



FINAL
JULY 2018

CITY OF YUBA CITY

Yuba City Basin Storm Water Resource Plan



Storm Water Resource Plan

Prepared for

City of Yuba City

Project No. 285-10-17-13



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July 26, 2018

Date

A blue ink signature of Douglas T. Moore.

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July 26, 2018

Date

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List of Acronyms and Appendices

ac-ft	Acre-feet
AGR	Agricultural Supply
Basin Plan	Water Quality Control Plan
BMP	Best Management Practices
CDFW	California Department of Fish and Wildlife
City	City of Yuba City
COLD	Cold Freshwater Habitat
County	Sutter County
CUL	Tribal Traditional Culture
CWA	Clean Water Act
DAC	Disadvantaged Communities
DWR	Department of Water Resources
ENR CCI	Engineering News Record Construction Cost Index
FEMA	Federal Emergency Management Agency
GIS	Geographic Information System
HSG	Hydrologic Soil Group
HUC	Hydrologic Unit Code
ILRP	Irrigated Lands Regulatory Program
IRWMP	Integrated Regional Water Management Plan
ISWEBE Plan	Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries
LID	Low Impact Development
LSA	Lake and Streambed Alteration
LWA	Larry Walker Associates
MAP	Mean Annual Precipitation
MDS	Master Drainage Study
MEP	Maximum Extent Practicable
MHI	Mean Household Income
MIGR	Migration of Aquatic Organisms
MS4	Municipal Storm Sewer System
MUN	Municipal and Domestic Supply
NCWA	Northern California Water Association
NPDES	National Pollutant Discharge Elimination System
NSV	North Sacramento Valley
O&M	Operations and Management
Ocean Plan	Water Quality Control Plan for Ocean Waters of California
Orders	Conditional Waivers of WDRs
PAW	Planning Area Watershed
PLU	Priority Land Uses

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REC-1	Water Contact Recreation
REC-2	Non-contact Water Recreation
RWQCB	Regional Water Quality Control Board
SMARTS	Storm Water Multiple Application and Report Tracking System
SOI	Sphere of Influence
SPWN	Spawning, Reproduction, and/or Early Development
Staff Report	May 2007 Final Staff Report
Stakeholder Outreach Plan	Stakeholder Outreach, Education and Engagement Plan
Statewide Mercury Provisions	Part 2 of the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California—Tribal and Subsistence Fishing Beneficial Uses and Mercury Provisions
SUB	Subsistence Fishing
SVRG	Sacramento Valley Rice Growers
SVWQC	Sacramento Valley Water Quality Coalition
SWRP	Storm Water Resource Plan
TAC	Technical Advisory Committee
TMDL	Total Maximum Daily Load
Trash Amendments	The Ocean Plan and ISWEBE Plan, Collectively
T-SUB	Tribal Subsistence Fishing
USACE	US Army Corps of Engineers
WARM	Warm Freshwater Habitat
WDR	Waste Discharge Requirement
West Yost	West Yost Associates
WILD	Wildlife Habitat
WLA	Wasteload Allocation
WQO	Water Quality Objective
YCB	Yuba City Basin



EXECUTIVE SUMMARY

Chapter Contents

- Introduction and Description of Watershed and Subwatersheds
- Public Outreach and Coordination
- Data Collection
- Quantitative Methods
- SWRP Project Evaluations, Quantitative Methods, and Project Ranking/Prioritization
- Implementation Strategy and Schedule
- Standard Provisions
- Storm Water Resource Plan Checklist and Self-Certification



The Yuba City Basin (YCB) Storm Water Resource Plan (SWRP) is a comprehensive document that identifies, prioritizes, and schedules storm water projects within Planning Area Watershed (PAW), which is the Yuba City Basin. Development of the SWRP was led by the City of Yuba City (City) and followed the guidelines of the State Water Resources Control Board for preparing a SWRP (2015b). The SWRP was prepared through collaborative efforts with stakeholders and the public and was tailored to the specific storm water and dry weather runoff issues in the watershed.

Each section of this Executive Summary corresponds to a chapter of the body of this SWRP. For example, Section ES.1 provides a summary of Chapter 1.

ES.1 INTRODUCTION AND DESCRIPTION OF WATERSHED AND SUBWATERSHEDS

ES.1.1 Watershed Description

The YCB watershed and subwatersheds are shown on Figure ES-1. The YCB is approximately 106 square miles. The watershed is urbanized in the northeast corner (Yuba City), and the rest of the watershed is rural and agricultural. Runoff generally flows from the northeast to southwest, where it is pumped out of the YCB at several locations.

ES.1.2 Surface Water Resources and Uses

The main surface waterbodies are within or adjacent to the YCB watershed are shown on Figure ES-1 and include the Lower Feather River, Sutter Bypass, Gilsizer Slough, and Live Oak Canal. In addition, there are several smaller, natural creeks as well as a number of drainage and irrigation facilities. Within the YCB watershed, the terrain is relatively flat, and waterways have been highly altered for both flood control and agricultural purposes.

- The Feather River borders the watershed on the east. It has multiple beneficial uses and provides agricultural and potable water. Yuba City provides approximately 18,000 acre-feet (ac-ft) of Feather River surface water per year for municipal uses within the PAW.
- Gilsizer Slough drains much of the eastern area of Yuba City and is a main drainage way within the YCB. Originally a natural drainage channel, it has been expanded and modified to convey urban and agricultural runoff to the Sutter Bypass.
- Live Oak Canal is another main drainage way within the YCB, and Live Oak Canal drains the western area of the City. Like Gilsizer Slough, the Live Oak Canal was also originally a natural drainage channel that has been modified to convey urban and agricultural runoff to the Sutter Bypass. The Live Oak Canal is an earthen trapezoidal channel that extends from the City to the State Main Drain, which in turn drains to the Sutter Bypass.

ES.1.3 Water Quality Priorities in the YCB Watershed

This section describes the various regulatory requirements such as storm water permits, applicable total maximum daily loads (TMDLs), and water body-pollutant combinations listed on the State's Clean Water Act Section 303(d) list of water quality limited segments as well as the resulting water quality priorities within the YCB watershed¹.

- Water Quality Control Plan for the Sacramento River and San Joaquin River Basins - This document establishes the beneficial uses and water quality objectives (WQOs) to protect those beneficial uses, and develops an implementation program to achieve the established WQOs. This document covers the YCB watershed.
- 303(d) List of Impaired Waterbodies - Waterbodies not meeting the designated Basin Plan WQOs and/or water quality standards are considered impaired and are placed on the CWA section 303(d) list, often times triggering the requirement to develop a Total Maximum Daily Load (TMDL) in order to ensure the attainment of the WQO and, ultimately, the protection of the beneficial uses. Table ES-1 identifies the 303(d)-listed waterbodies located in or adjacent to the YCB watershed and associated pollutants causing the impairments. By the tributary rule, these apply to the YCB watershed drainage channels too.

Table ES-1. 303(d)-Listed Waterbody-Pollutant Combinations for the YCB Watershed

Waterbody	Pollutant
Gilsizer Slough	Diazinon, Oxyfluorfen, pH
Lower Feather River	Chlorpyrifos, Group A Pesticides, Mercury, PCBs, and Unknown Toxicity
Sutter Bypass	Mercury
Wadsworth Canal	Diazinon, Chlorpyrifos

- Total Maximum Daily Loads (TMDL) - A TMDL is a water quality management plan for restoring impaired waters. It specifies the maximum amount of a pollutant allowed to enter a waterbody so that the waterbody will meet water quality standards for that particular pollutant. To ensure that water quality standards are met and beneficial uses are attained, allocations of the pollutant load to all identified sources are established for the pollutant(s) in question. The following TMDLs are applicable to the YCB watershed:
 - Sacramento and Feather Rivers Diazinon and Chlorpyrifos TMDL²; and
 - Central Valley Pyrethroid Pesticides TMDL³.

² https://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/resolutions/r5-2007-0034.pdf

³ https://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/resolutions/r5-2017-0057_res.pdf

- **Statewide Trash Amendments** - The objective of the Trash Amendments is to provide Water Boards' regulatory approach to protect aquatic life and public health beneficial uses and reduce environmental issues associated with trash in State waters.

The Trash Amendments require Phase II MS4 Permittees, after receiving the California Water Code Section 13383 letter from the State Water Board (issued June 1, 2017), to choose either “Track 1” or “Track 2” to comply with the narrative water quality objective for trash. The two options are summarized below:

- **Track 1** – Install, operate, and maintain full capture systems in storm drains that capture runoff from one or more of the Priority Land Uses (PLUs) within the municipalities’ jurisdiction. The monitoring requirements are fulfilled by the implementation/demonstration of the full capture systems.
- **Track 2** – Implement a plan with a combination of full capture systems, multi-benefit projects, institutional controls, and/or other treatment controls to achieve full capture system equivalency. Monitoring is required to demonstrate the effectiveness of the controls and compliance with full capture system equivalency.

The City selected Track 1 as its compliance option.

The YCB SWRP prioritized projects that will be consistent with the water quality requirements listed above, particularly projects to meet the Trash Amendments. These projects include trash screens in major drainage channels (Gilsizer Slough and the Live Oak Canal) and at existing detention basins. At the detention basis, the projects include Low Impact Development (LID) and green infrastructure-type solutions, such as site design and storm water treatment measures to achieve infiltration and biotreatment. SWRP projects that incorporate LID employ a variety of natural and constructed features that reduce the rate and volume of storm water runoff to the MS4 or surface water, filter pollutants out of runoff, facilitate the infiltration of water into the ground and replenish local natural surface water systems. As such, the SWRP multi-benefit projects will support and assist with Phase II MS4 Permit compliance and attainment of TMDL WLAs.

ES.2 PUBLIC OUTREACH AND COORDINATION

The State’s SWRP Guidelines describe how to prepare a SWRP and what information is required to be in a SWRP. The SWRP Guidelines require stakeholder and public involvement during the development and implementation of the SWRP, particularly to allow stakeholders and the public to submit projects for inclusion and evaluation in the SWRP. The *Stakeholder Outreach, Education and Engagement Plan* (Stakeholder Outreach Plan, provided in Appendix 2A) was prepared for the YCB SWRP to describe and guide the comprehensive outreach program for engaging stakeholders and the public during the development of the SWRP. The Stakeholder Outreach Plan addresses the following SWRP Guideline components:

- Ensures local agencies (including water purveyors) and nongovernmental organizations were consulted in SWRP development

- Provides community, stakeholders, and public participation in SWRP development, including identification and discussion of public and community engagement efforts/participation opportunities.
- Describes mechanisms, processes, and milestones that have been used to facilitate stakeholder and public participation and communication during development and implementation of the SWRP.
- Identifies specific audiences including local ratepayers, developers, locally regulated commercial and industrial stakeholders, nonprofit organizations, and the general public.
- Describes strategies to engage disadvantaged and climate vulnerable communities⁴ within the PAW boundaries and ongoing tracking of their involvement in the planning process.

Key groups identified for participation in the SWRP development process include the Technical Advisory Committee (TAC), Integrated Regional Water Management Plan (IRWMP) members, Stakeholders, the public, and local DACs. Engagement and coordination with each of these participant groups is described below.

ES.2.1 Technical Advisory Committee (TAC)

A six-member TAC (Table ES-2) was formed to guide the development of the SWRP. TAC members and the Consultant Team identified and contacted potential stakeholders to solicit participation in the SWRP process and notified stakeholders and the public of scheduled public meetings through emails, the City website, newspaper ads, flyers, and posts on social media (i.e., Facebook). Interested members of the public were able to sign up for SWRP announcements and receive meeting materials by providing their contact information on-line or on sign-in sheets at public meetings. The TAC met four times between September 2017 and June 2018. The discussion topics, activities, and schedule for each of the TAC meetings are provided in Appendix 2B.

⁴ It should be noted that the climate vulnerable areas of the Yuba City Basin, which include areas protected by levees, the southern portion of the watershed, are addressed in Section 2.7.

Table ES-2. Yuba City Basin SWRP TAC Members

TAC Member	Agency	Representation
Manu Dhaliwal	City of Yuba City	Storm Water Quality
Diana Langley	City of Yuba City	Public Works/Water Supply
Ben Moody	City of Yuba City	Storm Drainage Management
Matthew Langley	City of Yuba City	Parks and Grounds
Nick Ramos	Sutter County	Development Services
Sean Minard	MHM, Inc.	Development Community
Lynn Phillips ^(a)	Sutter Extension Water District	Agricultural Water Supply
Ravi Jawanda	State Water Resources Control Board	State Grant Manager
(a) Lynn Phillips was originally on the TAC, but was unable to continue his commitment. Although multiple attempts were made to replace Lynn with another member of the agricultural community, interested parties elected to remain stakeholders.		

ES.2.2 Public and Stakeholder Meetings

Stakeholders and the public were invited to three public/stakeholder meetings. Meetings were advertised through emails to potential stakeholders, social media (i.e., Facebook), the local newspaper, the City's website, the County's website, and flyers at the City's public information counter. The advertisements developed for each meeting are included in Appendix 2C.

Public meeting 1 included an opportunity for the Public/Stakeholder to learn about the SWRP and to submit projects to be included in the SWRP. Public meetings 2 And 3 provided the public/stakeholders an opportunity to be involved technical and policy issues related to project evaluations and prioritization. There was very limited participation by stakeholders and the public.

ES.2.3 North Sacramento Valley Integrated Regional Water Management Plan, Existing Planning Documents, Ordinances, and Programs

The NSV IRWM is a collaborative effort to enhance coordination of the water resources in six counties, including Butte, Colusa, Glenn, Shasta, Sutter, and Tehama counties. The IRWM is governed by an 18-member Board that consists of three individuals selected by each of the respective county Boards of Supervisors. The IRWM engages multiple agencies, stakeholders, tribes, individuals and groups to address water-related issues and offer solutions which can provide multiple benefits to the region. The TAC included one IRWM representative from Sutter County. The SWRP will be submitted for inclusion in the NSV IRWMP.

ES.3 DATA COLLECTION

To preclude duplication of past work, and to maximize the use of the past work:

- Several (18) past studies were reviewed and utilized to the extent possible for the SWRP, including Yuba City Basin Master Drainage Study
- The hydrologic and hydraulic computer models of the PAW developed for the Yuba City Basin Master Drainage Study were used to establish the design flow rates and water surface elevations for the planning and sizing of many of the SWRP projects.
- The City's and County's Geographical Information System (GIS) mapping was also used for the SWRP preparation.

ES.4 QUANTITATIVE METHODS

The methodology used to identify and prioritize projects can be summarized as a four-step process:

1. Project Identification
2. Project Screening
3. Project Evaluation
4. Project Prioritization

The first three steps in the process are summarized below. The fourth step, project prioritization, is discussed in Section ES.5.

ES.4.1 Project Identification

Projects were identified through a public request and submittal process. Members of the TAC, stakeholders, and members of the public were asked to submit ideas for projects. The project submittal period was open from September 20, 2017 (the first TAC meeting) until November 6, 2017 (two weeks following the first public meeting). A list of projects submitted are included in Table ES-3. Important project components were communicated to the TAC, stakeholders, and public during TAC Meeting 1, and Public Meeting 1 and through on-line published materials. The submitted projects were called "initial projects."

ES.4.2 Project Screening

The initial projects were subjected to a two-step screening process, which was adopted by the TAC at the September 20, 2017 TAC meeting. The first step in the screening process was the eligibility screening, and all submitted project passed the eligibility screening.

Executive Summary



The second step in the screening process was the feasibility screening, which is presented in Table ES-4, and includes the following:

- **Estimated Affordability** – The SWRP Projects must be affordable to the sponsoring agency. This criterion was evaluated as High, Medium, or Low. High indicates the project is affordable while low indicates the project is not affordable.
- **Implementability** – SWRP Projects must be feasible. This criterion includes compliance with all applicable federal and state laws, the cost of potential environmental impacts, permitting, complexity, and anticipated community support/opposition. This criterion was evaluated as High, Medium, or Low. High indicates the project is relatively easy to implement while low indicates that the project may be complex or hard to implement.
- **Regulatory Requirements** – Projects that help an agency meet regulatory requirements, (including compliance with the Trash Amendments), rules, or guidelines, received a High rating, while projects that were just “good to implement,” received a Medium or Low rating.
- **Publicly Owned Land** – The SWRP Guidelines recommend that projects be sited on publicly owned lands. This criterion was evaluated as High, Medium, or Low. High indicates the project is fully located on publicly owned land, while low indicates that the project is not on publicly owned land.
- **Trash Amendment Priority** – At the TAC Meeting 2 (held on December 6, 2017), the members of the TAC decided to prioritize projects that help the City meet the Trash Amendment requirements. Projects that help the City meet Trash Amendment requirements received a High rating.

A score of High was allocated five points, Medium was allocated 3 points, and Low was allocated one point. The twelve projects that received the highest scores moved onto the next step to be evaluated for the State’s Benefits. These twelve projects are called the “SWRP projects” in Table ES-4. The other projects are still included in the SWRP document, but continue to be called “initial projects.”

Table ES-3. Initial Submitted Projects

Reference to Project Number	Project Number	Project Name
	Category A	Modify Existing Detention Basins: Remove Existing concrete low flow channels and replace with vegetated swales, add trash capture where required, add playfields or parks, add water quality basins
4, 12, 13, 15, 20	A1	Gilsizer Slough North Detention Pond (includes water quality upgrades in corp yard)
5, 12, 13	A2	Northeast Yuba City Detention Pond
6, 12, 13	A3	North Yuba City Detention Pond
7, 12, 13	A4	South Yuba City Improvement District Detention Pond – North Pond
8, 12, 13	A5	South Yuba City Improvement District Detention Pond – South Pond
21	A6	Detention Basin between Hwy 99 and Civic Center Blvd, north of Hwy 20.
--(a)	A7	Detention Pond just east of WWTP
	Category B	Proposed Regional Detention Basins: Provide flood control for large storms and infiltration for small storms. Includes multi-use playfields, water quality basins, and vegetated swales.
1	B1	Newkom Ranch Detention Pond, for development
2	B2	Kells Ranch Detention Pond, for development
3	B3	North Township Area Detention Pond, for development
22	B4	Roosevelt Road Detention Pond, for existing flooding issues
	Category C	Widen Segments of Channels to Add Water Quality Features and Bike Paths
10	C1	Gilsizer Slough, from Lincoln Road to Stewart Road
9	C2	Live Oak Canal, from Wilder Estates to Bogue Road
	Category D	Flow Diversion
11	D1	Divert stormwater from the Gilsizer and Live Oak Canals to farther south in the basin for agricultural and habitat use
	Category E	Update or Create Standards and Plans
12, 13	E1	Standards for detention basins: Modify detention basin standards to allow recreational use of the basin, while meeting flood control, infiltration requirements, and trash control. Revise low flow channel design standards to provide infiltration.
14	E2	Standards for Gilsizer Slough: Minimize erosion, improve side slope, and standardize pipe inlets into the canal to increase trash capture
12, 19	E3	Trash capture master plan: Identify locations where trash capture is needed. Include standards for installing pipes into channels to control trash sources, and for installing trash screens in detention basins
	Category F	Trash Capture Projects: Infiltration Swales, Daylighting Storm Drains, and Trash Racks
16	F1	Walton Pipeline along Lincoln Road - daylight storm drain and add an infiltration swale and trash rack
17	F2	Onstott Pipeline along Highway 99 - daylight storm drain and add an infiltration swale and trash rack
18	F3	Add trash rack at Orchard and Park
--(a)	F4	Lincoln Road storm drain, along Lincoln Road - daylight storm drain and add an infiltration swale and trash rack
--(a)	F5	Jefferson Ditch - add infiltration detention area and trash rack
--(a)	F6	Del-Monte Square Commercial Park Storm Drain - daylight storm drain and add an infiltration swale and trash rack

(a) This project was added after discussing high priority issues at TAC Meeting 2 (December 6, 2017).

