:  See individual city reports for spill and discharge tracking.		

**C.5.f.iii ▶ MS4 Map Availability**

Discuss how you make your MS4 map available to the public and how you publicize the availability of the MS4 map.

This provision is handled at the city level. Please see individual city reports for this information.



## WHAT WE DO

### STORMWATER MANAGEMENT

**Stormwater and urban runoff is collected in a system that is completely separate from the wastewater system that transports sewage.**

All of the stormwater that our network of storm drains and pipes collects flows untreated into the Suisun Marsh, an environmentally-sensitive area of enormous proportions.



Stormwater and urban runoff is collected in a system that is complete separate from the wastewater system that transports sewage.

Suisun Marsh is the largest contiguous brackish water marsh remaining on the west coast of North America. More than 10 percent of the remaining natural wetlands in California are within the Suisun Marsh.

The marsh contains habitat for more than 220 bird species, 45 animal species, 16 different reptilian and amphibian species, and more than 40 fish species. The marsh also serves as the resting and feeding ground for thousands of waterfowl traversing the Pacific Flyway.

## And yes, the Suisun Marsh does play a role in the drinking water supply as well.

The 230-miles of winding levees within the marsh help to protect the drinking water supplies for 22 million people by preventing salt water intrusion into the Sacramento-San Joaquin Delta.

To maintain this pristine environment, the District assists the cities of Fairfield and Suisun City by participating in the URMP (Urban Runoff Management Program), and by maintaining the cities' stormwater pumpstations.

The URMP is intended to reduce or eliminate pollutants discharged from the urban environment into our storm drains, local creeks and the Suisun Marsh. Water flowing into our gutters and storm drains is not treated before discharge into our creeks, which feed into the expansive Suisun Marsh.

Key components of the URMP include industrial and commercial inspections, education outreach to schools and the general public, monitoring municipal maintenance activities, and ensuring that local residential and commercial construction sites do not contribute to pollution in our local waterways.

All of us at the Fairfield-Suisun Sewer District take our responsibility to protect the Suisun Marsh and our region's other vital environmental attributes very seriously. We hope you do as well. Together, we can protect and preserve these essential natural resources for generations to come.

[City Of Fairfield Stormwater](#)

[City of Suisun City Stormwater](#)

[Solano County Stormwater](#)



### **Creek and Marsh Watch**

*The cities of Fairfield, Suisun City and the Fairfield-Suisun Sewer District have joined together to form the Creek and Marsh Watch. These municipalities protect the local creeks and the Suisun Marsh.*

*The Suisun Marsh, just downstream from the city of Fairfield and Suisun City, is the largest contiguous brackish water marsh remaining on the west coast of North America. This enormous marsh is a critical part of the San Francisco Bay-Delta estuary ecosystem, encompassing 116,000 acres, including 52,000 acres of managed wetlands, 27,700 acres of upland grasses, 6,300 acres of tidal wetlands, and 30,000 acres of bays and sloughs.*

*Suisun Marsh is a critical nursery for endangered Delta smelt as well as multitudes of other native and introduced species. The Suisun Marsh is also a major stop-over point each year for 1.5 million migratory birds on the Pacific Flyway.*



*It is the responsibility of all of our citizens to protect our local creeks and the Suisun Marsh.*

*The Fairfield-Suisun Urban Runoff Management Program gratefully acknowledges the Santa Clara Valley Urban Runoff Pollution Prevention Program for sharing the content and the artwork of this brochure.*

### **TO REPORT ILLEGAL DISCHARGES and SPILL RESPONSE**

Solano County Resource Management  
(707) 784-6765 or [www.solanocounty.com](http://www.solanocounty.com)

Fairfield Police Department  
(707) 428-7300

Suisun City Police Department  
(707) 421-7373

#### **Other Useful Contacts**

(during normal business hours)

Solano Recycles (oil, latex, paint, etc)  
(707) 437-8900 or [www.solanorecycles.com](http://www.solanorecycles.com)

Fairfield-Suisun Sewer District  
(707) 429-8930

Fairfield Public Works Department  
(707) 428-7485 or [www.fairfield.ca.gov](http://www.fairfield.ca.gov)

Suisun City Public Works Department  
(707) 421-7340 or [www.suisun.com](http://www.suisun.com)

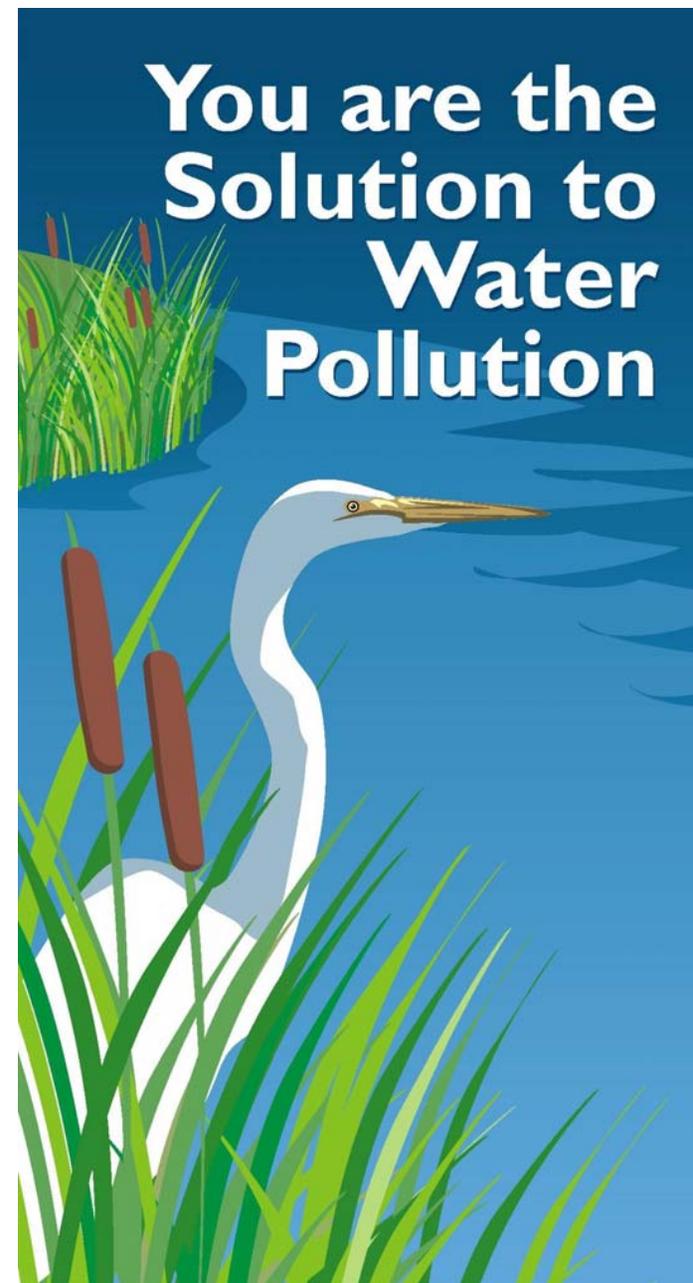
CA Department of Fish & Game  
Caltip 888-334-2258 (Poaching or Polluting)  
707-944-5500 or [www.dfg.ca.gov](http://www.dfg.ca.gov)

San Francisco Bay Regional  
Water Quality Control Board  
(510) 622-2300 or [www.swrcb.ca.gov](http://www.swrcb.ca.gov)



**Fairfield-Suisun Urban Runoff  
Management Program**

(07/07/15)



# **You are the Solution to Water Pollution**

**Creek and Marsh Watch**  
**Our Creeks.  
Our Water.  
Ours to Protect.**

## You live in a Watershed

A watershed is a land area that drains rain and other water into a creek, marsh, lake or bay. Rain and irrigation from lawns and gardens wash pollutants off surfaces like streets, sidewalks, and driveways into our storm drains and creeks and out to the Bay.

### You may live miles away from the Bay and still be polluting its waters

Water from your neighborhood enters the storm drain system and flows directly to local creeks, the Marsh, and the Bay *without any treatment*. It often is contaminated by pollutants that can be toxic to fish, wildlife and people.

Residents and small businesses are the leading causes of local stormwater pollution, and have become the primary threats to the Marsh and Bay. Pollutants that get into storm drains because of our daily choices and activities can end up in our local waterways. You may be polluting the Marsh and Bay without realizing it.

## Storm drains carry water and pollutants directly to our local creeks and the Suisun Marsh.

**Never put anything into the gutter, street or storm drain.**

*Pollution comes from everyday activities.*

Here are a few suggestions how you can help prevent stormwater pollution:

- *Motor oil and auto fluids.* If you change your own oil, recycle it, or take it to a household hazardous waste collection program.
- *Soap and dirt from washing cars in the driveway or street.* Go to a commercial car wash, or wash cars on a lawn or dirt surface and empty your bucket of soapy water into a sink or toilet.
- *Antifreeze, oil, paint or household cleaners.* Rinse latex paint tools in a sink, not outdoors. Also, clean up toxic spills like motor oil, paint and antifreeze with an absorbent material and dispose of soiled absorbent properly.
- *Dirt, leaves and lawn clippings that clog storm drains and choke creeks.* Rake or sweep to clean up outside. Compost leaves and yard clippings, or recycle them.
- *Weed killers, fertilizers and pesticides that are washed off lawns.* Use “green” gardening methods such as conserving water, planting native plants, protecting the soil and reducing the use of toxic pesticides. Adjust your sprinklers or irrigation systems to prevent over watering.
- *Litter and grime that collects on parking lots and sidewalks.* Use a broom, not a hose, to clean up outside. Use “green building” materials and practices, such as pervious paving, for your next project.
- *Pet waste left on lawns, streets, in the gutter or on sidewalks.* Pick it up and put it in a trash can.



**Section 6 – Provision C.6 Construction Site Controls**

<b>C.6.e.iii.(1) ► Hillside Development Criteria</b>		
What criteria is your agency using to determine hillside development areas?	Local criteria such as maps of hillside development areas or other written criteria	The permit definition of projects on sites with ≥ 15% slope
Attach a copy of hillside development area maps or provide your written criteria below, if applicable.		
Description:  This provision is handled at the city level. Please see individual city reports for this information.		

<b>C.6.e.iii.2.a, b, c ► Site/Inspection Totals</b>		
<b>Number of High Priority Sites (sites disturbing &lt; 1 acre of soil requiring storm water runoff quality inspection)</b> (C.6.e.iii.1.a)	<b>Number of sites disturbing ≥ 1 acre of soil</b> (C.6.e.iii.1.b)	<b>Total number of storm water runoff quality inspections conducted (include only High Priority Site and sites disturbing 1 acre or more)</b> (C.6.e.iii.1.c)
#	#	#
Comments:  This provision is handled at the city level. Please see individual city reports for this information.		

**C.6.e.iii.2.d ▶ Construction Activities Storm Water Violations**

This provision is handled at the city level. Please see individual city reports for this information.		
<b>BMP Category</b>	<b>Number of Violations<sup>50</sup> excluding Verbal Warnings</b>	<b>% of Total Violations<sup>51</sup></b>
Erosion Control		
Run-on and Run-off Control		
Sediment Control		
Active Treatment Systems		
Good Site Management		
Non Stormwater Management		
<b>Total<sup>52</sup></b>		<b>100%</b>

<sup>50</sup>Count one violation in a category for each site and inspection regardless of how many violations/problems occurred in the BMP category. For example, if during one inspection at a site, there are 2 erosion control violations, only 1 violation would be counted for this table.

<sup>51</sup>Percentage calculated as number of violations in each category divided by total number of violations in all six categories.

<sup>52</sup>The total number of violations may count more than one violation per inspection, since some inspections may result in violations in more than one category. For example, during one inspection of a site, there may have been both an erosion control violation and a sediment control violation. For this reason, the total number of violations in this table may not match the total number of enforcement actions reported in Table C6.e.iii.1.e.

**C.6.e.iii.2.e ► Construction Related Storm Water Enforcement Actions**

This provision is handled at the city level. Please see individual city reports for this information.

	<b>Enforcement Action</b> (as listed in ERP) <sup>53</sup>	<b>Number Enforcement Actions Issued</b>	<b>% Enforcement Actions Issued<sup>54</sup></b>
Level 1 <sup>55</sup>			
Level 2			
Level 3			
Level 4			
<b>Total</b>			<b>100%</b>

**C.6.e.iii.2.f, g ► Illicit Discharges**

This provision is handled at the city level. Please see individual city reports for this information.

	<b>Number</b>
Number of illicit discharges, actual and those inferred through evidence at high priority sites and sites that disturb 1 acre or more of land (C.6.e.iii.1.f)	
Number of sites with discharges, actual and those inferred through evidence at high priority sites and sites that disturb 1 acre or more of land (C.6.e.iii.1.g)	

<sup>53</sup>Agencies should list the specific enforcement actions as defined in their ERPs.  
<sup>54</sup>Percentage calculated as number of each type of enforcement action divided by the total number of enforcement actions.  
<sup>55</sup>For example, Enforcement Level 1 may be Verbal Warning.

**C.6.e.iii.2.h, i ► Violation Correction Times**

	Number	Percent
Violations (excluding verbal warnings) fully corrected within 10 business days after violations are discovered or otherwise considered corrected in a timely period (C.6.e.iii.1.h)		% <sup>56</sup>
Violations (excluding verbal warnings) not fully corrected within 30 days after violations are discovered (C.6.e.iii.1.i)		% <sup>57</sup>
<b>Total number of violations (excluding verbal warnings) for the reporting year<sup>58</sup></b>		100%
<b>Comments:</b>  This provision is handled at the city level. Please see individual city reports for this information.		

**C.6.e.iii.(4) ► Evaluation of Inspection Data**

Describe your evaluation of the tracking data and data summaries and provide information on the evaluation results (e.g., data trends, typical BMP performance issues, comparisons to previous years, etc.).

Description:

This provision is handled at the city level. Please see individual city reports for this information.

**C.6.e.iii.(4) ► Evaluation of Inspection Program Effectiveness**

Describe what appear to be your program's strengths and weaknesses, and identify needed improvements, including education and outreach.

Description:

This provision is handled at the city level. Please see individual city reports for this information.

<sup>56</sup>Calculated as number of violations fully corrected in a timely period after the violations are discovered divided by the total number of violations for the reporting year.  
<sup>57</sup>Calculated as number of violations not fully corrected within 30 days after the violations are discovered divided by the total number of violations for the reporting year.  
<sup>58</sup>The total number of violations reported in the table of Violation Correction Times equals the number of initial enforcement actions, i.e., this assumes one violation is issued for several problems during an inspection at a site. The total number of violations in the table of Violation Correction Times may not equal the total number of enforcement actions because one violation issued at a site may have a second enforcement action for the same violation at the next inspection if it is not corrected.

**C.6.f ▶ Staff Training Summary**

Training Name	Training Dates	Topics Covered	No. of Inspectors in Attendance	
Fairfield-Suisun C.6 Construction Sites Control	May 10, 2016	ERP, Construction Site Scenarios, Inspection forms and requirements of MRP 2.	23	

**Fairfield-Suisun Urban Runoff Management Program - C.6  
Construction Site Control Training**

March 10, 2016

**SIGN-IN SHEET**

Name	Organization	Phone
CHRIS CATON	CITY OF RICHMOND	707-428-7048
Dana Blatner	City of Vallejo	707 333-0059
James Olson	City of Vallejo	707 310-0013
Doug Guman	COF	707 428 7044
Dennis Uy	COV	(707) 688-2483
Mike Prouce	COF	707-428-7592
Brian Mann's	COF	707 428-7045
Michelle Rembaum	RUSCOB	510-622-2327
Danny Lawrence	CD	707 428-7520
JASON WILLIAMS	"	428-7521
DAVID DOYLE	COF	707-428-7442
Kevin Scharf	COF	707.299.1231
Pete Ivacky	COF	429.6280
Nick Logan	Suisun	421-7244
LEE EVANS	Suisun	421-7343
Doug Scott	VSFCD	644-8949
Craig Mann	VSFCD	644-8949
MARIA BARNETT	VSSCD	707 644 8949
DEREK CRUTCHFIELD	COV	(707) 648-5346
JEFF PENROD	Suisun	421-7349
DAVID MARTINEZ	Suisun	" "
TOM MARTIAU	COF	428-7478
KEVIN COLLEN	FAIRFIELD-SUISUN ORMP	707 688-8895

**Section 7 – Provision C.7. Public Information and Outreach**

**C.7.b.i.1 ► Outreach Campaign**

Summarize outreach campaign. Include details such as messages, creative developed, and outreach media used. The detailed outreach campaign report may be included as an attachment. If outreach campaign is being done by participation in a countywide or regional program, refer to the separate countywide or regional Annual Report.

Summary:

Please see BASMAA's separate report summarizing regional activities entitled: Regional Supplement for Training and Outreach.

In addition to participating in local events the Program has also participated in the 95.3 KUIC Hometown Green Environmental Campaign. Program members on a regular basis have recorded segments which are played daily on KUIC and focus on environmental messages. Messages include: the connectedness of our streets to our local creeks; recycling mercury containing products; trash and litter; proper car washing; recycling; and the reduction of waste by reusing items.

In addition the program has also participated in an array of local school education programs, public outreach activities, public involvement activities, trash and pesticide reduction actions. Please see below and report attachments for further explanations.

**C.7.c. Stormwater Pollution Prevention Education**

The Program promoted its Point of Contacts through the distribution of outreach materials: *You Are the Solution to Water Pollution / Creek and Marsh Watch*. This catchy trifold piece provides contact information to report illegal discharges and spills. These materials are given out at nearly every public event that the Program participates in. Contact information is also provided on each of the cities websites.

Local stormwater phone number(s)	Fairfield: 707-428-7479 Suisun City: 707-421-7340
Local/Regional stormwater website(s)	<a href="http://www.fssd.com/stormwater-management/">http://www.fssd.com/stormwater-management/</a>

Outreach:

The Fairfield-Suisun Sewer District, acting as the management agency for the Fairfield-Suisun Urban Runoff Program provides the links on its website to the permittee's stormwater locations. See link shown above. Each city has a website that contains information relative to stormwater quality and the stormwater Program.

**C.7.d ► Public Outreach and Citizen Involvement Events**

Describe general approach to event selection. Provide a list of outreach materials and giveaways distributed. Use the following table for reporting and evaluating public outreach events

Event Details	Description (messages, audience)	Evaluation of Effectiveness
Provide event name, date, and location. Indicate if event is local, countywide or regional.	Identify type of event (e.g., school fair, creek clean-up, storm drain stenciling, farmers market etc.), type of audience (school children, gardeners, homeowners etc.) and outreach messages (e.g., Enviroscene presentation, pesticides, stormwater awareness)	Provide general staff feedback on the event (e.g., success at reaching a broad spectrum of the community, well attended, good opportunity to talk to gardeners etc.). Provide other details such as: <ul style="list-style-type: none"> <li>• Success at reaching a broad spectrum of the community</li> <li>• Number of participants compared to previous years.</li> <li>• Post-event effectiveness assessment/evaluation results</li> <li>• Quantity/volume of materials cleaned up, and comparisons to previous efforts</li> </ul>
Coast and Creek Cleanup; September 19, 2015; 16 cleanup sites throughout Fairfield and Suisun City; this is a Program event that is also world-wide	The Program lead volunteer cleanup of local creeks, marsh and open space areas.	A record 692 volunteers (12% increase over last year) picked up 9,102 pounds of trash along 28 miles of waterway at 16 sites. This was a very successful event. See attached summary attached to the end of this section.

**FY 2015-2016 Annual Report**

**C.7 – Public Information and Outreach**

**Permittee Name: Fairfield-Suisun Urban Runoff Management Program**

<p>Home Depot Events; June 27, 2016 and June 29, 2016; 2121 Cadenasso Dr. Fairfield, CA; this is a Program event. Sore visits were also made by the Program Advocate on 7/31, 9/19, 10/14, 12/15, 1/18, 2/15, 3/9, 4/20, 5/3, 5/19 and 6/22</p>	<p>IPM Consultant Annie Joseph and IPM advocate Theresa Travers provided IPM training for Home Depot customers on safe gardening practices at the local Home Depot store.</p>	<p>Discussions were held with many Home Depot customers regarding alternatives to toxic pesticides. Customers were very engaged. See attached OWOW and BASMAA's Regional Supplement for Training and Outreach. There was a 20% increase in less toxic product shelf space over the prior year. Also attached are pre and post training surveys for Home Depot Employee trainings.</p>
<p>Fairfield- Suisun Farmers Market; Thursdays from May 3 through October 4; the event is held in downtown Fairfield at the intersection of W. Texas St. and Jefferson Street; this is a Program event.</p>	<p>Program members contract with Valcore Recycling to attend the weekly farmers market and man the Recycling and Environmental booth. Messages include the connectedness of our streets to our local creeks; less toxic alternatives to pesticides and only clean stormwater should be flowing to our local storm drain system. The booth also features information about reporting illegal discharges and free grease scrapers to avoid sanitary sewer overflows.</p>	<p>Starting in May and ending October an average of 16 visitors per week that stop and engage at the Fairfield Recycles and stormwater booth. Crewmembers also quiz guests and give out prizes went questions are answered correctly. Attendance has remained constant over the past few years at this booth.</p>
<p>Earth Day - April 23, 2016; Fairfield Civic Center This is a Program event.</p>	<p>The Program shared information with approximately 300 people of all ages and nationalities in attendance at the event. Quilt squares were drawn and</p>	<p>Our booth gave away reusable bags, brochures, trash pickers and plate scrapers. Booth stayed busy throughout the event and the children receiving the scrapers were engaging while receiving our message.</p>

**FY 2015-2016 Annual Report**

**Permittee Name: Fairfield-Suisun Urban Runoff Management Program**

**C.7 – Public Information and Outreach**

	decorated by those who stopped by the booth.	
Earth Day Cleanup of local creeks- April 23, 2016; LedgeWood Creek at Highway 80 behind Home Depot, Lower Union Avenue Creek and Suisun Marsh Cleanup along Grizzley Island Trail in Suisun City. This is a Program event.	The Program led these cleanups of our local waterways with approximately 63 people of all ages participating.	63 volunteers (a 75% increase over the previous year) picked up 2,082 pounds of trash along 3 miles of waterway. This was a new and very successful event.
Solano County Master Gardener Training; February , 2016; 501 Texas Street, Fairfield, CA; this is a Program activity.	IPM Consultant Annie Joseph and Program Manager, provided IPM training for Solano County Master Gardeners, who in turn instruct the general public on safe gardening practices at local farmers' markets and events throughout the county. Also described was the connectivity of the streets to our local creeks; the difference between stormwater and wastewater; the wastewater treatment process; how pesticides can impact the process.	35 including 13 new Master Gardeners were in attendance, based on the interaction between the presenters and speakers, the audience was highly engaged. These Master Gardeners will carry this message to tablings they do at libraries, and the local Farmers Markets in the area. Many of the Master Gardeners have their own gardening businesses so these messages will go also into the communities they service with their business and as volunteers in the communities. This was a new and very successful event, again.
Solano Community College Earth Day - April 19, 2019; The Program participated in this event located at Solano Community College. The event included earth friendly vendors. This is a Program event.	The Program shared information with participants of all ages and nationalities in attendance at the festival.	About 100 people (decrease of 33%) of all ages visited our booth, including college students interested in: careers in environmental fields; and our environmental messages regarding the difference between waste and storm waters. Students generally had a good understanding of the difference between storm water and wastewater.

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**C.7 – Public Information and Outreach**

		This was a moderately successful event with attendance decreasing from previous years.
Community Service Days; on the last Saturday of every month (weather permitting); this is a local event in Fairfield	These are volunteer events that involve picking up litter in various locations throughout the city of Fairfield.	Numbers were not kept, only approximations. Throughout the year, at five different locations throughout the city, there were over 100 people that participated and collected over 240 yards of trash throughout the streets of Fairfield. This is through the Matt Garcia Foundation.

**C.7.e. ► Watershed Stewardship Collaborative Efforts**

Summarize watershed stewardship collaborative efforts and/or refer to a regional report that provides details. Describe the level of effort and support given (e.g., funding only, active participation etc.). State efforts undertaken and the results of these efforts. If this activity is done regionally refer to a regional report.

Evaluate effectiveness by describing the following:

- Efforts undertaken
- Major accomplishments

Summary:

The Program conducts an array of activities which qualify for watershed stewardship collaborative efforts. These efforts are also mentioned in other portions of this Annual Report. Efforts directed toward Coast and Creek Cleanup result in watershed stewardship collaboration. Presentations were made to schools and clubs in the Fairfield Suisun Unified School District which resulted in an increased number of participants in our creek cleanup events. Creek Captains meetings are also used to encourage public involvement in watershed volunteer efforts.

**C.7.f. ► School-Age Children Outreach**

Summarize school-age children outreach programs implemented. A detailed report may be included as an attachment. Use the following table for reporting school-age children outreach efforts.

Program Details	Focus & Short Description	Number of Students/Teachers reached	Evaluation of Effectiveness
Provide the following information: Name Grade or level (elementary/ middle/ high)	Brief description, messages, methods of outreach used	Provide number or participants	Provide agency staff feedback. Report any other evaluation methods used (quiz, teacher feedback etc.). Attach evaluation summary if applicable.
School Water Education Program (SWEP); this Program is available for Kindergarten through 12 <sup>th</sup>	SWEP provides free water education resources to teach water awareness and conservation to students, teachers and parents in our service areas of Dixon,	10,667 K-12 students were reached throughout the	See attached final report from Program contractor.

**FY 2015-2016 Annual Report**

**C.7 – Public Information and Outreach**

**Permittee Name: Fairfield-Suisun Urban Runoff Management Program**

<p>grade, and is a Program element.</p>	<p>Vacaville, Fairfield, Suisun City and Travis Air Force Base. The in-class education Programs as well as the resource materials and assembly Programs are multi-discipline and aligned to the content standards for California public schools. The Programs encourage students and adults to develop a healthy attitude of personal responsibility towards our environment and develop skills needed to contribute meaningfully to decision-making process on issues involving our resources and particularly conserving our most precious resource, water.</p>	<p>Cities of Fairfield and Suisun City.</p>	
<p>The Watershed Explorers Program; Solano County third-graders. This is a Program element.</p>	<p>This Program is held at Rockville Hills Park, Hanns Park and Lagoon Lake Park. The Program utilizes science and placed base learning to build awareness and understanding of local creeks and watersheds, their unique ecosystems and ways in which we care for them. In the field discussions and activities teach children about the fragile habitats of birds and other</p>	<p>A total of 19 classes, with 541 students, and 143 chaperones; five schools comprising 21 classes and 665 students with 224 adults coming from the Fairfield Suisun Unified School District Area.</p>	<p>See attached final report from Program contractor.</p>

Permittee Name: Fairfield-Suisun Urban Runoff Management Program

	<p>wildlife. Students learn the importance of water quality in a watershed and discover that can be negatively impacted by urban runoff and its complements: trash, oil, household chemicals and other human and domestic animal waste and discards. Please go to : <a href="http://www.solanorcd.org/">http://www.solanorcd.org/</a> for videos of the Program.</p>		
<p>Suisun Marsh Watershed and Wetland Education Program; the classes available to middle schools throughout Solano County.</p>	<p>The Program provides place-based environmental education for underserved middle school students in Solano County. The central Program themes include: watersheds, wetlands, marsh functions, native and non-native plants, storm runoff, endangered and threatened species, and watershed connections between their residential communities, Suisun marsh, the San Francisco Bay, and the Pacific Ocean.</p>	<p>13 classes of approximately 431 students from schools throughout Fairfield and Suisun City participated in the Program.</p>	<p>See attached Suisun Marsh Watershed and Wetland Education Program 2015 Year End Report</p>

2015 California Coastal Cleanup Day  
 CCD Coordinator Report Form  
 People, Pounds & Miles

County: **Solano County**

Organization: **FSSD**

**Cleanup Information**

Site Name	Coastal or Inland	Site Captain	Phone/E-mail Address	# of People	Weight of Trash Collected	Weight of Recyclables Collected	Distance Cleaned	# of Sites	Zero Waste Sites	# of ppl w/ reusables	# of vessels	# of Bags	Unusual Finds
<b>Fairfield/Suisun City</b>													
Ledgewood Creek	Inland	Sandra Gonzalez	sgonzalez@ci.fairfield.ca.us	25	120	1	3.00	1	1	20	0	25	lawn mower
SuisunBoat Ramp/Peytonia Preserve	Coastal	Connie Gordon	Constance.Gordon@anheuser-busch.com	57	450	50	1.25	1	0	21	0	45	sleeping bag
Belden's Landing	Coastal	Gregg Walter Goodman	ggoodman@att.net	21	132	40	2.25	1	0	15	0	15	foam
Upper Laurel Creek	Inland	Ariana Ponce	<a href="mailto:ArianaPonce10@yahoo.com">ArianaPonce10@yahoo.com</a>	89	100	200	1.25	1	0	15	0	30	scooter
Mid Laurel Creek	Inland	Layne Ryan	<a href="mailto:Layneryana@yahoo.com">Layneryana@yahoo.com</a>	73	400	2	2.00	1	0	30	0	27	car bumper
Lower Laurel Creek	Inland	Nicholas Santos	DavidAv@fsusd.org	61	500	200	1.25	1	0	20	0	25	Rollerskate
Hill Slough/Rush Ranch	Coastal	Ken Poerner	ken@solanolandtrust.org	30	3000	200	1.50	1	0	1	0	33	Engine with transmission
American Canyon Creek (Silverado Dr. off Oakwood)	Inland	Robyn Morris	<a href="mailto:Morris20102020@hotmail.com">Morris20102020@hotmail.com</a>	30	75	100	2.00	1	0	30	0	35	fake \$1000 bill
Dan Wilson Creek	Inland	Meg Herston	<a href="mailto:Mherston@fssd.com">Mherston@fssd.com</a>	52	200	50	2.00	1	0	25	0	60	car parts
Serpas	Inland	Teri Luchini	tluchini@ci.fairfield.ca.us	10	45	60	1.20	1	0	6	0	14	hub cap
Union Avenue	Inland	Ben from City Hope	<a href="mailto:Jandreau5@Comcast.net">Jandreau5@Comcast.net</a>	47	1000	200	1.50	1	0	15	0	50	Bike Frame
Lower Union Ave	Inland	Adrian Antoo	<a href="mailto:Aantoo@fssd.com">Aantoo@fssd.com</a>	21	130	50	0.50	1	0	10	0	32	cushion from couch
Upper Dan Wilson	Inland	Ken Williams	<a href="mailto:Kwilliams@Solano.edu">Kwilliams@Solano.edu</a>	83	400	20	2.50	1	0	10	0	60	car bumper
Mic Coy Creek	Inland	Nellie	<a href="mailto:Ndimalanta@fssd.com">Ndimalanta@fssd.com</a>	45	300	20	2.00	1	0	20	0	32	no pollution sign
Grizzly Island Trail	coastal	Amanda Dam	<a href="mailto:adum@suisun.com">adum@suisun.com</a>	8	50	0	1.25	1	0	20	0	5	hub cap
Lower Ledgewood Creek	Inland	Justen Nunes	JNunes@EParkway.com	40	2200	600	2.00	1	0	30	1	50	washing machine drum
<b>TOTALS</b>				<b>692</b>	<b>9102</b>	<b>1793</b>	<b>27.5</b>	<b>16</b>	<b>1</b>	<b>288</b>	<b>1</b>	<b>538</b>	

**Fairfield Suisun Sewer District OWOW Report 2015/2016  
July 2015 through June 2016**

**August 11, 2016**

**Annie Joseph  
Ann Joseph Consulting**

**Home Depot information on less toxic products and shelf space 2016**

- **Increase in shelf space for less toxic products in their pesticide aisle 20% over last year.**
- **Increase in sales of the Scott's Miracle Gro line of Nature's Care Pesticides in Home Depot in Northern California average between 30-92% over last year's sales.**

**Store visits: Teresa Lavell IPM Advocate covered the store visits and several outreach events. Annie Joseph helped cover the Water wise event on March 19<sup>th</sup> and helped in the store training on June 27<sup>th</sup>.**

**Store visits by Advocate Teresa Lavell were on the following dates: 7/31,9/15,10/14,12/15,1/18,2/15,3/09,4/20,5/03,5/19,6/22.**

**During the store visits Teresa helped customers in the aisles and guided them to less toxic solutions. She updated shelf talkers and fact sheets and made sure the garden Associates were kept up to date on invasive pests, plants that attract beneficial insects, how their less toxic products work, and a heads up on seasonal pests for the coming month. She also shared the quarterly UCIPM Retail News Letter with the store Associates.**

**Solano County Master Gardener Outreach:** Annie trained the new class of Master Gardeners on Water Quality and Pesticides on **February 18, 2016 at the local Master Gardener office on Texas Street.** There were **13** new class members and she concentrated on the runoff from pyrethroid pesticides and the residues that can end up in wastewater in addition to Suisun Marsh. She also discussed proper disposal of pesticides and how less toxic products work.

**Kevin Cullen** joined up and was able to meet the class and talk about the vulnerability of the Suisun Marsh to pesticide runoff from home gardeners and answered questions from the audience.

Annie and IPM Advocate Teresa Lavell also helped train the Master Gardeners in sustainable landscaping practices and integrated pest management that align with the Bay Friendly Landscaping practices.

These Master Gardeners will carry this message to their customers that they garden for in addition to their volunteer work tabling events they do at libraries, local Farmers Markets in the communities they serve, and community events. Photos sent

### **Home Depot: Training June 27<sup>th</sup> and June 29<sup>th</sup>**

Annie and Teresa conducted a training and tabling on June 27<sup>th</sup>.

They were able to train 8 Associates and Teresa came back on Thursday the 29<sup>th</sup> and Trained an additional 2 Associates. Pre and post surveys were taken and results are in a separate attachment.

Associates were trained in the aisle near the pesticides. They were able to gather two merchandize team members who help stock the pesticide aisles in addition to eight store Associates making our total of **10 trainees**.

The Associates learned about storm water, wastewater, hhw, and IPM. Each also received a folder of resources such as a monthly pest calendar, how their less toxic products work, invasive pests like the Asian citrus psyllid, brown marmorated stink bug, an updated Home Depot Pocket/Product Guide for 2016, a list of all their less toxic products by pest and active ingredient, how to read a pesticide label, what beneficial insects they offer online, how to lose your lawn the Bay Friendly Way, Ten Most Wanted Bugs for Your Garden, native plants that attract the good bugs, local HHW disposal information, and a good bug bad bug chart.

They also received information about the Solano County Mosquito Abatement District and the services they provide for residents.

**Photos sent**

**\*Annie had flier made for Home Depot to raise Associates awareness of the beneficial insects they have available for customers to order online. Separate attachment sent to Kevin.**

### **Store update activities**

To follow up in between her visits Teresa spent time outside of the store researching many pest questions from Associates and customers. She got back to them in a timely fashion with thorough answers.

She was viewed by the Home Depot Associates as a tremendous resource for pest information. She is doing an outstanding job.

### **\*Mosquito Abatement – Annie and Debi Tidd created new hand out for stores.**

In early June Annie contacted **Solano County Mosquito Abatement District** to touch bases about services provided by their agency. She was very concerned because of the ZIKA virus outbreak overseas and the customer panic around the potential outbreak here. Her goal was to make a flier for the stores to have on hand. When Annie contacted the district later in the month to get an update on Zika, she spoke again with Richard Snyder the District Manager. He was interested in the one page flier that she created that shows the services offered by the district so customers will utilize their services. Anne e-mailed him the flier and is making sure she and he stay in touch. Annie sent flier in **separate attachment** to Kevin Cullen.

