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CONTRA COSTA CLEAN WATER PROGRAM

Contra Costa Watersheds Stormwater Resource Plan

Greening the Community for Healthy Watersheds

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List of Acronyms

ABAG	Association of Bay Area Governments
AGOL	ArcGIS Online
APN	Assessor's Parcel Number
BAIRWMP	Bay Area Integrated Regional Water Management Plan
BMP	Best Management Practice
CAD	Computer aided design
CCCWP	Contra Costa Clean Water Program
CCRCD	Contra Costa Resource Conservation District
CCW SWRP	Contra Costa Watersheds Stormwater Resource Plan
CEQA	California Environmental Quality Act
CIP	Capital improvement plan
DAC	Disadvantaged community
DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane
EBMUD	East Bay Municipal Utility District
EBRPD	East Bay Regional Park District
EDA	Economically Distressed Area
ESAs	Environmental Sensitive Areas
FEMA	Federal Emergency Management Agency
GI	Green infrastructure
GIS	Geographic Information System
GPS	Global Positioning System
HSPF	Hydrological Simulation Program
IRWM	Integrated Regional Water Management
IRWMP	Integrated Regional Water Management Plan
LID	Low impact development
LSPC	Loading Simulation Program in C++
MRP	Municipal Regional Permit
MS4	Municipal Separate Storm Sewer System
NGO	Non-governmental organization
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
OC pesticides	Organochlorine pesticides
OEHHA	Office of Environmental Health and Hazard Assessment
PAHs	Polycyclic aromatic hydrocarbons
PCBs	Polychlorinated biphenyls
RAA	Reasonable assurance analysis
RMC	Regional Monitoring Coalition
RMP	Regional Monitoring Program for Water Quality in San Francisco Bay

ROW	Rights-of-way
SFEI	San Francisco Estuary Institute
SUSTAIN	System for Urban Stormwater Treatment and Analysis Integration
SWMM	Storm Water Management Model
TAG	Technical advisory group
TMDL	Total Maximum Daily Load
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
WLA	Waste load allocation
WQBEL	Water quality-based effluent limitation

Contra Costa Watersheds Stormwater Resource Plan Executive Summary

The *Contra Costa Watersheds (CCW) Stormwater Resource Plan (SWRP)* was created to help build stormwater management projects and programs within Contra Costa County (County). The plan builds upon a foundation of support for and successful implementation of watershed protection programs, restoration projects, and low impact development throughout the County.

Multiple Benefits of Stormwater Management Projects

- Improved water quality
- Reduced localized flooding
- Increased water supplies for beneficial uses
- Environmental and community enhancement

These projects value stormwater as a resource and provide multiple benefits for the community. The *CCW SWRP* identifies potential stormwater management projects and programs that are eligible for grant funds like the Proposition 1 Storm Water Grant Program. The *CCW SWRP* is consistent with the *Storm Water Resource Plan Guidelines* (SWRCB, 2015).

The Contra Costa Clean Water Program (CCCWP) led the development of the *CCW SWRP*, on behalf of Contra Costa County Flood Control and Water Conservation District (Flood Control District), unincorporated Contra Costa County, the 19 incorporated cities and towns within Contra Costa County (Permittees), and other stakeholders. The *CCW SWRP* development included a robust outreach program to engage and solicit feedback from the County's well-organized and empowered community groups and the public. A Technical Advisory Group (TAG), made up of representatives from state, regional, and local agencies as well as stakeholder groups, was also established to help guide the *CCW SWRP* development.

Watersheds and Sub-watersheds

- Watershed: an area of land from which all the water, including rain and irrigation runoff, flows into the same body of water.
- Sub-watershed: smaller watersheds that drain to a larger body of water.

ES.1 CONTRA COSTA'S WATERSHEDS: APPROACH AND CHARACTERIZATION

The County boundary is the planning area of the *CCW SWRP*. The County's watersheds linked by similar water quality stressors and regional water quality impairments of the San Francisco Bay-Delta Estuary because of urbanization. Municipalities and other dischargers face regulatory requirements to implement control measures to address the loading of polychlorinated biphenyls (PCBs), mercury, pesticides, trash, and other pollutants. The CCCWP was formed to assist Permittees'

efforts to comply with stormwater permits through cross-jurisdictional and multiple watershed collaboration. CCCWP's record of success coordinating efforts across the County uniquely positioned it to lead the development of the *CCW SWRP*.

To reflect differences in watersheds across the County, and to incorporate community and creek-specific values into the planning process, the *CCW SWRP* organized the County into five watershed-based Planning Units: the East County, Central County, North County, South County, and West County Planning Units. The Planning Units are based on watershed boundaries and aggregate watersheds by geographic proximity, along with similar planning issues and management goals. **Figure ES-1** shows the grouping of sub-watersheds within each Planning Unit, and **Figure ES-2** shows the jurisdictional boundaries of the cities and towns that fall into each Planning Unit.

Mouth of Baxter Creek in Richmond

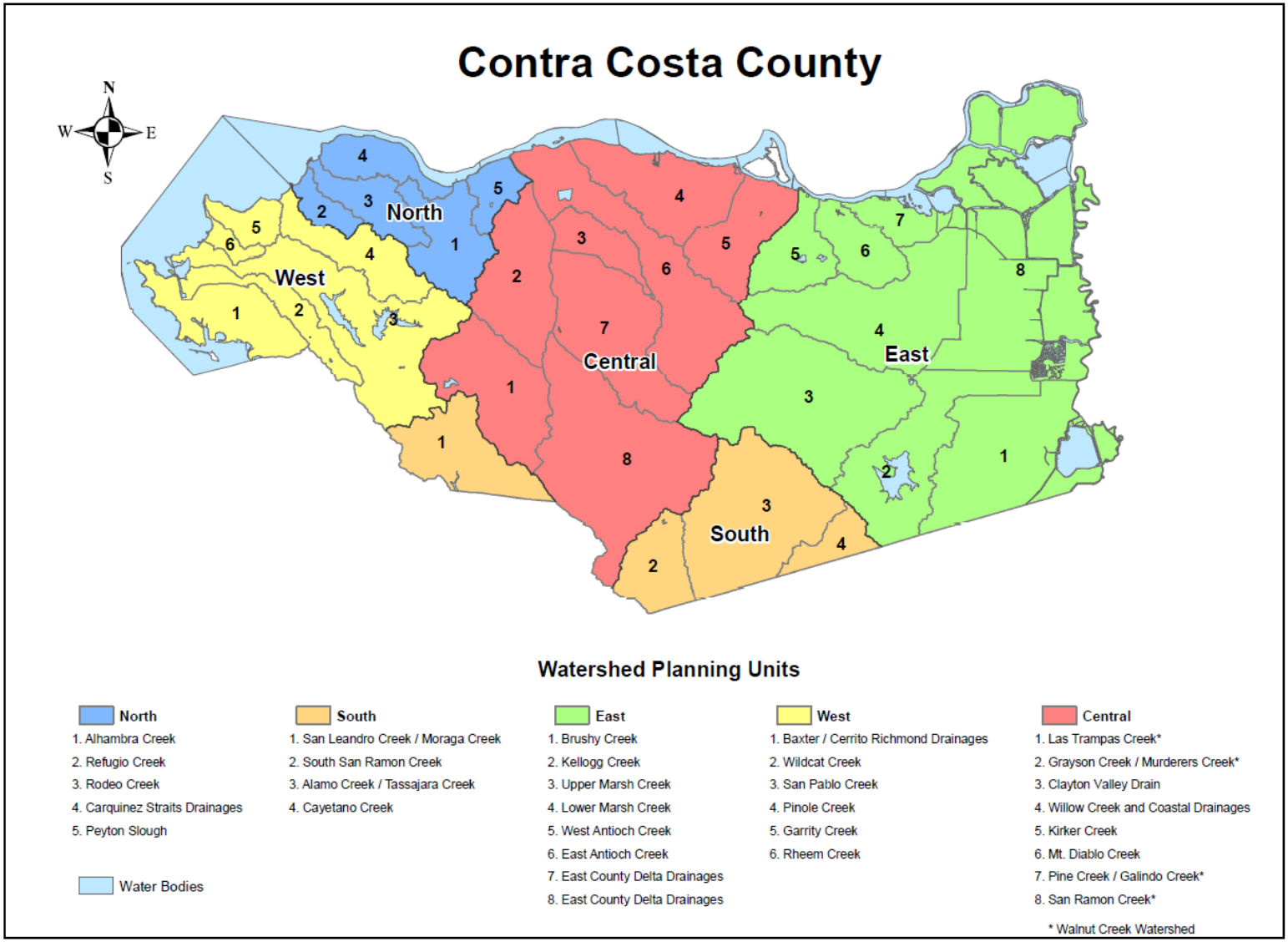


Figure ES-1. Contra Costa County Watershed Planning Units and Watersheds

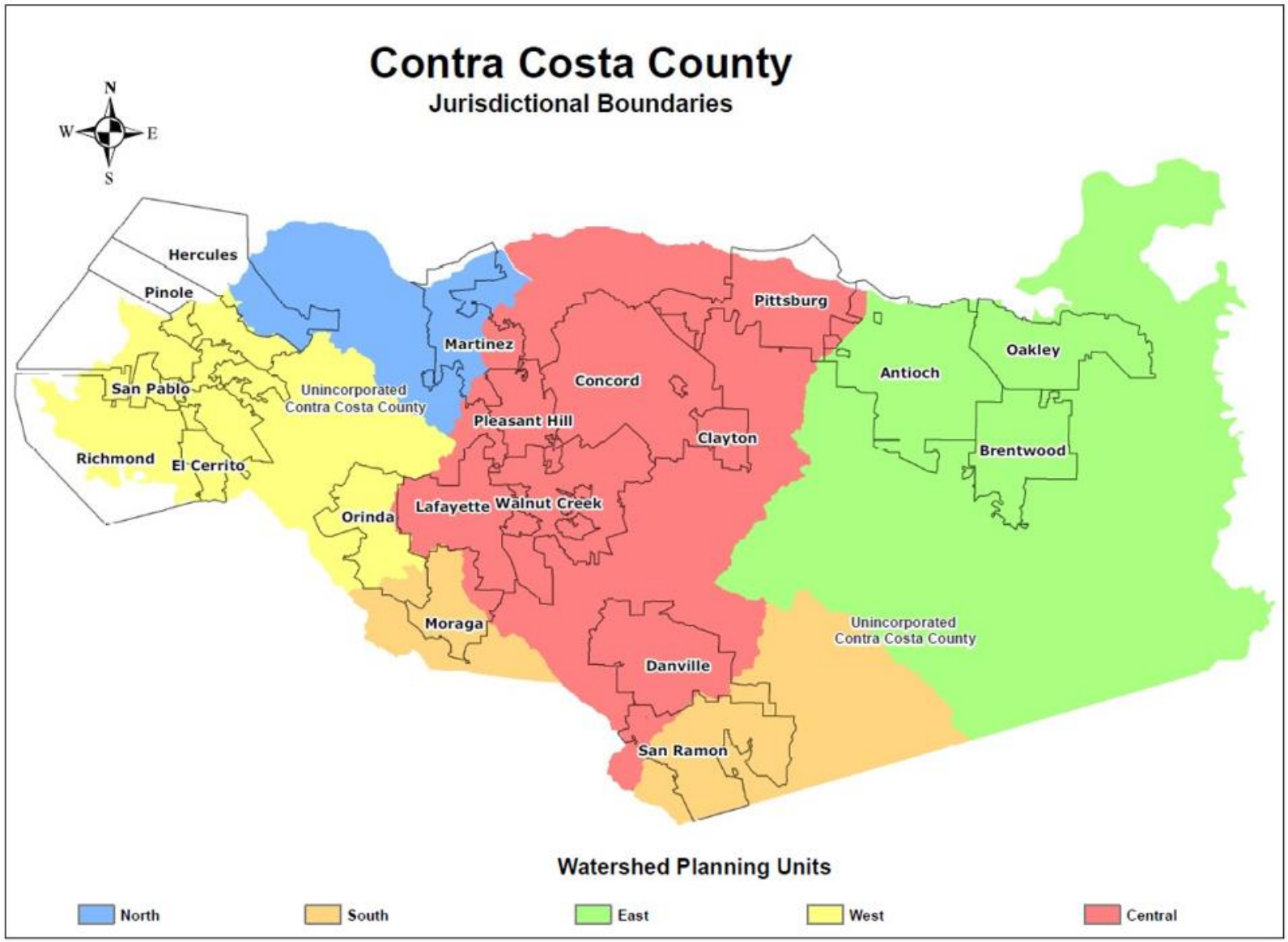


Figure ES-2. Contra Costa County Local Jurisdictions and Watershed Planning Unit

ES.2 WATER QUALITY COMPLIANCE STRATEGIES AND THE SWRP

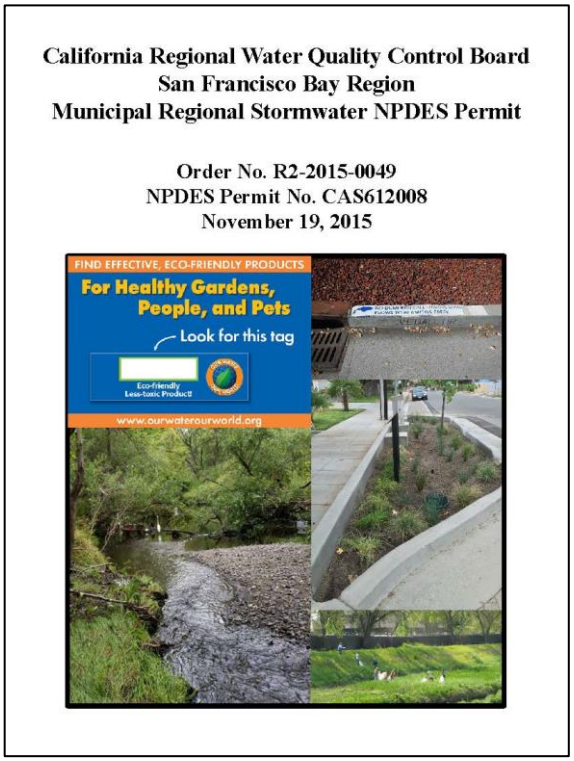
Many waters bodies in the County have impaired water quality or are tributary to impaired waters such as the San Francisco Bay and the Sacramento-San Joaquin Delta. Various watersheds are subject to Total Maximum Daily Loads (TMDLs) for mercury, PCBs, and pesticides. Compliance with TMDLs and applicable permits was a major driver informing the selection, evaluation, and prioritization of projects.

Total Maximum Daily Load

A TMDL is pollutant budget for a water body. It identifies the maximum amount of a pollutant a water body can receive and still meet water quality standards.

Stormwater discharges from the municipalities in the County are regulated under the San Francisco Bay Region Municipal Regional Stormwater National Pollutant Discharge Elimination System (NPDES) Permit[1] (MRP). While municipalities in eastern Contra Costa County fall within the geographic jurisdiction of the Central Valley Regional Water Quality Control Board (Central Valley Regional Water Board's). As of February 2019, the two Regional Water Boards agreed to regulate all stormwater discharges from Contra Costa municipalities under the MRP and the MRP was amended.[2].

The MRP requires Permittees to develop and implement Green Infrastructure (GI) Plans. The MRP further requires the Permittees to complete a reasonable assurance analysis (RAA) to demonstrate that required PCBs and mercury load reductions will be achieved by the TMDL deadlines through implementation of the GI Plans and other permit-required control measures.



The *CCW SWRP* forms the foundation for water quality improvement strategies through GI implementation, which are expected to be an essential part of the Permittees' approach to meet the TMDL and permit-mandated water quality improvement goals. The *CCW SWRP* incorporated water quality metrics into the process of selecting SWRP Projects and SWRP Opportunities, prioritizing them and evaluating their benefits. A primary goal for the *CCW SWRP* was to identify multiple benefit GI projects that could be included in municipal GI Plans and help the County's jurisdictions meet their TMDL and MRP requirements. County jurisdictions and other stakeholders will

[1] Order R2-2015-0049, NPDES Permit No. CAS612008
[2] Order R2-2019-0004

ultimately have the option to pursue future implementation grant funding for multiple benefit projects and opportunities included the *CCW SWRP*.

Figure ES-3 presents a conceptual understanding of the relationship between the *CCW SWRP*, GI Plans, and the RAA.

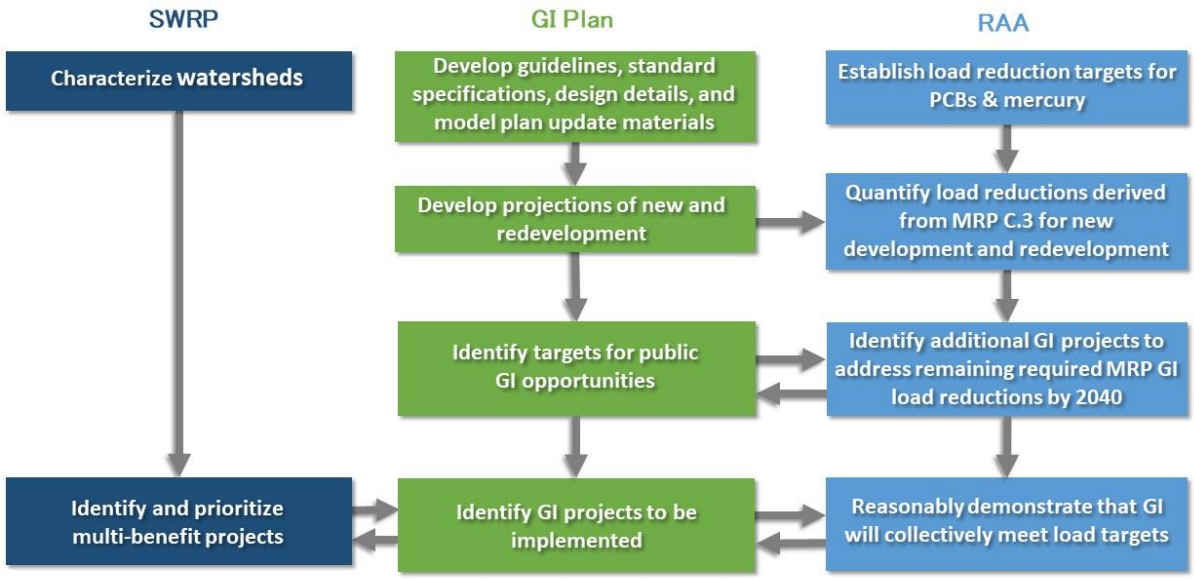


Figure ES-3. Relationship Between the *CCW SWRP*, the RAA, and the GI Plans

ES.3 SWRP PROJECTS, PROJECT CONCEPTS, AND OPPORTUNITIES

The *CCW SWRP* includes ten stormwater management project concepts, approximately 300 SWRP Projects, and thousands of additional SWRP Opportunities, some of which could be developed into SWRP Projects in the future. The process for identifying SWRP Opportunities, developing project concepts, and selecting opportunities for the final SWRP Project list is outlined below and shown in **Figure ES-4**.

1. **Identify projects** – Potential SWRP Opportunities were provided by the Permittees and other *CCW SWRP* stakeholders. Additional potential SWRP Opportunities were identified and catalogued using a geographic information system (GIS)-based opportunity analysis of data provided by the Permittees.
2. **Score SWRP Opportunities using an automated metrics-based evaluation** – The *CCW SWRP* used a quantitative metrics-based multiple benefit evaluation, as required by the *Storm Water Resource Plan Guidelines* (*SWRP Guidelines*, SWRCB, 2015), to score SWRP Opportunities. The benefits that were evaluated included water quality, water supply, flood control, environmental and community benefits. The scoring was automated using metrics based on available project attributes. The SWRP Opportunities for each jurisdiction are provided in **Appendix G** and maintained in the SWRP Project Viewer tool.
3. **Develop Project Concept Designs** – Ten high priority SWRP Opportunities were selected for development of concept designs at the 10% design level. High priority was defined as opportunities that represented a diversity of jurisdictions, watersheds, and

project types to serve as examples. The project concepts include the project footprint, stormwater treatment facilities, projected PCBs and mercury load reductions and other benefits, and a cost estimate. The ten concept designs are provided in **Appendix B**.

4. **Select SWRP Projects –** Starting with the SWRP Opportunities list, the Permittees selected and/or adapted opportunities using local institutional knowledge and priorities and incorporated them into their GI Plans. Opportunities that were included in the GI Plans comprise the final SWRP Project list (**Appendix F**). Each SWRP Project has been scored (prioritized) based on multiple benefits and secondarily ranked based on anticipated implementation timeframe. Some of the SWRP Projects are based on, in whole or in part, the ten project concept designs.

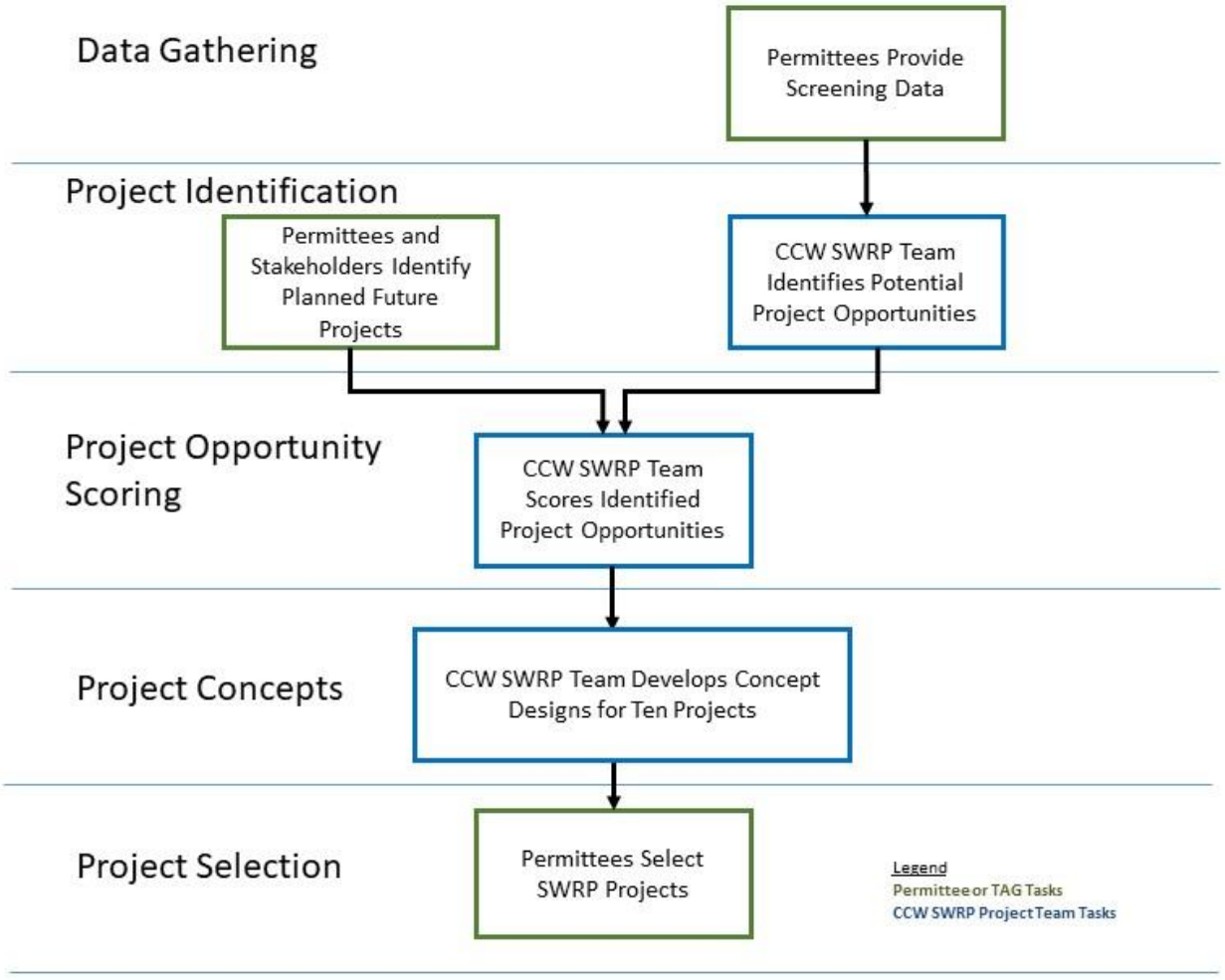


Figure ES-4. Process for Identifying SWRP Opportunities, Developing Project Concepts, and Selecting SWRP Projects

Table ES-1. Summary of *CCW SWRP* Project Concepts

Permittee	Project Name	Project Type
Antioch	Vieira Ave- Wilbur Ave Green Streets	Green street
Concord	Hillcrest Park Regional Retrofit	Stormwater capture/use, bioretention, and full trash capture in a city park
Danville	Sycamore Valley Road Park and Ride Expansion	Bioretention retrofit in a park and ride lot
El Cerrito	El Cerrito del Norte TOD Complete Street Improvements	Green street
Oakley	Oakley Train Station Green Infrastructure Project	Distributed bioretention at a train station and regional infiltration/bioretention basin
Orinda	Orinda Way Green Street Project	Green street
Pittsburg	Americana Storm Drainage Project	Retrofit of an existing detention basin for water quality and bioswales
Richmond	2nd Street Bikeway Project	Green street
San Pablo	Sutter Ave Green Street	Green street
Walnut Creek	Heather Farm Park Retrofit	Distributed bioretention throughout a city park

ES.4 *CCW SWRP* IMPLEMENTATION

Funding for building projects will be obtained by municipalities, partnerships of agencies, or other stakeholder project sponsors. The TMDL implementation schedules and requirements of the MRP are likely to be the primary driver for municipal decision-making regarding funding for GI projects. The MRP's GI planning requirements and the PCBs and mercury TMDL pollutant load reduction schedules will also drive the pace of implementation of the GI projects in the *CCW SWRP*.

The *CCW SWRP* is a living document. As projects are implemented and lessons learned through wider scale integration of GI and other multiple benefit stormwater capture or treatment projects, the *CCW SWRP* will be periodically updated for changing current regulatory requirements and implementation strategies. Updates are expected to coincide with the five-year cycle for reissuance of the MRP. A GIS-based web mapping application, known as the SWRP Project Viewer, will be used to add new multi-benefit stormwater projects to the SWRP Project list. Following the initial publication, the *CCW SWRP,* the SWRP Project list will be dynamically updated and maintained in the SWRP Project Viewer. The web mapping application is available on the CCCWP website: https://www.cccleanwater.org/resources/stormwater-resource-plan.

1. Introduction

The *Contra Costa Watersheds (CCW) Stormwater Resource Plan (SWRP)* was created to help build stormwater management projects and programs that provide multiple benefits. The plan builds upon a foundation of support for and successful implementation of watershed protection programs, restoration projects, and low impact development throughout Contra Costa County (County).

Multiple Benefits of Stormwater Management Projects

- Improved water quality
- Reduced localized flooding
- Increased water supplies for beneficial uses
- Environmental and community enhancement

Stormwater and dry weather runoff are major sources of pollution of surface waters in the County and other urbanized areas. Pollutants, trash and debris in a watershed are carried via the storm drain system into creeks and other water bodies, ultimately reaching the San Francisco Bay-Delta. Green Infrastructure (GI) is an infrastructure design approach that uses vegetation, soils, and natural processes to manage stormwater and create healthier urban environment. GI projects manage stormwater by mimicking a natural ecosystem by absorbing, filtering and storing water on site instead of carrying it directly to surface waters through the storm drain system. GI provides multiple benefits beyond water quality improvement. For example, GI projects that capture and infiltrate stormwater provide groundwater replenishment, which increases local water supplies and base flow in creeks. Other benefits include creation of habitat, beautification of streetscapes and community recreation areas, and enhancing flood protection.

The *CCW SWRP* identifies potential GI projects and stormwater management programs that are eligible to apply for state grant funding, such as Proposition 1 Storm Water Grant Program implementation. Development of the *CCW SWRP* was funded by a planning grant from the California Proposition 1 Storm Water Grant Program and Contra Costa Clean Water Program (CCCWP). The *CCW SWRP* is consistent with the *Storm Water Resource Plan Guidelines* (*SWRP Guidelines*, SWRCB, 2015).

The *CCW SWRP* forms a connection between regional water quality and water resources planning goals. The *CCW SWRP* identifies projects that can support municipal GI planning and implementation driven by water quality regulations. The *CCW SWRP* also reflects the goals of and will be incorporated into Integrated Regional Water Management (IRWM) plans within the County, providing a link between stormwater and management of other water resources. The implementation of multiple benefit *CCW SWRP* projects will help protect and improve water bodies, which provide important environmental, community, health, and economic benefits within the County. *CCW SWRP* also represents progress towards treating stormwater as a valuable local water resource.

1.1 ENTITIES INVOLVED IN PLAN DEVELOPMENT

The *CCW SWRP* was prepared by a consultant team engaged by the CCCWP on behalf of the Contra Costa County Flood Control and Water Conservation District (Flood Control District), unincorporated Contra Costa County, and the 19 incorporated cities and towns within the County.

The *CCW SWRP* was developed in collaboration with local agencies, non-governmental organizations (NGOs), and the public through a robust outreach and public participation program.

1.2 CONTRA COSTA'S WATERSHEDS: APPROACH AND CHARACTERIZATION

Watersheds and Subwatersheds

- Watershed: an area of land from which all the water, including rain and irrigation runoff, flows into the same body of water.
- Sub-watersheds: smaller watersheds that drain to a larger body of water.

The County boundary is the planning area of the *CCW SWRP*. The 31 major watersheds and sub-watersheds within the County are linked by similar water quality stressors and regional water quality impairments of the Bay-Delta Estuary because of urbanization. Municipal entities and other dischargers are required to address regional Total Maximum Daily Loads (TMDLs) and water quality requirements for control measures to address the loading of polychlorinated biphenyls (PCBs), mercury, pesticides, trash, and other pollutants. To reflect differences in watersheds across the County, and to incorporate community and creek-specific management goals into the planning process, the *CCW SWRP* organizes the County into five watershed-based Planning Units: East County, Central County, North County, South County, and West County Planning Units. The Planning Units, shown in **Figure 4-9**, are based on watershed boundaries and aggregate watersheds by geographic proximity, along with similar planning requirements and local values.

1.3 WATER QUALITY ISSUES AND REGULATORY REQUIREMENTS

Many waters in the County have impaired water quality or are tributary to impaired waters such as the San Francisco Bay and the Sacramento-San Joaquin Delta (Delta). Various watersheds are subject to TMDLs for mercury, PCBs, and pesticides. Compliance with TMDLs and applicable stormwater permits was a major driver informing the selection, evaluation, and prioritization of projects.

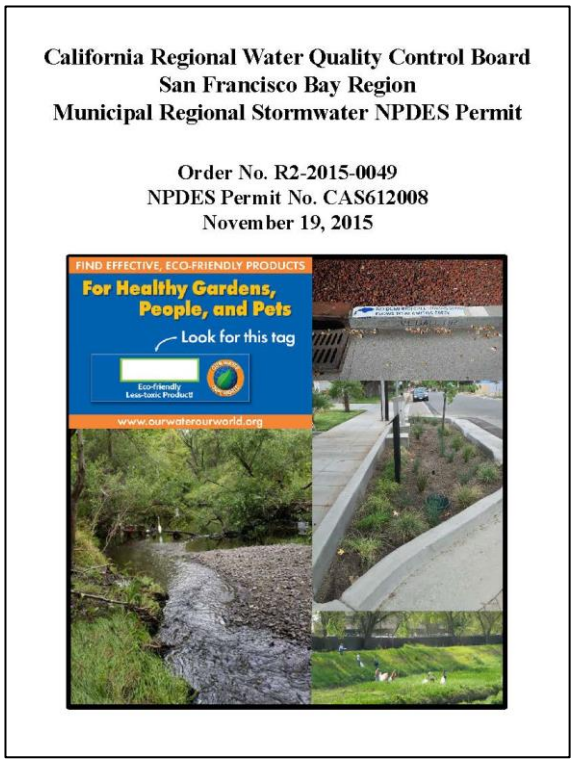
The County spans the geographic jurisdictions of two Regional Water Boards. The eastern portion of the County, which drains to the Delta and includes portions of unincorporated Contra Costa County, Flood Control District jurisdiction, and the cities of Antioch,

Total Maximum Daily Loa

- A TMDL is pollutant budget for a water body. It identifies the maximum amount of a pollutant a water body can receive and still meet water quality standards.
- A TMDL identifies sources of a pollutant, allowable contributions from each source to meet water quality standards, and actions and schedules to meet standards.

Brentwood, and Oakley, is located within the geographic jurisdiction of the Central Valley Regional Water Board. The other County municipalities, including portions of unincorporated Contra Costa County and most of the Flood Control District jurisdiction, drain to the San Francisco Bay.