Table ES-4. Feasibility Screening

Reference to Original Number	Project Number	Project Name	Affordability	Implement-ability	Helps Agency Meet Regulatory Requirements ^(a)	Public Land	Trash Amendment Priority	Score	Results	Reasoning
	Category A	Modify Existing Detention Basins: Remove existing concrete low flow channels and replace with vegetated swales, add trash capture where required, add playfields or parks, add water quality basins								
4, 12, 13, 15, 20	A1	Gilsizer Slough North Detention Pond (includes water quality upgrades in corp yard)	Medium	High	High	High	High	23	SWRP	Top 12
5, 12, 13	A2	Northeast Yuba City Detention Pond	Medium	High	Low	High	Low	15	Initial	Top 12
6, 12, 13	A3	North Yuba City Detention Pond	Medium	High	Low	High	Low	15	Initial	Top 12
7, 12, 13	A4	South Yuba City Improvement District Detention Pond – North Pond	Medium	High	High	High	High	23	SWRP	Top 12
8, 12, 13	A5	South Yuba City Improvement District Detention Pond – South Pond	Medium	High	Low	High	Low	15	Initial	Top 12
21	A6	Detention Basin between Hwy 99 and Civic Center Blvd, north of Hwy 20.	Medium	High	Medium	Medium	Low	15	Initial	Top 12
-- ^(b)	A7	Detention Pond just east of WWTP	Medium	High	High	High	High	23	SWRP	Top 12
	Category B	Proposed Regional Detention Basins: Provide flood control for large storms and infiltration for small storms. Includes multi-use playfields, water quality basins, and vegetated swales								
1	B1	Newkom Ranch Detention Pond	Medium	Medium	Low	Medium	Low	11	Initial	Low score
2	B2	Kells Ranch Detention Pond	Medium	Medium	Low	Medium	Low	11	Initial	Low score
3	B3	North Township Area Detention Pond	Medium	Medium	Low	Medium	Low	11	Initial	Low score
22	B4	Roosevelt Road Detention Pond	Low	Medium	Medium	Low	Low	9	Initial	Low score
	Category C	Widen segments of channels to add water quality features and bike paths								
10	C1	Gilsizer Slough, from Lincoln Road to Steward Road	Medium	Low	Low	Medium	Low	9	Initial	Low score
9	C2	Live Oak Canal, from Wilder Estates to Bogue Road	Medium	Low	Low	Medium	Low	9	Initial	Low score
	Category D	Flow Diversion								
11	D1	Divert stormwater from the Gilsizer and Live Oak Canals to the southern part of the basin for agricultural and habitat use.	Low	Low	Low	Medium	Low	7	Initial	Low score
	Category E	Update or create standards and plans								
12, 13	E1	Standards for detention basins: Modify detention basin standards to allow recreational use of the basin, while meeting flood control, infiltration requirements, and trash control. Adjust low flow channel design standards to provide infiltration.	High	High	High	N/A	Medium	19	SWRP	Top 12
14	E2	Standards for Gilsizer Slough: Minimize erosion, improve side slope, and standardize pipe inlets into the canal to increase trash capture	High	High	High	N/A	Medium	19	SWRP	Top 12
12, 19	E3	Trash capture master plan: Identify locations of where trash capture is needed. Include standards for installing pipes into channels to control trash sources, and for installing trash screens in detention basins	High	High	High	N/A	High	21	SWRP	Top 12
	Category F	Trash Capture Projects: Infiltration swales, daylighting storm drains, and trash racks								
16	F1	Walton Pipeline along Lincoln Road - daylight storm drain and add an infiltration swale and trash rack	Medium	Medium	High	Low	High	17	SWRP	Low score
17	F2	Onstott Pipeline along Highway 99 - daylight storm drain and add an infiltration swale and trash rack	Medium	Medium	High	Low	High	17	SWRP	Low score
18	F3	Add trash rack at Orchard and Park for ease of maintenance. Consider configuring for trash amendments.	Medium	Medium	High	High	High	21	SWRP	Top 12
-- ^(b)	F4	Lincoln Road storm drain, along Lincoln Road - daylight storm drain and add an infiltration swale and trash rack	Medium	Medium	High	Low	High	17	SWRP	Low score
-- ^(b)	F5	Jefferson Ditch - add infiltration detention area and trash rack	Medium	Medium	High	High	High	21	SWRP	Top 12
-- ^(b)	F6	Del-Monte Square Commercial Park Storm Drain - daylight storm drain and add an infiltration swale and trash rack	Medium	Medium	High	Medium	High	19	SWRP	Top 12

Total Projects

23

Total SWRP Projects

12

Initial Projects

11

(a) If an agency is required to meet State or Federal permits or requirements (such as the Trash Amendments) and the project helps meet those requirements, the project receives a "High"

(b) This project was added after discussing high priority issues at TAC Meeting 2 (December 6, 2017)

Executive Summary



ES.4.3 SWRP Project Evaluation

In accordance with SWRP guidelines, SWRP Projects must provide multiple benefits to maximize the State's identified Benefit Categories (listed in Table ES-3). The SWRP Projects were evaluated both quantitatively or qualitatively for how well they met the State's Benefit Categories. The TAC prioritized the State's Benefit Categories for the YCB watershed. The prioritization of benefits is shown in Table ES-5; with higher scores meaning the benefit is more important and lower scores meaning the benefit is less important.

Table ES-5. TAC Prioritization of Each of the State's Benefit Categories	
State Benefit Categories	TAC Prioritization Score
Water Quality	8.0
Water Supply	8.1
Flood Management	9.4
Environment	4.0
Community	5.4

The methodology for evaluating the SWRP Projects was described in the Yuba City Basin SWRP - Multiple Benefits Evaluation Methodology Technical Memorandum (Appendix 5B).

ES.5 SWRP PROJECT EVALUATIONS, QUANTITATIVE METHODS, AND PROJECT RANKING/PRIORITIZATION

Using the evaluation methodology, the implementation and planning SWRP projects were evaluated to calculate total point scores and prioritized based on the total point scores, as shown in Table ES-6.

Table ES-6. Project Ranking Summary Based on Multiple Benefit Evaluation			
Project Number	Project Title	Total Points	Rank
A7	Detention Pond East of WWTP Modifications	127.9	1
A4	Shanghai Bend Detention Pond Modifications	118.6	2
A1	Gilsizer North Detention Basin Modifications	106.2	3
F5	Jefferson Ditch Improvements	63.3	4
E1	Detention Basin Standards	54.2	5
F3	Madrone and Orchard/Park Trash Capture	38.9	6
F1, F2 & F4	Gilsizer Slough at Lincoln Road Trash Capture	37.4	7
F6	Live Oak Canal at Franklin Road Trash Capture	30.5	8
E2	Gilsizer Slough Standards	29.9	9
E3	Trash Capture Master Plan	25.6	10

The estimated planning/engineering, construction, total capital, and O&M costs of each project are summarized in Table ES-7. For the planning projects, there is only a planning/engineering cost; there are no construction, total capital, or O&M costs. For implementation projects; planning and engineering, construction, total capital, and O&M costs were estimated.

Table ES-7. Project Cost Summary (Summarized from Chapter 5)

SWRP Project	Planning / Engineering Costs, dollars	Construction Cost, dollars	Land or Right -of-Way Acquisition Costs, dollars	Total Capital Cost, dollars	Annual O&M Costs, dollars per year
A1. Gilsizer North Detention Basin	98,700	513,300	0	612,000	26,800
A4. Shanghai Bend Detention Basin	126,900	659,900	0	786,800	24,800
A7. Detention Basin East of WWTP	38,100	198,000	0	236,100	4,000
F1., F2., F4., Trash Capture in Gilsizer Slough at Lincoln Road	64,200	333,900	0	398,100	6,000
F3. Trash Capture at Orchard and Park	29,200	151,600	0	180,800	6,000
F5. Trash Capture at Jefferson Ditch	17,800	92,200	0	110,000	4,000
F6. Trash Capture in Live Oak Canal at Franklin Road	11,600	60,100	0	71,700	6,000
E1. Standards for Detention Basins	20,000	--	--	20,000	--
E2. Standards for Gilsizer Slough	20,000	--	--	20,000	--
E3. Trash Capture Master Plan	79,800	--	--	79,800	--
Total	\$506,300	\$2,009,000	\$0	\$2,515,300	\$77,600

ES.6 IMPLEMENTATION STRATEGY AND SCHEDULE

The SWRP projects were scheduled for the years 2018 through 2030, based on the following criteria (listed from most important to least important):

- The importance of the project to the funding agency and organization (primarily how the City intends to comply with State-mandated Trash Amendment requirements).
- Projects that have the widest range of benefits (i.e., projects that scored very highly because they performed well in only one category were prioritized lower than projects that didn't score quite as well, but had points distributed over more categories).
- The interdependencies of projects (meaning that the Trash Capture Master Plan needs to be completed prior to the installation of trash capture projects).
- The prioritization of the SWRP projects from Chapter 5, and
- The availability of capital and O&M funds,

The City's estimated available capital funding for SWRP projects for the next 20 years is \$100,000 per year (in 2018 dollars). The estimated available O&M funding for SWRP projects for the next 20 years is \$50,000 per year. This 20-year projection of future funding extends beyond the City's budgeting horizon, and consequently, the reliability of the future funding beyond the year 2022 is not certain.

The implementation plan (schedule) is summarized in Table ES-8. Eight of the SWRP projects are trash capture projects and are scheduled for implementation within or near a ten-year time frame to meet the Trash Amendment requirements. As only \$100,000 is available annually for engineering, design, and construction costs, implementing many of these projects will require additional funding sources. Similarly, O&M costs increase every time a new project is implemented, and therefore, additional sources of O&M funding will be required after the year 2026.

Table ES-8. Project Implementation Schedule Summary		
SWRP Project	Planning Year	Construction Year
E3. Trash Capture Master Plan	2018	--
A1. Gilsizer North Detention Basin	2018	2019
F3. Trash Capture at Orchard and Park	2020	2021
F1., F2., F4., Trash Capture in Gilsizer Slough at Lincoln Road	2022	2023
A4. Shanghai Bend Detention Basin	2024	2025
A7. Detention Basin East of WWTP	2026	2027
F5. Trash Capture at Jefferson Ditch	2028	2029
F6. Trash Capture in Live Oak Canal at Franklin Road	2028	2029
E1. Standards for Detention Basins	2030	--
E2. Standards for Gilsizer Slough	2030	--

As part of the implementation strategy, the TAC selected five projects for conceptual design to help secure grant funding and to facilitate future design and construction of these projects. The TAC selected the first five implementation projects on the schedule (Project E3 is a planning project and consequently would not be eligible for Proposition 1 grant funding).

- A1. Gilsizer North Detention Basin
- F3. Trash Capture at Orchard and Park
- F1., F2., F4., Trash Capture in Gilsizer Slough at Lincoln Road
- A4. Shanghai Bend Detention Basin
- A7. Detention Basin East of WWTP

ES.7 STANDARD PROVISIONS

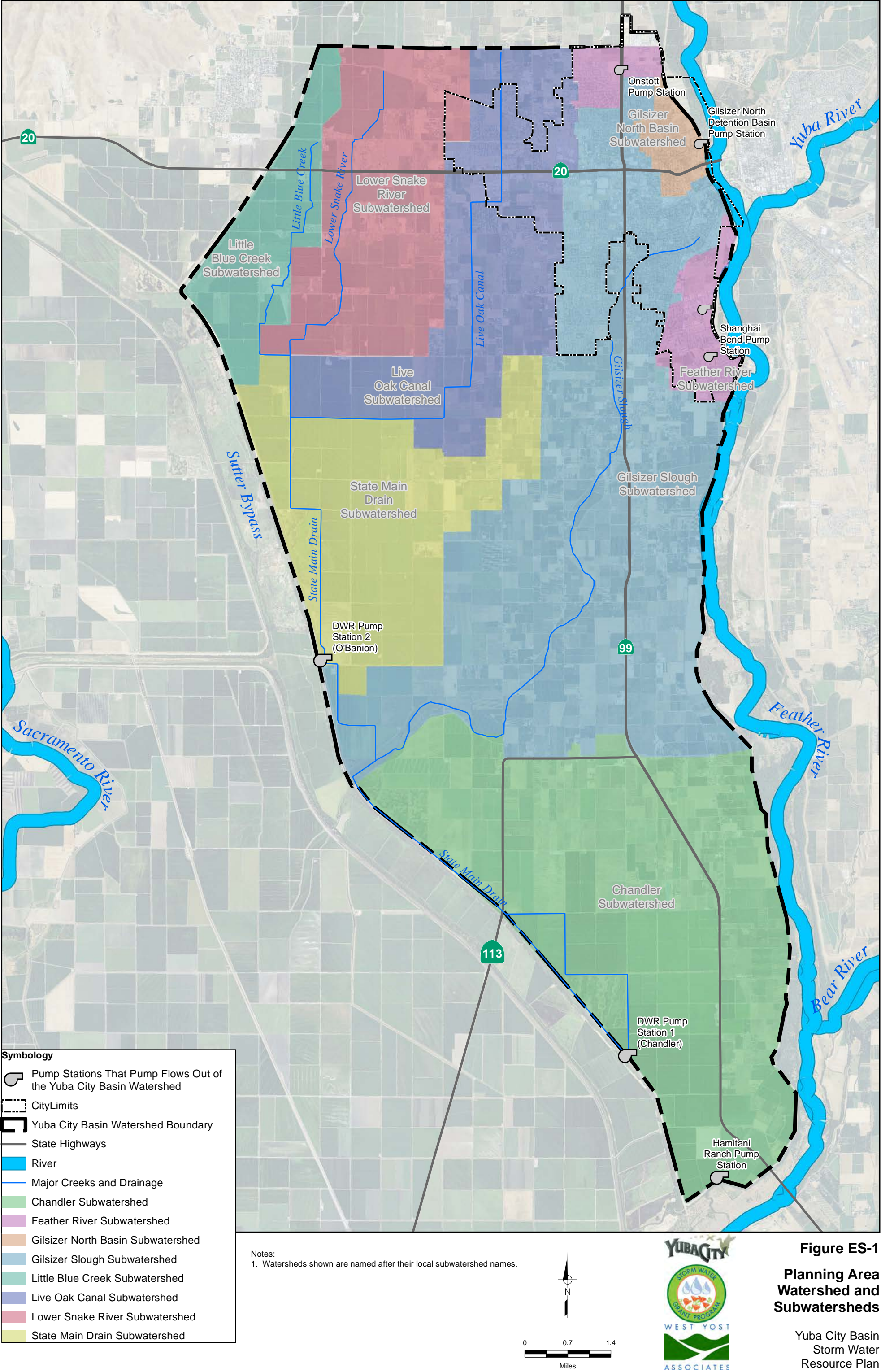
The SWRP Guidelines require several standard provisions be addressed in the SWRP document, including the following:

- California Environmental Quality Act Compliance - Many of the SWRP projects will improve the environment; however, the project could cause temporary, construction related impacts or some permanent environmental impacts. Therefore, a CEQA review will be performed for each SWRP implementation project to identify impacts; and if needed, corrective mitigation measures will be recommended.
- Consistency with Water Quality Control Plans, Applicable Water Quality Control Policies, and Water Rights - The SWRP prioritizes projects that will be consistent with and contribute toward compliance with the Basin Plan and other applicable water quality control plans and regulation and are consistent with existing water rights.
- Submission to Entities Overseeing the Integrated Regional Water Management Plans and Other Local Plans - The final SWRP will be submitted to the NSV IRWMP for adoption in October 2018 following the adoption of the SWRP by City Council.
- Consistency with Applicable Permits - The SWRP enhances efforts to achieve pollutant reductions of TMDL pollutants by prioritizing those projects that have multiple benefits. Multi-benefit SWRP projects will also support and assist with Phase II MS4 Permit compliance and contribute toward attainment of TMDL WLAs.
- Consistency with California Health and Safety Code – Pest and Mosquito Abatement – The Administrative Draft SWRP was submitted to the Sutter-Yuba Mosquito and Vector Control District for review and comment. City operations and maintenance staff will oversee and maintain any new infrastructure installed within City boundaries. Existing practices for pest and mosquito abatement will be employed.

- Modification of a River or Stream Channel - Several of the SWRP implementation projects will involve modifications to existing drainage courses including; Gilsizer Slough, Live Oak Canal, and Jefferson Ditch. The following permits will be acquired if needed for specific projects:
 - CWA Section 404 USACE Permit.
 - CWA Section 401 RWQCB Certification
 - A California Department of Fish and Wildlife Lake and Stream Bed Alteration Agreement
 - Local agency permits
- Monitoring of SWRP Implementation - To assess the effectiveness of SWRP implementation on a watershed basis, implementation of projects and various project elements should be monitored and documented annually, and compared with the implementation schedule. The amount of trash collected by the projects should also be monitored and documented.

ES.8 STORM WATER RESOURCE PLAN CHECKLIST AND SELF-CERTIFICATION

The SWRP Guidelines provide a checklist to ensure all required elements of the SWRP have been achieved. The checklist is provided in Chapter 8 and all SWRP requirements have been achieved.





CHAPTER 1: INTRODUCTION AND DESCRIPTION OF WATERSHEDS AND SUBWATERSHEDS

Chapter Contents

- Introduction
- Watershed Description
- Public Agencies, Water Utilities, and Other Internal Boundaries
- Surface Water Resources and Uses
- Groundwater Resources and Uses
- Watershed Processes



CHAPTER 1

Introduction and Description of Watershed and Subwatersheds



1.1 INTRODUCTION

The Yuba City Basin (YCB) Storm Water Resource Plan (SWRP) is a comprehensive document that addresses storm water projects within the YCB watershed. Development of the SWRP was led by the City of Yuba City (City). The SWRP was prepared through collaborative efforts with stakeholders and the public and was tailored to the specific storm water and dry weather runoff issues in the watershed. The main goal of the SWRP is to identify and prioritize storm water and dry weather runoff projects in the Planning Area Watershed (PAW) through detailed analysis of watershed processes and surface and groundwater resources, input from stakeholders and the public, and analysis of multiple benefits that can be achieved. The collective objective of this plan is to address major challenges to and opportunities for managing storm water and dry weather runoff within the PAW.

1.2 WATERSHED DESCRIPTION

The planning area watershed is the YCB watershed. The YCB watershed and subwatersheds are shown on Figure 1-1. The YCB is approximately 106 square miles with 8 major subwatersheds, described below. The hydrologic unit code level 10 (HUC-10) watersheds called Gilsizer Slough – Snake River does not recognize that the East Interceptor Canal bisects the original watershed, creating the northern boundary of the YCB watershed, and therefore, the HUC-10 watersheds do not correlate exactly with the YCB watershed. The YCB watershed is the correct watershed for this plan.

The YCB watershed has relatively flat topography and is surrounded by levees. The YCB is bounded by the East Interceptor Canal to the north, Sutter Bypass to the west, and Feather River to the east.

The watershed is urbanized in the northeast corner (Yuba City) and the rest of the watershed is rural and agricultural. Runoff generally flows from the northeast to southwest, where it is pumped out of the YCB at several locations. Subwatersheds are delineated by man-made features from agricultural irrigation and the conveyance of runoff to major creeks. The subsheds are described below (West Yost, 2018a):

- **Little Blue Creek Subwatershed:** The agricultural area at the very northwest corner of the Yuba City Basin drains to Little Blue Creek, a natural creek with man-made alterations, that eventually flows into the Lower Snake River. The Little Blue Creek Subwatershed is 5.2 square miles.
- **Lower Snake River Subwatershed:** The agricultural area between Live Oak Canal and Little Blue Creek drains to the Lower Snake River, a natural creek with man-made alterations that conveys flow to the State Main Drain. The Snake River Subwatershed is 11.3 square miles.
- **Live Oak Canal Subwatershed:** The urban and urbanizing area west of Yuba City drains to the Live Oak Canal, an engineered canal that conveys flow to the Lower Snake River. The Live Oak Canal Subwatershed is 13.5 square miles.



- **Gilsizer Slough North Basin Subwatershed:** This area drains a relatively small area within Yuba City to a detention basin, which is then pumped into the Feather River. The Gilsizer Slough North Basin Subwatershed is 1.3 square miles.
- **Feather River Subwatershed:** There are several urban areas within Yuba City that drain to detention basins and then are pumped into the Feather River. The Feather River Subwatershed is 3.6 square miles.
- **State Main Drain Subwatershed:** The State Main Drain collects flows from the Lower Snake River, Little Blue Creek, and Live Oak Canal, in addition to flows from an agricultural area and conveys the flow to the O'Banion Pump Station. The State Main Drain Subwatershed is 13.5 square miles.
- **Gilsizer Slough Subwatershed:** The majority of Yuba City and the agricultural area surrounding Gilsizer Slough drains into Gilsizer Slough, which is then pumped out of the Yuba City Basin via the O'Banion Pump Station. Gilsizer Slough was originally a natural creek that has been widened and modified to convey high flows resulting from development. The Gilsizer Slough Subwatershed is 33.3 square miles.
- **Chandler Subwatershed:** This is an agricultural area south of Gilsizer Slough that drains to the Chandler Pump Station via roadside ditches and the State Main Drain. During times of high flows, the Hamitani Ranch Pump Station pumps flows from the agricultural area at the southern tip of the Yuba City Basin into the Feather River. The Chandler Subwatershed is 28.2 square miles.

The YCB is the correct watershed for this SWRP because it is a self-contained watershed. It is isolated from all other lands, and receives no runoff or surface flow from outside these boundaries. Inclusion of this basin in a larger watershed would force the basin to fall into the Feather River and Sutter Bypass/Sacramento River watersheds. Yuba City (City) is unable to organize all of the cities, counties, water agencies, etc. within the Feather River and Sutter Bypass/Sacramento River watersheds.

1.3 PUBLIC AGENCIES, WATER UTILITIES, AND OTHER INTERNAL BOUNDARIES

Yuba City, the only urbanized area in the YCB, is the only provider of urban water supplies and sewer utilities in the YCB watershed. The rest of the watershed is agricultural. The only utility agencies that serve the agricultural area are agricultural water districts.

- **Municipalities:** Yuba City is the only incorporated city in the watershed and is located in the northeast corner. The extents of the city limits and Sphere of Influence are shown on Figure 1-2. Yuba City is the land use authority for areas with the City Limits.
- **County:** Sutter County is the only County within the PAW. Sutter is the land use authority for all areas in the PAW outside of Yuba City.



- **Disadvantaged Communities:** See Figure 1-2. Disadvantaged communities (DACs) are areas defined by the State as having a mean household income (MHI) that is less than 80 percent of the Statewide MHI. Severely DACs are areas defined by the State as having a MHI that is less than 60 percent of the Statewide MHI. The SWRP guidelines (SWRCB, 2015b) encourage the SWRP development to engage DAC participation and encourage the prioritization of projects located within DACs. For this plan, block groups, or census data, from subdivisions of tracts with populations that range from 600 to 4,000 was used to designate DAC locations. There are several DAC and severely DAC block groups within the watershed.
- **Water Districts:** See Figure 1-2.
 - Yuba City supplies water to the urban areas. The source water is surface water from the Feather River.
 - Groundwater from private wells provides potable water for those outside of the Yuba City water service area.
 - There are multiple water districts that provide irrigation water for the agricultural areas:
 - Sutter Extension Water District
 - Oswald Water District
 - Feather Water District
 - Tudor Mutual Water Company
 - Garden Highway Mutual Water Company
 - Sutter Bypass Butte Slough Water Users Association
- **Sewer Districts:** Yuba City provides sewer services to all areas within the city limits, see Figure 1-2. Septic systems are used outside of this boundary.
- **Groundwater Basins:** The entire watershed is in the Sacramento Valley groundwater basin and the Sutter sub-groundwater basin. Further descriptions of groundwater use and quality are provided below, see Figure 1-3.