### **\*New partner store: Suisun Ace Hardware 6/23/16**

Annie visited the store and they wanted her to come back the next day to meet the new store manager and owner. Annie went back on the 24<sup>th</sup> and met Richard the new store manager and they are interested in having training and setting up their store for OWOW. Annie took photos of their shelves to make tags and scheduled to come back for set up on July 1<sup>st</sup>. Training date set for later in July so they can schedule a training after hours for employees. This will be a great partner store.

### **Events:**

#### **Annie conducted an outreach event at Home Depot. On March 19<sup>th</sup> for a Home Depot Waterwise Event.**

She contacted **35 customers**. This was an event sponsored by Home Depot to partner in the community to reduce water use outdoors. Annie was contacted by Home Depot corporate to have OWOW participate in the event. Agencies attending the event included Solano County Water Agency, Solano RCD, Republic Services, and Master Gardeners. Also attending were vendors from Scott's Miracle Grow Company, Kellogg's Garden Supply,

Altman Plants, and Hines Nurseries. It was a great opportunity to show the vendors how OWOW partners to showcase their eco-friendly products. The area for the event was outside in the parking lot out in front of the store. The event was fairly slow because of the cold weather but Annie was able to meet with the store manager Kevin and with the District Manager Tim Gudas. They were very grateful for our participation.

Annie's display included the fact sheets, less toxic products, a large Good Bug poster to help customers to see the good bugs that are helpers in the garden, plants that are waterwise and attract beneficial insects, OWOW handouts on Ten Tips for Water wise Gardening and Protecting Landscapes during a Drought.

When the event was over Annie went into the store to return products from her display and helped customers in the aisles for another hour and a half.

**Questions covered were:**

- Ants inside –talked caulking and bait stations, ant fact sheet
- Rats and Mice- exclusion and trapping, fact sheet rats and mice
- Aphids on roses- talked about hosing off with water, using organic fertilizers. Gave aphid fact sheet
- Scale on fruit trees – talked about dormant spraying, keeping ants from protecting scale.
- Mosquitoes- repair screens, remove standing water, put screens on rain barrels, clean roof gutters of debris, use mosquito dunks. Gave mosquito fact sheet
- Cockroaches indoors- repair leaking pipes, caulking, clean up kitchen areas, use bait stations, boric acid powder, discouraged fogging with pyrethroids, gave cockroach fact sheets.
- Fertilizing questions – talked advantages of using organic fertilizers vs synthetic.

**Photo of event sent.**

**On June 26<sup>th</sup> at Home Depot** Teresa set up the table in the pesticide aisle. Teresa helped customers with questions below:

- Fertilizers organic and slow release(benefits of these)
- Whiteflies –she talked cultural practices and different products such as soaps and oils

- Cockroach questions – talked traps, baits, diatomaceous earth, cockroach fact sheet
- Caterpillars- talked about bt
- Silverfish- talked boric acid , diatomaceous earth, roach tablets
- Spiders – talked about the beneficial side, spider fact sheet
- Questions about OWOW resources
- Unidentified critter eating vegetables, she encouraged them to get proper identification and gave them the UCIPM bookmark.
- Aphid infestations on roses- talked about decreasing their habit of weekly fertilizing with synthetic fertilizers, encouraged them to hose off aphids, use insecticidal soaps and oils, use organic fertilizers. Aphid fact sheets
- Aphids on plum trees- talked about dormant spraying in fall and winter next year, control ants by using bait stations, Aphid fact sheet.
- Teresa reached 20 customers that day.

### **Outreach to the landscape community.**

**In January Annie contacted the Master Gardener Coordinator Jennifer Baumbach and asked if she would pass on the information to the Master Gardeners for a training class for:**

**Bay Friendly Training and Qualification for Design of Sustainable Landscapes**

**To be held at Napa Valley College**

**Wednesdays March 9<sup>TH</sup> to March 30, 2016.**

**The training was sponsored by the City of Napa, County of Napa, Napa RCD, Solano Water Agency, and Napa County Storm Water Pollution Prevention Program.**

**Many of the Master Gardeners also have gardening design and maintenance businesses in addition to their volunteer activities. They were trained in sustainable gardening practices in our training on February 18<sup>th</sup> which was a good introduction to the Bay Friendly Gardening Course offered in March.**

## Summary of Pre-Training Surveys

A total of   10   Pre-Training surveys were returned.

Here are the results of those surveys

Survey Question	Yes	No	I Don't Know
When water enters a storm drain, does it go to a treatment plant before it reaches a creek?	<b>10%</b>	<b>80%</b>	<b>10%</b>
When water enters a sanitary sewer from a house drain like your sink or toilet, are pesticides removed at the sewage treatment plant before the treated water reaches a creek or Bay?	<b>20%</b>	<b>70%</b>	<b>10%</b>
Do you think it's more effective to treat an ant infestation with a bait station rather than a spray?	<b>70%</b>	<b>10%</b>	<b>20%</b>
<b>Do you know where</b> Where is your local household hazardous waste collection facility located	<b>60%</b>  (Street address and/or City)		<b>40%</b>
<p>Check all that are methods that are used in Integrated Pest Management (IPM)</p> <ul style="list-style-type: none"> <li><b>a.</b> Use of beneficial insects and bacterial based products to control pests. <b>60%</b></li> <li><b>b.</b> Forbidding the use of pesticides. <b>30%</b></li> <li><b>c.</b> Not over or under watering plants. <b>70%</b></li> <li><b>d.</b> Use of traps or barriers to control pests. <b>100%</b></li> </ul>			

What is the solution to control fleas that is safest for pets and best for the creeks, bays, and ocean?

- a. Use room foggers, closing off areas where pets eat.
- b. Use sprays outdoors and/or indoors
- c. Wash pet with warm soapy water, use flea comb, wash bedding in hot soapy water, vacuum carpets. **90%**
- d. Spot on flea treatments applied to the pet's skin. **20%**

Of the following, which is the least toxic (IPM) method of controlling aphids?

- a. Apply fast acting fertilizers.
- b. Spray insecticidal soaps and/or prevent ants from vegetation with tanglefoot or bait stations. **70%**
- c. Prune plants vigorously. **10%**
- d. Use products with pyrethroids. **20%**

## Summary of End of Training Evaluation Forms

A total of 10 final evaluations were returned.

Here are the results of those surveys

Survey Question	Yes	No	I Don't Know
When water enters a storm drain, does it go to a treatment plant before it reaches a creek?		<b>100%</b>	
When water enters a sanitary sewer from a house drain like your sink or toilet, are pesticides removed at the sewage treatment plant before the treated water reaches a creek or Bay?		<b>100%</b>	
Do you think it's more effective to treat an ant infestation with a bait station rather than a spray?	<b>100%</b>		
Do you know Where is your local household hazardous waste collection facility located?	<b>100%</b>		
Where is your local household hazardous waste collection facility located	<b>100% yes know</b> (Street address and/or City)		
Check all that are methods that are used in Integrated Pest Management (IPM) <ul style="list-style-type: none"> <li>a. Use of beneficial insects and bacterial based products to control pests. <b>100%</b></li> <li>b. Forbidding the use of pesticides. <b>10%</b></li> <li>c. Not over or under watering plants. <b>100%</b></li> <li>d. Use of traps or barriers to control pests. <b>100%</b></li> </ul>			

What is the solution to control fleas that is safest for pets and best for the creeks, bays, and ocean?

- a. Use room foggers, closing off areas where pets eat.
- b. Use sprays outdoors and/or indoors
- c. Wash pet with warm soapy water, use flea comb, wash bedding in hot soapy water, vacuum carpets. **100%**
- d. Spot on flea treatments applied to the pet's skin.

Of the following, which is the least toxic (IPM) method of controlling aphids?

- a. Apply fast acting fertilizers.
- b. Spray insecticidal soaps and/or prevent ants from vegetation with tanglefoot or bait stations. **100%**
- c. Prune plants vigorously.
- d. Use products with pyrethroids.

Training Evaluation Questions	Disagree	Neutral	Agree
I learned at least one less-toxic management method today.	<b>10%</b>		<b>90%</b>
The training will help me recommend and/or sell less-toxic products.			<b>100%</b>
I can comfortably share what I learned with customers and/or co-workers.			<b>100%</b>
I can easily use the Our Water Our World shelf-tags and fact sheets to inform customers about less-toxic pest management.			<b>100%</b>
	Too much info	Just right	Not enough info
Printed resource materials from this training were....		<b>100%</b>	

Please use the back side of this survey and evaluation for additional comments or explanation.

<p>What part of the Training was most helpful?</p>	<p><b>All info , Product info, Learning about product , Learning that wastewater treatment does not take out pesticides, Explanations of which treatments are safe to use, Dog flea info , New product info about the Ortho products that are good for the environment, Reviewing, Learning about organic pesticides</b></p>
<p>What part of the Training could be improved?</p>	<p><b>More detailed product information, More time needed, Perfect nothing more needed , No improvements needed – 3, N/A</b></p>

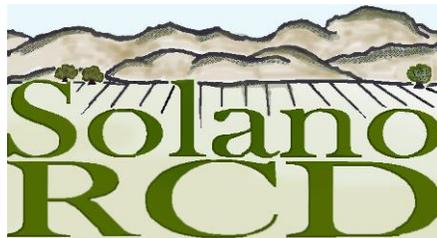
# School Water Education Program

## *2015-2016 Program Report*

July 2016

### *Program Funding*

Cities of Vacaville, Fairfield, Suisun, Vallejo, Benicia, Fairfield-Suisun  
Sewer District, and Solano Irrigation District



1170 N Lincoln, Suite 110 Dixon, CA 95620

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[Solanorcd.org](http://Solanorcd.org)

## **School Water Education Program (SWEP)**

The School Water Education Program Committee is in its 1<sup>st</sup> year contracting the Solano Resource Conservation District (SRCD) to implement the School Water Education Program (SWEP). This program is supported by cities of Vacaville, Fairfield, Suisun, Benicia, Fairfield-Suisun Sewer District, and Solano Irrigation District.

The curriculum for this program was created by Solano RCD using their own material and resources developed from previous SWEP program coordinators. The curriculum was written in September 2016, and has been revised throughout the year to adaptively manage content to better fit with student style, readiness and funder objectives. The SWEP program includes a basic lesson about Solano County water that can be adapted for kids K-12, a 'Test Your Tap' lesson and lab, Project Water Education for Teachers (W.E.T.), and various booklets and incentives that are distributed to Solano County Teachers. SWEP also participated in Youth Ag Day, an annual festival held for Solano County 3<sup>rd</sup> graders at the County Fair Grounds in Vallejo.

Marianne Butler manages the program, Laura Morgan is the program coordinator and teaches the majority of in-class lessons, Carla Murphy assists with teaching the in-class lessons, and Jill Buldoc and Wendy Low facilitate the Project W.E.T training. This program is available to K-12 students and teachers on a year round basis.

### **SWEP Winter/Spring 2016 (January-June 2016) Program Summary**

The SWEP program consists of an introductory *Solano County Water* lesson presented in-class by SWEP staff, a two-day "Test Your Tap" lesson on water quality presented in-class by SWEP staff, and a Project W.E.T. teacher training workshop.

The *Solano County Water* lesson teaches K-12 students about water awareness for those living in Solano County. Subjects covered include where student drinking water comes from, storm water pollution in their watershed, and water conservation. From January-June 2016, 3,119 students participated in the SWEP Solano County Water lesson and 827 units of materials were distributed.

*Test Your Tap* is a two-day, in-class lesson geared toward students in grade levels 6-12. The first lesson compares student city water quality vs. bottled water quality. It also looks at the environmental impacts of bottled water. The second lesson is a water quality lab. Students bring in water from various tap and bottled water sources, comparing the quality of both. The goal of this lesson is to teach students where their water comes from as well promote the use of tap water in Solano County. In spring 2016, 356 students participated in the Test Your Tap lesson and lab.

Tables 1 and 2 summarize the student participation and material breakdown per city for both the *Solano County Water* and *Test Your Tap* lessons.

2015-2016 School Water Education Program Report

**Table 1.** Solano County student participation by city and grade during spring 2016. Lessons include *Solano County Water* lesson and *Test Your Tap*

January-June 2016 SWEP Lessons					
City	Students K-6	No. of Classes K-6	Students 7-12	No. of Classes 7-12	Total Lessons
Vacaville	682	22	0	0	22
Benicia	354	12	114	4	16
Suisun City	196	7	0	0	7
Fairfield	549	20	388	14	34
Vallejo	810	29	0	0	29
Dixon	310	12	0	0	12
Rio Vista	72	3	0	0	3
<b>Tot. County</b>	<b>2973</b>	<b>105</b>	<b>502</b>	<b>18</b>	<b>123</b>

**Table 2.** Summary of SWEP materials distributed throughout Solano County in spring 2016

January-June 2016 Materials							
City	Water Conserv. Challenge.	SCWA Video. Post/Flier	TYT Worksheet	TYT Test Tabs	Inventory	Fliers for SWEP/Project WET Outreach	Total Materials
Vacaville							0
Benicia			159	180			339
Suisun City							0
Fairfield	276	10	20	36	114		456
Vallejo	30					2	32
Dixon							0
Rio Vista							0
<b>Total</b>	<b>306</b>	<b>10</b>	<b>179</b>	<b>216</b>	<b>114</b>	<b>2</b>	<b>827</b>

Project W.E.T. is a teacher training that provides teachers the resources needed to teach about water related subjects in their classroom. Project W.E.T. was held on February 27<sup>th</sup>, 2016 with 21 teacher attendees. Table 3 summarizes the number of teachers who attended the training by city; Table 4 provides a breakdown of the types of materials distributed. Materials distributed were not recorded by city this year, but we will alter our record keeping to account for this information beginning with the 2016-2017 school year.

**Table 3.** Summary of Project WET teacher participants by city and age

Project W.E.T Participants		
City	Participants K-6	Participants 7-12
Vacaville		1
Benicia		
Suisun City	1	1
Fairfield	5	4
Vallejo	4	3
Dixon	2	1
Rio Vista		

**Table 4.** Summary of Project WET distributed materials by type

Project WET Materials 2016	
Type of Material	# of Materials
Incentives	695
Curriculum	10
Work Books	235
<b>Total</b>	<b>940</b>

SWEP attended the 14<sup>th</sup> Annual Youth Ag Day festival at the Solano County Fairgrounds in Vallejo on March 15<sup>th</sup>, 2016. 325 students attended the SWEP booth, and 1,595 materials were distributed to students, parents and teachers. Laura Morgan coordinated the incoming groups of students while Carla Murphy, Josie Murphy (volunteer) and Shelby Allreed (intern with the Solano County Water Agency) helped distribute materials and conduct enviroscape demonstrations for the students. Educators primarily focused on where student drinking water comes from, storm water pollution and water conservation. Figure 5 summarizes the student breakdown per city, and Figure 6 summarizes the materials distributed during the event. The materials given out were not recorded with notation of the recipients' city. That data will be recorded for future events.

**Table 5.** Student attendance at Youth Ag Day by city

Youth Ag Day 2016	
City	Students K-6
Vacaville	92
Benicia	5
Suisun City	30
Fairfield	99
Vallejo	95
Dixon	0
Rio Vista	4
<b>County</b>	<b>325</b>

**Table 6.** Summary of materials distributed during Youth Ag Day 2016

Youth Ag Day Materials 2016	
Type of Material	No. of Items
Incentives	757
SWEP Fliers	200
Water Conservation Challenge Sheets	40
Work Books	598
<b>Total</b>	<b>1595</b>

During January-June 2016, 3,800 students participated in SWEP in-class room lessons, labs and festival booths. 3,362 items of water education materials were distributed to students, teachers, and parents during this time period.

## Full Year Summary (July 2015-June 2016)

The 2015/2016 school year was the first year Solano RCD was contracted to facilitate SWEP implementation in Solano County Schools. All existing SWEP programs were reviewed and revised by Solano RCD to provide recipients with the most accessible and current information available.

Solano RCD designed the *Solano County Water* lesson with built-in adjustability to ensure applicability to every grade level. This lesson is the foundation for all SWEP programming. Students learn about where their water comes from, basic watershed science, storm water pollution causes and effects, and water conservation strategies and purpose. The *Solano County Water* lesson is now part of Solano RCD's Watershed Explorers program, serving as a "pre field trip" foundational lesson for the program. This new component provides teachers with an option to have their students participate in a water conservation challenge with their families, in which students record and track water usage as they learn the basics of water budgeting. Teachers are provided links to the Solano County Water video and the National Oceanic and Atmospheric Administration (NOAA) Trash Talk video to enrich students' experience and understanding of the water lesson and its ramifications in their lives. As a result of this strategy, 3,857 students participated in the *Solano County Water* Lesson in the 2015/2016 school year.

Solano RCD also revised the *Test Your Tap* lecture and lab, aligning the information and presentation with science-based learning standards students in grades 6-12. This lesson begins with the environmental and health impacts of bottled water, providing students with science-based reasoning and environmental incentives to use water from their tap for drinking water. The lesson presents *The Story of Stuff: Bottled Water* video from the Story of Stuff Project and shares primary research done on the quantity and sourcing of bottled water brands. In the second session of this 2-part lesson, students complete a hands-on water lab, conducting six tests to measure water quality (including Iron, Copper, pH, Chlorine, Nitrate, and Phosphate) in tap and bottled water samples they have collected. Students receive and follow a lab protocol as they complete a lab worksheet to record results. Evaluation forms were not part of this program this year, but will be added to the program going forward to obtain documented teacher feedback for next year's SWEP annual meeting. 596 students participated in the *Test Your Tap* program and 635 pieces of lab related materials were distributed during the 2015/2016 school year.

The Project WET training program was also reviewed and revised by Solano RCD. The new program uses two Solano RCD educators, Jill Buldoc and Wendy Low, as facilitators and instructors for the all-day teacher training workshop. The event was held on February 27<sup>th</sup>, 2016 at Solano Community College in Fairfield. 21 teachers attended the event and took home 941 units of materials.

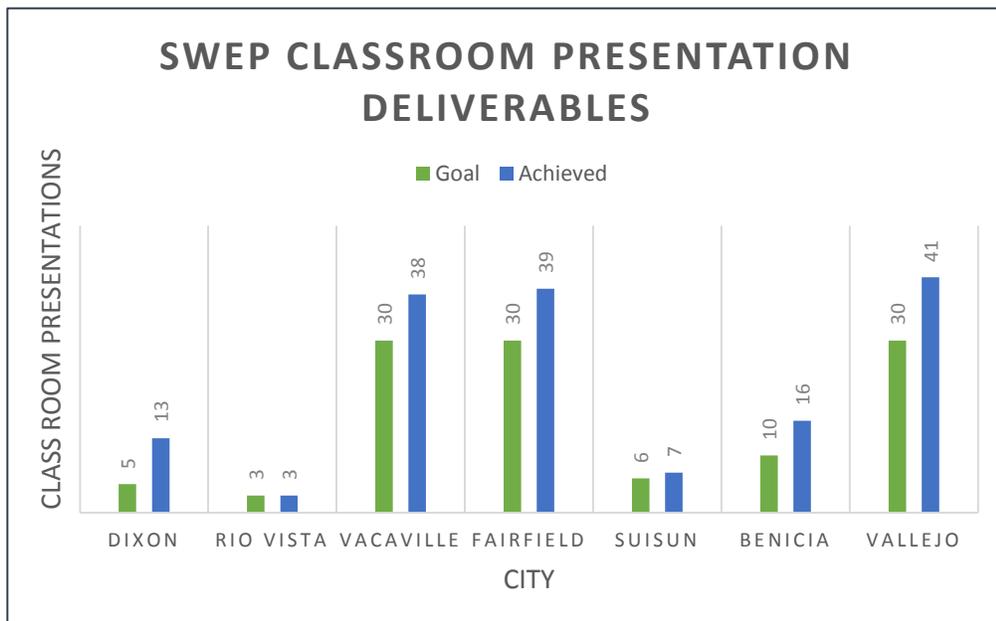
Staff engaged Marc Garman of Lab Rat Pictures to create promotional videos for the SWEP program, created in July 2016. These videos advertise the SWEP *Test your Tab* lesson and Project WET training to Solano County teachers, students and parents, generating awareness of

and interest in the program. These videos are available on the SRCD website ([www.solanorcd.org/SWEP](http://www.solanorcd.org/SWEP)).

During the 2015-2016 school year, 4,799 individuals participated in SWEP in-classroom lessons, labs, festival activities, and teacher trainings. 5,242 pieces of educational materials were distributed to students, teachers, and parents. Table 7 summarizes SWEP participants throughout the 2015-2016 year by city and program. Program staff met or exceeded all its classroom presentation goals in the 2015-2016 school year, depicted in Fig 1.

**Table 7.** Summary of participation in SWEP programs for the 2015-2016 school year, by city and individual SWEP program

SWEP 2015-2016 Participation Summary					
City	Solano County Water Lesson	Test Your Tap	Project WET	Youth Ag Day	City Totals
Vacaville	802	240	1	92	1135
Benicia	152	316		5	473
Suisun City	196		2	30	228
Fairfield	1059	40	9	99	1207
Vallejo	1231		6	95	1332
Dixon	345		3	0	348
Rio Vista	72			4	76
<b>Grand Total</b>	<b>3857</b>	<b>596</b>	<b>21</b>	<b>325</b>	<b>4799</b>



**Figure 1.** Comparison of the classroom presentation target goals set forth by the SWEP committee with actual achievements during the 2015-2016 school year

## **2016/2017 Expectations**

In the next school year, SWEP staff will work towards exceeding participation goals in water related education activities throughout Solano County. Program review and refinement is ongoing. As part of this general strategy, SWEP will premiere a revised *Test Your Tap* lecture and lab focusing on 5<sup>th</sup> grade. Henderson Elementary in Benicia has already scheduled their 5<sup>th</sup> graders to pilot this lesson in August. After review and fine tuning, the *Test Your Tap* lesson will be offered to all Solano County 5<sup>th</sup> grade classes. SWEP staff are also working with the Benicia Middle School science program to implement a *Test Your Tap* component in all Benicia Middle 7<sup>th</sup> grade science classes.

In the 2016-2017 school year, Project W.E.T. training will be offered twice (in September 2016 and again in February 2017) to create greater opportunity for Solano County teacher participation.

During summer 2016, SWEP staff is working with Marc Garman of Lab Rat Pictures to create a new Solano County Water video with funding from the Solano County Water Agency (SCWA). The new video will cover all the basic components of SWEP programing, including where Solano County water comes from, watershed awareness and water conservation. The video will be available to Solano County students and teachers in winter 2017.

## **Solano County Water Education Programs 2015-2016 Summary**

There are 9 organizations in Solano County that deliver water related education programs to K-12 students in the form of classroom presentations, field trips, assemblies, and water related contests. These organizations include: SWEP, Solano RCD, Putah Creek Council's Water Ways, Ranger Teri Luchini from Rockville Park in Fairfield, Solano Land Trust, private presenters ZunZun and Rock Steady, Sue Alfeld from the City of Benicia, and the Solano County Water Agency (SCWA). All organizations combined have outreached to 44,479 individuals and handed out 21,072 units of materials. Table 8 summarizes all of the water education programs conducted in Solano County during the 2015-2016 school year by city and type of outreach. Please refer to the data tracking excel document for a breakdown of program specifics.

**Table 8.** Summary of all water education programs operating in Solano County, by jurisdiction, number of attendees and number and type of activities

City	Presentations	Field Trips	Assemblies	Total
<b>Benicia</b>				
No. of Events	88	31	4	123
No. of Attendees	2,656	1,053	1,004	4,713
<b>Dixon</b>				
No. of Events	38	9	3	50
No. of Attendees	1,054	433	840	2,327
<b>Fairfield</b>				
No. of Events	89	14	13	116
No. of Attendees	2,672	640	3,374	6,686
<b>Rio Vista</b>				
No. of Events	13	5	3	21
No. of Attendees	455	170	455	1,080
<b>Suisun City</b>				
No. of Events	23	11	8	42
No. of Attendees	953	383	2,582	3,981
<b>Vacaville</b>				
No. of Events	81	23	26	130
No. of Attendees	2,223	1,093	8,161	11,477
<b>Vallejo</b>				
No. of Events	133	51	32	216
No. of Attendees	3,815	2,483	7,854	14,152

Photos from 2015-2016 SWEP Outreach



Laura Morgan presents at Youth Ag Day at the Solano County Fairgrounds



Carla Murphy (Solano RCD educator) teaches a SWEP lesson at Laurel Creek Elementary School in Fairfield



21 teachers participate in Project W.E.T training at Solano Community College



Brian Brown, Statewide Project W.E.T coordinator, demonstrates an activity at the Project W.E.T training at Solano Community College



Laura Morgan teaches a SWEP lesson at the Fairfield Suisun Public Safety Academy

# Suisun Marsh

## Watershed Education Program

### *2015 Program Summary*

February 2016

### *Program Funding* Solano County Water Agency

#### *Additional Funding*

Benicia Sustainability Commission, Solano County Office of Resource Management, Fairfield-Suisun Sewer District & Habitat Conservation Fund



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2015 Suisun Marsh Watershed Education Program Summary

Solano County Water Agency (SCWA) is in the eighth year contracting the Solano Resource Conservation District (Solano RCD) to implement the Suisun Marsh Watershed Education Program. Additional support provided by Benicia Sustainability Commission, Solano County Office of Resource Management and Fairfield-Suisun Sewer District.

Sections of the curriculum were adapted from the California Coastal Commission’s Waves, Wetlands and Watersheds and Our Wetlands, Our World and the teaching objectives are directly linked to California’s common core standards. The curriculum was written in August of 2008 and has been revised each year. It includes three pre–field trip classroom lessons, one poster session, a five-hour field trip at Rush Ranch and two post–field trip lessons. Funding through a CalRecycle grant in 2014 and 2015 will allow for the 2<sup>nd</sup> post lesson to wrap up the program.

Marianne Butler manages the program, Jamie Solomon and Laura Morgan teach the in-class lessons and lead the field trips, and program educators Don Broderson, Carla Murphy, Wendy Low, Deborah Bartens, Anna Kluge and Jill Bolduc assist on the field trips. The program is split into two sessions – Session 1 occurs from late August to mid-October and Session 2 from mid-October to mid-December.

**Students**

In 2008, 4 classes of 140 students participated from Crystal Middle School in Suisun City.

In 2009, 18 classes of 600 students participated from Crystal Middle in Suisun City, Grange Middle in Fairfield, Sullivan Middle in Fairfield, and Cambridge Elementary in the Travis Unified School District.

In 2010, 18 classes of 626 students participated from Crystal Middle in Suisun City and Grange Middle in Fairfield.

In 2011, 33 classes of 1,129 students participated from Crystal Middle in Suisun City, Grange and Sullivan Middle in Fairfield, Vaca Peña Middle and Orchard in Vacaville, Center Elementary in the Travis District, and Solano Middle in Vallejo.

In 2012, 27 classes of 882 students participated from Crystal Middle in Suisun City, Grange, Tolenas, and Suisun Valley in Fairfield, Vaca Peña Middle and Orchard in Vacaville.

In 2013, 27 classes of 869 students participated from Crystal Middle in Suisun City, Public Safety Academy, Matt Garcia, David Weir, Nelda Mundy, and Suisun Valley Elementary in Fairfield, Vaca Peña Middle and Orchard Elementary in Vacaville.

In 2014, 30 classes of 940 students participated from Crystal Middle in Suisun City, Public Safety Academy, Nelda Mundy, Rolling Hills Elementary, Grange Middle and B Gale Wilson in Fairfield, Vaca Peña Middle and Orchard Elementary in Vacaville.

School	City	Grade	Total Students	Number of Classes
Crystal Middle	Suisun City	6 <sup>th</sup>	187	6
Vaca Peña Middle	Vacaville	7 <sup>th</sup>	172	6
Orchard Elementary	Vacaville	6 <sup>th</sup>	62	2
Public Safety Academy	Fairfield	6 <sup>th</sup>	102	3
Nelda Mundy Elementary	Fairfield	5 <sup>th</sup>	142	4
Benicia Middle	Benicia	6 <sup>th</sup>	396	12
Riverview Middle	Rio Vista	6 <sup>th</sup>	81	3
Gretchen Higgins Elementary	Dixon	6 <sup>th</sup>	93	3
Solano Middle	Vallejo	6 <sup>th</sup>	64	2
<b>2015 TOTAL</b>			<b>1,299</b>	<b>41</b>

Figure 1 – Students totals

**Since 2008, 6,385 students in 198 classes have participated in this program.**

## Methods

The program spans August – December. Session one takes place August-October. The second session takes place October- December. Early each session classroom sessions are held. Each class then participates in a poster session at their school followed by the all-day field trip to Rush Ranch Open Space. Field trips are followed with two classroom sessions where students solidify what they've learned and talk about the ramifications of human behaviors on marine and marsh health.

The student field manual is included with this report. Descriptions of the lessons are as follows:

The first lesson discusses California's drought and provides techniques where students can take action to help relieve the pressure on the watershed. The concept of a water conservation challenge is revealed and students are informed of their objective to begin working to save water. Prior to this lesson, students collect their baseline water usage data. From this discussion onward, students start a 3-day challenge of tracking their water use for each of the 3 weeks of program lessons. This data is then compared to their baseline data at the end of the challenge. The second part of the lesson addresses the characteristics of a watershed and demonstrates how storm water pollution affects our creeks, marsh, and ocean. An enviroscape model is presented to visually show students how litter and debris runs off the pavement, flows into the storm drain, to the nearest creek, enters the Suisun Marsh and eventually makes its way to the ocean.

In the second lesson, students review their water usage, discuss what worked well with their conservation practices, and strategize how to save a bit more for the next week. Then, students look at the geography of Solano County as it relates to the Suisun Marsh Watershed through various types of maps. Students travel around the classroom in small groups, visiting different mapping stations and work together in groups to answer questions about each map. Maps for this session include a local area road map, Solano County topographic map, Suisun Marsh watershed map, a nautical chart of Suisun Bay, and an aerial map stretching from Lake Berryessa to Suisun Bay.

The third lesson consists of several central concepts. The students start their final water conservation challenge week and continue the discussion on water saving methods. Following, a power point provides background on native and non-native plants and reveals the significance of plants and animals on the endangered, threatened, and species of concern lists that reside within the Suisun Marsh. Classes participate in a discussion on how human actions dictate whether a species is tipped over the edge to extinction, or brought back to increase in numbers for future generations. Following, students work together to create a wetland model, which demonstrates the buffering and filtering effects of the marsh. The lesson works to bring home the concept that the Suisun Marsh is part of the students' watershed, while demonstrating the important features of a marsh. Finally, this lesson provides instruction for the poster session. Students are broken into eight groups and assigned a species to research. The list of species included: Riparian Woodrat, Chinook Salmon, Soft Birds-beak, Giant Garter Snake, Delta Smelt, Salt Marsh Harvest Mouse, Suisun Thistle, and the California Ridgway's Rail. Each group is provided with a packet of information on their species.

The poster sessions are primarily held prior to each class's field trip. Students research their species and present their findings to the class.

The all-day outdoor excursions at Rush Ranch are held September - December. Each field trip begins with a rotation through three stations centered on the topics of soil, water, and plants. At the soil station, students use a color chart to identify soil composition and use their hands to experience the different textures of soil in the marsh and grassland. At the water station, students test the water from First Mallard Slough for dissolved oxygen, temperature, phosphate, pH, and turbidity. As a small group, they discuss the data from the experiments and theorize how various types of pollution may affect Suisun Marsh and other wetlands. At the plant station, students set up a plant sampling quadrat by using a hula-hoop to randomly select a site. Students analyze the percent cover of plant species (native or non-native) within

the site using plant guides created by Suisun RCD. Following the stations, students enjoy lunch at the picnic tables in the eucalyptus grove.

Next, students explore the Rush Ranch property by taking a nature walk through the different habitats, which include a eucalyptus grove, grassland, and marsh. While on the walk, students look for scat, tracks, plants, and wildlife. Each student is equipped with a pair of binoculars to look for birds and they have the opportunity to view barn owls. An olive tree outside of the barn provides evidence of owls as students observe owl pellets found on the ground by the tree's trunk.

Following the interpretive walk, students sit quietly on top of Overlook Hill and write poetry about their experiences and impressions of the wetland. Teachers submit the poems to River of Words. River of Words is a California-based non-profit organization that connects kids to the watersheds they live in through art and poetry. The organization runs an annual Art and Poetry Contest in conjunction with the Library of Congress. All program participants receive a Watershed Explorers Certificate. In 2010 a student from Grange Middle School was a finalist in the One Block Contest.

After the field trip teachers are asked to play "Our Synthetic Sea," which explains the harmful effects of marine debris, especially plastic, in an easy to understand scientific study by the Algalita Marine Research Foundation. The video prepares students for the final lesson on marine debris.

Lesson four discusses how birds and other marine life are affected by marine debris. A display box of an albatross bolus (consisting of squid beaks and plastic) is past around the class. We want students to feel within them that the land, the plants, and the animals are all part of the same system we are and that their survival and health is not only as important as ours, but that the two are linked. The lesson concludes with the results from the water challenge. Students learn how much water they saved as a class and receive a shower timer donated from SCWA to continue their conservation practices.

For the years 2014 and 2015, students take the post-assessment quiz during a 5<sup>th</sup> lesson. In 2014 Bilgee the Bilge Pad (Protector of Lake Berryessa) joined each class to request support to help keep storm drains clean and solicited student participation to create a new superhero suit and comic for Bilgee's partner, Petrolia (Used Oil Avenger). In 2015 Petrolia herself asked students to develop a second comic on stormwater runoff.

### **Deliverables and Results**

All deliverables involved in initiating and completing the program were successfully completed. We have met the central program themes that include; watersheds, wetlands, marsh functions, native and non-native plants, storm run-off, endangered and threatened species, origin of Solano County drinking water, and watershed connections between their residential communities, the Suisun Marsh, the San Francisco Bay, and the Pacific Ocean.

We worked with Brandan Hiltman to schedule classes for a North Bay Regional Water Treatment Plant tour. Nearly half (13/30) of the classes took the tour and a quarter of classes participated in 2013.

### **Water Conservation Challenge**

We piloted the water challenge component in the Suisun Marsh Program in 2014. The program was conceived as a 4-part, take-home exercise. As planned, Part 1 asked students to collect baseline household water usage data to find out how much water they typically use on any given day. Students were given a datasheet to take home and record usage data for 7 days. Following three supporting in-class lessons, students were asked to repeat the process each week, using their growing knowledge to alter in-home behaviors and practices with the goal of increasing the amount of water they were able to conserve as the challenge progressed.

At the end of the 4-week challenge, students were asked to take their average daily use from their baseline data, and compare it to their average daily use from week four. We received feedback from nearly all participating teachers that 7 days of recording during 4 separate weeks (including the baseline data) was way too much for students to manage and teachers to facilitate.

In response, we altered the challenge for the second session of classes in 2014. Based on feedback from participating teachers, we revised the challenge to a 3-day per week, 3-week-long challenge.

At the end of the two program sessions, we had full compliance from half of the teachers. The teachers who fully engaged with the program reported saving approximately 3,000 gallons of water in their classroom when subtracting the amount of water used in the 3<sup>rd</sup> week of the challenge from their baseline data. The winning teachers received a gift certificate for \$50 for a student pizza party to celebrate their hard work.

We wanted full program compliance from all participants this year, fall of 2015. Before the start of the 2015-2016 school year, we revised the program again. For session one, we went to a 1-day per week, 4-week-long challenge. During week one, students collected their baseline data by observing water usage on one day. For the subsequent three weeks, students repeated this monitoring for just one day of each week. The baseline data and the data collected during the 4<sup>th</sup> week of the challenge were compared. Again, a handful of classes did not participate due to time constraints.

In the 2<sup>nd</sup> session of the program, we reduced the duration of the challenge once again and collected a *baseline water log* and only one *water log savings*. We hoped that with just two homework assignments instead of four, the exercise would divert less time away from each class and still transmit the important message of water conservation. We had nearly 100% teacher compliance rate with this challenge.