In a designation letter issued pursuant to Water Code 13228(b), dated January 6, 2017, the CCCWP was informed of the agreement reached between the San Francisco Bay and Central Valley Regional Water Boards to transfer regulatory authority of the communities in the eastern portion of the County from the Central Valley to the San Francisco Bay Regional Water Board. As of February 2019, this transfer was completed and the eastern portion of Contra Costa County were named as Permittees subject to the San Francisco Bay Region Municipal Regional Stormwater National Pollutant Discharge Elimination System (NPDES) Permit (Order No. R2-2015-0049, as amended by Order No. R2-2019-0004). This stormwater permit is commonly known as the Municipal Regional Permit or MRP and is cited throughout this document as the governing NPDES permit for the entire County.[3]



The MRP requires Permittees to develop GI Plans and requires reasonable assurance analyses (RAAs) to demonstrate that pollutant load reductions for the San Francisco Bay PCBs and Mercury TMDLs will be met through a combination of implementation of the GI Plans and other source control measures. The *CCW SWRP* was developed considering regional regulatory requirements for stormwater dischargers, particularly the GI planning requirements. The projects identified in the *CCW SWRP* will be used to help the Permittees meet their GI planning requirements. Projects were also evaluated in a manner consistent with the RAA requirements in the MRP to assess load reductions for compliance with the Mercury and PCBs TMDLs waste load allocations (WLAs). County municipalities and other stakeholders will ultimately have the option of pursuing future implementation grant funding for multiple benefit projects included in their GI Plans.

1.4 SWRP PROJECTS, PROJECT CONCEPTS, AND OPPORTUNITIES

The *CCW SWRP* includes ten stormwater management project concepts, approximately 300 SWRP Projects, and thousands of SWRP Opportunities, some of which could be developed into SWRP Projects in the future. The process for identifying SWRP Opportunities, developing project concepts, and selecting projects for the final SWRP Project list is outlined below and shown in **Figure 1-1**:

[3] Permittees located within the Central Valley Region were previously regulated under the East Contra Costa County Municipal NPDES Permit issued by the Central Valley Regional Water Board (Order No. R5-2010-0102).

1. **Identify projects** – Potential SWRP Opportunities were provided by the CCCWP Permittees and other *CCW SWRP* stakeholders. Additional potential SWRP Opportunities were identified and catalogued using a geographic information system (GIS)-based opportunity analysis of data provided by the Permittees.
2. **Score SWRP Opportunities using an automated metrics-based evaluation** – The *CCW SWRP* used a quantitative metrics-based multiple benefit evaluation, as required by the *SWRP Guidelines*, to score the SWRP Opportunities. The benefits that were evaluated included water quality, water supply, flood control, environmental and community benefits. The scoring was automated using metrics based on available project attributes. The SWRP Opportunities for each jurisdiction are provided in **Appendix G** and maintained in the SWRP Project Viewer tool.
3. **Develop Project Concept Designs** – Ten high priority SWRP Opportunities were selected for development of concept designs at the 10% design level. High priority was defined as opportunities that represented a diversity of jurisdictions, watersheds, and project types to serve as examples. The project concepts include the project footprint, stormwater treatment facilities, projected PCBs and mercury load reductions and other benefits, and a cost estimate. The ten concept designs are provided in **Appendix B**.
4. **Select SWRP Projects** – Starting with the SWRP Opportunities list, the Permittees selected and/or adapted opportunities using local institutional knowledge and priorities and incorporated them into their GI Plan. Opportunities that were included in the GI Plans comprise the final SWRP Project list (**Appendix F**). Each SWRP Project has been scored (prioritized) based on multiple benefits and secondarily ranked based on anticipated implementation. Some of the SWRP Projects are based on, in whole or in part, the ten project concept designs.

Examples of Green Infrastructure/Stormwater Multi-Benefit Projects in Contra Costa County

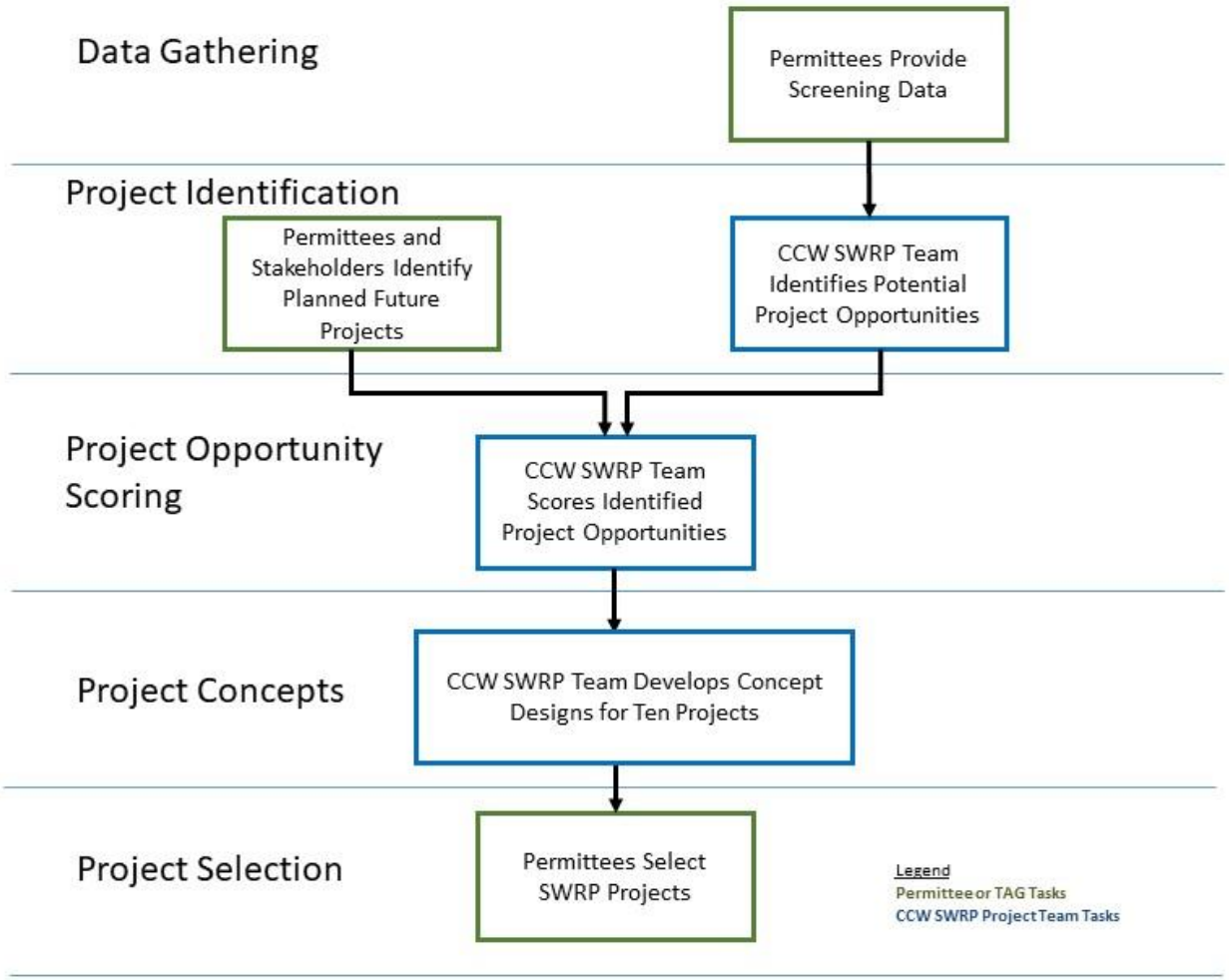


Figure 1-1. Process for Identifying SWRP Opportunities, Developing Project Concepts, and Selecting SWRP Projects

2. Coordination and Collaboration

The development of a successful *CCW SWRP* required coordination and collaboration among municipalities, special districts, NGOs, other stakeholders within the County, and the public, as well as government agencies, to gather data, identify SWRP Opportunities, and ensure that local goals and values are reflected in the document. A group of technical advisors, representing municipalities, watershed advocacy and planning groups, and disadvantaged communities was assembled into a technical advisory group (TAG) to help guide the development of the *CCW SWRP*. This section describes the roles of cooperating entities, the TAG, supporting entities, and the public as well as the *CCW SWRP*'s relationship with existing and anticipated planning documents. Specific public education and outreach activities that were conducted during the *CCW SWRP* development process are discussed in **Section 3.**

2.1 COORDINATION OF COOPERATING ENTITIES AND STAKEHOLDERS

2.1.1 Contra Costa Clean Water Program and Stormwater Permittees

The CCCWP serves and is administered on behalf of the County municipalities and the Flood Control District, which are collectively called the "Permittees." The mission of the CCCWP is to coordinate and assist Permittees' efforts to reduce and/or eliminate pollutant discharges into and from their municipal separate storm sewer systems (MS4s) in compliance with the MRP. The CCCWP prepared the *CCW SWRP* on behalf the Permittees and other County stakeholders

Regular updates on the progress and development of the *CCW SWRP* were presented to the CCCWP's Management Committee at their monthly meetings. The CCCWP Development Committee served as a forum to solicit and receive Permittee feedback on specific items, particularly the interface between the *CCW SWRP* and the GI Plans.

CCCWP Members

- City of Antioch
- City of Brentwood
- City of Clayton
- City of Concord
- City of El Cerrito
- City of Hercules
- City of Lafayette
- City of Martinez
- City of Oakley
- City of Orinda
- City of Pinole
- City of Pittsburg
- City of Pleasant Hill
- City of Richmond
- City of San Pablo
- City of San Ramon
- City of Walnut Creek
- Town of Danville
- Town of Moraga
- Unincorporated Contra Costa County
- Contra Costa County Flood Control and Water Conservation District

2.1.2 Technical Advisory Group

A TAG made up of representatives from state, regional, and local agencies as well as stakeholder groups, was established to help develop the *CCW SWRP*. The TAG provided direction for developing the *CCW SWRP*, reviewed preliminary work products, and assisted in coordinating efforts between *CCW SWRP* development and stormwater permit compliance efforts.

Agencies and Organizations Represented on the TAG

- State Water Board
- San Francisco Bay Regional Water Board
- City of Pittsburg
- City of El Cerrito
- City of Walnut Creek
- Unincorporated Contra Costa County
- Contra Costa County Flood Control and Water Conservation District
- American Rivers
- The Watershed Project
- Contra Costa Resource Conservation District
- Diablo Water District

Many of the TAG members were chosen because they are involved in multiple other stakeholder groups and represent a diversity of perspectives throughout the County. A concerted effort was made to include representatives from disadvantaged communities (DACs) identified by the state. TAG members have expertise in watershed planning, environmental planning and engineering, and have an in-depth knowledge of ecological and social characteristics of County watersheds.

A full list of TAG members is provided in **Appendix C**. The TAG met four times during the project.

2.1.3 Other Cooperating and Supporting Entities

2.1.3.1 Other Cooperating Entities Participating in CCW SWRP Process

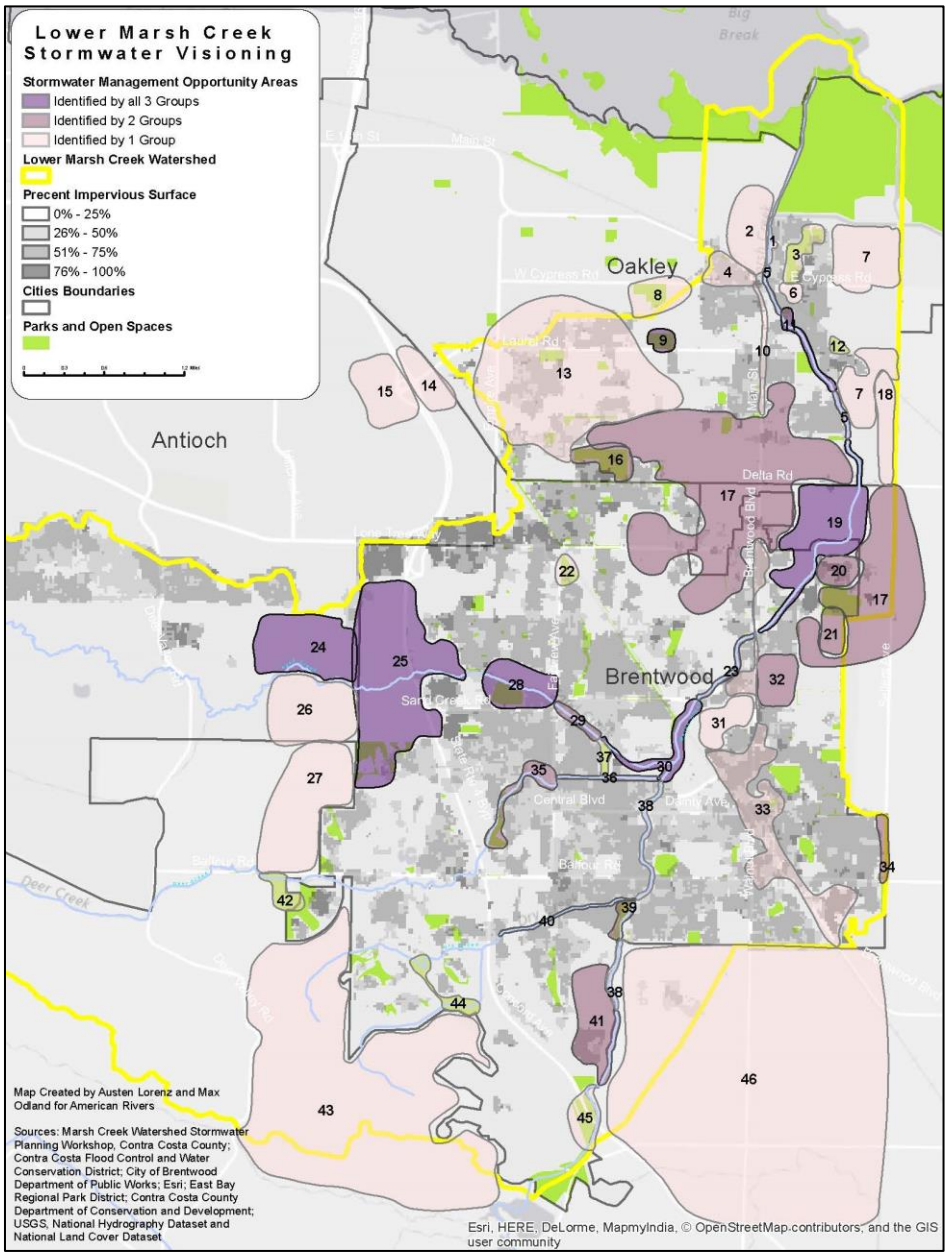
Other stakeholders and community groups within the County actively participated in *CCW SWRP* development. The full list of *CCW SWRP* stakeholders is provided in **Appendix C**. In particular, American Rivers organized a stakeholder outreach event in December of 2017 to develop maps with creek restoration and green infrastructure projects in the Wildcat, San Pablo, and Rheem Creek Watersheds. Prior to the *CCW SWRP* development process, in September 2015, American Rivers organized a workshop for stakeholders in the Marsh Creek watershed, which included a presentation on multiple benefits of stormwater management projects and GI and an interactive mapping exercise to identify opportunities for GI in the lower Marsh Creek watershed. Identified opportunities were incorporated into the *CCW SWRP* process. In addition, watershed stakeholders were provided opportunities to submit potential projects for inclusion in the *CCW SWRP*, as described in **Section 6.1**.

2.1.3.2 Supporting Entities Contributing Funding or In-kind Support

This *CCW SWRP* was funded through a Proposition 1 Storm Water Grant Program planning grant from the State Water Board. Local match funding included the following:

- American Rivers' 2015 work in the Marsh Creek Watershed and 2016 work in the Wildcat, San Pablo, and Rheem Creek Watersheds provided $146,000 of in-kind match for the *CCW SWRP* effort.

- The Friends of Alhambra Creek contributed $1,000 towards development of the *CCW SWRP*.
- The CCCWP contributed in-kind administrative labor towards facilitating development of the *CCW SWRP* and managing the planning grant.
- The costs of planning activities for a stormwater diversion pilot project completed by unincorporated Contra Costa County in partnership with the West County Wastewater District.
- The County's existing grant program to fund watershed-based community organizations provided funding for community organization participation in the planning process.



Example of SWRP Opportunities Identified during American Rivers' Outreach in the Marsh Creek Watershed

2.1.4 Education, Outreach and Public Participation

Effective community engagement is essential to the success and acceptance of stormwater management projects and the development of a meaningful *CCW SWRP*. Outreach to engage and educate the public and community stakeholder groups was conducted on both County-wide and Planning Unit scales at key points during plan development, to provide opportunities for feedback on *CCW SWRP* priorities and projects. **Section 3** describes the education, outreach and public participation activities that were conducted during *CCW SWRP* development, including outreach specifically targeted at DACs within the County. **Appendix C** contains a comprehensive list of *CCW SWRP* stakeholders.

2.2 RELATIONSHIP WITH EXISTING PLANNING DOCUMENTS

The first task in selecting SWRP Opportunities for the *CCW SWRP* was to review planning efforts previously undertaken within the County to identify opportunities and develop project concepts for dry weather runoff and stormwater treatment, capture, or use. Plans and reports relevant to the *CCW SWRP*, including but not limited to IRWM plans (as discussed in **Section 2.3**), creek restoration or watershed enhancement plans undertaken by creek groups, TMDL compliance efforts, monitoring plans and other watershed management planning and low impact development (LID) or GI planning efforts by the County or jurisdictions within the County, were reviewed to select projects achieving *CCW SWRP* goals. Outreach was conducted to solicit information from municipalities, government agencies, NGOs, and watershed groups on existing potential projects and previously identified opportunities.

The education, outreach, and public participation strategy employed during the development of the *CCW SWRP* is discussed in **Section 3.** The specific outreach activities soliciting information on existing potential projects and previously identified opportunities is described in detail in **Section 6.**

2.3 INTEGRATED REGIONAL WATER MANAGEMENT GROUPS

IRWM is defined by the California Department of Water Resources (DWR) as a collaborative effort to manage all aspects of water resources in a region. Senate Bill 985, an amendment to the Stormwater Resource Planning Act passed on August 28, 2014, requires the regional IRWM group to incorporate the SWRPs into their IRWM Plans. There are two regional IRWM groups in the County: East Contra Costa County IRWM Group and Bay Area IRWMP. Integration of the *CCW SWRP* into the IRWM plans will further the goals of valuing stormwater as a local water resource and may open other sources of project funding.

Both IRWM groups provided letters of support when the CCCWP applied for Proposition 1 Planning Grant to fund the development of the *CCW SWRP*. The *CCW SWRP* was submitted to the IRWM groups to be incorporated into the Bay Area and East Contra Costa County IRWM Plans.

2.3.1 East Contra Costa IRWM Group

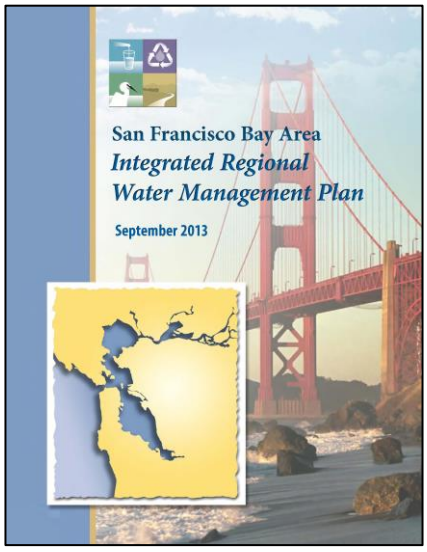
The East Contra Costa County IRWM group is a multiple-stakeholder collaboration to manage all aspects of water resources in the 350-square mile region north and east of Mount Diablo and south and west of the San Joaquin River.

Mike Yeraka, General Manager of the Diablo Water District, agreed to be the liaison between the TAG and the East Contra Costa County IRWM group. CCCWP provided updates to the East Contra Costa County IRWM group about the development of the *CCW SWRP*. The East Contra Costa County IRWM group meets every other month on the fourth Wednesday and is coordinated by the Contra Costa Water District.

2.3.2 Bay Area IRWMP

The Bay Area IRWM Plan (BAIRWMP) is a nine-county effort to coordinate and improve water supply reliability, protect water quality, manage flood protection, maintain public health standards, protect habitat and watershed resources, and enhance the overall health of the San Francisco Bay. The Coordinating Committee is the coordinating body for the BAIRWMP.

The BAIRWMP region has the same boundary as the San Francisco Bay Regional Water Board. The BAIRWMP region is divided into four sub-regions to address local issues and projects within that sub-region. The East Sub-region includes portions of Contra Costa and Alameda Counties. There are two "leads" that represent the East Sub-region on the BAIRWMP Coordinating Committee: Mark Boucher of Flood Control District represents Contra Costa County, and Carol Mahoney of Zone 7 Water Agency represents Alameda County.



There is no regular East Sub-region meeting. Mark Boucher has an e-mail list with engaged stakeholders from the East Sub-region. Mitch Avalon, a consultant for the Flood Control District and a member of the TAG, coordinated with Mark Boucher to identify stormwater projects in the East Sub-region and update the BAIRWMP Coordinating Committee on major *CCW SWRP* development milestones. The BAIRWMP Coordinating Committee meets the fourth Monday of the month.

3. Education, Outreach, and Public Participation

At the initiation of the *CCW SWRP* development, a Stakeholder Outreach, Education and Engagement Plan, (**Appendix E**) was developed to identify how the *CCW SWRP* development process would interact with and build upon the County's well-organized and empowered community groups. The Stakeholder Outreach, Education and Engagement Plan describes the public engagement process for stakeholders to learn about the planning process, provide feedback on the process and priorities, and submit potential stormwater opportunities that would achieve multiple benefits including improving water quality, augmenting water supply, enhancing flood control, restoring habitat, and involving and enhancing the community. **Appendix C** contains the working list of stakeholder contacts engaged during the *CCW SWRP* development.

West County Planning Unit Stakeholder Workshop

Public meetings and other outreach methods were used to engage community stakeholders, including local watershed groups, NGOs, jurisdictions, government agencies, and special districts, to solicit community comments, feedback and suggestions for local stormwater projects that reflect local values and needs within the County's watersheds. Outreach was coordinated at key points in the development of the plan, such as at the initiation of *CCW SWRP* development, during the compilation of existing project concepts, following the development of draft evaluation criteria, and during the review of the draft *CCW SWRP*. **Appendix D** contains a list of public comments and responses on the draft *CCW SWRP*.

North County Planning Unit Stakeholder Workshop

East County Planning Unit Stakeholder Workshop

3.1 PUBLIC EDUCATION AND PARTICIPATION OPPORTUNITIES

The County has four established groups that coordinate watershed planning efforts among stakeholders at a regional or county-wide scale. These include the CCCWP and two IRWM groups, (described in **Section 2.3**), and the Contra Costa Watershed Forum. The Contra Costa Watershed Forum provides a central point of organization for approximately 50 community

groups, private citizens, state and local agencies, and others interested in stream stewardship and watershed health.

The Contra Costa Watershed Forum's regularly scheduled meetings are on the second Wednesdays of odd months. The group is coordinated by the Contra Costa Resource Conservation District (CCRCD). Watershed Forum meetings served as one of the primary outreach and participation venues for engaging the public in the development of the *CCW SWRP*. The Project Team provided regular updates on the planning process at Contra Costa Watershed Forum meetings and solicited feedback at key points in the process. The TAG also provided county-wide outreach as it was comprised of technical advisors representing municipalities, county-wide watershed planning groups, and DACs to help guide the development of the *CCW SWRP* (also described in **Section 2.1.2**).

In addition to county-wide efforts, a more targeted, local outreach effort was conducted to engage stakeholder groups within the five Planning Units. The stakeholder contact list in **Appendix C** provides contacts for each Planning Unit. Some special districts and agencies have county-wide jurisdiction but have specific interest and projects in specific watersheds. These agencies and special districts are listed in multiple Planning Units and include the East Bay Regional Park District, the Flood Control District, unincorporated Contra Costa County, the CCRCD, and the Contra Costa Mosquito and Vector Control District. Key public outreach venues specific to Planning Units are described in **Appendix E.**

There are several DACs located in cities and unincorporated areas of Contra Costa County. These groups and outreach efforts to these groups are described in more detail in **Section 3.1.1.**

DACs in Contra Costa County

Unincorporated Contra Costa County:

- North Richmond
- Tara Hills
- Rodeo
- Crockett
- Pacheco
- Bay Point
- Bethel Island

Portions of:

- City of Richmond
- City of El Cerrito
- City of Pinole
- City of San Pablo
- City of Martinez
- City of Pleasant Hill
- City of Antioch
- City of Pittsburg
- City of Oakley
- City of Brentwood

3.1.1 Disadvantaged Communities

The *CCW SWRP* planning area includes DACs, as identified by the state based on median household income. DACs were identified using the California DWR DAC Mapping Tool[4] website. DACs were identified by Disadvantaged Community Block Groups, Disadvantaged Community Tracts, and Disadvantaged Community Places. Maps of DACs in the County and each region are in **Appendix E**.

The *CCW SWRP* supports multiple benefit urban greening efforts in DACs, where a lack of community resources can impact quality of life, including having

[4] The DWR DAC Mapping Tool was developed to support Proposition 1 planning efforts.

access to parks, open spaces, stream trails, and sports fields. The *CCW SWRP* will create a pathway for identification, development, and potential future grant funding of GI projects that are a critical component of broader urban greening initiatives in these areas. GI projects located in DACs may be particularly effective at reducing pollutant loads in the County, as many of the DACs are located in older industrial areas that have been identified as high opportunity areas for the reduction of PCBs loads.

Six of the ten representatives on the TAG serve or represent DACs within the County. DACs are also located in four of the five watershed Planning Units. American Rivers, a TAG representative, completed two multi-stakeholder efforts to identify multiple benefit stormwater projects in the Wildcat, San Pablo and Rheem Creek watersheds, as described in **Section 2.1.3.1**, which include large portions of the DACs of North Richmond, Richmond, and San Pablo; and in the Marsh Creek Watershed, which include portions of DACs in Brentwood and Oakley. These initial stormwater planning efforts were incorporated into the *CCW SWRP* and were expanded to include larger areas of the West County and East County Planning Units.

3.2 MEDIA OUTREACH

Media outreach allowed shared communication opportunities with all stakeholders throughout the development of the *CCW SWRP*. A master e-mail list was developed based on the stakeholder contact list in **Appendix C** to distribute information, announce upcoming stakeholder engagement opportunities, and keep stakeholders engaged and informed about major milestones and *CCW SWRP* development progress. A software communication program called SharePoint was used to communicate with the TAG. The CCCWP also provided information about *CCW SWRP* updates in Management Committee meeting minutes posted on their website.

CONTRA COSTA CLEAN WATER PROGRAM

CONTRA COSTA WATERSHEDS STORMWATER RESOURCE PLAN

In 2016, the Contra Costa Clean Water Program was awarded a Proposition 1 planning grant to fund the development of the *Contra Costa Watersheds Stormwater Resource Plan.*

California's **Stormwater Management Planning Act** requires the development of a Stormwater Resource Plan in order to receive grant funds for runoff projects from any bond approved by voters after January 2014. This requirement applies to Proposition 1 which authorized $200 million in grants for multi-benefit stormwater management projects.

The *Stormwater Resource Plan* will use a watershed-based planning approach to develop stormwater management project concepts that will help meet water quality requirements and provide additional benefits such as flood control, habitat restoration, community enhancement, and groundwater recharge.

A significant focus of the plan will be developing green infrastructure project concepts for municipalities throughout the county. Green infrastructure is recognized as the preferred approach to mitigate water quality impacts associated with urbanization. Green infrastructure facilities such as rain gardens, permeable pavement, infiltration basins, and constructed wetlands can also provide additional community and environmental benefits.

The *Stormwater Resource Plan* will serve multiple important purposes for Contra Costa municipalities and other stakeholders. It will help Contra Costa municipalities fulfill the Green Infrastructure Plan requirements of the Municipal Regional Stormwater Permit, as well as position municipalities and other Contra Costa entities (e.g., watershed groups) to compete for stormwater management grant funding in the future. The development of the plan will be supported by a Technical Advisory Group consisting of stakeholder representatives including municipalities, NGOs, regulators, and technical experts.

For more information about the *Contra Costa Watersheds Stormwater Resource Plan,* please contact Adele Ho at Adele.Ho @pw.cccounty.us.

The Contra Costa Clean Water Program is comprised of Contra Costa County, nineteen of its incorporated cities and the Contra Costa Flood Control & Water Conservation District. The CCCWP strives to eliminate stormwater pollution through public education, inspection and enforcement activities, and industrial outreach.

255 Glacier Drive, Martinez, CA 94553-4825 • Tel (925) 313-2360 Fax: 313-2301 • Website: www.cccleanwater.org

Example of Factsheet Developed to Provide Information on the SWRP Development

3.3 SCHEDULE OF OUTREACH ACTIVITIES

Table 3-1 provides a schedule of major outreach meetings, activities and public engagement opportunities.

Table 3-1. Schedule of Outreach Activities Conducted During the *CCW SWRP* Process

Date	Description	Goal
April 13, 2017	Presentation to the Contra Costa Public Managers Association (Contra Costa City Managers and County Administrator)	Announce the upcoming *CCW SWRP* process to Contra Costa's municipal leaders. Discuss the relationship between the *CCW SWRP* and the GI Plans to help the municipal leaders understand relationship and upcoming resource needs for the two planning processes.
May 15, 2017 (Municipal Stakeholders) July 14, 2017 (All other Watershed Groups and Stakeholders)	Deadlines for submissions in response to the email solicitation of existing watershed project concepts for inclusion in the *CCW SWRP* process described in **Section 6**.	Develop draft list and maps of existing stakeholder stormwater project concepts for inclusion in the planning process.
May 17, 2017	Presentation at Contra Costa Watershed Forum Meeting	Announce launch of development of the *CCW SWRP*; inform stakeholders of project goals and schedule, discuss questions and get feedback.
June 1, 2017	Presentation at CCRCD Staff Meeting	Provide information to CCRCD staff about the *CCW SWRP* and get feedback on coordination and outreach opportunities.
June 27, 2017	Technical Advisory Group Kickoff Meeting #1	Develop goals and objectives, formalize roles, develop a schedule for future meetings, and get feedback on the *CCW SWRP* outreach plan.
July 12, 2017	Presentation at Contra Costa Watershed Forum Meeting	Provide an update on the *CCW SWRP* planning process. Discuss solicitation for existing project concepts and answer questions.
August 28, 2017	Presentation at Bay Area IRWMP Coordinating Committee Meeting	Provide an overview of the *CCW SWRP* planning process and discuss integration of SWRP and Bay Area IRWMP. Confirm that relevant IRWMP projects are included in draft list and maps of stormwater projects.

Date	Description	Goal
August 30, 2017	Presentation at East Contra Costa County IRWM group Meeting	Provide an overview of the *CCW SWRP* planning process and discuss integration of *CCW SWRP* and East County IRWMP. Confirm that relevant IRWMP projects are included in draft list and maps of stormwater projects.
September 5, 2017	Alhambra Creek Watershed Council Meeting (North County Planning Unit Stakeholder Outreach Meeting)	Engage North County stakeholders in the *CCW SWRP* development and get input on draft project evaluation criteria and draft list and maps of stormwater projects.
September 11, 2017	South County Planning Unit Stakeholder Outreach Meeting	Engage South County stakeholders in the *CCW SWRP* development and get input on draft project evaluation criteria and draft list and maps of stormwater projects.
September 12, 2017	East County Planning Unit Stakeholder Outreach Meeting	Engage East County stakeholders in the *CCW SWRP* development and get input on draft project evaluation criteria and draft list and maps of stormwater projects.
September 13, 2017	Presentation at Contra Costa Watershed Forum Meeting	Provide an update on the *CCW SWRP* development and outreach efforts to date.
September 18, 2017	Walnut Creek Watershed Council Meeting (Central County Planning Unit Stakeholder Outreach Meeting)	Engage Central County stakeholders in the *CCW SWRP* development and get input on draft project evaluation criteria and draft list and maps of stormwater projects.
September 21, 2017	Wildcat and San Pablo Creek Watershed Council Meeting (West County Planning Unit Stakeholder Outreach Meeting)	Engage West County stakeholders in the *CCW SWRP* development and get input on draft project evaluation criteria and final draft list and maps of stormwater projects.
December 8, 2017	Technical Advisory Group Meeting #2	Update on results of Stakeholder Workshops; update on modeling approach and prioritization criteria; discuss and get feedback on approach to implementation strategy.