1.4 SURFACE WATER RESOURCES AND USES

The main surface waterbodies within the YCB watershed include the Lower Feather River, Sutter Bypass, Gilsizer Slough, and Wadsworth Canal. In addition, there are several smaller, natural creeks as well as a number of drainage and irrigation facilities. See Figure 1-1 for the main surface waterbodies.

Within the YCB watershed, the terrain is relatively flat, and waterways have been highly altered for both flood control and agricultural purposes. Channelization and levee construction along Sutter Bypass and the Feather River increased arable farmland and reduced flooding. Creeks and drainages within the watershed were altered to provide conveyance for supply and drainage of urban or agricultural lands (see drainage and irrigation facilities and natural creeks on Figure 1-3). These creeks are also used for irrigation water supply and habitat in some areas.

Chapter 1

Introduction and Description of Watersheds and Subwatersheds



The Feather River borders the watershed on the east. It has multiple beneficial uses and provides agricultural and potable water for multiple communities, including Yuba City. Yuba City provides approximately 18,000 acre-feet (ac-ft) of Feather River surface water per year for municipal uses within the water service area.

The Sutter Bypass borders the watershed on the west. Pumps inside the YCB pump runoff into the Sutter Bypass during the wet season. Irrigation tailwater flows by gravity to the Sutter Bypass during the dry season.

Gilsizer Slough is a main drainage way within the YCB. Originally a natural drainage channel, it has been expanded and modified to convey urban and agricultural runoff to the Sutter Bypass. Throughout the urban areas, the channel is an earthen trapezoidal channel with structural erosion control blocks on the channel banks. In the agricultural areas, the channel is an earthen trapezoidal channel with little to no vegetation in the channel or on the banks. Gilsizer Slough is maintained by the Gilsizer County Drainage District within the City and maintenance periodically extends from the City downstream to George Washington Boulevard.

Live Oak Canal is another main drainage way within the YCB. Like Gilsizer Slough, the Live Oak Canal was also originally a natural drainage channel that has been modified to convey urban and agricultural runoff to the Sutter Bypass. The Live Oak Canal is an earthen trapezoidal channel that extends from the northern parts of the city all the way to the State Main Drain. Live Oak Canal is maintained by Sutter County.

Wadsworth Canal borders the YCB on the north. It is a manmade canal that conveys irrigation and agricultural tailwater north of the YCB to the Sutter Bypass. No drainage from the YCB currently flows into the Wadsworth Canal.

1.4.1 Surface Water Quality

The Feather River water quality is typically good. Most of the surface water within the YCB is made up of storm water runoff from urban areas and agricultural tail water, and therefore may have sediment, pesticides, and other constituents common to urban and agricultural storm water runoff.

1.4.2 Water Quality Priorities in the YCB Watershed

This section describes the various regulatory requirements such as storm water permits, applicable total maximum daily loads (TMDLs), and water body-pollutant combinations listed on the State's Clean Water Act Section 303(d) list of water quality limited segments as well as the resulting water quality priorities within the YCB watershed¹.

¹ The information provided in this section is from the report entitled "Yuba City Basin Storm Water Resource Plan Water Quality Compliance Approach" (Water Quality Compliance Report) (LWA 2017), included as Appendix 1A. References cited in this section are provided in Section 6 of the Water Quality Compliance report.

1.4.2.1 Water Quality Control Plan for the Sacramento River and San Joaquin River Basins

Under the federal Clean Water Act (CWA) and California's Porter-Cologne Water Quality Control Act, the State Water Board and Regional Water Quality Control Boards (Regional Water Boards) have regulatory responsibility for protecting the quality of the State's surface water and groundwater. Each Regional Water Board is required to formulate, adopt, and support the implementation of/compliance with water quality control plans (Basin Plans), which establish beneficial uses and water quality objectives (WQOs) to protect those uses, and develop an implementation program to achieve the established WQOs.

The Basin Plan applicable to the YCB watershed is the Central Valley (Region 5) Regional Water Board's "Water Quality Control Plan for the Sacramento and San Joaquin River Basins" (CVRWQCB, 2016). Table II-1 of the Basin Plan lists the main waterbodies within the region as well as the associated beneficial uses, and Section III of the Basin Plan establishes the WQOs to protect the designated beneficial uses.

The main waterbodies located in the YCB watershed include the Sutter Bypass, the Lower Feather River, Gilsizer Slough and Wadsworth Canal. Beneficial uses for the Sutter Bypass and Lower Feather River are listed in Table II-1 of the Basin Plan and are presented in Table 1-1. Pursuant to the Tributary Rule (40 CFR 131.10(b)), the beneficial uses designated for the Sutter Bypass and the Lower Feather River generally apply to their tributaries so that beneficial uses for the Sutter Bypass also apply to Gilsizer Slough and Wadsworth Canal. The beneficial use definitions applicable to main waterbodies in the YCB watershed are provided in Table 1-2.

1.4.2.2 303(d) List of Impaired Waterbodies

Waterbodies not meeting the designated Basin Plan WQOs and/or water quality standards are considered impaired and are placed on the CWA section 303(d) list, often times triggering the requirement to develop a TMDL in order to ensure the attainment of the WQO and, ultimately, the protection of the beneficial uses.

Table 1-3 identifies the 303(d)-listed waterbodies located in the YCB watershed and associated pollutants causing the impairments. The pollutant-waterbody combinations are also depicted on Figure 1-4. The 303(d) list indicates that the sources for the listed pollutants are unknown, with the exception of mercury in the Lower Feather River, to which the 303(d) list attaches the following comment: "All resource extraction sources are abandoned mines." More information regarding 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, is embedded in the following sections.

Table 1-1. Main Surface Water Bodies in the YCB Watershed and Associated Beneficial Uses																		
Surface Water Bodies	Hydro Unit Number	MUN	Agriculture		Industry			Recreation			Freshwater Habitat ^(a)		Migration		Spawning		WILD	NAV
			AGR		PROC	IND	POW	REC-1		REC-2	WARM	COLD	MIGR		SPWN			
		Municipal and Domestic Supply	Irrigation	Stock Watering	Process	Service Supply	Power	Contact	Canoeing and Rafting	Other Non-Contact	Warm	Cold	Warm	Cold ^(b)	Warm	Cold ^(b)	Wildlife Habitat	Navigation
Sutter Bypass	520.3		E ^(d)					E			E			E		E		
Lower Feather River	515.0	E	E					E	E	E	E	E	E	E	E	E		
<div>(a) Resident does not include anadromous. Any segments with both COLD and WARM beneficial use designations will be considered COLD water bodies for the application of water quality objectives.</div> <div>(b) Salmon and steelhead.</div> <div>(c) Fish Barrier Dam to Sacramento River.</div> <div>(d) Existing beneficial uses (E).</div>																		

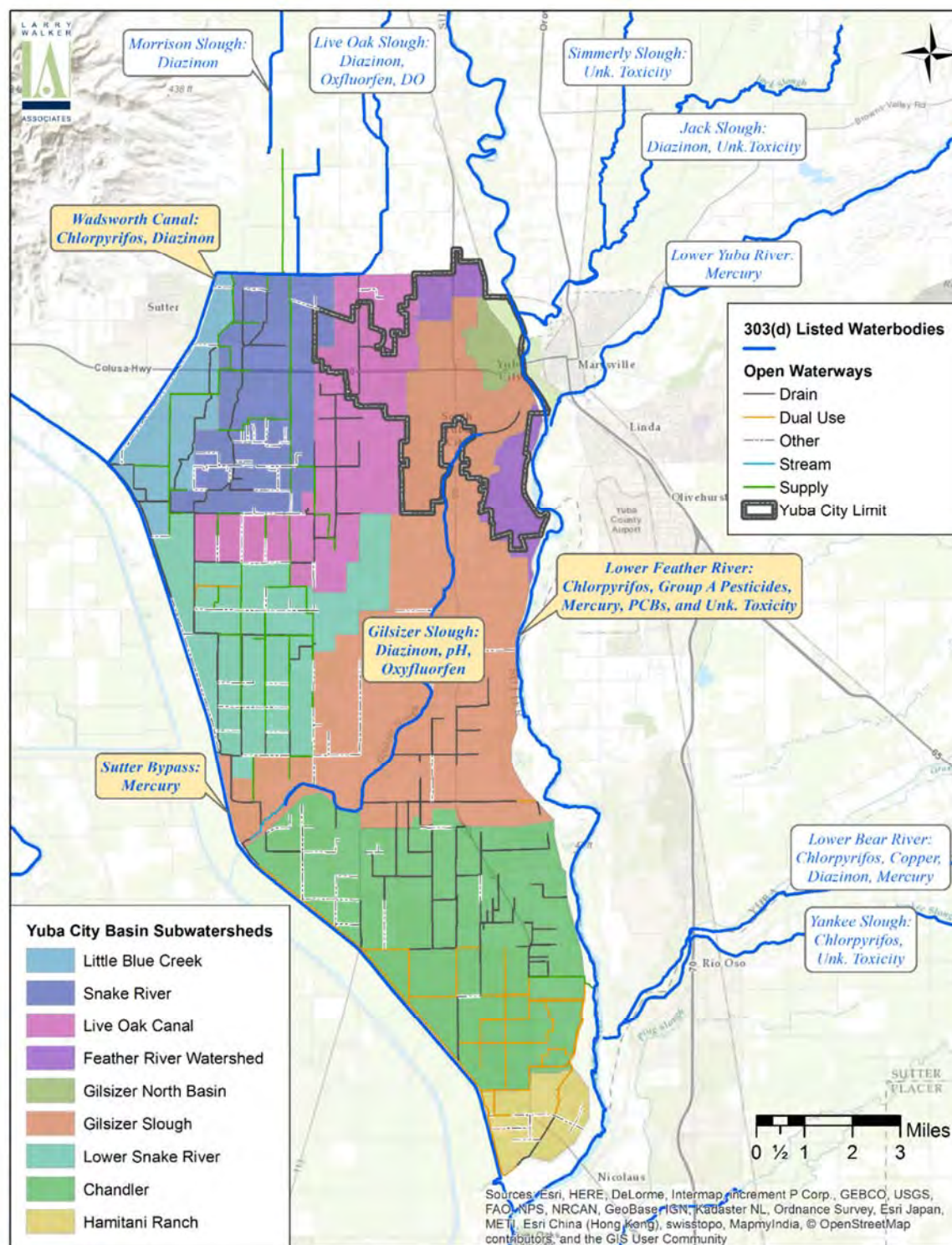
Table 1-2. Beneficial Use Definitions Applicable to Main Waterbodies in the YCB Watershed

Abbreviation	Beneficial Use	Definition
MUN	Municipal and Domestic Supply	Uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.
AGR	Agricultural Supply	Uses of water for farming, horticulture, or ranching including, but not limited to, irrigation (including leaching of salts), stock watering, or support of vegetation for range grazing.
REC-1	Water Contact Recreation	Uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, white water activities, fishing, or use of natural hot springs.
REC-2	Non-contact Water Recreation	Uses of water for recreational activities involving proximity to water but where there is generally no body contact with water nor any likelihood of ingestion of water. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.
WARM	Warm Freshwater Habitat	Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.
COLD	Cold Freshwater Habitat	Uses of water that support cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.
MIGR	Migration of Aquatic Organisms	Uses of water that support habitats necessary for migration or other temporary activities by aquatic organisms, such as anadromous fish.
SPWN	Spawning, Reproduction, and/or Early Development	Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish.
WILD	Wildlife Habitat	Uses of water that support terrestrial or wetland ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats or wetlands, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.

Table 1-3. 303(d)-Listed Waterbody-Pollutant Combinations for the YCB Watershed

Waterbody	Pollutant
Gilsizer Slough	Diazinon, Oxyfluorfen, pH
Lower Feather River	Chlorpyrifos, Group A Pesticides, Mercury, PCBs, and Unknown Toxicity
Sutter Bypass	Mercury
Wadsworth Canal	Diazinon, Chlorpyrifos

Figure 1-4. Water Quality Priorities in the Yuba City Basin Planning Area



1.4.2.3 Total Maximum Daily Loads

A TMDL is a water quality management plan for restoring impaired waters. It specifies the maximum amount of a pollutant allowed to enter a waterbody so that the waterbody will meet water quality standards for that particular pollutant. To ensure that water quality standards are met and beneficial uses are attained, allocations of the pollutant load to all identified sources are established for the pollutant(s) in question.

The following TMDLs are applicable to the YCB watershed:

- Sacramento and Feather Rivers Diazinon and Chlorpyrifos TMDL², and
- Central Valley Pyrethroid Pesticides TMDL³.

Additional details regarding TMDL implementation requirements where storm water or urban runoff has been identified as a source are discussed below.

The YCB SWRP will enhance efforts to achieve pollutant reductions required by TMDLs by prioritizing those projects which have multiple benefits. For example, storm water infiltration will not only provide groundwater recharge, but it will also reduce the volume of storm water discharged to surface water, which reduces pollutant loads discharged to surface water. Monitoring data collected under TMDL implementation requirements will be used to evaluate constituent levels and assess attainment of wasteload allocations (WLAs) in urban discharges. Water quality improvements will be realized as discharges of storm water and dry weather runoff to waterbodies are reduced through multi-benefit storm water projects.

1.4.2.3.1 Sacramento and Feather Rivers Diazinon and Chlorpyrifos TMDL

The TMDL for two organophosphorus insecticides, diazinon and chlorpyrifos, became effective on August 11, 2008. The May 2007 Final Staff Report (Staff Report) prepared by the Regional Water Board identified the primary sources as agricultural and urban applications. However, since most non-agricultural uses of diazinon and chlorpyrifos were phased out beginning in 2001, agricultural applications are the primary sources of these insecticides. After application, diazinon and chlorpyrifos can reach surface water during rainfall or irrigation events, when residual material can migrate with storm water runoff or irrigation return water and enter the Sacramento or Feather Rivers or their tributaries (CVRWQCB, 2007).

The Staff Report identifies municipal wastewater treatment plants and municipal storm water discharges as point sources with assigned WLAs and agricultural operations as non-point sources with load allocations.

² https://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/resolutions/r5-2007-0034.pdf

³ https://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/resolutions/r5-2017-0057_res.pdf



TMDL implementation requirements applicable to storm water and dry weather runoff are specified in Attachment G of the Phase II Municipal Separate Storm Sewer System General Permit (Order No. 2013-0001 DWQ, NPDES General Permit No. CAS000004) (Phase II MS4 Permit) (SWRCB, 2013). Attachment G, “Region-Specific Requirements for Implementation of TMDLs”, specifically identifies 18 Phase II MS4 responsible parties for TMDL implementation, including two located in the YCB watershed (the City and the County of Sutter). Implementation activities conducted by the City currently focus on education and outreach, pollution prevention, and good housekeeping (City of Yuba City, 2017).

The Phase II MS4 Permit requires that Permittees who are assigned a WLA or who are identified as a responsible party in an approved TMDL must comply with monitoring requirements in Attachment G and to consult with the Regional Water Board within one year of the Permit effective date to determine the study design and a monitoring implementation schedule. In accordance with the Regional Water Board’s June 2014 letter (CVRWQCB, 2014), the City is required to develop and implement a TMDL monitoring program. The City is in the process of preparing a TMDL Monitoring Plan and Quality Assurance Project Plan to fulfill the monitoring requirements specified in Attachment G.

Compliance with the Phase II MS4 Permit-related TMDL requirements is documented in Annual Reports.

1.4.2.3.2 Central Valley Pyrethroid Pesticides TMDL

This TMDL was adopted by the Regional Water Board on June 8, 2017 and is pending approval by the State Water Board, the Office of Administrative Law, and USEPA. The information in this section is excerpted from the Central Valley Water Board’s June 2017 Final Staff Report (CVRWQCB, 2017).

The main sources of pyrethroid insecticides are agricultural and urban applications, with the mass applied split almost evenly between agricultural (49 percent) and non-agricultural (51 percent) uses. A portion of urban and agricultural pyrethroid applications can reach surface water during rainfall or irrigation events, when residual pyrethroids can migrate with storm water runoff or irrigation return water, and enter streams, rivers, creeks and sloughs. In urban areas, pyrethroids are primarily used for structural pest control, which accounted for 92 percent of reported non-agricultural uses from 2002-2011. The agricultural uses of pyrethroids are diverse and include use on a wide variety of crops.

The proposed Basin Plan amendment includes TMDLs for urban water bodies with pyrethroids impairments, requirements for addressing water bodies on the 303(d) list for pyrethroids in agricultural areas, and a conditional prohibition of discharge for pyrethroids to water bodies with designated or existing warm and cold freshwater habitat (WARM and COLD, respectively) beneficial uses throughout the basin. None of the waterbody segments with pyrethroid impairments listed in the Basin Plan amendment are located in the YCB watershed. However, implementation requirements under the conditional prohibition apply to municipal storm water discharges, municipal and domestic wastewater discharges, and agricultural discharges to the Lower Feather River (WARM and COLD), and the Sutter Bypass (WARM), as well as to their tributary streams.

According to the Final Staff Report, attainment of the proposed pyrethroid triggers in storm water will likely require continued support through actions of the municipal dischargers working together with the Regional Water Board, and state, federal, and local agencies responsible for registering pesticides and regulating pesticide use as part of an overall pesticide pollution prevention strategy. Where WLAs are established, compliance with the proposed WLAs can be attained by implementing BMPs to reduce pyrethroid pesticides in urban runoff. The specific BMPs include education and outreach activities and pollution prevention activities.

Under the proposed TMDL, specific monitoring and reporting requirements will be established in the monitoring and reporting programs associated with NPDES permits (including the Phase II MS4 Permit), WDRs, and conditional waivers of WDRs. Monitoring for pyrethroids will be incorporated within the TMDL Monitoring Plan for the Sacramento and Feather Rivers Diazinon and Chlorpyrifos TMDL. Compliance with Phase II MS4 Permit-related TMDL implementation requirements will be documented in Annual Reports.

1.4.2.4 Statewide Trash Amendments

On April 7, 2015, the State Water Board adopted an Amendment to the Water Quality Control Plan for Ocean Waters of California (Ocean Plan) to Control Trash and Part 1 Trash Provision of the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries (ISWEBE Plan). Together, they are collectively referred to as “the Trash Amendments,” which became effective on December 2, 2015. The objective of the Trash Amendments is to provide statewide consistency for the Water Boards' regulatory approach to protect aquatic life and public health beneficial uses and reduce environmental issues associated with trash in State waters, while focusing limited resources on high trash generating areas (SWRCB, 2015a).

The Trash Amendments require Phase II MS4 Permittees, after receiving the California Water Code Section 13383 letter from the State Water Board (issued June 1, 2017), to choose either “Track 1” or “Track 2” to comply with the narrative water quality objective for trash. The two options are summarized below:

- Track 1 – Install, operate, and maintain full capture systems in storm drains that capture runoff from one or more of the Priority Land Uses (PLUs) within the municipalities' jurisdiction. The monitoring requirements are fulfilled by the implementation/demonstration of the full capture systems.
- Track 2 – Implement a plan with a combination of full capture systems, multi-benefit projects, institutional controls, and/or other treatment controls to achieve full capture system equivalency. Monitoring is required to demonstrate the effectiveness of the controls and compliance with full capture system equivalency.

The City submitted a response to the Section 13383 letter via the Storm Water Multiple Application and Report Tracking System (SMARTS) on September 1, 2017. The City conducted a preliminary planning-level analysis to identify the extent of PLU areas within its Phase II jurisdiction and to determine a compliance option selection. For this analysis, the City examined its current land uses to determine which ones met the definition of PLU areas as defined in the Statewide Trash Provisions. The City then categorized individual parcels as PLUs by relating the

current land use of the parcel with the PLU land use analysis and excluded parcels with land uses that did not fit the definition. As a result of the preliminary planning level analysis, the City selected Track 1 as its compliance option.

Projects prioritized and selected through the SWRP process are anticipated to incorporate, as appropriate, full capture systems approved for use by the State Water Board to fulfill requirements of the Trash Amendments or to seek approval of devices that will be used. Examples of full capture systems currently on the State Water Board's approved list include bioretention, detention basins, and infiltration trenches or basins.⁴ Accordingly, SWRP projects that incorporate these systems will support compliance with the Trash Amendments, while at the same time achieving storm water runoff quantity and quality benefits.

1.4.2.5 Statewide Mercury Provisions

On May 2, 2017, the State Water Board adopted Resolution 2017-0027, which approved "Part 2 of the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California—Tribal and Subsistence Fishing Beneficial Uses and Mercury Provisions" (Statewide Mercury Provisions).⁵ This Resolution provides a consistent regulatory approach throughout the State by setting mercury limits to protect the beneficial uses associated with the consumption of fish by people and wildlife. Additionally, the State Water Board established three new beneficial use definitions for use by the State and Regional Water Boards in designating Tribal Traditional Culture (CUL), Tribal Subsistence Fishing (T-SUB), and Subsistence Fishing (SUB) beneficial uses to inland surface waters, enclosed bays, or estuaries in the State. The State Water Board approved one new narrative and four new numeric mercury objectives to apply to those inland surface waters, enclosed bays, and estuaries of the State that have any of the following beneficial use definitions: COMM, CUL, T-SUB, WILD, MAR, RARE, WARM, COLD, EST, or SAL, with the exception of waterbodies or waterbody segments with site-specific mercury objectives.