We planned our original challenge very carefully, and worked with various models of home water use auditing in the design. We believed and still believe that the original challenge, as conceived, was a meaningful activity that could lead to real understanding about the way we use water, and build a real sense of empowerment in students about what they and their families could do to be more effective stewards of our precious water resources. We believe there are many components to the challenges the exercise has faced:

1. Water conservation is not considered as important as other goals and objectives in the classroom or at home. We know teachers are under enormous pressure to meet state standards and school directives, and until this objective is as important, only a few will ever be willing/able to put the same kind of energy and time toward it.
2. We hoped the water conservation and drought outreach done by local water agencies and municipalities would have penetrated into the general consciousness enough that teachers and students would believe that personal action was both necessary and important. That hope wasn't met. Some teachers and some students did take the challenge as we'd intended, but they were a tiny minority.
3. The challenge necessarily required a high amount of self-reflection on the part of students, which needed to be fostered and supported by both their teachers and their families. In general, there was not the buy-in or the will in either group to generate the needed support for this exercise.

We continue to evaluate and refine the water conservation challenge to develop this exercise into something students and teachers can become excited about and take to heart. Unfortunately, this iteration of the challenge was not able to generate that excitement. The goal to inspire students to improve their water conservation habits for both themselves and their families remains. We hope that as teachers began to see even the incomplete data from this year's challenge, they will be more inspired to fully participate and inspire their students and students' families to do the same.

## Program Evaluation

This program took place over an 18-week period during September through December, 2015. 41 classes from 9 schools in every city in the county participated in the program. Student participants were asked to take a five-question assessment quiz at the start of the program and again on the last day of the program. The post assessment asked students to answer three more questions, two of which asked for student responses to the “Water Conservation Challenge” each was asked to participate in, and one which asked students to explain their knowledge of personal waste reduction.

The pre- and post-assessments consisted of the same questions, listed below in italics. Directly below each question is a representative answer from the post-assessment.

1. *Name your watershed?*  
Each city’s local watershed
2. *Where does your drinking water come from?*  
Water runs off the roads and paved surfaces, enters the storm drains, flows into creeks, into the Suisun Marsh and eventually drains into the Pacific Ocean.
3. *Where does storm (rain) water go after it hits the pavement?*  
Water runs off the roads and paved surfaces, enters the storm drains, flows into creeks, into the Suisun Marsh and eventually drains into the Pacific Ocean.
4. *What are the main threats to the Suisun Marsh?*  
Non-native invasive plants, development, and pollution (which includes pesticides, fertilizers, oil, litter, pet waste, etc.)
5. *Write down two ways you can help protect the Suisun Watershed.*
  - \* Throw litter into the garbage can and not on the ground
  - \* Clean up after your dog
  - \* Educate your friends and family on where litter goes
  - \* Fix your car if it’s leaking oil and encourage your parents to recycle used oil
  - \* Attend California Coastal Cleanup

### Additional Questions asked on the Post-Assessment instrument

- 6.a. *Was the Water Conservation Challenge hard?*  
Yes- I/my family use a lot of water and it was hard to track
- 6.b. *After the Suisun Marsh Program, how will you use water differently?*  
I/we’ll use less water now
7. *Define each “R” in “Reduce, Reuse, Recycle”. Give one example of how each R works.*  
Reduce means to use less. We don’t use throwaway bags when we go to the store.  
Re-use means to use over and over again. We use cloth bags when we buy our groceries.  
Recycle means to turn something into something new. We recycle our aluminum cans to make new cans.

Student answers on the pre-assessment instruments in the 10% sample reflected low to very low knowledge about all the concepts examined in the quiz. Student ability to provide correct or partly correct answers to the 5 questions ranged from 7% to 63%. Students demonstrated the least knowledge about their watershed and the threats to the Suisun Marsh, with just 7% of students able to correctly identify their home watershed, the source of their drinking water or the main threats to the marsh. 32% percent of students could correctly tell us where rainwater goes after it hits the ground, and 32% could identify two ways to protect the Suisun Marsh.

When we looked at partially correct answers—those that identified at least some portion of the concept we were looking for—appropriate responses rose to 32 percent on the rainwater question and to 63% on

the protecting Suisun Marsh question. Overall, 30% of the sample provided correct or partially correct answers to the 5 pre-assessment questions. 70% percent of the sample provided incorrect or no answers to the pre-assessment quiz questions.

Student responses in the sample of post-assessment quizzes showed an average improvement of 60 percentage points when considering correct and partially correct answers.

- 96% percent of students in the sample were able to correctly or partially correctly name their watershed;
- 99% could identify major threats to the Suisun Marsh;
- 96% could identify two stewardship behaviors they could enact to protect the marsh;
- 97% understood the implications of stormwater runoff (improvement of 55 percentage points).

Students improved the least in their responses to the question about where their drinking water comes from. In the pre-assessment, 7% of the sample was able to provide a correct or partially correct answer to this question. In the post-assessment, that number rose to 60% of the sample. This is a marked contrast to student improvement in understanding this concept in year's past.

There were three additional questions asked of students in the post-assessment, intended to assess student response to a Water Conservation Challenge they were asked to complete. The challenge required that they record a baseline water usage log, learn some ways to personally conserve water, and then record a follow up water conservation log. The assessment instrument asked students if the Water Conservation Challenge was hard, and if they would make any personal changes as a result of participating in the challenge. 36% of respondents said the challenge was hard (28% because they normally use a lot of water, 5% because it was hard to record their water usage and 3% said it was hard but gave no reason) and 9% did not provide an answer. 56% of students said the challenge was not difficult (5% said they didn't try hard, 24% said they didn't use a lot of water to begin with, 21% said it was easy to reduce water usage and 6% said the challenge wasn't hard, but provided no explanation). 86% percent of students said they will use water differently as a result of the Water Conservation Challenge, 4% reported they will not change their personal water use, and 11% of the sample did not answer the question.

For the personal waste reduction question, 24% of the sample could correctly define the three Rs, and provide a good example of each. 44% could either define the three Rs or gave a good example, for a total of 67% of correct or partially correct answers.

This year, there were several notable changes to the demographics that supply our assessment sample. For the first time, our population included special needs students. Also for the first time, our assessment population included students who participated as third graders in Solano RCD's Watershed Explorers program. None of these populations was identified on the assessment instruments, so we cannot know if students representing any of these groups were represented in our 10% random sample, though it is probable that they were. We are considering ways to account for these populations in future assessments, with particular emphasis to track performance of the students who were exposed to the Watershed Explorers curriculum in the third grade.

In conclusion, students represented by the sample improved dramatically in their ability to answer every question, indicating an overall gain in understanding of the big concepts we are working with. The 10% sample improved in performance by 278%, an improvement of 60 percentage points and equating with the assignment of a failing grade to the assignment of an A- grade.

## ***Appendix A – Quotes***

### **Teacher Quote**

“The kids were really engaged. A lot of them had never been exposed to what a watershed was. They get to actually go out and do some field experiments, like testing water temperature and understanding why temperature is important. They were excited about being able to leave the classroom, and it didn’t take them long to figure out they were actually learning some stuff – that it wasn’t just a get-out-of-class day.” Bruce Vieira, a sixth-grade math and science teacher at Rio Vista’s Riverview Middle School, who participated for the first time last fall.

### **Student Quotes**

“Thank you for teaching me about the Suisun Marsh. I really enjoyed this entire program. My favorite lesson would have to be that of the marine debris. Now I am making sure that I never accidentally let my trash and wrappers fly out of my pockets. I don’t want to hurt the cut animals in the pictures and videos EVER.” Jarrett, Vaca Peña Middle School, Ms. Olson’s class

“Thank you so much for teaching me about oil spills and what we can do to help it from getting in the river. I will do my best to help the river problems. At my house we do all the 3 R’s.” Lakenthia, Vaca Peña Middle School, Ms. Olson’s class

“I learned to not take long showers and to not waste water.” Krystianna, Vaca Peña Middle School, Ms. Olson’s class

**Appendix B – Photo Documentation**



Program educator giving soil samples to students



Solano RCD education program staff



Students involved in the poetry writing on Overlook Hill



Ms. Robin Shishido-Baily's class (Benicia) who won the water challenge (all wearing program shirts)



Program educator explaining the significance of the RRR messaging



Many students celebrate the soil station by painting their faces with their soil sample

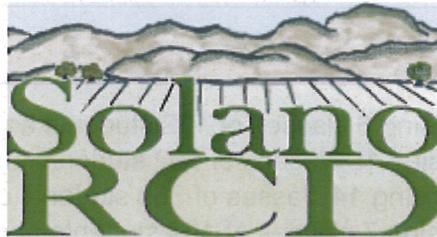
# The Watershed Explorers Program

## 2016 Program Summary

Solano RCD is very grateful to its current funders:

The Habitat Conservation Fund  
Solano County & All City Jurisdictions  
Vallejo Water Conservation Program  
Fairfield Suisun Sewer District  
Suisun Resource Conservation District  
Vallejo Sanitation and Flood Control District  
City of Vacaville - Utilities Department  
Potrero Hills Landfill

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## The Watershed Explorers Program 2016 Program Summary

### Overview

The Watershed Explorers Program utilizes science and place-based learning to build awareness and understanding of local creeks and watersheds, their unique ecosystems, and ways in which we care for them. In-the-field discussions and activities teach children about the fragile habitats of birds and other wildlife. Students learn the importance of water quality in their watershed and discover the impacts of urban runoff and its components: trash, oil, household chemicals and other human and domestic animal waste and discards. Concepts are directly linked to the California State Standards and the program offers local children, many of whom have little or no experience being in open space settings, a concrete, experiential introduction to their watershed and the creatures that inhabit it.

### Audience

Year	Locations	Number of Classes	Number of Students	Number of Adult Chaperones	Total People Attending
2007	Lynch Canyon	4	120	n/a	n/a
2008	Lynch Canyon	18	427	n/a	n/a
2009	Hanns Park	4	80	n/a	n/a
2010	Hanns Park Lynch Canyon	37	807	214	1,021
2011	Hanns Park Rockville Hills Park	54	1,181	308	1,489
2012	Hanns Park Rockville Hills Park	39	923	275	1,198
2013	Hanns Park Rockville Hills Park	63	1,761	449	2,210
2014	Hanns Park Rockville Hills Park Lagoon Lake Park	70.5	1,912	427	2,339
2015	Hanns Park Rockville Hills Park Lagoon Lake Park	79	2,119	492	2,611
2016	Glen Valley Pond Rockville Hills Park Lagoon Lake Park Sandy Beach Park Glen Cove Marina/BSP	78	2,051	519	2,570

Figure A: Program Audience

### 2016 Participants

- Benicia – 2 schools comprising 6 classes of 152 students and 30 adults
- Vallejo – 6 schools comprising 18 classes of 507 students and 104 adults
- Fairfield – 3 schools comprising 14 classes of 369 students and 172 adults
- Suisun – 2 schools comprising 7 classes of 196 students and 52 adults
- Vacaville – 6 schools comprising 18 classes of 445 students and 95 adults
- Dixon – 4 schools comprising 12 classes of 310 students and 52 adults
- Rio Vista – 1 school comprising 3 classes of 72 students and 14 adults

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**44% of all Solano County 3rd grade classes participated**

**68% of all 3<sup>rd</sup> grade classes in smaller districts**

**37% of all 3<sup>rd</sup> grade classes in larger districts**

2016 was the final year of program funding through the Habitat Conservation Fund grant with CA State Parks. Our goal is to secure funding to remain at the current level of student enrollment as seen in 2015 and 2016.

### Goals and Objectives

The primary program goal is to help students develop an awareness of the outdoor, natural world. Participants leave the program:

- Understanding the impact of storm water on their watershed, particularly the impacts of oil, chemicals and human debris in that storm water.
- Knowing individual stewardship practices in their watershed, i.e., how they can mitigate or eliminate the impacts of their own and their family's behaviors around storm water protection and water quality.
- Understanding the difference between native and non-native, invasive plants.

### Method

Participants receive preparatory information in the classroom, from their teachers, who use the program's manual to ready students for the field trip. Students are given journals and participate in various activities including:

- Making a paper watershed model to observe what happens when oil or other contaminants are improperly disposed of in the watershed.
- Learning how water flows.
- Counting the number of gallons of water they use each day and discussing ways to lessen their consumption.
- Drawing the life cycle of a plant, reading about pollinators and discussing phenology and its relevance to the interconnectedness of humans, animals, weather and our environment.

Additionally, with support from the Solano RCD's School Water Education Program, a Solano RCD educator provides a one hour presentation for each enrolled class discussing where students' water comes from, where their water goes (storm water) and techniques to conserve water. A hands-on, three-dimensional Enviroscape presentation allows students to participate in the physical dynamics of a watershed, and experience a small-scale simulation of the effects of various types of pollution. After discussing and demonstrating how water moves oil and other pollutants, students review a used motor oil collection brochure in their manuals to share a concrete way to "be part of the solution" with their parents/guardians when they get home.

When students arrive at their local park for their field trip, they are outfitted with the equipment they'll need to investigate the landscape, and divided into groups to visit a series of learning stations that help them to explore and understand their field trip site. Students look for traces of birds, insects and mammals as they hike through the park. Guided by program staff, students use their journals to identify native and non-native plant species and wildlife.

Students participate in a variety of hands-on activities, tailored to each program site. They have the chance to propagate Yellowray Goldfields in 'cow pots', small pots made from cow dung the biodegradable and can be placed directly into the ground. They also view a storm water model with a used oil can spilled on it and discuss the significance of properly disposing of used oil. Students

## **The Watershed Explorers Program 2016 Program Summary**

touch table that brings components of the environment they're visiting into tactile focus, and microscope area where they examine details not easily seen with the naked eye.

During the lunch portion of the trip, educators talk to students about RRR concepts, using student lunches as tangible examples of reusable items and the importance of recycling.

At the end of the field trip, program staff gathers all participants together to debrief about the day's experiences. A majority of students consistently report that planting seeds and vegetation and seeing wildlife were highlights of their day. Students also report enjoying the hands-on demonstration of hydrology and the enviroscape demonstration of how flowing water and the pollution it can carry impacts the park they've just visited and their larger watershed.

### **2016 Watershed Explorers Evaluation Narrative**

We measure our success in meeting program goals in our outdoor education programs with a two-part assessment. Students take the first assessment quiz prior to participating in the Watershed Explorers program, and the quiz is intended to make a baseline assessment of what knowledge students bring to the program. Participants take the second quiz after participating in the in-class curriculum and the fieldtrip, to capture changes in the level of knowledge students have as they leave the program. The 6 question pre and post-assessments are designed to measure student understanding of two watershed systems (the water cycle, focusing on storm water runoff; and native plant and pollinator systems), and student knowledge of practical watershed stewardship, assessed by asking students to list concrete ways they can interact with those systems to protect and enhance the ecosystem in which they live.

We collected 1,804 pre-assessments, administered in the classroom to students who took part in the 2016 program by participating teachers, followed by 1,609 post-assessments, which were administered during our post field trip in-class lessons (through a CalRecycle Used Oil Grant with Petrolia). The data table for the program is available by request. The assessment questions are as follows:

1. Circle the name of your watershed:  
Sacramento River   Suisun Marsh   Carquinez Strait   San Pablo Bay
2. What happens if oil gets into our creeks?
3. What are the 3 R's?
4. a. What is a native plant?  
b. What is an invasive plant?
5. In your city, where is the first place water goes after it hits the street?
6. Name two things you can do to make your watershed a healthier place.

Looking at the pre-assessment as a whole, 31% of respondents were able to answer all questions with correct/partially correct answers. By the post-assessment, 76% of the respondents were able to respond to all questions with correct/partially correct answers. This represents a performance increase of 45 percentage points, and represents a "grade" movement from an "F" to a "C."

82% of participants responded with correct/partially correct answers to question 6 in the post-assessment, the question that asked for students to demonstrate real-life applications of program concepts. This was an increase of 32 percentage points over pre-assessment answers to the same question, in which 50% of students gave correct/partially correct answers.

Students listed specific practices for this question. Water conservation practices and 3R (Reduce-Reuse-Recycle) practices generated the most correct responses in both the pre and post-

## The Watershed Explorers Program 2016 Program Summary

assessments. Students demonstrated growth in awareness of the basic 3R concept. Since water conservation is in essence a practice of usage reduction, we have considered those responses to this question as part of the 3R discussion. Please see Figure B below.

Practice	Pre Assmnt correct	Post Assmnt correct	Change
Reduce Reuse Recycle	0	18%	18%
Reduce	1%	3%	2%
Reuse	0	10%	10%
Recycle	5%	13%	8%
Recycle used oil	1%	18%	14%
Conserve water	4%	19%	14%

*Figure B: Responses for Question 6*

Improvement in pre and post-assessment performance was generally consistent for all questions. The greatest increase in correct answers was in response to question number 3 regarding the 3R's, with a change from 15% correct and partially correct answers in the pre-assessment to 85% correct and partially correct answers in the post-assessment.

Students had the most difficulty with the concept of native/invasive plants. In the pre-assessment, 12% and 9% respectively were able to provide at least a partially correct descriptor of what each term means. In the post-assessment those numbers had improved to 54% and 40% respectively. The concept of non-native invasive plants was the concept students had the most difficulty with in this sample, with 14 percentage points fewer correct and partially correct answers in the post-assessment sample than any other question. These results are consistent with those from the last several years of this program. The concept of native and invasive plants is clearly one of the more difficult concepts we teach.

### Grant Manager Quote

“Thank you for arranging for my co-worker Karen and I to attend the Solano Outdoor Program (this is the name of the HCF grant that has provided 50% matching funds to Watershed Explorers for the last 4 years). We truly had a wonderful time at Rockville Hills – and the program you run is amazing! It was a great experience to see first-hand how the youth interact with the Solano RCD staff and how these children are given the opportunity to learn about so many aspects of the environment in their own backyard.”

Natalie Bee, Office of Grants and Local Services, Habitat Conservation Fund

### 2016 Teacher Quotes

Amazing Program! You have thought of everything! I love the additions of the pre and post lessons. The visuals before, during and after helped with understanding the concepts. Everything was very well planned and extremely organized. The guides were kind and knowledgeable. Your support with transportation is extremely helpful! The bar graph in the journal was super!”

Val Blanchard – Orchard Elementary, Vacaville

## **The Watershed Explorers Program 2016 Program Summary**

Great exposure for the students. We get so little time for science so we are thrilled to get to have a science field trip!

Laura Barton – Padan Elementary, Vacaville

The program was great. I appreciate the patience of your staff. WE had many obstacles and you were flexible with us. Lots of hands on experiences.

Betsy Messer – Fairmont, Vacaville

This program was well organized and the activities were engaging and well planned. I like how staff referred the students to their journals to show them the places oil could be recycled. Excellent Program. We definitely would like to have this continue for our students in the future.

Wendy Meineche – Robert Semple, Benicia

I have always enjoyed this field trip and my students do, as well. I love the outdoors and for some of my students, each year its their first real hike. I love the idea of the outside classroom becoming real and not just something they read or learn in class. SRCD staff rocks! Keep up the fabulous work!

Elaine James – Crescent Elementary, Fairfield

I was awestruck by the programs preparation and execution. I know firsthand how much work it takes in planning and how fluid and easily lessons flow when the pre-work is done and I commend and applaud your organization not only an interesting but valuable program!

Mrs. Finnigan – Glen Cove Elementary, Vallejo

# The Watershed Explorers Program 2016 Program Summary

## Photo Documentation



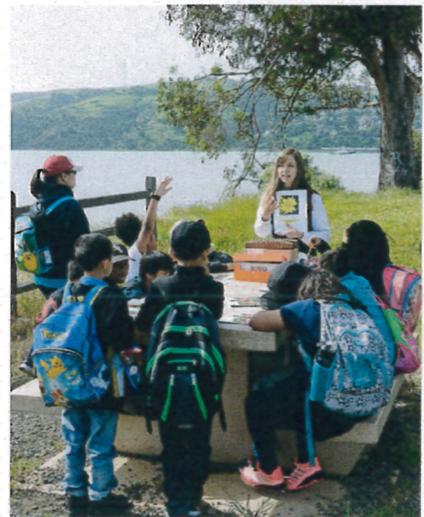
Solano RCD Educator Jill Bolduc talking with students about storm water pollution in Glen Cove Waterfront Park in Vallejo



Solano RCD Educator Anna Kluge with students from KI Jones in Rockville Hills Park in Fairfield



Solano RCD Educator Carla Murphy with students from Laurel Creek Elementary in Fairfield providing an in-class through the School Water Education Program



Laura Morgan, Solano RCD Education Coordinator discussing the significance of wildflowers



Solano RCD Assistant Program Manager, Jamie Solomon at Valley Glen Pond in Dixon providing an introduction for students



Students smelling the toyon shrub and learning about phenology in Benicia State Rec Area

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JUL 01 2016

FAIRFIELD-SUISUN  
SEWER DISTRICT



**WATERSHED EXPLORERS  
STUDENT JOURNAL**

.....

GLEN VALLEY POND  
LAGOON VALLEY PARK  
ROCKVILLE HILLS PARK  
SANDY BEACH PARK  
GLEN COVE MARINA/BENICIA S.P.

.....

NAME: \_\_\_\_\_

# Pre-Assessment

Please answer these questions as best you can. Don't worry if you don't know an answer, you'll get another chance to take the quiz after you've learned more. Your answers will help us make sure this program gives you information you can understand and use. Thanks!

**What city do you live in?** \_\_\_\_\_

1. Circle the name of the watershed you live in:

Sacramento River   Suisun Marsh   Carquinez Strait   San Pablo Bay

2. What happens if oil from cars gets into our creeks?

3. What are the 3 R's?

**Please answer the questions on the back!**

4. a. What does it mean to be a native plant?

b. What does it mean to be an invasive plant?

5. In your city, where is the first place rain water goes after it hits the street?

6. Name two things you can do to make your watershed a healthier place.

1.

2.

# Montessori 3rd graders first in Dixon to participate in Solano RCD Watershed Explorers program

Dixon - Solano Resource Conservation District's Watershed Explorers program will take 2,200 third graders from every city in the County on an all-day field trip to a local open space.

This year, Dixon 3rd graders are slated to visit Valley Glen Pond and the students from Dixon Montessori Charter School were the first to cash in on this invaluable outdoor experience

Intrepid scientist explorers will visit their local parks to explore and learn about the natural systems at work there. A series of learning stations will guide students through their program park, providing hands-on education about the ecosystem and natural resources students encounter.

We live in a world where severe drought threatens to settle permanently in the west, and the affects of climate change can already be felt. The Watershed Explorers program introduces students- the stewards of the future- to the concepts of ecology and stewardship they will need to man-



COURTESY PHOTO

3rd graders from Dixon Montessori Charter School visited Glen Valley Pond earlier this week to participate in the Solano RCD's Watershed Explorers Program.

age their world. It exposes students to the natural world all around them, and helps them to see it with new perspective.

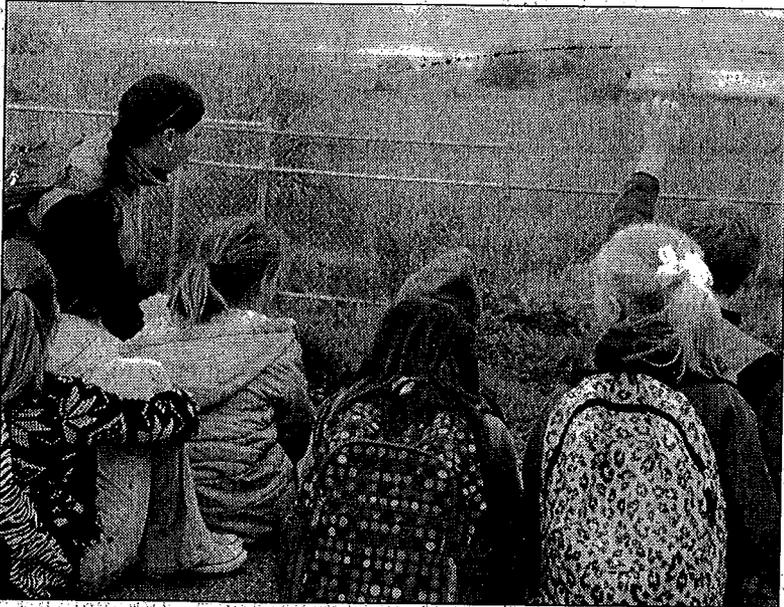
Before each class goes on its field trip, students work through an in-classroom cur-

riculum with their teacher. The School Water Education Program provides a pre-field trip class focused on Solano Water and conservation.

On the all-day field trip, students learn about their park and the challenges faced by all

wild spaces, and the actions they and their families can take to protect and preserve their natural heritage. Solano Resource Conservation

See RCD page 3



COURTESY PHOTO

District program educators deliver CA Standard-based lessons that draw students in, making environmental science both tangible and relevant. The program educators work with students to sharpen their skills of observation and to help them see, hear and experience the parks they visit in a new, deeper way.

At the end of their field trip, students are given a copy of the Solano County OUT-DOOR! Guide to local parks and opens spaces. The passport-like booklet was developed by the RCD to encourage students to explore county natural areas with friends and family.

It was funded by a CA State Parks Habitat Conservation

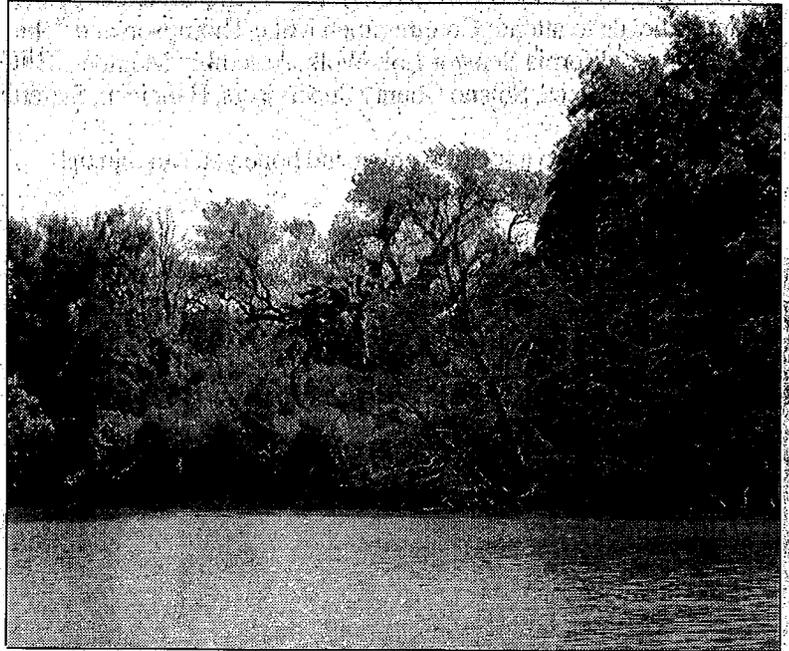
Fund grant, which also matches local support to fund this program. This program sunsets at the end of June, 2016, taking fifty thousand dollars of annual program support. The RCD is looking for local funders and new opportunities to replace this funding so that it can continue to reach as many students as possible.

To learn more about the Watershed Explorers program and see videos of previous year programming, please check out the Solano RCD website at [solanorcd.org](http://solanorcd.org). For more information, including availability for additional class participation, please call Marianne Butler at (574) 674-5611.

# S 2,200 third graders to learn about Solano County through Watershed Explorers Program

Solano County - Solano Resource Conservation District's Watershed Explorers program will take 2,200 third graders from every city in the County on an all-day field trip to a local open space. This year, the program adds sites at Glen Cove Marina/Benicia State Park, Valley Glen Pond in Dixon, and Sandy Beach Park in Rio Vista to existing sites at Rockville Park in Fairfield and Lagoon Lake/Peña Adobe in Vacaville.

Intrepid scientist explorers will visit their local parks to explore and learn about the natural systems at work there. A series of learning stations will guide students through their program park, providing hands-on education about the ecosystem and natural resources students encounter. We live in a world where severe drought threatens to settle permanently in the west, and the affects of climate change can already be felt. The Watershed Explorers program introduces students, the stewards of the future, to the concepts of ecology and stewardship they will need to manage their world. It exposes students to the natural world all around them, and helps them to see it



TRIBUNE FILE PHOTO

with new perspective.

Before each class goes on its field trip, students work through an in-classroom curriculum with their teacher. The School Water Education Program provides a pre-field trip class focused on Solano Water and conservation.

On the all-day field trip, students learn about their park, the challenges faced by all wild spaces, and the actions they and their families can take to protect and preserve their natural her-

itage. Solano Resource Conservation District program educators deliver CA Standard-based lessons that draw students in, making environmental science both tangible and relevant. The program educators work with students to sharpen their skills of observation and to help them see, hear and experience the parks they visit in a new,

See PROGRAM page 3

**PROGRAM**  
Cont. from Page 1

deeper way.

At the end of their field trip, students are given a copy of the Solano County OUTDOOR! Guide to local parks and opens spaces. The passport-like booklet was developed by the RCD to encourage students to explore county natural areas with friends and family. It was funded by a CA State Parks Habitat Conservation Fund grant, which also matches local support to fund this program. This program sunsets at the end of June, 2016, taking fifty thousand dollars of annual program support. The RCD is looking for local funders and new opportunities to replace this funding so that it can continue to reach as many

students as possible.

This year, Petrolia, the Used Oil Avenger, will be visiting every Watershed Explorers classroom after the field trip. Petrolia is a live-action superhero dedicated to keeping used oil out of Solano County waterways. Supported by a Cal Recycle Used Oil Grant, students in last year's Watershed Explorers and Suisun Marsh Watershed Program classes helped to design Petrolia's costume and create a comic book about her exploits. Students will receive Petrolia's first comic book, and be invited to help generate ideas for the next edition.

To learn more about the Watershed Explorers program and see videos of previous year programming, please check out the Solano RCD website at [solanorcd.org](http://solanorcd.org).

Dear Ms Anna,

Thank you for showing us all about water sheds.

What I really liked was when we

were hiking and we saw a snake. What

I learned today was that we have to

protect our water sheds so our animals

won't die. Thank you for teaching us

all about our water sheds.

Sincerely

Journey

Section 9 – Provision C.9 Pesticides Toxicity Controls

**C.9.a. ► Implement IPM Policy or Ordinance**

Is your municipality implementing its IPM Policy/Ordinance and Standard Operating Procedures?  Yes  No

If no, explain:  
 This provision is handled at the city level. Please see individual city reports for this information.

Report implementation of IPM BMPs by showing trends in quantities and types of pesticides used, and suggest reasons for increases in use of pesticides that threaten water quality, specifically organophosphates, pyrethroids, carbaryl, and fipronil. A separate report can be attached as evidence of your implementation.

**Trends in Quantities and Types of Pesticides Used<sup>59</sup>**

Pesticide Category and Specific Pesticide Used	Amount <sup>60</sup>					
	FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21
<b>Organophosphates</b>	NA					
Product or Pesticide Type A	NA					
Product or Pesticide Type B	NA					
<b>Pyrethroids</b>	NA					
Product or Pesticide Type X	NA					
Product or Pesticide Type Y	NA					
<b>Carbamates</b>	NA					
Product or Pesticide Type X	NA					
Product or Pesticide Type Y	NA					

<sup>59</sup>Includes all municipal structural and landscape pesticide usage by employees and contractors.

<sup>60</sup>Weight or volume of the product or preferably its active ingredient, using same units for the product each year. Please specify units used. The active ingredients in any pesticide are listed on the label. The list of active ingredients that need to be reported in the pyrethroids class includes: metofluthrin, bifenthrin, cyfluthrin, beta-cyfluthrin, cypermethrin, deltamethrin, esfenvalerate, lambdacyhalothrin, and permethrin.

<b>Fipronil</b>	NA					
<b>Product or Pesticide Type X</b>	NA					
<b>Product or Pesticide Type Y</b>	NA					
<b>Indoxacarb</b>	Reporting not required in FY 15-16					
<b>Diuron</b>	Reporting not required in FY 15-16					
<b>Diamides</b>	Reporting not required in FY 15-16					
<b>IPM Tactics and Strategies used:</b>						
Both Program cities have adopted IPM policies. This provision is handled at the city level. Please see individual city reports for this information.						

<b>C.9.b ▶ Train Municipal Employees</b>	
Enter the number of employees that applied or used pesticides (including herbicides) within the scope of their duties this reporting year.	NA
Enter the number of these employees who received training on your IPM policy and IPM standard operating procedures within this reporting year.	NA
Enter the percentage of municipal employees who apply pesticides who have received training in the IPM policy and IPM standard operating procedures within this reporting year.	NA
Type of Training:	
This provision is handled at the city level. Please see individual city reports for this information.	

**C.9.c ▶ Require Contractors to Implement IPM**

Did your municipality contract with any pesticide service provider in the reporting year?	<input type="checkbox"/>	<b>Yes</b>	<input checked="" type="checkbox"/>	<b>No</b>
If yes, briefly describe how contractor compliance with IPM Policy/Ordinance and SOPs was monitored				
Both Program cities have adopted IPM policies. This provision is handled at the city level. Please see individual city reports for this information.				

**C.9.d ▶ Interface with County Agricultural Commissioners**

Did your municipality communicate with the County Agricultural Commissioner to: (a) get input and assistance on urban pest management practices and use of pesticides or (b) inform them of water quality issues related to pesticides,	<input type="checkbox"/>	<b>Yes</b>	<input checked="" type="checkbox"/>	<b>No</b>
<b>If yes, summarize the communication. If no, explain.</b>				
No water quality issues observed associated with the application of pesticides.				
Did your municipality report any observed or citizen-reported violations of pesticide regulations (e.g., illegal handling and applications of pesticides) associated with stormwater management, particularly the California Department of Pesticide Regulation (DPR) surface water protection regulations for outdoor, nonagricultural use of pyrethroid pesticides by any person performing pest control for hire.	<input type="checkbox"/>	<b>Yes</b>	<input checked="" type="checkbox"/>	<b>No</b>
If yes, provide a summary of improper pesticide usage reported to the County Agricultural Commissioner and follow-up actions taken to correct any violations. A separate report can be attached as your summary.				

**C.9.e.ii (1) ▶ Public Outreach: Point of Purchase**

Provide a summary of public outreach at point of purchase, and any measurable awareness and behavior changes resulting from outreach (here or in a separate report); <b>OR</b> reference a report of a regional effort for public outreach in which your agency participates.
Summary:
See attached OWOW report from Program Contractor Annie Joseph.

**C.9.e.ii (2) ► Public Outreach: Pest Control Contracting Outreach**

Provide a summary of outreach to residents who use or contract for structural pest control and landscape professionals); **AND/OR** reference a report of a regional effort for outreach to residents who hire pest control and landscape professionals in which your agency participates.

Summary:

IPM Program Consultant Annie Joseph and the Program Manager, provided IPM training for Solano County Master Gardeners, who in turn instruct the general public on safe gardening practices at local farmers' markets and events throughout the county. Also described was the connectivity of the streets to our local creeks; the difference between stormwater and wastewater; the wastewater treatment process; how pesticides can impact the process.

**C.9.e.ii.(3) ► Public Outreach: Pest Control Operators**

Provide a summary of public outreach to pest control operators and landscapers and reduced pesticide use (here or in a separate report); **AND/OR** reference a report of a regional effort for outreach to pest control operators and landscapers in which your agency participates.

Summary:

IPM Program Consultant Annie Joseph and Program Manager, provided IPM training for Solano County Master Gardeners, who in turn instruct the general public on safe gardening practices at local farmers' markets and events throughout the county. Also described was the connectivity of the streets to our local creeks; the difference between stormwater and wastewater; the wastewater treatment process; how pesticides can impact the process.