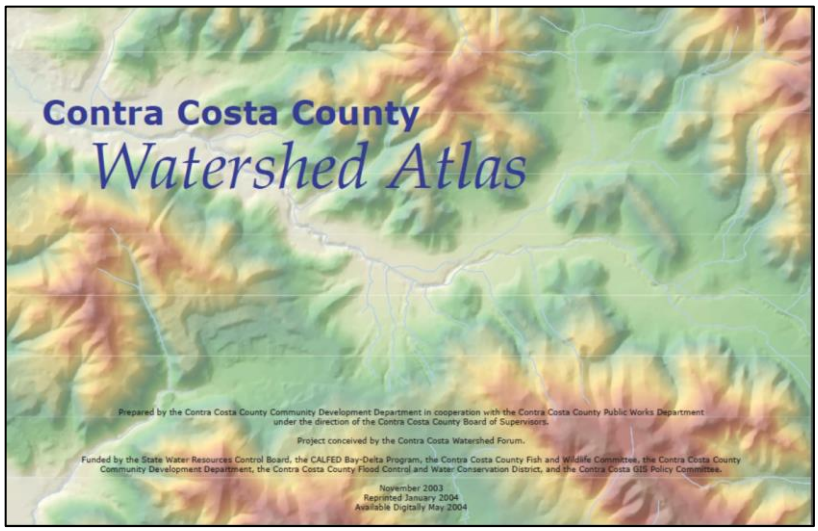
Date	Description	Goal
February 2, 2018	Technical Advisory Group Meeting #3	Review preliminary results of analysis and project prioritization; discuss selection of high priority opportunities for project concept plan development.
May 9, 2018	Contra Costa Watershed Forum Meeting	Update on the *CCW SWRP* development.
June 13, 2018	Technical Advisory Group Meeting #4	Feedback from TAG on *CCW SWRP* Administrative Draft.
July 11, 2018	Contra Costa Watershed Forum Meeting	Update on the *CCW SWRP* development.
August 31, 2018	E-mail to master stakeholder outreach list; post on website and share with TAG on SharePoint	Begin soliciting public comments on Public Draft *CCW SWRP*.
September 12, 2018	Contra Costa Watershed Forum Meeting	Present the Public Draft *CCW SWRP* and solicit comments.
November 14, 2018	Contra Costa Watershed Forum Meeting	Update on the *CCW SWRP* development.
November 28, 2018	Presentation at East Contra Costa County IRWM group Meeting	Update on the *CCW SWRP* development.
January 2019	E-mail to master stakeholder outreach list; post on website and share with TAG on SharePoint	Announce posting of *CCW SWRP*.

4. Contra Costa's Watersheds: Planning Approach and Characterization

The Contra Costa County boundary was selected as the planning area of the *CCW SWRP* to integrate the SWRP development process with existing county-wide stormwater compliance coordination efforts, to recognize that the types of stormwater capture and use projects envisioned the SWRP are typically administered based on geo-political boundaries, and to efficiently use administrative resources in managing the planning grant project. Contra Costa County has 16 major watersheds. These 16 major watersheds comprise 31 sub-watersheds, of which all but eight are entirely within the County. The planning area was also selected because it corresponds with the two IRWM groups within the County (discussed in **Section 2.3**).

The CCCWP was formed to assist Permittees' efforts to comply with stormwater permits through cross-jurisdictional and multiple watershed collaboration. The CCCWP's record of success coordinating efforts across the County uniquely positioned the Program to lead the development of the *CCW SWRP*. The CCCWP is closely aligned with the Contra Costa Watershed Forum (CCWF) that has been coordinating an exchange of information and promoting the protection and restoration of Contra Costa creeks and watersheds since 1999.

The County watersheds are subject to similar water quality stressors and contribute to regional water quality impairments of the San Francisco Bay-Delta Estuary. The water bodies are all subject to regional TMDLs and regulatory requirements calling for control measures to address the loading of mercury, PCBs, pesticides, trash, and other contaminants. GI is recognized as an essential strategy for the region to mitigate the effects of urbanization and address these water quality concerns.



The Watershed Atlas was a Significant Resource for the SWRP

There are 19 incorporated cities and towns in the County. The County's watersheds include over 1,300 miles of creeks and drainages. **Figure 4-1** provides an overview of the County creeks and drainages and **Figure 4-2** provides an overview of planned land use including open space and parks. Additional detailed maps of the watersheds can be found in the *Watershed Atlas* and on the CCCWP website https://www.cccleanwater.org/watersheds/watersheds-in-contra-costa-county. **Figure 4-4** shows the major watersheds, and sub-watersheds are shown in **Figure 4-9**. Minor tributaries are not shown in these figures but are discussed in

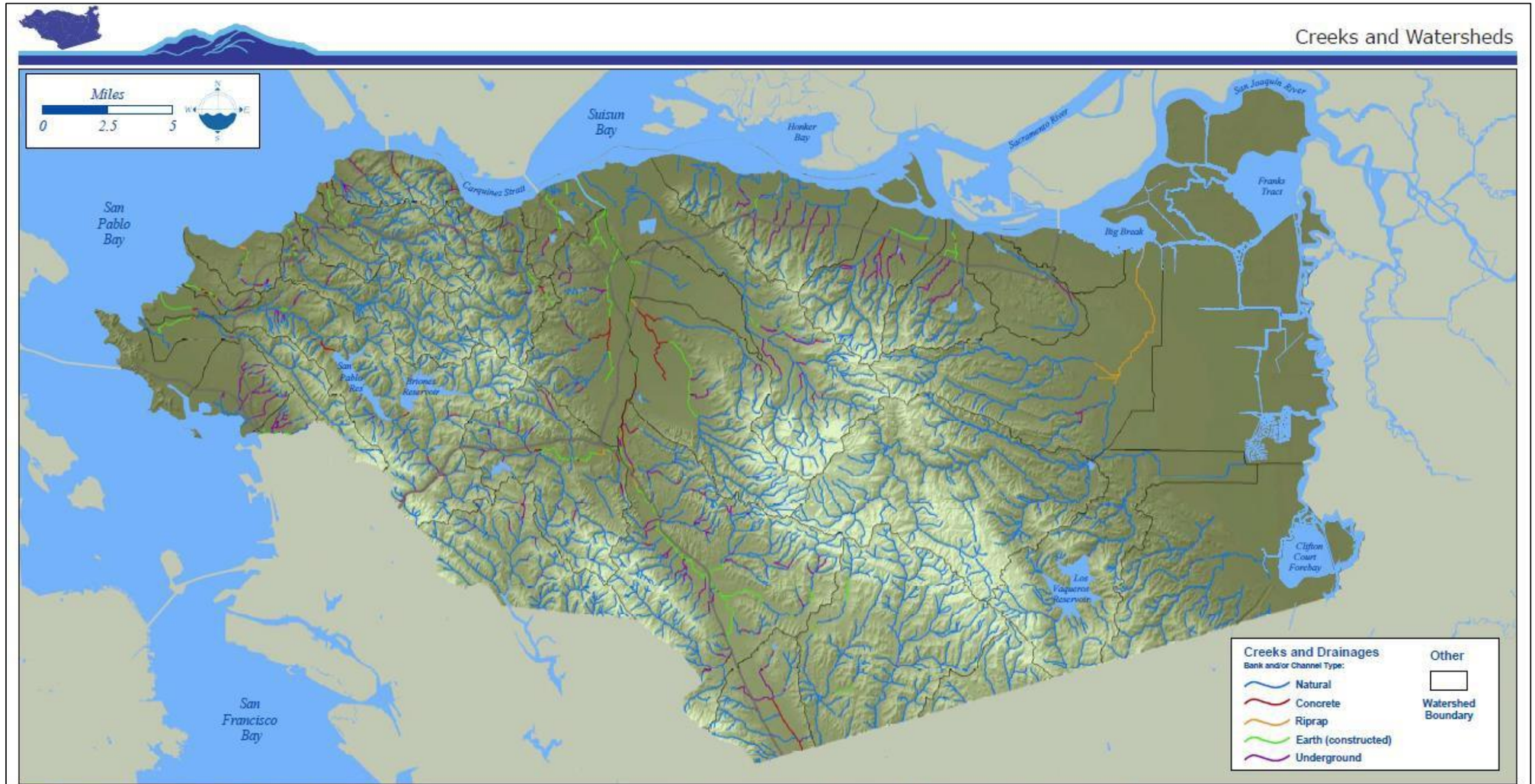
Section 4.1. Land uses within the County consist of 37% urban lands,[5] 31% agricultural lands; and 32% open space, parks and recreation areas, and water. **Figure 4-5** and **Figure 4-6** show the water utility boundaries for the eastern portion of the County (East County Water Management Association, 2015) and key water infrastructure for the western portion of the County (Kennedy-Jenks et al., 2013). **Figure 4-7** and **Figure 4-8** show the groundwater basin boundaries for the eastern portion of the County (Diablo Water District, 2007) and western portion of the County (Kennedy-Jenks et al., 2013).

Creeks in the western portion of the County flow towards the San Francisco Bay, while those in the eastern portion of the County flow towards the Sacramento-San Joaquin Delta. The largest watersheds in the County are the Walnut Creek (93,556 acres) and Marsh Creek (60,066 acres) watersheds, which span multiple jurisdictions. However, many of the smaller watersheds and sub-watersheds are "community sized" and are important features of those communities.

The *CCW SWRP* organizes the County into five watershed-based Planning Units. The Planning Units are based on watershed boundaries and aggregate watersheds by geographic proximity, along with similar planning requirements and local values. **Figure 4-9** shows the grouping of sub-watersheds within each Planning Unit, and **Figure 4-10** shows the jurisdictional boundaries of the cities and towns that fall into each Planning Unit.

Mouth of Baxter Creek in Richmond

[5] Urban land uses include commercial, industrial, business parks and offices, multi-family residential, and single-family residential land uses.



Countywide Creek Channel Length Statistics*

	Miles	Percent
Length of Longest Creek in County **	34.57	
Total Length of Creeks & Drainages in County	1,349.63	
Type of Bank or Channel:		
Natural (no obvious reinforcements)	1,148.16	85.1%
Concrete	133.34	9.9%
Earth (constructed)	56.31	4.2%
Riprap	11.13	0.8%
Underground	112.56	8.3%

Notes on Channel Length Statistics Table:

*Data relate to mapped channels only. Does not include storm drains. Bank type for segments shorter than 100 feet was not mapped.

** Marsh Creek is the longest creek entirely within the County.

The Creeks and Watersheds of Contra Costa County

Contra Costa County has 31 major watersheds and sub-watersheds containing more than 1300 miles of creeks and drainages. All but eight of these watersheds are entirely within Contra Costa County. While the Walnut Creek Watershed is very large (93,556 acres) and spans many cities, many of the other watersheds are conveniently "community-sized". For instance, Alhambra and Pinole Creeks are closely identified with (and are important features of) the Cities of Martinez and Pinole respectively.

Creeks and drainages in low-lying urban areas often have concrete-lined or constructed earth banks, or they may actually run underground through pipes and culverts. Such constructed features are designed to manage flood risks and/or minimize the land area necessary to convey water downstream, but may lack the aesthetic and ecological values of a more natural creek system.

Figure 4-1. Overview of the Creeks and Watersheds of Contra Costa County (Contra Costa County 2004)

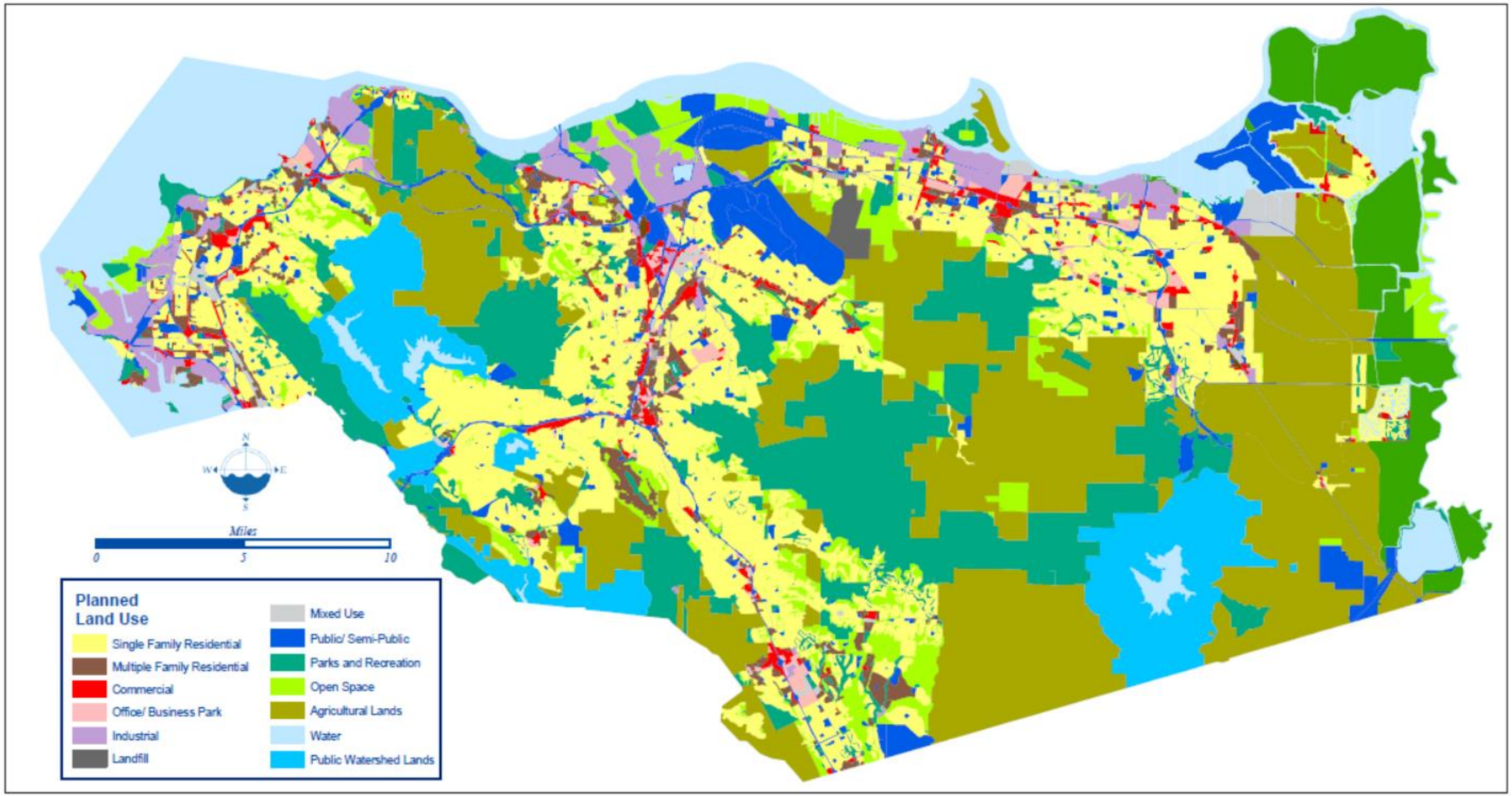


Figure 4-2. Overview of Planned Land Use in Contra Costa County (Contra Costa County 2004)

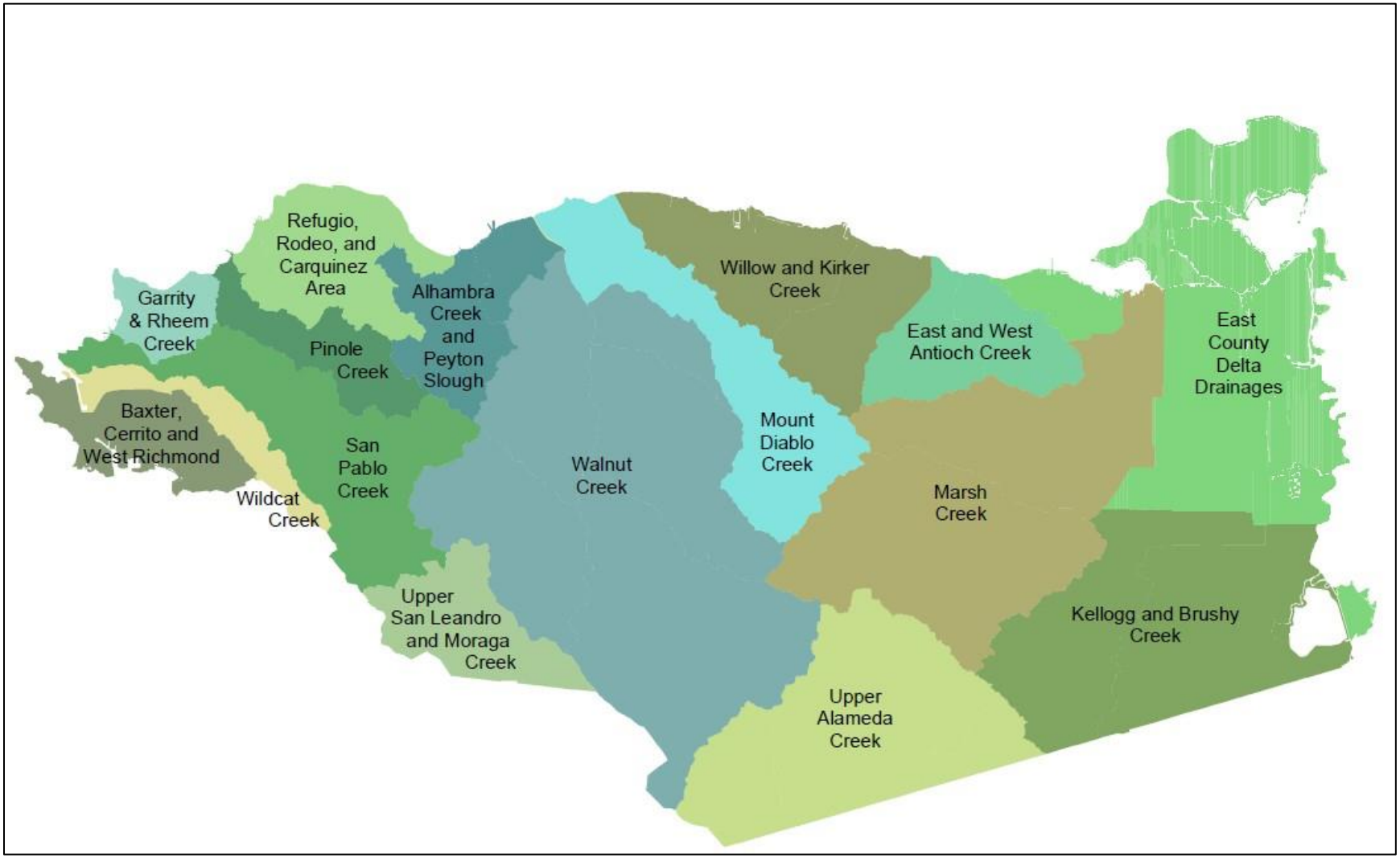


Figure 4-3. Major Watersheds in Contra Costa County (Contra Costa County, 2004)

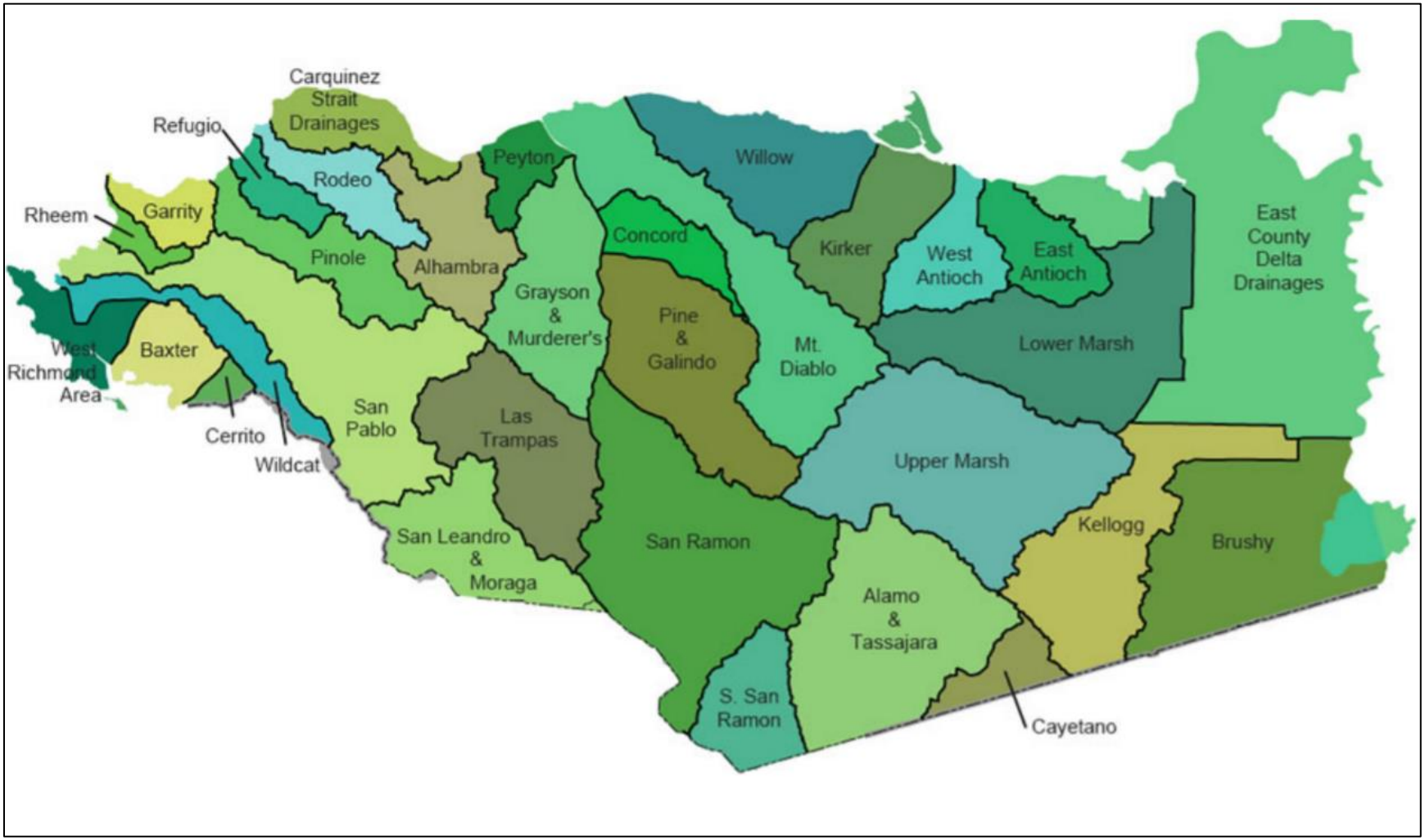


Figure 4-4. Sub-Watersheds in Contra Costa County

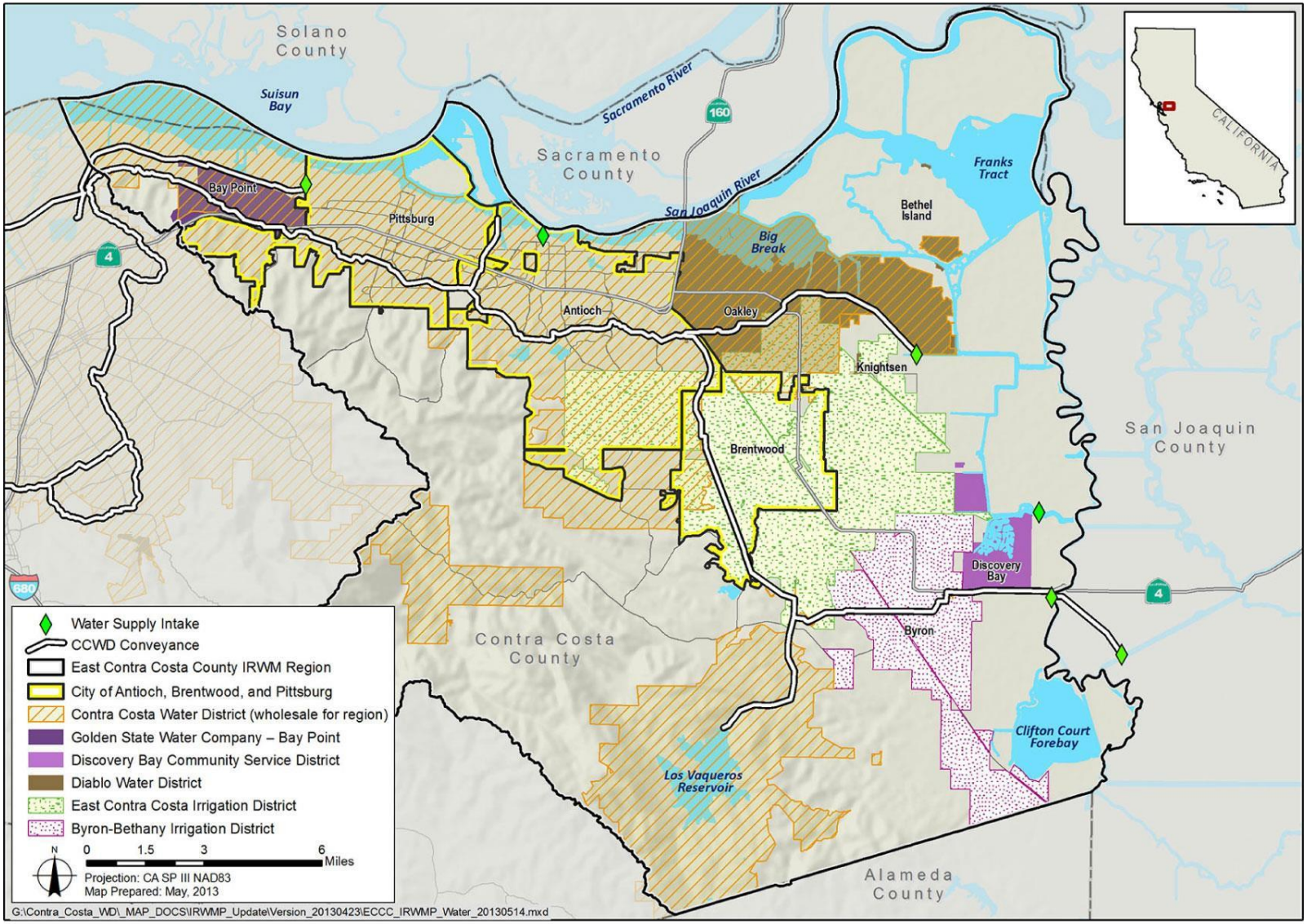


Figure 4-5. East County Water Agency Map (East County Water Management Association, 2015)

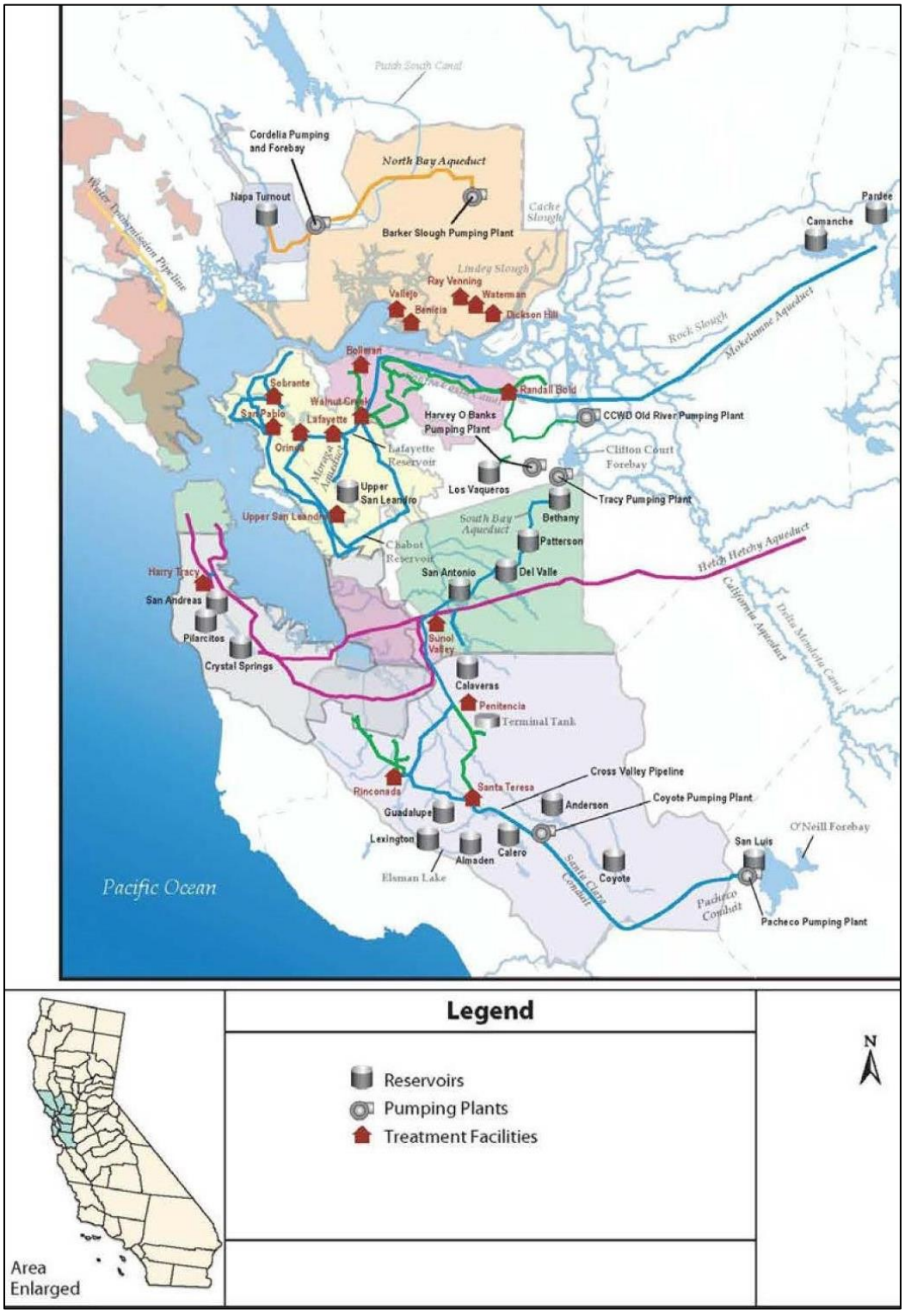


Figure 4-6. West County Water Infrastructure Map (Kennedy-Jenks et al., 2013)

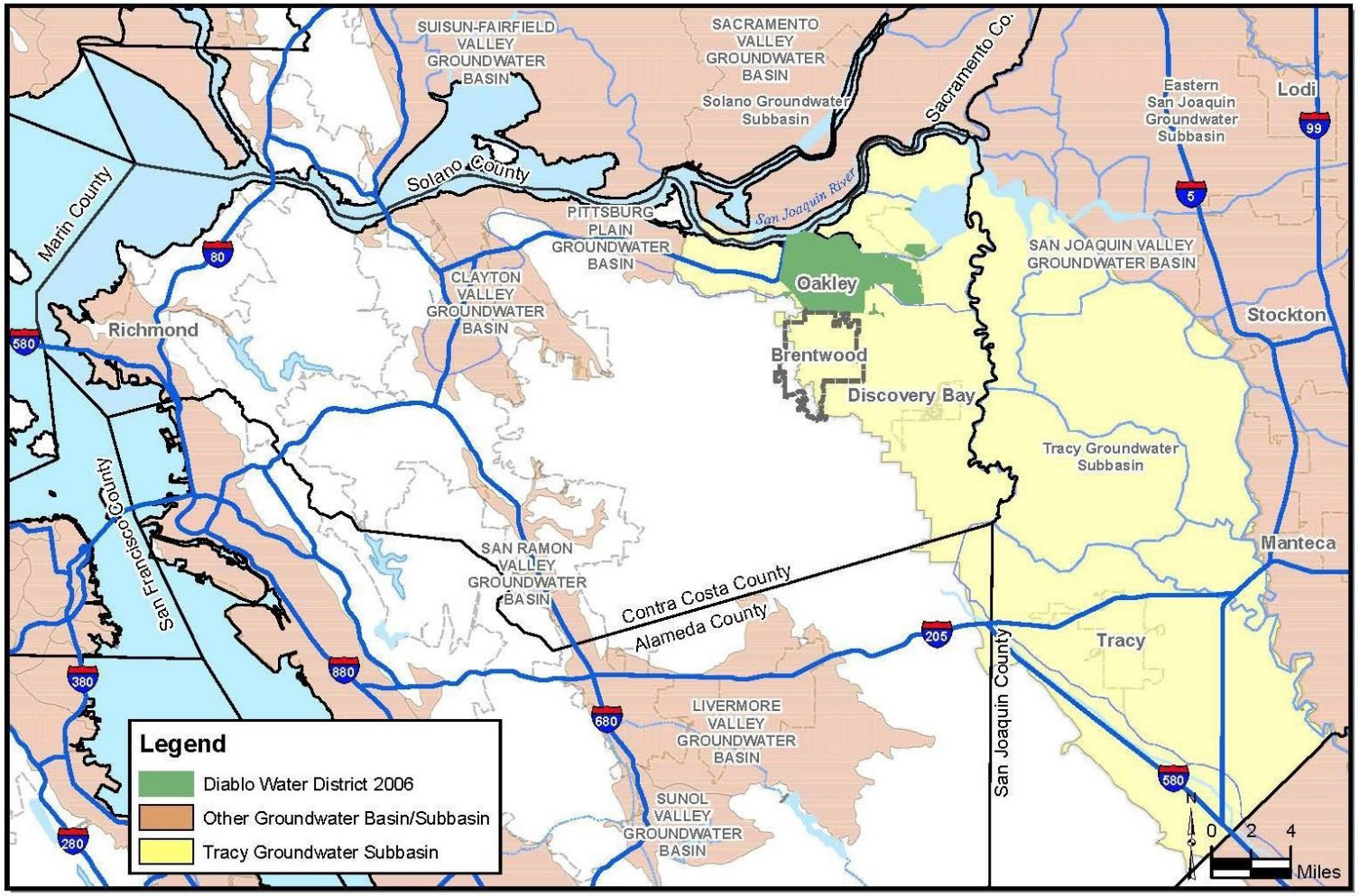


Figure 4-7. East County Groundwater Basins (Diablo Water District, 2007)