Pursuant to the implementation approach for the Statewide Mercury Provisions, the Phase II MS4 Permit will be revised in the future to include a combination of the following mercury pollution prevention and mercury control measures to reduce total mercury or methylmercury discharges:

- Thermometer exchange programs and fluorescent lamp recycling programs or enhancement of household hazardous waste collection programs to better address mercury-containing waste products (potentially including thermometers and other gauges batteries, fluorescent and other lamps, switches, relays, sensors, and thermostats).
- Public education and outreach on disposal of household mercury-containing products and use of non-mercury containing alternatives.
- Education of auto dismantlers on how to remove, store, and dispose of mercury switches in autos.

⁴ https://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/trash_implementation/fcs_list_of_mbts_04aug17.pdf

⁵ https://www.waterboards.ca.gov/water_issues/programs/mercury/docs/hg_prov_final.pdf

- Survey of use, handling, and disposal of mercury-containing products used by the MS4 discharger agencies and development of a policy and time schedule for eliminating the use of mercury containing products by the discharger.

All of the aforementioned control measures are required; except, at the discretion of the Permitting Authority, additional measure(s) may be substituted for one or more measures if the substituted measure(s) would provide an equivalent level of control or prevent total mercury or methylmercury pollution.

In conjunction with the BMPs and control measures identified above, projects selected through the SWRP prioritization process will further contribute to mercury load reductions to surface water, thereby supporting compliance with the new mercury standards. SWRP projects that reduce the volume of storm water runoff to surface water (e.g., through infiltration) also reduce the load of waterborne mercury and other pollutants that might otherwise reach surface water. Projects that filter sediment and other particulates from storm water runoff (e.g., through infiltration, vegetated swales, or detention basins) also reduce the pollutant load typically associated with sediment, including mercury.

1.4.3 Regulatory Framework

The Phase II MS4 Permit is the National Pollutant Discharge Elimination System (NPDES) General Permit that regulates small MS4 storm water discharges in the YCB watershed. General Waste Discharge Requirements (WDRs) regulating discharges from irrigated agricultural lands are also described in this section. These regulatory mechanisms are designed to control the discharge of pollutants to surface water primarily through the implementation of Best Management Practices (BMPs). Each regulation is described in more detail below.

1.4.3.1 Phase II MS4 Permit

The Phase II MS4 Permit regulates discharges of storm water and dry weather runoff from small MS4s to waters of the U.S. (SWRCB, 2013). The City is required to comply with the Phase II MS4 Permit, including the applicable TMDL implementation requirements in Attachment G. Compliance with the Phase II MS4 Permit, including TMDL implementation requirements, is documented in Annual Reports submitted to the State Water Board. The Phase II MS4 Permit recognizes the following:

Finding 1. Storm water is a resource and an asset and should not be treated as a waste product. Managing rainwater and storm water at the source is a more effective and sustainable alternative to augmenting water supply, preventing impacts from flooding, mitigating storm water pollution, creating green space, and enhancing fish and wildlife habitat. California encourages alternative, innovative, multi-objective solutions to help use and protect this valuable resource, while at the same time controlling pollution due to urban runoff.

The Phase II MS4 Permit and TMDLs generally require Permittees and responsible parties to implement a series of BMPs in order to reduce pollutants from the MS4s to the maximum extent practicable (MEP). The MEP standard requires Permittees to apply BMPs that are effective in reducing or eliminating the discharge of pollutants to the waters of the U.S. The specific requirements are included within the NPDES Permit provisions.

As a part of the overall strategy for the municipal storm water program, a series of BMPs are implemented in order to comply with the Discharge Prohibitions and Receiving Water Limitations, including source controls and/or treatment controls. Regulated projects (i.e., those that create and/or replace 5,000 square feet or more of impervious surface) must implement low impact development (LID) standards designed to reduce the volume of runoff, treat storm water, and provide baseline hydromodification management.

The YCB SWRP will prioritize projects that will be consistent with LID and green infrastructure-type solutions, such as site design and storm water treatment measures to achieve infiltration, evapotranspiration, harvesting/reuse and/or bioretention. SWRP projects that incorporate green infrastructure employ a variety of natural and constructed features that reduce the rate and volume of storm water runoff to the MS4 or surface water, filter pollutants out of runoff, facilitate the infiltration of water into the ground and replenishment of local natural surface water systems, and/or allow for on-site storage of water for a beneficial use (SWRCB 2015b). As such, SWRP multi-benefit projects will support and assist with Phase II MS4 Permit compliance and attainment of TMDL WLAs.

1.4.3.2 Irrigated Agriculture Waste Discharge Requirements

Water discharges from agricultural operations in California include irrigation runoff, flows from tile drains, and storm water runoff. These discharges can affect water quality by transporting pollutants, including pesticides, sediment, nutrients, salts (including selenium and boron), pathogens, and heavy metals, from cultivated fields into surface waters. Many surface water bodies are impaired by pollutants such as pesticides, nitrate, and salts from agricultural sources. Nutrients and salts contained in such discharges that percolate down to groundwater can also impact groundwater quality.

To prevent agricultural discharges from impairing the waters that receive these discharges, the State Water Board's Irrigated Lands Regulatory Program (ILRP) regulates discharges from irrigated agricultural lands. This is done by issuing WDRs or conditional waivers of WDRs (Orders) to growers. The WDRs regulate waste discharges from irrigated lands that could affect ground and/or surface waters of the State. The WDRs allow for the formation of compliance groups or coalitions to promote economies of scale and reduce the potential administrative burden on State Water Board staff that would result from issuing individual WDRs to each grower.

The ILRP issued two WDRs that are applicable to the YCB watershed, as follows:

- Central Valley Regional Water Board Order No. R5-2014-0030-R1, amended by Order Nos. R5-2015-0115, R5-2016-0014, and R5-2016-0015 and entitled "Waste Discharge Requirements General Order for Growers within the Sacramento River Watershed that are Members of a Third-Party Group" (SWRCB, 2016):
 - The Sacramento Valley Water Quality Coalition (SVWQC) is the largest compliance group in the state, encompassing approximately 1.3 million acres of irrigated agricultural lands. There are 13 individual subwatershed compliance groups under the umbrella of the SVWQC, with third-party oversight of the SVWQC provided by the Northern California Water Association (NCWA). Local Farm Bureaus and Resource Conservation Districts also provide oversight and assistance to subwatershed groups.

- Central Valley Regional Water Board Order No. R5-2014-0032, amended by Order No. R5-2015-0115 and entitled “Waste Discharge Requirements General Order for Sacramento Valley Rice Growers” (SWRCB, 2015c):
 - Sacramento Valley Rice Growers (SVRG) formed a compliance group separate from SVWQC, driven by the unique agricultural practices required for rice cultivation. The California Rice Commission provides third-party oversight of the SVRG.

The WDRs specify numerous requirements for members (owners or operators that enroll irrigated acreage in the program) and third-party groups (entities that coordinate the actions of members), including surface water monitoring and reporting, submittal of farm evaluations, attendance at outreach events, preparation and implementation of sediment and erosion control plans and nitrogen management plans, and groundwater quality assessment and monitoring. Where water quality objectives or triggers are exceeded in surface water or groundwater, WDRs may require development and implementation of a Surface Water Quality Management Plan or a Groundwater Quality Management Plan, respectively. Approved TMDLs in the Basin Plan that apply to water bodies within the third-party’s geographic area and have allocations for irrigated agriculture are required to be implemented in accordance with the applicable Basin Plan provisions.

The YCB SWRP will be consistent with and support compliance with WDRs where prioritized multi-benefit projects direct storm water runoff from agricultural lands to groundwater recharge. Benefits will be realized in groundwater quantity and quality through groundwater replenishment, particularly in groundwater basins with elevated concentrations of salts. Reducing the volume of runoff to surface water will reduce pollutant loads including pesticides, sediment, nutrients, salts, pathogens and heavy metals, contributing to surface water quality improvements and attainment of TMDL WLAs.

1.4.4 YCB SWRP Strategies to Address Water Quality Compliance

Urbanization has led to the modification and disruption of natural watershed processes. The increase in impervious surfaces increases runoff volume, flow rates, and flow velocity. As less precipitation is allowed to enter the root zone, increased runoff rates and volumes more effectively mobilize and transport pollutants to drainage networks like MS4s and eventually to receiving waters (McKee, 2003). Additionally, there is a strong relationship between urban watershed sediment yields and loading of contaminants to local waterbodies such as mercury, heavy metals, and pesticides/insecticides. Storm water runoff from agricultural and rural areas also mobilizes and transports substances such as chemicals (e.g., fertilizers, insecticides, legacy pesticides, heavy metals), pathogenic bacteria, sediment, and many other constituents of concern that degrade surface water quality.

The YCB SWRP is designed to prioritize and select projects that achieve multiple benefits, including the following:

- Water quality improvements;
- Water supply augmentation through groundwater management and/or storm water runoff capture and use;

- Flood management;
- Environmental benefits such as habitat protection and improvement, increased urban green space, reestablishment of the natural hydrograph, and reduced greenhouse gas emissions; and
- Community benefits such as enhanced and/or created recreational and public use areas, community involvement and employment opportunities.

Among these, one of the more significant benefits is the mitigation of water quality impacts to surface water from storm water runoff. The SWRP's objective of maximizing water quality serves as the nexus between the SWRP and those regulatory mechanisms described in Section 1.4.2 and Section 1.4.3 of this report (i.e., the Phase II MS4 Permit, TMDLs, WDRs); SWRP projects that are consistent with and contribute to compliance with these regulatory mechanisms are given a higher priority ranking and therefore have a greater likelihood of being implemented.

Table 1-4 summarizes the pollutants of concern in the YCB watershed and potential strategies to address them through anticipated SWRP projects. In addition to the benefits listed in Table 1-4, potential SWRP strategies are designed to contribute toward compliance with applicable regulatory permits, TMDLs, and WDRs.

Table 1-4. Pollutants of Concern in the YCB Watershed, Anticipated SWRP Strategies to Address Them, and Resulting Benefits		
Pollutants of Concern	Potential SWRP Strategies	Benefits
<ul style="list-style-type: none"> • Diazinon, Chlorpyrifos • Pyrethroid Pesticides • Group A Legacy Pesticides and PCBs • Oxyfluorfen (herbicide) • Mercury • Trash 	<ul style="list-style-type: none"> • Infiltration/groundwater recharge • Biofiltration • Bioretention • Detention/retention basins • Hydromodification control • Green street projects • Grass filter strips, bioswales and/or other BMPs to improve water quality of runoff • Capture and use systems • Public outreach/education 	<ul style="list-style-type: none"> • Groundwater replenishment • Reduced volume of storm water to surface water • Reduced pollutant load to surface water and improvements to water quality • Flood management • Habitat protection and improvement • Community benefits

The YCB SWRP identifies, prioritizes, and selects projects that reduce storm water and dry weather runoff. The SWRP Projects will reduce pollutants in storm water discharges, increase infiltration/groundwater recharge, improve flood control, and protect water quality in receiving waters. These objectives will be accomplished by employing an array of appropriate non-structural, structural, regional, and green infrastructure BMPs to reduce runoff volume, velocity, and erosion and sediment transport, maximize the use of green infrastructure for catchment, infiltration, and treatment, and by conducting public outreach and education. Such BMPs have benefits across multiple pollutant categories (e.g., pesticides, trash, heavy metals). SWRP projects will therefore be consistent with and will contribute toward compliance with applicable regulatory mechanisms, including applicable permits, TMDLs, and WDRs.

1.5 GROUNDWATER RESOURCES AND USES

The Sutter Sub Groundwater Basin is an important component of the water supply system in the YCB. The primary use of groundwater in the YCB is agricultural irrigation, with the majority of use occurring on the east side of the watershed. Groundwater in the urban area is also used as a non-potable irrigation supply for several City parks as well as a potable supply for those who are outside the City's water service area. Understanding groundwater uses, quantity, and quality helps guide the identification of storm water projects.

1.5.1 Groundwater Quantity and Levels

Groundwater levels fluctuate slightly in the basin based on the season and location; however, groundwater levels appear to be slightly increasing since the 1980s. Groundwater level fluctuations are due to pumping (which results in decreases in water levels) and irrigation (which results in an increase in water levels due to infiltration). Department of Water Resources, the California agency in charge of monitoring groundwater elevations and land subsidence, does not consider the Sutter Basin to be in overdraft nor has it noted the occurrence of any inelastic subsidence (Wood Rodgers, 2012).

1.5.2 Groundwater Recharge

Groundwater recharge occurs in the YCB when surface water is infiltrated through permeable soils, typically located along the Feather River and Gilsizer Slough. In some locations within the watershed, groundwater levels are high enough to discharge into streams/ditches and cannot accept additional recharge. Some of these areas include the confluence of the Feather River and Sutter Bypass, and around Live Oak Canal (TAC, 2017).

1.5.3 Groundwater Quality

Groundwater quality in the YCB tends to have elevated constituents in certain areas. Elevated levels of salinity can be due to agricultural activities or can occur naturally, although the source of salinity has not been identified. The elevated salinity makes it difficult to use the groundwater for irrigation in certain areas. Boron, manganese, and arsenic are naturally occurring elements, and occur at elevated levels throughout the watershed. Nitrates have also been found at elevated levels in relatively shallow groundwater wells. Nitrates are not naturally occurring and can be introduced to groundwater through septic systems, fertilizers, or confined animal operations (Wood Rodgers, 2012).

The City historically used groundwater as their potable water supply; however, the groundwater was hard, had a hydrogen sulfide odor, and historically exceeded maximum contaminant levels for arsenic, iron, manganese, and nitrate. Many of the city's potable groundwater wells have been abandoned, possibly due to the poor water quality (West Yost, 2018b).

1.6 WATERSHED PROCESSES

Historically, the Yuba City Basin was an agricultural area that flooded frequently. A bypass system and levees were constructed in the early 1900s to provide flood control and drainage to allow agriculture and communities to develop and thrive. The YCB remains mostly agricultural with urbanization in the north-east corner of the basin. Hydrologic processes in agricultural areas are

Chapter 1

Introduction and Description of Watersheds and Subwatersheds



affected by physical characteristics such as hydrologic soil group/infiltration rate and land slope. Urban hydrology; however, tends to be more affected by impervious cover and man-made drainage systems. This understanding of physical characteristics and hydrologic processes helped inform the project selection and prioritization process.

1.6.1 Hydrologic Soil Group

Hydrologic soil groups (HSGs) characterize the ability of a soil to infiltrate water. The more infiltration capacity, the lower the runoff potential. HSG A has the highest infiltration capacity (lowest runoff potential) while HSG D has the lowest infiltration capacity and highest runoff potential. The majority of the YCB watershed contains HSGs C and D, which have moderate to high runoff potential. See Figure 1-5 for a map of HSGs in the YCB. In the urban areas in the northeastern part of the watershed, the main HSG is C, with a moderate runoff potential. The western part of the watershed contains mostly HSG D soils, with high runoff potential. Along Gilsizer Slough and Feather River are HSG B soils, with low runoff potential.

1.6.2 Land Uses and Impervious Cover

The amount of impervious cover is related to how the land is used. See Figure 1-6 for existing land uses. Land uses in the urban area in the northeast corner of the YCB consist of residential, commercial, industrial, and mixed uses. Impervious cover for these types of land uses range from 30 percent to 95 percent, where high impervious percent is associated with high runoff potential. Land use in the rest of the YCB includes agriculture and associated rural facilities. Impervious cover for the agricultural areas ranges from 2 percent to 5 percent, and has low potential for runoff in the wet season. Alternatively, in the dry season, irrigation tailwater from rice fields (dry weather runoff) is conveyed in drainage ditches and drains into the Sutter Bypass.

1.6.2.1 Open Space, Habitat, and Public Lands

As previously noted, a majority of the watershed is agricultural. Figure 1-7 shows locations of rice fields, open space, and habitat in the agricultural areas of the YCB. Many agricultural areas on the west side of the watershed are rice fields, which provide habitat for birds and reptiles typically found in wetlands. There are constructed wetlands in and south of where Gilsizer Slough drains into the State Main Drain on the west side of the watershed. In addition, part of the Sutter National Wildlife Refuge, a protected area located mainly in the Sutter Bypass that provides habitat for migratory birds, is located along the State Main Drain within the YCB.

The State Water Board encourages the prioritization of projects on public land over private land, and the enhancement of public recreation. To facilitate project identification, public land, schools, greenways, parks, and open space in the urban areas are shown on Figure 1-8.

1.6.2.2 High Trash Generation Areas

California has started requiring Phase II Municipal Storm Sewer System (MS4) permittees to capture trash from high trash generating land uses. Yuba City is a Phase II MS4 permittee. High trash generating land uses are generally identified as commercial, industrial, and high density residential land uses, in addition to public transportation stations (bus stops in this watershed). High trash generating land uses are shown on Figure 1-9.

1.6.3 Drainage Facilities

Runoff is conveyed from urban areas using man-made drainage facilities, including engineered channels, piped systems, detention basins, and pumps. These facilities are shown on Figure 1-10.

Runoff is conveyed in the agricultural areas using natural creeks or drainage ways, engineered channels, roadside ditches, and pumps. These conveyance facilities are shown on Figure 1-3, while pump locations are shown on Figure 1-1.

1.6.4 Slope

Slopes in the YCB are relatively flat. Slopes greater than 5% are typically only found in drainage ways, levees, and other human-made facilities. Flatter slopes have the potential to produce lower runoff than steep slopes.

1.6.5 Precipitation Data

The following precipitation data was used during the project evaluation process and was obtained from Sutter County's Design Storm Runoff Manual (see Appendix 1B).

The YCB has mean annual precipitation (MAP) ranging from 17 inches per year on the western side of the watershed to about 20 inches per year on the eastern side of the watershed. The MAP for Yuba City is approximately 19.5 inches per year. See Appendix 1B for depths, durations, and frequencies for larger storms that apply to the Yuba City Basin watershed.

The one-year, one-hour rainfall depth can be used for sizing certain water quality features, including some trash removal facilities. The one-year, one-hour rainfall depth for Sutter County is approximately 0.34 inches. This value was extrapolated from the depth, duration, and frequency tables provided in Sutter County's Design-Storm Runoff manual (Appendix 1B).

Water quality features can be sized using a rainfall depth that correlates with an 85th percentile storm. In other words, 85 percent of all storms that occur in a typical year will have that rainfall depth or less. The CASQA New Development and Redevelopment Handbook (2003) provides guidance on a unit basin storm volume that can be used to size volume-based BMPs. These storage volumes are listed in Table 1-5 below for various runoff coefficients. The CASQA New Development and Redevelopment Handbook (2003) also provides a rainfall intensity to be used for the design of flow-based BMPs. The intensity for an 85th percentile storm is 0.095 inches/hour. The Sacramento Gauge was used for both the volume-based and flow-based rainfall depths and intensity (Appendix D in the CASQA Handbook).