**C.9.f ► Track and Participate in Relevant Regulatory Processes**

Summarize participation efforts, information submitted, and how regulatory actions were affected; **AND/OR** reference a regional report that summarizes regional participation efforts, information submitted, and how regulatory actions were affected.

Summary:

The actual work of tracking and participating in the ongoing regulatory efforts related to pesticides was accomplished through CASQA. CASQA conducted its activities on behalf of members and coordinated funding contributions and activities through its Pesticides Subcommittee, a group of stormwater quality agencies affected by pesticides or pesticides-related toxicity listings, TMDLs, or permit requirements, as well as others knowledgeable about pesticide-related stormwater issues. FY 2015-16 was another productive year for the Subcommittee. The CASQA

**FY 2015-2016 Annual Report**

**Permittee Name: Fairfield-Suisun Urban Runoff Management Program**

**C.9 – Pesticides Toxicity Controls**

Pesticides Subcommittee's annual report for FY 2015-16 (see Regional Supplement) provides a comprehensive and detailed accounting of efforts to track and participate in relevant regulatory processes as well as accomplishments related to pesticides and stormwater quality.

**Fairfield Suisun Sewer District OWOW Report 2015/2016  
July 2015 through June 2016**

**August 11, 2016**

**Annie Joseph  
Ann Joseph Consulting**

**Home Depot information on less toxic products and shelf space 2016**

- **Increase in shelf space for less toxic products in their pesticide aisle 20% over last year.**
- **Increase in sales of the Scott's Miracle Gro line of Nature's Care Pesticides in Home Depot in Northern California average between 30-92% over last year's sales.**

**Store visits: Teresa Lavell IPM Advocate covered the store visits and several outreach events. Annie Joseph helped cover the Water wise event on March 19<sup>th</sup> and helped in the store training on June 27<sup>th</sup>.**

**Store visits by Advocate Teresa Lavell were on the following dates: 7/31,9/15,10/14,12/15,1/18,2/15,3/09,4/20,5/03,5/19,6/22.**

**During the store visits Teresa helped customers in the aisles and guided them to less toxic solutions. She updated shelf talkers and fact sheets and made sure the garden Associates were kept up to date on invasive pests, plants that attract beneficial insects, how their less toxic products work, and a heads up on seasonal pests for the coming month. She also shared the quarterly UCIPM Retail News Letter with the store Associates.**

**Solano County Master Gardener Outreach:** Annie trained the new class of Master Gardeners on Water Quality and Pesticides on **February 18, 2016 at the local Master Gardener office on Texas Street.** There were **13** new class members and she concentrated on the runoff from pyrethroid pesticides and the residues that can end up in wastewater in addition to Suisun Marsh. She also discussed proper disposal of pesticides and how less toxic products work.

**Kevin Cullen** joined up and was able to meet the class and talk about the vulnerability of the Suisun Marsh to pesticide runoff from home gardeners and answered questions from the audience.

Annie and IPM Advocate Teresa Lavell also helped train the Master Gardeners in sustainable landscaping practices and integrated pest management that align with the Bay Friendly Landscaping practices.

These Master Gardeners will carry this message to their customers that they garden for in addition to their volunteer work tabling events they do at libraries, local Farmers Markets in the communities they serve, and community events. Photos sent

### **Home Depot: Training June 27<sup>th</sup> and June 29<sup>th</sup>**

Annie and Teresa conducted a training and tabling on June 27<sup>th</sup>.

They were able to train 8 Associates and Teresa came back on Thursday the 29<sup>th</sup> and Trained an additional 2 Associates. Pre and post surveys were taken and results are in a separate attachment.

Associates were trained in the aisle near the pesticides. They were able to gather two merchandize team members who help stock the pesticide aisles in addition to eight store Associates making our total of **10 trainees**.

The Associates learned about storm water, wastewater, hhw, and IPM. Each also received a folder of resources such as a monthly pest calendar, how their less toxic products work, invasive pests like the Asian citrus psyllid, brown marmorated stink bug, an updated Home Depot Pocket/Product Guide for 2016, a list of all their less toxic products by pest and active ingredient, how to read a pesticide label, what beneficial insects they offer online, how to lose your lawn the Bay Friendly Way, Ten Most Wanted Bugs for Your Garden, native plants that attract the good bugs, local HHW disposal information, and a good bug bad bug chart.

They also received information about the Solano County Mosquito Abatement District and the services they provide for residents.

**Photos sent**

**\*Annie had flier made for Home Depot to raise Associates awareness of the beneficial insects they have available for customers to order online. Separate attachment sent to Kevin.**

### **Store update activities**

To follow up in between her visits Teresa spent time outside of the store researching many pest questions from Associates and customers. She got back to them in a timely fashion with thorough answers.

She was viewed by the Home Depot Associates as a tremendous resource for pest information. She is doing an outstanding job.

### **\*Mosquito Abatement – Annie and Debi Tidd created new hand out for stores.**

In early June Annie contacted **Solano County Mosquito Abatement District** to touch bases about services provided by their agency. She was very concerned because of the ZIKA virus outbreak overseas and the customer panic around the potential outbreak here. Her goal was to make a flier for the stores to have on hand. When Annie contacted the district later in the month to get an update on Zika, she spoke again with Richard Snyder the District Manager. He was interested in the one page flier that she created that shows the services offered by the district so customers will utilize their services. Anne e-mailed him the flier and is making sure she and he stay in touch. Annie sent flier in **separate attachment** to Kevin Cullen.

### **\*New partner store: Suisun Ace Hardware 6/23/16**

Annie visited the store and they wanted her to come back the next day to meet the new store manager and owner. Annie went back on the 24<sup>th</sup> and met Richard the new store manager and they are interested in having training and setting up their store for OWOW. Annie took photos of their shelves to make tags and scheduled to come back for set up on July 1<sup>st</sup>. Training date set for later in July so they can schedule a training after hours for employees. This will be a great partner store.

### **Events:**

#### **Annie conducted an outreach event at Home Depot. On March 19<sup>th</sup> for a Home Depot Waterwise Event.**

She contacted **35 customers**. This was an event sponsored by Home Depot to partner in the community to reduce water use outdoors. Annie was contacted by Home Depot corporate to have OWOW participate in the event. Agencies attending the event included Solano County Water Agency, Solano RCD, Republic Services, and Master Gardeners. Also attending were vendors from Scott's Miracle Grow Company, Kellogg's Garden Supply,

Altman Plants, and Hines Nurseries. It was a great opportunity to show the vendors how OWOW partners to showcase their eco-friendly products. The area for the event was outside in the parking lot out in front of the store. The event was fairly slow because of the cold weather but Annie was able to meet with the store manager Kevin and with the District Manager Tim Gudas. They were very grateful for our participation.

Annie's display included the fact sheets, less toxic products, a large Good Bug poster to help customers to see the good bugs that are helpers in the garden, plants that are waterwise and attract beneficial insects, OWOW handouts on Ten Tips for Water wise Gardening and Protecting Landscapes during a Drought.

When the event was over Annie went into the store to return products from her display and helped customers in the aisles for another hour and a half.

**Questions covered were:**

- Ants inside –talked caulking and bait stations, ant fact sheet
- Rats and Mice- exclusion and trapping, fact sheet rats and mice
- Aphids on roses- talked about hosing off with water, using organic fertilizers. Gave aphid fact sheet
- Scale on fruit trees – talked about dormant spraying, keeping ants from protecting scale.
- Mosquitoes- repair screens, remove standing water, put screens on rain barrels, clean roof gutters of debris, use mosquito dunks. Gave mosquito fact sheet
- Cockroaches indoors- repair leaking pipes, caulking, clean up kitchen areas, use bait stations, boric acid powder, discouraged fogging with pyrethroids, gave cockroach fact sheets.
- Fertilizing questions – talked advantages of using organic fertilizers vs synthetic.

**Photo of event sent.**

**On June 26<sup>th</sup> at Home Depot** Teresa set up the table in the pesticide aisle. Teresa helped customers with questions below:

- Fertilizers organic and slow release(benefits of these)
- Whiteflies –she talked cultural practices and different products such as soaps and oils

- Cockroach questions – talked traps, baits, diatomaceous earth, cockroach fact sheet
- Caterpillars- talked about bt
- Silverfish- talked boric acid , diatomaceous earth, roach tablets
- Spiders – talked about the beneficial side, spider fact sheet
- Questions about OWOW resources
- Unidentified critter eating vegetables, she encouraged them to get proper identification and gave them the UCIPM bookmark.
- Aphid infestations on roses- talked about decreasing their habit of weekly fertilizing with synthetic fertilizers, encouraged them to hose off aphids, use insecticidal soaps and oils, use organic fertilizers. Aphid fact sheets
- Aphids on plum trees- talked about dormant spraying in fall and winter next year, control ants by using bait stations, Aphid fact sheet.
- Teresa reached 20 customers that day.

### **Outreach to the landscape community.**

**In January Annie contacted the Master Gardener Coordinator Jennifer Baumbach and asked if she would pass on the information to the Master Gardeners for a training class for:**

**Bay Friendly Training and Qualification for Design of Sustainable Landscapes**

**To be held at Napa Valley College**

**Wednesdays March 9<sup>TH</sup> to March 30, 2016.**

**The training was sponsored by the City of Napa, County of Napa, Napa RCD, Solano Water Agency, and Napa County Storm Water Pollution Prevention Program.**

**Many of the Master Gardeners also have gardening design and maintenance businesses in addition to their volunteer activities. They were trained in sustainable gardening practices in our training on February 18<sup>th</sup> which was a good introduction to the Bay Friendly Gardening Course offered in March.**

## Summary of Pre-Training Surveys

A total of **\_\_10\_\_** Pre-Training surveys were returned.

Here are the results of those surveys

Survey Question	Yes	No	I Don't Know
When water enters a storm drain, does it go to a treatment plant before it reaches a creek?	<b>10%</b>	<b>80%</b>	<b>10%</b>
When water enters a sanitary sewer from a house drain like your sink or toilet, are pesticides removed at the sewage treatment plant before the treated water reaches a creek or Bay?	<b>20%</b>	<b>70%</b>	<b>10%</b>
Do you think it's more effective to treat an ant infestation with a bait station rather than a spray?	<b>70%</b>	<b>10%</b>	<b>20%</b>
<b>Do you know where</b> Where is your local household hazardous waste collection facility located	<b>60%</b>  (Street address and/or City)		<b>40%</b>
<p>Check all that are methods that are used in Integrated Pest Management (IPM)</p> <ul style="list-style-type: none"> <li><b>a.</b> Use of beneficial insects and bacterial based products to control pests. <b>60%</b></li> <li><b>b.</b> Forbidding the use of pesticides. <b>30%</b></li> <li><b>c.</b> Not over or under watering plants. <b>70%</b></li> <li><b>d.</b> Use of traps or barriers to control pests. <b>100%</b></li> </ul>			

What is the solution to control fleas that is safest for pets and best for the creeks, bays, and ocean?

- a. Use room foggers, closing off areas where pets eat.
- b. Use sprays outdoors and/or indoors
- c. Wash pet with warm soapy water, use flea comb, wash bedding in hot soapy water, vacuum carpets. **90%**
- d. Spot on flea treatments applied to the pet's skin. **20%**

Of the following, which is the least toxic (IPM) method of controlling aphids?

- a. Apply fast acting fertilizers.
- b. Spray insecticidal soaps and/or prevent ants from vegetation with tanglefoot or bait stations. **70%**
- c. Prune plants vigorously. **10%**
- d. Use products with pyrethroids. **20%**



# OUR WATER – OUR WORLD

## FIGHT THE BITE

Services Provided by the Solano County  
Mosquito Abatement District



### Solano County Mosquito Abatement

2950 Industrial Court, Fairfield, CA 94533  
707-437-1116/[www.solanomosquito.com](http://www.solanomosquito.com)

#### MOSQUITOES:

- Trained technicians will inspect your property for mosquito problems, can provide advice on management, and may be able to treat the problem.
- Free mosquitofish are available for delivery or pickup at the District's office (March through October).
- District technicians can help identify mosquito samples.

#### EDUCATION:

- This website provides links to other websites providing information about mosquitoes and West Nile Virus.

Our Water Our World helps consumers find less-toxic products for use in their homes and gardens. For a copy of ***Controlling Mosquitoes Around Your Home*** and information on managing rats, yellowjackets and a wide variety of other pests, visit our web site at [www.ourwaterourworld.org](http://www.ourwaterourworld.org)

Section 10 - Provision C.10 Trash Load Reduction

<b>C.10.a.i ► Trash Load Reduction Summary</b>	
<p>For Population-based Permittees, provide an estimate of the overall trash reduction percentage achieved to-date within the jurisdictional area of your municipality that generates problematic trash levels (i.e., Very High, High or Moderate trash generation) . Base the estimate on the information presented in C.10.b i-iv and C.10.e.i-ii. Provide a discussion of the trash estimate below, including whether the applicable trash reduction performance guideline or deadline was attained. If not attained, include a discussion of next steps (e.g., development of a detailed plan or report of non-compliance).</p>	
<b>Trash Load Reductions</b>	
Percent Trash Reduction in All Trash Management Areas (TMAs) due to <b>Trash Full Capture Systems</b> (as reported C.10.b.i)	
Percent Trash Reduction in all TMAs due to <b>Control Measures Other than Trash Full Capture Systems</b> (as reported in C.10.b.ii)	
Percent Trash Reduction due to <b>Jurisdiction-wide Source Control Actions</b> (as reported in C.10.b.iv)	
<b>SubTotal for Above Actions</b>	
<b>Trash Offsets (Optional)</b>	
Offset Associated with Additional Creek and Shoreline Cleanups (as reported in C.10.e.i)	
Offset Associated with Direct Trash Discharges (as reported in C.10.e.ii)	
<b>Total Estimated % Trash Load Reduction in FY 15-16</b>	
<b>Discussion of Trash Load Reduction Estimate:</b>	
<p>This provision is handled and reported at the city level. Please see individual city reports for this information.</p>	

Permittee Name: Fairfield-Suisun Urban Runoff Management Program

**C.10.a.iii ► Mandatory Trash Full Capture Systems**

Provide the following:

- 1) Total number and types of full capture systems (publicly and privately-owned) installed prior to FY 15-16, during FY 15-16, and to-date, including inlet-based and large flow-through or end-of-pipe systems, and qualifying low impact development (LID) required by permit provision C.3.
- 2) Total land area (acres) treated by full capture systems for population-based Permittees and total number of systems for non-population based Permittees compared to the total required by the permit.

Type of System	# of Systems	Areas Treated (Acres)
<b>Installed Prior to FY 15-16</b>		
<p>The cities participated in the Bay Area SFEP/ABAG Trash Capture Grant Project. In an effort to provide as much full trash capture treatment area as possible and because the city of Fairfield drains through Suisun City, the cities proposed a combined full trash capture device for approval to the Water Board. On March 11, 2011 the cities received approval from the Water Board to share their full trash capture device.</p> <p>The device was installed in June 2012 and is located downstream from the city of Fairfield and upstream from Suisun City Marina. The device chosen is a Contech CDS 5653, one of the largest devices made by Contech. With the MRP requiring Fairfield to fully capture 146 acres and Suisun City's to fully capture 22 acres, the total required treatment area is 168 acres. The collaborated treatment area provided resulted in 270 acres which is 102 acres (61%) above that required in the MRP.</p> <p><b>Descriptions of Maintenance Activities:</b></p> <p>As a clear indicator of the collaborative nature of our Program, maintenance for the CDS device has been accepted by the city of Fairfield. Please see city of Fairfield annual report for 2015 2016 for maintenance activities on the Contech CDS 5653.</p>	1	270
<b>Installed in FY 15-16</b>		

See individual city reports for this provision.		
<b>Total for all Systems Installed To-date</b>		<b>NA</b>
<b>Treatment Acreage Required by Permit (Population-based Permittees)</b>		<b>NA</b>
<b>Total # of Systems Required by Permit (Non-population-based Permittees)</b>		<b>NA</b>

**C.10.b.i ► Trash Reduction - Full Capture Systems**

Provide the following:

- 1) Jurisdictional-wide trash reduction in FY 15-16 attributable to trash full capture systems implemented in each TMA;
- 2) The total number of full capture systems installed to-date in your jurisdiction;
- 3) Since the effective date of MRP 2.0 (January 1, 2016), the percentage of systems that exhibited significant plugged/blinded screens or were >50% full when inspected or maintained;
- 4) A narrative summary of any maintenance issues and the corrective actions taken to avoid future full capture system performance issues; and
- 5) A certification that each full capture system is operated and maintained to meet the full capture system requirements in the permit.

<b>TMA</b>	<b>Jurisdiction-wide Reduction (%)</b>	<b>Total # of Full Capture Systems</b>	<b>% of Systems Exhibiting Plugged/Blinded Screens or &gt;50% full</b>	<b>Summary of Maintenance Issues and Corrective Actions</b>
		NA	NA	This provision is handled and reported at the city level. Please see individual city reports for this information.
<b>Total</b>				

**Certification Statement:**

**C.10.b.ii ► Trash Reduction – Other Trash Management Actions (PART A)**

Provide a summary of trash control actions other than full capture systems or jurisdictional source controls that were implemented within each TMA, including the types of actions, levels and areal extent of implementation, and whether actions are new, including initiation date.

TMA	Summary of Trash Control Actions Other than Full Capture Systems
	This provision is handled and reported at the city level. Please see individual city reports for this information.



**FY 2015-2016 Annual Report**

**Permittee Name: Fairfield-Suisun Urban Runoff Management Program**

**C.10 – Trash Load Reduction**

Provide a description of each jurisdictional-wide trash source control action implemented to-date. For each control action, identify the trash reduction evaluation method(s) used to demonstrate on-going reductions, summarize the results of the evaluation(s), and provide the associated reduction of trash within your jurisdictional area. Also include the total % reduction credit for all source controls up to the maximum 10% allowed by MRP 2.0.

Source Control Action	Summary Description & Dominant Trash Sources and Types Targeted	Evaluation/Enforcement Method(s)	Summary of Evaluation/Enforcement Results To-date	% Reduction	Total Reduction Credit (%)
<p>The Program is relying on the passage of proposition 67 on this year's November ballot:                      If Proposition 67 is approved by the state's voters, it would:<a href="#">[2][3]</a></p> <ul style="list-style-type: none"> <li>• Ratify Senate Bill 270 (2014).</li> <li>• Prohibit large grocery stores and pharmacies from providing plastic single-use carryout bags and ban small grocery stores, convenience stores and liquor stores from doing so the following year.</li> <li>• Allow single-use plastic bags for meat, bread, produce, bulk food and perishable items.</li> <li>• Mandate stores to charge 10 cents for recycled, compostable and reusable grocery bags.</li> <li>• Exempt consumers using a payment card or voucher issued by the California Special Supplemental Food Program from being charged for bags.</li> <li>• Provide \$2 million to state plastic bag manufacturers for the purpose of helping them retain jobs and transition to making thicker, multi-use, recycled plastic bags.</li> </ul>					

**C.10.c ► Trash Hot Spot Cleanups**

Provide the FY 15-16 cleanup date and volume of trash removed during each MRP-required Trash Hot Spot cleanup during each fiscal year listed. Indicate whether the site was a new site in FY 15-16.

Trash Hot Spot	New Site in FY 15-16 (Y/N)	FY 15-16 Cleanup Date(s)	Volume of Trash Removed (cubic yards)				
			FY 2011-12	FY 2012-13	FY 2013-14	FY 2014-15	FY 2015-16
This provision is handled and reported at the city level. Please see individual city reports for this information.							



**C.10.d ► Long-Term Trash Load Reduction Plan**

Provide descriptions of significant revisions made to your Long-term Trash Load Reduction Plan submitted to the Water Board in February 2014. Describe significant changes made to primary or secondary trash management areas (TMA), trash generation maps, control measures, or time schedules identified in your plan. Indicate whether your trash generation map was revised and is attached to your Annual Report.

Description of Significant Revision	Associated TMA
This provision is handled and reported at the city level. Please see individual city reports for this information.	

<b>C.10.e. ► Trash Reduction Offsets (Optional)</b>			
Provide a summary description of each offset program implemented, the volume of trash removed, and the offset claimed in FY 15-16. Also, for additional creek and shoreline cleanups, describe the number and frequency of cleanups conducted, and the locations and cleanup dates. For direct discharge control programs approved by the <u>Water Board Executive Officer</u> , also describe the results of the assessments conducted in receiving waters to demonstrate the effectiveness of the control program. Include an Appendix that provides the calculations and data used to determine the trash reduction offset.			
<b>Offset Program</b>	<b>Summary Description of Actions and Assessment Results</b>	<b>Volume of Trash (CY) Removed/Controlled in FY 15-16</b>	<b>Offset (Jurisdiction-wide Reduction %)</b>
<b>Additional Creek and Shoreline Cleanups (Max 10% Offset)</b>	<p>On September 29th, 2015 the program led volunteer cleanup of local creeks throughout both cities. 692 volunteers picked up 10,895 pounds of trash and recyclable on 28 miles of waterway.</p> <p>On April 23, 2016 the Program led volunteer cleanups of Ledgewood Creek in Fairfield, Lower Union Avenue Creek and the Suisun Marsh at Grizley Island Road. There were 63 volunteers who picked up 10.3 CY of trash along 3 miles of waterway.</p>	<p>54</p> <p>10.3</p>	
<b>Direct Trash Discharge Controls (Max 15% Offset)</b>	This option is currently not being utilized by the Program permittees.		

Permittee Name: Fairfield-Suisun Urban Runoff Management Program

Appendix XX. Baseline trash generation and areas addressed by full capture systems and other control measures in Fiscal Year 15-16.

TMA	2009 Baseline Trash Generation (Acres)					Trash Generation (Acres) in FY 15-16 After Accounting for Full Capture Systems					Jurisdiction-wide Reduction via Full Capture Systems (%)	Trash Generation (Acres) in FY 15-16 After Accounting for Full Capture Systems and Other Control Measures					Jurisdiction-wide Reduction via Other Control Measures (%)	Jurisdiction-wide Reduction via Full Capture AND Other Control Measures (%)
	L	M	H	VH	Total	L	M	H	VH	Total		L	M	H	VH	Total		
	See individual city reports for these numbers																	
Totals																		



**THE SUISUN  
MARSH  
IS OURS TO  
PROTECT**

**PUT TRASH  
WHERE IT  
BELONGS**

Our Creeks.

Our Water.

Ours to Protect.



# ATTENTION

Restaurant Owners and Managers



Trash harms our Suisun Marsh. Maintaining a trash free facility is your responsibility. (Ord nos. S-714 and F-22B)

- Inspect your trash enclosure and facility area daily
- Close your dumpster lid
- Pick up any loose trash
- Provide plenty of trash receptacles
- Minimize food wrappers and bags
- Ensure adequate trash pickup frequency



**REPUBLIC  
SERVICES**



**Solano Garbage Company**  
A Division of Republic Services



**Section 11 - Provision C.11 Mercury Controls**

- C.11.a ► Implement Control Measures to Achieve Mercury Load Reductions**
- C.11.b ► Assess Mercury Load Reductions from Stormwater**
- C.11.c ► Plan and Implement Green Infrastructure to Reduce Mercury Loads**
- C.11.d ► Prepare Implementation Plan and Schedule to Achieve TMDL Allocations**
- C.11.e ► Implement a Risk Reduction Program**

Summary:

See attached reports entitled: Fairfield-Suisun Urban Runoff Management Program's Mercury and PCBs Watershed/Management Areas and Control Measures; and the Interim Accounting Methodology for TMDL Loads Reduced Reports.

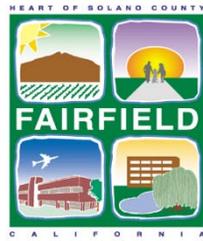
Section 12 - Provision C.12 PCBs Controls

- C.12.a ▶ Implement Control Measures to Achieve PCBs Load Reductions**
- C.12.b ▶ Assess PCBs Load Reductions from Stormwater**
- C.12.c ▶ Plan and Implement Green Infrastructure to Reduce PCBs Loads**
- C.12.d ▶ Prepare Implementation Plan and Schedule to Achieve TMDL Allocations**
- C.12.e ▶ Evaluate PCBs Presence in Caulks/Sealants Used in Storm Drain or Roadway Infrastructure in Public Rights-of-Way**
- C.12.f ▶ Manage PCB-Containing Materials and Wastes During Building Demolition Activities So That PCBs Do Not Enter Municipal Storm Drains**
- C.12.g.▶ Fate and Transport Study of PCBs: Urban Runoff Impact on San Francisco Bay Margins**
- C.12.h ▶ Implement a Risk Reduction Program**

Summary:

See attached reports entitled: Fairfield-Suisun Urban Runoff Management Program's Mercury and PCBs Watershed/Management Areas and Control Measures; and the Interim Accounting Methodology for TMDL Loads Reduced Reports

# Fairfield-Suisun Urban Runoff Management Program



Mercury and PCBs Control Measures

## Watersheds and Management Areas Report

**Load Reductions Consistent with**

**Provision C.11.a.iii.(2) and C.12.a.iii.(2)**

**September 30, 2016**

**The Fairfield-Suisun Urban Runoff Management Program gratefully acknowledges the Contra Costa Clean Water Program for sharing the content and format of this report.**

## **1 INTRODUCTION**

### **1.1 Purpose**

This *Mercury and PCBs Watershed/Management Areas (W/MAs) and Control Measures* report was prepared by the Fairfield-Suisun Urban Runoff Management Program (FSURMP) in cooperation with the Contra Costa Clean Water Program per the Municipal Regional Permit (MRP) for urban stormwater issued by the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB; Order No. R2-2015-0049). This report fulfills the requirements of MRP Provisions C.11.a.iii.(2) and C.12.a.iii.(2) for reporting a list of the watershed/management areas where mercury and PCBs control measures are currently being implemented and those in which new control measures will be or have the potential to be implemented during the term of this permit, along with the specific control measures and an implementation schedule. Although many of the control measures may be selected primarily for the purpose of achieving PCBs load reductions during this MRP permit term, substantial mercury load reductions may result as a tangential benefit and will be accounted for in tracking mercury load reductions.

The following MRP reporting requirements are addressed within this report:

- The list of W/MAs where control measures are currently being implemented or will be implemented during the term of the Permit;
- The number, type, and locations and/or frequency (if applicable) of control measures;
- A cumulative listing of all potentially PCBs-contaminated sites Permittees have referred to the SFBRWQCB to date, with a brief summary description of each site and where to obtain further information;
- The description, scope, and start date of PCBs control measures;
- For each structural control and non-structural best management practice (BMP), interim implementation progress milestones (e.g., construction milestones for structural controls or other relevant implementation milestones for structural controls and non-structural BMPs) and a schedule for milestone achievement; and
- Clear statements of the roles and responsibilities of each participating Permittee for implementation of identified control measures.

This report is organized into the following sections:

1. Introduction and Background
2. Control Measures Overview
3. Watersheds/Management Areas, Control Measures, and Schedule for each Permittee.

## **1.2 Background**

### **1.2.1 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 SFBRWQCB 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 BMPs, are the tools that Permittees can use to assist in restoring water quality in the Bay.

### **1.2.2 Municipal Regional Permit**

NPDES permit requirements associated with Phase I municipal stormwater programs and Permittees in the Bay area are included in the 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/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.

### **1.3 Approach**

#### **1.3.1 Control Measures**

The urban stormwater runoff wasteload allocation for PCBs represents a 90 percent reduction from the estimated existing load. The TMDL implementation plans set roughly 20-year timelines for achieving the reductions but also incorporate an adaptive implementation planning approach. The adaptive approach consists of the development of a plan that includes early implementation actions based on existing knowledge that have a reasonable probability of success and an overview of options for future actions. For PCBs and mercury in the Bay, the immediate or early implementation actions are not expected to completely eliminate the Bay impairment. Therefore, future actions must be evaluated based on continued monitoring and response to the early implementation actions, as well as based on well-designed studies used for model refinement.

The MRP Fact Sheet notes that the initial focus of provisions C.11/12 is on measures designed to reduce PCBs, while also evaluating opportunities for mercury reduction. Implementation actions may fall into four categories depending on the available knowledge and confidence in a control measure's effectiveness (listed in decreasing order of confidence):

- Full-scale implementation throughout the region.
- Focused implementation in areas where benefits are most likely to occur.
- Pilot-testing in a few specific locations.
- Other: This may refer to experimental control measures, research and development, desktop analysis, laboratory studies, and/or literature review.

During the previous MRP term, Permittee effort was largely focused on gathering necessary information about control measure effectiveness through pilot projects and

some focused implementation of the most effective control measures. In this term of the MRP, the emphasis has shifted towards focused and some full-scale implementation of the most effective control measures. Progress will be measured through accounting for specific load reductions as described in the report: *Interim Accounting Methodology for TMDL Loads Reduced* (BASMAA, 2016).

The Permittees, stormwater programs, Bay Area Stormwater Management Agencies Association (BASMAA), SFBRWQCB, and other interested parties (e.g., the Regional Monitoring Program) began gathering data and developing an understanding of the sources and pathways for mercury and PCBs in the Bay in the late 1990's. These same parties developed a framework to address these pollutants throughout the following decade.

The Regional Stormwater Monitoring and Urban BMP Evaluation: A Stakeholder-Driven Partnership to Reduce Contaminant Loadings project funded by a State of California Proposition 13 grant and conducted by the San Francisco Estuary Institute (SFEI) defined conceptual models of sources and pathways of mercury and PCBs in Bay Area urban watersheds (McKee et al., 2006). The SFEI Proposition 13 project compiled PCBs and mercury chemical analysis results from about 600 sediment samples collected at over 360 locations throughout the Bay Area from roadways and stormwater drainage infrastructure (e.g., storm drain inlets, pump house wet wells, piping beneath manholes, and open channels) (Yee and McKee, 2010). These data supported the general hypothesis that concentrations of PCBs and mercury are elevated in specific parts of the urban landscape and showed that:

- Pollutant concentrations are highly patchy, even at moderate to small spatial (sub-kilometer) and temporal (approximately annual) scales. This patchiness reflects the episodic nature of many release and transport events and processes.
- Concentrations at sites within three kilometers of one another showed similarities in concentration, which may be due to similarities in land use, activities, or transport of shared pollutant sources.
- Individual sites and areas most contaminated with PCBs are often not those with high mercury, which is a logical finding given the different use histories and original pollutant sources.

Another outcome of the SFEI Proposition 13 project was a desktop evaluation of control measures for PCBs and mercury load reductions (Mangarella et al., 2010).

Building upon the efforts of the SFEI Proposition 13 project, BASMAA conducted an EPA grant-funded project called Clean Watersheds for a Clean Bay (CW4CB). The CW4CB

project, which began in May 2010 and will be complete in May 2017, is a collaboration among the MRP Permittees designed to evaluate the effectiveness of stormwater controls for PCBs and mercury. The CW4CB Project implemented a number of pilot projects for various control measures called for by the Bay PCBs and mercury TMDLs and the first-term MRP. The CW4CB work products included:

- Selecting five high priority subwatersheds that discharge urban runoff with PCBs and other pollutants to the Bay;
- Identifying PCBs and mercury source areas within the project subwatersheds and referring these sites to regulatory agencies for cleanup and abatement;
- Developing methods to enhance removal of sediment with PCBs and other pollutants during municipal sediment management activities;
- Retrofitting 8 to 10 urban sites with stormwater treatment facilities;
- Facilitating development and implementation of a regional risk communication and exposure reduction program that focuses on educating the public about the health risks of consuming certain species of Bay fish that contain high levels of PCBs and mercury; and
- Creating public education outreach materials, project web portal, guidance manual, and technical workshops.

The Permittees are using the information gathered and lessons learned through the CW4CB project and the earlier projects as the basis to identify the W/MAs and control measures listed in this report.

With the adoption of the current MRP, the FSURMP is now in the process of evaluating the program's GIS capabilities to support additional compliance activities related to: 1) the C.3.j Green Infrastructure Planning and Implementation provisions; 2) the C.11 Mercury Controls and C.12 PCBs Controls provisions; and possibly, 3) the C.8 Water Quality Monitoring provisions. This expansion of the FSURMP's Program GIS capabilities is critical to Permittees' ongoing work to identify watersheds and management areas where multiple-benefit control measure implementation opportunities will be identified and prioritized for implementation during this permit term and over the coming decades. Additionally, this GIS database will likely be used to track and map existing and future C.3 projects, allow ease of ongoing review of opportunities for incorporating GI into existing and planned Capital Improvement Projects (CIPs), and assist in the development of GI plans.

The FSURMP's stormwater GIS platform features maps and applications created using ESRI ArcGIS. The FSURMP anticipates its expanded stormwater GIS platform will be an important tool for maintaining relevant stormwater data; reviewing, analyzing and displaying geographical information; accounting for and assessing compliance with load reduction performance goals; and reporting. The data used for this platform originates from many sources over the last decade and will be reviewed and updated as needed to reflect current land uses and implementation of C.3 projects as new and redevelopment occurs.

### 1.3.2 Watershed /Management Area Delineation

The Program has created a list of W/MAs and control measures (i.e., a control measure plan that describes what, where, and when control measures will be implemented) for PCBs and mercury, provided in the sections below. The ultimate goal for the listed control measures is to achieve the Solano County and the Fairfield-Suisun Program PCBs load reductions listed in MRP Tables 12.1 and Table 12.2 during this MRP term:

- 16.2 g/yr PCBs by 6/30/18,
- 102.6 g/yr PCBs by 6/30/2020, and
- 4.3 g/yr PCBs using green infrastructure by 6/30/2020.

A W/MA is an area where load reduction credit will be sought for PCBs or mercury control measures. The W/MAs cover all Old Industrial and Old Urban areas, but may include some New Urban areas where appropriate. W/MAs were delineated using the maps showing the 2015 PCBs source property screening results (i.e. high, moderate, and low/no likelihood), known PCBs source properties (from the CW4CB Task 3 referrals, DTSC EnviroStor, and the State Water Board Geotracker), and land uses (i.e., Old Industrial, Old Urban, New Urban, and Open Space) from the Mercury and PCBs Control Measures Watershed and Management Areas Report (FSURMP, 2016). These factors were used to create approximate delineations based on the geography within each Permittee's jurisdiction.

The W/MAs and identified control measures may also evolve over time as the Permittees learn more about these areas through implementation of the control measures. The Permittees will be developing Green Infrastructure Plans per MRP Provision C.3.j and the delineations of W/MAs in this report may also be revised as part of that planning process. Additionally, the Permittees may use results from the CW4CB project (which will be available at the end of 2016) to adjust preliminary control measure selections in the coming year.

### 1.3.3 Roles and Responsibilities for Implementation of Control Measures

Table 1-1 below summarizes, for each control measure, the roles and responsibilities of the Permittees, FSURMP, and BASMAA. In a general sense, screening/sampling will primarily be conducted by the FSURMP, establishment of regional frameworks will be conducted by BASMAA, and adoption and implementation of control measures will be conducted by the Permittees.