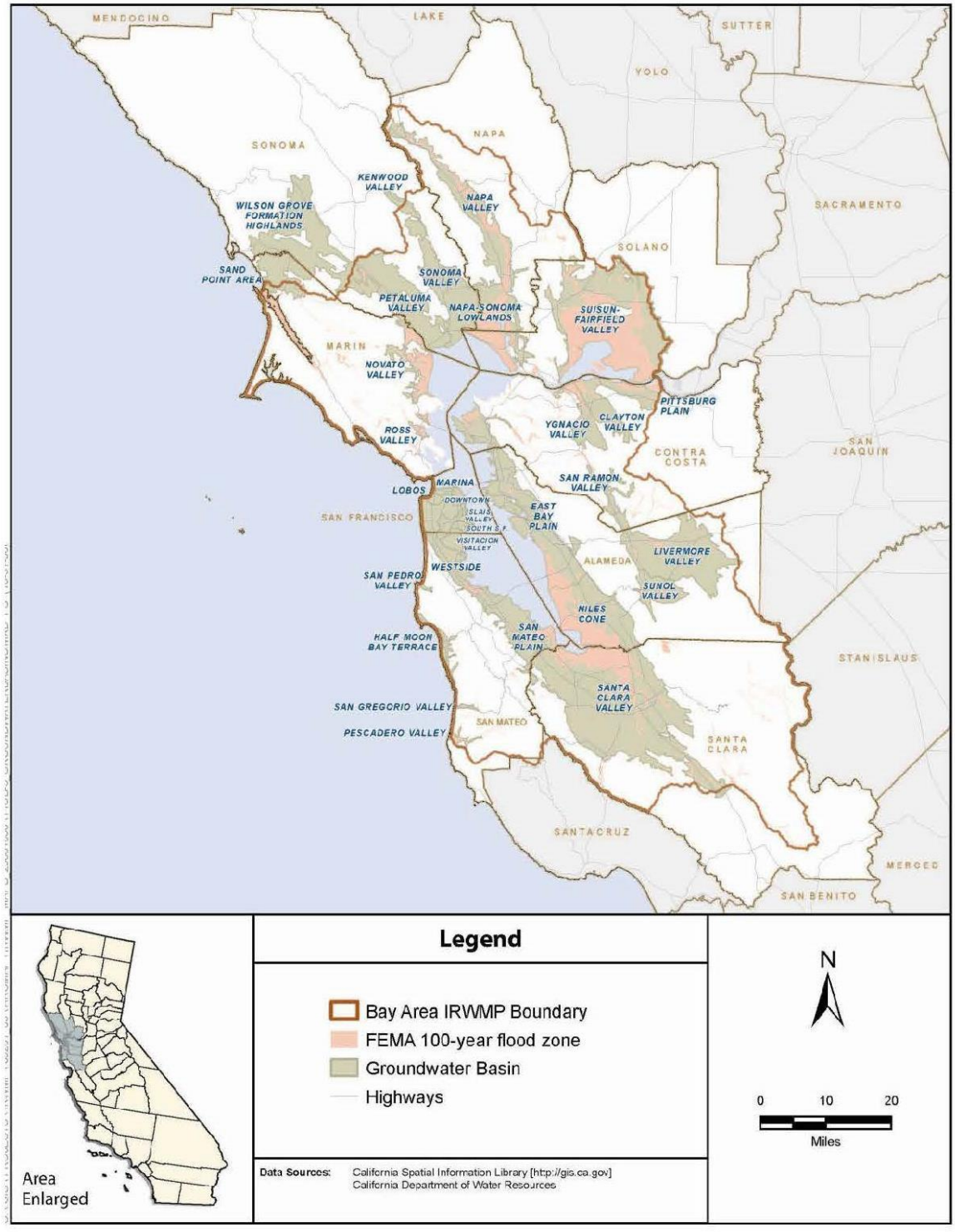


Figure 4-8. West County Groundwater Basins (Kennedy-Jenks et al., 2013)

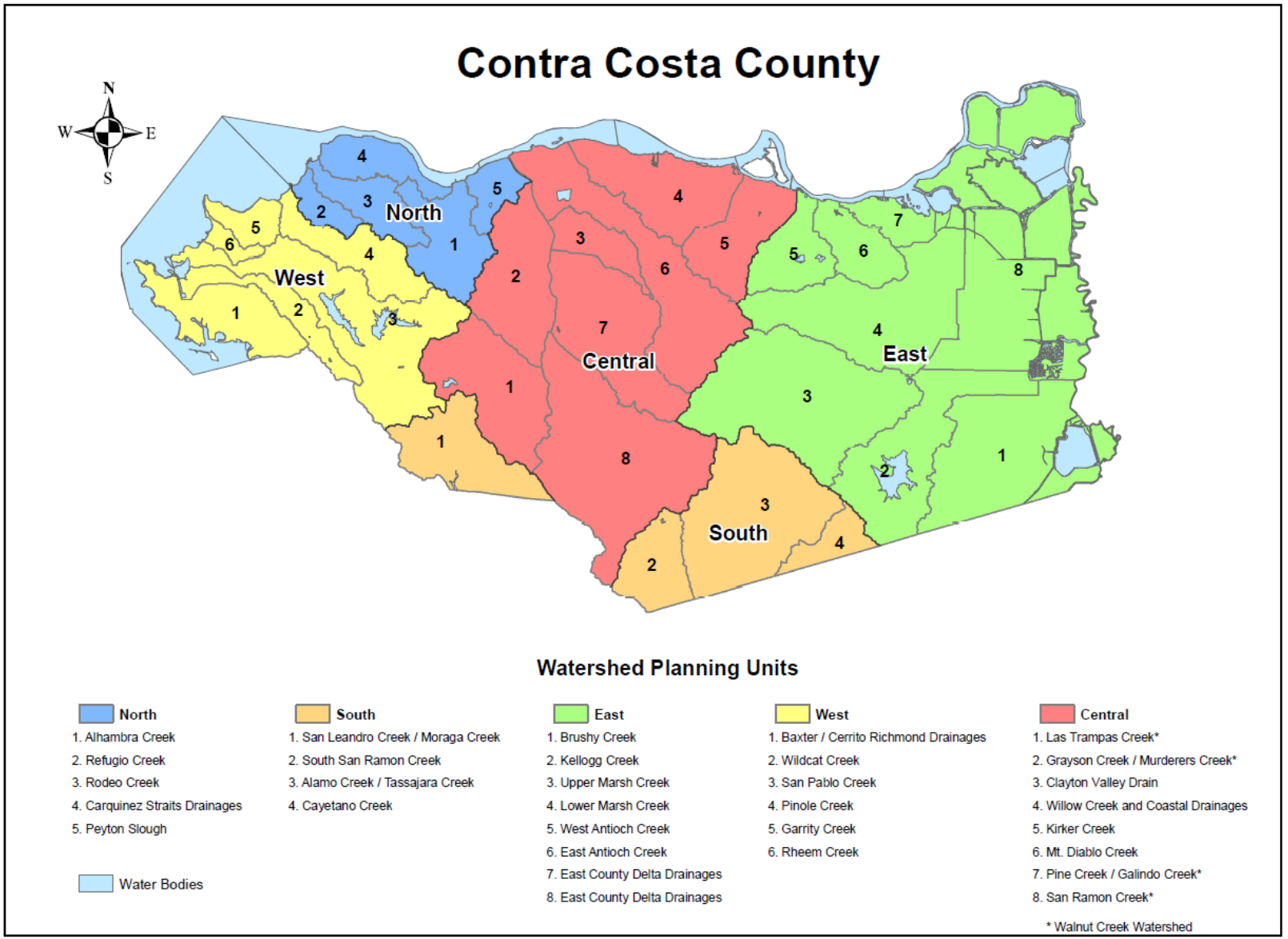


Figure 4-9. Contra Costa County Watershed Planning Units and Watersheds

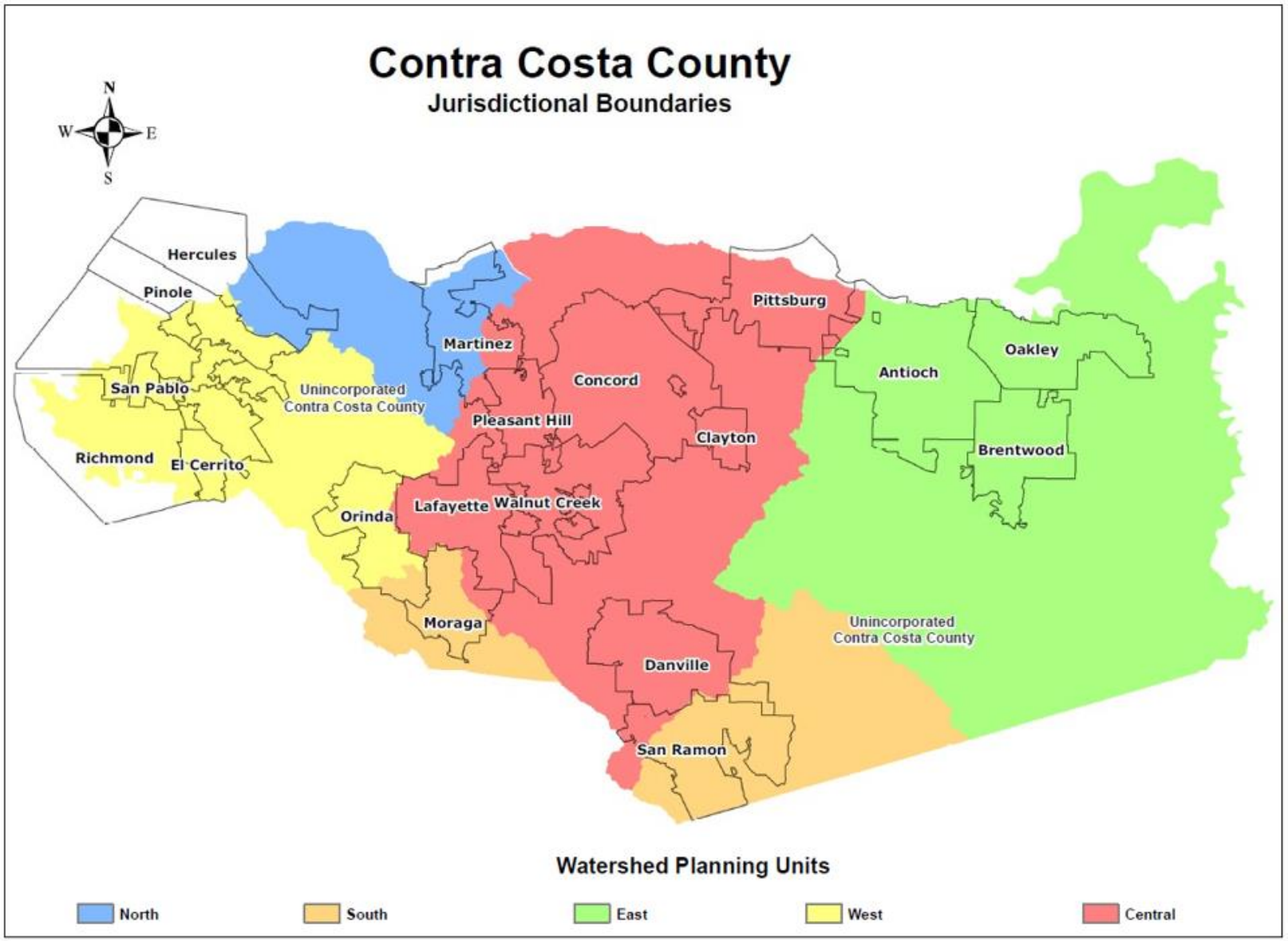


Figure 4-10. Contra Costa County Local Jurisdictions and Watershed Planning Units

4.1 *CCW SWRP* WATERSHED PLANNING UNITS

A summary of characteristics in each Planning Unit, including a description of watersheds, is provided in the following sections. The Planning Unit descriptions include a characterization of the current land use, public agency and water utility boundaries, surface and groundwater resources, and water quality priorities present in each area.

4.1.1 East County Watersheds Planning Unit

East County Watersheds

East Antioch Creek
West Antioch Creek
Marsh Creek
Kellogg Creek
Brushy Creek
East County Delta Drainages

The major watersheds within the East County Planning Unit are located within California's Central Valley. Creeks in these watersheds originate on public lands, including East Bay Regional Park District (EBRPD) land, Mount Diablo State Park, and ranchlands before flowing into residential areas and into the Sacramento-San Joaquin Delta. The watersheds in this Planning Unit are distinguished from the rest of the County by a greater proportion of agricultural land uses, high soil infiltration capacity, and have historically been regulated by the Central Valley Regional Water Board.[6]

The cities of Oakley and Brentwood are located entirely within this Planning Unit. Additionally, the City of Antioch is almost completely located within the East County Planning Unit, though its northwestern border lies in the Central County Planning Unit (Contra Costa County, 2004).

Seven water districts serve this area. Water districts that serve portions of entities within the East County Planning Unit include the Contra Costa Water District, the Diablo Water District, the Discovery Bay Community Services District, the East Contra Costa Irrigation District, and the Byron-Bethany Irrigation District. The Cities of Brentwood and Antioch (within the Contra Costa Water District) act as water utilities (East County Water Management Association, 2015) (see **Figure 4-5** and **Figure 4-6**). A summary of the water supply sources for each of these water districts (based on information provided by the water districts) is provided in **Table 4-1**.

Portions of the East County Planning Unit are underlain by the Tracy Groundwater Sub-basin, within the San Joaquin Valley Groundwater Basin (Diablo Water District, 2007) (see **Figure 4-7**). This Planning Unit must address water quality issues specific to the Sacramento-San Joaquin Delta, including the Delta Methylmercury TMDL.

A summary of characteristics in the major watersheds in the Planning Unit are included in the following sections. Unless otherwise indicated, all information was obtained from the *Contra Costa County Watershed Atlas* (Contra Costa County, 2004).

[6] Eastern Contra Costa County (the City of Antioch, City of Brentwood, City of Oakley, Contra Costa County, and Contra Costa County Flood Control and Water Conservation District) was previously regulated under the Central Valley Regional Water Board's Eastern Contra Costa County MS4 permit (Order No. R5-2010-0102). The Central Valley Regional Water Board and the San Francisco Bay Regional Water Board have recently agreed to regulate stormwater discharges from Eastern Contra Costa County under the MRP.

Table 4-1. Water Sources for Water Districts in the East County Planning Unit

Water District	Water Source
Contra Costa Water District	Water originates within the Sierra Nevada, and is drawn from Rock Slough near Oakley, Mallard Slough in Bay Point, Old River near the town of Discovery Bay and nearby Middle River. After being drawn, water is transported in the Contra Costa Canal, which begins at Rock Slough and branches west to Clyde, north to Martinez and south to Walnut Creek.
Diablo Water District	Water originates from Shasta and Friant Dams and flows into the Sacramento-San Joaquin Delta. From the Delta the water is pumped into the Contra Costa Canal and then into the Los Vaqueros Reservoir. This surface water is treated and blended with groundwater before delivery.
Discovery Bay Community Services District	The town draws water from the Sacramento-San Joaquin Valley groundwater basin through six wells. The aquifer is approximately 300 feet below the surface.
East Contra Costa Irrigation District	The District utilizes a 1912 appropriative right to draw water from the Indian Slough on Old River, a tributary of the San Joaquin River.
Byron-Bethany Irrigation District	One point of diversion on the intake channel of the California Aqueduct for the District's Pre-1914 service areas and a long-term water supply contract with the U.S. Bureau of Reclamation for the Central Valley Project service area.
City of Antioch	Purchases surface water from the Contra Costa Water District.
City of Brentwood	Uses Sacramento-San Joaquin Delta Water and blends with groundwater from the Sacramento-San Joaquin Valley groundwater basin, pumped from seven wells (through agreement with East Contra Costa Irrigation District). The City has the option of purchasing from the Contra Costa Water District.

4.1.1.1 East and West Antioch Creek Watersheds

The East and West Antioch Creek watersheds are located in the northeastern region of the County. The larger creek system in this area drains from the hills south of Antioch to the Sacramento-San Joaquin Delta. Both watersheds fall primarily within the City of Antioch, though the southwestern region lies in unincorporated County and the eastern boundaries fall within the Cities of Brentwood and Oakley.

East Antioch Creek flows from headwaters near Lone Tree Way in Antioch. A number of detention basins and levees have been constructed along the creek to prevent flooding into the Marsh Creek drainage area. Land uses in the East Antioch Creek watershed consist of 87% urban lands and 13% open space, parks and recreation areas, and water.

Markley Canyon Creek and other unnamed tributaries feed into West Antioch Creek before it discharges into the Sacramento-San Joaquin Delta. The main stem of West Antioch Creek remains above ground for most of its length, though it flows through a constructed channel in its lower half. Large sections of its tributaries have been routed underground through more developed areas to provide flood protection and drainage. Land uses in the West Antioch Creek watershed consist of 5% agricultural lands; 47% urban lands; and 48% open space, parks and recreation areas, and water.

Two reservoirs within the West Antioch Creek watershed, Antioch Municipal Reservoir and Contra Loma Reservoir, provide drinking water storage. Both reservoirs are fed by the Contra Costa Canal, which diverts water from the Sacramento-San Joaquin Delta at Rock Slough (Contra Costa Water District, 2017 and City of Antioch, 2017).

The East and West Antioch Creek watersheds do not contain any water bodies that have been identified in the State's 303(d) list of Impaired Water Bodies (CVRWQCB, 2016).

4.1.1.2 Marsh Creek Watershed

Marsh Creek's headwaters are located in the eastern Mount Diablo foothills, from which the Creek and its tributaries flow across the northeastern portion of the County and drain into the Sacramento-San Joaquin Delta. The upper watershed contains protected open space areas, including Mount Diablo State Park, and EBRPD's Round Valley and Morgan Territory Regional Preserves. Marsh Creek is the second largest watershed in the County, at 60,066 acres. The Marsh Creek watershed is primarily located in unincorporated County, with portions located within the Cities of Antioch, Brentwood, and Oakley.

Marsh Creek in Oakley at the Site of a Recently Completed Restoration Project

Marsh Creek and a tributary, Briones Creek, feed the Marsh Creek Reservoir on the eastern edge of the watershed. Farmers and flood control authorities have altered Marsh Creek's historical path through the alluvial plain north of Marsh Creek Reservoir to protect agricultural resources. Changes have included the building of levees, detention basins, and dams, as well as culverting, straightening, and the creation of concrete-lined channels. These changes have led to reduced riparian habitat and vegetation, as well as the intended alteration of flow.

More recent projects have been countering historic changes by restoring natural watershed processes and improving water quality. Some examples of projects underway or completed include:

- The Three Creeks Parkway Restoration project commenced in 2016 to widen and improve an approximately 4,000-foot section of Marsh Creek in the City of Brentwood to provide additional flood conveyance capacity and restore riparian habitat along the creek. The project is a cooperative effort of American Rivers and the Flood Control District.

- In 2013 a flood protection and habitat restoration project commenced in the Upper Sand Creek Basin. The project expanded the basin capacity to enhance flood control, restored a stretch of the creek and planted native willows, created 10 acres of wetlands, and installed trash capture devices.

Upper Sand Creek Basin in Antioch

Land uses in the Marsh Creek watershed consist of 44% agricultural lands; 24% urban lands; and 32% open space, parks and recreation areas, and water.

Marsh Creek has a TMDL for diazinon while a number of associated water bodies are identified on the state's 303(d) list of impaired water bodies. Water quality impairments include:

- Marsh Creek Reservoir for mercury,
- Dunn Creek (Mount Diablo Mine to Marsh Creek) for mercury and metals,
- Marsh Creek (Dunn Creek to Marsh Creek Reservoir) for mercury and metals,
- Marsh Creek (Marsh Creek Reservoir to San Joaquin River) for indicator bacteria, mercury, and toxicity, and
- Sand Creek (tributary to Marsh Creek) for DDE, DDT, dieldrin, disulfoton, indicator bacteria, salinity, specific conductivity, and toxicity (CVRWQCB, 2016).
- Sand Creek was listed for chlorpyrifos and diazinon, but these are identified as addressed by a non-TMDL action.

4.1.1.3 Kellogg and Brushy Creek Watersheds

The Kellogg and Brushy Creek watersheds are located in the southeastern portion of the County, bordering Alameda and San Joaquin Counties. The watersheds are comprised entirely of unincorporated County land, with minimal developed areas.

Both Kellogg and Brushy Creek were diverted and altered by farmers in the north and eastern parts of the watershed, where Marsh, Kellogg and Brushy Creeks enter the alluvial plain. The Kellogg Creek watershed includes the Los Vaqueros Reservoir, which is owned by the Contra Costa Water District and receives water pumped from the Contra Costa Canal. The reservoir provides water to 450,000 County residents during the summer months. The protected open space at Los Vaqueros Reservoir is home to a variety of animal and bird species.

Land uses in the Kellogg Creek watershed consist of 21% agricultural lands; 1% urban lands; and 78% open space, parks and recreation areas, and water. Land uses in the Brushy Creek watershed consist of 81% agricultural lands; 11% urban areas; and 8% open space, parks and recreation areas, and water.

Kellogg Creek (from Los Vaqueros Reservoir to Discovery Bay) is 303(d) listed as impaired for indicator bacteria, dissolved oxygen, salinity, and toxicity. Discovery Bay is listed as impaired for mercury. Brushy Creek has not been specifically identified in the State's 303(d) list of Impaired Water Bodies (CVRWQCB, 2016).

4.1.1.4 East County Delta Drainages

The East County Delta Drainages are located in the eastern-most portion of the County. Ninety-one percent of the land in the East County Delta Drainages region is unincorporated, with the remainder falling within the Cities of Antioch, Oakley, and Brentwood.

Water that falls in California's Central Valley ultimately flows to the Pacific Ocean through the Sacramento-San Joaquin Delta. More than half of California's water needs are met with water pumped from the Delta in the East County Delta Drainages.

The bays located along the County shoreline and the East County Delta Drainages are tidally influenced. Peripheral levees have been built to protect Delta islands that have subsided below sea level, and previous major levee breaks have created new water bodies in this region.

Sediment deposits in this flood-prone region produced soil that attracted agriculture to the area. Flood control infrastructure and irrigation canals were subsequently constructed to protect the farmland and to provide water to it. Land uses in the East County Delta Drainages consist of 67% agricultural lands; 21% urban lands; and 12% open space, parks and recreation areas, and water.

Old River is 303(d) listed as impaired for chlorpyrifos, electrical conductivity, low dissolved oxygen, and total dissolved solids. Delta Waterways (southern portion) are impaired for chlorpyrifos, DDT, diazinon, electrical conductivity, pesticides, invasive species, mercury, and toxicity (CVRWQCB, 2016).

4.1.2 Central County Watersheds Planning Unit

This Planning Unit consists of the Walnut Creek, Mount Diablo Creek, Willow, and Kirker Creek watersheds. Walnut Creek is the largest watershed in the County, at 93,556 acres. These watersheds contain protected open space areas, including Mount Diablo State Park, and generally drain from the Mount Diablo foothills through suburban areas to Suisun Bay (Walnut Creek and Mount Diablo Creek), which is tributary to San Pablo Bay, or the Sacramento-San Joaquin Delta (Willow and Kirker Creeks) (Contra Costa County, 2004).

Central County Watersheds

Walnut Creek
Mount Diablo Creek
Willow Creek
Kirker Creek

This Planning Unit must address water quality issues specific to the Sacramento-San Joaquin Delta and the San Pablo Bay, including the Delta Methylmercury TMDL, and 303(d) listings for Chlordane, DDT, dieldrin, dioxin compounds, furan compounds, invasive species, mercury, PCBs, PCBs (dioxin-like) and selenium in the San Pablo Bay.

Cities located entirely within this Planning Unit include Concord, Clayton, Pleasant Hill, Walnut Creek, and Lafayette. The easternmost region of Martinez, the majority of Pittsburg,

the majority of Danville, and a small western portion of Antioch also lie within the Central County Planning Unit (Contra Costa County, 2004).

Water Districts that serve entities within the Central County Planning Unit include the Contra Costa Water District, the East Bay Municipal Utility District (EBMUD), the Castle Rock County Water District, and the Golden State Water Company (East County Water Management Association, 2015). The City of Pittsburg (within the Contra Costa Water District) acts as a water utility (see **Figure 4-5** and **Figure 4-6**). A summary of the water supply sources for each of these water districts (based on information provided by the water districts) is provided in **Table 4-2**.

Table 4-2. Water Sources for Water Districts in the Central County Planning Unit

Water District	Water Source
Contra Costa Water District	Water originates within the Sierra Nevada, and is drawn from Rock Slough near Oakley, Mallard Slough in Bay Point, Old River near the town of Discovery Bay and nearby Middle River. After being drawn, water is transported in the Contra Costa Canal, which begins at Rock Slough and branches west to Clyde, north to Martinez and south to Walnut Creek.
East Bay Municipal Utility District (EBMUD)	EBMUD water supply originates in the Mokelumne River watershed in the Sierra Nevada and is transported to their water infrastructure network in the East Bay.
Castle Rock County Water District	Purchases untreated water from Contra Costa Water District.
Golden State Water Company	Purchases treated water from the Contra Costa Water District, which is blended with groundwater from three Golden State Water Company wells located in the Pittsburg Plain Groundwater Basin.
City of Pittsburg	Eighty-five to ninety-five percent of the City's untreated water is purchased from the Contra Costa Water District. The remaining water supply is extracted from the Pittsburg Plain Groundwater Basin.

Groundwater basins within the East County Planning Unit include the Pittsburg Plain, the Clayton Valley, and the Ygnacio Valley groundwater basins (Kennedy-Jenks et al., 2013) (see **Figure 4-7** and **Figure 4-8**).

Unless otherwise indicated, all information was obtained from the *Contra Costa County Watershed Atlas* (Contra Costa County, 2004).

4.1.2.1 Walnut Creek Watershed

The Walnut Creek watershed encompasses the Grayson-Murderers, Concord, Pine-Galindo, San Ramon, and Las Trampas sub-watersheds. Draining the west side of Mount Diablo and the east side of the East Bay hills, Walnut Creek's major tributaries include San Ramon Creek, Bollinger Creek, Las Trampas Creek, Lafayette Creek, Grayson Creek, Murderer's Creek, Pine Creek, Tice Creek, and Galindo Creek. The Cities of Walnut Creek, Lafayette, Pleasant Hill and Danville lie completely within the boundaries of the Walnut Creek watershed, while the Cities of Concord, Martinez, and small areas of Moraga and San Ramon are partly within the watershed.

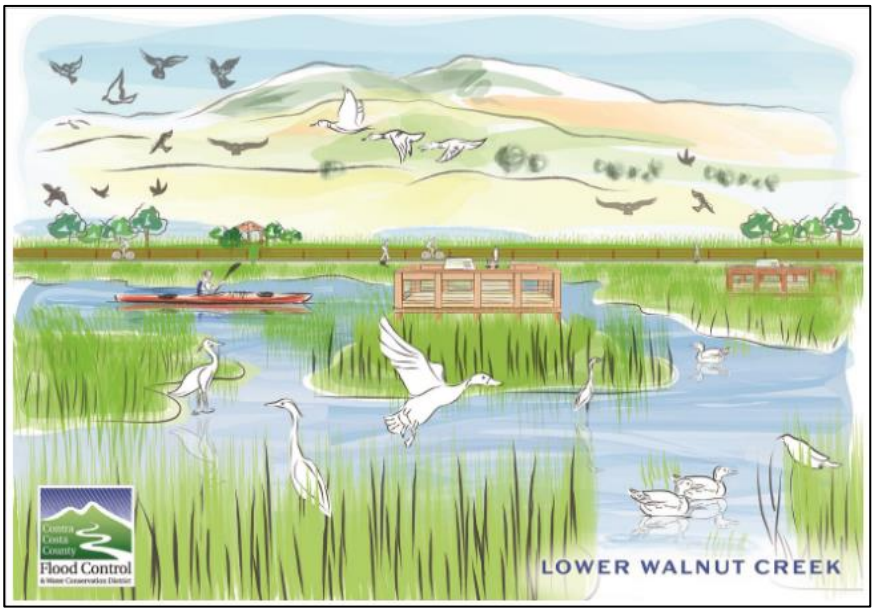
Agriculture and livestock were previously important industries in the valleys of the Walnut Creek watershed. An increase in housing and commercial development along the creek created the need for improved flood control measures. Today, a stormwater drainage system reroutes surface waters from their original path through the valley. Land use and other physical factors have also affected the way surface and groundwater reach the creek channel.

Green Valley Creek in Danville, a Tributary to San Ramon Creek in the Upper Walnut Creek Watershed

In 2014, the Flood Control District assumed management of the lowest four miles of Walnut Creek and began restoration planning. With the completion of a Project Study Report, the Flood Control District has begun the preparation of construction plans and environmental permits. The long-term vision for Lower Walnut Creek is "A sustainable channel that provides critical flood protection in a way that is more compatible with the plants and animals that call the creek home."

Land uses in the Walnut Creek watershed consist of 13% agricultural lands; 58% urban lands; and 29% open space, parks and recreation areas, and water.

Walnut Creek has a TMDL for diazinon (SFBRWQCB, 2017).



An Artist's Sketch of a Restored Lower Walnut Creek

4.1.2.2 Mount Diablo Creek Watershed

Mount Diablo Creek flows off the north slopes of Mount Diablo and travels northwesterly towards Suisun Bay. The lower third of the watershed is encompassed by the 12,800-acre Concord Naval Weapons Station, which is divided into the 7,630-acre Tidal Area and the 5,170-acre Inland Area (City of Concord, 2018). The Tidal Area was owned and managed by the U.S. Navy, and is now owned and managed by the U.S. Army. The Inland Area was approved for closure in 2005 and surplused by the U.S. Navy in 2007. The City of Concord is developing a re-use plan for the Inland Area in partnership with the County and EBRPD. The U.S. Navy expects to transfer the Inland Area to the City of Concord in 2018 (City of Concord, 2018). The remainder of the watershed consists primarily of unincorporated County land (approximately 64% of the watershed), with small portions within the Cities of Clayton and Concord.

The headwaters of Mount Diablo Creek, along with some of the creek's major tributaries, including Mitchell Creek, Back Creek, and Donner Creek, are located in Mount Diablo State Park. In the early 1800's, the Spanish established Ranchos in the watershed and used the area for grazing and farming. Currently, Mount Diablo Creek and its tributaries flow relatively unencumbered from the headwaters to Suisun Bay, though Mount Diablo Creek is channeled underground through a few areas that are more developed.

View of Mount Diablo Watershed from Mount Diablo State Park

Land uses in the Mount Diablo Creek watershed consist of 20% agricultural lands; 42% urban lands; and 38% open space, parks and recreation areas, and water.

Mount Diablo Creek is 303(d) listed for diazinon and toxicity (SFBRWQCB), 2017).

4.1.2.3 Willow and Kirker Creek Watersheds

The watersheds of Willow and Kirker Creek are located in the northern region of the County. Sixty four percent of the land area within the watersheds is unincorporated County, while the remaining 36% of the watershed is located within the Cities of Pittsburg, Bay Point, and Antioch.

Kirker Creek flows north from the foothills of Mount Diablo to the Sacramento-San Joaquin Delta. Though most of Kirker Creek runs through an open channel, culverts direct the creek underground at road crossings and through some urban areas. Kirker Creek originally flowed directly north to the Delta but was diverted in the 1940s to bypass the U.S. Steel property. The creek now makes a 90-degree turn and flows into the Los Medanos Wasteway. Kirker Creek flows during the rainy season (November through April) and dries out in the summer, though irrigation and related urban runoff keep some portions of the creek wet throughout the year.

Land uses in the Kirker Creek watershed consist of 39% agricultural lands; 44% urban lands; and 17% open space, parks and recreation areas, and water.

Willow Creek is located in the middle of the Planning Unit (north side), with approximately 10 miles of unnamed tributaries draining into its lower reaches. Most of the lower reaches of these tributaries, including creeks to the east of Willow Creek, are in underground culverts as they flow through residential neighborhoods in the Cities of Bay Point and Pittsburg.

Land uses in the Willow Creek watershed consist of 8% agricultural lands; 64% urban lands; and 28% open space, parks and recreation areas, and water.

Kirker Creek is 303(d) listed as impaired for pyrethroids, toxicity, and trash (SFBRWQCB, 2017).

4.1.3 North County Watersheds Planning Unit

The North County Planning Unit consists of the Alhambra Creek, Peyton Slough, and Refugio, Rodeo, and Carquinez Area watersheds. These watersheds consist of diverse land uses, including rural, open space areas in the upper watersheds, and urbanized and industrial areas in the lower watersheds flowing toward the Carquinez Strait (Contra Costa County, 2004).

North County Watersheds

Alhambra Creek
Peyton Slough
Refugio Creek
Rodeo Creek
Carquinez Strait Drainages

Most of the land area in the North County Planning Unit is part of unincorporated Contra Costa County, though it encompasses nearly all the Cities of Hercules and Martinez (Contra Costa County, 2004).