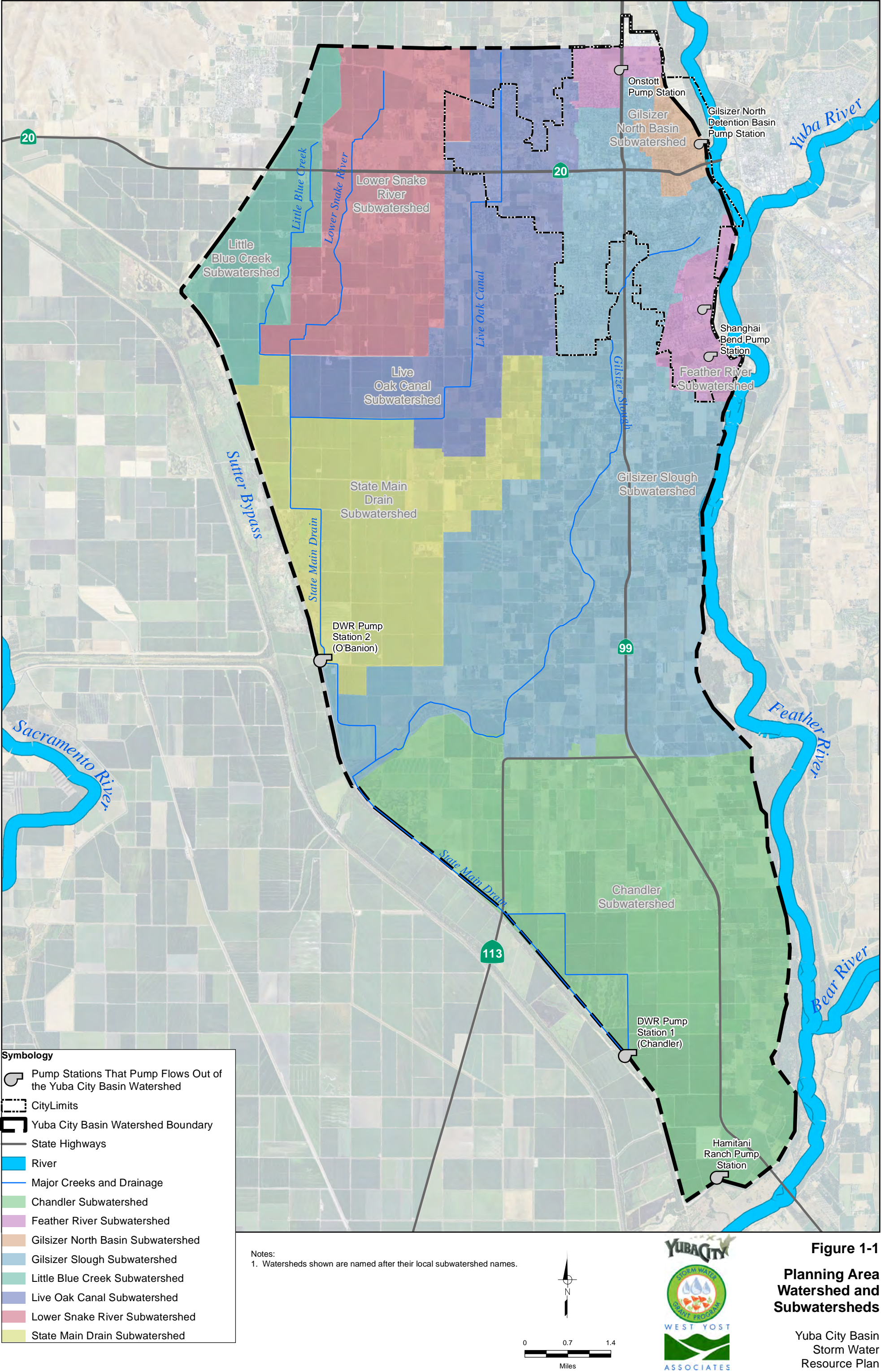
Table 1-5. Storage Volume Required for Volume-Based BMPs for the Annual 85th Percentile Rainfall, with 48-hour Drawdown (from Appendix D in CASQA Handbook)

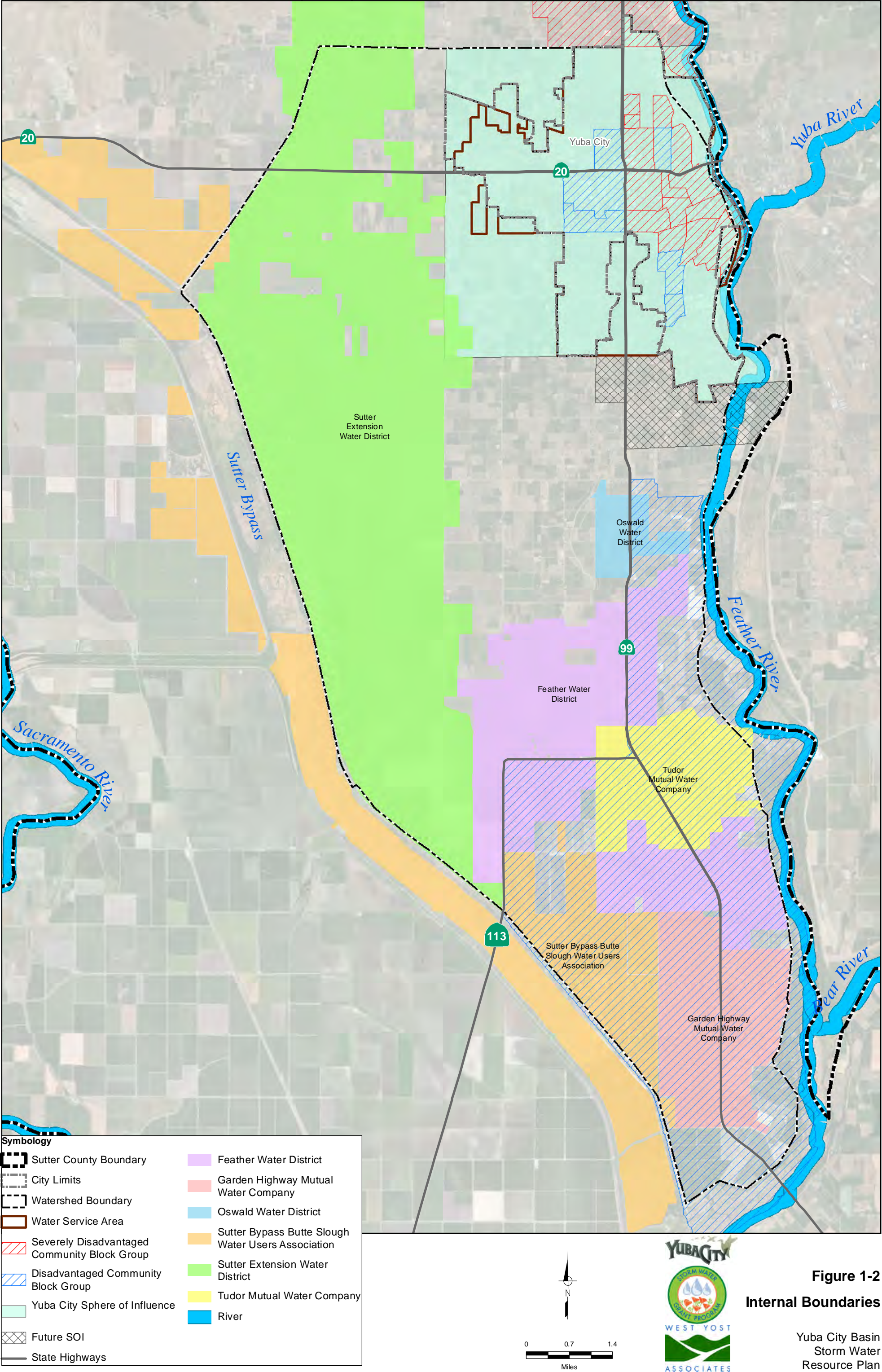
Runoff Coefficient	Unit Basin Storage Volume, inches (Sacramento Gauge)
0.25	0.21
0.50	0.41
0.75	0.62
1.00	0.82

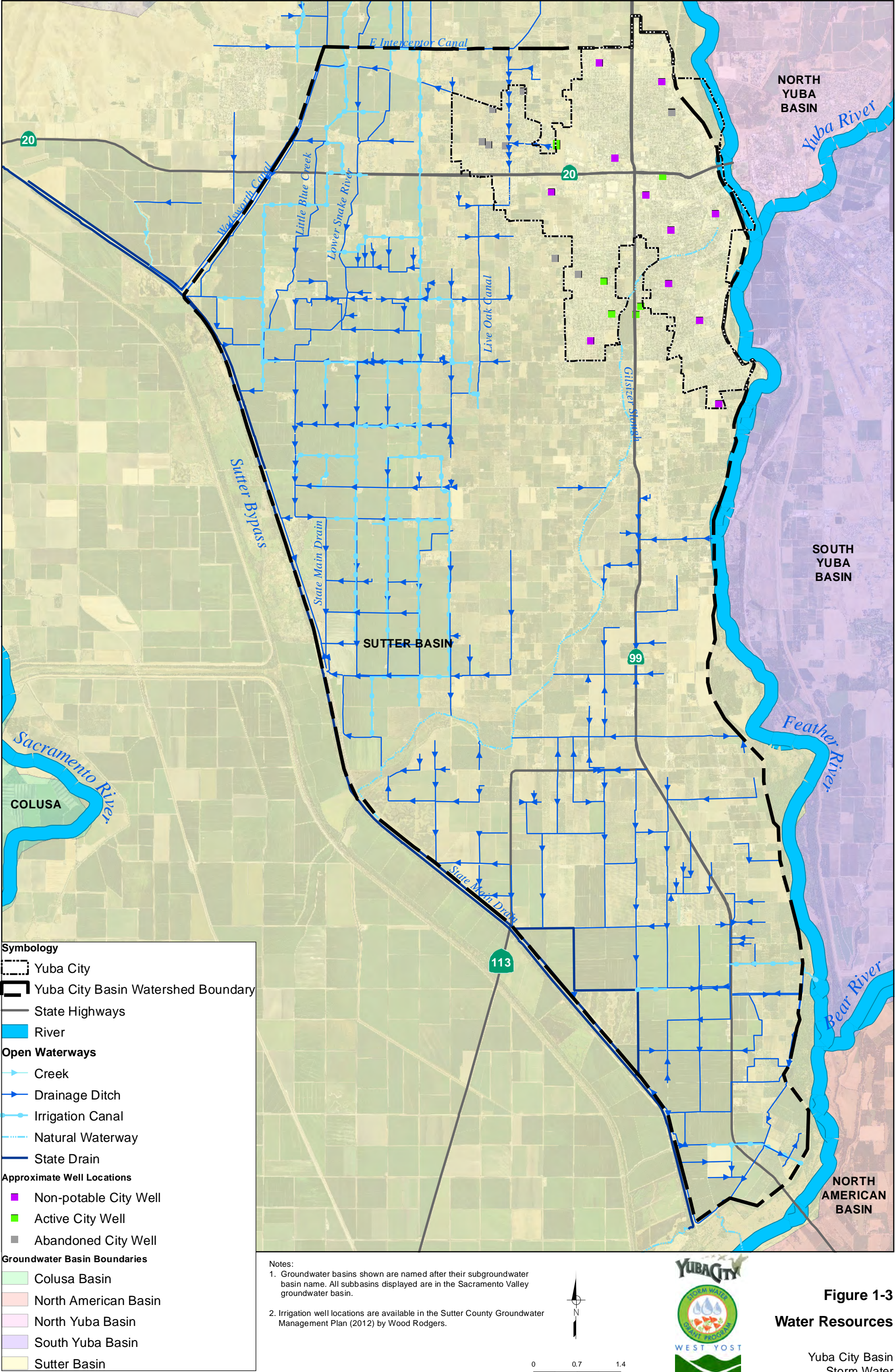
1.6.6 Disruption of Natural Watershed Processes

The PAW was historically open space that was converted to agricultural and urban areas. This conversion resulted in changes to the topography and hydrologic and hydraulic processes.

- Large increases in impervious surfaces increase runoff and decrease infiltration.
- Irrigation of agricultural lands with imported water increases groundwater infiltration and increases summer-time runoff.
- Irrigation of agricultural lands with locally pumped groundwater decreases groundwater supplies and increases summer-time runoff.
- Leveling of land decreases slopes and removes natural topographic depressions that can increase the velocity and quantity of runoff and decrease the recharge of groundwater.
- Channelizing runoff into drains increases the velocity of runoff, increases erosion, and decreases the capacity for runoff to infiltrate to groundwater.







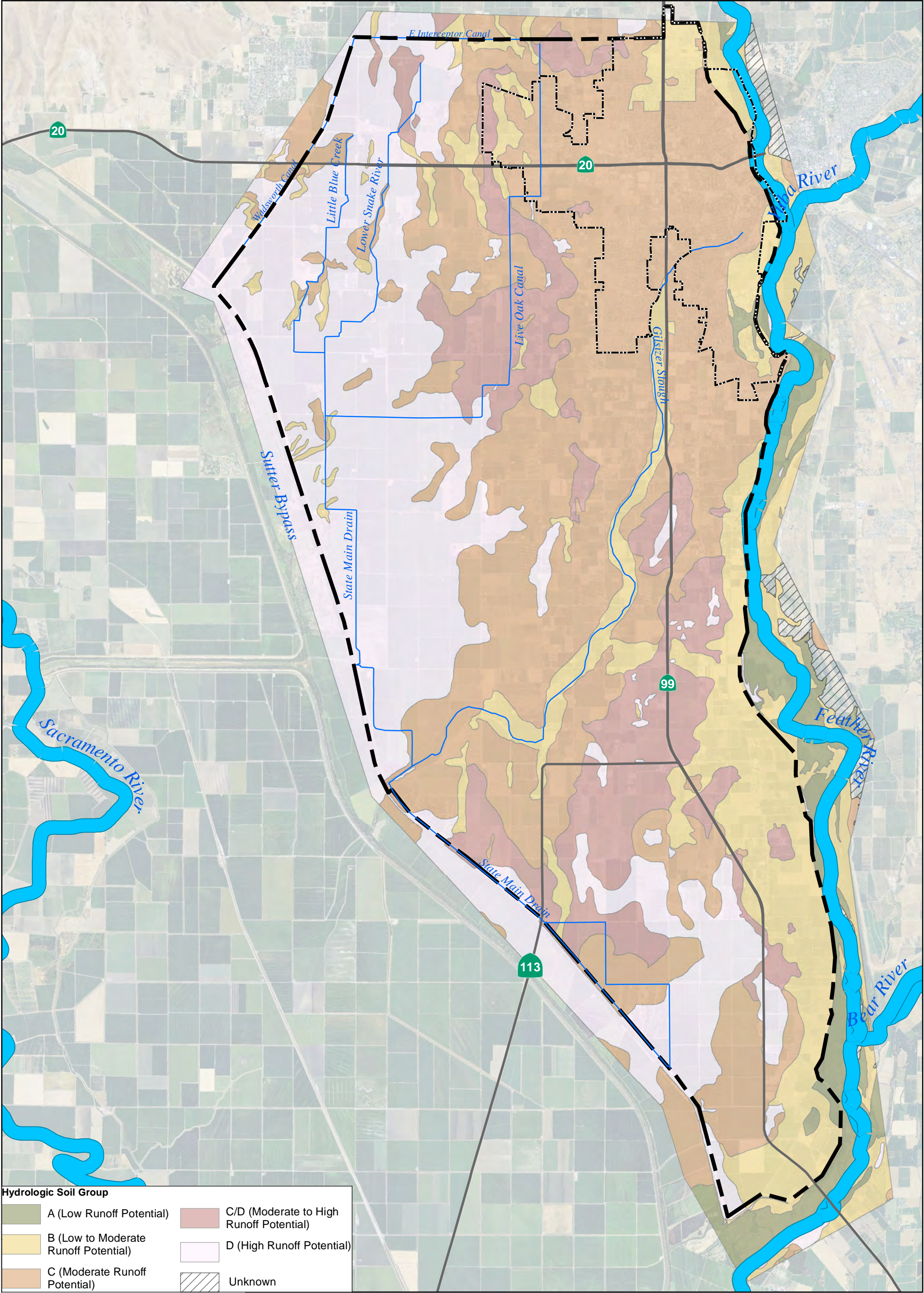
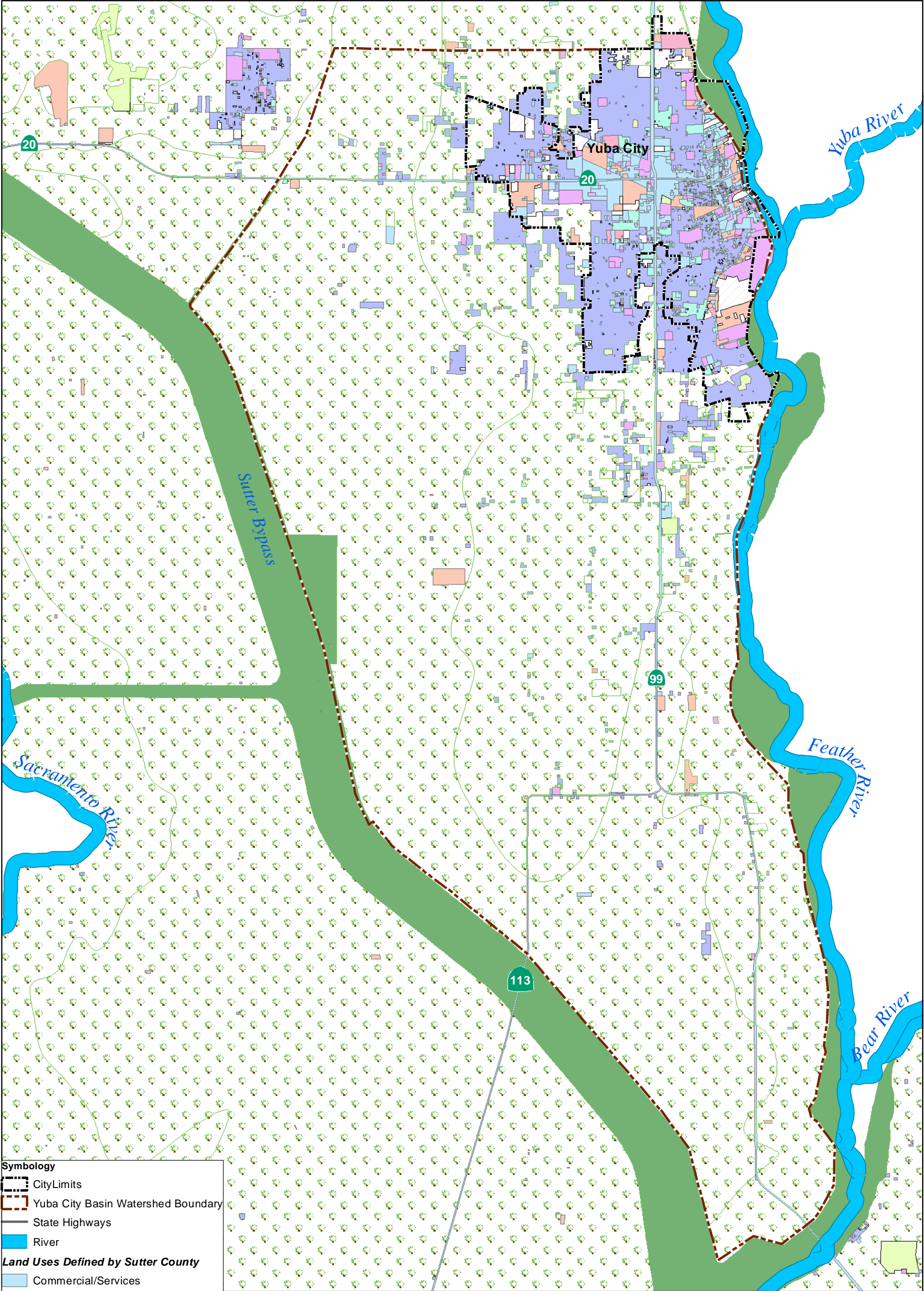


Figure 1-5
Hydrologic
Soil Groups

Yuba City Basin
Storm Water
Resource Plan



Symbology

- City Limits
- Yuba City Basin Watershed Boundary
- State Highways
- River

Land Uses Defined by Sutter County

- Commercial/Services
- Industrial
- Public/Government Facilities
- High Density Residential
- Medium Density Residential
- Low Density Residential
- Parks
- Open Space
- Agriculture
- Vacant

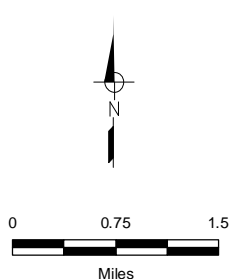
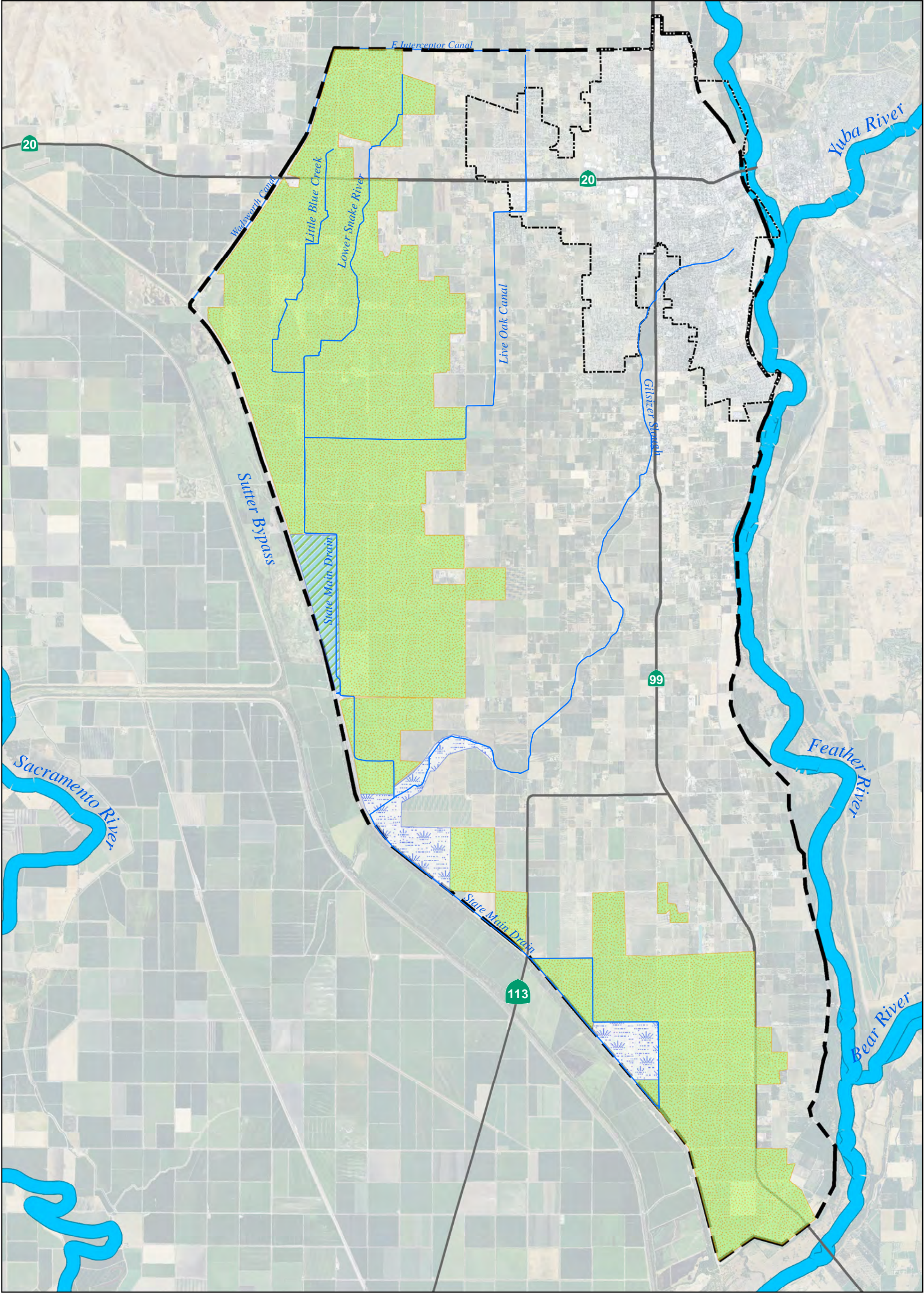