**Table 1-1: Control Measure Roles and Responsibilities**

Control Measure Category	Roles and Responsibility		
	Permittee	Program	BASMAA
Source Property Identification and Abatement	<ul style="list-style-type: none"> <li>Work with Program to design monitoring program.</li> <li>Prepare referral forms, including identification of enhanced O&amp;M.</li> <li>Implement enhanced O&amp;M for referred properties.</li> </ul>	<ul style="list-style-type: none"> <li>Design and conduct POCs monitoring.</li> <li>Compile and submit referrals to SFBRWQCB</li> <li>Coordinate with BASMAA on ongoing control measure adaptive management.</li> </ul>	<ul style="list-style-type: none"> <li>Discuss ongoing control measure implementation and adaptive management at Monitoring / Pollutants of Concern (MPC) Committee.</li> </ul>
Green Infrastructure / Treatment Control Measures	<ul style="list-style-type: none"> <li>Prepare a GI Plan.</li> <li>Implement GI projects.</li> <li>Gather data on C.3 projects.</li> </ul>	<ul style="list-style-type: none"> <li>Support GI planning.</li> <li>Compile data on C.3 projects.</li> </ul>	<ul style="list-style-type: none"> <li>Coordinate GI planning at Development Committee.</li> <li>Discuss control measure implementation and adaptive management at MPC Committee.</li> </ul>
Managing PCBs in Building Materials	<ul style="list-style-type: none"> <li>Participate in BASMAA Regional Project.</li> <li>Adopt Framework.</li> </ul>	<ul style="list-style-type: none"> <li>Assist BASMAA Regional Project.</li> </ul>	<ul style="list-style-type: none"> <li>Develop Framework through Regional Project.</li> </ul>
Managing PCBs in Infrastructure	<ul style="list-style-type: none"> <li>Participate in BASMAA Regional Project.</li> </ul>	<ul style="list-style-type: none"> <li>Assist BASMAA Regional Project.</li> <li>Conduct monitoring.</li> </ul>	<ul style="list-style-type: none"> <li>Develop monitoring plan and report monitoring results via Regional Project.</li> </ul>
Enhanced O&M	<ul style="list-style-type: none"> <li>Implement enhanced O&amp;M where identified.</li> </ul>	<ul style="list-style-type: none"> <li>Coordinate with BASMAA on ongoing control measure adaptive management.</li> </ul>	<ul style="list-style-type: none"> <li>Discuss ongoing control measure implementation and adaptive management at MPC Committee.</li> </ul>
Diversion to POTW	<ul style="list-style-type: none"> <li>Implement diversion where identified.</li> </ul>	<ul style="list-style-type: none"> <li>Implement diversion where identified.</li> </ul>	<ul style="list-style-type: none"> <li>Discuss ongoing control measure implementation and adaptive management at MPC Committee.</li> </ul>
Mercury Load Avoidance and Reduction	<ul style="list-style-type: none"> <li>Conduct collection events.</li> </ul>	<ul style="list-style-type: none"> <li>Compile and track data.</li> </ul>	<ul style="list-style-type: none"> <li>Discuss ongoing control measure implementation and adaptive management at MPC Committee.</li> </ul>
Illegal Dumping Cleanup	<ul style="list-style-type: none"> <li>Identify illegal dumping sites.</li> <li>Conduct/coordinate cleanup.</li> </ul>	<ul style="list-style-type: none"> <li>Compile and track data.</li> </ul>	<ul style="list-style-type: none"> <li>Discuss ongoing control measure implementation and adaptive management at MPC Committee.</li> </ul>
Stockpiles, Spills, and Disposal of PCBs	<ul style="list-style-type: none"> <li>Identify facilities through routine inspections.</li> <li>Conduct/coordinate cleanup.</li> </ul>	<ul style="list-style-type: none"> <li>Compile and track data.</li> <li>Coordinate w/ Permittees, BASMAA partners, SFBRWQCB, and PGE as needed.</li> </ul>	<ul style="list-style-type: none"> <li>Discuss ongoing control measure implementation and adaptive management at MPC Committee.</li> </ul>



In addition, the Permittees will be tracking control measure implementation and reporting load reductions using the Interim Accounting Tool developed by a BASMAA regional project. The FSURMP will compile and report the program-wide list of site referrals and overall load reductions. BASMAA will compile and report the MRP permit area-wide list of site referrals and overall load reductions.

Although each Permittee’s administrative structure is unique, Table 1-2 summarizes, in general, the roles and responsibilities of the various city, departments that may be related to implementation of selected control measures:

**Table 1-2: Permittee Department Roles and Responsibilities**

Department	Typical Role / Responsibility
Public Works	<ul style="list-style-type: none"> <li>• Creeks, watersheds, and stormwater management</li> <li>• Public facility services and maintenance</li> <li>• Engineering and construction services</li> <li>• Capital improvement projects</li> </ul>
Community Development / Planning Department	<ul style="list-style-type: none"> <li>• Planning/zoning/General Plan development</li> <li>• Development project review &amp; approvals</li> <li>• Construction and building inspections</li> </ul>

## **2 DESCRIPTION OF CONTROL MEASURES**

This section provides a general description of the types of control measures that are currently being implemented or will be implemented by the Permittees during this and future permit terms to control PCBs and mercury.

### **2.1 Source Property Identification and Abatement**

Source property identification and abatement involves investigations of properties located in historically industrial land use or other land use areas where PCBs were used, released, and/or disposed of and where sediment concentrations have been found at levels significantly above urban background levels. The source property identification and abatement control measure begins with performing investigations of these “High Likelihood” areas to identify PCBs sources to the municipal storm drain system. Once a source property is identified, the source of PCBs on the property may be abated or caused to be abated directly by the Permittee or the Permittee may choose to refer the source property to the SFBRWQCB for investigation and abatement by the SFBRWQCB or another appropriate regulatory agency with investigation and cleanup authority. Source properties may include sites that were previously remediated or are currently being remediated but have PCBs soils cleanup levels that are elevated above urban background levels or may be newly identified source properties.

The Permittees will validate the existence of significantly elevated PCBs concentrations through surface soil/sediment sampling in the right-of-way or stormwater sampling in the storm drain system where visual inspections and/or other information suggest that a specific property is a potential source of significantly elevated PCBs concentrations. Where data confirm significantly elevated PCBs concentrations (e.g., a sediment concentration equal to or greater than 1.0 mg/kg or a concentration greater than 0.5 mg/kg plus other lines of evidence) are present in soil/sediment from a potential source property or in stormwater samples, the Permittees will take actions to cause the property to be abated or will refer that property to the SFBRWQCB to facilitate the issuance of orders for further investigation and remediation of the subject property.

For each confirmed source property, the Permittee will implement or cause to be implemented, where appropriate, one or a combination of interim enhanced operation and maintenance (O&M) measures in the street or storm drain infrastructure adjacent to the source property during the source property abatement process to remove historically deposited sediment and/or to prevent further contaminated sediment from entering the storm drain. These enhanced O&M measures will be described in the source property referral that is sent to the SFBRWQCB. If the Permittee finds that enhanced O&M

measures are not justified based on the results of the soil/sediment investigation, the Permittee must discuss these findings with the SFBRWQCB prior to submitting the source property referral. The SFBRWQCB will review the source property referral and provide comments to the Permittee within 30 days (if needed).

The FSURMP, in collaboration with the Permittees, are conducting ongoing targeted investigation and monitoring for known or suspected source properties. Source identification is one of five priority POC management information needs required by MRP provision C.8.f.

The properties that have been referred to the SFBRWQCB as of September 2016 are listed in Table 2-1 below.

**Table 2-1: Contaminated Sites Referred to the SFBRWQCB**

SITE NAME	LOCATION	YEAR REFERRED
No Contaminated Sites have been referred to the SFBRWQCB		

**2.2 Green Infrastructure / Treatment Control Measures**

This control measure includes new development and redevelopment projects on private and public properties regulated by Provision C.3, as well as retrofit of existing infrastructure in public ROW areas and on public properties not subject to Provision C.3.

Permittees will account for implemented C.3. projects and may implement green infrastructure (GI) projects over this permit term to achieve the PCBs load reductions shown in MRP Table 12.2 and mercury load reductions shown in MRP Table 11.1. Permittees may also choose to include potential GI projects that may be implemented over this permit term. As an example, these may include a project that has been planned or identified; however, funding sources for implementation have not been secured at the time of this report.

Permittees will be identifying existing C.3 projects as part of this control measure and, in compliance with the requirement of MRP Provision C.3.b.i.(2), will be tracking development projects that are subject to C.3. over this permit term.

In addition, the Permittees will be conducting an ongoing review of opportunities for incorporating GI into existing and planned capital improvement projects over this permit term (a.k.a., no missed opportunities) and developing a GI Plan for the inclusion of low impact development drainage design into storm drain infrastructure on public and private lands, including streets, roads, storm drains, parking lots, building roofs, and other storm drain infrastructure elements, in compliance with MRP Provision C.3.j.

## **2.3 Managing PCBs In Building Materials and Infrastructure**

### **2.3.1 PCBs in Building Materials**

During the first three years of the permit term, the Permittees will develop and implement (or cause to be developed and implemented) an effective protocol for managing materials with PCBs concentrations of 50 ppm or greater in applicable structures at the time such structures undergo demolition, so that PCBs do not enter the MS4. PCBs from these structures can enter storm drains during and/or after demolition through vehicle track-out, airborne releases, soil erosion, stormwater runoff, or improper waste disposal. Applicable structures include, at a minimum, commercial, public, institutional and industrial structures constructed or remodeled between the years 1950 and 1980 and with building materials with PCBs concentrations of 50 ppm or greater. Single-family residential and wood frame structures are exempt. A Permittee is exempt from this requirement if the only structures that existed pre-1980 within its jurisdiction were single-family residential and/or wood-frame structures. The PCBs management framework will be implemented by the start of the fourth year of the permit term (i.e., July 1, 2019).

Permittees are required to develop a protocol by June 30, 2019 that includes each of the following components, at a minimum:

1. The necessary authority to ensure that PCBs do not enter municipal storm drains from PCBs-containing materials in applicable structures at the time such structures undergo demolition;
2. A method for identifying applicable structures prior to their demolition; and
3. Method(s) for ensuring PCBs are not discharged to the municipal storm drain from demolition of applicable structures.

By July 1, 2019 and thereafter, Permittees are required to:

- Implement or cause to be implemented the PCBs management protocol for ensuring PCBs are not discharged to municipal storm drains from demolition of

applicable structures via vehicle track-out, airborne releases, soil erosion, or stormwater runoff.

- Develop an assessment methodology and data collection program to quantify in a technically sound manner PCBs loads reduced through implementation of the protocol for controlling PCBs during demolition of applicable structures. This should be reported on in the 2020 Annual Reports at the regional level on behalf of all Permittees.
- In their 2016, 2017, and 2018 Annual Reports, Permittees are required to summarize the steps they have taken to begin implementing this requirement. In their 2020 Annual Reports and thereafter, Permittees are required to provide documentation of each of the number of applicable structures that applied for a demolition permit during the reporting year and a running list of the applicable structures that applied for a demolition permit (since the date the PCBs control protocol was implemented) that had material(s) with PCBs at 50 ppm or greater, with the address, demolition date, and brief description of PCBs control method(s) used.

The Program and Permittees are actively participating in a BASMAA Regional Project to address PCBs in building materials. This Regional Project will develop an implementation framework, guidance materials, and tools for local agencies to ensure that PCBs-containing materials and wastes are properly managed during building demolition. This Regional Project will also include developing training materials and conducting trainings for municipal staff and outreach workshops for the industry on implementing the framework/protocols developed via the project. The tools and materials developed as part of the project will build upon materials and outputs developed in 2010-2011 by the San Francisco Estuary Partnership with State Water Board grant funding, called the “PCBs in Caulk Project”, as well as subsequent and parallel activities by BASMAA.

### 2.3.2 PCBs in Infrastructure

PCBs may also be found in storm drain or roadway infrastructure in public rights-of-way such as caulk and sealants used in storm drains and between concrete curbs and street pavement. Permittees will investigate whether PCBs are present in such materials and in what concentrations. These results will be reported no later than the 2018 Annual Report. The results of these investigations will inform further investigations of PCBs in infrastructure and the development of Permittees’ GI Plans.

The Program and Permittees will be participating in a BASMAA Regional Project to develop a Quality Assurance Project Plan (QAPP) and Sampling and Analysis Plan (SAP)

to characterize the levels of PCBs in caulks/sealants used in storm drains and roadway infrastructure to quantify the potential PCBs load reduction benefits that may result from public infrastructure improvements. The monitoring program and laboratory analysis per the QAPP and SAP may be conducted by the Program in coordination with BASMAA or via a BASMAA Regional Project. A project report to be included in the 2018 Annual Report will either be prepared by the Program in coordination with BASMAA or via a BASMAA Regional Project.

## **2.4 Enhanced Operation and Maintenance**

Routine MS4 O&M activities include street sweeping, drain inlet cleaning, and pump station maintenance. In addition, culverts and channels are also routinely maintained (i.e., desilted). Enhancements to routine operations and new actions such as storm drain line and street flushing may enhance the Permittees' ability to reduce PCBs and mercury in stormwater. PCBs load reductions achieved through implementation of enhanced O&M control measures, aside from enhanced O&M control measures associated with source property referrals, may be counted as part of the overall load reductions during this permit term.

## **2.5 Diversion to POTW**

This control measure consists of diverting dry weather flows from MS4s to publically owned treatment works (POTWs) as a method to reduce loads of PCBs and

The diversion of dry weather flows to POTWs in Solano County has been taken on by the Fairfield Suisun Sewer District. The project involves changing the operation of an existing pump station so as to divert stormwater from the station to the Fairfield Suisun Sewer District wastewater treatment plant. The pump station is located in the city of Fairfield just upstream from Suisun city. It serves a watershed area of approximately 6 acres all of which is zoned commercial, of which a significant portion is automotive repair. The pump station changes to be 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
- Monitoring concentrations of pollutants and pollutant indicators in the diverted water

## **Current Status**

Normal discharges from the State Street Pump Station were terminated in mid –June 2016. The contents of the pump stations wet well removed by Vactor truck and then discharged to the Fairfield Suisun Sewer District treatment plant. As dry weather runoff accumulates in the pump station, the water will be removed and disposed of at the POTW. The pump station resumes its normal discharge operation settings in late September 2016. This project is ongoing.

## **2.6 Source Controls and Other Control Measures**

### **2.6.1 Mercury Load Avoidance and Reduction**

Mercury load avoidance and reduction includes a number of source control measures listed in the California Mercury Reduction Act adopted by the State of California in 2001. These source controls include material bans, reductions of the amount of mercury allowable for use in products, and mercury device recycling. The following source controls bans are included:

- Sale of cars that have light switches containing mercury;
- Sale or distribution of fever thermometers containing mercury without a prescription;
- Sale of mercury thermostats; and,
- Manufacturing, sale, or distribution of mercury-added novelty items.

In addition, fluorescent lamps manufacturers continue to reduce the amount of mercury in lamps sold in the U.S. Manufacturers have significantly reduced the amount of mercury in fluorescent linear tube lamps.

Mercury Device Recycling Programs resulting in Mercury load reduction generally include three types of programs that promote and facilitate the collection and recycling of mercury-containing devices and products:

- Permittee-managed household hazardous waste (HHW) drop-off facilities and curbside or door-to-door pickup;
- Private business take-back and recycling programs (e.g., Home Depot); and,
- Private waste management services for small and large businesses.

The Permittees coordinate local household hazardous waste (HHW) collection facilities to implement mercury collection and recycling in accordance with MRP Provisions C.11.a.i and C.11.a.ii.

FSURMP Permittees collect HHW at the same regional facility in Fairfield, Solano County:

- Republic Services at 2901 Industrial Court, Fairfield, CA

Republic Services serves the communities of Fairfield, Suisun City and parts of unincorporated Solano County. The types of data collected at this facility includes the standard Cal Recycle 303a form. However, these efforts are no longer required to be reported, but will be tracked for mercury loads reduced through implementation of mercury avoidance and reduction control measures.

### 2.6.2 Illegal Dumping Clean-Up

This source control measure entails clean-up of construction and demolition debris from illegal dumping areas. This control measure will apply to construction and demolition illegal dumping only during this permit term, but may be expanded to other types of illegally dumped trash if supported by monitoring data.

### 2.6.3 Stockpile, Spills, and Disposal of PCBs

This control measure includes the proper clean-up and disposal of stockpiles, spills, and/or improperly disposed quantities of PCBs. The measure would involve, for instance, a concentrated source of PCBs (e.g., a barrel) that is found and cleaned-up or properly disposed and the clean-up of transformer spills by PG&E (see Table 2-2 below for a list of PG&E transformer pole spills in Fairfield and Suisun City).

**Table 2-2: PG&E Transformer Pole Spills in Fairfield and Suisun City**

CITY	SPILL DATE	LOCATION	QUANTITY/ CONCENTRATION	DATE OF FINAL SPILL REPORT FROM PGE AND SFBRWQCB
There have been no reported or discovered transformer pole spills to report.				

BASMAA representatives have been working with SFBRWQCB staff to ensure thorough documentation and clean-up completion of PG&E PCBs transformer spills. This activity could have a significant effect on where PCBs in the public right-of-way are found, as many spills happen in residential areas. Residential areas are not typically high likelihood areas for PCBs sources, so no other control measures have been developed specifically

for these areas. SFBRWQCB and BASMAA representatives will work on better defining agency roles and responsibilities in responding to spills, at least for their own agencies, and hope to get PG&E to cooperate to make a smoother and more transparent process as we try to reduce the loading of PCBs into the San Francisco Bay, Suisun and San Pablo Bays.

SFBRWQCB staff arranged a meeting on February 26, 2016 with the BASMAA MPC chair and Daniel Sanchez, Hazardous Materials and Water Quality Program Manager for PG&E. Mr. Sanchez had agreed to provide BASMAA and SFBRWQCB with (1) an inventory of spills in the Bay Area, and (2) written SOPs for spill response. Mr. Sanchez stated that the SFBRWQCB, Certified Unified Program Agency (CUPA) & Office of Emergency Services (OES) are called if the spill exceeds 49 gallons or threatens a waterway, a storm drain, or human health, and that a CUPA gets a courtesy call for every spill. No information has come from Mr. Sanchez since the meeting.

All information on the spills and clean-ups are not currently available, as the process to get documentation of the completion of a clean-up is difficult. PG&E has many private contractors that are called out at odd hours in inclement weather to do the clean-up. Tracking one representative who can confirm PG&E's process or progress on spills has proven impossible so far. Many spills are less than 49 gallons and less than 50 ppm, but still have significant levels of PCBs concentrations (e.g., 5 gallons of transformer oil with a PCBs concentration of 44 ppm).

## **City of Fairfield**

### **2.7 List of Watersheds / Management Areas**

The watersheds / management areas (W/MAs) within the City of Fairfield are shown on the Figures entitled: Potential Green Infrastructure and Source Property Parcels East Fairfield and Potential Green Infrastructure and Source Property Parcels West Fairfield and are listed below:

1. Urban Old Properties
2. Old Industrial
3. Electrical Properties
4. Railroad Properties
5. City Owned - Properties with Stormwater Pipes (intersecting parcel)

## **2.8 Scope and Schedule of PCBs Control Measures**

A summary of the control measures that are currently being implemented or will be implemented during the term of the permit in each of the W/MAs is provided in Table 2-3 and are discussed in the sections below.

### **2.8.1 Source Property Identification and Abatement**

#### *PCBs-Contaminated Properties Referred to the Regional Water Board*

No properties within the City of Fairfield have been referred to the SFBRWQCB as a result of implementation of the Source Property Identification and Abatement control measure to date.

#### *Ongoing Investigations*

Ongoing investigations may result in a property referral in the future.

### **2.8.2 Green Infrastructure / Treatment Control Measures**

Any development, redevelopment, and infrastructure projects within each of the W/MA's will be subject to the development standards in effect at the time an application would be made, such as demolition standards and applicable provisions of section C.3.

### **2.8.3 Managing PCBs in Building Materials and Infrastructure**

#### *Managing PCBs in Building Materials*

The Program and Permittees are actively participating in a BASMAA Regional Project to address PCBs in building materials as described in section 2.3.1.

#### *Managing PCBs in Infrastructure*

The Program and Permittees will be participating in a BASMAA Regional Project to address PCBs in infrastructure as described in section 2.3.2.

### **2.8.4 Enhanced Operation and Maintenance Control Measures**

No enhanced operation and maintenance control measures are proposed.

### 2.8.5 Diversion to POTW

The project involves changing the operation of an existing pump station so as to divert stormwater from the station to the Fairfield Suisun Sewer District wastewater treatment plant. The pump station is located in the city of Fairfield just upstream from Suisun city. It serves a watershed area of approximately 6 acres all of which is zoned commercial, of which a significant portion is automotive repair. The pump station changes to be 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
- Monitoring concentrations of pollutants and pollutant indicators in the diverted water

### **Current Status**

Normal discharges from the State Street Pump Station were terminated in mid -June 2016. The contents of the pump stations wet well removed by Vactor truck and then discharged to the Fairfield Suisun Sewer District treatment plant. As dry weather runoff accumulates in the pump station, the water will be removed and disposed of at the POTW. The pump station resumes its normal discharge operation settings in late September 2016. This project is ongoing.

### 2.8.6 Source Controls and Other Control Measures

#### *Mercury Load Avoidance and Reduction*

The Permittees are actively implementing mercury recycling programs in all W/MA's in order to reduce mercury loading to the Bay.

#### *Illegal Dumping Cleanup*

The Permittees will identify and cleanup illegal dumping of construction and demolition debris where illegal dumping of construction and demolition debris occurs.

#### *Stockpiles, Spills, and Disposal of PCBs*

Stockpiles and spills of PCBs will be addressed as they are identified through industrial facility inspection and spill notification programs.



**Table 2-3. City of Fairfield Watershed/Management Areas & Summary of Control Measures**

Control Measure Category	Watershed/Management Area				
	Old Industrial	Old Urban	PG&E	Rail	City Owned Parcels
Source Property Identification and Abatement					
Source Property Investigation	C, P		Po	Po	
Referral of Source Property	Po				
Direct Abatement of Source Property	Po				
Categorical Source Property Referral	Po		Po		
Green Infrastructure / Treatment Control Measures					
Redevelopment Subject to C.3	Po	Po	Po		
GI/Treatment Measures Not Subject to C.3	Po	Po	Po		Po
Full Trash Capture Devices (HDS)	Po	Po			Po
Managing PCBs in Building Materials and Infrastructure					
Managing PCBs in Building Materials	Po	Po			
Managing PCBs in Infrastructure	Po	Po			
Enhanced O&M					
Street Sweeping	Po	Po			
Storm Drain Inlet Cleaning	Po	Po			
Pump Station Maintenance	Po	Po			
Desilting of Channels and Culverts	Po	Po			
Street Flushing	Po	Po			
Storm Drain Line Cleaning	Po	Po			
Diversion to POTW					
Diversion to POTW	C, Po				
Source Controls and Other Control Measures					
Mercury Load Avoidance and Reduction	Po	Po			
Illegal Dumping Cleanup	Po	Po			Po
Stockpiles, Spills, and Disposal of PCBs	Po	Po			

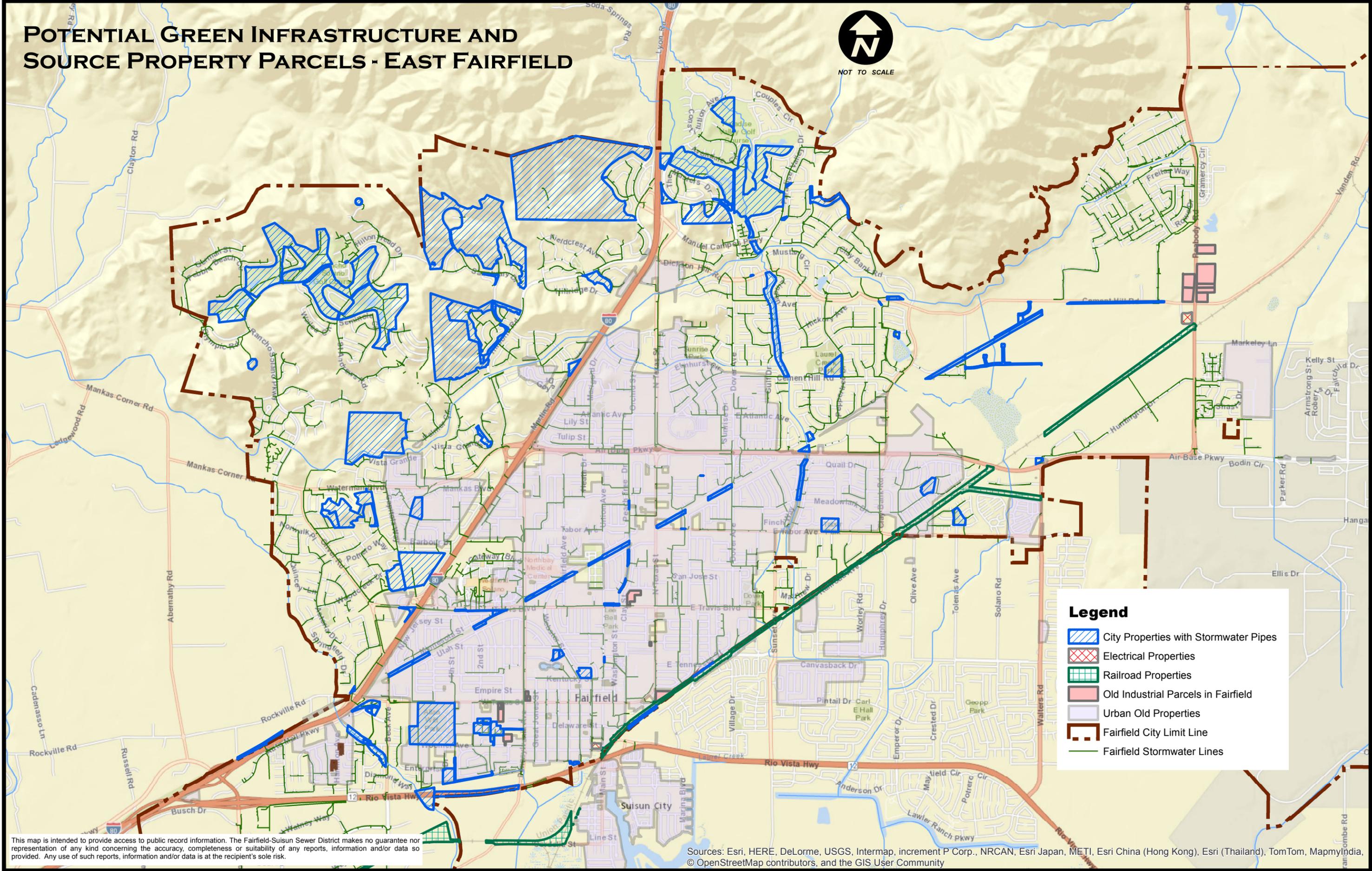
Completed (C), Planned (P), Potential (Po)

**Figure 2-1: Watershed/Management Areas in the City of Fairfield**

# POTENTIAL GREEN INFRASTRUCTURE AND SOURCE PROPERTY PARCELS - EAST FAIRFIELD



NOT TO SCALE



**Legend**

-  City Properties with Stormwater Pipes
-  Electrical Properties
-  Railroad Properties
-  Old Industrial Parcels in Fairfield
-  Urban Old Properties
-  Fairfield City Limit Line
-  Fairfield Stormwater Lines

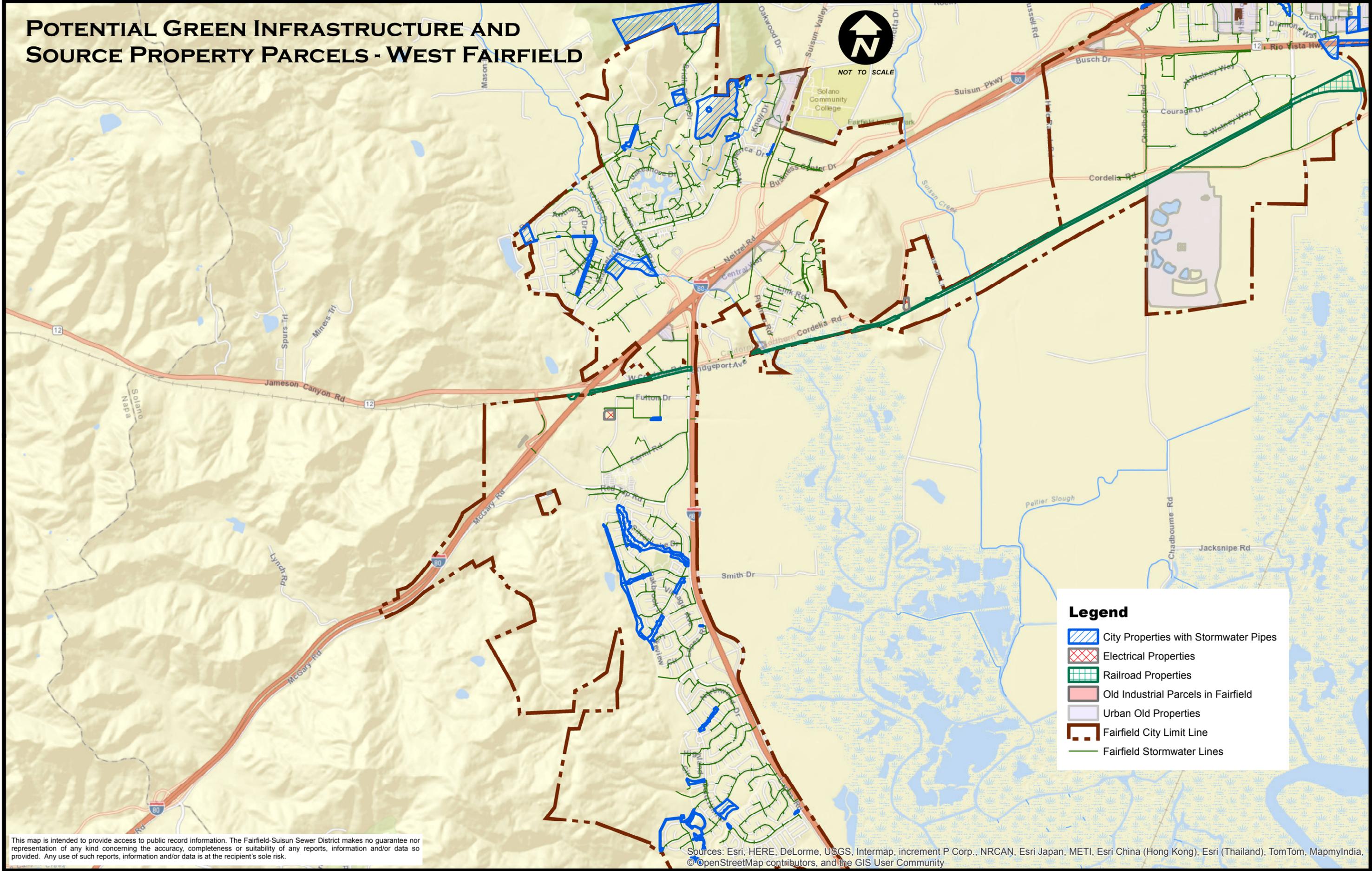
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Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

# POTENTIAL GREEN INFRASTRUCTURE AND SOURCE PROPERTY PARCELS - WEST FAIRFIELD



NOT TO SCALE



**Legend**

-  City Properties with Stormwater Pipes
-  Electrical Properties
-  Railroad Properties
-  Old Industrial Parcels in Fairfield
-  Urban Old Properties
-  Fairfield City Limit Line
-  Fairfield Stormwater Lines

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### **3 CITY OF SUISUN CITY**

#### **3.1 List of Watersheds / Management Areas and Control Measures**

The watersheds / management areas (W/MAs) within the City of Suisun City are shown on the following Figure entitled: Potential Green Infrastructure and Source Property Parcels Suisun City and are listed below:

1. Urban Old Properties
2. Old Industrial
3. Electrical Properties
4. Railroad Properties
5. City Owned - Properties with Stormwater Pipes (intersecting parcel)

#### **3.2 Scope and Schedule of PCBs Control Measures**

A summary of the control measures that are currently being implemented or will be implemented during the term of the permit in each of these W/MAs is provided in Table 3-3 and are discussed in the sections below.

##### **3.2.1 Source Property Identification and Abatement**

###### *PCBs-Contaminated Properties Referred to the Regional Water Board*

No properties within the City of Suisun City have been referred to the SFBRWQCB as a result of implementation of the Source Property Identification and Abatement control measure to date.

###### *Ongoing Investigations*

Ongoing investigations may result in property referrals in the future. Based on our current knowledge of historical land uses in Suisun City, all old industrial parcels in Suisun City have been evaluated.

##### **3.2.2 Green Infrastructure / Treatment Measures**

Any development, redevelopment, and infrastructure projects within each of the W/MA's will be subject to the development standards in effect at the time an application would be made, such as demolition standards and applicable provisions of section C.3.

### 3.2.3 Managing PCBs in Building Materials and Infrastructure

#### *Managing PCBs in Building Materials*

The Program and Permittees are actively participating in a BASMAA Regional Project to address PCBs in building materials as described in section 2.3.1.

#### *Managing PCBs in Infrastructure*

The Program and Permittees will be participating in a BASMAA Regional Project to address PCBs in infrastructure as described in section 2.3.2.

### 3.2.4 Enhanced Operation and Maintenance Control Measures

No enhanced operation and maintenance control measures are proposed.

### 3.2.5 Diversion to POTW

See section 2.8.5 of this report. This is a program wide-diversion effort.

### 3.2.6 Source Controls and Other Control Measures

#### *Mercury Load Avoidance and Reduction*

The Permittees are actively implementing mercury recycling programs in all W/MA's in order to reduce mercury loading to the Bay.

#### *Illegal Dumping Cleanup*

The Permittees will identify and cleanup illegal dumping of construction and demolition debris where illegal dumping of construction and demolition debris occurs.

#### *Stockpiles, Spills, and Disposal of PCBs*

Stockpiles and spills of PCBs will be addressed as they are identified through industrial facility inspection and spill notification programs.