EBMUD serves entities within the North County Planning Unit, with the exception of the City of Martinez, which is served by Contra Costa Water District (Kennedy-Jenks et al., 2013) (see **Figure 4-5**).

Table 4-3. Water Source for Water Districts in the North County Planning Unit

Water District	Water Source
East Bay Municipal Water District	EBMUD water supply originates in the Mokelumne River watershed in the Sierra Nevada and is transported to their water infrastructure network in the East Bay.
Contra Costa Water District	Water originates within the Sierra Nevada, and is drawn from Rock Slough near Oakley, Mallard Slough in Bay Point, Old River near the town of Discovery Bay and nearby Middle River. After being drawn, water is transported in the Contra Costa Canal, which begins at Rock Slough and branches west to Clyde, north to Martinez and south to Walnut Creek.

There are no major groundwater basins located within the North County Planning Unit (Kennedy- Jenks et al., 2013) (see **Figure 4-7**).

Creeks of the North County Planning Unit ultimately discharge to San Pablo Bay, which is 303(d) listed for Chlordane, DDT, dieldrin, dioxin compounds, furan compounds, invasive species, mercury, PCBs, PCBs (dioxin-like) and selenium.

Unless otherwise indicated, all information was obtained from the Contra Costa County Watershed Atlas (Contra Costa County, 2004).

4.1.3.1 Alhambra Creek and Peyton Slough Watersheds

The watersheds of Alhambra Creek and Peyton Slough are located in the northwestern region of the County. The majority of both watersheds are located in unincorporated County land area, with smaller portions within the City of Martinez.

Alhambra Creek's headwaters are located in Briones Regional Park. Its main stem is joined by two large tributaries, Franklin Creek and Arroyo Del Hambre, before making its way through the residential and commercial areas of downtown Martinez to discharge into the Carquinez Strait. The mouth of Alhambra Creek has moved northward since the beginning in the mid-1800s, when tons of sediment loosened by hydraulic mining practices in the Sierra Nevada washed into the Delta and changed the shape of the waterfront. The lower elevations of the watershed, primarily comprised of the floodplain of Alhambra Creek, were steadily urbanized through the late 1800s, but the upper watershed is largely undeveloped.

Land uses in the Alhambra Creek watershed consist of 44% agricultural lands; 23% urban lands; and 33% open space, parks and recreation areas, and water.

The highly urbanized Peyton Slough watershed is located east of the Alhambra Creek watershed. More than half of the Peyton Slough watershed including the entirety of the upper watershed is urbanized. Peyton Creek is culverted underground for over a third of its length through residential and industrial areas. Stormwater in the upper watershed is controlled by storm drain systems throughout the area, which is predominantly residential. McNabney Marsh, located to the west of the Slough, is home to many species of waterfowl and shorebirds and is part of the EBRPD's Waterbird Regional Preserve.

A project led by the Alhambra Creek Restoration and Environmental Education Collaborative completed Phase 1of a restoration project on Alhambra Creek that removed rock gabions and non-native invasive plant species from the active channel and installed an equilibrium

channel. Using bioengineering techniques and native riparian plant species, a more natural riparian corridor was created while stabilizing the creek banks.

Land uses in the Peyton Slough watershed consist of 74% urban lands and 26% open space, parks and recreation areas, and water.

Neither Alhambra Creek nor Peyton Slough has been identified in the State's 303(d) list of Impaired Water Bodies (SFBRWQCB, 2017).

4.1.3.2 Refugio, Rodeo, and Carquinez Area Watersheds

Refugio Creek, Rodeo Creek and the various drainages that flow into the Carquinez Strait are located in northwest Contra Costa County. Together, the watersheds encompass 16,348 acres of diverse land cover including pristine oak-covered hills, an interstate highway, ranches, heavy industry, towns, and newer residential development. The City of Hercules and the communities of Rodeo, Crockett, and Port Costa are located in the watershed, with the remainder encompassing unincorporated County land area.

Refugio Creek, Rodeo Creek, Canada Del Cierbo Creek, and Edwards Creek trend northwest and resemble other West County drainages in that they juxtapose a rural upper watershed with an urbanized or industrialized lower watershed. The upper watershed of Rodeo Creek and its tributaries begin in private ranchland and EBRPD property. An industrial area and the community of Rodeo are in the lower watershed. Two similar drainages to the north of Rodeo begin in undeveloped land on the east side of Interstate 80 before being diverted underground through refinery properties.

Land uses in the Refugio and Rodeo Creek watersheds consist of 4% agricultural lands; 68% urban lands; and 28% open space, parks and recreation areas, and water.

The shorter, steeper Carquinez drainages flow from southeast to northwest following local topography. These drainages are mostly unnamed except for Bull Valley Creek, which flows north through the town of Port Costa, first filling the reservoir located just south of town. The upper watersheds of these smaller drainages also begin in EBRPD land and ranchlands before flowing into residential and industrial areas located on the shores of the Carquinez Strait.

Land uses in the Carquinez area watersheds consist of 33% agricultural lands; 31% urban lands; and 36% open space, parks and recreation areas, and water.

Rodeo Creek has a TMDL for diazinon. Refugio Creek has not been identified in the State's 303(d) list of Impaired Water Bodies (SFBRWQCB, 2017).

4.1.4 South County Watersheds Planning Unit

This Planning Unit includes watersheds that do not drain directly from the County to the San Francisco Bay, including Upper Alameda Creek, which flows south into Alameda County, and Upper San Leandro and Moraga Creeks, which flow into Upper San Leandro Reservoir, which outlets south of the Alameda County Line. Protection of water supply (quantity and quality) is a key factor in this Planning Unit.

South County Watersheds

Upper Alameda Creek
Upper San Leandro Creek
Moraga Creek

The majority of the Cities of San Ramon and Moraga are located within the South County Planning Unit. In addition, a small southern portion of Orinda and the eastern portion of Danville lie within the region.

Water Districts serving entities within the South County Planning Unit include EBMUD (Kennedy-Jenks et al., 2013) (see **Figure 4-6**) and the Zone 7 Water Agency (Zone 7 Water Agency, 2017).

Table 4-4. Water Sources for Water Districts in the South County Planning Unit

Water District	Water Source
East Bay Municipal Water District (EBMUD)	EBMUD water supply originates in the Mokelumne River watershed in the Sierra Nevada and is transported to their water infrastructure network in the East Bay.
Zone 7	Zone 7's surface water is comprised mostly of State Water Project water imported through the Bay-Delta, augmented by a small amount of other imported water supplies as well as runoff from local rainfall.

The San Ramon Valley groundwater basin is located within the South County Planning Unit (Kennedy-Jenks et al., 2013) (see **Figure 4-7** and **Figure 4-8**).

Creeks of the South County Planning Unit ultimately discharge to the San Francisco Bay, which has TMDLs for mercury and PCBs, and is also 303(d) listed for chlordane, DDT, dieldrin, dioxin compounds, furan compounds, invasive species, mercury, PCBs, PCBs (dioxin-like), selenium, and trash (all for San Francisco Bay, Central).

Unless otherwise indicated, all information was obtained from the *Contra Costa County Watershed Atlas* (Contra Costa County, 2004).

4.1.4.1 Upper Alameda Creek Watershed

One of the largest watersheds in the Bay Area, the Alameda Creek watershed stretches from the Mount Diablo foothills in the north to Mount Hamilton in the south. A little less than one tenth of the watershed is located in Contra Costa County, a region that encompasses the Cayetano, Alamo-Tassajara, and South San Ramon sub-watersheds. Nearly all of the City of San Ramon falls within the Upper Alameda Creek watershed, as does a small southern part of Danville. Most of land to the east is part of the unincorporated County.

The upper watershed area in southern Contra Costa County is only part of the headwaters of the massive Alameda Creek watershed. Most of the creek (and its watershed) is located in Alameda County, where it flows from the eastern boundary of the Alameda County (near Livermore) to where it reaches San Francisco Bay in the City of Fremont near Coyote Hills Regional Park and the San Francisco Bay National Wildlife Refuge.

Land uses in the Cayetano sub-watershed consist of 95% agricultural lands and 5% open space, parks and recreation areas, and water. Land uses in the Alamo-Tassajara sub-watershed consist of 50% agricultural lands; 18% urban lands; and 32% open space, parks and recreation areas, and water. Land uses in the South San Ramon sub-watershed consist of 18% agricultural lands; 51% urban lands; and 31% open space, parks and recreation areas, and water.

Alameda Creek has a TMDL for diazinon.

4.1.4.2 Upper San Leandro and Moraga Creek Watersheds

A total of 13,059 acres of the Upper San Leandro and Moraga Creek watersheds are located within the County. The creeks in this area include Moraga Creek, San Leandro Creek, Laguna Creek, Redwood Creek, Indian Creek, Rimer Creek, Buckhorn Creek, and Callahan Creek. The southern extent of the City of Orinda and a major portion of the Town of Moraga are the local jurisdictions in the watersheds, along with a small portion of unincorporated County area.

Both San Leandro Creek and Moraga Creek flow into the Upper San Leandro Reservoir, which is managed by EBMUD. The reservoir is located in both Alameda and Contra Costa Counties, with its outlet in Alameda County. Water discharged from the reservoir flows through Alameda County to the San Francisco Bay. The channels of the creeks throughout the Planning Unit area are relatively unmodified. Large flood control channels have not been built in this region. Moraga Creek has been routed underground in short reaches to accommodate urbanization and infrastructure development.

Land uses in the Upper San Leandro and Moraga Creek watersheds consist of 17% agricultural lands; 30% urban lands; and 53% open space, parks and recreation areas, and water.

The Upper San Leandro Reservoir is 303(d) listed as impaired for mercury. Neither San Leandro Creek nor Moraga Creek are 303(d) listed (SFBRWQCB, 2017).

4.1.5 West County Watersheds Planning Unit

This Planning Unit includes the Pinole Creek; Wildcat Creek; Rheem and Garrity Creeks; Baxter, Cerrito, and West Richmond Creeks; and San Pablo Creek watersheds, which drain to San Pablo Bay. This unit encompasses a mix of heavily urbanized and less urbanized areas. The San Pablo Creek watershed includes the San Pablo and Briones Reservoirs, which are potable water supply reservoirs.

West County Watersheds

Pinole Creek
Rheem Creek
Garrity Creek
Baxter Creek
Cerrito Creek
West Richmond Creek
San Pablo Creek

The West County Planning Unit encompasses the Cities of Pinole, San Pablo, Richmond, and El Cerrito. The majority of Orinda, a small portion of Hercules, and a large region of unincorporated Contra Costa County also lie within this Planning Unit.

EBMUD services entities located in the West County Planning Unit (Kennedy-Jenks, 2013) (see **Figure 4-6**).

Table 4-5. Water Source for Water Districts in the West County Planning Unit

Water District	Water Source
East Bay Municipal Water District (EBMUD)	EBMUD water supply originates in the Mokelumne River watershed in the Sierra Nevada and is transported to their water infrastructure network in the East Bay.

Portions of the East Bay Plain groundwater basin are located within the West County Planning Unit (Kennedy-Jenks, 2013) (see **Figure 4-8**).

Creeks of the West County Planning Unit ultimately discharge to San Francisco Bay, which has TMDLs for mercury and PCBs, and is also 303(d) listed for chlordane, DDT, dieldrin, dioxin compounds, furan compounds, invasive species, mercury, PCBs, PCBs (dioxin-like), selenium, and trash (all for San Francisco Bay, Central).

Unless otherwise indicated, all information was obtained from the *Contra Costa County Watershed Atlas* (Contra Costa County, 2004).

4.1.5.1 Pinole Creek Watershed

Pinole Creek is a northwesterly flowing stream in western Contra Costa County with headwaters in the Briones Hills. The Pinole Creek watershed is lightly developed compared to other watersheds in western Contra Costa County. The City of Pinole occupies the northern third of the watershed.

Interstate 80 forms a man-made margin where Pinole Creek leaves the confines of the East Bay hills. From this point to the Bay, U.S. Army Corps of Engineers carried out extensive work on the Pinole Creek channel in the 1950s to control flooding in the downtown area. The central reaches of Pinole Creek and its tributaries meander through a broad, open valley and have a relatively intact flood plain. Various restoration projects along the tributaries that feed Pinole Creek have provided shade and habitat to areas previously denuded by grazing and erosion. The upper watershed remains a woodlands and grasslands landscape. Supported by a multi-organization partnership, a project to restore fish passage to historic spawning grounds in the upper Pinole Creek Watershed was completed in 2016, and later a restricting culvert was replaced by the Flood Control District in 2017.

Land uses in the Pinole Creek watershed consist of 31% agricultural lands; 19% urban lands; and 50% open space, parks and recreation areas, and water.

There is a TMDL for diazinon for Pinole Creek.

4.1.5.2 Wildcat Creek Watershed

Information on Wildcat Creek was obtained from the *Wildcat Creek Restoration Action Plan* (Urban Creeks Council, April 2010). From its headwaters at Vollmer Peak in Tilden Regional Park, Wildcat Creek flows northwest through Wildcat Canyon, between the Berkeley hills and San Pablo Ridge. EBRPD owns and manages two parks within the canyon, Tilden and Wildcat Canyon Regional Parks, constituting approximately 80 percent of the Wildcat Creek watershed drainage area. EBRPD manages an artificial lake for swimming (Lake Anza, constructed in 1938), a dammed pond focused on environmental education (Jewel Lake, constructed in 1921), a public golf course, botanic garden, natural open space, picnic amenities and habitat along with managed grazing.

According to San Francisco Estuary Institute's 2001 report, *Wildcat Creek Watershed: A Scientific Study of Physical Processes and Land Use Effects,* terrestrial and fluvial flows over steep slopes and land use impacts within the Upper Watershed are a major source of sediment for Wildcat Creek.

Once the creek exits the canyon and crosses the East Bay's active Hayward Fault, it flows westward through the urban communities of San Pablo, Richmond, and North Richmond before reaching the tidally-influenced Wildcat Marsh, its industrialized edges, and the San Pablo Bay.

Roughly ninety percent of Wildcat Creek's channel remains open and is lined by a thin band of vegetation within the lower watershed, and a vast portion of the channel banks have been revetted to prevent erosion and protect private property. Within the creek's urban reaches of the alluvial plain, the streambed typically dries up during the summer.

There is a long history of creek and watershed restoration activities in Wildcat Creek watershed that have served as significant examples and case studies of managing rivers for multiple uses and especially for early doing this in economically disadvantaged communities. Creek restoration projects spanning more than three decades have provided flood control; increased channel sinuosity and meander; removed failing concrete check dams; stabilized eroding banks with vegetative soil bio-engineered techniques; provided creek side trail access, removed non-native species, widened the flood plain, created pools and placed root wads and boulders to provide habitat, removed invasive species, planted native species, and reintroduced rainbow trout. Work continues in Wildcat Creek with a new project planned to begin in 2019 that will restore 2,200 linear feet to include refuge areas for fish, a modified floodplain to accommodate larger flow volumes, a widened creek corridor, re-planting native plants on the restored bank. Runoff will be treated though bioswales and a shared use path and creek overlooks will enhance community enjoyment of the creek.

The rich sediments in the alluvial fan previously supported farming, while the middle and upper watershed provided pasture for livestock and horses. Later, industry and manufacturing established in Richmond changed the land use dramatically.

Land uses in the Wildcat Creek watershed currently consist of 1% agricultural lands; 29% urban lands; and 70% open space, parks and recreation areas, and water.

There is a TMDL for diazinon for Wildcat Creek.

4.1.5.3 Rheem and Garrity Creek Watersheds

Located in western Contra Costa County, the Rheem and Garrity Creek watersheds include sections of the Cities of Richmond, Pinole, and San Pablo, as well as a small portion of unincorporated County. EBRPD's Point Pinole Regional Shoreline is located at the western-most tip of the watershed.

Mouth of Rheem Creek in Point Pinole Regional Shoreline

The area rapidly became a populated, industrial center after an explosives factory opened (on the land that is now regional shoreline) in the late 1800s. The factory continued production until 1960. The headwaters of Rheem Creek begin just east of Interstate 80 in a

residential neighborhood of Richmond. One third of the Creek is culverted under residential areas, while the other two-thirds are above ground but contained in concrete and earthen channels. Flowing through a variety of industrial and residential areas, Rheem Creek reaches the Bay a half mile south of Point Pinole Regional Shoreline.

Land uses in the Rheem Creek watershed consist of 75% urban lands and 25% open space, parks and recreation areas, and water. Land uses in the Garrity Creek watershed consist of 80% urban lands and 20% open space, parks and recreation areas, and water.

Neither Rheem Creek nor Garrity Creek has been identified in the State's 303(d) list of Impaired Water Bodies (SFBRWQCB, 2017).

4.1.5.4 Baxter, Cerrito, and West Richmond Watersheds

The area encompassing the Baxter, Cerrito, and West Richmond watersheds is a series of sub-basins in the westernmost region of the County. The headwaters of these creeks are in the northern extent of the Berkeley Hills. Wildcat Creek watershed forms this region's northern boundary and the County line follows Cerrito Creek along the watershed's southern boundary. The Cities of Richmond and El Cerrito fall within these watersheds, as does the community of Kensington.

Many creeks in the Baxter and Cerrito Creek watersheds were lined or culverted during the first half of the 20th century to accommodate new urbanization and prevent flooding in the lower watersheds. This relatively level area between the Berkeley hills and Point Richmond is now drained by an extensive municipal stormwater system. The Richmond flatlands were first drained for agricultural use. Later, following the introduction of the railroad, this area became the site of industry in the region.

Baxter Creek and its tributaries originate in underground springs beneath El Cerrito's golf course and flow down from the hills in three branches. After running through a series of neighborhood parks, the creeks join and flow through Richmond into Stege Marsh and San Francisco Bay.

Cerrito Creek in El Cerrito

The cities of Richmond and El Cerrito and watershed stakeholders have actively pursued several restoration projects to promote and demonstrate a commitment to clean water and environmental stewardship; and respond to citizen interest and regional goals for a preserved, enhanced and restored natural ecosystem within the urban environment. Some of these projects include:

- The formation of the Friends of Baxter Creek in 2005 to purchase land and restore Baxter Creek at Gateway Park in El Cerrito.

- Restoration of 1,000 feet of creek in Booker T. Anderson park, which is in an urban, low-income area in Richmond. The restoration project has included naturalizing and revegetating the creek. Students from Stege Elementary are playing an integral part in the revegetation process, growing willows to plant along the banks.
- Daylighted a segment of Baxter Creek at Poinsett Park in El Cerrito, where the City of El Cerrito determined that restoring a natural creek would be the most cost and resource effective response to a failing culvert.
- Restoration of a segment of Cerrito Creek at the El Cerrito Plaza. The Friends of Five Creeks coordinates with the City of El Cerrito on education and maintenance activities at the creek at the Plaza and west of San Pablo Avenue from Adams to Creekside Park.
- Restoration of Baxter Creek along Richmond Greenway in Richmond, which was completed in 2018 as part of Richmond-Ohlone Greenway Gap Closure Project (https://www.ci.richmond.ca.us/3469/Greenway-Gap-Closure).

Land uses in the Baxter Creek watershed consist of 88% urban lands and 12% open space, parks and recreation areas, and water. Land uses in the Cerrito Creek watershed consist of 91% urban lands and 9% open space, parks and recreation areas, and water. Land uses in the West Richmond watershed consist of 80% urban lands and 20% open space, parks and recreation areas, and water.

Cerrito Creek straddles the Contra Costa-Alameda County border, draining the hills of El Cerrito and the unincorporated Community of Kensington before emptying into the Albany Flats and then San Francisco Bay, just south of EBRPD's Point Isabel Regional Shoreline.

Neither Baxter Creek nor Cerrito Creek has been identified in the State's 303(d) list of Impaired Water Bodies (SFBRWQCB, 2017).

4.1.5.5 San Pablo Creek Watershed

The San Pablo Creek watershed is located in the heart of western Contra Costa County. From its headwaters in the City of Orinda, San Pablo Creek flows approximately 20 miles before reaching San Francisco Bay. The watershed covers parts of Orinda, Richmond, and San Pablo, though the majority of it lies in unincorporated County. The creek's headwaters flow into the San Pablo Reservoir and tributary headwaters to the north enter the Briones Reservoir, both of which are operated by EBMUD.

As water leaves the San Pablo Reservoir, it flows through first rural and then heavily urbanized residential and commercial areas before reaching the saltwater marshes adjacent to San Francisco Bay. San Pablo Creek's flow regime and steep banks have kept the creek from consignment to culverts in the Cities of San Pablo and Richmond and the community of El Sobrante retaining some natural watershed features.

The municipalities and local creek groups have undertaken several restoration efforts to restore creek banks, remove invasive plant species, and plant natives.

Land uses in the San Pablo Creek watershed consist of 2% agricultural lands; 36% urban lands; and 62% open space, parks and recreation areas, and water.

San Pablo reservoir is 303(d) listed as impaired for chlordane, dieldrin, heptachlor epoxide, mercury, PCBs, and toxaphene, and San Pablo Creek has TMDLs for diazinon and trash.

5. Water Quality Concerns and Regulatory Requirements

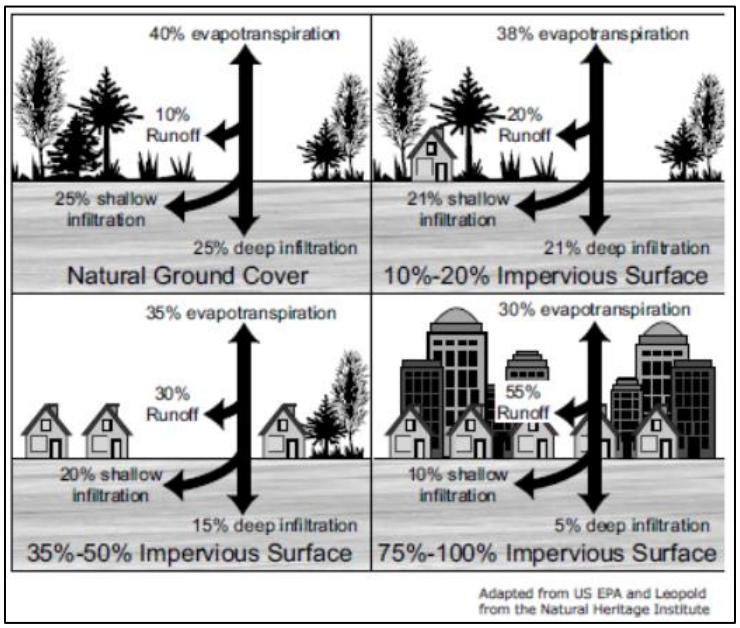
Urbanization of the County and the Bay Area as a whole is associated with elevated levels of contaminants in local water bodies, including PCBs, mercury, pesticides, and trash. Addressing water quality concerns and associated regulatory requirements facing the County's watersheds are a major driver informing selection and prioritization of *CCW SWRP* projects.

5.1 ALTERED WATERSHED PROCESSES AND POLLUTANT GENERATING ACTIVITIES

Runoff from watersheds within the County carries pollutants associated with urban development, industrialization, agriculture, and atmospheric deposition to local water bodies including the San Francisco Bay and the Sacramento-San Joaquin Delta.

Contaminant sources vary by pollutant and are dispersed throughout the watersheds in the County and/or attributed to specific historical or contemporary land uses. The CCCWP has documented pollutant generating activities and pollutants of concern through its report of waste discharge submitted to the San Francisco Bay Regional Water Board in April of 2014. A comparable report covering the eastern portion of the county was submitted to the Central Valley Regional Water Board in 2015.

Regional urbanization has led to the modification and disruption of natural watershed processes. In urban settings, the presence of impervious surfaces increases runoff coefficients[7] and therefore runoff volumes. The amount of impervious surfaces in a watershed is a factor in predicting watershed health. As the area of impervious surface increases, watersheds can be affected by increased flow. Urbanization results in stormwater arriving at creeks in greater volumes and more quickly than in unaltered watersheds. (Contra Costa, 2004)



As less precipitation enters soils, increased runoff rates and volumes are capable of more effectively mobilizing and carrying pollutants to storm drainage networks and eventually to receiving waters (McKee, et al., 2003). Additionally, there is a strong relationship between urban watershed sediment yields and loading of contaminants to local water bodies, such as mercury, trace metals, PCBs, polycyclic aromatic hydrocarbons (PAHs), and chlorinated pesticides (McKee, et al., 2003).

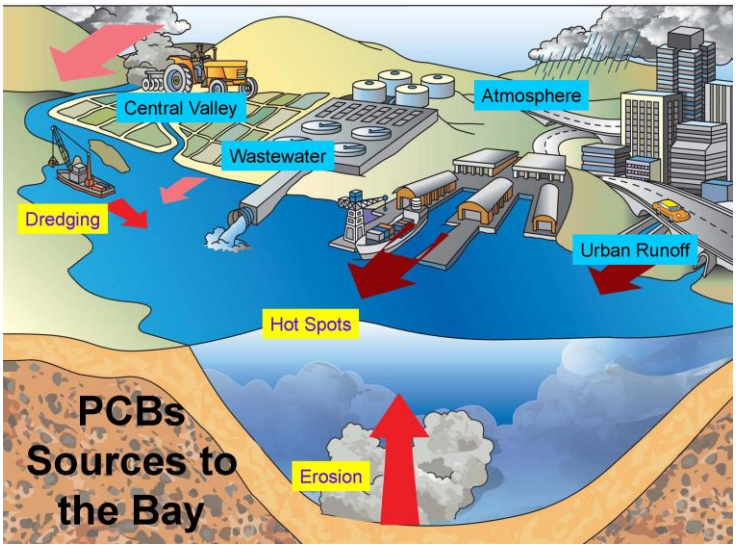
[7] The proportion of a rainfall volume that subsequently runs off of a land surface.

5.1.1 Pollutants of Concern

The quality of urban runoff impacts local creeks and larger water bodies, including the Bay and the Delta. Pollutants of concern, for which the Permittees in the County are subject to TMDLs and permit specified load reductions and implementation actions, include mercury, methyl mercury, PCBs, pesticide related toxicity, and trash. Concerns related to toxicity due to pesticide loading and trash are both local and regional, as toxicity impacts aquatic life in local water bodies as well as the Delta, and trash from County watersheds flows through storm drains and local creeks, ultimately reaching the Bay or Delta. The impairments for mercury, methyl mercury and PCBs are based on protection of health of people who consume fish from the Bay or Delta and protection of aquatic organisms and wildlife. In response to health concerns regarding human exposure to PCBs and other bioaccumulative contaminants, including methyl mercury, dioxins, and organochlorine pesticides, the Office of Environmental Health and Hazard Assessment (OEHHA) issued an advisory with detailed recommendations for limiting human consumption of fish caught in the Bay and the Delta (OEHHA, 2011).

5.1.1.1 Polychlorinated Biphenyls

PCBs are synthetic organic compounds that are toxic to humans and wildlife, highly persistent in the environment, and bioaccumulate[8] in the food chain. PCBs were manufactured in the United States between 1929 and 1979 for use in various industrial and commercial applications. The most toxic PCB congeners are those that mimic the effects of dioxin (PCB 77, 126, and 169). Chronic exposure to these PCB congeners is known to cause developmental abnormalities, growth suppression, endocrine disruption, impairment of immune functions, and cancer (McKee, et al., 2003).



Although production of PCBs in the United States has been banned for decades, they persist in watershed soils, estuarine sediment, and biota in many parts of the Bay Area. PCBs have a high tendency to partition into organic matter, persist in soil and sediment, and bioaccumulate in lipids of animals. Due to the historical use of PCBs and the persistence of PCBs in the environment, areas urbanized prior to 1979 throughout the region continue to be primary sources of PCBs in stormwater runoff and receiving waters (McKee, et al., 2003; SFBRWQCB, 2008).

[8] Bioaccumulation is the accumulation of a chemical substance in an organism's tissue.

5.1.1.2 Mercury and Methyl Mercury

Mercury persists in the environment, bioaccumulates in tissue, and biomagnifies in higher levels of the food web. Mercury may contribute to an increase in hatching failures in aquatic bird species and is a developmental neurotoxin that can lead to birth defects, infant mortality, and learning disorders in humans who consume contaminated fish (McKee, et al., 2003). Sources of mercury in County watersheds include historic mining operations, improper disposal of mercury containing products, such as fluorescent light tubes, and atmospheric deposition due to coal combustion by oil refineries (San Francisco Baykeeper, 2013), which distributes mercury throughout the watersheds (SFBRWQCB, 2006; Davis, et al., 2014). According to the *2013 Contra Costa Clean Water Program Methylmercury Control Study Work Plan*, "Methylmercury is a form of mercury bound to carbon that poses the highest risks for accumulation in the food chain. Methylmercury is formed from inorganic mercury by naturally occurring bacteria that convert mercury to methylmercury and thrive under anaerobic conditions. Slow moving or stagnant waters are a risk factor for increased methylmercury in receiving waters." (AMEC, 2013)

5.1.1.3 Pesticides

Toxicity testing completed in the early 1990s showed that water samples from many Bay Area urban creeks adversely affected indicator organisms used to evaluate toxicity to biological communities due to diazinon and chlorpyrifos use in residential and agricultural areas. Residual diazinon and chlorpyrifos reaches local water bodies through runoff from rainfall events or irrigation. The use of these pesticides has been largely phased out by the United States Environmental Protection Agency (USEPA), however toxicity due to pesticide use is still a concern due to the application of alternative pesticides, such as pyrethroids (SFBRWQCB, 2005; CVRWQCB, 2006; CVRWQCB, 2017).

Legacy organochlorine (OC) pesticides, such as DDT, chlordane, and dieldrin, are also a water quality concern in the County watersheds. These compounds were used as insecticides beginning in the 1940s for agricultural crops and for pest control and mosquito abatement in urban areas (McKee, et al., 2003). OC pesticides are organic chemicals of current environmental concern in San Francisco Bay due to their lengthy persistence in the ecosystem and their potential deleterious effects on wildlife and human health.

5.1.1.4 Trash

The MRP states that trash is being discharged at levels that have the reasonable potential to cause or contribute to exceedances of narrative water quality objectives in the *Water Quality Control Plan for the San Francisco Region (Basin Plan)*. In addition to direct disposal and windblown trash, trash is present in waterways as runoff carries improperly discarded trash into storm drains. There are currently six water bodies within the County, including the San Francisco Bay, that are listed as impaired by trash on the Clean Water Act section 303(d) list (SFBRWQCB, 2017).

5.2 APPLICABLE PERMITS AND TMDLS

Compliance with TMDLs and applicable permits was a major driver informing the selection, evaluation, and prioritization of *CCW SWRP* projects. Stormwater discharges from municipalities in the County are currently regulated under the MRP, which incorporates TMDL requirements.

Many watersheds in the County have impaired water quality or are tributary to impaired waters such as the San Francisco Bay and the Sacramento-San Joaquin Delta. Various watersheds are subject to TMDLs for mercury, PCBs, and pesticides.

TMDLs

1. San Francisco Bay Mercury TMDL (Bay Mercury TMDL)
2. San Francisco Bay PCBs TMDL (PCBs TMDL)
3. Bay Area Urban Creeks TMDL for Diazinon and Pesticide-Related Toxicity (Urban Creeks Toxicity TMDL)
4. Sacramento-San Joaquin Delta Methylmercury TMDL (Delta Methylmercury TMDL)
5. Sacramento-San Joaquin Delta Diazinon and Chlorpyrifos TMDL (Delta Pesticides TMDL)
6. Central Valley Pyrethroid Pesticides TMDL and Basin Plan Amendment (CV Pyrethroid TMDL)

TMDLs and associated WLAs are incorporated into the MRP through water quality-based effluent limitations (WQBELs), which are expected to be achieved through a set of required implementation actions and planning. This *CCW SWRP* was developed to assist Permittee efforts to comply with the MRP's WQBELs, and the TMDL and GI planning provisions. The potential to achieve load reductions for PCBs and mercury was a key factor informing the identification, evaluation and prioritization processes for *CCW SWRP* projects. For the Bay Mercury TMDL and the PCBs TMDL, final allocations must be achieved within 20 years of the effective date of the TMDL, with interim loading milestones at 10 years from the effective date of the TMDL corresponding to a 50% reduction from the 2003 baseline loadings. The San Francisco Bay 2030 and 2028 interim WLAs for the PCBs TMDL and the Bay Mercury TMDL, respectively, are presented in **Table 5-1**, along with near term (2018 and 2020) load reduction goals. Contra Costa County specific load reduction goals for the mercury and PCBs TMDLs are discussed in **Section 5.2.1**.

Table 5-1. Interim WLAs for the PCBs TMDL and Bay Mercury TMDL

Year	Aggregate WLAs for All Sources of Urban Runoff to San Francisco Bay	
	PCBs (kg/year)	Mercury (kg/year)
2003 (Baseline)	20	160
2018	19.5	120
2020	17	
2028		82
2030	2	

The mercury and PCBs TMDLs recognize the need for adaptive management and implementation of control programs designed to achieve the desired water quality outcomes and note the challenges of achieving the stormwater WLAs for these distributed pollutants. In particular, the modification of existing urban infrastructure to GI is expected to take longer than 20 years. Each TMDL allows the San Francisco Bay Regional Water Board to modify the compliance timeframe upon reasonable demonstration of the need for more time to achieve implementation.