Figure 1-6
Existing
Land Uses

Yuba City Basin
Storm Water
Resource Plan



- Symbology**
- Constructed or Natural Wetlands
 - Rice Fields
 - Sutter National Wildlife Refuge
 - Yuba City
 - Yuba City Basin Watershed Boundary

- State Highways
- River
- Major Creeks and Drainage

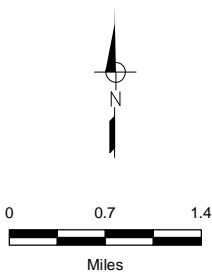
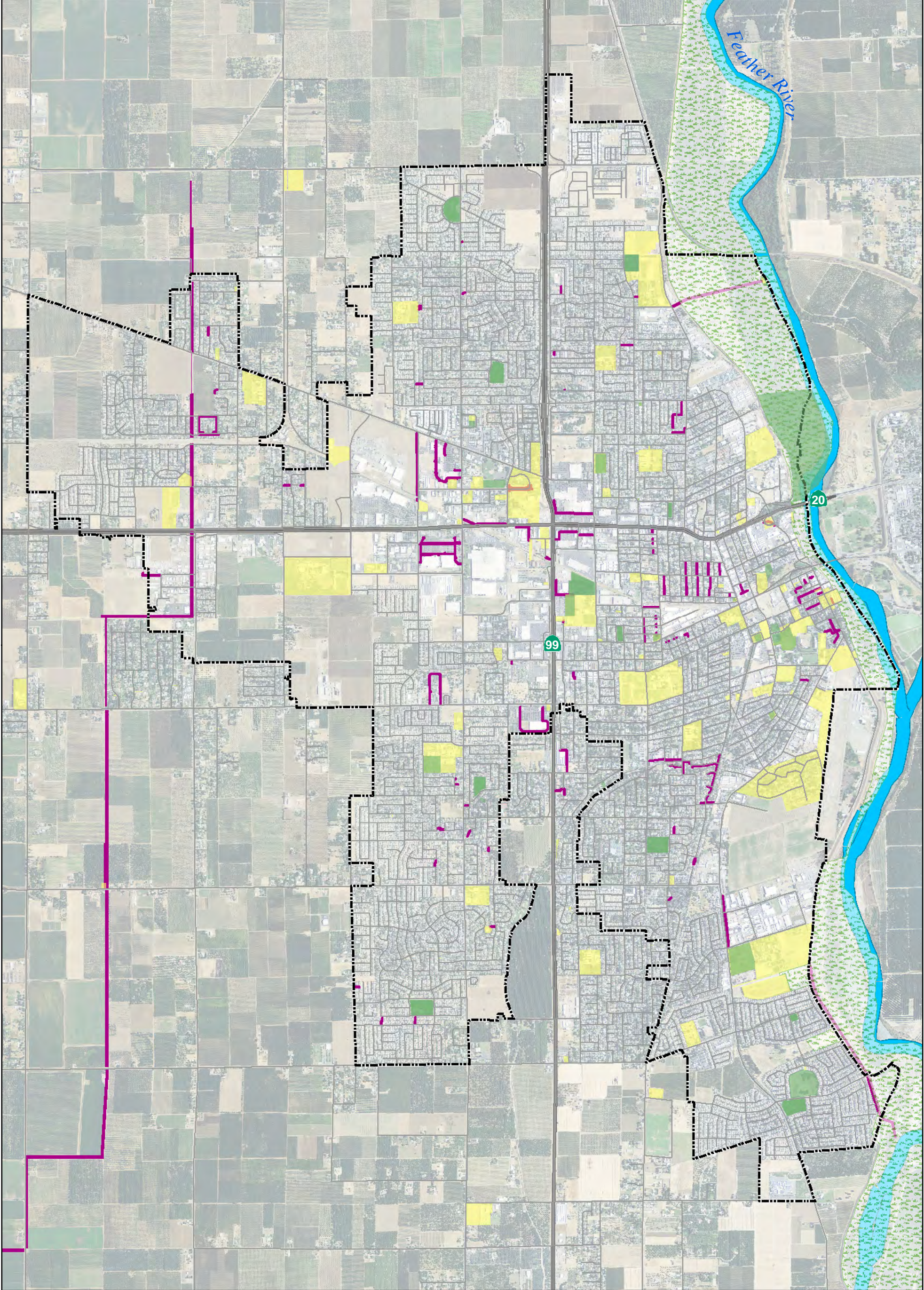


Figure 1-7
Open Space and Habitat in Agricultural Areas
Yuba City Basin Storm Water Resource Plan



- Symbology**
- City Limits
 - Public Land
 - Urban Parks
 - Open Space
 - Existing Public Easements
 - State Highways
 - River

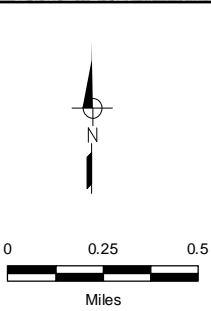
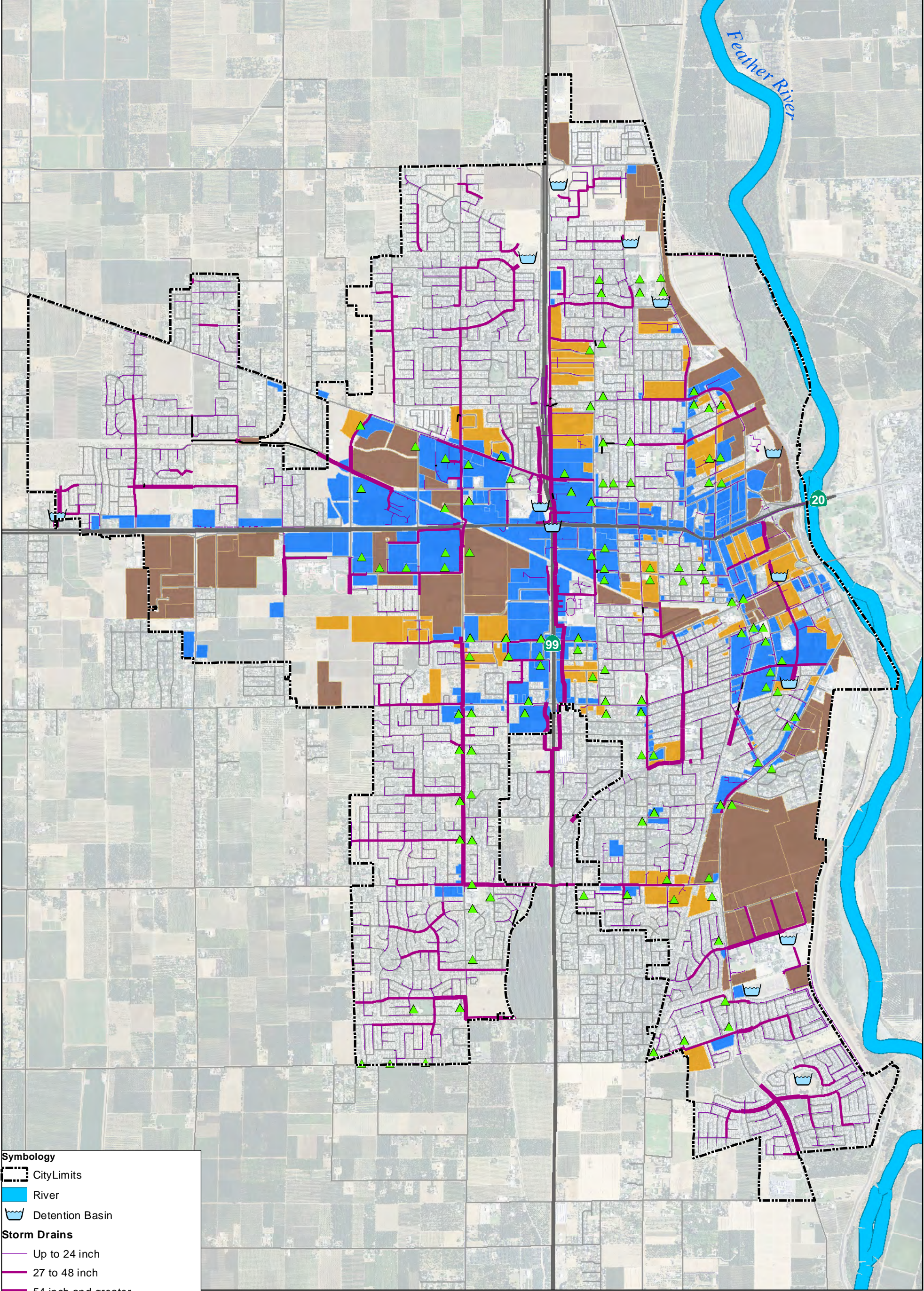


Figure 1-8
Urban Area Public Land, Parks, and Open Space
Yuba City Basin
Storm Water
Resource Plan



Symbology

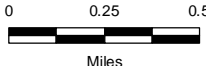

- City Limits
- River
- Detention Basin

Storm Drains

- Up to 24 inch
- 27 to 48 inch
- 54 inch and greater
- Unknown
- State Highways

High Trash Generation Land Uses

- Industrial
- Commercial
- Medium/High Density Residential
- Yuba City Bus Stops






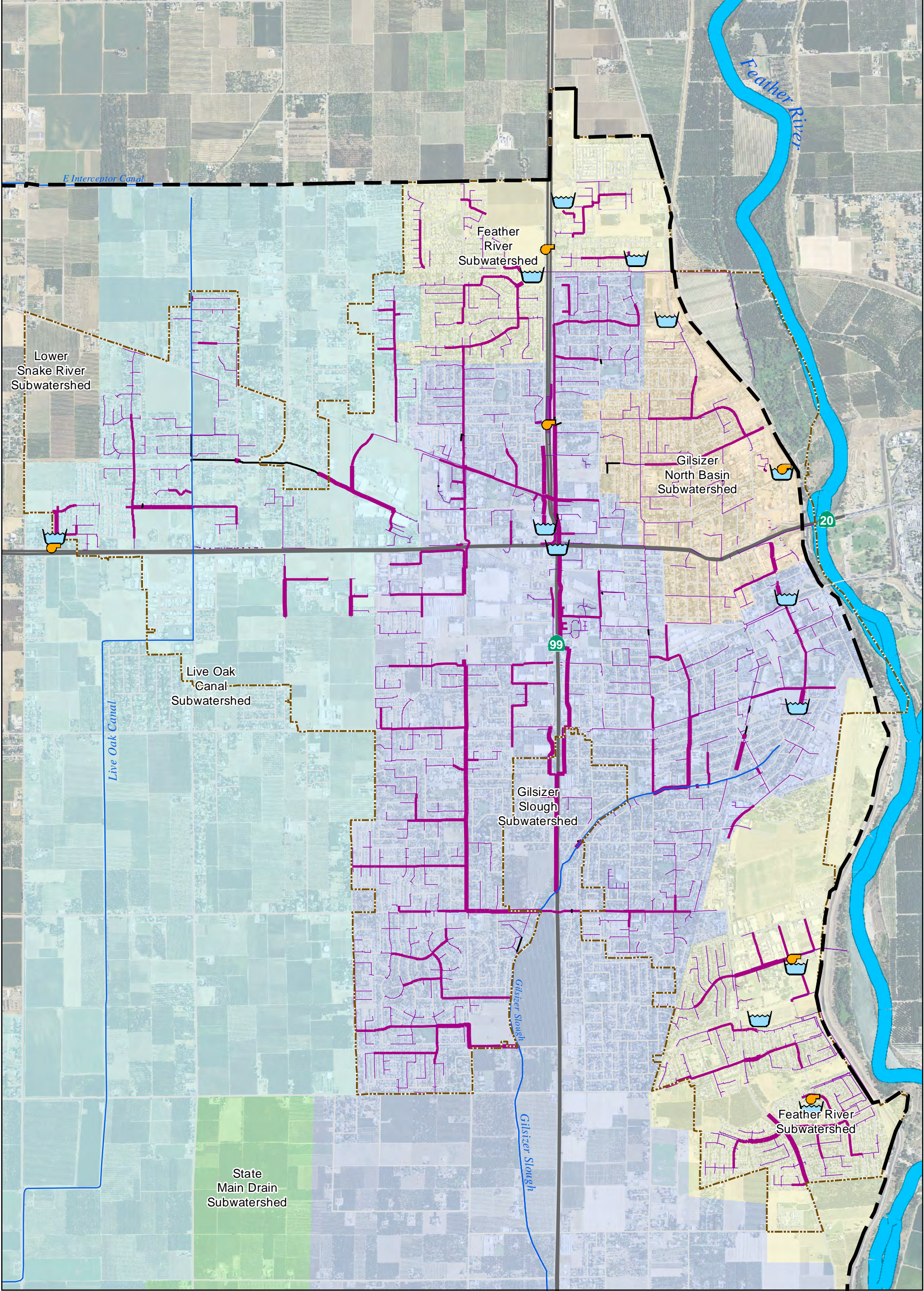


Figure 1-9
Urban Area High Trash
Generation Land Uses



Symbology

- City Limits
- Yuba City Basin Watershed Boundary
- Detention Basin
- Pump Station
- River
- Major Creeks and Drainage
- State Highways

- Storm Drains**
- Unknown
 - Up to 24 inch
 - 27 to 48 inch
 - 54 inch and greater

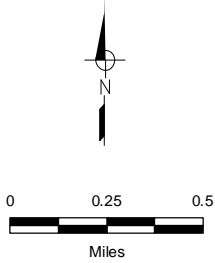


Figure 1-10
Urban Storm Drain Facilities

Yuba City Basin
Storm Water
Resource Plan



CHAPTER 2: PUBLIC OUTREACH AND COORDINATION

Chapter Contents

- Identification and Summary of Public Engagement Efforts and Community Participation in SWRP Development
- SWRP Related Public Agencies, Organizations, and Utilities
- Technical Advisory Committee
- Stakeholders and Public
- North Sacramento Valley Integrated Regional Water Management Plan Existing Planning Documents, Ordinances, and Programs
- Required Decisions that Must be Made by Local, State, or Federal Agencies
- Environmental Justice and Climate Vulnerable Areas



CHAPTER 2

Public Outreach and Coordination



The SWRP Guidelines require stakeholder and public involvement during the development and implementation of the SWRP in order to maximize potential project ideas for storm water projects that incorporate multiple benefits including water quality, water supply augmentation, flood management, environmental, and community enhancement. Establishing an inclusive process that incorporates stakeholder and public input is a critical component of SWRP development and implementation and ensures the long-term success of the integrated regional planning effort.

The *Stakeholder Outreach, Education and Engagement Plan* (Stakeholder Outreach Plan) (LWA, 2017a) was prepared for the YCB SWRP to describe and guide the comprehensive outreach program for engaging stakeholders and the public during the development of the SWRP. The Stakeholder Outreach Plan is provided as Appendix 2A and addresses the following SWRP Guidelines components:

- Local agencies and nongovernmental organizations were consulted in Plan development [CWC 10565(a)].
- Community participation was provided for in Plan development [CWC 10562(b)(4)].
- 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.
- Plan includes identification and discussion of public engagement efforts and community participation in Plan development.
- 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.
- 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.
- Plan identifies specific audiences including local ratepayers, developers, locally regulated commercial and industrial stakeholders, nonprofit organizations, and the general public.
- Plan describes strategies to engage disadvantaged and climate vulnerable communities¹ within the Plan boundaries and ongoing tracking of their involvement in the planning process.
- Plan includes a schedule for initial public engagement and education.

¹ It should be noted that the climate vulnerable areas of the Yuba City Basin, which include areas protected by levees, the southern portion of the watershed, are addressed in Section 2.7.

Key groups identified for participation in the SWRP development process include the Technical Advisory Committee (TAC), Integrated Regional Water Management Plan (IRWMP) members, Stakeholders, the public, and local DACs. Engagement and coordination with each of these participant groups is described in the following sections.

2.1 IDENTIFICATION AND SUMMARY OF PUBLIC ENGAGEMENT EFFORTS AND COMMUNITY PARTICIPATION IN SWRP DEVELOPMENT

The City, with assistance from West Yost Associates (West Yost) and Larry Walker Associates (LWA) (Consultant Team), facilitated the organization, coordination, and collaboration among stakeholders and provided opportunities for public participation and education throughout development of the SWRP. The City and Consultant Team conducted outreach efforts to keep stakeholders apprised of development and progress of the SWRP and to solicit input at key points in the process including initiation of the SWRP, identification of project concepts, application of evaluation criteria, prioritized projects, and review of the SWRP.

A six-member TAC was formed to guide the development of the SWRP (see section 2.3 for more details on meetings and other forms of TAC engagement). TAC members and the Consultant Team identified and contacted potential stakeholders to solicit participation in the SWRP process and notified stakeholders and the public of scheduled public meetings through emails, the City website, newspaper ads, flyers, and posts on social media (i.e., Facebook). Interested members of the public were able to sign up for SWRP announcements and receive meeting materials by providing their contact information on sign-in sheets at public meetings. See section 2.4 for more detailed information on outreach efforts targeting stakeholders and the general public.

These same outreach mechanisms will be used to engage stakeholders and the public during implementation of the YCB SWRP projects.

2.2 SWRP RELATED PUBLIC AGENCIES, ORGANIZATIONS, AND UTILITIES

The City and TAC developed a list of agencies and organizations located within the PAW that would be key to the success of SWRP development and implementation. Included in the list were public agencies, non-profit organizations and privately-owned water utilities. Table 2-1 lists the agencies and organizations within the PAW that were identified and invited to participate in development of the SWRP and indicates those that elected to participate. Participant representation ultimately included Sutter County and the North Sacramento Valley Integrated Watershed Management Plan (NSV IRWMP), Gilsizer County Drainage District, storm drain utilities operated by the City, and water supply utilities operated by the City.

The City did not identify any citizen groups or non-profit organizations working on storm water or dry weather runoff in the PAW.

Table 2-1. Public Agencies, Organizations, Utilities Invited to Participate in SWRP Development

Organization	Representative	Representation	Participant
Sutter County	Nick Ramos	Sutter County	✓
NSV IRWM	Nick Ramos	NSV IRWM	✓
Yuba City Public Works	Ben Moody	City Storm Drainage	✓
Yuba City Public Works	Diana Langley	City Water Supply	✓
Sutter-Butte Flood Control Agency	Michael Bessette	Flood Control	
DWR, Sutter Maintenance Yard	Joel Farias	Flood Control	
Feather Water District	Dan Duncan	Water Supply	
Garden Highway Mutual Water Company	Jon Munger	Water Supply	
Gilsizer County Drainage District	Nick Ramos	Drainage	✓
Oswald Water District	Sureena Bains Thiara	Water Supply	
Sutter Bypass Butte Slough Water Users Association	Jon Munger	Water Supply	✓
Sutter Extension Water District	Lynn Phillips	Water Supply	✓
Tudor Mutual Water Company	Todd Duncan	Water Supply	
Yuba City Schools	Robert Shemwell	Public Agency	
Yuba-Sutter Farm Bureau	Jessica DeCoito	Non-Profit Agency	

2.3 TECHNICAL ADVISORY COMMITTEE

A TAC, made up of representatives from local agencies and stakeholders, was established to help guide the development of the SWRP. TAC members were recommended by City staff during the initial stages of the SWRP development process, and further refined/clarified during the SWRP kickoff meeting on September 6, 2017. The TAC participants are listed in Table 2-2.

Table 2-2. Yuba City Basin SWRP TAC Members

TAC Member	Agency	Representation
Manu Dhaliwal	City of Yuba City	Storm Water Quality
Diana Langley	City of Yuba City	Public Works/Water Supply
Ben Moody	City of Yuba City	Storm Drainage Management
Matthew Langley	City of Yuba City	Parks and Grounds
Nick Ramos	Sutter County	Development Services
Sean Minard	MHM, Inc.	Development Community
Lynn Phillips ^(a)	Sutter Extension Water District	Agricultural Water Supply
Ravi Jawanda	State Water Resources Control Board	State Grant Manager

(a) Lynn Phillips was originally on the TAC, but was unable to continue his commitment. Although multiple attempts were made to replace Lynn with another member of the agricultural community, interested parties elected to remain stakeholders.

TAC members were involved throughout the development of the SWRP through a series of key meetings and phone calls designed to solicit input and provide status updates. TAC members were also tasked with proposing projects, reviewing and commenting on work products, assisting in public engagement, and recommending projects for conceptual design. TAC members were expected to work collaboratively and creatively for the benefit of the PAW, subwatersheds, and stakeholders. A commitment letter, which identified the responsibilities and expectations, was provided to and signed by each TAC member, and is included in Appendix 2B-1.

The TAC met four times between September 2017 and June 2018. The discussion topics, activities, and schedule for each of the TAC meetings are listed below. Additional details are included in Appendix 2B-2 through Appendix 2B-6.