**Table 3-1. City of Suisun City Watershed/Management Areas & Summary of Control Measures**

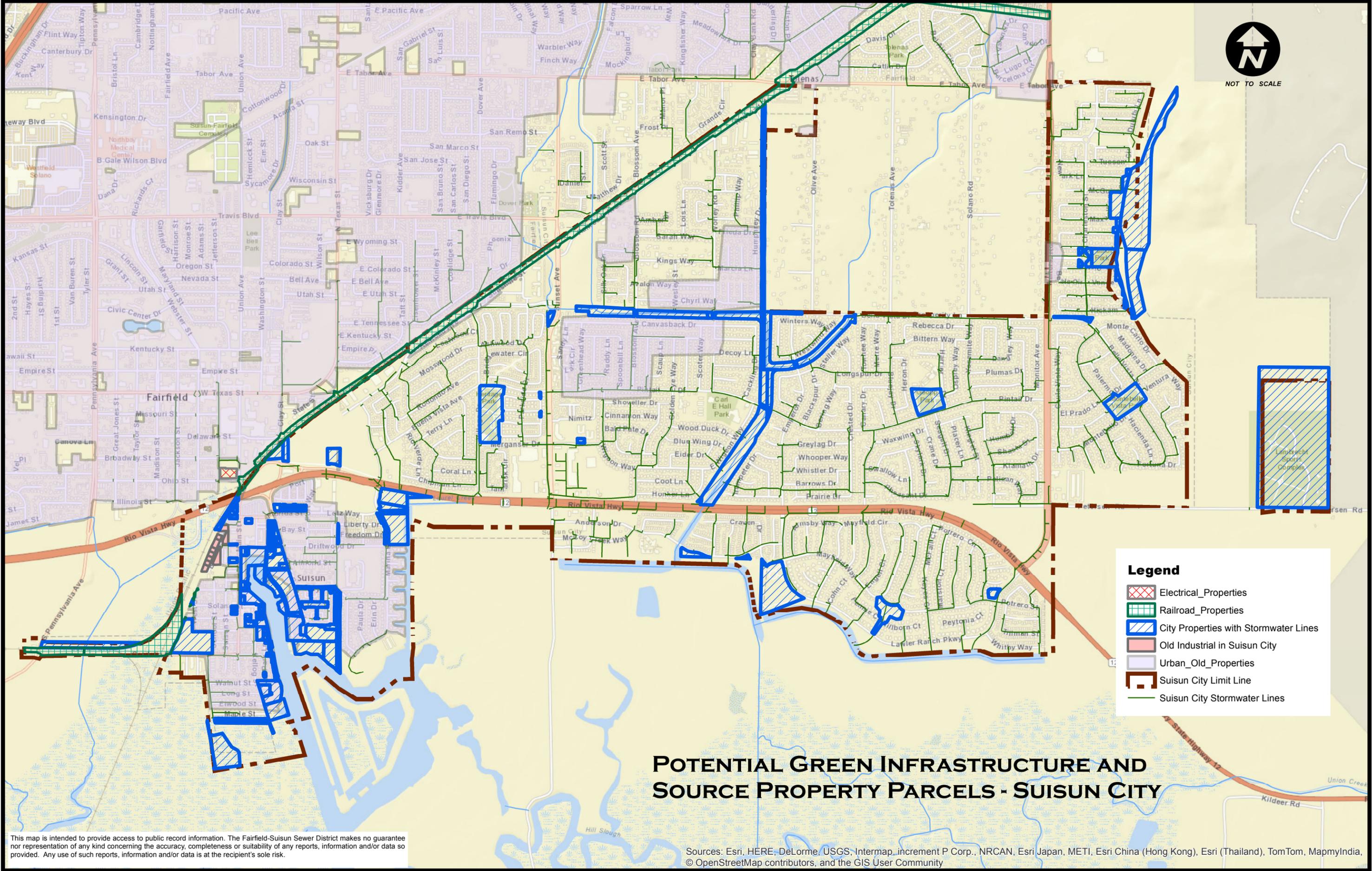
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	Old Industrial	Old Urban	PG&E	Rail	City Owned Parcels
Source Property Identification and Abatement					
Source Property Investigation	C, P		Po	Po	
Referral of Source Property	Po				
Direct Abatement of Source Property	Po				
Categorical Source Property Referral	Po		Po		
Green Infrastructure / Treatment Control Measures					
Redevelopment Subject to C.3	Po	Po	Po		
GI/Treatment Measures Not Subject to C.3	Po	Po	Po		Po
Full Trash Capture Devices (HDS)	Po	Po			Po
Managing PCBs in Building Materials and Infrastructure					
Managing PCBs in Building Materials	Po	Po			
Managing PCBs in Infrastructure	Po	Po			
Enhanced O&M					
Street Sweeping	Po	Po			
Storm Drain Inlet Cleaning	Po	Po			
Pump Station Maintenance	Po	Po			
Desilting of Channels and Culverts	Po	Po			
Street Flushing	Po	Po			
Storm Drain Line Cleaning	Po	Po			
Diversion to POTW					
Diversion to POTW	C, Po				
Source Controls and Other Control Measures					
Mercury Load Avoidance and Reduction	Po	Po			
Illegal Dumping Cleanup	Po	Po			Po
Stockpiles, Spills, and Disposal of PCBs	Po	Po			

Completed (C), Planned (P), Potential (Po)

**Figure 3-1: Watershed Management Areas in the City of Suisun City**



NOT TO SCALE



**Legend**

-  Electrical\_Properties
-  Railroad\_Properties
-  City Properties with Stormwater Lines
-  Old Industrial in Suisun City
-  Urban\_Old\_Properties
-  Suisun City Limit Line
-  Suisun City Stormwater Lines

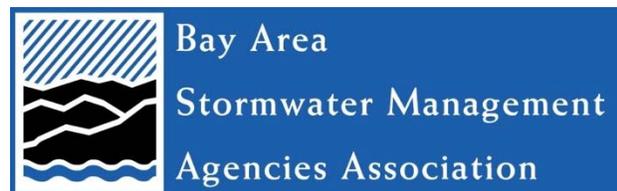
# POTENTIAL GREEN INFRASTRUCTURE AND SOURCE PROPERTY PARCELS - SUISUN CITY

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# Interim Accounting Methodology for TMDL Loads Reduced

*Prepared for*



*Prepared by*

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19 September 2016

*Version 1.0*

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## LIST OF ACRONYMS AND ABBREVIATIONS

ACCWP	Alameda Countywide Clean Water Program
BASMAA	Bay Area Stormwater Management Agencies Association
CCCWP	Contra Costa Clean Water Program
GI	Green Infrastructure
GIS	Geographic Information System
IMR	Integrated Monitoring Report
mg/ac/yr	milligram per acre per year
mg/kg	milligram per kilogram
MPC	Monitoring and Pollutants of Concern Committee
MRP	Municipal Regional Permit
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
O&M	Operation and Maintenance
PCBs	Polychlorinated Biphenyls
POC	Pollutants of Concern
POTW	Publically Owned Treatment Works
RAA	Reasonable Assurance Analysis
SCVURPPP	Santa Clara Valley Urban Runoff Pollution Prevention Program
SFEI	San Francisco Estuary Institute
SFBRWQCB	San Francisco Bay Regional Water Quality Control Board
SMCWPPP	San Mateo Countywide Water Pollution Prevention Program
TMDL	Total Maximum Daily Load
WY	Water Year

## **1. INTRODUCTION**

### **1.1 Background**

The Municipal Regional Stormwater Permit (MRP; SFBRWQCB, 2015<sup>1</sup>) Provisions C.11.a and C.12.a require the Permittees to demonstrate cumulative Bay Area-wide and Program area-specific mercury and polychlorinated biphenyls (PCBs) load reductions over the current permit term. MRP Provisions C.11.b and C.12.b require the Permittees to develop and implement an assessment methodology and data collection program to quantify mercury and PCBs loads reduced through implementation of pollution prevention, source control, and treatment control measures. The Permittees will use this assessment methodology to demonstrate progress towards achieving the load reductions required in this permit term. This report has been prepared to address the requirements of MRP Provisions C.11.b.iii.(1) and C.12.b.iii.(1).

Methods included in this report build upon those included in the Integrated Monitoring Report (IMR) Part B (BASMAA, 2014) submitted by MRP Permittees to the Water Board on February 1, 2014; and methodologies described in MRP provision C.12 and the MRP Fact Sheet (SFBRWQCB, 2015).

### **1.2 Report Overview**

A description of the control measures, load reduction accounting methodologies, reporting requirements, and assumptions are presented in Sections 2 through 7 of this report for the following mercury and PCBs control measure categories:

- Source Property Identification and Abatement;
- Green Infrastructure/Treatment Control Measures;
- Management of PCBs in Building Materials and Infrastructure;
- Enhanced Operations and Maintenance Control Measures;
- Pump Station Diversion; and
- Source Controls and Other Control Measures.

Section 8 presents a discussion of how the interim accounting methodologies may be updated and refined to account for new information gathered over this permit term. Section 9 presents a discussion on how the findings and framework from the interim accounting methodology may be

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<sup>1</sup> Reissued November 19, 2015 with effective date January 1, 2016, to 77 Phase I municipal stormwater Permittees in five Bay Area counties which are among over 90 local agencies comprising the Bay Area Stormwater Management Agencies Association (BASMAA).

used to develop a longer-term accounting methodology consistent with the Reasonable Assurance Analysis (RAA) required by MRP Provisions C.11.c.ii.(2) and C.12.c.ii.(2).

### **1.3 Interim Accounting System Basis**

The Interim Accounting System outlined in this report is based on relative mercury and PCBs yields from different land use categories. This methodology was outlined in the 2014 Integrated Monitoring Reports (IMRs) (ACCWP, 2014; CCCWP, 2014; SCVURPPP, 2014; SMCWPPP, 2014) and is described in the MRP Fact Sheet. The method involves using default factors for PCBs and mercury load reduction credits resulting from foreseeable control measures implemented during this permit term. This report documents the method described in the MRP Fact Sheet; updates and refines the accounting system to account for new information; justifies the assumptions, analytical methods, sampling schemes, and parameters used to quantify the load reduction for each type of control measure; and indicates what information will be collected and submitted to confirm the calculated load reduction for each unit of activity for each control measure.

As described in the MRP Fact Sheet, a land use-based yield is an estimate of the mass of a contaminant contributed by an area of a particular land use per unit time. Essentially, different types of land uses yield different amounts of pollutants because land use types differ in their degree of contamination resulting from differing intensities of historic or ongoing use of pollutants. The land use categories used to land use-based yields were identified from studies conducted to identify potential POC sources and source areas.

A number of preliminary GIS data layers were developed using existing and historical information on land use and facility types that were located in the Bay Area during the early to mid-20<sup>th</sup> century. GIS data layers developed included a revised “Old Industrial” land use layer that attempted to depict industrial areas that were present in the year 1968 and an “Old Urban” land use layer that depicts urbanized areas developed by 1974, other than Old Industrial areas. The year 1974 was used as this was the closest year to 1968 for which data were available. The other categories include “New Urban”, which depicts areas urbanized after 1974; “Open Space”, which represents undeveloped land; and “Other”, which consists of airport and military areas. “Source Property” areas are located in historically industrial or other areas where PCBs were used, released, and/or disposed of and/or where sediment concentrations are significantly elevated above urban background levels.

PCBs were more heavily used in older industrial areas so older industrial land use areas yield a much higher mass of PCBs per unit area than newer urban land use areas. The estimated average PCBs and mercury yields are summarized for the six land use yield categories in Table 1 below. These yields are assigned based on land use, but may also be assigned by the Permittees based on monitoring data and/or inspection results. Table 2 presents land use area-weighted average particle concentrations of PCBs, based on average urban suspended sediment yields of roughly 40 metric tons per km<sup>2</sup> (McKee et al. 2013).

**Table 1: Estimated Land Use-Based Yields for PCBs and Mercury**

Land Use Category	Assumed Average PCBs Yield (mg/ac/yr)	Assumed Average Mercury Yield (mg/ac/yr)
Source Property	4,065	1,300
Old Industrial	86.5	1,300
Old Urban	30.3	215
New Urban	3.5	33
Other	3.5	26
Open Space	4.3	33

mg/ac/yr – milligrams per acre per year

Note: The derivation of these land use-based yields is described in Appendix A to this report. See Table A-3 for further detail.

**Table 2. Estimated Average Land Use Particle Concentrations for PCBs and Mercury\***

Land Use	PCBs (mg/kg/yr)	Mercury (mg/kg/yr)
Source Property	25.1	8.0
Old Industrial	0.5	8.0
Old Urban	0.2	1.3
New Urban	0.02	0.2
Agriculture/Open Space	NA	NA

mg/kg/yr – milligrams per acre per year

\*Particle concentrations in the table above are based on the yields included in Table 1 and the assumed average suspended sediment production of 40 metric tons per km<sup>2</sup> for Source Property, Old Industrial, Old Urban and New Urban land uses. Because sediment production from agricultural and open space land uses range significantly, no PCB or mercury particle concentrations are estimated for these land uses.

## **2. SOURCE PROPERTY IDENTIFICATION AND ABATEMENT**

### **2.1 Control Measure Description**

Source property identification and abatement involves investigations of properties located in historically industrial land use or other land use areas where PCBs or Mercury was used, released, and/or disposed of and/or where sediment concentrations are significantly elevated above urban background levels. The source property identification and abatement control measure begins with performing investigations in High Likelihood/Interest areas to identify PCB/Mercury sources to the municipal storm drain system. Once a source property is identified, the source of PCBs/Mercury on the property may be abated or caused to be abated directly by the Permittee or the Permittee may choose to refer the source property to the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) for investigation and abatement by the SFBRWQCB or another appropriate regulatory agency with investigation and cleanup authority. Source properties may include sites that were previously remediated but still have soils concentrations of PCBs/Mercury that are elevated above urban background levels or may be newly identified source properties.

The Permittees will validate the existence of significantly elevated PCB/Mercury concentrations through surface soil/sediment sampling in the right-of-way or through water sampling where visual inspections and/or other information suggest that a specific property is a potential source of significantly elevated PCB/Mercury concentrations. Where data confirm significantly elevated concentrations (e.g., a sediment concentration equal to or greater than 1.0 mg/kg or a concentration greater than 0.5 mg/kg and other lines of evidence) are present in soil/sediment from a potential source property or in stormwater samples, the Permittees will take actions to cause the property to be abated or will refer that property to the SFBRWQCB to facilitate the issuance of orders for further investigation and remediation of the subject property.

For each confirmed source property, the applicable Permittee will implement or cause to be implemented, where appropriate, one or a combination of interim enhanced operation and maintenance (O&M) measures in the street or storm drain infrastructure adjacent to the source property during the source property abatement process to remove historically deposited sediment and/or to prevent further contaminated sediment from entering the storm drain. These enhanced O&M measures will be described in the source property referral that is sent to the SFBRWQCB. If the Permittee finds that enhanced O&M measures are not justified based on the results of the soil/sediment investigation, the Permittee must discuss these findings with the SFBRWQCB prior to submitting the source property referral. The SFBRWQCB will review the source property referral and provide comments to the Permittee within 30 days (if needed).

#### **2.1.1 Categorical Source Properties**

Categorical source properties include non-municipally-owned electrical utilities and railroads. These types of source properties present special challenges for identification and referral due to

their quantity, dispersed nature, difficulty in sampling, and the general lack of Permittee control over the property owner.

Permittees may identify and refer specific electrical utility and railroad properties if considered a source property or area based on investigation. Where a Permittee demonstrates limited ability to perform enhanced O&M for this type of property, the Permittee may request that the SFBRWQCB use its authority to require the referred source property owner to implement control measures to prevent the release of PCBs (or Mercury) from the identified source property or area.

Permittees may choose to collect data on electrical utility properties and railroads in order to refer an entire category or subcategory of these properties to the SFBRWQCB at a future date. No special load reduction accounting methodology is proposed for categorical referrals in this report, but a categorical accounting methodology would be proposed at the time of categorical referral in the future.

## 2.2 Loads Reduced Accounting Methodology

The amount of PCBs and mercury loads (i.e., annual mass or milligrams per year (mg/yr)) reduced will be assessed using the following interim accounting method:

$$\text{Load of POC Reduced} = SP_A \cdot (SP_Y - OU_Y)$$

Where:

$SP_A$	=	Source property area (acres (ac))
$SP_Y$	=	Source property PCBs or mercury yield (mg/ac/yr)
$OU_Y$	=	Old Urban land use PCBs or mercury yield (mg/ac/yr)

Thus, for PCBs the load reduced in mg/yr will be calculated as the area of the source property in acres multiplied by 4,035 mg/ac/yr (i.e., 4,065 – 30.3 mg/ac/yr).

For mercury, the load reduced in mg/yr will be calculated as the area of the source property in acres multiplied by 1,085 mg/ac-yr (i.e., 1,300 – 215 mg/ac/yr).

As described in the MRP Fact Sheet, 50% of this load reduction will be credited to the Permittee for properties that are referred to the SFBRWQCB for abatement<sup>2</sup>. For these source properties, the Permittee will implement or cause to be implemented enhanced O&M measures in the vicinity of the referred source property. The remaining 50% load reduction for referred properties will be

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<sup>2</sup> The MRP Fact Sheet states that load reductions will be credited during this permit term for source property referrals during the first three years of the permit term. Properties that are identified as sources after this time period (e.g., as land uses and property owners change over time) may be referred and credited during future permit terms.

credited to the Permittee upon completion of the abatement process or at ten years, whichever occurs first. The SFBRWQCB will notify the Permittee when the abatement process is complete.

If the Permittee chooses to abate the property or cause the property to be abated directly without referral to the SFBRWQCB, either through encouraging voluntary actions by the property owner or using municipal enforcement powers, then 100% of the load reduction will be credited to the Permittee at the time that the abatement is complete<sup>3</sup>.

### **2.3 Reporting**

For the source property identification and abatement control measure load reduction reporting, the area of each property will be estimated using the County Assessor's parcel map or an equivalent method. For those source properties that are referred to the SFBRWQCB for abatement, a referral form will be provided that describes the enhanced O&M investigation and results and identifies any enhanced O&M control measures that have been implemented or are planned to be implemented at the source property. For those source properties that are being abated or caused to be abated directly by the Permittee, the Permittee will provide a statement that the property has been abatement.

### **2.4 Assumptions**

The following assumptions apply to this control measure category:

- For source properties that include a combination of previously industrial area and area that is not likely to be a source of PCBs (e.g., unimpacted open space area), the source property yield will only be applied to the portion of the property that is likely to be a source area.
- The determination of the need and extent for enhanced O&M control measures for each identified source property (e.g., if significant quantities of soils/sediment are present in the street and/or storm drain adjacent to the identified source property and if those soils/sediment have significantly elevated PCBs concentrations) will be based on the best professional judgement of the Permittee given site-specific conditions. The referral submittal will include a quantitative justification for this determination. It is assumed that the majority of referred source properties will need enhanced O&M control measures. If the Permittee finds that enhanced O&M measures are not justified based on the results of the soil/sediment investigation, the Permittee must discuss these findings with the

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<sup>3</sup> The Permittee shall provide documentation to the SFBRWQCB that abatement has effectively eliminated transport of PCBs offsite and from entering the municipal separate storm sewer system (MS4) infrastructure for all transport mechanisms that apply to the site. The documentation should include any additional information, such as type of abatement (e.g., have the sources of PCBs to the MS4 been completely eliminated via capping, paving, walls, plugging/removal of internal storm drains, etc.) and/or water or sediment monitoring data that demonstrates the effective elimination of transport of PCBs offsite into the MS4.

SFBRWQCB prior to submitting the source property referral or the 50% load reduction credit will not be awarded.

- In addition to street sweeping, drain inlet cleaning, pump station cleaning, or storm drain cleanout conducted or caused to be conducted by the Permittee, enhanced O&M control measures may also include installation of rumble strips at entrances/exits of source properties to reduce offsite tracking of contaminated sediment; installation of silt fence, gravel bags, fiber rolls, walls, or other sediment control devices at the edge of the right-of-way to prevent contaminated sediment from reaching the MS4; requesting that the SFBRWQCB require a source property to be covered under the Industrial General Permit, with enhanced monitoring and best management practices (BMP) implementation for pollutants of concern (POC) control; or similar control measures. The selected enhanced O&M control measure or combination of measures should be implemented during the source property abatement process such that historically deposited sediment is removed and additional contaminated sediment is prevented from entering the MS4.

### 3. GREEN INFRASTRUCTURE/ TREATMENT CONTROL MEASURES

#### 3.1 Control Measure Description

This control measure includes both new development and redevelopment activities as well as retrofit of treatment controls (including green infrastructure) into existing developed areas. This control measure includes new development and redevelopment projects on private and public properties, as well as retrofit of existing infrastructure in public right-of-way areas and on public properties.

Permittees will account for previously implemented projects and/or will implement green infrastructure projects over this permit term to achieve the PCBs load reductions shown in MRP Table 12.2 and mercury load reductions shown in MRP Table 11.1.

#### 3.2 Loads Reduced Accounting Methodology

As discussed in the MRP Fact Sheet, when contaminated areas are newly developed, redeveloped, or retrofitted, the pollutant yield of the area will be reduced through a variety of mechanisms (i.e., removal, capping, or paving of contaminated sediment and/or treatment of the post-development runoff). The amount of PCBs and mercury load reduction can be obtained by multiplying the area of the new development/redevelopment/retrofit project by the difference in land use-based yield (either Old Industrial minus New Urban or Old Urban minus New Urban, whichever pre-development land use is applicable).

##### 3.2.1 Parcel-Based New Development, Redevelopment, or Retrofit Projects

The Permittees will quantify and report the amount of PCBs and mercury loads reduced from implementation of post-development treatment measures (as well as land use change and abatement) for new development, redevelopment, and parcel-based retrofit projects using the following interim accounting method:

$$\text{Load of POC Reduced} = P_A \cdot (P_Y - NU_Y)$$

Where:

$P_A$	=	New development/redevelopment/parcel-based retrofit project area (ac)
$P_Y$	=	Existing PCBs or mercury yield (mg/ac/yr)
$NU_Y$	=	New Urban PCBs or mercury yield (mg/ac/yr)

### 3.2.2 Green Street Projects, Regional Retrofit Projects, and Full Trash Capture Devices

The Permittees will quantify and report the amount of PCBs and mercury loads reduced from implementation of green street projects, regional retrofit projects<sup>4</sup>, and full trash capture devices (i.e., hydrodynamic separators (HDS) units) using the following interim accounting method:

$$\text{Annual Mass of PCB Reduced} = P_A \cdot P_Y \cdot E_f$$

Where:

- $P_A$  = Tributary area treated by stormwater green infrastructure/retrofit treatment measure (acres)
- $P_Y$  = Area-weighted PCBs or mercury yield (mg/acre-year)
- $E_f$  = Efficiency factor for green infrastructure/retrofit treatment control measure (assumed to be 70%) or HDS units (assumed to be 20%)<sup>5</sup>

### 3.3 Reporting

The following information will be reported for new development/redevelopment/retrofit, green street, and HDS projects:

- Project name and location.
- Whether the project is a new development/redevelopment project subject to MRP Provision C.3.b.ii., a new development/redevelopment project subject to the provisions of the previous MRP, a retrofit project or other project that is not subject to the C.3 provisions of this permit term or the previous permit term, a green street project, or a full trash capture project.
- The year that project construction was completed.
- Total project area for new development/redevelopment/parcel-based retrofit projects and the project tributary drainage area for green streets, regional retrofit, and HDS projects.
- The land use area(s) for the project and the area-weighted land use-based yield for the project area.
- POC loads reduced for each project.

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<sup>4</sup> These projects provide treatment control for existing developed areas without redeveloping the tributary area.

<sup>5</sup> See Appendix C for HDS unit efficiency factor data analysis.

## **4. MANAGE PCBs IN BUILDING MATERIALS AND INFRASTRUCTURE**

### **4.1 Control Measure Description**

#### **4.1.1 PCBs in Building Materials**

During the first three years of the permit term, the Permittees will develop and implement or cause to be developed and implemented an effective protocol for managing materials with PCBs concentrations of 50 ppm or greater in applicable structures at the time such structures undergo demolition, so that PCBs do not enter the municipal separate storm sewer system (MS4). PCBs from these structures can enter storm drains during and/or after demolition through vehicle track-out, airborne releases, soil erosion, stormwater runoff, or improper waste disposal. Applicable structures include, at a minimum, commercial, public, institutional and industrial structures constructed or remodeled between the years 1950 and 1980 with building materials with PCBs concentrations of 50 ppm or greater. Single-family residential and wood frame structures are exempt. A Permittee is exempt from this requirement if the only structures that existed pre-1980 within its jurisdiction were single-family residential and/or wood-frame structures.

#### **4.1.2 PCBs in Infrastructure**

PCBs-containing caulks and sealants may also be found in public infrastructure such as parking garages, bridges, dams, storm drain pipes, and pavement joints (e.g., curb and gutter).

### **4.2 Loads Reduced Accounting Methodology**

#### **4.2.1 PCBs in Building Materials**

As stated in the MRP, for this permit term the Permittees will receive a total of 2,000 g/yr (2 kg/yr) PCBs load reduction value if protocols for managing PCBs-containing materials during demolition, as required in MRP Provision C.12.f., have been developed and implemented.

The Permittee-specific portion of the 2,000 g/yr PCBs load reduction value will be based on the proportion of the county population in each municipality in the 2000 Census. If all of the Permittees in a county wish to use an alternative method of distributing the load reductions for managing PCB-containing materials during demolition, these Permittees will report through their countywide stormwater programs on their alternative method (if different from the default population-based method) for assigning Permittee-specific load fractions in the 2019 Annual Report. This can be determined by the Permittees within each county and may be different from one county to the next, but all of the Permittees within a county must use the same method of distributing the county load reductions.

The PCBs load reduction for this control measure will be accounted for in the 2019 Annual Report, if the protocols are developed and implemented prior to July 1, 2019. If the protocols are developed

and implemented prior to July 1, 2018, the PCBs load reduction for this control measure will be accounted for in the 2018 Annual Report.

#### 4.2.2 PCBs in Infrastructure

For infrastructure projects, the following interim accounting method will be used to account for PCBs loads reduced by developing and implementing effective protocols for identifying and managing PCBs-containing materials during infrastructure improvement projects:

$$PCBs\ Loads\ Reduced = A + B$$

Where:

- |   |   |  |
|---|---|--|
| A | = | Estimated average annual mass of PCBs in the infrastructure that entered the MS4 from the infrastructure prior to the infrastructure improvement (mg/yr)   |
| B | = | Estimated average annual mass of PCBs that would have entered the MS4 as a result of the improvement project without proper controls (this accounts for a change in the identification, management, and disposal practices for PCBs-containing caulks and sealants during infrastructure improvement projects) (mg/yr) |

The PCB load reduction for this control measure will be accounted for on an individual project basis during this permit term. Monitoring conducted to address the requirements of MRP Provision C.12.e will be used to inform factors A and B above, in conjunction with project-specific monitoring to measure the mass of PCBs-containing caulk and/or sealants in the project's infrastructure.

### 4.3 Reporting

#### 4.3.1 PCBs in Building Materials

The Permittees will summarize the steps they have taken to begin implementing this control measure, either collectively or individually, in the 2016, 2017, and 2018 Annual Reports.

Each Permittee seeking exemption from the C.12.f requirement to implement this control measure will submit documentation in the 2017 Annual Report, such as historic maps or other historic records, clearly demonstrating that the only structures that existed pre-1980 within its jurisdiction were single-family residential and/or wood-frame structures.

In the 2020 Annual Report, the Permittees will provide:

- Documentation demonstrating implementation with each of the minimum requirements in Provision C.12.f.ii(1)(a)-(c).

- An assessment methodology and data collection program to quantify PCBs loads reduced through implementation of the protocol for controlling PCBs during building demolition.

In the 2020 Annual Report and thereafter, the Permittees will provide documentation of each of the following items:

- The number of applicable structures that applied for a demolition permit during the reporting year; and
- A running list of the applicable structures that applied for a demolition permit (since the date the PCBs control protocol was implemented) that had material(s) with PCBs at 50 ppm or greater, with the address, demolition date, and brief description of PCBs control method(s) used.

#### **4.3.2 PCBs in Infrastructure**

The PCB load reduction for this control measure will be reported for each infrastructure project in the Annual Report following project completion. A report will be prepared that describes the infrastructure improvement project, the monitoring done to measure the PCBs present in the caulk and/or sealants, and how the factors A and B were determined.

Monitoring conducted to address the requirements of MRP Provision C.12.e will be reported in the 2018 Annual Report.

### **4.4 Assumptions**

#### **4.4.1 PCBs in Building Materials**

- All Permittees will receive their share of the total of 2,000 g/yr PCBs load reduction value if protocols for managing PCBs-containing materials during demolition, as required in MRP Provision C.12.f., have been developed and implemented within their jurisdiction.
- Permittees that have SFBRWQCB Executive Officer approval as exempt from this requirement will also receive their share of the total 2,000 g/yr PCBs load reduction value.

#### **4.4.2 PCBs in Infrastructure**

- Sufficient data will be collected as part of the monitoring conducted to address the requirements of MRP Provision C.12.e. to inform the values for factors A and B. A project-specific analysis may also be conducted by the Permittee to develop these factors.

## 5. ENHANCED OPERATION AND MAINTENANCE CONTROL MEASURES

### 5.1 Control Measure Description

Routine MS4 operation and maintenance (O&M) activities include street sweeping, drain inlet cleaning, and pump station maintenance. In addition, culverts and channels are also routinely maintained (i.e., desilted). Enhancements to routine operations and new actions such as storm drain line and street flushing may enhance the Permittees' ability to reduce PCBs and mercury in stormwater. PCBs load reductions achieved through implementation of enhanced O&M control measures, aside from enhanced O&M control measures associated with source property referrals, may be counted as part of the overall load reductions expected during this permit term.

### 5.2 Loads Reduced Accounting Methodology

#### 5.2.1 Inlet Cleaning and Street Sweeping

Load reductions for inlet cleaning and street sweeping will be calculated as follows:

$$\text{Annual Load of PCB Reduced} = P_A \cdot P_Y \cdot EE_f$$

Where:

- $P_A$  = Catchment area for enhanced O&M measure (acres)
- $P_Y$  = Area-weighted PCBs yield (mg/acre-year) for the enhanced O&M catchment area based on land use yield (see Table 1)
- $EE_f$  = Enhancement Efficiency factor for enhanced O&M control measure (See Appendix D for enhanced inlet cleaning. The enhancement efficiency factor for street sweeping will be based on the results of CW4CB Task 4 WINSLAM modeling analysis).

#### 5.2.2 Pump Station Cleanout, Storm Drain Line Cleanout, Street Flushing, and Culvert/Channel Desilting

Load reductions for enhanced pump station cleanout, storm drain line cleanout, street flushing, and culvert/channel desilting will be calculated as follows:

$$\text{Enhanced}_{LR} = \text{Current}_{LR} - \text{Baseline}_{LR}$$

Where:

- $\text{Current}_{LR} = \text{Vol}_{\text{Current}} \cdot \% \text{Sed} \cdot \rho \cdot \text{Conc}$
- $\text{Baseline}_{LR} = \text{Vol}_{\text{Baseline}} \cdot \% \text{Sed} \cdot \rho \cdot \text{Conc}$

$Vol_{Current}$	=	Average volume of material collected via the enhanced O&M control measure in current year(s) (post-Fiscal Year 2001-02) (m <sup>3</sup> /yr)
$Vol_{Baseline}$	=	Average volume of material collected via the O&M control measure in baseline years (prior to and including Fiscal Year 2001-02) (m <sup>3</sup> /yr) (assumed to be zero for storm drain cleanout and street flushing)
%Sed	=	Percent of material collected (by volume) by the enhanced O&M control measure that is sediment < 2mm in diameter (measured)
$\rho$	=	Sediment density of the material collected by the enhanced O&M control measure (weight per unit volume) (measured)
Conc	=	Average concentration of PCBs in sediments collected by the enhanced O&M control measure (mg/kg; see Section 1, Table 2, for land use-based sediment concentrations to calculate area-weighted concentrations or alternatively use project-specific measurements).

### 5.3 **Reporting**

The following information will be reported for this control measure:

- Description of O&M measure enhancement.
- Volume of material collected above baseline and loads reduced.
- Loads reduced.

## 6. DIVERSION TO POTW

### 6.1 Control Measure Description

This control measure consists of diverting dry weather and/or first flush events from MS4s to publically owned treatment works (POTWs) as a method to reduce loads of PCBs and mercury in urban runoff.

### 6.2 Loads Reduced Accounting Methodology

The load reduction calculation method for this control measure is:

$$\text{EnhancedReductionDiversi} = \text{CurReductionDiversi} - \text{BaseReductionDiversi}$$

Where:

BaseReductionDiversi = Mass of PCBs or mercury reduced via POTW diversions of urban stormwater in 2002 (assume zero for all diversions except the Palo Alto Diversion Structure)

CurReductionDiversi = Mass of PCBs or mercury reduced via POTW diversions of urban stormwater in Year of Interest

And:

$$\text{Base or Cur ReductionDiversi} = \text{ConcDiversi} \cdot \text{VolDiversi}$$

Where:

ConcDiversi = Average concentration of PCBs or mercury in sediment and/or water diverted to POTW (measured)

VolDiversi = Volume of sediment and/or water diverted to POTW (measured)

### 6.3 Reporting

For diversions, a project-specific report will be prepared that describes the diversion and project-specific load reduction calculations.

## 7. SOURCE CONTROLS AND OTHER CONTROL MEASURES

This control measure category includes institutional source controls, such as mercury recycling, and other source control measures such as managing illegal dumping of construction debris and stockpiles of PCBs-containing materials. Descriptions of the control measures, accounting method, reporting, and uncertainties for each of these control measures are provided in the subsections following.

### 7.1 Mercury Load Avoidance and Reduction

Mercury load avoidance and reduction includes a number of source control measures listed in the California Mercury Reduction Act adopted by the State of California in 2001. These source controls include material bans, reductions of the amount of mercury allowable for use in products, and mercury device recycling. The following source controls bans are included:

- Sale of cars that have light switches containing mercury;
- Sale or distribution of fever thermometers containing mercury without a prescription;
- Sale of mercury thermostats; and,
- Manufacturing, sale, or distribution of mercury-added novelty items.

In addition, fluorescent lamps manufacturers continue to reduce the amount of mercury in lamps sold in the U.S. Manufactures have significantly reduced the amount of mercury in fluorescent linear tube lamps.

Mercury Device Recycling Programs resulting in Mercury load reduction generally include three types of programs that promote and facilitate the collection and recycling of mercury-containing devices and products:

1. Permittee-managed household hazardous waste (HHW) drop-off facilities and curbside or door-to-door pickup;
2. Private business take-back and recycling programs (e.g., Home Depot); and,
3. Private waste management services for small and large businesses.

#### 7.1.1 Loads Avoided/Reduced Accounting Methodology

The load avoidance/reduction methodology for this control measure is:

$$HgReduction_{L/S/T} = BaseLoad_{L/S/T} - CurLoad_{L/S/T}$$

Where:

BaseLoad<sub>L/S/T</sub> = Baseline load of mercury in urban stormwater in 2002 from lamps (L), switches (S), and thermostats (T)

$CurLoad_{L/S/T}$  = Current load of mercury in urban stormwater in year of interest from lamps (L), switches (S), and thermostats (T)

And:

$BaseLoad_{L/S/T}$  =  $BaseMass_{L/S/T} \cdot BaseNum_{L/S/T} \cdot T$

$CurLoad_{L/S/T}$  =  $CurMass_{L/S/T} \cdot CurNum_{L/S/T} \cdot T$

Where:

$BaseMass_{L/S/T}$  = Average mass of total mercury in each lamp (L), switch (S), and thermostat (T) in 2002 (Assume: 93mg per kilogram of linear fluorescent lamp or Compact Fluorescent Lamp (CFL); 2.9g per switch; and 4g per thermostat).

$CurMass_{L/S/T}$  = Average mass of total mercury in each lamp (L), switch (S), and thermostat (T) recycled in year of interest (Assume: 35mg per kilogram of linear fluorescent lamp or CFL; 2.9g per switch; and 4g per thermostat).

$BaseNum_{L/S/T}$  = Number or weight of lamps (L), switches (S), and thermostats (T) improperly discarded into the environment in 2002.

$CurNum_{L/S/T}$  = Number or weight of lamps (L), switches (S), and thermostats (T) discarded into the environment improperly in year of interest.

T = % of total mercury in lamps (L), switches (S), and thermostats (T) that when improperly discarded are transported to the Bay via urban stormwater (Assume 4.8%).

And:

$BaseNum_{L/S/T}$  =  $BaseSpent_{L/S/T} - BaseRecycle_{L/S/T}$

$CurNum_{L/S/T}$  =  $CurSpent_{L/S/T} - CurRecycle_{L/S/T}$

Where:

$BaseSpent_{L/S/T}$  = Number or weight of lamps (L), switches (S), and thermostats (T) that reached their end-of-life in 2002

$BaseRcy_{L/S/T}$  = Number or weight of lamps (L), switches (S), and thermostats (T) recycled in 2002

$CurSpent_{L/S/T}$  = Number or weight of lamps (L), switches (S), and thermostats (T) that reached their end-of-life in year of interest

$CurRecycle_{L/S/T}$  = Number or weight of lamps (L), switches (S), and thermostats (T) recycled in year of interest

### 7.1.2 Reporting

The following information will be reported for this control measure:

- Description of mercury recycling program and activities.
- Mass of mercury reduced or avoided as a results of these programs and activities.

## 7.2 **Illegal Dumping Clean-Up**

This source control measure entails clean-up of construction and demolition debris from illegal dumping areas. This control measure will apply to construction and demolition illegal dumping only during this permit term, but may be expanded to other types of illegally dumped trash if supported by monitoring data.