The *CCW SWRP* will also assist Permittee efforts to comply with TMDL and MRP requirements for other pollutants of concern for the County, such as pesticides and trash. Descriptions of MRP and TMDL requirements for addressing the pollutants of concern outlined in **Section 5.1** are discussed in **Sections 5.2.1-5.2.3**.

5.2.1 Polychlorinated Biphenyls

Urban runoff requirements in the PCBs TMDL are incorporated into the MRP. The MRP requires implementation of non-structural (source control) and structural (GI) control measures to reduce PCBs loads in urban runoff. Contra Costa Permittees are required to collectively reduce PCBs loads by 0.09 kilogram (kg)/year by 2018, and 0.56 kg/year by 2020. Under the MRP, Permittees are required to develop and implement a GI Plan, as part of the new development and redevelopment provisions for implementation of GI projects by 2020, 2030, and 2040. For Contra Costa Permittees, collectively, GI must achieve a PCBs load reduction of 0.023 kg/year by June 30, 2020 and 0.5 kg/year by 2040. The MRP further requires the Permittees to complete a RAA to demonstrate that required PCBs load reductions will be achieved by the TMDL deadlines through implementation of the GI Plans and other non-GI control measures. The PCBs WLA for Contra Costa Permittees is 0.3 kg/year.

5.2.2 Mercury and Methyl Mercury

Urban runoff WLAs in the Bay Mercury TMDL are incorporated into the MRP. Similar to PCBs, the control strategy for mercury is focused on implementation of GI to capture sediment bound mercury. The MRP draws on previous studies that indicate that focusing on PCBs priority land uses (old urban, industrial) for siting of GI will yield mercury load reductions as well. The MRP states that County Permittees must collectively implement GI to reduce mercury loads by 9 grams/year by June 30, 2020 and by 1.7 kg/year by 2040. The MRP also requires an RAA to show that permit required mercury load reductions will be achieved through implementation of the GI Plans and other control measures. The Bay Mercury TMDL WLA for Contra Costa Permittees is 11 kg/year.

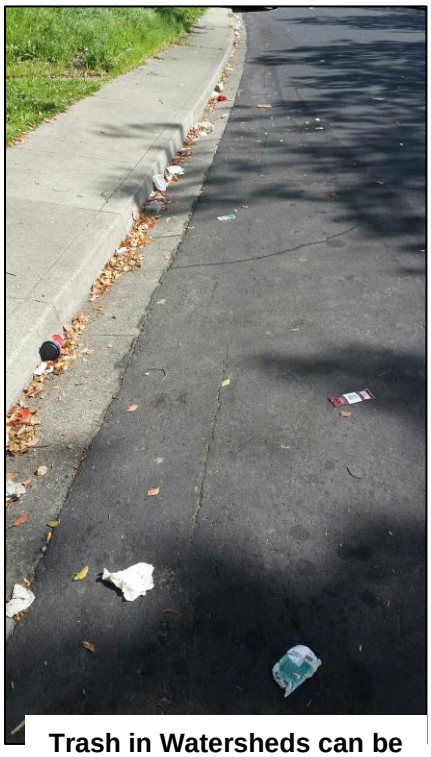
For the Delta Methylmercury TMDL, WLAs are established for three Delta sub-regions: the Central Delta was allocated 0.75 grams/year; Marsh Creek was allocated 0.30 grams/year; and the West Delta was allocated 3.2 grams/year. The final compliance date for the WLA is 2030, unless the TMDL is modified. The strategy to control methylmercury in the eastern Contra Costa County watersheds relies on a similar approach to controlling total mercury throughout the watershed. However additional studies are underway to evaluate and determine whether controls that limit the conditions of methylation (e.g., management of reservoirs) and clean-up of mine sites upstream of reservoirs would provide water quality benefits.

5.2.3 Pesticides

The MRP strategy for control of pesticides associated with toxicity, including chlorpyrifos and diazinon, requires urban runoff management agencies to "minimize their own pesticide use, conduct outreach to others, lead monitoring efforts, and take actions related to pesticide regulatory programs."

CCW SWRP projects are likely to achieve some load reduction of pesticides through runoff reduction and sediment capture, however the main strategy for compliance with the Bay Area Urban Creeks TMDL for Diazinon and Pesticide-Related Toxicity, the Sacramento-San Joaquin Delta Diazinon and Chlorpyrifos TMDL, and the Central Valley Pyrethroid Pesticides TMDL and Basin Plan Amendment will be implemented through non-structural control measures (source control) as opposed to structural projects in the *CCW SWRP*.

5.2.4 Trash



Trash in Watersheds can be Carried into Storm Drains and to Creeks

The MRP incorporates trash control strategies and requirements for trash reductions that are consistent with both the *Basin Plan* and the statewide amendment to the *Water Quality Control Plan for Inland Surface Waters, Bays and Estuaries in California* relating to trash controls. The approach to trash reduction in the MRP is based on implementation and maintenance of full trash capture systems or other trash management actions, or combinations of actions, with trash discharge control equivalent to or better than full trash capture systems, to reduce trash generation. The MRP recognizes full trash capture systems certified by the State Water Board provided that the "facility, including its maintenance prevents the discharge of trash to the downstream MS4 and receiving waters and discharge points from the facility, including overflows, are appropriately screened or otherwise configured to meet the full trash capture screening specification." To date, the State Water Board has identified a limited set of GI controls or LID measures as meeting the full trash capture system requirements. Therefore,

projects identified by the *CCW SWRP* that include LID features that are certified as full capture devices will assist the Permittees efforts to reduce trash loads.

5.3 CONTRA COSTA COUNTY WATER QUALITY COMPLIANCE STRATEGIES AND THE *CCW SWRP*

A broad array of actions including the implementation of GI and source control efforts is expected to be required to achieve mercury and PCBs WLAs and improve urban water quality. The interim load reduction accounting methodology (BASMAA, 2016c) identifies the following categories of control measures that form this broader strategy:

- Identification of source properties where PCBs and mercury were used, released, or disposed of where concentrations are significantly higher than background levels;
- GI and treatment control measures;
- Management of PCBs in building materials and infrastructure;
- Implementation of enhanced operations and maintenance measures or structural measures at source properties to prevent contaminated sediment from entering storm drains; and
- Source control, including material bans, mercury device recycling, and proper clean-up and disposal of stockpiles, spills and improperly disposed quantities of PCBs.

Clayton Road at Treat Boulevard in Concord, Before and After the Installation of Bioretention Green Infrastructure

The potential GI projects identified in the *CCW SWRP* are expected to be an essential part of Permittees' strategy to meet the TMDL and MRP mandated water quality improvement goals. The *CCW SWRP* incorporates water quality metrics into the process of selecting SWRP Opportunities, prioritizing them, and evaluating their benefits. A primary goal for this *CCW SWRP* was to identify multiple benefit GI projects that could be included in municipal GI Plans. County municipalities and stakeholders will ultimately have the option of pursuing future implementation grant funding for multiple benefit projects included in their GI Plans.

GI is expected to have a broad effect on water quality and watershed health due to resulting reductions in runoff and sediment loads. Reduction of runoff through infiltration and evapotranspiration disrupts the delivery of pollutants to storm drainage systems and water bodies. Implementation of GI reduces runoff volumes entering storm drain infrastructure and peak flow rates, which is a factor in modification of physical characteristics of streams. GI and other controls also remove sediment from runoff, keeping sediment-bound pollutants, including legacy pesticides, from reaching storm drains. Outreach and engagement processes (discussed in detail in **Section 3**) were leveraged to provide early information to community stakeholders about the relationship between the *CCW SWRP* and the GI Plan development as well as about the value and multiple benefits of GI. The outreach work conducted through the *CCW SWRP* development process was intended to assist Permittees with their more focused jurisdiction-specific GI outreach efforts.

Figure 5-1 presents a conceptual understanding of the relationship between the *CCW SWRP*, GI Plans, and the RAA.

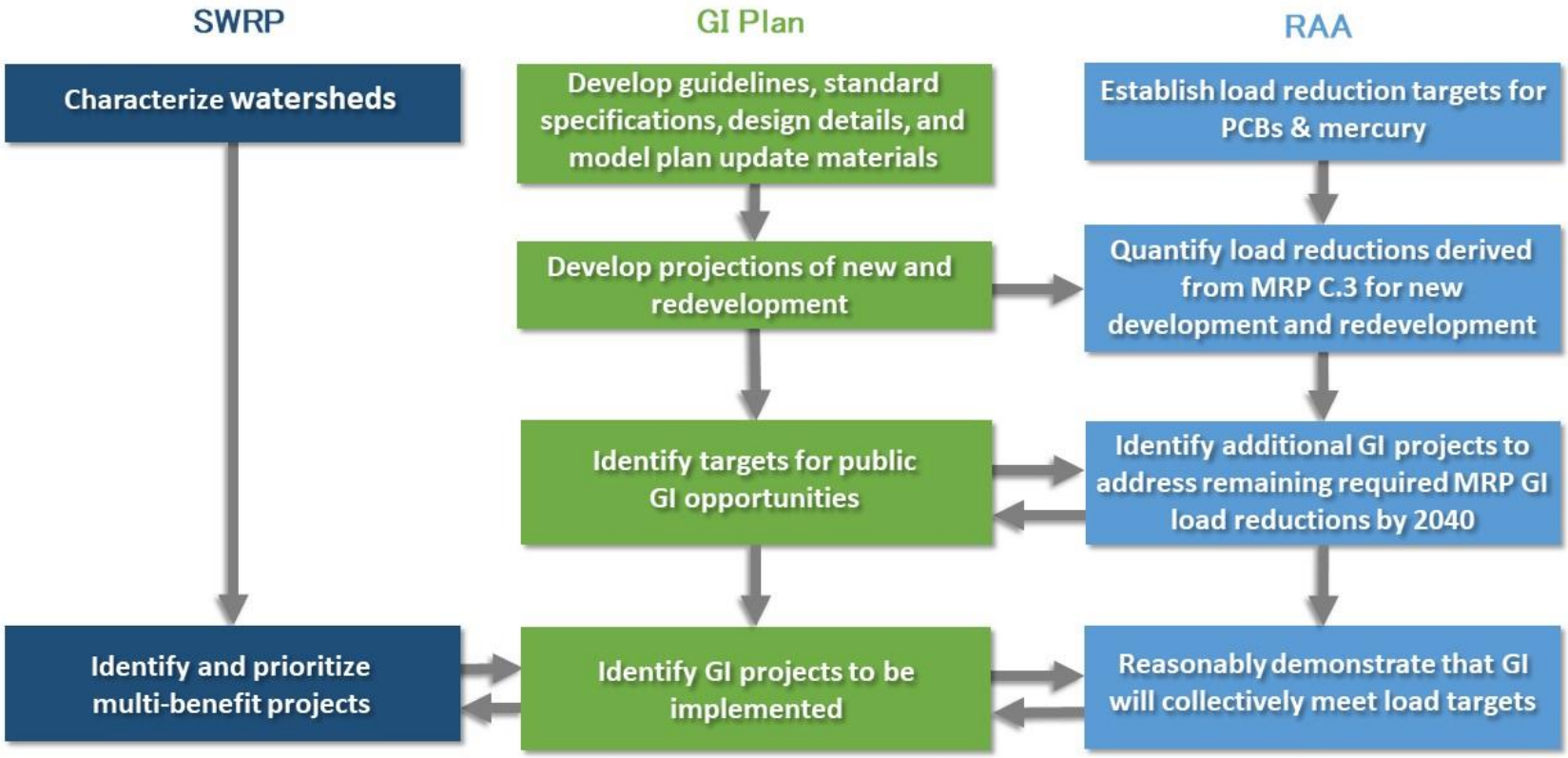


Figure 5-1. Relationship Between the SWRP, the RAA, and the GI Plans

6. Identification of SWRP Opportunities

This section outlines the analytical process used to identify potential GI opportunities on publicly-owned parcels and rights-of-way (ROW) for the *CCW SWRP*. SWRP Opportunities were identified from existing plans including, IRWM plans, creek restoration and watershed enhancement plans, MRP and TMDL compliance plans, municipal capital improvement plans (CIPs), and other watershed and LID planning efforts. Projects were also submitted for consideration by cooperating entities and stakeholders as discussed in **Section 6.1**. Additional GI opportunity locations were identified through a GIS-driven desktop screening process, discussed in **Section 6.2**.

6.1 PROCESS OF CATALOGING EXISTING OPPORTUNITIES

A request for information regarding potential opportunities, existing conditions, and management goals was sent to the municipal jurisdictions in April 2017 and followed up with additional requests and reminders. Similar requests for potential opportunities were sent via email to the watershed stakeholders in June of 2017 including IRWM groups, watershed and environmental planning groups and NGOs, elected officials, and other government agencies. Messages soliciting potential opportunities were sent to 69 jurisdictions, government agencies, non-governmental organizations, and watershed groups. Additional opportunities for watershed stakeholders to add planned and potential opportunities to the analysis process were provided in September and October 2017 through a dual process of requesting the submission of opportunities and through the stakeholder outreach meetings. During these meetings submitted opportunities were mapped and stakeholders were asked to review the maps to confirm the information and provide supplement information or additional opportunities. See **Section 3.1** for a full description of the process to involve stakeholders in the identification of SWRP Opportunities.

Information related to the identification of potential opportunities was received from 25 jurisdictions, government agencies, non-governmental organizations, and watershed groups.

The potential opportunities request spreadsheet that was sent to jurisdictions, government agencies, NGOs, and watershed groups required the inclusion of the following information for each potential project to be included in the *CCW SWRP*:

- Facility name;
- Facility location (Assessor's Parcel Number [APN] or Global Positioning System [GPS] coordinates);
- Facility type;
- Facility drainage area; and
- Facility size and/or volume.

Additional optional opportunity information requested included assessments of facility benefits, facility planning stage and/or completion date, and additional notes or description of the facility. In addition to these project submittals, 18 jurisdictions and watershed groups provided plans and reports relevant to the *CCW SWRP*. The reports received were reviewed to identify potential opportunities and stormwater management programs.

Example of a Stakeholder Developed SWRP Opportunity Based on Earlier Work in the Marsh Creek Watershed

6.2 PROCESS OF IDENTIFYING ADDITIONAL OPPORTUNITIES

A desktop opportunity analysis was conducted in a GIS platform to identify additional locations for GI opportunities in addition to those cataloged as described in **Section 6.1**.

6.2.1 Data Solicitation and Standardization

Spatial data (GIS data, computer aided design [CAD] data, or Google Earth files) were needed to identify potential opportunities using a desktop analysis and to characterize the site suitability for project implementation. To meet the data needs for the GIS-based screening analysis, spatial data layers from each jurisdiction within the *CCW SWRP* planning area were initially requested in February 2017, with subsequent requests made to obtain all needed information. The data requested are described in **Table 6-1**, along with data obtained from publicly available sources. These GIS datasets, which formed the basis for the opportunity analysis and hydrologic modeling efforts, were standardized across the County in ESRI geodatabase format.

Table 6-1. Data Obtained and Used for GIS-based SWRP Opportunity Identification

Data Requested from Jurisdictions	Data Obtained from Publicly Available Sources
• Land use-based PCBs and mercury yield classifications (kg/ac/yr) developed by the County in 2014	• Soils data from the Natural Resources Conservation Service (NRCS) in Soil Survey Geographic Database format
• PCBs source area desktop screening analysis conducted by the County in 2014	• GeoTracker sites from California Department of Toxic Substances Control

Data Requested from Jurisdictions	Data Obtained from Publicly Available Sources
• Parcels with ownership information and parcel use code	• Association of Bay Area Governments (ABAG) 2014 Land Use
• Road centerlines	• Contra Costa County roadway centerline data
• Rights-of-Way (ROW) boundaries	• National Land Cover Dataset
• Storm drain network information	• Percent Impervious cover from the United States Geological Survey (USGS) National Land Cover Database (2011)
• Future areas of development or redevelopment	• Federal Emergency Management Agency (FEMA) Flood Hazard Map
	• Landslides, liquefaction, and other geotechnical hazard information (California Geological Survey)
	• County digital elevation model or topography contours to compute slope

6.2.2 SWRP Opportunity Identification

The desktop GIS analysis entailed screening for publicly-owned parcels and ROW. Due to the nature of the analysis, the screening was conducted without consideration of physical feasibility constraints that would preclude implementation of a GI project. The opportunity analysis consisted of the steps described in **Table 6-2.**[9]

Table 6-2. Process for Identifying Additional SWRP Opportunities

Step	Description
1. Identify publicly-owned parcels	Publicly-owned parcels were identified through parcel ownership and/or tax-exempt status.
2. Screen identified publicly-owned parcels	Publicly-owned parcels meeting the following criteria were screened further for physical feasibility in Step 5. The parcels that did not meet these criteria were not considered as GI opportunity sites. • Parcels at least 0.1 acres in size; and • Parcels with average slopes less than 10%.
3. Identify ROW	Non-interstate highway public ROW within urban areas were identified using metadata in the county-wide roadway data layer. Roadways considered were state and county highways and connecting roads as well as local, neighborhood, and rural roads.
4. Identify land uses	Land uses of identified locations or adjacent land uses were identified based on a combination of ABAG land use categories and use codes provided by the Contra Costa County Assessor.

[9] This analysis did not include screening checks that should occur as part of a project concept development which include the presence of steep slopes in drainage areas, need for a liner due to proximity to structures, and other feasibility checks. The screening also did not include field checks that would be conducted as part of project design, such as drainage tie-ins, land use checks, or other data verification.

Step	Description
5. Screen all identified locations for physical feasibility	Identified parcel-based, regional, and ROW locations were screened to remove sites with the following physical constraints (to the extent that the necessary data had been provided or obtained): • Regional facilities were not considered for sites that were greater than 500 feet from a storm drain due to limited feasibility in treating runoff from a larger drainage area; • Parcel-based facilities were not considered for sites that were more than 50% undeveloped due to the limited potential for pollutant of concern load reduction; • Sites with significant drainage area outside of urbanized areas, as these sites would not provide opportunity for significant pollutant of concern load reduction; • Sites more than 50% within environmentally sensitive areas (ESAs) (designated wetlands, biologically sensitive areas) so as not to disturb these habitats; • Sites with more than 50% overlying landslide hazard zones to avoid the potential for increasing landslide risk.

6.3 OPPORTUNITY CLASSIFICATION

All opportunities (i.e., those identified in the GIS opportunity analysis and the stakeholder process) were then classified in order to conduct a metrics-based evaluation. The opportunities were classified using the following information:

1. GI project type;
2. Infiltration feasibility;
3. Facility type; and
4. Drainage area information.

These classifications are described below.

6.3.1 Green Infrastructure Project Type

The opportunities identified through the GIS opportunity analysis and stakeholder process were categorized as parcel-based, regional, or ROW/green street opportunities, as described in **Table 6-3**.

Table 6-3. Green Infrastructure Project Types and Categorization Criteria

Green Infrastructure Project Type	Definition	Description
ROW/green street projects	Treating the road and portions of adjacent parcels	• All street-based projects.
Regional Projects	Treating a large area draining to the parcel	• The parcel contains at least 0.5 acre of undeveloped or pervious area (as identified through the land use class); and • The drainage area is larger than the parcel itself and the location is sufficiently close to a storm drain (i.e., within 500 feet, where storm drain pipe data is available).
Parcel-based projects	Treating the drainage area only on the identified parcel	• All other parcel locations.

6.3.2 Infiltration Feasibility

All SWRP Opportunity locations were categorized as feasible, infeasible, or partially feasible for infiltration, as described in **Table 6-4**.

Table 6-4. Infiltration Feasibility Categorization Criteria

Infiltration Feasibility Category	Description
Hazardous/infeasible for infiltration	Projects that are located: • More than 50% overlying liquefaction hazards; or • Within 100 feet of a site with soil or groundwater contamination (e.g., based on proximity to active Geotracker[10] or EnviroStor[11] sites).
Infiltration safe but only partially feasible	None of the above constraints exist, but the soil underlying the facility is relatively poorly draining (identified as hydrologic soil group [HSG] C or D).
Infiltration feasible	The site has none of the infiltration hazards present and the soil underlying the facility is relatively well draining (identified as HSG A or B).

For the purpose of project scoring, locations feasible for infiltration were assumed to retain the full water quality capture volume. At locations that are partially feasible for infiltration, it was assumed that infiltration would be promoted in the facility, but the full water quality capture volume would not be infiltrated due to poor drainage. These areas were assumed to infiltrate to the extent possible using a raised underdrain. Locations that are hazardous for infiltration

[10] Geotracker is a California State Water Resources Control Board website which tracks sites with the potential to impact water quality in California, including contaminated sites (https://geotracker.waterboards.ca.gov/).

[11] EnviroStor is the Department of Toxic Substances Control's data management system for tracking cleanup, permitting, enforcement and investigation efforts at hazardous waste facilities and sites with known contamination or sites where there may be reasons to investigate further (https://www.envirostor.dtsc.ca.gov/public/).

were assumed to implement non-infiltrating GI projects (i.e., lined bioretention) and were assumed to retain no volume.

6.3.3 Facility Type

Each potential SWRP Opportunity location was assigned a facility type. For potential SWRP Opportunities identified by the Permittees and/or stakeholders, a facility type was assigned based on the facility description or classification provided by the agency or project proponent. SWRP Opportunities were assigned facility types as follows:

- Capture and Reuse
- Constructed Wetland
- Creek/Marsh Restoration
- Education Center
- Flood Control Basin
- Flood Control/Reservoir
- Habitat Restoration
- Habitat Restoration and Flood Control
- Lined Bioretention
- Unlined Bioretention
- Unlined Swale
- Water Quality Basin

Unlined Bioretention Retrofit in the County Public Works Building Parking Lot

6.3.4 Project Drainage Area

For each identified SWRP Opportunity, the project drainage area was identified and characterized as follows:

1. All SWRP Opportunities with identified drainage areas were characterized as provided.
2. For ROW SWRP Opportunities for which drainage area had not been characterized, the roadway and an assumed tributary width (e.g., 50 feet per side) that extends into the adjacent parcels was considered the project drainage area.
3. For parcel-based SWRP Opportunities for which drainage area had not been characterized, the entire parcel was assumed to make up the drainage area.
4. For regional SWRP Opportunities for which the drainage area had not been characterized, the drainage area characterization (i.e., slope and land use) was approximated.

6.4 LIST OF POTENTIAL SWRP OPPORTUNITIES

The SWRP Opportunities cataloged or identified and subsequently classified using the methods described in **Section 6.3** were then compiled into a database that included all the information that was provided as well as information identified as part of the GIS screening process. A database containing the full lists of SWRP Opportunities is presented in **Appendix G**, and a database is also maintained in the SWRP Project Viewer tool.

Pervious Pavement in Walnut Creek (Pervious Asphalt Left and Pervious Pavers Right) are Examples of Multi-Benefit Stormwater Projects that Promote Water Infiltration in Areas Where Vegetation is Not Appropriate

7. Multiple Benefit Metric Evaluation, Scoring, and Project Selection

This section provides a description of the multiple benefits evaluation, the SWRP Opportunity scoring process, and SWRP Project selection.

7.1 MULTIPLE BENEFIT EVALUATION

The *SWRP Guidelines* require a metrics-based assessment of water quality, water supply, flood management, environmental, and community benefits of SWRP Opportunities. The *SWRP Guidelines* divide these benefit categories into "main" and "additional" benefits, as shown in **Table 7-1**, and require that at least two "main" benefits of SWRP Opportunities be described quantitatively.

Table 7-1. *SWRP Guidelines* for Stormwater Management Benefits

Benefit Category	Main Benefit	Additional Benefit
Water Quality	• Increased filtration and/or treatment of runoff	• Nonpoint source pollution control • Reestablished natural water drainage and treatment
Water Supply	• Water supply reliability • Conjunctive use	• Water conservation
Flood Management	• Decreased flood risk by reducing runoff rate and/or volume	• Reduced sanitary sewer overflows
Environmental	• Environmental and habitat projection and improvement • Increased urban green space	• Reduced energy use, greenhouse gas emissions, or provides a carbon sink • Reestablishment of the natural hydrograph
Community	• Employment opportunities provided • Public education	• Community involvement • Enhance and/or create recreational and public use areas

The SWRP Opportunities that are contained in the database were first scored using quantitative metrics that account for the multiple benefits that are described in this section. As the preliminary scoring system was automated, it was necessary to use metrics that were contained in the database for the multiple benefit scoring. The scoring scheme described below was adapted from the *Stormwater Resource Plan for San Mateo County* (SMCWPPP, 2017) and the *Ventura Countywide Municipal Stormwater Resource Plan* (Ventura Countywide Stormwater Quality Management Program, 2016). The scoring process is consistent with the *SWRP Guidelines*. The quantitative metrics and qualitative

Earth Day Volunteers Restoring the Upper Sand Creek Watershed in Antioch

components that were scored are associated with providing the multiple benefits identified in the *SWRP Guidelines* (i.e., water quality, water supply, flood control, environmental benefit, and community benefit), that would be derived from implementation of the SWRP Opportunity.

The scored project database for each Planning Unit, watershed, and jurisdiction (included in **Appendix G**) was then provided to the Permittees for review and use in preparing their local GI Plans. The SWRP Opportunity list was used by the Permittee in conjunction with the Permittee's institutional knowledge of local conditions, project feasibility, multi-benefit priorities, and funding potential to develop the list of projects included in their GI Plan. The GI Plan project list for each Permittee were then incorporated into the SWRP Project list, which is provided in **Appendix F**.

7.1.1 SWRP Opportunity Scoring

Using the information compiled in the identified SWRP Opportunity database and the SWRP Project list, each opportunity and project received a score using the point system presented in **Table 7-2**. A description of each scored component is provided below:

- **Parcel area** (for regional and parcel-based GI projects only) – This scoring component awarded more points for larger parcels, as it is easier to site a project on a larger parcel.
- **Slope** – This scoring component is related to ease of construction and implementation. Flatter locations typically require less grading and hydraulic connection considerations and received more points.
- **Infiltration feasibility** – More points were awarded to locations that overlie infiltrating soils, as retention of runoff through infiltration provides enhanced pollutant reduction, reestablishment of natural drainage, groundwater aquifer recharge potential, and reduction of runoff rates, among other beneficial outcomes.
- **PCBs/mercury yield classification in opportunity drainage area** – This scoring component is related to the influent TMDL pollutant loads. Locations in areas with higher pollutant loading rates for PCBs and mercury (such as old industrial areas) have greater potential to reduce pollutant loads. An additional point was awarded to opportunities with a property within its assumed drainage area that is known to be a historical source of elevated PCBs loads to the storm drain system.
- **Removes pollutant loads from stormwater** – Points were awarded to opportunities and projects designed as green infrastructure or treatment control facilities. More points were awarded to partially and fully infiltrating green infrastructure locations than non-infiltrating opportunities, as infiltration increases pollutant load reduction. An additional point was awarded for regional opportunities or projects, as these would remove a larger pollutant load than a parcel-based or ROW opportunity or project.
- **Augments water supply** – Increasing points were awarded based on potential water supply provided. Locations with infiltrating soils and overlying potential water supply aquifers that promote infiltration were given one point, while opportunities and projects specifically designed to augment water supply were given two points.

- **Provides flood control benefits** – Flood control facilities received points specific to providing flood control benefits. Green infrastructure opportunities and projects (fully or partially infiltrating) were assumed to provide some flood control benefits, while opportunities and projects specifically designed to address flooding issues were given more points.
- **Re-establishes natural water drainage systems or develops, restores, or enhances habitat and open space** – Hydromodification control, stream restoration, and habitat restoration opportunities and projects received points specific to providing these environmental benefits. Fully and partially infiltrating green infrastructure opportunities and projects were given one point for providing hydrologic benefit.
- **Provides community enhancement and engagement** – Opportunities and projects that specifically provide public use areas or public education components with potential opportunities for community engagement and involvement were given points specific to providing community benefits.

Rain Garden on San Pablo Avenue with Signs to Educate the Public

Table 7-2. Opportunity Metric-Based Multiple Benefit Scoring

Opportunity Component	Benefit Addressed	Points		
		0	1	2
General Stormwater Management Performance/Implementation Feasibility				
Parcel area (for regional and parcel-based opportunities only)	All	< 1 acre	1 - < 4 acres	> 4 acres
Location slope	All	7-10%	3-7%	0-3%
Infiltration feasibility	All	No	Partial	Yes
Individual Benefit Performance				
PCBs/Mercury yield classification in opportunity drainage area[1]	Water Quality	New Urban, Agriculture /Open Space, or Other	Old Urban	Old Industrial or Source Property (+1)
Removes pollutant loads from stormwater	Water Quality	Trash Capture Devices	Non-Green Infrastructure and Non-Infiltrating Green Infrastructure Treatment Control	Partially and Fully Infiltrating Green Infrastructure Opportunity or Regional Opportunity (+1)
Augments Water Supply	Water Supply	--	Infiltrating Green Infrastructure or Infiltrating Flood Control Opportunity over Potential Water Supply Aquifer	Harvest/Use or Other Water Augmentation Opportunity[2]
Provides Flood Control Benefits	Flood	--	Fully and Partially Infiltrating Green Infrastructure Opportunity	Flood Control Opportunity[2]
Re-establishes Natural Water drainage systems	Environmental	--	Fully and Partially Infiltrating Green Infrastructure Opportunity	Stream Restoration or Hydromodification Control[2]
Develops, restores, or enhances habitat and open space	Environmental	--	Green Infrastructure Opportunity	Habitat Restoration Opportunity[2]

Opportunity Component	Benefit Addressed	Points		
		0	1	2
Provides enhanced or created recreational and public use areas with potential opportunities for community involvement and education	Community	--	Green Infrastructure Opportunity	Public Use Area or Public Education Opportunity Component[3]

1. Includes parcel yield classification for parcel-based opportunities; drainage area yield classification for regional opportunities; and adjacent parcel yield classification for ROW opportunities. Scores will be weighted on the portion of the drainage area in each yield classification.
2. As identified by the opportunity proponent.
3. Defined as providing "enhanced or created recreational and public use areas, community involvement, or employment opportunities" per the State Storm Water Resource Plan Guidelines (SWRCB, 2015) per Permittee/Stakeholder opportunity information. Typically, an added opportunity feature.

7.2 SCORED SWRP OPPORTUNITY DATABASE

All SWRP Opportunity scores are documented in the SWRP Opportunity database, which is maintained in the SWRP Project Viewer tool and included as **Appendix G**. This database lists opportunities according to the municipal jurisdiction that they are located in and provides their scores and information relevant to the score. The compiled SWRP Opportunity database includes the following information:

- The SWRP Opportunity name (if planned);
- The SWRP Opportunity proponent/stakeholder (if planned);
- Provided or assumed facility type;
- The jurisdiction in which the SWRP Opportunity is located;
- The Planning Unit in which the SWRP Opportunity is located;
- The watershed in which the SWRP Opportunity is located;
- The parcel number (APN) for parcel-based SWRP Opportunities;
- The public agency that owns the parcel (per County parcel information);
- The street name for ROW opportunities; and
- The component scores and total score from the metrics-based evaluation.

7.3 SWRP PROJECT LIST

The scored SWRP Opportunity database was provided to the TAG for general review. Jurisdiction-specific SWRP Opportunity lists were then provided to each Permittee.

Permittees used the scored SWRP Opportunity lists to develop their GI Plans. The intent is for the GI Plan to describe how LID drainage design will be included in storm drain

infrastructure, including streets, roads, storm drains, parking lots, building roofs, and other storm drain infrastructure elements. The goal for these plans, as stated in MRP Provision C.3.j, is to serve as an implementation guide and reporting tool during the current and subsequent MRP terms to provide reasonable assurance that urban runoff TMDL waste load allocations (e.g., for the San Francisco Bay mercury and PCBs TMDLs) will be met. The GI Plans set long term goals for reducing the adverse water quality impacts of urbanization and urban runoff on receiving waters. The GI Plans prioritized particular areas and projects within each Permittee's jurisdiction for implementation of GI projects. Specifically, the GI Plans included prioritization criteria, a map(s), and a list(s) of GI projects specific to each jurisdiction.

Each GI Plan selected project locations from the SWRP Opportunity list and prioritized them so that the list of projects focused on the municipality's specific needs.

Selection and prioritization criteria included:

- Planned CIP projects that could be modified to incorporate or already do incorporate GI. This could be planned ROW improvements or other parcel-based CIP projects.
- Potential multi-benefit projects, such as integrating GI with flood control, park improvements, bike/pedestrian street improvements, or climate resiliency projects.
- Parcels and ROW segments that have a greater potential of reducing loads of PCBs and mercury, such as those adjacent to source properties and/or located in old industrial land use areas.
- Parcels and ROW segments that have a greater potential of reducing general urban runoff pollutants (such as petroleum hydrocarbons, metals, nutrients, bacteria, etc.). These areas would include more traveled roadways (e.g., highways, arterials, major connector roads) and commercial areas in Old Urban land use areas.
- Parcels and ROW segments that drain to sensitive habitat areas.
- ROW segments adjacent to or within planned private redevelopment projects or areas (e.g., Specific Plans) that may be funded and implemented through an Alternative Compliance program.