2.3.1 TAC Meeting 1 (Kickoff) – September 20, 2017

- TAC member introductions
- Major goals for TAC Kickoff meeting
- What is a SWRP?
- SWRP process overview
- Roles and responsibilities
- Schedule and key milestones
- Discussion topics
 - Adoption of eligibility and feasibility screening criteria
 - Benefit weighting values
 - Water quality/watershed specific issues
 - Initial projects
 - Outreach
- Next steps

2.3.2 TAC Meeting 2 (Initial Projects and Eligibility/Feasibility Screening Meeting) – December 6, 2017

- Review summary from meeting 1
- Adopt State benefit category prioritizations
- Identify initial projects submitted
- Present preliminary eligibility and feasibility screening of submitted initial projects and top 12 projects
- TAC recommendation for the preliminary initial project list and screening and top 12 projects
- Present Draft Water Quality Compliance Technical Memorandum and multiple benefit technical memoranda

2.3.3 TAC Meeting 3 (SWRP Projects) – April 18, 2018

- Review summary from meeting 2
- Present top 12 SWRP projects: project descriptions, benefit evaluations, and rankings/prioritization
- TAC verification of the final projects rankings/prioritization
- Select 5 projects for additional conceptual design
- Discuss the implementation plan and strategy for each SWRP project

2.3.4 TAC Meeting 4 (Project Prioritization) – May 14, 2018

- Review summary from meeting 3
- Present draft SWRP
- TAC recommendation to adopt the SWRP

2.4 STAKEHOLDERS AND PUBLIC

The City and the TAC identified additional stakeholders whose input would be solicited at several key points during development of the SWRP, including opportunities to submit projects, and when considering major technical and policy issues related to the development and implementation of the SWRP. The general outreach efforts covered disadvantaged communities and climate-vulnerable areas of the PAW. Table 2-3 lists stakeholders (in addition to the utilities and water districts that were listed in Table 2-1) that were invited to participate in the SWRP development process.

Table 2-3. Stakeholders Invited to Participate in SWRP Development			
Stakeholder	Representative	Representation	Participant
City of Yuba City	Darin Gale	Contractors (City contact)	✓
City of Yuba City	Spencer Morrison	Accounting Manager	✓
Building Industry Association	Chris Norem	Building Industry	
Building Industry Association	Katie Donahue	Building Industry	
Teichert Construction	Alberto Ramirez	Building Industry	✓
Laughlin and Spence	Jeff Spence	Civil Engineering	✓
Motna Farms	Jon Munger	Irrigated Agriculture	
Local Citizen	Elizabeth Avelar	Public	✓
Local Citizen	Barinder Suprai	Public	✓

Stakeholders and the general public were invited to three public/stakeholder meetings. Meetings were advertised through emails to potential stakeholders, social media (i.e., Facebook), the local newspaper, the City's website, the County's website, and flyers at the City's public information counter. The advertisements developed for each meeting are included in Appendix 2C.

The schedule, discussion topics, and activities planned for each public/stakeholder meeting are listed below. Meeting agendas, sign-in sheets, presentations, handouts and meeting summaries are also included in Appendix 2C.

2.4.1 Public/Stakeholder Meeting 1 (SWRP Kickoff Meeting) – October 23, 2017

- Purpose of the SWRP
- Describe SWRP objectives/goals
- Describe the initial projects submittal form and submittal process
- Describe initial project screening process
- Present initial projects submitted to date
- Discuss known water quality problems and applicable permits
- Request initial projects

2.4.2 Public/Stakeholder Meeting 2 (SWRP Projects) – January 9, 2018

- Present final initial projects eligibility and feasibility screening results
- Ranking of SWRP projects
- One-page descriptions of the twelve SWRP projects
- Present final community-wide values results
- Request comments

2.4.3 Public/Stakeholder Meeting 3 (Ranked/Prioritized Projects) – May 17, 2018

- Present SWRP project descriptions, evaluations, ranking, prioritization and implementation schedule
- Request comments

Lead agencies for projects selected for implementation will schedule additional Public/Stakeholder meetings to engage the public in project design and when considering major technical and policy issues related to project implementation. The same or similar outreach mechanisms will be used to notify the public of future meetings and other opportunities for participation and providing feedback. Lead agencies will continue to target a wide stakeholder audience to ensure that all interested and affected groups, including DACs and environmental justice groups, will have opportunities to participate and provide feedback.

2.5 NORTH SACRAMENTO VALLEY INTEGRATED REGIONAL WATER MANAGEMENT PLAN, EXISTING PLANNING DOCUMENTS, ORDINANCES, AND PROGRAMS

This section describes the relationship between the SWRP and the North Sacramento Valley Integrated Regional Water Management Plan (NSV IRWMP), the Yuba City Master Drainage Study, and the City's best management practices guidance on low impact development. Other existing planning documents, ordinances, and programs of relevant agencies and organizations are summarized in Chapter 3.

2.5.1 NSV IRWMP

The NSV IRWM is a collaborative effort to enhance coordination of the water resources in six counties, including Butte, Colusa, Glenn, Shasta, Sutter, and Tehama counties. The IRWM is governed by an 18-member Board that consists of three individuals selected by each of the respective county Boards of Supervisors. The IRWM engages multiple agencies, stakeholders, tribes, individuals and groups to address water-related issues and offer solutions which can provide multiple benefits to the region. Representatives of the six counties are working in partnership with community stakeholders, tribes and the public to identify the water-related needs of the region. This information was used to develop goals and objectives of the NSV IRWM Plan and to identify projects and programs to be included in the Plan. The Plan was adopted in April 2014, and positions the region and local partners to receive funding for high-priority projects.

The City of Yuba City will coordinate with the NSV IRWM as needed in order to ensure that the SWRP and the IRWM Plan are consistent and complimentary.

2.5.2 Yuba City Basin Master Drainage Study

The Yuba City Basin Master Drainage Study analyzed flooding issues for existing and buildout conditions in the Yuba City Basin. A hydrologic and hydraulic computer model was created to evaluate the causes of flooding and identify drainage solutions for flooding problems for both existing and buildout land uses. This model was modified to evaluate a 1-year, 1-hour design storm flow rates and water surface elevations in drainage conveyance facilities to size the SWRP projects.

2.5.3 Yuba City Post Construction Standards Plan

This document is a guidance document to provide standards for low impact development and hydromodification techniques for new development that meets certain impervious percent requirements. This document identifies design criteria and best management practices to prevent storm water and dry weather runoff pollution from new development following construction and to increase effective storm water and dry weather runoff management for new and upgraded infrastructure and residential, commercial, industrial, and public development. Where appropriate, SWRP projects will use these standards for design guidance.

2.6 REQUIRED DECISIONS THAT MUST BE MADE BY LOCAL, STATE, OR FEDERAL AGENCIES

The YCB SWRP will be coordinated and implemented within the existing governance framework of the City of Yuba City. It is not anticipated that an altered governance structure will be necessary. However, it is recognized that decisions will be required by local, state and/or federal regulatory agencies for SWRP project selection and implementation. The types of decisions include:

- **Project Prioritization** – The City will continue to identify, prioritize and select priority projects for implementation.
- **Permitting and Environmental Processes** – Once a project is selected, the City and/or project lead will work with the California Department of Fish and Wildlife, the Central Valley Regional Water Board, U.S. Fish & Wildlife, and/or the U.S. Army Corps of Engineers to obtain the necessary permits and approvals.
- **Funding** – the City and project lead will coordinate to submit grant applications, as needed, to obtain funding for high priority projects. This will involve support/approvals from the Central Valley Regional Water Board, State Water Resources Control Board, and the California Department of Water Resources in order to obtain grant funding. In addition, the City or project lead will need to obtain approvals for any grant matches/local financial requirements.
- The final SWRP will be submitted to City Council for adoption in October 2018.
- The final SWRP will be submitted to the North Sacramento Valley Integrated Regional Watershed Management Plan for adoption in October 2018 following the adoption of the SWRP by City Council.

Monitoring and visualization requirements for project implementation will be project-specific. The project applicant will be responsible for fulfilling monitoring and visualization requirements contained in future project-specific grant agreements and will coordinate efforts so that monitoring programs already underway will not be duplicated. In addition, monitoring data will be integrated with datasets from other (i.e., regional) programs.

2.7 ENVIRONMENTAL JUSTICE AND CLIMATE VULNERABLE AREAS

The primary environmental justice and climate vulnerable area/issue in the PAW is that the southern portion of the PAW is subject to flooding from both local drainage and levee failure. This area includes primarily agricultural land uses. Representatives from this area, including Garden Highway Mutual Water Company, Sutter Bypass Butte Slough Water Users Association, and the Yuba Sutter Farm Bureau were contacted and offered membership on the TAC and were also provided opportunities to participate as stakeholders.



CHAPTER 3: DATA COLLECTION

Chapter Contents

- Introduction
- Existing Documents and Studies
- Geographical Information System (GIS) Mapping



3.1 INTRODUCTION

To preclude duplication of past work, and to maximize the use of the past studies and projects, the currently available information and studies were reviewed and are summarized in this chapter.

3.2 EXISTING DOCUMENTS AND STUDIES

3.2.1 Reference 1: Master Drainage Study for Sutter County, September 1979

This study was prepared by George S. Nolte and Associates for Sutter County (County). This report evaluated both the Live Oak Canal and Gilsizer Slough. The Live Oak Canal and Gilsizer Slough improvements were sized for a 50-year storm event with one foot of freeboard. In this study, all private road crossings were assumed to be enlarged at the owner's cost. This report includes a map that provides a summary of all of the Live Oak Canal culverts as of 1979; this map probably depicted the facilities accurately in 1979, but it may not accurately represent current conditions.

For Gilsizer Slough, three alternatives were evaluated, including:

1. Full channel conveyance in which peak flows are conveyed in the Gilsizer Slough without detention;
2. Full channel conveyance to one detention basin located just downstream of Oswald Road; and
3. Full channel conveyance to two detention basins located just downstream of Bogue Road and Oswald Road.

The third alternative was recommended, which included no improvements downstream of Oswald Road. The estimated cost of the recommended alternative was \$6.4 million in 1979 dollars (May 1979, Engineering News Record Construction Cost Index (ENR CCI) of 2890). Inflated to July 2015 (ENR CCI of 10,037), this cost would be \$22.2 million. However, the recommended improvements have not been implemented.

For the Live Oak Canal, two alternative improvement plans were identified, including:

1. Full channel enlarging and deepening (by 7 feet) of the Live Oak Canal, and
2. Pumping of runoff from trunk lines into the channel.

The first alternative was recommended, and this alternative included no improvements downstream of the point the Live Oak Canal flows into the State Drain (even though this alternative would deliver greatly increased flows to the State Drain). The estimated cost of the recommended alternative was \$4.9 million in 1979 dollars. Inflated to July 2015, this cost would be \$17.1 million. However, most of the recommended improvements have not been implemented.

3.2.2 Reference 2: Live Oak Canal Crossing at State Route 20, Predesign Analysis, September 5, 1995

This study was prepared by MHM Inc. for the County, Department of Public Works. At the time of this report, the Live Oak Canal crossing of Route 20 was a single, 30-inch pipe which was located above the invert of the channel. The lack of sufficient pipe capacity apparently contributed to flooding upstream of Route 20. This report evaluated five improvement options, but no specific option was recommended. Since this report, it appears that an additional 72-inch culvert was added at the Live Oak Canal crossing of Route 20.

3.2.3 Reference 3: Live Oak Canal and North Township Road Areas Drainage Study, November 29, 1995

This study was prepared by MHM Inc. for the County, Department of Public Works. This study evaluated improvements to reduce/eliminate flooding in three specific areas, including Dresser Road, Daphne Lane, and North Township Road. It also proposed a set of improvements for the Live Oak Canal. This report provides a wealth of information on the history and current status (per 1995) of the Obanion Road Pump Station.

3.2.4 Reference 4: Design Storm Runoff: Sutter County California, prepared by David Ford Consulting Engineers, July 1998

This very useful document provides design storm rainfall duration-depth-frequency data, rainfall distribution data, and data/methodologies for transforming rainfall into runoff hydrographs. It includes Reference 5 as an appendix.

3.2.5 Reference 5: Design Rainfall Study for Sutter County, prepared by James D. Goodridge, June 11, 1998

This document develops and provides design rainfall depths for the County for mean annual precipitations of 15 to 22 inches, return frequencies of two years to 200 years, and durations of five minutes to one year.

3.2.6 Reference 6: Sutter County Master Drainage Plan, March 2002

This report was prepared by Psomas for the County. This County-wide study includes report sections on the Live Oak Canal. This study delineated the boundaries of major watersheds within the County. The study evaluated the adequacy of culverts under public arterial roadways. It did not evaluate the adequacy of private road crossings or channel capacities. This study provides a summary of the culvert sizes under public roadways.

3.2.7 Reference 7: Yuba City Sphere of Influence Master Drainage Plan, March 2002

This report was prepared by Psomas for the County. The study developed trunk drain sizes and lengths to convey runoff from future development areas to the Live Oak Canal. Costs for the proposed storm drains were also developed.

3.2.8 Reference 8: Sutter County General Plan Background Report

This document provides some information related to depths to groundwater. The depths to groundwater vary greatly by area. This document also provides a good general understanding of the major watersheds in the County, the major rivers and bypasses bordering the County, and the drainage and flood control-related issues (as of 2008).

3.2.9 Reference 9: Sutter County General Plan

This document provides the County's goals and policies related to storm drainage and flood protection. The land use and zoning maps are also provided. Appendix C of the General Plan provides historical flood information.

3.2.10 Reference 10: West Yuba City Master Drainage Study, prepared by West Yost Associates, March 2006

This study evaluated four alternatives to provide drainage service to the West Yuba City Area, which is tributary to the Live Oak Canal. It included estimates of capital costs, operations and maintenance costs, and life cycle costs. Alternative 4 was selected as the recommended project, which separated the Live Oak Canal watershed into a north watershed with a Northern Detention Basin and a south watershed with a Southern Detention Basin. In both watersheds, the Live Oak Canal was greatly enlarged to increase the conveyance capacity. Also, trunk storm drains were planned and sized to convey runoff from future growth areas to the Live Oak Canal. Alternative 4 had a total capital cost of \$137.2 million.

3.2.11 Reference 11: Drainage Project Feasibility, Addendum A, Alternative 5, prepared by West Yost Associates, August 2012

This document was an addendum to the West Yuba City Master Drainage Study that evaluated a fifth alternative. In Alternative 5, several major trunk storm drains were eliminated (previously included in Alternative 4), the drainage facilities in the northern watershed were reconfigured to reduce costs, and contingency engineering percentages were reduced. The estimated capital cost of Alternative 5 was \$38.8 million.

3.2.12 Reference 12: Sutter Butte Flood Control Agency Interior Drainage Analysis, prepared by Peterson, Brustad, Inc. October 2011

This study analyzed the 1 percent and 0.5 percent annual exceedance probability to develop flood depths and boundaries. The purpose of this study was to meet Federal Emergency Management Agency (FEMA) levee mapping requirements and to support compliance with the State of California Urban Level of Flood Protection criteria. The study area included the Sutter Basin from north of Biggs to the confluence of the Sutter Bypass and Feather River. HEC-HMS and HEC-RAS were used to develop runoff hydrographs and system drainage, and Flow 2D was used to analyze flooding impacts from levee breaks. The study found that the majority of flooding depths were less than 0.5 feet and were contained in agricultural areas adjacent to the drainage channels. However, the most prominent flooding within the Yuba City Basin occurred around the Department of Water Resources (DWR) pump stations and ranged from 0 to 3 feet while some additional, shallow flooding occurred along Gilsizer Slough north of Obanion Road.

3.2.13 Reference 13: Yuba City Basin Master Drainage Study, West Yost Associates, February 2018

This study analyzed flooding issues for existing conditions in the Yuba City Basin. Historical flooding issues were identified. A hydrologic and hydraulic computer model was created to evaluate the causes of flooding. The model was calibrated using small storms from 2016 and input from operators. Design storms were used to identify flooding issues. Solutions within available agency budgets were developed to reduce flooding risks, including two small detention basin projects. The basins were selected because they were located in one of the few areas considered feasible for detention basins within the City. These projects were developed to provide benefits (i.e., a decrease in water surface elevations) to the entire drainage system, although the majority of the decrease in water surface elevations is located closely upstream or downstream of the projects. These small detention basin projects will contribute to reductions in local flooding issues, and can be designed to optimize infiltration and improve water quality.

Projects were also developed to mitigate impacts from development. Twenty-one detention basins were preliminarily sited and sized, and cost estimates were prepared.

3.2.14 Reference 14: Sutter County Groundwater Management Plan, Wood Rodgers March 2012

This report provides a summary of geologic characteristics, hydrology and surface water, and groundwater levels, quantity, and quality for the County.

3.2.15 Reference 15: Yuba City Post Construction Standards Plan

This document is a guidance document to provide standards for low impact development and hydromodification techniques for new development that meets certain impervious percent requirements. This document identifies design criteria and best management practices to prevent storm water and dry weather runoff pollution for new development following construction and increase effective storm water and dry weather runoff management for new and upgraded infrastructure and residential, commercial, industrial, and public development.

3.2.16 Reference 16: North Sacramento Valley Integrated Regional Water Management Plan

The PAW is located within the NSV IRWM area. The NSV IRWM provides information on many of the water features in the NSV watershed. The IRMP also identifies critical and foundational goals and objectives for the watershed. Part of the purpose of the IRMP was to prioritize a list of projects. A project that involves detention on Live Oak Canal is included in the list of IRWMP projects.

3.2.17 Reference 17: City of Yuba City 2015 Urban Water Management Plan

The purpose of the UWMP is to maintain efficient use of urban water supplies, continue to promote conservation programs and policies, ensure that sufficient water supplies are available to meet future water demands, and provide a mechanism for response during water drought conditions. This document did not identify any opportunities for storm water to be used as a source of potable or non-potable water supply.

3.2.18 Reference 18: Wastewater System Master Plan Update, Revised March 2006

The City owns and operates a wastewater collection, treatment, and disposal system to provide separate sewer infrastructure to City residents. In order to prepare for expected growth in the western part of the sphere of influence (SOI) of the City, the City updated its Wastewater System Master Plan. The scope of the plan covers the collection system and wastewater treatment system within the City Limits, but focuses on the collection system within the SOI and expected impacts to the wastewater treatment system due to growth within the City's current boundaries and within the SOI. No ties to storm water were noted as part of this report.

3.3 GEOGRAPHICAL INFORMATION SYSTEM MAPPING

Geographical Information System (GIS) mapping was provided by the City and County. Table 3-1 presents the GIS mapping received.

Table 3-1. GIS Shapefiles

GIS Shapefile Description	Relevance to SWRP
Boundary – City	Identify internal boundaries and urbanization
Boundary – City Sphere of Influence	Identify internal boundaries and urbanization
Boundary – County	Identify internal boundaries
Boundary – Watershed	Identify internal boundaries
Boundary – Disadvantaged Communities	Strategies to engage DACs
Boundary – Tribal Areas	Strategies to engage tribal communities
Boundary – Sewer Area	Identify internal boundaries
Boundary – Water Districts (Municipal)	Identify internal boundaries and where potable water is supplied
Boundary – Irrigation Districts	Identify internal boundaries and where irrigation water is supplied
Boundary – Drainage Districts	Identify internal boundaries and identify agencies managing drainage
Flood – Levees	Identify flood control facilities
Floodplains	Identify locations of delineated flooding
Geology/soils	Identify Hydrologic soil groups
Habitat	Identify locations of habitat
Land Use – Existing, County	Identify existing land use (and therefore impervious coverage) for the County, shows location of parks, open space, and publicly owned land
Public Land – Parks	Identify publicly owned land
Public Land – Easements	Identify publicly owned easements
Storm Facilities – Detention Basins	Identify locations of storm drainage facilities to guide project identification process
Storm Facilities – Storm Drains	Identify locations of storm drainage facilities to guide project identification process
Surface Slope	Identify locations of steep/flat slopes to guide project identification process
Water Source – Groundwater Basins	Identify ground water resources, ground water basins
Water Source – Rivers and Streams	Identify surface water resources
Water Source – City Groundwater Wells	Identify locations of wells for potential recharge opportunities
Water Source – City Non-Potable Wells	Identify locations of wells for potential recharge opportunities



CHAPTER 4: QUANTITATIVE METHODS

Chapter Contents

- Process Overview
- Project Identification Methods
- Screening Criteria
- Project Evaluation Methodology
- Storm Water Quality Evaluation Criteria for Implementation Projects
- Ranking and Prioritizing Projects
- Data Management



To be consistent with State Water Code requirements, the YCB SWRP is required to develop and utilize a metrics-based analysis to demonstrate that its proposed storm water and dry water capture projects and programs will satisfy the State’s identified water management objectives and have multiple benefits. This section outlines the overall methodology for soliciting, screening, analyzing, and prioritizing SWRP projects in accordance with the State Water Resource Control Board’s Storm Water Resource Plan Guidelines (SWRCB, 2015b).

4.1 PROCESS OVERVIEW

The methodology used to identify and prioritize projects can be summarized as a four-step process:

1. Project Identification
2. Project Screening
3. Project Evaluation
4. Project Prioritization

The methodology used in each of the four steps is discussed in greater detail in the following sections.

Due to the absence of a single, watershed-wide modeling suite to identify or quantify all possible SWRP project benefits, an analysis matrix was developed to evaluate the significance of each potential project benefit outlined in the SWRP Guidelines, normalize the amount of benefit expected into a point score, and then sum the total points value for all project benefits. This strategy allows local control over the prioritization to optimize regional benefits, while ensuring compliance with SWRP Guidelines that will position prioritized projects for future funding solicitations. The methodology is open and transparent, allowing input from the public, stakeholders, and the TAC, and it is adaptable to evaluate a variety of project types.

4.2 PROJECT IDENTIFICATION METHODS

Projects were identified through a public request and submittal process. Members of the TAC, stakeholders, and members of the public were asked to submit ideas for projects. The YCB watershed area has one project included in the North Sacramento Valley Integrated Regional Watershed Management Plan that included building two large detention basins, one for a “north system” and one for a “south system.” The PAW does not have a green infrastructure plan or Watershed-based Water Quality Priorities and Projects, so the project submittal period was crucial to the development of the SWRP.