The load reduction calculation method for this control measure is:

$$\text{Load reduced} = (\text{volume of construction and demolition debris cleanup per year}) \cdot (\text{average concentration of PCBs and mercury in construction and demolition debris})$$

Information needed to calculate the load reduction includes:

- Volume of construction and demolition debris (measured)
- Average concentration of PCBs and mercury measured in construction and demolition debris (measured)

Load reduced will be analyzed and determined on a case-by-case basis unless region-wide data is developed through monitoring at a later date.

## 7.3 **Stockpile, Spills, and Disposal of PCBs**

This control measure includes the proper clean-up and disposal of stockpiles, spills, and/or improperly disposed quantities of PCBs. The measure would involve, for instance, a concentrated source of PCBs (e.g., a barrel) that is found and cleaned-up or properly disposed.

The load reduction calculation method for this control measure is:

$$\text{Load reduced} = (\text{mass of PCBs in pile}) \cdot (\text{fraction of mass that was or could have entered the MS4 per year})$$

Load reduced would have to be analyzed and determined on a case-by-case basis. Factors that should be considered in determining the fraction of mass that was or could have entered the MS4 per year include proximity to a storm drain, lack of secondary containment/potential for a spill for stockpiles, extent of exposure to rainfall, history of previous spills, etc.

## **8. PROGRAM UPDATES AND REFINEMENTS**

### **8.1 Interim Accounting Methodology**

The interim accounting methodology outlined in this report may be updated and refined to account for significant new information as it becomes available. If needed, the proposed updates will be submitted as an addendum to this report for Executive Office approval in the 2017 Annual Report or subsequent Annual Reports during this permit term.

### **8.2 Transition to Long Term Accounting Methodology**

#### **8.2.1 Reasonable Assurance Analysis**

##### ***Green Infrastructure***

MRP Provision C.3.j requires the Permittees to develop a Green Infrastructure Plan for inclusion in the 2019 Annual Report. The Green Infrastructure Plan must be developed using a mechanism to prioritize and map areas for potential and planned green infrastructure projects, both public and private, on a drainage-area-specific basis, for implementation by 2020, 2030, and 2040. MRP Provisions C.11.c and C.12.c require the Permittees to prepare a Reasonable Assurance Analysis (RAA) for inclusion in the 2020 Annual Report that quantitatively demonstrates that mercury load reductions of at least 10 kg/yr and PCBs load reductions of at least 3 kg/yr will be achieved by 2040 through implementation of green infrastructure throughout the permit area.

This reasonable assurance analysis should do the following:

1. Quantify the relationship between the areal extent of green infrastructure implementation and mercury and PCBs load reductions. This quantification should take into consideration the scale of contamination of the treated area as well as the pollutant removal effectiveness of likely green infrastructure strategies.
2. Estimate the amount and characteristics of land area that will be treated through green infrastructure by 2020, 2030, and 2040.
3. Estimate the amount of mercury and PCBs load reductions that will result from green infrastructure implementation by 2020, 2030, and 2040.
4. Quantitatively demonstrate that mercury load reductions of at least 10 kg/yr and PCBs load reductions of at least 3 kg/yr will be realized by 2040 through implementation of green infrastructure projects.
5. Ensure that the calculation methods, models, model inputs, and modeling assumptions used have been validated through a peer review process.

### ***TMDL Implementation Plan***

Additionally, MRP Provisions C.11.d. and C.12.d. require the Permittees to prepare plans and schedules for mercury and PCBs control measure implementation and a RAA demonstrating that sufficient control measures will be implemented to attain the mercury TMDL wasteload allocations by 2028 and the PCBs TMDL wasteload allocations by 2030. The implementation plans, which will also be included in the 2020 Annual Report along with the green infrastructure RAA outlined above, must:

1. Identify all technically and economically feasible mercury or PCBs control measures (including green infrastructure projects, but also other control measures such as source property identification and abatement, managing PCBs in building materials during demolition, enhanced operations and maintenance, and other source controls) to be implemented;
2. Include a schedule according to which technically and economically feasible control measures will be fully implemented; and
3. Provide an evaluation and quantification of the mercury and PCBs load reduction of such measures as well as an evaluation of costs, control measure efficiency, and significant environmental impacts resulting from their implementation.

#### **8.2.2 Long Term Accounting Methodology**

MRP Provisions C.11.b.iii.(3)/C.12.b.iii.(3) require the Permittees to submit in the 2018 Annual Report any refinements, if necessary, to the Interim Accounting Methodology for use during the subsequent permit term. The need for updating to the Interim Accounting Methodology will be assessed at that time. At a minimum, the proposed Permanent Accounting Methodology will be consistent with green infrastructure RAA methodology for green infrastructure control measures. The Permanent Accounting Methodology for the other control measures will likely be based on the framework established in this Interim Accounting Methodology and will be informed by the implementation and monitoring conducted over the next two years.

## 9. REFERENCES

- Alameda Countywide Clean Water Program (ACCWP), 2014. Integrated Monitoring Report Part C: PCB and Mercury Load Reduction. Prepared for ACCWP by Geosyntec Consultants. March 2014.
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- Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP), 2014. Watershed Monitoring and Assessment Program Integrated Monitoring Report – Part C Pollutants of Concern Load Reduction Opportunities. March 2014.
- McKee, L.J., Gilbreath, A.N., Wu, J., Kunze, M.S., Hunt, J.A., 2014. Estimating Regional Pollutant Loads for San Francisco Bay Area Tributaries using the Regional Watershed Spreadsheet Model (RWSM): Year's 3 and 4 Progress Report. A technical report prepared for the Regional Monitoring Program for Water Quality in San Francisco Bay (RMP), Sources, Pathways and Loadings Workgroup (SPLWG), Small Tributaries Loading Strategy (STLS). Contribution No. 737. San Francisco Estuary Institute, Richmond, California.
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- San Francisco Bay Regional Water Quality Control Board (SFBRWQCB), 2015. Municipal Regional Stormwater NPDES Permit, Order No. R2-2015-0049, NPDES Permit No. CAS612008. November 19, 2015

# APPENDIX A

## Yield Regression Analysis

## **A.1 METHODOLOGY**

The methodology presented in this appendix was developed to assist the MRP Permittees in identifying which watershed characteristics correlate well with areas that have high, moderate, and low rates of pollutant of concern (POC) (i.e., mercury and polychlorinated biphenyls (PCBs)) loading to receiving waters via stormwater runoff. The methodology was developed using the collective local understanding of the types of land areas, facilities, and activities that generate POCs, with a focus on PCBs. The ultimate goal of the analysis was to provide first order estimates of POC loading rates from high, moderate, and low likelihood source areas and to assist Permittees in identifying areas for implementing POC load reduction measures that would have the greatest load reduction benefit.

### **A.1.1 Source Area Mapping**

Documented uses and sources of PCBs and mercury in the urban environment and the results of PCBs source identification and abatement studies described in the 2014 Integrated Monitoring Report (IMR) Part B (BASMAA, 2014) have been used to identify PCBs source areas. Findings demonstrate that PCBs (and to a lesser extent mercury) sources are generally associated with watershed areas where equipment containing POCs were transported or used and facilities that recycle POCs or POC-containing devices and equipment. These sources include current and historic metal, automotive, and hazardous waste recycling and transfer stations; electrical properties and power plants; and rail lines. These sources are typically located in areas that were industrialized between the late 1920's and the late 1970's, the timeframe when PCBs and mercury production were the greatest in the U.S.

To assist Permittees in identifying potential POC sources and source areas, a number of preliminary GIS data layers were developed using existing and historical information on land use and facility types that were located in the Bay Area during the early to mid-20<sup>th</sup> century. GIS data layers included a revised "Old Industrial" land use layer that attempted to depict industrial areas that were present in the year 1968; an "Old Urban" land use layer that depicts urban areas developed by 1974, other than those depicted as Old Industrial; points depicting current facilities that have the potential to have or have had PCBs on-site; and historical and current rail lines where PCBs may have been transported.

#### **A.1.1.1. Old Industrial Land Areas**

Three sets of data layers were acquired and served as the primary sources of information used to create the Old Industrial data layer: 1) the 2005 version of the Association of Bay Area Governments (ABAG) land use data layers for the five Bay Area counties, which depicts current industrial land use areas; 2) 1968 aerial photographs for the Bay Area at 30,000 scale acquired from the United States Geological Survey's (USGS) Earth Explorer website; and 3) the most currently available County Assessor parcel data layers for Bay Area counties. Through the development of the Old Industrial layer, two data layers were created. The first depicts industrial land areas in 1968 that are not currently characterized as industrial by ABAG. This data layer was

## Appendix A: Yield Regression Analysis

created by panning through 1968 aerial photography and identifying industrial land areas outside of the areas characterized as industrial land use in roughly 2005 by ABAG. The purpose of this layer was to identify potential industrial facilities that were present in 1968, but possibly redeveloped or incorrectly identified within the ABAG land use data. The second data layer that was created depicts areas characterized by ABAG in 2005 as industrial land uses that were clearly not industrial in the 1968 aerial photographs. Most of these areas were developed into industrial land uses after 1968 and are most commonly agricultural in the aerial photographs. All parcels that were identified as at least partially industrial in 1968 were visually checked in the data layer to provide greater confidence in its accuracy. Minor edits were then made based on this quality assurance check. If there was uncertainty as to whether a parcel in the 1968 photographs was industrial, then the parcel was classified based on the ABAG land use data. As a final check, the 1968 aerial photographs were also compared to current aerial photographs and each parcel that had been redeveloped was attributed with the current land use, even if that land use remained industrial.

### **A.1.1.2. Old and New Urban Land Areas**

Old Urban and New Urban land use data layers that depict areas urbanized prior to and after 1974, respectively, were developed using an urban extents data layer from 1974, the closest year to 1968 that the data were available. All areas that were within the urban extent in 1974 were defined as Old Urban; those areas that fell outside of this definition were classified as New Urban.

### **A.1.1.3 Identification of Potential POC Associated Facilities**

Point data were collected for a number of facility types that may be associated with either PCBs or mercury. These facility types include those associated with electrical generation, known mercury emitters, metal manufacturing, drum recycling, metal recycling, shipping, automotive recycling, general recycling, and those known to have or historically have had PCBs in use. This information was primarily gathered by the San Francisco Estuary Institute (SFEI) as part of the Urban Stormwater Best Management Practices (BMPs) Proposition 13 Grant project and contains data from a variety of sources, including the California Air Resources Board, EnviroStor, Superfund, Department of Toxic Substances Control, and the State Water Resource Control Board.

Certain facility types for which point data were developed were mapped in greater detail to develop polygons to allow area calculations to be performed. Of particular interest for PCBs were the several hundred electrical substations in the Bay Area. Areas for these facilities were delineated using current and 1968 aerial photographs to attribute whether each facility was built prior to or after 1968. Additionally, military, port, and railroad land use areas were developed using ABAG 2005 land use data and the latest assessor's parcel data. Military parcels were further edited to only include developed areas.

Land use and facility data layers created as part of this effort were then combined to create one contiguous data layer. This data layer was attributed with additional information such as city, county, and watershed.

**A.2 YIELD ANALYSIS**

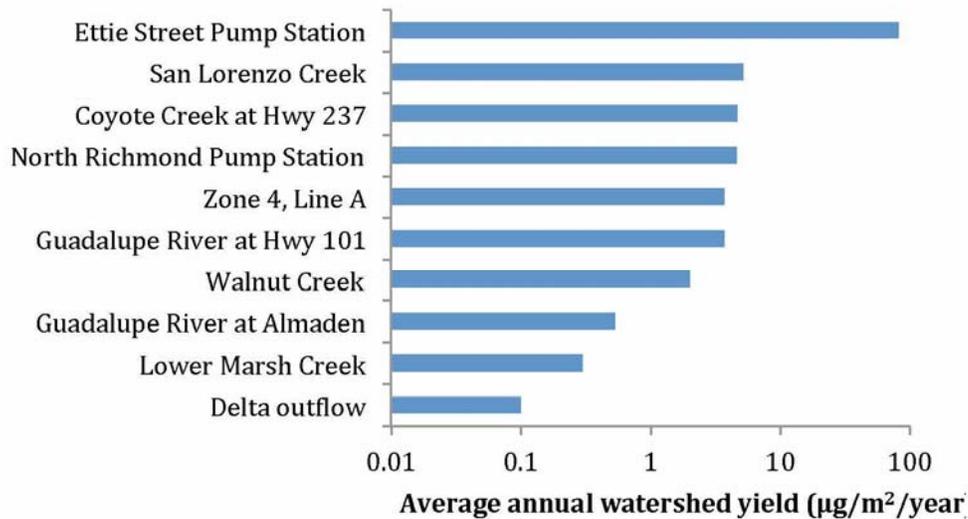
The yield analysis consisted of the following three steps:

- Review watershed yield data,
- Characterize the watersheds in terms of yield, and
- Develop regression equations linking yields to watershed attributes.

The analysis results are discussed below.

**A.2.1 Review of SFEI Watershed Yield Data**

SFEI’s *PCBs in San Francisco Bay: Assessment of the Current State of Knowledge and Priority Information Gaps* (Davis et al., 2014) summarizes what had been learned from monitoring PCBs in San Francisco Bay and in the watersheds that discharge to the Bay prior to 2014. Data are presented for various media including fish tissue, sediment, and water. Yield estimates are also provided for monitored watersheds (Figure A-1).



**Figure A-1: Average Annual Watershed Yield**

SFEI also reported yield estimates for Lower Marsh Creek, San Lorenzo Creek, Walnut Creek, Sunnyvale East Channel, and the Ettie Street Pump Station (ESPS) in the *POC Loads Monitoring Data, Water Year 2011 Report* (Table 13; McKee et al., 2012). The estimates of yield from these sources (ranked by yield) are provided in Table A-1 below. These yield estimates cover a range from approximately 0.1 to 82 µg/m<sup>2</sup>/yr. The lowest yield is associated with the Delta outflow and the highest yield is associated with the ESPS watershed.

## Appendix A: Yield Regression Analysis

**Table A-1: Mean Annual PCBs Yield Estimates**

Watershed	PCBs Yield [ $\mu\text{g}/\text{m}^2/\text{yr}$ ]	PCBs Yield [ $\mu\text{g}/\text{acre}/\text{yr}$ ]	Watershed Cluster No. <sup>1</sup>
Ettie Street Pump Station	82	331,843	1
Sunnyvale East Channel (H)	8.8	35,612	2
Sunnyvale East Channel (L)	4.8	19,425	2
Coyote Creek at Hwy 237	4.8	19,425	6
North Richmond Pump Station	4.7	19,020	NA
Zone 4, Line A	3.8	15,378	1
Guadalupe River at Hwy 101	3.8	15,378	6
San Lorenzo Creek	2.6	10,522	6
Walnut Creek	2.0	8,094	6
Guadalupe River at Almaden	0.54	2,185	6
Lower Marsh Creek	0.30	1,214	NA
Delta Outflow	0.10	405	NA

Sources: *PCBs in San Francisco Bay: Assessment of the Current State of Knowledge and Priority Information Gaps* (Davis et al., 2014) and *POC Loads Monitoring Report WY 2011* (McKee et al., 2012).

NA – not identified in list of watersheds in *Exploratory Categorization of Watersheds for Potential Stormwater Monitoring in San Francisco Bay* (Greenfield et al., 2010).

<sup>1</sup> From *Exploratory Categorization of Watersheds for Potential Stormwater Monitoring in San Francisco Bay* (Greenfield et al., 2010). Clusters are a function of land cover, imperviousness, historic industrial land use, and other features.

Yield estimates for HgT provided in the *POC Loads Monitoring Report, WY 2011* (Table 13, McKee et al., 2012) are summarized in Table A-2 below.

**Table A-2: Mean Annual Total Mercury Yield Estimates**

Watershed	HgT Yield [ $\mu\text{g}/\text{m}^2/\text{year}$ ]	HgT Yield [ $\mu\text{g}/\text{acre}/\text{yr}$ ]	Watershed Cluster No.
Ettie Street Pump Station	79	319,702	1
Walnut Creek	29	117,359	6
Sunnyvale East Channel (H)	23	93,078	2
Sunnyvale East Channel (L)	13	52,609	2
Lower Marsh Creek	9	36,422	NA
San Lorenzo Creek	8	32,375	6

Source: *POC Loads Monitoring Data WY 2011* (Table 13, McKee et al., 2012)

NA – not identified in list of watersheds in *Exploratory Categorization of Watersheds for Potential Stormwater Monitoring in San Francisco Bay* (Greenfield et al., 2010).

### **A.2.2 Watershed Characterization**

The yield data summarized above indicates that yields vary between watersheds. Therefore, an analysis was conducted to look for trends between yield and watershed characteristics.

SFEI has conducted a watershed characterization study where they categorized 185 watersheds in the Bay Area into eight “clusters” depending on land cover, imperviousness, historical industrial land use, and other features (Greenfield et al., 2010). As indicated in Tables A-1 and A-2 above, the watersheds for which yield estimates are available fall into cluster numbers 1, 2 or 6, where the clusters (and the number of watersheds classified within each cluster) are defined as:

## Appendix A: Yield Regression Analysis

- Cluster No. 1: high commercial and residential land cover and imperviousness, high historic industry and railroads, no PG&E facilities, moderate area (41 watersheds)
- Cluster No. 2: High commercial and residential land cover and imperviousness, high historic industry and railroads, one to four PG&E facilities, large area (43 watersheds)
- Cluster No. 6: largest watersheds, with moderate population density, high open land cover, and low imperviousness (22 watersheds)

This analysis indicates that generally the highest yielding watersheds tend to be in clusters 1 and 2, which are the smaller, more developed and impervious watersheds.

A further analysis was conducted by Geosyntec Consultants to examine if the watersheds could be classified based on observed water quality, rather than watershed characteristics alone. For this purpose, data collected as part of the reconnaissance study conducted by McKee et al. (2012)<sup>6</sup> were examined. Figure A-2 below shows mean particle ratio<sup>7</sup> and mean total PCBs concentrations measured at various locations in the reconnaissance study (total of 17 watersheds). The bars represent the range of observations. The data clearly distinguish two categories of watersheds, a set of watersheds (black circles) in contrast to elevated watersheds (red squares) where concentrations are significantly higher. (A similar distinction was found by McKee et al. (2012) in their analysis of particle ratio data.)

The elevated watersheds consist of ESPS, Santa Fe Channel, Pulgas Creek North, and Pulgas Creek South, of which the latter three watersheds are in Cluster No. 2. Those watersheds near the origin of Figure A-2 have moderate discharge quality in contrast to the elevated watersheds, and are referred to herein as “baseline watersheds.” The concept being that, unless data indicate that a watershed is elevated, the best estimate of loads would be derived from data describing the baseline watersheds.

A similar analysis for HgT indicated that most of the watersheds that were higher in PCBs concentrations were also higher in HgT concentrations, but the data exhibited more of a continuum (see Figure 4, McKee et al., 2012). So the decision was made to not distinguish watersheds for HgT as was done with PCBs, but rather to assume that all the watersheds were in the same population. This decision was also driven in part by the more limited data set that is available for HgT yield.

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<sup>6</sup>Source of Data: California Environmental Data Exchange Network (CEDEN), SFEI River Loading Study Program, <http://www.ceden.us/AdvancedQueryTool>

<sup>7</sup> The particle ratio is the ratio of the pollutant of concern concentration (e.g., PCB concentration) to the suspended sediment concentration, for a water sample.



## Appendix A: Yield Regression Analysis

To simplify the regression, land use categorizations from the basemap described in section A.1.1 above were aggregated into five categories (Table A-3).

**Table A-3: Land Use Categories for Regression Analysis**

Specific Category	General Category
Electrical Property - Old	1 – Old Industrial
Industrial - Old	1 – Old Industrial
Industrial - Old - Now Open Space/Vacant	1 – Old Industrial
Industrial - Old - Now Redeveloped	1 – Old Industrial
Port	1 – Old Industrial
Railroad	1 – Old Industrial
Freeway	2 – Old Urban
Urban Old - Commercial	2 – Old Urban
Urban Old - HDR	2 – Old Urban
Urban Old - LDR	2 – Old Urban
Urban Old - Other	2 – Old Urban
Electrical Property - New	3 – New Urban
Industrial - New	3 – New Urban
Urban New - Commercial	3 – New Urban
Urban New - HDR	3 – New Urban
Urban New - LDR	3 – New Urban
Urban New - Other	3 – New Urban
Agriculture	4 – Open Space
Open Space	4 – Open Space
Airport	5 – Other
Military (Developed Areas Only)	5 – Other

The form of the linear regression equation is:

$$\text{Yield (mg/acre/yr)} = [(A \times \text{area (old industrial)} + B \times \text{area (old urban)} + C \times \text{area (new urban)} + D \times \text{area (open)} + E \times \text{area (other)}) / \text{Total Area}]$$

Where the coefficients (i.e., land use yields) are:

$$A = 50 \text{ mg/acre/year (old industrial)}$$

$$B = 17.5 \text{ mg/acre/year (old urban)}$$

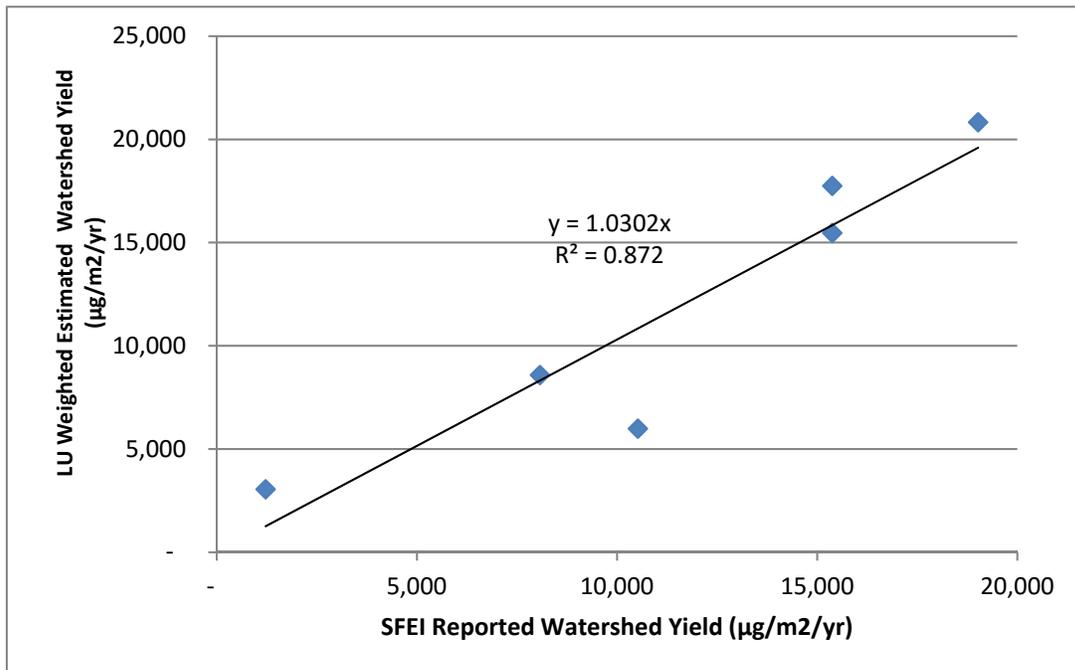
$$C = 2 \text{ mg/acre/year (new urban)}$$

$$D = 2.5 \text{ mg/acre/year (open space)}$$

$$E = 2 \text{ mg/acre/year (other)}$$

## Appendix A: Yield Regression Analysis

Coefficients were determined iteratively and are considered to represent the central tendency of the land use yields based on the watershed data available at the time (2013). The regression analysis results show the importance of land use type on yield, with old industrial having the highest yield. This is consistent with the analysis conducted by McKee et al. (2012), which showed a positive correlation between PCBs concentrations and historic industrialization. Old Urban also has a modest effect and the effects of other land uses are negligible. Figure A-3 below shows how the predicted yields using the regression equation compare to the reported yields from SFEI based on measurements. An  $R^2$  of 0.87 indicates that approximately 87 percent of the variability in PCBs yields could be explained by land use.



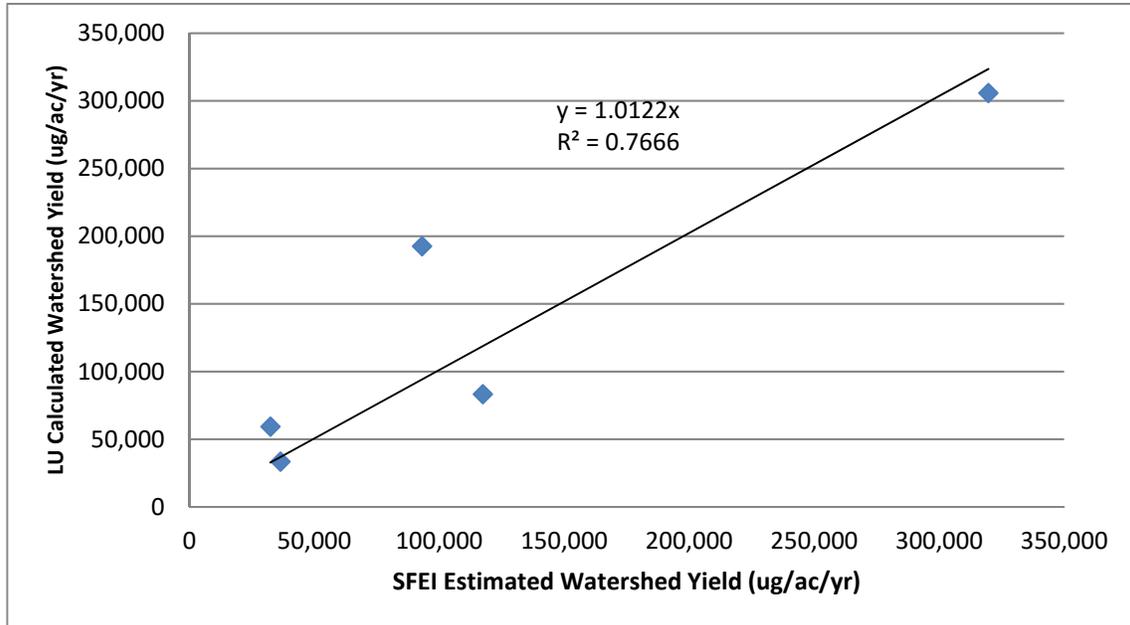
**Figure A-3: PCBs Yields Using Linear Regression versus Estimated Yields Based on Monitoring Data**

Similarly, a linear regression analysis was conducted for HgT which resulted in the following regression coefficients, considered to approximately represent the central tendency of the yields from land uses present in the watershed.

- A = 1,000 mg/acre/year (old industrial)
- B = 165 mg/acre/year (old urban)
- C = 25 mg/acre/year (new urban)
- D = 25 mg/acre/year (open space)
- E = 20 mg/acre/year (other)

## Appendix A: Yield Regression Analysis

Figure A-4 below shows the correlation of the linear regression to the SFEI reported data. The  $R^2$  of 0.76 indicates that land use explains about 76 percent of the variability in estimated yields. The importance of Old Industrial, and to a lesser extent Old Urban land use, similar to that with PCBs, is illustrated by the magnitude of the coefficients for these land uses.



**Figure A-4: Total Mercury Yields Using Linear Regression versus Estimated Yields Based on Monitoring Data**

### A.3 YIELD CORRECTION FACTOR

#### A.3.1 PCBs Yield

##### A.3.1.1 Land Use-Based Yields

The land use-based PCBs yields from the regression analysis reported above were multiplied by the area of each land use within each MRP Permittee's jurisdictional boundary to develop estimates of Permittee-based total calculated load. The resulting loads were reported in each countywide program's IMR Part C. These loads are summarized by county in Table A-4 below.

Appendix A: Yield Regression Analysis

**Table A-4: PCBs Loading Reported in the 2014 IMR**

County	Load From Land Use Yields (g/yr)	Load From Elevated Watersheds (g/yr) <sup>1</sup>
Alameda	2,566	399
Contra Costa	1,995	354
San Mateo	1,086	86
Santa Clara	2,738	179
Solano <sup>2</sup>	285	N/A
<b>Total</b>	<b>8,670</b>	<b>1,018</b>

<sup>1</sup> Loading for the five pilot watersheds was calculated separately from the rest of the county land area using the yield from the Ettie Street Pump Station watershed (331,843 µg/ac/yr).

<sup>2</sup> Solano County loads were not reported in their IMR Part C. For this analysis, Solano County load was calculated using the same land use breakdown and yield regression analysis as other MRP Permittees.

The total loads calculated for the IMR have been normalized to the TMDL baseline load of 16 kg/yr for the MRP Permittees for the purposes of load reduction accounting. The total estimated PCBs loads shown above are 8.67 kg/yr from the baseline watersheds (calculated using the land use-based yields from the regression analysis), plus 1.01 kg/yr from the elevated watersheds<sup>8</sup>. A correction factor for the land use yield-based loads is appropriate as the land use-based yields were developed using monitoring data for the baseline watersheds (described in Section A.2.2 above). The elevated watershed loads, on the other hand, are not normalized as these loads are based on long-term measurements of PCBs and mercury loads in discharges from the Ettie Street Pump Station (see Section A.2.2 above). The area-normalized load corresponding to the Ettie Street Pump Station watershed was considered to be representative of the PCBs watershed-based yield for the other elevated watersheds. The estimated total loading for the baseline watersheds was corrected by applying a multiplier to the load calculated using land use-based yield according to the following equation:

$$8.67 \frac{kg}{yr} * F + 1.01 \frac{kg}{yr} = 16.0 \frac{kg}{yr}$$

From this equation, the estimated land use yields should be multiplied by 1.73 to approximate a baseline load of 16.0 kg/yr. Thus, the adjusted land use-based PCBs yields for non-source areas/property are:

- Old Industrial = 86.5 mg/ac/yr
- Old Urban = 30.3 mg/ac/yr

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<sup>8</sup> Elevated watersheds include (BASMAA, 2014):

1. Ettie Street Pump Station watershed, City of Oakland, Alameda County.
2. Lauritzen Channel watershed, City of Richmond, Contra Costa County.
3. Leo Avenue watershed, City of San Jose, Santa Clara County.
4. Parr Channel watershed, City of Richmond, Contra Costa County.
5. Pulgas Creek Pump Station watershed, City of San Carlos, San Mateo County.

## Appendix A: Yield Regression Analysis

- New Urban/Other = 3.5 mg/ac/yr
- Open Space = 4.3 mg/ac/yr

### A.3.1.2 Source Area/Property Yield

To support identification of potential PCBs sources by the Alameda Countywide Clean Water Program (ACCWP) and City of Oakland, Geosyntec Consultants conducted a desktop screening of the ESPS Watershed’s Old Industrial land use areas and identified a set of properties with higher likelihood as PCBs sources (called High Likelihood parcels) for further evaluation. This screening effort resulted in the five-level breakdown of land areas shown in Table A-5 below.

**Table A-5: ESPS Watershed Parcel Screening Results, Yields, and Loads**

Land Use	Area (Acres)	Adjusted Yield (mg/ac/yr)	Adjusted Load (g/yr)
High Likelihood	89.5	4,065	363.8
Old Industrial	123.4	86.5	10.7
Old Urban	789.7	30.3	23.9
New Urban and Other	181.4	3.5	0.6
Open Space	18.7	4.3	0.1

The load from the High Likelihood area can be calculated by subtracting the adjusted load from the other land uses (35.3 g/yr, see Table A-5) from the overall ESPS load (399.1 g/yr, see Table A-4). Thus the High Likelihood area load is 363.8 g/yr. Back calculating for High Likelihood yield ((363.8 g/yr / 89.5 ac) x 1,000) results in an estimated 4,065 mg/ac/yr yield for the source area properties.

### A.3.2 Mercury Yield

The land use-based PCBs yields from the regression analysis reported above were multiplied by the area of each land use within each MRP Permittee’s jurisdictional boundary to develop estimates of Permittee-based total calculated load. The resulting loads were reported in each countywide program’s IMR Part C. These loads are summarized by county in Table A-6 below.

**Table A-6: Total Mercury Loading Reported in the 2014 IMR**

County	Load From Land Use Yields (g/yr)
Alameda	31
Contra Costa	25
San Mateo	12
Santa Clara	30
Solano <sup>1</sup>	3.1
<b>Total</b>	<b>101</b>

<sup>1</sup> Solano County loads were not reported in their IMR Part C. For this analysis, Solano County load was calculated using the same land use breakdown and yield regression analysis as other MRP Permittees.

## Appendix A: Yield Regression Analysis

Mercury land-use based yields were similarly adjusted to better reflect the total wasteload allocation required for the TMDL. The total loads reported in the 2014 IMR were normalized to the TMDL baseline load of 128 kg/yr for the MRP Permittees for the purposes of load reduction accounting. The total estimated total mercury loads shown above are 101 kg/yr. The estimated total loading can be corrected by applying a multiplier to the total load calculated using the land use-based yields according to the following equation:

$$101 \frac{kg}{yr} * F = 128 \frac{kg}{yr}$$

This results in an adjustment factor of 1.3. Less precision was used in the estimation of the mercury factor as the mercury land use-based yields are slightly less certain than the PCBs loads (illustrated by the smaller correlation factor resulting from the regression). Thus, the adjusted land use-based total mercury yields are:

- Old Industrial = 1,300 mg/ac/yr
- Old Urban = 215 mg/ac/yr
- New Urban/Open Space = 33 mg/ac/yr
- Other = 26 mg/ac/yr

### A.4 LIMITATIONS AND UNCERTAINTY

There are a variety of sources of uncertainty in the estimated POC yields, including:

- Elevated Watersheds. The data, especially for PCBs, indicate that there are some watersheds where concentrations are elevated relative to other monitored watersheds, and that these elevated watersheds have high PCBs yields and therefore contribute disproportionately to loads. There may be additional elevated watersheds that have not been identified due to limitations in monitoring conducted to date.
- Data Limitation. Limitations in the monitoring data used to estimate yields include the limited number of watersheds, the limited number of storm events sampled, and limited grab sample collection.
- Land Use Database Accuracy. Land use is the basis for the regression analysis. Not only is the type of land use important, but in the case of PCBs the age of the land use also is critical. The land use data therefore are attempting to characterize the historical evolution of land use based on available sources and aerial photo interpretation. The land use maps have not been fully “ground truthed” and therefore pose an important limitation in the analysis.

## Appendix A: Yield Regression Analysis

- Land Use as a Surrogate. Land use is used as a surrogate for actual PCBs and mercury sources, and although the types of potential sources have been identified, the actual locations and sizes of sources are difficult to determine at this level of analysis. So the same land use type in different locations may have very different sources and thus distinctly different PCBs and mercury concentrations in runoff.

In summary, it is difficult to assess the quantitative implications of these limitations on the magnitude of the projected loads, especially as analysis shifts from regional to smaller spatial scales. Experience with the difficulty in making loading estimates suggests that the projected loads be considered as first order approximation only, which are reflective of the central tendency of the data for the Bay Area as a whole.

SFEI's *Sources, Pathways and Loadings: Multi-Year Synthesis with a Focus on PCBs and Hg* (McKee et al., 2015) discusses the considerable challenges in developing improved estimates of land use-based yields of PCBs and mercury. As discussed above, the regression-based estimate of regional PCBs load that was reported in the 2014 IMR appears to be about 40 percent low. The report suggests that a regional estimate of approximately 20 kg/yr annual load of PCBs in urban runoff (for the entire Bay watershed) remains reasonable; however, other reports disagree. The regression-based estimate of regional total mercury load that was reported in the 2014 IMR appears to be about 20 percent low.