For some Permittees, the GI plan projects consisted entirely of selected SWRP Opportunities; other Permittees incorporated planned projects that were not provided during the initial SWRP identification process. Some SWRP Opportunities were used by Permittees as a starting point but were modified for inclusion in the GI Plan. The GI Plan projects were combined to form the list of the prioritized SWRP Projects provided in **Appendix F.** Each of these projects has been scored (prioritized) using the same methodology that was used to score the SWRP Opportunities.

Each project in the Permittees' GI Plans were assigned an estimated project completion date (i.e., 2020, 2030, or 2040). This projected project completion date has been used as a secondary basis for ranking the SWRP Projects, as shown below inTable 7-2 **Table 7-3**.

Table 7-3. SWRP Project Implementation Timeframe

Estimated Completion Date	Secondary Project Rank
2020	1
2030	2
2040	3

The project names in the SWRP Project list correspond to those used in each Permittee's GI Plan. The ten project concepts have also been included in the SWRP Project list. If the SWRP concept project was modified in the process of developing the GI Plan, then the modified project is also included in the SWRP Project list.

The SWRP Project list is provided in **Appendix F**.

7.3.1 SWRP Project Cost Estimates

Cost estimates are provided for each project in the SWRP Project list. Costs are based on GI facility cost data gathered from several sources within the San Francisco Bay Area and Southern California, which were used to develop relationships between project size and total capital cost, including construction and design.[12]

Construction costs vary by facility type and project location. For example, green street projects often include ancillary construction costs associated with retrofitting the existing right-of-way and therefore are often relatively more expensive than other project types per unit area treated. Regional facilities have greater tributary areas and thus often have reduced costs per acre treated given fixed mobilization costs. SWRP Projects were assigned to one of the following drainage area types, based on information provided in the Permittee's GI Plan:

- ROW: Projects built within the right-of-way, which include curb cutting and other costs associated with street retrofits. The treatment control measures may include infiltration trenches, bioretention, and infiltration galleries.
- Parcel-Based: Biofilters, swales, infiltration strips, and bioretention installed within a parcel to treat runoff generated on that parcel.
- Regional: Infiltration basins, large storage facilities, and treatment wetlands installed to treat runoff from a larger drainage area.

Table 7-4 below presents unit cost for design and construction, in 2018 dollars, for each drainage area category. When analyzing these cost data, best professional judgment was used to distribute the design and construction costs when the information provided was unclear. If design costs were not available for a project, an estimate for design was inferred from other projects for which such costs were available. From these, the cost of design is approximately 30% of the construction cost.

The 25th and 75th percentile costs used the "low" and "high" estimates of capital cost, respectively, for the range of cost estimates presented in the SWRP Project list.

[12] The methodology for cost estimation can be found in the Green Infrastructure Cost Estimation Methodology and in the link provided:
https://www.cccleanwater.org/userfiles/kcfinder/files/GI%20Cost%20Estimation%20TM%20%2811-28-18%29.pdf

Table 7-4: Statistical Summary of Unit Capital Cost for Each Drainage Area Category

Drainage Area Category	Unit Capital Cost ($/ac treated) in 2018 Dollars[1]	
	Low Estimate (25th-percentile)	High Estimate (75th-percentile)
Green Street	$70,000	$267,000
Distributed Green Infrastructure	$90,000	$176,000
Regional Stormwater Control	$25,000	$127,000

1. Unit costs have been rounded to the nearest $1,000.

7.3.2 Stormwater Capture Analysis

MRP Provision C.3.j requires that the GI projects, such as those included in the SWRP Project list, be designed to meet the treatment and hydromodification sizing requirements of MRP Provision C.3.d. The sizing requirements may be summarized as:

1. Volume-based treatment systems must be sized to capture and treat the 85th percentile 24-hour rainfall runoff event or the volume of runoff required to capture 80 percent of the average annual runoff volume.
2. Flow-based treatment systems must be sized to treat 10 percent of the 50-year peak flow rate, the flow of runoff equal to two times the 85th percentile hourly rainfall intensity, or the flow of runoff resulting from a rain event equal to at least 0.2 inches per hour intensity.

However, the provision allowed for the Permittees to propose an approach for sizing non-regulated GI projects for which project constraints preclude fulling meeting the C.3.d sizing requirements. To address this provision and further define the C.3.d sizing requirements for GI projects, the Bay Area Stormwater Management Agencies Association (BASMAA) conducted a project to perform continuous simulation hydrologic modeling to evaluate relationships of facility size (e.g., area, depth, flow rate) to facility performance.

The report[13] describes the modeling analysis that was performed to better understand the relationship between bioretention (the most common form of GI facility in the Bay Area) configuration and annual runoff treatment across the different BASMAA stormwater agencies and their climate zones. Long-term continuous modeling was used to compute stormwater runoff, simulate bioretention hydraulics, and estimate the annual percentage of stormwater that is treated. The analysis was performed for 10 different rain gauges that together represent the full range of climate conditions across the Bay Area. The analysis also considered different bioretention configurations and treatment goals.

The results of the analysis showed that bioretention facilities are a useful and flexible approach for improving stormwater quality in urban areas. The project developed a useful set of tools that will help municipal staff implement GI projects in constrained public areas and

[13] The BASMAA report on Green Infrastructure Facility Sizing is available online at the link provided: https://www.cccleanwater.org/userfiles/kcfinder/files/BASMAA_Guidance%20for%20Sizing%20Green%20Infrastructure%20Facilities%20in%20Street%20Projects%20with%20companion%20Analysis%20June%202019.pdf

assess the effectiveness of existing facilities. Following is a summary of the conclusions of the report:

1. The modeling analysis showed that bioretention facility performance is closely related to mean annual rainfall. For most locations, the bioretention area needed to treat 80 percent of the average annual runoff volume ranges from 1.5 to 2.5 percent of the connected upstream impervious area. Regression equations are provided in the report as a sizing tool. The default simplified C.3 sizing standard is to size bioretention facilities at 4 percent of the connected upstream area. These results show that bioretention facilities sized to the "4 percent rule" capture more than 80 percent of the average annual runoff volume.
2. The modeling analysis was used to develop nomographs that estimate the annual stormwater treatment percentage across a range of bioretention facility sizes and mean annual rainfall depths. These nomographs can be used to estimate the annual treatment percentages for retrofit projects with space constraints and will enable municipal staff to compare bioretention with other treatment technologies.
3. The modeling demonstrated the relationship between stormwater treatment percentage and level of permeability of surrounding soils for bioretention facilities without an underdrain.
4. The modeling analysis also assessed a conservative scenario for bioretention facilities installed in NRCS Group D soils with a very low permeability. The modeling analysis compared these results to lined bioretention facilities and showed very similar results, which confirmed that the sizing guidance presented in the report can apply to flow through planters or similar facilities that do not infiltrate to surrounding soils.

8. Selected Project Concepts Quantitative Analysis

8.1 QUANTITATIVE METRICS

Following the scoring process described in **Section 7**, a subset of ten high priority SWRP Opportunities were selected to develop project concepts, which are presented in **Section 9**. Each jurisdiction was asked to submit one SWRP Opportunity for consideration. The consultant team coordinated with the TAG to develop the list of ten projects to develop GI project concepts, which is described in **Section 9**.

In addition to the quantitative metrics used to prioritize SWRP Opportunities and Projects described in **Section 7**, the "main" benefits for the *CCW SWRP* project concepts (i.e., runoff volume retained, pollutant loads reduced, and urban green space created) were further quantified using the metrics and tools summarized in **Table 8-1**.

Table 8-1. *CCW SWRP* "Main" Benefits, Metrics and Tools

Benefit	Metric	Quantitative Tool
Water Supply, Flood Management	Average annual volume retained (e.g., acre-feet/year)	Hydraulic/hydrologic model
Water Quality	Load reductions for PCBs and mercury (e.g., grams/year)	Hydraulic/hydrologic/water quality model
Environmental	Increased urban green space (e.g., square feet)	Conceptual GI design

Section 8.2 describes the hydraulic/hydrologic and water quality models evaluated and selected to quantify water supply, flood control and water quality benefits for the project concepts. As discussed in **Section 5**, quantitative methods and models used to quantify water quality benefits will also be used to support the development of MRP required GI Plans and RAAs. The benefits associated with the potential increase in urban green space through the implementation of concept projects was evaluated based on the footprint of project concepts, presented in **Section 9**.

8.2 SELECTED HYDROLOGIC/HYDRAULIC MODELING TOOLS AND QUANTITATIVE METHODOLOGIES

8.2.1 Model Evaluation

This section provides an evaluation of hydrologic/hydraulic and water quality models that are suitable to support the detailed quantification of project benefits for the *CCW SWRP* and the RAAs. Several RAA capable[14] modeling approaches to water quality and water quantity

[14] Consistent with BASMAA's Bay Area Reasonable Assurance Analysis Guidance Document (BASMAA, 2017).

benefit quantification were evaluated for use: SWMM,[15] HSPF/LSPC,[16] SUSTAIN,[17] and GreenPlan-IT.[18]

All the modeling approaches require a geoprocessing (i.e., desktop GIS-based) step to identify specific sites to target for implementation of green infrastructure and to develop model input parameters to appropriately represent the tributary drainage area to each facility. A summary of these models is provided in **Table 8-2** (BASMAA, 2017).

Table 8-2. Summary of Possible Models for Quantification and RAA

Model or Tool	Model Type: Hydro-logic Model	Model Type: Hydrologic /Hydraulic Model	Model Type: Water Quality Model	Notes	Input Complexity	Simulation Type(s)	Built-in GI
USEPA SWMM		X	X	SWMM can be used on its own or in combination with separate pollutant loading models.	Medium/ High	Event or Continuous	Yes
HSPF/ LSPC		X	X	Can be linked to BASINS and SUSTAIN.	High	Event or Continuous	Yes
SUSTAIN (with HSPF)	X		X	Used to develop, evaluate, and select optimal GI combinations at various watershed scales based on cost and effectiveness.	Medium	Event or Continuous	Yes
GreenPlan- IT (with SWMM[1])	X		X	Used to prioritize GI activities in a watershed to optimize water quality return on investment.	Medium	Event or Continuous	Yes
SBPAT (with SWMM)	X		X	Used to prioritize GI activities in a watershed to optimize water quality return on investment.	Medium	Continuous	Yes

1. Represents current configuration of model. It could be developed further to utilize other dynamic simulation models such as HSPF or HEC.

[15] Storm Water Management Model (USEPA).

[16] Hydrological Simulation Program – FORTRAN/ Los Angeles County Department of Public Works Loading Simulation Program in C++ (USGS).

[17] System for Urban Stormwater Treatment and Analysis Integration (USEPA)

[18] The Green Plan-IT tool is a GIS and modeling, planning level toolkit to aid municipalities in identifying optimal combinations of GI features and sites for desirable water quality outcomes on a watershed scale.

8.2.2 Selected Modeling Approach

When selecting the modeling software, the team considered the tools and datasets available for use, the end use of model outputs, and the requirements outlined in the Bay Area RAA Guidance Document (BASMAA, 2017). In practice, SWMM and HSPF/LSPC, with their capacity to interface with external tools, are considered well-tested and equivalent in terms of performance, and therefore there is no disadvantage to using SWMM. SWMM was selected for the CCW *SWRP* over HSPF/LSPC to leverage staff knowledge from previous SWMM modeling efforts and will set the stage for the modeling needed for the RAA.

The recommended modeling approach included three components: land surface characterization, long term runoff simulation, and load-based surface water quality modeling. The land surface characterization identified features that impact the quantity of runoff in the drainage areas to specific projects. The combination of land surface features was used as input parameters for hydrologic simulations. The SWMM hydrologic engine was used to compute long-term continuous runoff for representative project drainage areas using locally available rainfall records. The model included hydraulic representations of proposed facilities to simulate the performance of the projects identified for development of concept designs. These simulations included the area draining to a project facility sized as identified in the project concepts designs presented in **Section 9**.

Modeling the water quality performance was conducted by combining the runoff response resulting from the hydrologic simulations of the drainage areas with land use-based pollutant concentrations to estimate loading to the facilities. The facility influent load was computed using the Regional Watershed Spreadsheet Model, developed by San Francisco Estuary Institute (SFEI), which quantified land use-based average annual concentrations of PCBs and mercury. These concentrations were volume-weighted with the land surface runoff response simulations to calculate the load of each pollutant entering or bypassing treatment facilities. The modeled facility long-term capture performance (i.e., hydraulic performance) was combined with monitored facility pollutant effluent data to represent load reductions occurring in the facilities. These monitored facility pollutant effluent data for PCBs and mercury were obtained from several data sources including the BASMAA Clean Watersheds for a Clean Bay pilot projects, the International Best Management Practices Database, and other studies which examined Best Management Practices (BMP) performance for PCBs and mercury removal. These empirical data were statistically analyzed to develop a representative value for facility effluent concentrations of PCBs and mercury.

9. Green Infrastructure Project Concepts

Project concepts were developed for ten SWRP Opportunities and are presented in **Appendix B**. After the development of the SWRP Opportunities, jurisdictions identified a project to be considered for concept development, and 15 projects were proposed for consideration. The 15 proposed projects were reviewed and vetted. The process included obtaining guidance from the TAG on the criteria for selecting the final list of ten projects. High priority for the purpose of selecting the projects for concept development was defined as opportunities that represented a diversity of jurisdictions, watershed, and project types to serve as examples. The vetting criteria were:

- Geographical distribution of the project
  As an equity factor, the selected projects should be distributed through the municipal jurisdictions and the SWRP Planning Units.
- Stage of design and synergies with planned CIPs
  Projects further in the design process or which are associated with a CIP will have more underlying information needed to support the development or enhancement of the GI design aspects, have a greater acceptance by the municipal agencies, and have a higher chance of being ready to be developed into a implementation grant application.
- Diversity of project types (ROW, parcel, regional)
  SWRP project concepts are expected to serve a examples for the development of future concepts and therefore need to represent all of the expected types of projects for which permittees might seek implementation grant funding or develop into concepts for GI Plan implementation.
- Diversity of multi-benefits and project score
  Projects selected for concept developed should represent a diversity of benefits. While scoring was considered it was not the dominant criteria.

As a result of these vetting criteria, the 10 high priority projects recommended for concept development are located in 10 different jurisdictions; eight different watersheds; and represent a diversity of project types (one parcel-based, four ROW, and five regional projects). All projects selected provide multiple benefits. In almost all of the cases the selected projects were amongst the top scored projects in each jurisdiction.

Table 9-1 summarizes project concepts developed. The project concepts presented in **Appendix B** describe the selected projects listed in **Table 9-1**. The methodologies for sizing and developing the costs for the BMPs are also presented in **Appendix B**.

Table 9-1. *CCW SWRP* Project Concepts

Permittee/ Responsible Agency	Project Name	Project Type	Estimated Cost from Project Concept	Total Score	Project Benefits						
					Estimated PCBs Loads Reduced (grams/year)	Estimated Mercury Loads Reduced (grams/year)	Water Supply	Flood Management	Natural Drainage System	Habitat or Open Space	Community
Antioch	Vieira Ave-Wilbur Ave Green Streets	Green street	$1,938,500	13.5	1.1	0.2	N/A	The project will provide flood management benefit through detention and infiltration.	The project will provide hydrologic benefit to natural drainage system by allowing for infiltration	The project will add a total of 0.3 acres of green space within an urban area.	The project will provide water quality educational signage at Site 6.
Concord	Hillcrest Park Regional Retrofit	Stormwater capture/use, bioretention, and full trash capture in a city park	$2,034,400	15	1.6	10.5	The project will harvest urban runoff for irrigation.	N/A	N/A	N/A	The project will provide water quality educational signage.
Danville	Sycamore Valley Road Park and Ride Expansion	Bioretention retrofit in a park and ride lot	$591,700	13	0.6	0.5	N/A	The project will provide flood management benefit through detention and infiltration benefits.	The project will provide hydrologic benefit to natural drainage system by allowing for infiltration.	N/A	The project will provide water quality educational signage.
El Cerrito	El Cerrito del Norte TOD Complete Street Improvements	Green street	$219,200	11	0.03	0.07	N/A	The project will provide flood management benefit by promoting infiltration.	N/A	The project will provide 0.05 acres of green space within the urban area.	N/A
Oakley	Oakley Train Station Green Infrastructure Project	Distributed bioretention at a train station and regional infiltration/bioretention basin	$2,478,000	13.5	0.3	1	The project will provide water supply benefits via groundwater recharge at the infiltration basin.	The project will provide flood management benefit through detention and infiltration benefits.	The project will provide hydrologic benefit to natural drainage system by allowing for infiltration.	The project will provide 2.6 acres of green space.	The project will provide water quality educational signage.
Orinda	Orinda Way Green Street Project	Green street	$584,000	10	0.02	0.2	N/A	The project will provide some flood management benefits through peak flow attenuation.	N/A	N/A	The project will provide water quality educational signage.
Pittsburg	Americana Storm Drainage Project	Retrofit of an existing detention basin for water quality and bioswales	$8,174,000	12	1.1	0.2	N/A	The project will alleviate observed localized flooding along North Parkside Drive.	The project will provide hydrologic benefit to a natural drainage system by allowing for infiltration.	N/A	The project will improve park features and provide water quality educational signage.

Permittee/ Responsible Agency	Project Name	Project Type	Estimated Cost from Project Concept	Total Score	Project Benefits						
					Estimated PCBs Loads Reduced (grams/year)	Estimated Mercury Loads Reduced (grams/year)	Water Supply	Flood Management	Natural Drainage System	Habitat or Open Space	Community
Richmond	2nd Street Bikeway Project	Green street	$6,486,900	14	2.3	1.1	N/A	The project will provide some flood management benefits through peak flow attenuation.	N/A	The project will provide 0.3 acres of green space within an urban area.	The project will improve 2nd street by incorporating a bikeway. Bioretention bulbouts will calm traffic.
San Pablo	Sutter Ave Green Street	Green street	$1,657,700	13	0.1	0.4	N/A	The project will provide flood management benefit through detention and infiltration benefits.	The project will provide hydrologic benefit to natural drainage system by allowing for infiltration.	The project will provide 0.21 acres of green space in an urban area.	The project will calm traffic, improve pedestrian facilities, and potentially install street trees.
Walnut Creek	Heather Farm Park Retrofit	Distributed bioretention throughout a city park	$2,057,000	13	0.9	0.6	N/A	The project will provide flood management benefit through detention and infiltration of peak flows.	The project will provide hydrologic benefit to natural drainage system by providing infiltration.	N/A	The project will provide water quality educational signage.

10. Implementation Strategy for the *CCW SWRP*

Implementation of the *CCW SWRP* will include both project implementation and adaptive management. Successful implementation of the *CCW SWRP* plan requires funding resources, continued stakeholder engagement, coordination with efforts to comply with water quality regulations, as well as specific actions for individual project implementation, such as obtaining necessary environmental permits.

10.1 RESOURCES FOR PLAN IMPLEMENTATION

10.1.1 Resources for Plan Updates and Adaptive Management

Although many stakeholders participated in creating the Plan, the CCCWP was the primary developer and coordinator of the *CCW SWRP*. It is anticipated that the CCCWP will also facilitate future *CCW SWRP* updates and ongoing adaptive management of the *CCW SWRP*, unless this task is taken on by another entity. It is also anticipated that the CCCWP will, with support from outside sources, fund *CCW SWRP* updates to the extent feasible. The CCCWP Permittees regularly meet to coordinate and discuss the implementation of water quality programs within the County. These regular meetings will periodically include discussions of *CCW SWRP* updates when needed.

Potential Sources of Project Funding

- Proposition 1 Implementation Grants (Round 2)
- Other state or federal grant programs
- Partnerships with Caltrans or other governmental agencies in the watersheds
- Municipal CIP funding
- Transportation funding
- Private foundation grant funding

10.1.2 Resources for SWRP Project Implementation

Funding for implementation of SWRP Projects included in the *CCW SWRP* will be obtained by the municipal agency, partnerships of agencies, or other stakeholder project sponsors working to implement the identified projects. SWRP Project implementation will depend on funding availability. Preliminary cost estimates for each SWRP Project, based on the methodology described in **Section 7.3.1**, are included in **Appendix F**. A summary table with the estimated project costs by estimated project completion date is provided in **Table 10-1**.

Table 10-1. *CCW SWRP* Estimated Project Cost and Timeline[1]

Estimated Date of Project Completion	By 2020	2121-2030	2031-2040
Number of Projects	20	74	237
Assumed Drainage Area (Acres)	328	523	2,774
Total Estimated Capital Cost[2] (Low)	$10,175,000	$38,054,000	$144,157,000

Estimated Date of Project Completion	By 2020	2121-2030	2031-2040
Total Estimated Capital Cost[2] (high)	$46,966,000	$105,689,000	$455,301,000

1. Costs were determined following a cost estimation methodology (Geosyntec, 2018) and may be subject to change.
2. Costs provided in 2018 dollars.

Proposition 1 Implementation Grants are expected to be a key near-term source of project funding. This program grants requires a local match funding amount of 50% of the project cost. Projects located in and benefiting a DAC or Economically Distressed Area (EDA) will have lower local match requirements, depending on the portion of the projected located in and benefitting a DAC or EDA. The Department of Water Resources maintains mapping tools for DACs (https://gis.water.ca.gov/app/dacs/) and EDAs (https://gis.water.ca.gov/app/edas/) that can be used to identify these areas. Other entities that provide grants that could include GI, such as Urban Greening, Parks and Recreation Funding, or transportation funding administered by the Metropolitan Transportation Commission,[19] may provide differential match requirements for communities meeting certain economic or congestion criteria.

Green Street Project in the Streets of Brentwood Shopping Development in Brentwood.

10.1.3 Design Criteria for New and Redevelopment BMPs

The New Development and Redevelopment provision of the MRP identifies design criteria and performance standards to address stormwater and dry weather runoff pollutant discharges and prevent increases in runoff flows associated with new and redevelopment. These provisions require regulated projects[20] to include appropriate BMPs for source control, site design, and stormwater treatment measures. The goals are primarily accomplished through LID techniques (SFBRWQCB, 2015). To effectively implement the MRP's new and redevelopment requirements, CCCWP developed the *Stormwater C.3 Guidebook, Stormwater*

[19] http://opendata.mtc.ca.gov/datasets/mtc-communities-of-concern-in-2018-acs-2012-2016
[20] See MRP Provision C.3.b.ii for the categories of regulated projects.

Quality Requirements for Development Applications, available online at: https://www.cccleanwater.org/construction-business/development. The GI Plans that will be developed by each municipality will incorporate standard specifications and typical details for GI practices.

10.2 PLAN IMPLEMENTATION

10.2.1 Timeline for Submitting the *CCW SWRP* into the Integrated Regional Water Management Plans

The finalized *CCW SWRP* was submitted to both the East Contra Costa County IRWM Group and Bay Area IRWMP in January 2019, and was resubmitted to both groups in November 2019, after addressing additional comments.

10.2.2 Actions, Projects, and Studies by which the Projects in the *CCW SWRP* will be Implemented

The MRP's GI planning requirements and the PCBs and mercury TMDL pollutant load reduction schedules will primarily drive the pace of implementation of the municipally-sponsored GI opportunities in the *CCW SWRP*. The pace of implementation of other types of GI and multiple benefit projects will be prompted by other drivers. GI planning efforts required by the MRP will be completed by 2020. These planning efforts will determine the amount of GI needed to achieve required pollutant load reductions to meet the mercury and PCBs WLAs by 2028 and 2030, respectively, and the MRP's GI goals by 2040. Required GI Plans for most of the Contra Costa Permittees were submitted to the San Francisco Bay Regional Water Board, September in 2019.[21] A subsequent RAA Technical Report, due in September 2020, will:

1. Identify all technically and economically feasible mercury or PCBs control measures to be implemented. This will include the GI projects listed in the municipal GI Plans as well as other source control measures;
2. Include a schedule according to which technically and economically feasible control measures will be implemented; and
3. Provide an evaluation and quantification of the mercury and PCBs load reduction of such measures as well as a general planning level evaluation of costs, control measure efficiency, and potential environmental impacts resulting from their implementation.

The *CCW SWRP* established a foundation for the list of GI projects available for municipalities to include in their GI Plans. Although these stormwater capture projects have several additional multiple benefits (beyond pollutant load reduction) that justify their implementation and investment, the TMDL implementation schedules and regulatory requirements of the MRP are likely to be the primary driver for municipal decision-making regarding funding needs for GI projects.

[21] Per the amended MRP, GI Plans for the East Contra Costa Permittees are due by December 31, 2020.

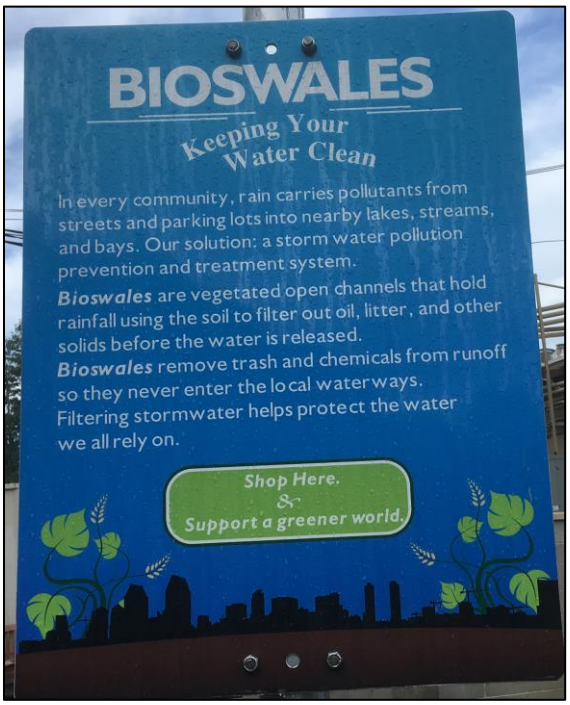
10.2.3 Timelines for SWRP Projects

The West County Permittees' GI Plans, completed in September 2019, included estimated timelines for the completion of the identified GI projects, which have been incorporated into the SWRP Project list in **Appendix F**. Estimated timelines for the East County Permittees' SWRP Projects are also included in the SWRP Project list in **Appendix F**.

Planning documents for specific projects will identify project-specific implementation schedules and timelines. Municipal GI project sponsors will be responsible for tracking the implementation status of their GI projects and reporting completed projects as described in **Section 10.2.5**.

10.2.4 Entities Responsible for Project Implementation

The primary entity assumed to be responsible for individual project implementation, should funding become available, is included in the list of SWRP Projects. However, if other jurisdictions or other agencies (e.g., Caltrans) are located within a project drainage area, partnerships may be developed to support project funding and implementation.



10.2.5 Procedures to Track the Status the *CCW SWRP* Project Implementation

Project implementation will be tracked using the SWRP Project Viewer. As described in **Section 10.3**, authorized users will be able update project information and status to show constructed projects.

10.2.6 Community Participation Strategy for *CCW SWRP* Implementation

An extensive community participation strategy supported development of the *CCW SWRP*. This provides a springboard for continued community participation through adaptive management and implementation phases. It is anticipated that outreach for new stakeholder projects would occur periodically with *CCW SWRP* updates. While these updates are planned to occur once every five years, the project lists will be dynamic, and stakeholders will be able to submit projects via the process described in **Section 10.3.1**.

Community engagement and participation will also occur during individual project implementation. Community engagement strategies will focus on the community where the project is located and will be implemented by the project sponsor.

It is hoped that many *CCW SWRP* projects will serve as a public demonstration of the multiple benefits of stormwater management projects, including features and functionality that can provide community benefits. With educational tools such as interpretive signage, the public can gain a better understanding of their watersheds as well as learn about additional

opportunities to capture, treat, and conserve water. Early projects can provide a mechanism for community participation and education that will help garner support for sustained project implementation over time.

10.2.7 Strategy and Timeline for Obtaining Necessary Federal, State, and Local Permits

As funding is identified for projects, the initial task for project implementation will involve a planning phase that will identify necessary permits, including evaluations for the California Environmental Quality Act (CEQA). All necessary federal, state, and local permits, as well as CEQA evaluations, will be obtained by project proponents as needed for project implementation.

10.3 ADAPTIVE MANAGEMENT

10.3.1 Incorporation of Additional Projects

The SWRP Project Viewer can be used to add new multi-benefit stormwater projects to the SWRP Project list or SWRP Opportunity lists as they are identified. Following the initial publication of the *CCW SWRP*, the SWRP Project lists can be dynamically updated and maintained in the mapping tool.

The web mapping application enables authorized users to screen and prioritize parcels for future multi-benefit stormwater projects within the *CCW SWRP* planning area. CCCWP staff and Permittees will be authorized users for the tool. The web mapping application additionally provides a public viewer tool that allows the public to view the SWRP Project and SWRP Opportunities and submit new projects via an information form that will be routed to the local jurisdiction's authorized user.

The tool is integrated into the existing CCCWP AGOL platform (see **Section 10.2.5**) and consists of two categories of data:

1. Static data, consisting of background and reference data, including the reference layers that informed the opportunity analyses of this *CCW SWRP*, the complete list of SWRP Opportunities, and the SWRP Project list are provided in **Appendix F**.
2. Live user input data, consisting of projects identified by stakeholders and new potential SWRP Opportunities created by the users of the tool as they track project implementation and identify additional SWRP Opportunities.

Maintaining a Living *CCW SWRP*

The *CCW SWRP* will be updated over time to incorporate additional multi-benefit projects as well as revised to reflect knowledge gained through stormwater program implementation, including programs to address the TMDLs.

The background and reference data include the individual data layers from the opportunity, and a hazards GIS screening process. This data is viewable as both individual layers, and as a composite layer that aggregates the screening process into a 'score' indicating whether a

location is suitable for a project or not. Parcels, roads, and watersheds with high scores are indicated alongside this data so that they can be identified as viable project sites.

SWRP Project information will be editable in the web tool by authorized users. The SWRP Opportunities identified as part of the *CCW SWRP* development effort were the first entries into the tool and included project descriptions, locations, goals, and benefits. Modeling information and results can be entered as data attributes into the new project as it is completed. The database is dynamic and may be continuously updated based on authorized user input. Any alteration of static data may impact live user data and may require users to revise their inputs.

The web mapping application is available on the CCCWP website: https://www.cccleanwater.org/resources/stormwater-resource-plan.

10.3.2 Updates and Other *CCW SWRP* Adaptations

The *CCW SWRP* may also be revised to reflect knowledge gained through stormwater program implementation, including programs to address TMDLs. Ongoing adaptations to the *CCW SWRP* may include and/or be influenced by: re-characterization of water quality priorities, source assessment re-evaluations, project effectiveness assessments, updated metrics-based quantitative analyses, deleted or new projects, completion of projects, or modified statutory or stormwater permit requirements, such as new TMDLs.

As projects are implemented and lessons learned through wider scale integration of GI and other multi-benefit stormwater capture projects, the *CCW SWRP* will be periodically updated to provide revisions to characterizations of watersheds, project drivers, and the project implementation plan. This is expected to occur once every five years, coinciding with the five-year cycle for reissuance of the MRP. The *CCW SWRP* project list will be periodically updated using the SWRP Project Viewer tool during interim periods between updates to the *CCW SWRP* document as a whole.

10.4 IMPLEMENTATION PERFORMANCE MEASURES

The CCCWP currently has several tools in place and/or in the process of development that will assist in tracking project performance over time, particularly as related to water quality improvements.

10.4.1 Pollutant Load Reduction Accounting

MRP Provisions C.11.b and C.12.b required CCCWP 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 are using this assessment methodology to demonstrate progress towards achieving the pollutant load reductions required in this permit term. This assessment methodology is outlined in the Final Interim Accounting Methodology for TMDL Loads Reduced report (BASMAA, 2016c). Loads reduced through implementation of GI projects, including those identified in the *CCW SWRP*, are reported each year in the CCCWP Annual Report, which is made available online through the CCCWP website.

10.4.2 Reasonable Assurance Analysis

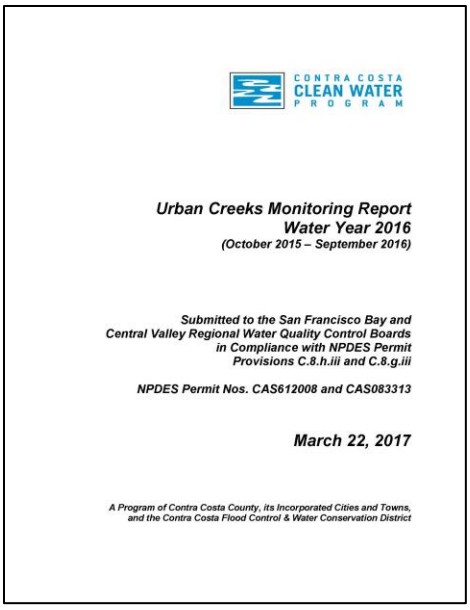
MRP Provision C.3.j requires the Permittees to develop a GI plan for inclusion in the 2019 Annual Report. The GI Plan must be developed using a mechanism to prioritize and map areas for potential and planned GI projects, both public and private, on a drainage-area-specific basis, for implementation by 2020, 2030, and 2040. The *CCW SWRP* serves as the foundation for this GI analysis for County Permittees.