In addition, the standing conceptual model of relative distribution of PCB and total mercury in the landscape (SFEI, 2010) is that the PCBs unit load distribution in the landscape should be more variable than the total mercury distribution. This relative variation in land use yield is supported by product use history, degree of atmospheric recycling, and sources of the two pollutants; variation in concentrations found in Bay Area soils and sediments; and the yields generated from monitoring in the Bay Area which indicate a 800-fold variation for PCBs and a 70-fold variation for total mercury (if the Sacramento River is excluded) (see also SFEI, 2010; Davis et al., 2012; 2014). The relative variation in land use yield for the adjusted yields reported above, presented in Table A-7, is consistent with this conceptual model and therefore these yields are acceptable as first order approximations.

**Table A-7: Normalized Land Use-Based Yields for PCBs and Mercury**

Land Use Category	Assumed Average PCBs Yield (mg/ac/yr)	PCBs Yield Normalized to Open Space	Assumed Average Mercury Yield (mg/ac/yr)	Mercury Yield Normalized to Open Space
Source Property	4,065	945	1,300	50
Old Industrial	86.5	20	1,300	50
Old Urban	30.3	7	215	8.3
New Urban	3.5	0.8	33	1.3
Other	3.5	0.8	26	0.8
Open Space	4.3	1	33	1

## Appendix A: Yield Regression Analysis

### A.5 References

- Bay Area Stormwater Management Agencies Association (BASMAA), 2014. Integrated Monitoring Report Part B: PCB and Mercury Loads Avoided and Reduced via Stormwater Control Measures. Prepared for BASMAA by Geosyntec Consultants and EOA, Inc. January 2014.
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- Davis, J.A., L.J. McKee, T. Jabusch, D. Yee, and J.R.M. Ross, 2014. PCBs in San Francisco Bay: Assessment of the Current State of Knowledge and Priority Information Gaps. RMP Contribution No. 727. San Francisco Estuary Institute, Richmond, California.
- Greenfield, B.K., Klatt, M., Leatherbarrow, J.E., McKee, L.J., 2010. Exploratory Categorization of Watersheds for Potential Stormwater Monitoring in San Francisco Bay: Technical Memorandum. San Francisco Estuary Institute, Oakland CA 94621. 43 pp.
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- SFEI, 2010. A BMP Tool Box for Reducing Polychlorinated biphenyls (PCBs) and Mercury (Hg) in Municipal Stormwater. A Report Prepared by Lester McKee, Donald Yee, Alicia Gilbreath, Kat Ridolfi, Sarah Pearce, and Peter Mangarella in Consultation with Geoff Brosseau, Arleen Feng and Chris Sommers of BASMAA for the San Francisco Bay Regional Water Quality Control Board (Water Board). San Francisco Estuary Institute, Oakland, CA. 83pp.

## APPENDIX B

### Street and Storm Drain Sediment

### Data Analysis

## Appendix B: Street and Storm Drain Sediment Data Analysis

### B.1 Descriptive Statistics

Tables B-1 and B-2, and Figures B-1 and B-2 presents descriptive statistics for the PCBs and Mercury street and storm drain sediment dataset that has been compiled by BASMAA to-date. This dataset includes 1,204 PCBs samples and 952 mercury samples taken within the street right-of-way, storm drain conveyance system, and private properties from 1999 through 2015. Data are summarized by the predominant land use within the vicinity of where the sediment was collected.

**Table B-1: PCBs concentrations in sediment collected from streets, stormwater conveyance systems, and private properties located in Alameda, Contra Costa, Santa Clara, San Mateo, and Solano Counties between 1999 and 2015.**

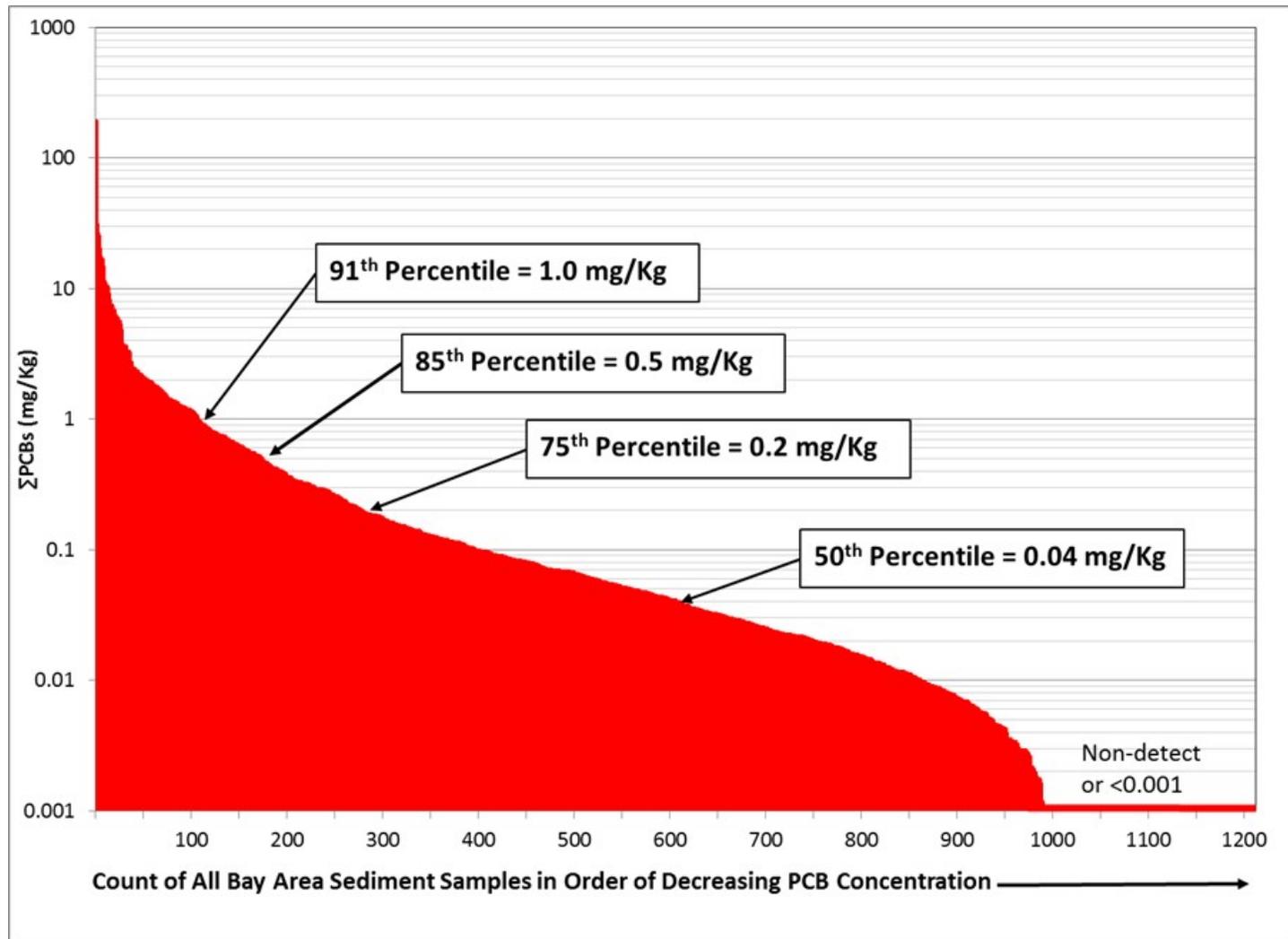
Statistic	PCB Source Properties	Old Industrial	Old Urban	New Urban	Open Space	All Samples
Maximum	192.91	93.41	16.81	0.07	0.20	192.91
90 <sup>th</sup> Percentile	11.52	0.47	0.36	0.03	0.07	0.83
75 <sup>th</sup> Percentile	5.35	0.14	0.13	0.02	0.04	0.17
Mean	6.70	0.33	0.25	0.02	0.03	0.72
Geometric Mean	2.17	0.05	0.04	0.01	0.01	0.05
Median	1.67	0.04	0.04	0.01	0.01	0.04
25 <sup>th</sup> Percentile	0.92	0.01	0.01	0.01	0.01	0.01
10 <sup>th</sup> Percentile	0.60	0.01	0.01	ND	ND	0.01
Minimum	ND	ND	ND	ND	ND	ND
<i>n</i>	81	835	214	30	44	1204

Appendix B: Sediment Data Analysis

**Table B-2: Mercury concentrations in sediment collected from streets, stormwater conveyance systems, and private properties located in Alameda, Contra Costa, Santa Clara, San Mateo, and Solano Counties between 1999 and 2015.**

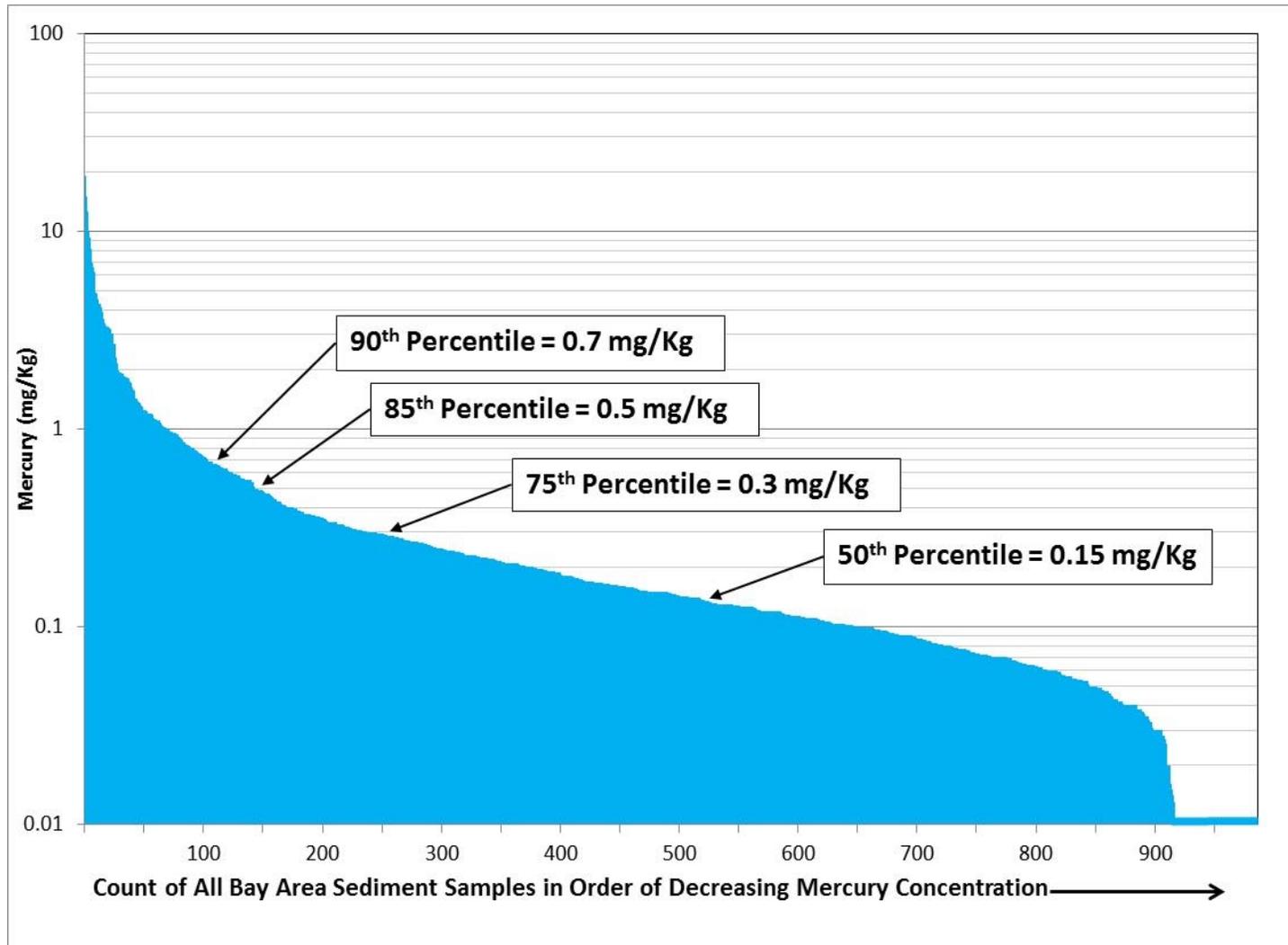
<b>Statistic</b>	<b>PCB Source Properties</b>	<b>Old Industrial</b>	<b>Old Urban</b>	<b>New Urban</b>	<b>Open Space</b>	<b>All Samples</b>
Maximum	20.60	18.90	12.54	3.31	4.26	20.60
90 <sup>th</sup> Percentile	2.70	0.67	0.73	0.45	0.32	0.77
75 <sup>th</sup> Percentile	1.37	0.30	0.39	0.28	0.18	0.32
Mean	1.54	0.40	0.44	0.35	0.28	0.44
Geometric Mean	0.55	0.18	0.21	0.19	0.12	0.19
Median	0.67	0.16	0.20	0.15	0.12	0.16
25 <sup>th</sup> Percentile	0.15	0.09	0.10	0.10	0.07	0.09
10 <sup>th</sup> Percentile	0.09	0.06	0.06	ND	ND	0.06
Minimum	0.02	0.01	0.01	0.05	0.02	0.01
<i>n</i>	41	740	161	29	40	952

Appendix B: Sediment Data Analysis



**Figure B.1: Total PCB concentrations in sediment collected from streets, stormwater conveyance systems, and private properties located in Alameda, Contra Costa, Santa Clara, San Mateo, and Solano Counties between 1999 and 2015.**

Appendix B: Sediment Data Analysis



**Figure B.2: Total mercury concentrations in sediment collected from streets, stormwater conveyance systems and private properties located in Alameda, Contra Costa, Santa Clara, San Mateo, and Solano Counties between 1999 and 2015.**

## APPENDIX C

### HDS Unit Efficiency Factor Data Analysis

**C.1 Purpose and Approach**

The purpose of this appendix is to document findings of analysis conducted to determine average percent removal of total suspended solids (TSS) by hydrodynamic separator (HDS) units.

First, percent removal of TSS was calculated for the Clean Watersheds for a Clean Bay (CW4CB) Task 5 Leo Avenue pilot project. For this project, a prefabricated Contech HDS unit called the Continuous Deflective Separator (CDS) was retrofitted into the existing storm drain system in the Leo Avenue Watershed in San Jose.

Influent and effluent water quality was sampled at four events as summarized in Table C-1 below. The CDS unit removed an average of 30% of TSS coming into the unit.

**Table C-1: Percent Removal of TSS at Leo Ave CDS Unit**

Event	Date	Sample Location	TSS (mg/L)	% Removal
1	28-Feb-14	Inflow	110	17%
		Outflow	91	
2	29-Mar-14	Inflow	230	17%
		Outflow	190	
3	31-Oct-14	Inflow	62	88%
		Outflow	7.5	
4	02-Dec-14	Inflow	82	-3%
		Outflow	84.5	
<b>Average</b>				<b>30%</b>

Next, the International Stormwater BMP Database (<http://bmpdatabase.org/>) was evaluated for potentially useful studies. Twenty studies of manufactured devices were identified as useful for analysis. These studies had a total of 334 paired inflow/outflow data points for TSS. Percent removal was calculated for each paired data point and then averaged for the BMP. The results for these studies along with descriptions of land use type and watershed size and imperviousness are presented in Table C-2 below. Average percent removal ranged from -85% (i.e., an increase in TSS concentration in outflow compared to inflow) to 73% and averaged 19% across all studies (including the Leo Ave. unit).

The dataset was also analyzed by removing BMPs that were treating just roads or highways, parking lots, or college campuses. In this scenario, ten studies remained that had mixed, other, or unknown land use type. Including the Leo Ave unit, the average percent removal of TSS from the BMPs evaluated in this group of studies was slightly higher at 22%.

Appendix C: HDS Unit Efficiency Factor Data Analysis

**Table C-2: Percent Removal of TSS for Studies in BMP Database**

Site and BMP	Device Model	Land Use Type	Watershed % impervious	Watershed Area (ac)	Average TSS % Removal <sup>1</sup>
OP Soccer Complex: PMSU56 40 40	Contech CDS, Model PMSU56 40 10	Parking lots adjacent to soccer fields.	90	3.98	-85%
NW Birch Place CDS unit: Continuous Deflective Separation unit	CDS Unit	Low Density Residential: 47.4% Office Commercial: 42.2% Multi-Family Residential: 10.3%	--	45.0	-14%
Broadway Outfall: CDS Unit	CDS			132	-6%
University of New Hampshire F3: Continuous Deflective Separation	CDS	College Campus: 100%	100	0.32	-5%
Lake O Sediment Demo: CDS Unit	PSW56_53		--	--	-3%
I-210 / Orcas Ave: Orcas	CDS	Roads/Highway: 100%	100	1.11	-3%
USGS_WI_HSD_DD: Hydrodynamic Settling Device	Downstream Defender®, manufactured by Hydro International.		84	1.90	-1%
I-210 / Filmore Street: Filmore CDS	CDS	Roads/Highway: 100%	100	2.50	2%
University of New Hampshire F2: Environment 21 V2B1	Environment 21 V2B1	College Campus: 100%	100	0.32	5%
University of New Hampshire F1: Vortechincs	Vortechincs	College Campus: 100%	100	0.32	13%
USGS_WI_HSD: HSD	Hydrodynamic Settling Device, Contech	The HSD treats a 0.25-acre deck section of the westbound I-794 freeway	100	0.25	26%
Harrisburg Public Works Yard: PAYardTerreKleene	Terre Kleen	--	90	3.21	28%
SC_StructBMP3: BMP3	Vortechincs	BMP3 is located along the westbound lane of S.C. Highway 802	--	--	29%
Indian River Lagoon CDS Unit: CDS Unit	CDS	Open Space: 38% Light Industrial: 32% Office Commercial: 19%	11	61.5	30%

Appendix C: HDS Unit Efficiency Factor Data Analysis

Site and BMP	Device Model	Land Use Type	Watershed % impervious	Watershed Area (ac)	Average TSS % Removal <sup>1</sup>
Leo Avenue: HDS Unit <sup>2</sup>	Contech CDS	--	--	--	30%
SC_StructBMP1&2: BMP2	CDS Technologies	BMP2 is located along the southbound lane of U.S. Highway 21	100	1.11	39%
University of New Hampshire E1: Aqua Swirl	Aqua Swirl	College Campus: 100%	100	0.99	40%
Timothy Edwards Middle School: Vortechs No 5000	Vortechs	--	80	1.95	45%
VC: VC	Vortcapture	Residential area with lots of organic matter/leaf litter loading	--	--	53%
Marine Village Watershed: Vortechs <sup>TM</sup> Stormwater Treatment System	Vortechs	Office Commercial: 50% Medium Density Residential: 45% Unknown: 5%	95	9.34	72%
NJ Manasquan Bank: NJManasquanCDS	High Efficiency Continuous Deflective Separator (CDS), Model 20 25	--	79	0.89	73%

Notes: -- indicates information was not provided.

1. Based on analysis of paired inflow/outflow results.
2. Leo Ave CW4CB study. Not a BMPDB Study.

## Appendix C: HDS Unit Efficiency Factor Data Analysis

The manufacturer's removal efficiency claims and the tested removal efficiencies of six of the BMPs evaluated in the studies were summarized as reported in the Massachusetts Stormwater Technology Evaluation Project (MASTEP) clearinghouse database (Table C-3).

**Table C-3: Percent Removal of TSS for Six Manufactured Devices from MASTEP**

<b>Product (BMP)</b>	<b>Manufacturer</b>	<b>Manufacturer's Removal Efficiency claim</b>	<b>Tested Removal Efficiency</b>
Aqua-Swirl	Aqua Shield	85%	84-87%
CDS	Contech	70%	65-95%
Vortechs	Contech	35-85%	35-64%
Downstream Defender	Hydro International	90%	70%
V2B1	Environment 21	80%	65%
Terre Kleen	Terre Hill	78%	17-50%
<b>Average<sup>1</sup></b>			<b>56%</b>

Notes: 1. Average based on low end of reported efficiency range.

Based on the above findings, 20% is a conservative estimate of the average percent removal of TSS by HDS units. For the purposes of interim load reduction accounting, the method assumes that HDS units reduce PCBs and mercury concentrations in direct proportion to the TSS reduction.

## APPENDIX D

### Enhanced Inlet Cleaning Efficiency Factor Data Analysis

## D.1 Purpose and Approach

The purpose of this appendix is to document findings of analysis conducted to determine the enhanced efficiency factors ( $EE_f$ ) for sediment removal associated with increasing the frequency of storm drain inlet cleaning.

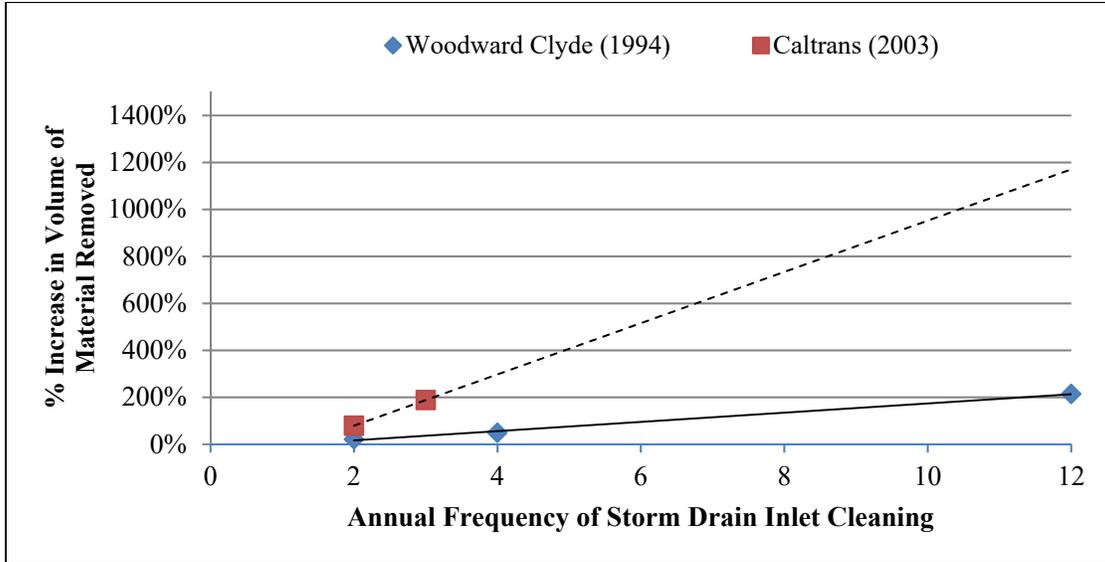
Based on a review of available literature, there are limited data available on the reductions of pollutants (including sediment) associated with different storm drain inlet maintenance frequencies. No studies were found that assessed the reduction either PCBs or mercury due to enhanced inlet cleaning frequencies. Two studies in particular, Woodward Clyde (1994) and Caltrans (2003), however evaluated the increase in the removal of material (i.e., sediment, vegetation and trash) from inlets under different cleaning frequencies. Results from both studies indicated that the volume of material removed from inlets increased with cleaning frequency.

The CalTrans (2003) *Drain Inlet Cleaning Efficacy Study* was designed to measure the potential increases in material volume/mass and water quality benefits due to increased inlet cleaning frequencies on freeways. The study was conducted from 1996 through 2000. The volume and mass of material removed under annual, biannual, and 3 times per year cleaning frequencies at 55 to 90 inlets, depending on the year, were measured.

The Woodward Clyde (1994) *Storm Inlet Pilot Study* was conducted in Alameda County in 1993. This study was also designed to measure the potential increases in material volume/mass due to increased inlet cleaning frequencies. A total of 15 inlets draining residential, industrial or commercial land uses were monitored. The volume and mass of material removed under annual, biannual, quarterly and monthly cleaning frequencies were measured.

The increased removal of material measured during both studies is presented in Figure D-1. Caltrans removals appear to be much greater than removal efficiencies measured during the Woodward Clyde study and therefore may not be realistic for the purposes of developing conservative efficiency factors for the Interim Accounting Methodology. Results from the Woodward Clyde study, however, appear to be generally consistent with the results of similar studies (BASMAA 2014; SCVURPPP 2016) that were focused on litter/trash, but also removed and measured other materials (e.g., sediment and vegetation) from inlets.

Appendix D: Enhanced Inlet Cleaning Efficiency Factor Data Analysis



**Figure D.1: Reported results of increases in material (e.g., sediment, vegetation and litter) removed as a result of increased storm drain inlet cleaning.**

Based on the above findings, Table D.1 presents a conservative estimate of the enhanced efficiency factors for enhanced storm drain inlet cleaning. For the purposes of interim load reduction accounting, the method assumes the following:

- Based on an analysis of 36 Alameda County and San Mateo Permittee storm drain inlet cleaning datasets from 1996 through 2009, on average, municipalities clean their inlets once per year (annually);
- Based on the same dataset, an average of 100 kg of material (sediment, vegetation and litter) is removed from each inlet annually (see descriptive statistics below);

Statistic	Mass (kg) of Material Removed Annually per inlet
Maximum	4049
90 <sup>th</sup> Percentile	476
75 <sup>th</sup> Percentile	284
Mean	268
Geometric Mean	100
Median	91
25 <sup>th</sup> Percentile	41
10 <sup>th</sup> Percentile	21
Minimum	5
# of Municipalities in Dataset	36

## Appendix D: Enhanced Inlet Cleaning Efficiency Factor Data Analysis

- Each inlet (on average) receives drainage from a catchment of 1 acre (BASMAA 2014), equating to a unit material removal rate of 100kg per acre per year;
- The fraction of material associated with PCBs and mercury yields (i.e., sediment <63um) is approximately 15% on average (McKee et al. 2006);
- The annual suspended sediment load to each inlet is roughly 162 kg per year on average (see Table 2); and
- Based on the assumptions above, roughly 15 kg of sediment associated with PCBs and mercury is removed from each inlet cleaned on an annual frequency, equating to about a 9% reduction of PCBs and mercury via annual cleaning (i.e., 15 kg / 162 kg).

**Table D.1: Enhanced efficiency factors (EE<sub>f</sub>) for increased storm drain inlet cleaning frequencies.**

		Enhanced Cleaning Frequency		
		Biannually	Quarterly	Monthly
Original Cleaning Frequency	Annually (Baseline = 0.09)	0.02	0.05	0.20
	Biannually		0.03	0.18
	Quarterly			0.15

### References

BASMAA (2014). San Francisco Bay Area Stormwater Trash Generation Rates - Final Technical Report. Bay Area Stormwater Management Agencies Association. Prepared by EOA, Inc. Oakland. June.

Caltrans (2003). Drain Inlet Cleaning Efficacy Study. California Department of Transportation. *CTSW-RT-03-057.36.1*. June.

McKee, L., P. Mangarella, B. Williamson, J. Hayworth and L. Austin (2006). Review of methods used to reduce urban stormwater loads: Task 3.4. A Technical Report of the Regional Watershed Program: Oakland, CA, San Francisco Estuary Institute SFEI Contribution #429: 150 pp.

SCVURPPP (2016). Storm Drain Trash Monitoring and Characterization Project. Santa Clara Valley Urban Runoff Pollution Prevention Program. Prepared by EOA, Inc. August.

Woodward-Clyde. 1994. Storm Inlet Pilot Study. Prepared for the Alameda County Urban Runoff Clean Water Program.

**Section 13 - Provision C.13 Copper Controls**

**C.13.a.iii ► Manage Waste Generated from Cleaning and Treating of Copper Architectural Features**

<p><i>(For FY 15-16 Annual Report only)</i> Do you have adequate legal authority to prohibit the discharge of wastewater to storm drains generated from the installation, cleaning, treating, and washing of copper architectural features, including copper roofs?</p>	<input checked="" type="checkbox"/>	<b>Yes</b>	<input type="checkbox"/>	<b>No</b>
<p><i>(For FY 15-16 Annual Report only)</i> Provide a summary of how copper architectural features are addressed through the issuance of building permits.</p>				
<p>Summary:</p> <p>Both cities have specific requirements in their storm water ordinance for prohibition of copper-containing water to the storm drain system.</p> <p>The Program has revised its C.3 New Development Guidance Document and BMPs which will reduce the impact of architectural copper features, including copper roofs, during construction and post construction. Because architectural Copper is not a popular feature in the Fairfield Suisun area, discharge of copper laden water from these structures is not seen as a significant source of copper.</p> <p>In addition, the Program has developed a flyer for the permit counter entitled: Requirements for Architectural Copper. The flyer is based on a similar version from the San Mateo County-wide Water Pollution Prevention Program. The flier (see attached) describes how copper can harm aquatic life and best management practices which must be implemented to prevent prohibited discharges to the storm drain system.</p>				
<p><i>(FY 15-16 Annual Report and each Annual Report thereafter)</i> Provide summaries of permitting and enforcement activities to manage waste generated from cleaning and treating of copper architectural features, including copper roofs, during construction and post-construction.</p>				
<p>Summary:</p> <p>The Program has developed a flyer for the permit counter entitled: Requirements for Architectural Copper. The flyer is based on a similar version from the San Mateo County-wide Water Pollution Prevention Program. The flier (see attached) describes how copper can harm aquatic life and best management practices which must be implemented to prevent prohibited discharges to the storm drain system.</p>				

**C.13.b.iii ► Manage Discharges from Pools, Spas, and Fountains that Contain Copper-Based Chemicals**

<i>(For FY 15-16 Annual Report only)</i> Do you have adequate legal authority to prohibit the discharge to storm drains of water containing copper-based chemicals from pools, spas, and fountains?	<input checked="" type="checkbox"/>	<b>Yes</b>	<input type="checkbox"/>	<b>No</b>
<i>(For FY 15-16 Annual Report only)</i> Provide a summary of how copper-containing discharges from pools, spas, and fountains are addressed to accomplish the prohibition of the discharge.				
<p>Summary:</p> <p>Both cities have specific requirements in their storm water ordinance for prohibition of copper laden water to the storm drain system. Specifically, all swimming pools, spas, hot codes, and fountains that utilize copper-based chemicals shall not discharge into any storm drain was in the city's jurisdiction.</p>				
<i>(FY 15-16 Annual Report and each Annual Report thereafter)</i> Provide summaries of any enforcement activities related to copper-containing discharges from pools, spas, and fountains.				
<p>Summary:</p> <p>There have been no reported discharges of copper containing water from pools, spas and fountains within the program area.</p>				

**C.13.c.iii ► Industrial Sources Copper Reduction Results**

Based upon inspection activities conducted under Provision C.4, highlight copper reduction results achieved among the facilities identified as potential users or sources of copper, facilities inspected, and BMPs addressed.
<p>Summary:</p> <p>Training of Health Inspectors was performed on February 12, 2016. The focus of the training was consistency in enforcement levels, enforcement authority; city stormwater ordinances (including Copper controls); high-priority facilities needed to be inspected during the fiscal year and enforcement levels associated with illegal discharges.</p> <p>The Program has revised its C.3 New Development Guidance Document and BMPs to reduce the impact of architectural copper features, including copper roofs, during construction and post construction. Because architectural Copper is not a popular feature in the Fairfield Suisun area, discharge of copper laden water from these structures is not seen as a significant source of copper.</p>

In addition, the Program has developed a flyer for the permit counter entitled: Requirements for Architectural Copper. The flyer is based on a similar version from the San Mateo County-wide Water Pollution Prevention Program. The flier (see attached) describes how copper can harm aquatic life and best management practices which must be implemented to prevent prohibited discharges to the storm drain system.

# Requirements for Architectural Copper

## Fairfield-Suisun Urban Runoff Management Program

**Protect water quality during installation, cleaning, treating, and washing!**

### Copper from Buildings May Harm Aquatic Life

Copper can harm aquatic life in San Francisco Bay. Water that comes into contact with architectural copper may contribute to impacts, especially during installation, cleaning, treating, or washing. Patination solutions that are used to obtain the desired shade of green or brown typically contain acids. After treatment, when the copper is rinsed to remove these acids, the rinse water is a source of pollutants. Municipalities prohibit discharges to the storm drain of water used in the installation, cleaning, treating and washing of architectural copper.



*Building with copper flashing, gutter and drainpipe.*

### Use Best Management Practices (BMPs)

The following Best Management Practices (BMPs) must be implemented to prevent prohibited discharges to storm drains.

#### ***During Installation***

- If possible, purchase copper materials that have been pre-patinated at the factory.
- If patination is done on-site, implement one or more of the following BMPs:
  - Discharge the rinse water to landscaping. Ensure that the rinse water does not flow to the street or storm drain. Block off storm drain inlet if needed.
  - Collect rinse water in a tank and pump to the sanitary sewer. Contact your local sanitary sewer agency before discharging to the sanitary sewer.
  - Collect the rinse water in a tank and haul off-site for proper disposal.
- Consider coating the copper materials with an impervious coating that prevents further corrosion and runoff. This will also maintain the desired color for a longer time, requiring less maintenance.



*Storm drain inlet is blocked to prevent prohibited discharge. The water must be pumped and disposed of properly.*

#### ***During Maintenance***

Implement the following BMPs during routine maintenance activities, such as power washing the roof, re-patination or re-application of impervious coating:

- Block storm drain inlets as needed to prevent runoff from entering storm drains.
- Discharge the wash water to landscaping or to the sanitary sewer (with permission from the local sanitary sewer agency). If this is not an option, haul the wash water off-site for proper disposal.

### Protect the Bay/Ocean and yourself!

If you are responsible for a discharge to the storm drain of non-stormwater generated by installing, cleaning, treating or washing copper architectural features, you are in violation of the municipal stormwater ordinance and may be subject to a fine.



*Photo credit: Don Edwards National Wildlife Sanctuary*

**Section 15 -Provision C.15 Exempted and Conditionally Exempted Discharges**

**C.15.b.vi.(2) ► Irrigation Water, Landscape Irrigation, and Lawn or Garden Watering**

Provide implementation summaries of the required BMPs to promote measures that minimize runoff and pollutant loading from excess irrigation. Generally the categories are:

- Promote conservation programs
- Promote outreach for less toxic pest control and landscape management
- Promote use of drought tolerant and native vegetation
- Promote outreach messages to encourage appropriate watering/irrigation practices
- Implement Illicit Discharge Enforcement Response Plan for ongoing, large volume landscape irrigation runoff.

Summary:

See Program's annual report, section C.7. This portion of the annual report shows the Program's efforts towards the promotion of the School Water Education Program (SWEP). One of the primary focuses of this Program is water conservation. SWEP provides free water education resources to teach water awareness and conservation to students, teachers and parents in our service areas of Fairfield, Suisun City and Travis Air Force Base. The in-class education Programs include resource materials and assembly Programs are multi-discipline and aligned to the content standards for California public schools. The Programs encourage students and adults to develop a healthy attitude of personal responsibility towards our environment and develop skills needed to contribute meaningfully to decision-making process on issues involving our resources and particularly conserving our most precious resource, water.

See above section C.9 of the Program's annual report. This portion of the annual report shows the Program's efforts toward the promotion of less toxic pest control and landscape management. The Program contracts with consultant Annie Joseph regarding Our Water Our World, including outreach efforts regarding pesticide reduction or the use of less toxic products to pesticides. For additional information on regional efforts, see section C.9.h.i of the Regional Supplement for Training and Outreach for FY2015-2016 submitted by BASMAA on behalf of all MRP Permittees.

Suisun City Council has adopted a water efficient landscaping ordinance. The goal of this ordinance is to promote the conservation and efficient use of water and to prevent the waste of this valuable resource and use water efficiently without waste by setting a maximum applied water allowance as an upper limit for water use and reduce water use to the lowest practical amount. This ordinance, effective January 1, 2010 applied to all new construction and rehabilitated landscapes for public agency projects and private development projects with a landscape area equal to or greater than 2,500 square feet requiring a building or landscape permit, plan check or design review.

The City of Fairfield has also put the State Water Efficient Landscape Ordinance into effect. The ordinance focuses on new development design to be highly water efficient and minimize run-off. It applies to large developments and large re-landscaping in the city.