MRP Provisions C.11.c and C.12.c require the preparation of an RAA for inclusion in the 2020 Annual Report that quantitatively demonstrates that mercury load reductions of at least 10 kg/year and PCBs load reductions of at least 3 kg/year will be achieved across the Bay Area by 2040 through implementation of GI throughout the permit area.
The RAA will do the following:

1. Quantify the relationship between the areal extent of GI implementation and mercury and PCBs load reductions. This quantification will take into consideration the scale of contamination of the treated area as well as the pollutant removal effectiveness of GI strategies likely to be implemented.
2. Estimate the amount and characteristics of land area that will be treated by GI by 2020, 2030, and 2040.
3. Estimate the amount of mercury and PCBs load reductions that will result from GI implementation by 2020, 2030, and 2040.
4. Quantitatively demonstrate that mercury load reductions of at least 10 kg/year and PCBs load reductions of at least 3 kg/year will be realized by 2040 through implementation of GI projects across the Bay Area.
5. Ensure that the calculation methods, models, model inputs, and modeling assumptions used have been validated through a peer review process.

Additionally, MRP Provisions C.11.d. and C.12.d. require the preparation of plans and schedules for mercury and PCBs control measure implementation and an RAA demonstrating that sufficient control measures will be implemented to attain the mercury TMDL WLAs by 2028 and the PCBs TMDL WLAs by 2030.

The RAA results will be included in CCCWP's 2020 Annual Report.


CONTRA COSTA CLEAN WATER PROGRAM

Urban Creeks Monitoring Report
Water Year 2016
(October 2015 – September 2016)

Submitted to the San Francisco Bay and Central Valley Regional Water Quality Control Boards in Compliance with NPDES Permit Provisions C.8.h.iii and C.8.g.iii

NPDES Permit Nos. CAS612008 and CAS083313

March 22, 2017

A Program of Contra Costa County, its Incorporated Cities and Towns, and the Contra Costa Flood Control & Water Conservation District

10.4.3 Water Quality Monitoring

10.4.3.1 CCCWP Monitoring Program

MRP Provision C.8 specifies the monitoring required to be conducted by the CCCWP Permittees, including creek status monitoring, stressor/source identification projects, pollutants of concern monitoring, and pesticides and toxicity monitoring. The MRP allows the Permittees to address monitoring requirements either through regional collaboration or individually through their area-wide stormwater

programs. The CCCWP Permittees participate in a regional monitoring collaboration to address the monitoring requirements in Provision C.8. The collaboration is known as the BASMAA Regional Monitoring Coalition (RMC). The RMC Work Group is a subgroup of the BASMAA Monitoring and Pollutants of Concern Committee, which meets and communicates regularly to coordinate planning and implementation of monitoring-related activities. RMC Work Group meetings are coordinated by a coordinator funded by the participating county stormwater programs. This workgroup includes staff from the San Francisco Bay Regional Water Board at two levels – those generally engaged with the MRP, as well as those working regionally with the State of California's Surface Water Ambient Monitoring Program (SWAMP). Through the RMC Work Group, the BASMAA RMC developed a Quality Assurance Program Plan (BASMAA, 2016a), Standard Operating Procedures (BASMAA, 2016b), data management tools, and reporting templates and guidelines. Regionally-implemented activities of the RMC are conducted under the auspices of BASMAA.

Water quality monitoring is conducted by the CCCWP on behalf of its Permittees. The results of this monitoring along with monitoring conducted within Contra Costa County by third-party water quality monitoring parties and the Regional Monitoring Program for Water Quality in San Francisco Bay (RMP) is detailed in the Urban Creeks Monitoring Report, submitted to the Water Boards in March each year. This report is made available to the public on the CCCWP's website and is posted on the San Francisco Bay Regional Water Board's website.

10.4.3.2 Regional Monitoring Program

San Francisco Bay Estuary monitoring is conducted through the Regional Monitoring Program. The RMP is a long-term monitoring program that is discharger funded and shares direction and participation by regulatory agencies and the regulated community, with the goal of assessing water quality in San Francisco Bay. The regulated community includes the CCCWP Permittees, publicly owned treatment works, dredgers, and industrial dischargers. The RMP is intended to answer the following core management questions:

1. Are chemical concentrations in the estuary potentially at levels of concern and are associated impacts likely?
2. What are the concentrations and masses of contaminants in the estuary and its segments?
3. What are the sources, pathways, loadings, and processes leading to contaminant-related impacts in the estuary?
4. Have the concentrations, masses, and associated impacts of contaminants in the estuary increased or decreased?
5. What are the projected concentrations, masses, and associated impacts of contaminants in the estuary?

The RMP publishes reports and study results on the San Francisco Estuary Institute website.[22]

[22] www.sfei.org/rmp.

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Appendix A: Stormwater Resource Plan Checklist

Storm Water Resource Plan Checklist and Self-Certification

The following should be completed and submitted to the State Water Resources Control Board Division of Financial Assistance in support of a storm water resource plan /functionally equivalent plan. The documents submitted, including this checklist, will be used to determine State Water Board concurrence with the Storm Water Resource Plan Guidelines and statutory water code requirements.

When combining multiple documents to form a functionally equivalent Storm Water Resource Plan, submit a cover letter explaining the approach used to arrive at the functionally equivalent document. The cover letter should explain how the documents work together to address the Storm Water Resource Plan Guidelines.

STORM WATER RESOURCE PLAN GENERAL CONTACT INFORMATION	
Contact Info: **Name** **Phone Number** **Email**	 **Courtney Riddle, Contra Costa Clean Water Program** **925-313-2392** **courtney.riddle@pw.cccounty.us**
Date Submitted to State Water Resource Control Board:	**January 30, 2019** **Resubmitted November 30, 2019**
Regional Water Quality Control Board:	**San Francisco Bay Regional Water Quality Control Board** **Central Valley Regional Water Quality Control Board**
Title of attached documents (expand list as needed):	**1. *Contra Costa Watersheds Stormwater Resource Plan Greening the Community for Healthy Watersheds***

STORM WATER RESOURCE PLAN INFORMATION	
Storm Water Resource Plan Title:	***Contra Costa Watersheds Stormwater Resource Plan***
Date Plan Completed/Adopted:	**January 18, 2019** **Revised November 30, 2019**
Public Agency Preparer:	**Contra Costa Clean Water Program**
IRWM Submission:	**January 30, 2019** **Resubmitted: November 30, 2019**
Plan Description:	**The *Contra Costa Watersheds (CCW) Storm Water Resource Plan (SWRP)* was created to facilitate the development and implementation of stormwater and dry weather management projects and programs that provide multiple benefits within Contra Costa County.**

Checklist Instructions:

For **each element** listed below, review the applicable section in the Storm Water Resource Plan Guidelines and enter ALL of the following information**.** Be sure to provide a clear and thorough justification if a recommended element (non-shaded) is not addressed by the Storm Water Resource Plan.

A. Mark the box if the Storm Water Resource Plan meets the provision

B. In the provided space labeled **References**, enter:
   1. Title of document(s) that contain the information (or the number of the document listed in the General Information table above);
   2. The chapter/section, **and page number(s)** where the information is located within the document(s);
   3. The entity(ies) that prepared the document(s) if different from plan preparer;
   4. The date the document(s) was prepared, and subsequent updates; and
   5. Where each document can be accessed[1] (website address or attached).

STORM WATER RESOURCE PLAN CHECKLIST AND SELF-CERTIFICATION		
Mandatory Required Elements per California Water Code are Shaded and Text is **Bold**		
Y/N	**Plan Element**	**Water Code**
WATERSHED IDENTIFICATION (GUIDELINES SECTION VI.A)		
Y	**1. Plan identifies watershed and subwatershed(s) for storm water resource planning.**	**10565(c) 10562(b)(1) 10565(c)**
References: Contra Costa County has 16 major watersheds. These 16 major watersheds comprise 31 sub-watersheds. All watersheds within the County are addressed by the *CCW SWRP*. The *CCW SWRP* organized the watersheds into five watershed-based Planning Units: the East County, Central County, North County, South County, and West County Planning Units. **Figure 4-9**, on page **4-11**, shows the grouping of subwatersheds within each Planning Unit. The watersheds and subwatersheds are described in **Section 4.1** starting on page **4-13**.		
Y	2. Plan is developed on a watershed basis, using boundaries as delineated by USGS, CalWater, USGS Hydrologic Unit designations, or an applicable integrated regional water management group, and includes a description and boundary map of each watershed and sub-watershed applicable to the Plan.	
References: The Contra Costa County boundary was selected as the planning area of the CCW SWRP to integrate the SWRP development process with existing county-wide stormwater compliance coordination efforts, to recognize that the types of stormwater capture and use projects envisioned the SWRP are typically administered based on geo-political boundaries, and to efficiently use administrative resources in managing the planning grant project. The planning area was also selected because it corresponds with the two IRWM groups within the County. Pages **4-1** to **4-2** explain why the county boundary was selected as the CCW SWRP planning area. The 16 major watersheds that comprise 31 subwatersheds are organized into five Planning Units described in **Section 4.1**. **Figure 4-9**, on page **4-11**, shows the grouping of watersheds and subwatersheds within each Planning Unit.		

[1] All documents referenced must include a website address. If a document is not accessible to the public electronically, the document must be attached in the form of an electronic file (e.g. pdf or Word 2013) on a compact disk or other electronic transmittal tool.

WATERSHED IDENTIFICATION
(GUIDELINES SECTION VI.A)

Y	3. Plan includes an explanation of why the watershed(s) and sub-watershed(s) are appropriate for storm water management with a multiple-benefit watershed approach;

References:
Section 4, on pages **4-1** to **4-2**, describes how the effort to create a SWRP for all the watersheds in the County was undertaken to integrate the SWRP development process with existing county-wide stormwater compliance coordination efforts, to recognize that the types of stormwater capture and use projects envisioned the SWRP are typically administered based on geo-political boundaries, and to efficiently use administrative resources in managing the planning grant project.

Y	4. Plan describes the internal boundaries within the watershed (boundaries of municipalities; service areas of individual water, wastewater, and land use agencies, including those not involved in the Plan; groundwater basin boundaries, etc.; preferably provided in a geographic information system shape file);

References:
Internal boundaries within the County are shown in the following: **Figure 4-10** (page **4-12**) municipalities; **Figure 4-5** and **Figure 4-6** (pages **4-7** and **4-8**) water agencies; **Figure 4-7** and **Figure 4-8** (pages **4-9** and **4-10**) groundwater basins. Available GIS shape files were incorporated into the SWRP Project Viewer, which is described in **Section 10.3.1** on page **10-5**.

Y	5. Plan describes the water quality priorities within the watershed based on, at a minimum, applicable TMDLs and consideration of water body-pollutant combinations listed on the State's Clean Water Act Section 303(d) list of water quality limited segments (a.k.a., impaired waters list);

References:
Section 5.1.1, on pages **5-2** through **5-4**, identifies water quality priorities within the County. Applicable TMDLs for these pollutants are listed on page **5-4** and pollutants on the State's Clean Water Act Section 303(d) list within each watershed are identified in **Section 5.2** on pages **5-4** through **5-7**.

Y	6. Plan describes the general quality and identification of surface and ground water resources within the watershed (preferably provided in a geographic information system shape file);

References:
Figure 4-7 (page **4-9**) and **Figure 4-8** (page **4-10**) identify groundwater basins within the County. Available GIS shape files were incorporated into the SWRP Project Viewer, which is described in **Section 10.3.1** on page **10-5**.

Y	7. Plan describes the local entity or entities that provide potable water supplies and the estimated volume of potable water provided by the water suppliers;

References:
Section 4 lists potable water suppliers within each Planning Unit in **Table 4-1** (East County Planning Unit: page **4-14**), **Table 4-2,** (Central County Planning Unit; page **4-18**), **Table 4-3,** (North County Planning Unit; page **4-22**), **Table 4-4** (South County Planning Unit; page **4-24**), and **Table 4-5** (West County Planning Unit; page **4-25**).

Y	8. Plan includes map(s) showing location of native habitats, creeks, lakes, rivers, parks, and other natural or open space within the sub-watershed boundaries; and

References:
Figure 4-1 (page **4-3**) shows creeks and other surface water bodies within the County. **Figure 4-2** (page **4-4**) shows parks and other open spaces within the County. More detailed maps of these features are found in the *Watershed Atlas* http://cocowaterweb.org/wp-content/uploads/Watershed-Atlas.pdf. Maps of habitat areas are not available.

Y	9. Plan identifies (quantitative, if possible) the natural watershed processes that occur within the sub-watershed and a description of how those natural watershed processes have been disrupted within the sub-watershed (e.g., high levels of imperviousness convert the watershed processes of infiltration and interflow to surface runoff increasing runoff volumes; development commonly covers natural surfaces and often introduces non-native vegetation, preventing the natural supply of sediment from reaching receiving waters).

References:
Section 5.1, on page **5-1** through **5-4**, discusses watershed processes and describes how regional urbanization has led to the modification and disruption of natural watershed processes and associated transport of pollutants to water bodies via stormwater. Additional discussion of the alteration and restoration or watershed processes is included in the subwatershed descriptions in **Section 4.1** on pages **4-13** through **4-29**.

WATER QUALITY COMPLIANCE
(GUIDELINES SECTION V)

Y	**10. Plan identifies activities that generate or contribute to the pollution of storm water or dry weather runoff, or that impair the effective beneficial use of storm water or dry weather runoff.**	**10562(d)(7)**

References:
Section 5.1, on pages **5-1** through **5-4**, describes activities that contribute to the pollution of stormwater runoff and dry weather.

Y	**11. Plan describes how it is consistent with and assists in, compliance with total maximum daily load implementation plans and applicable national pollutant discharge elimination system permits.**	**10562(b)(5)**

References:
Sections 5.1 through **5.3** (pages **5-1** through **5-8**) describe how the *CCW SWRP* is consistent with and assists in compliance with applicable TMDL implementation plans and NPDES permits.

Y	**12. Plan identifies applicable permits and describes how it meets all applicable waste discharge permit requirements.**	**10562(b)(6)**

References:
Sections 5.2 and **5.3** (pages **5-4** through **5-8**) identify requirements in applicable permits and describe how the *CCW SWRP* meets all applicable waste discharge permit requirements.

ORGANIZATION, COORDINATION, COLLABORATION
(GUIDELINES SECTION VI.B)

Y	**13. Local agencies and nongovernmental organizations were consulted in Plan development.**	**10565(a)**

References:
Section 2.1 (pages **2-1** through **2-4**) describes coordination and collaboration with local agencies and nongovernmental organizations during *CCW SWRP* development.

Y	**14. Community participation was provided for in Plan development.**	**10562(b)(4)**

References:
Section 3 (pages **3-1** through **3-6**) and **Appendix E** describe strategies for community participation and public education.

Y	15. Plan includes description of the existing integrated regional water management group(s) implementing an integrated regional water management plan.
References: **Section 2.3** (pages **2-4** and **2-5**) identifies and describes the two regional IRWM groups in the County: East Contra Costa County IRWM Group and Bay Area IRWMP	

ORGANIZATION, COORDINATION, COLLABORATION
(GUIDELINES SECTION VI.B)

Y	16. Plan includes identification of and coordination with agencies and organizations (including, but not limited to public agencies, nonprofit organizations, and privately-owned water utilities) that need to participate and implement their own authorities and mandates in order to address the storm water and dry weather runoff management objectives of the Plan for the targeted watershed.
References: **Section 2.1** (pages **2-1** through **2-4**) describes coordination among agencies and organizations within the County, and **Appendix C** provides a complete list of *CCW SWRP* stakeholders. Potable water suppliers within each Planning Unit are listed in **Table 4-1** (East County Planning Unit; page **4-14**), **Table 4-2** (Central County Planning Unit; page **4-18**), **Table 4-3** (North County Planning Unit; page **4-22**), **Table 4-4** (South County Planning Unit; page **4-24**), and **Table 4-5** (West County Planning Unit; page **4-25**).	
Y	17. Plan includes identification of nonprofit organizations working on storm water and dry weather resource planning or management in the watershed.
References: **Appendix C** provides a complete list of *CCW SWRP* stakeholders, including nonprofit organizations. **Section 2.1.3** (page **2-2**) describes the roles of specific organizations in *CCW SWRP* development.	
Y	18. Plan includes identification and discussion of public engagement efforts and community participation in Plan development.
References: **Section 3** (pages **3-1** through **3-6**) and **Appendix E** describe the public engagement and community participation efforts undertaken during *CCW SWRP* development.	
Y	19. Plan includes identification of required decisions that must be made by local, state or federal regulatory agencies for Plan implementation and coordinated watershed-based or regional monitoring and visualization.
References: **Section 10.2** (page **10-2** through **10-5**) identifies decisions that must be made by regulatory agencies for *CCW SWRP* implementation, and **Section 10.4.3** (pages **10-7** through **10-8**) describes regional monitoring required by the San Francisco Bay Municipal Regional Stormwater Permit (MRP).	
Y	20. Plan describes planning and coordination of existing local governmental agencies, including where necessary new or altered governance structures to support collaboration among two or more lead local agencies responsible for plan implementation.
References: **Section 2.1.1** (page **2-1**) describe the coordination among local government agencies for *CCW SWRP* development. **Section 10.2** (pages **10-2** through **10-5**) and **Section 10.3** (pages **10-5** through **10-6** describe the coordination for the *CCW SWRP* implementation and adaptive management.	
Y	21. Plan describes the relationship of the Plan to other existing planning documents, ordinances, and programs established by local agencies.
References: **Sections 2.2** and **2.3**, (pages **2-4** through **2-5**) describe the relationship between the *CCW SWRP* to local IRWMPs and other existing planning documents, and **Section 6.1** (page **6-1**) describes incorporation of projects in existing planning documents into the *CCW SWRP*.	

N	22. (If applicable) Plan explains why individual agency participation in various isolated efforts is appropriate.

References:
This checklist item is not applicable to the *CCW SWRP* as it was developed as a multi-agency effort.

QUANTITATIVE METHODS
(GUIDELINES SECTION VI.C)

Y	23. **For all analyses:** Plan includes an integrated metrics-based analysis to demonstrate that the Plan's proposed storm water and dry weather capture projects and programs will satisfy the Plan's identified water management objectives and multiple benefits.

References:
Section 8 (pages **8-1** through **8-3**) describe the process for quantification of flood control, water supply and environmental benefits, and mercury and PCBs load reductions for project concepts. **Section 7** (pages **7-1** through **7-9**) describes the quantitative approach to multiple benefit prioritization for SWRP Projects and SWRP Opportunities..

Y	24. **For water quality project analysis (section VI.C.2.a)** Plan includes an analysis of how each project and program complies with or is consistent with an applicable NPDES permit. The analysis should simulate the proposed watershed-based outcomes using modeling, calculations, pollutant mass balances, water volume balances, and/or other methods of analysis. Describes how each project or program will contribute to the preservation, restoration, or enhancement of watershed processes (as described in Guidelines section VI.C.2.a)

References:
Section 5.2 (pages **5-4** through **5-7**) describes the relevant requirements in the MRP and **Section 5.3** (pages **5-7** through **5-8**) describes how the *CCW SWRP* is consistent with these requirements. **Section 8** (pages **8-1** through **8-3**) describes the modeling approach to evaluating how projects will contribute to the restoration of watershed processes and PCBs/mercury load reductions.

Y	25. **For storm water capture and use project analysis (section VI.C.2.b):** Plan includes an analysis of how collectively the projects and programs in the watershed will capture and use the proposed amount of storm water and dry weather runoff.

References:
Sections 6 and **7** (pages **6-1** through **7-9**) describe how stormwater and dry weather capture and use SWRP Opportunities were identified and prioritized. **Section 7.3.2** (pages **7-8** through **7-9)** provides an analysis of the qualification of stormwater and dry weather capture and use and **Appendix F** provides a table summarizing the quantified benefits of SWRP Projects. **Section 8** (pages **8-1** through **8-3**) describes how the volume of stormwater or dry weather runoff captured was quantified and **Appendix B** presents the results of quantification.

Y	26. **For water supply and flood management project analysis (section VI.C.2.c):** Plan includes an analysis of how each project and program will maximize and/or augment water supply.

References:
Sections 6 and **7** (pages **6-1** through **7-9**) describe how stormwater and dry weather capture and use or infiltration SWRP Opportunities were identified and prioritized. **Section 7.3.2**(pages 7-8 through **7-9)** provides an analysis of the qualification of stormwater and dry weather capture and use and **Appendix F** provides a table summarizing the quantified benefits of SWRP Projects. **Section 8** (pages **8-1** through **8-3**) describes how the volume of stormwater or dry weather runoff captured was quantified for project concepts, and **Appendix B** presents the results of quantification.

Y	27. **For environmental and community benefit analysis (section VI.C.2.d):** Plan includes a narrative of how each project and program will benefit the environment and/or community, with some type of quantitative measurement.
References: **Appendix B** presents narratives describing environmental and community benefits of project concepts.	
Y	28. **Data management (section VI.C.3):** Plan describes data collection and management, including: a) mechanisms by which data will be managed and stored; b) how data will be accessed by stakeholders and the public; c) how existing water quality and water quality monitoring will be assessed; d) frequency at which data will be updated; and e) how data gaps will be identified.
References: **Section 10.2.5** (page **10-4**) describes mechanisms for storing project data in a county-wide GIS-based web mapping application used to track project implementation, and procedures and frequency for updating these data. The SWRP Project Viewer available at: https://www.cccleanwater.org/resources/stormwater-resource-plan. **Section 10.4.3** (pages **10-7** through **10-8**) also describes regional water quality monitoring, and how monitoring data will be made publicly available.	

IDENTIFICATION AND PRIORITIZATION OF PROJECTS
(GUIDELINES SECTION VI.D)

Y	**29. Plan identifies opportunities to augment local water supply through groundwater recharge or storage for beneficial use of storm water and dry weather runoff.**	**10562(d)(1)**
References: **Sections 6** and **7** (pages **6-1** through **7-9**) describe how stormwater and dry weather capture and use or infiltration SWRP Opportunities were identified and prioritized. Prioritized lists of SWRP Projects are included in **Appendix F,** and prioritized lists of SWRP Opportunities are included in **Appendix G**. The prioritized lists with full details of the multi benefits, including scoring are provided in the web-based SWRP Project Viewer available at: https://www.cccleanwater.org/resources/stormwater-resource-plan.		
Y	**30. Plan identifies opportunities for source control for both pollution and dry weather runoff volume, onsite and local infiltration, and use of storm water and dry weather runoff.**	**10562(d)(2)**
References: **Sections 6** and **7** (pages **6-1** through **7-9**) describe how stormwater and dry weather capture and use or infiltration SWRP Opportunities that provide pollutant load reduction, and pollutant source control programs, were identified and prioritized. Prioritized lists of SWRP Projects are included in **Appendix F,** and prioritized lists of SWRP Opportunities are included in **Appendix G**. The prioritized lists with full details of the multi benefits, including scoring are provided in the web-based SWRP Project Viewer available at: https://www.cccleanwater.org/resources/stormwater-resource-plan.		
Y	**31. Plan identifies projects that reestablish natural water drainage treatment and infiltration systems, or mimic natural system functions to the maximum extent feasible.**	**10562(d)(3)**
References: **Sections 6** and **7** (pages **6-1** through **7-9**) describe how stormwater and dry weather infiltration SWRP Opportunities were selected where feasible and how reestablishment of natural water drainage and treatment was prioritized in the multiple benefit analysis. Prioritized lists of SWRP Projects are included in **Appendix F,** and prioritized lists of SWRP Opportunities are included in **Appendix G**. The prioritized lists with full details of the multi benefits, including scoring are provided in the web-based SWRP Project Viewer available at: https://www.cccleanwater.org/resources/stormwater-resource-plan.		

Y	**32. Plan identifies opportunities to develop, restore, or enhance habitat and open space through storm water and dry weather runoff management, including wetlands, riverside habitats, parkways, and parks.**	**10562(d)(4)**
References: **Sections 6** and **7** (pages **6-1** through **7-9)** describe how SWRP Opportunities with environmental benefits, such as developing, restoring or enhancing habitat and open space, were identified and prioritized. Prioritized lists of SWRP Projects are included in **Appendix F,** and prioritized lists of SWRP Opportunities are included in **Appendix G**. The prioritized lists including full details of the multi benefits are provided in the web-based SWRP Project Viewer available at: https://www.cccleanwater.org/resources/stormwater-resource-plan.		
Y	**33. Plan identifies opportunities to use existing publicly owned lands and easements, including, but not limited to, parks, public open space, community gardens, farm and agricultural preserves, school sites, and government office buildings and complexes, to capture, clean, store, and use storm water and dry weather runoff either onsite or offsite.**	**10562(d)(5), 10562(b)(8)**
References: **Section 6** (pages **6-1** through **6-7**) describes the GIS based analysis used to identify public parcels for SWRP Opportunities.		
Y	**34. For new development and redevelopments (if applicable): Plan identifies design criteria and best management practices to prevent storm water and dry weather runoff pollution and increase effective storm water and dry weather runoff management for new and upgraded infrastructure and residential, commercial, industrial, and public development.**	**10562(d)(6)**
References: **Section 10.1.3**, page **10-2**, identifies the MRP design criteria and performance standards for new and redevelopment project and references the *Stormwater C.3 Guidebook, Stormwater Quality Requirements for Development Applications*, https://www.cccleanwater.org/construction-business/development.		
Y	**35. Plan uses appropriate quantitative methods for prioritization of projects. (This should be accomplished by using a metrics-based and integrated evaluation and analysis of multiple benefits to maximize water supply, water quality, flood management, environmental, and other community benefits within the watershed.)**	**10562(b)(2)**
References: **Section 7** (pages **7-1** through **7-9**) describes the metrics based multiple-benefit prioritization process.		
Y	36. *Overall:* Plan prioritizes projects opportunities and programs using a metric-driven approach and a geospatial analysis of multiple benefits to maximize water supply, water quality, flood management, environmental, and community benefits within the watershed.	
References: **Sections 6** and **7** (pages **6-1** through **7-9**) describe how SWRP Opportunities achieving multiple benefits were identified and prioritized using a metric-driven approach and a geospatial analysis.		
Y	37. *Multiple benefits:* Each project in accordance with the Plan contributes to at least two or more **Main Benefits** and the maximum number of **Additional Benefits** as listed in Table 4 of the Guidelines. (Benefits are not counted twice if they apply to more than one category.)	

References: **Sections 6** and **7** (pages **6-1** through **7-9**) describe how projects achieving multiple benefits were identified and prioritized including Main and Additional Benefits. **Appendix B**, **Appendix F,** and **Appendix G** identify the Main and Additional Benefits of each project concept, SWRP Project, and SWRP Opportunity.

IMPLEMENTATION STRATEGY AND SCHEDULE
(GUIDELINES SECTION VI.E)

Y	38. Plan identifies resources for Plan implementation, including: 1) projection of additional funding needs and sources for administration and implementation needs; and 2) schedule for arranging and securing Plan implementation financing.
References: **Section 7.3.1**(pages **7-7** through **7-8**) provides the methodology for developing cost estimates for the SWRP Projects. **Section 10** (pages **10-1** through **10-8**) identifies resources for *CCW SWRP* implementation, including funding needs for SWRP Project and SWRP Opportunity implementation as well as plan updates and adaptive management, and schedules for securing *CCW SWRP* implementation financing. **Table 10-1** (page **10-1**) provides a summary of the estimated costs for implementing the SWRP Projects.	
Y	**39. Plan projects and programs are identified to ensure the effective implementation of the storm water resource plan pursuant to this part and achieve multiple benefits. 10562(d)(8)**
References: **Section 10** (pages **10-1** through **10-8**) describes strategies for effective implementation of the *CCW SWRP.* **Sections 6** and **7** (pages **6-1** through **7-9**) describe how SWRP Opportunities achieving multiple benefits were identified and prioritized.	
Y	**40. The Plan identifies the development of appropriate decision support tools and the data necessary to use the decision support tools. 10562(d)(8)**
References: **Sections 6** and **7** (pages **6-1** through **7-9**) describe decision support tools used to identify and prioritize multiple benefit SWRP Opportunities. **Section 10** (pages **10-1** through **10-8**) describes tools that will support decisions regarding *CCW SWRP* implementation.	
Y	41. Plan describes implementation strategy, including: a) Timeline for submitting Plan into existing plans, as applicable; b) Specific actions by which Plan will be implemented; c) All entities responsible for project implementation; d) Description of community participation strategy; e) Procedures to track status of each project; f) Timelines for all active or planned projects; g) Procedures for ongoing review, updates, and adaptive management of the Plan; and h) A strategy and timeline for obtaining necessary federal, state, and local permits.

References:
Section 10 (pages **10-1** through **10-9**) describes the implementation strategy.
Section 10.2.1 (page **10-3**): a) Timelines for submitting the *CCW SWRP* into existing IRWMPs (also described in **Section 2.3** (pages **2-4** through **2-5**).
Section 10.2.2 (page **10-3**): b) Specific actions by which the *CCW SWRP* will be implemented.
Section 10.2.3 (page **10-4**): f) Timelines for active or planned projects. **Appendix F** identifies the timelines for the SWRP Projects.
Section 10.2.4 (page **10-4**): c) Entities responsible for project implementation; **Appendix B** lists the project proponents for the project concepts; and **Appendix F** lists the proponents for the SWRP Projects; and **Appendix G** lists the proponents for SWRP Opportunities.
Section 10.2.5 (page **10-4**): e) Procedures to track project status.
Section 10.2.6 (page **10-4**): d) Community participation strategy for *CCW SWRP* implementation.,
Section 10.2.7 (page **10-5**): h) Strategies and timelines for obtaining necessary permits.
Section 10.3 (pages **10-5** through **10-6**): g) Procedures for adaptive management and update of the *CCW SWRP.*

Y	**42. Applicable IRWM plan: 10562(b)(7)** **The Plan will be submitted, upon development, to the applicable integrated regional water management (IRWM) group for incorporation into the IRWM plan.**

References:
Section 2.3 (pages **2-4** through **2-5**) identifies and describes the two regional IRWM groups in the County: the East Contra Costa County IRWM Group and Bay Area IRWMP. **Section 2.3** (pages **2-4** through **2-5**) and **Section 10.2.1** (pages **10-3** through **10-8**) discuss submission of the *CCW SWRP* into existing IRWMPs.

Y	43. Plan describes how implementation performance measures will be tracked.

References:
Section 10.2.5 (page **10-4**) describes procedures for tracking project implementation performance measures.

EDUCATION, OUTREACH, PUBLIC PARTICIPATION
(GUIDELINES SECTION VI.F)

Y	**44. Outreach and Scoping: 10562(b)(4)** **Community participation is provided for in Plan implementation.**

References:
Section 10 (pages **10-1** through **10-8**) describes community participation strategies for *CCW SWRP* implementation.

Y	45. Plan describes public education and public participation opportunities to engage the public when considering major technical and policy issues related to the development and implementation.

References:
Section 10 (pages **10-1** through **10-8**) describes public education and public participation opportunities for *CCW SWRP* implementation.

Y	46. Plan describes mechanisms, processes, and milestones that have been or will be used to facilitate public participation and communication during development and implementation of the Plan.

References: **Section 3** (pages **3-1** through **3-6** and **Section 10** (pages **10-1** through **10-9**) describe mechanisms, process and milestones to facility public participation and communication during development and implementation of the *CCW SWRP.*	
Y	47. Plan describes mechanisms to engage communities in project design and implementation.
References: **Section 10** (pages **10-1** through **10-8**) describes mechanisms to engage communities in project design and implementation.	
Y	48. Plan identifies specific audiences including local ratepayers, developers, locally regulated commercial and industrial stakeholders, nonprofit organizations, and the general public.
References: **Appendix C** provides a list of stakeholders within the County. **Section 3** (pages **3-1** through **3-6**) and **Appendix E** provide information on the plan developed to outreach to stakeholders and the public.	
Y	49. Plan describes strategies to engage disadvantaged and climate vulnerable communities within the Plan boundaries and ongoing tracking of their involvement in the planning process.
References: **Section 3** (page **3-1** through **3-6**) and **Appendix E** describe strategies to engage and DACs and climate vulnerable communities within the County.	
Y	50. Plan describes efforts to identify and address environmental injustice needs and issues within the watershed.
References: **Sections 6** and **7** (pages **6-1** through **7-9**) describe how opportunities to address environmental injustice were considered in SWRP Opportunity identification and prioritization.	
Y	51. Plan includes a schedule for initial public engagement and education.
References: **Table 3-1** (pages **3-4** through **3-6**) provides the schedule of public engagement and education.	

DECLARATION AND SIGNATURE

I declare under penalty of perjury that all information provided is true and correct to the best of my knowledge and belief.

Authorized Signature	Title	Date
	PUBLIC WORKS DIRECTOR	11/21/19

Public Agency