The project submittal period was open from September 20, 2017 (the first TAC meeting) until November 6, 2017 (two weeks following the first public meeting). A list of projects submitted are included in Table 4-1.

Projects were considered important if they resulted in the multiple benefits identified by the State. Important project components were communicated to the TAC, stakeholders, and public during TAC Meeting 1, and Public Meeting 1.

Table 4-1. Initial Submitted Projects

Reference to Project Number	Project Number	Project Name
	Category A	Modify Existing Detention Basins: Remove Existing concrete low flow channels and replace with vegetated swales, add trash capture where required, add playfields or parks, add water quality basins
4, 12, 13, 15, 20	A1	Gilsizer Slough North Detention Pond (includes water quality upgrades in corp yard)
5, 12, 13	A2	Northeast Yuba City Detention Pond
6, 12, 13	A3	North Yuba City Detention Pond
7, 12, 13	A4	South Yuba City Improvement District Detention Pond – North Pond
8, 12, 13	A5	South Yuba City Improvement District Detention Pond – South Pond
21	A6	Detention Basin between Hwy 99 and Civic Center Blvd, north of Hwy 20.
--(a)	A7	Detention Pond just east of WWTP
	Category B	Proposed Regional Detention Basins: Provide flood control for large storms and infiltration for small storms. Includes multi-use playfields, water quality basins, and vegetated swales.
1	B1	Newkom Ranch Detention Pond, for development
2	B2	Kells Ranch Detention Pond, for development
3	B3	North Township Area Detention Pond, for development
22	B4	Roosevelt Road Detention Pond, for existing flooding issues
	Category C	Widen Segments of Channels to Add Water Quality Features and Bike Paths
10	C1	Gilsizer Slough, from Lincoln Road to Stewart Road
9	C2	Live Oak Canal, from Wilder Estates to Bogue Road
	Category D	Flow Diversion
11	D1	Divert stormwater from the Gilsizer and Live Oak Canals to father south in the basin for agricultural and habitat use
	Category E	Update or Create Standards and Plans
12, 13	E1	Standards for detention basins: Modify detention basin standards to allow recreational use of the basin, while meeting flood control, infiltration requirements, and trash control. Revise low flow channel design standards to provide infiltration.
14	E2	Standards for Gilsizer Slough: Minimize erosion, improve side slope, and standardize pipe inlets into the canal to increase trash capture
12, 19	E3	Trash capture master plan: Identify locations where trash capture is needed. Include standards for installing pipes into channels to control trash sources, and for installing trash screens in detention basins
	Category F	Trash Capture Projects: Infiltration Swales, Daylighting Storm Drains, and Trash Racks
16	F1	Walton Pipeline along Lincoln Road - daylight storm drain and add an infiltration swale and trash rack
17	F2	Onstott Pipeline along Highway 99 - daylight storm drain and add an infiltration swale and trash rack
18	F3	Add trash rack at Orchard and Park
--(a)	F4	Lincoln Road storm drain, along Lincoln Road - daylight storm drain and add an infiltration swale and trash rack
--(a)	F5	Jefferson Ditch - add infiltration detention area and trash rack
--(a)	F6	Del-Monte Square Commercial Park Storm Drain - daylight storm drain and add an infiltration swale and trash rack

(a) This project was added after discussing high priority issues at TAC Meeting 2 (December 6, 2017).

4.3 SCREENING CRITERIA

To identify the twelve SWRP projects to be evaluated further (consistent with the authorized scope of work), a two-step screening process was used. All projects originally submitted are included in this SWRP (Table 4-1), but only the screened SWRP projects were evaluated qualitatively and quantitatively for the benefits they provide. The TAC adopted the following screening criteria at the September 20, 2017 TAC meeting.

The first step in the screening process is the eligibility screening, which is presented in Table 4-2 and includes the following:

- **Location** – The SWRP Projects must be located in the YCB watershed and subwatersheds as defined in the Planning Area Watershed Description letter from West Yost Associates to Manu Dhaliwal, dated November 28, 2017. This criterion was evaluated as either Yes or No.
- **Capture** – As encouraged by the State SWRP Guidelines, each SWRP project should have a component of storm water or dry weather runoff capture. During the screening process, the State clarified that projects submitted to the SWRP can be general storm water projects and do not necessarily have to provide capture. Therefore, this criterion was for information only, and projects were not eliminated using this criterion.
- **Benefits** – As required by the State SWRP Guidelines, each SWRP Project must have at least two main benefits and as many additional benefits as possible. See Table 4 of the SWRP Guidelines for the list of main and additional benefits. Projects that provide more than the minimum benefits were prioritized above projects that meet only the minimum number of benefits. This criterion was evaluated as either Yes or No.
- **Project Sponsor** – The SWRP Project must have a sponsor that can fund the initial capital costs and the annual operations and maintenance of the project. This criterion was evaluated as either Yes or No, and the sponsor was identified.

Table 4-2. Eligibility Screening

Reference to Original Number	Project Number	Project Name	Located in Yuba City Basin	Includes Capture	Meets State's Benefit Requirements	Funding Sponsor
	Category A	Modify Existing Detention Basins: Remove existing concrete low flow channels and replace with vegetated swales, add trash capture where required, add playfields or parks, add water quality basins				
4, 12, 13, 15, 20	A1	Gilsizer Slough North Detention Pond (includes water quality upgrades in corp yard)	Yes	Yes	Yes	Yes, Yuba City
5, 12, 13	A2	Northeast Yuba City Detention Pond	Yes	Yes	Yes	Yes, Yuba City
6, 12, 13	A3	North Yuba City Detention Pond	Yes	Yes	Yes	Yes, Yuba City
7, 12, 13	A4	South Yuba City Improvement District Detention Pond – North Pond	Yes	Yes	Yes	Yes, Yuba City
8, 12, 13	A5	South Yuba City Improvement District Detention Pond – South Pond	Yes	Yes	Yes	Yes, Yuba City
21	A6	Detention Basin between Hwy 99 and Civic Center Blvd, north of Hwy 20.	Yes	Yes	Yes	Yes, Yuba City
-- (b)	A7	Detention Pond just east of WWTP	Yes	Yes	Yes	Yes, Yuba City
	Category B	Proposed Regional Detention Basins: Provide flood control for large storms and infiltration for small storms. Includes multi-use playfields, water quality basins, and vegetated swales				
1	B1	Newkom Ranch Detention Pond	Yes	Yes	Yes	Yes, Yuba City
2	B2	Kells Ranch Detention Pond	Yes	Yes	Yes	Yes, Yuba City
3	B3	North Township Area Detention Pond	Yes	Yes	Yes	Yes, Yuba City
22	B4	Roosevelt Road Detention Pond	Yes	Yes	Yes	Yes, Yuba City
	Category C	Widen segments of channels to add water quality features and bike paths				
10	C1	Gilsizer Slough, from Lincoln Road to Steward Road	Yes	Yes	Yes	Yes, Yuba City
9	C2	Live Oak Canal, from Wilder Estates to Bogue Road	Yes	Yes	Yes	Yes, Yuba City
	Category D	Flow Diversion				
11	D1	Divert stormwater from the Gilsizer and Live Oak Canals to farther south in the basin for agricultural and habitat use	Yes	Yes	Yes	Yes, Agriculture water districts
	Category E	Update or create standards and plans				
12, 13	E1	Standards for detention basins: Modify detention basin standards to allow recreational use of the basin, while meeting flood control, infiltration requirements, and trash control. Adjust low flow channel design standards to provide infiltration.	Yes	Yes	Yes	Yes, Yuba City
14	E2	Standards for Gilsizer Slough: Minimize erosion, improve side slope, and standardize pipe inlets into the canal to increase trash capture	Yes	Yes	Yes	Yes, Yuba City
12, 19	E3	Trash capture master plan: Identify locations of where trash capture is needed. Include standards for installing pipes into channels to control trash sources, and for installing trash screens in detention basins	Yes	Yes	Yes	Yes, Yuba City
	Category F	Trash Capture Projects: Infiltration swales, daylighting storm drains, and trash racks				
16	F1	Walton Pipeline along Lincoln Road - daylight storm drain and add an infiltration swale and trash rack	Yes	Yes	Yes	Yes, Yuba City
17	F2	Onstott Pipeline along Highway 99 - daylight storm drain and add an infiltration swale and trash rack	Yes	Yes	Yes	Yes, Yuba City
18	F3	Add trash rack at Orchard and Park	Yes	No ^(a)	Yes	Yes, Yuba City
-- (b)	F4	Lincoln Road storm drain, along Lincoln Road - daylight storm drain and add an infiltration swale and trash rack	Yes	Yes	Yes	Yes, Yuba City
-- (b)	F5	Jefferson Ditch - add infiltration detention area and trash rack	Yes	Yes	Yes	Yes, Yuba City
-- (b)	F6	Del-Monte Square Commercial Park Storm Drain - daylight storm drain and add an infiltration swale and trash rack	Yes	Yes	Yes	Yes, Yuba City
(a) This project does not provide capture of stormwater, but the State of California clarified that projects submitted to the SWRP can be general stormwater projects, and do not necessarily have to provide capture. Therefore, this project was not removed during the eligibility screening.						
(b) This project was added after discussing high priority issues at TAC Meeting 2 (December 6, 2017).						

The second step in the screening process is the feasibility screening, which is presented in Table 4-3, and includes the following:

- **Estimated Affordability** – The SWRP Projects must be affordable to the sponsoring agency. This criterion was evaluated as High, Medium, or Low. High indicates the project is affordable while low indicates the project is not affordable.
- **Implementability** – SWRP Projects must be feasible. This criterion includes compliance with all applicable federal and state laws, the cost of potential environmental impacts, permitting, complexity, and anticipated community support/opposition. This criterion was evaluated as High, Medium, or Low. High indicates the project is relatively easy to implement while low indicates that the project may be complex or hard to implement.
- **Regulatory Requirements** – Projects that help an agency meet regulatory requirements, (including compliance with the Trash Amendments), rules, or guidelines, received a High rating, while projects that were just “good to implement,” received a Medium or Low rating.
- **Publicly Owned Land** – The SWRP Guidelines recommend that projects be sited on publicly owned lands (page 15). This criterion was evaluated as High, Medium, or Low. High indicates the project is fully located on publicly owned land, while low indicates that the project is not on publicly owned land.
- **Trash Amendment Priority** – At the TAC Meeting 2 (held on December 6, 2017), the members of the TAC decided to prioritize projects that help the City meet the Trash Amendment requirements. Projects that help the City meet Trash Amendment requirements received a High rating.

A score of High was allocated five points, Medium was allocated 3 points, and Low was allocated one point. The twelve projects that received the highest scores moved onto the evaluation phase to be evaluated for the State’s Benefits. These twelve projects are called the “SWRP projects.” The other projects continue to be called “Initial projects.”

Table 4-3. Feasibility Screening

Reference to Original Number	Project Number	Project Name	Affordability	Implement-ability	Helps Agency Meet Regulatory Requirements ^(a)	Public Land	Trash Amendment Priority	Score	Results	Reasoning
	Category A	Modify Existing Detention Basins: Remove existing concrete low flow channels and replace with vegetated swales, add trash capture where required, add playfields or parks, add water quality basins								
4, 12, 13, 15, 20	A1	Gilsizer Slough North Detention Pond (includes water quality upgrades in corp yard)	Medium	High	High	High	High	23	SWRP	Top 12
5, 12, 13	A2	Northeast Yuba City Detention Pond	Medium	High	Low	High	Low	15	Initial	Top 12
6, 12, 13	A3	North Yuba City Detention Pond	Medium	High	Low	High	Low	15	Initial	Top 12
7, 12, 13	A4	South Yuba City Improvement District Detention Pond – North Pond	Medium	High	High	High	High	23	SWRP	Top 12
8, 12, 13	A5	South Yuba City Improvement District Detention Pond – South Pond	Medium	High	Low	High	Low	15	Initial	Top 12
21	A6	Detention Basin between Hwy 99 and Civic Center Blvd, north of Hwy 20.	Medium	High	Medium	Medium	Low	15	Initial	Top 12
-- ^(b)	A7	Detention Pond just east of WWTP	Medium	High	High	High	High	23	SWRP	Top 12
	Category B	Proposed Regional Detention Basins: Provide flood control for large storms and infiltration for small storms. Includes multi-use playfields, water quality basins, and vegetated swales								
1	B1	Newkom Ranch Detention Pond	Medium	Medium	Low	Medium	Low	11	Initial	Low score
2	B2	Kells Ranch Detention Pond	Medium	Medium	Low	Medium	Low	11	Initial	Low score
3	B3	North Township Area Detention Pond	Medium	Medium	Low	Medium	Low	11	Initial	Low score
22	B4	Roosevelt Road Detention Pond	Low	Medium	Medium	Low	Low	9	Initial	Low score
	Category C	Widen segments of channels to add water quality features and bike paths								
10	C1	Gilsizer Slough, from Lincoln Road to Steward Road	Medium	Low	Low	Medium	Low	9	Initial	Low score
9	C2	Live Oak Canal, from Wilder Estates to Bogue Road	Medium	Low	Low	Medium	Low	9	Initial	Low score
	Category D	Flow Diversion								
11	D1	Divert stormwater from the Gilsizer and Live Oak Canals to the southern part of the basin for agricultural and habitat use.	Low	Low	Low	Medium	Low	7	Initial	Low score
	Category E	Update or create standards and plans								
12, 13	E1	Standards for detention basins: Modify detention basin standards to allow recreational use of the basin, while meeting flood control, infiltration requirements, and trash control. Adjust low flow channel design standards to provide infiltration.	High	High	High	N/A	Medium	19	SWRP	Top 12
14	E2	Standards for Gilsizer Slough: Minimize erosion, improve side slope, and standardize pipe inlets into the canal to increase trash capture	High	High	High	N/A	Medium	19	SWRP	Top 12
12, 19	E3	Trash capture master plan: Identify locations of where trash capture is needed. Include standards for installing pipes into channels to control trash sources, and for installing trash screens in detention basins	High	High	High	N/A	High	21	SWRP	Top 12
	Category F	Trash Capture Projects: Infiltration swales, daylighting storm drains, and trash racks								
16	F1	Walton Pipeline along Lincoln Road - daylight storm drain and add an infiltration swale and trash rack	Medium	Medium	High	Low	High	17	SWRP	Low score
17	F2	Onstott Pipeline along Highway 99 - daylight storm drain and add an infiltration swale and trash rack	Medium	Medium	High	Low	High	17	SWRP	Low score
18	F3	Add trash rack at Orchard and Park for ease of maintenance. Consider configuring for trash amendments.	Medium	Medium	High	High	High	21	SWRP	Top 12
-- ^(b)	F4	Lincoln Road storm drain, along Lincoln Road - daylight storm drain and add an infiltration swale and trash rack	Medium	Medium	High	Low	High	17	SWRP	Low score
-- ^(b)	F5	Jefferson Ditch - add infiltration detention area and trash rack	Medium	Medium	High	High	High	21	SWRP	Top 12
-- ^(b)	F6	Del-Monte Square Commercial Park Storm Drain - daylight storm drain and add an infiltration swale and trash rack	Medium	Medium	High	Medium	High	19	SWRP	Top 12
Total Projects									23	
Total SWRP Projects									12	
Initial Projects									11	
(a) If an agency is required to meet State or Federal permits or requirements (such as the Trash Amendments) and the project helps meet those requirements, the project receives a "High".										
(b) This project was added after discussing high priority issues at TAC Meeting 2 (December 6, 2017).										

4.4 PROJECT EVALUATION METHODOLOGY

In accordance with Table 4 of the SWRP guidelines, SWRP Projects must provide multiple benefits to maximize the State's identified Benefit Categories; including water quality, water supply, flood management, environment, and the community. Projects were evaluated either quantitatively or qualitatively for how well they met these State's Benefit Categories.

The TAC prioritized the State's Benefit Categories for the YCB watershed. The prioritization of benefits is shown in Table 4-4; with higher scores meaning the benefit is more important and lower scores meaning the benefit is less important. This prioritization was used to calculate the maximum score possible for each benefit category, also shown in Table 4-4.

Table 4-4. Prioritization of Each Benefit Category		
State Benefit Categories	TAC Prioritization of Category	Maximum Score Possible for Project Evaluations
Water Quality	8.0	80
Water Supply	8.1	81
Flood Management	9.4	94
Environment	4.0	40
Community	5.4	54

The SWRP projects submitted included different types of storm water projects, including planning studies and implementation projects. The projects were separated into two categories: plans/studies (hereafter referred to as planning projects) and implementation projects.

Implementation projects were evaluated both qualitatively and quantitatively based on how well they achieved each of the State- and TAC-identified benefits relative to the other implementation projects. Table 4-5 shows the multiple evaluation criteria under each State-identified benefit category and explains the method of analysis for each criterion. The dark grey rows indicate a primary benefit, while light grey rows indicate an additional benefit, as defined by the State. The non-shaded rows represent additional evaluation criteria that were considered help information. The total possible points for each category is shown in Table 4-5.

Due to the difficulty of evaluating quantitative benefits for plans, projects included in the planning category were evaluated qualitatively based on how well they achieve each of the five State-identified benefits relative to the other SWRP planning projects. Planning projects were evaluated based on the general content of the plans. Table 4-6 shows how the five benefit categories were evaluated for planning projects. The total possible points shown in the last column of Table 4-6 were established to be the same as the total possible points for the implementation projects so that the overall ranking of implementation and planning projects would be based on the same total possible point value.

The benefit categories have the same possible points for both planning projects and implementation projects and the same total possible points.

Table 4-5. Method of Evaluation for Implementation SWRP Projects				
Evaluation Criteria	Quantitative Evaluation Criteria (Metric)	Qualitative Evaluation Criteria (Metric)	Method of Analysis	Point Allocation
Water Quality Benefit Category (Increased filtration and/or treatment of runoff)				
- Natural water drainage and treatment		Not Improved, Improved	Improved = Establish natural water drainage (allow more infiltration)	Not Improved (0 pts), Improved (10 pts)
- Nonpoint source pollution control. See Priority Pollutants, (i.e. 303(d) List Pollutants) listed below:				
- Sediment, mercury, Group A Pesticides, and oxygen demanding substances	lbs/year of sediment (TSS) removed		<p><i>Mercury concentrations associated with sediment concentrations, so projects that remove sediment will also remove mercury. Constructed wetlands enhance mercury methylation. The amount of flow treated is relative to the mercury removed.</i></p> <p><i>Group A Pesticides include DDT and Dieldrin: Urban SW preliminary data summary found that DDT in urban storm water exceeded health criteria of DDT in water. Even though DDT was banned in 1970s, its very persistent and thus likely present in soils. Organochlorine levels are declining in environment as a whole. Projects that remove sediment may also remove DDT. Dieldrin was banned in 1985. Very persistent and thus likely present in soils. Organochlorine levels are declining in environment as a whole. Projects that remove sediment may also remove Dieldrin.</i></p> <p><i>The Effectiveness Evaluation of BMPs in Portland Oregon (2005) uses TSS as a surrogate for oxygen demand, including biochemical oxygen demand, chemical oxygen demand, and total organic carbon.</i></p> <p>- Calculate flow per year to project within drainage watershed. - Calculate loading to project per year, using average inflow concentration in Table 7. - Use average percent removal for pollutant in Table 7.</p>	0 to 10 points based on estimated load reduction relative to the maximum load reduction for all implementation SWRP Projects.
- Chlorpyrifos, Diazinon, Oxyfluorfen		None, Medium, High	<p><i>Diuron is a non-banned pesticide. Chlorpyrifos and diazinon are restricted use pesticides.</i></p> <p>None = No change in pesticide use Medium = Reduces use of pesticides High = Eliminates use of pesticides</p>	None (0 pts), Medium (5 pts), High (10 pts)
- PCBs	lb/year of PCBs removed		<p>PCBs can enter a watershed through transformers, atmospheric deposition, and eroded or re-suspended particles. PCBs tend to behave like sediment, and can be settled out. BMPs that remove PCBs will need to be maintained with special handling and disposal.</p> <p>- Calculate flow per year to project within drainage watershed. - Calculate loading to project per year, using average inflow concentration in Table 7. - Use average percent removal for pollutant in Table 7.</p>	0 to 10 points based on load reduction relative to the maximum load reduction for all implementation SWRP Projects.
- Trash	amount of trash captured based on trash generation by land-use rate		<p>- Calculate loading to project using average trash generation for high trash generating land uses shown in Table 8. - Normalize total trash generation by drainage watershed area. - Assume full capture equivalency trash systems will be implemented.</p>	0 to 10 points based on trash removal relative to maximum trash removals for all implementation Projects.
- Fecal Coliform	MPN/year		<p>- Calculate flow per year to project within drainage watershed. - Calculate loading to project per year, using average trash generation rate in Table 8. - Use average percent removal for pollutant in Table 7.</p>	0 to 10 points based on load reduction relative to the maximum load reduction for all implementation SWRP Projects.
- Heavy Metals (cadmium, copper, lead, and zinc)	lbs/year of heavy metals removed		<p>These metals are detected in nearly all of urban storm water samples and exceed aquatic life standards. Typical sources include roofing, brake pads, tire wear, and vehicle emissions.</p> <p>- Calculate flow per year to project within drainage watershed. - Calculate loading to project per year, using average inflow concentration in Table 7. - Use average percent removal for pollutant in Table 7.</p>	0 to 10 points based on load reduction relative to the maximum load reduction for all implementation SWRP Projects.
- Oils and grease (polyaromatic hydrocarbons or PAHs)	lb/year of PAHs removed		<p>- Calculate flow per year to project within drainage watershed. - Calculate loading to project per year, using average inflow concentration in Table 7. - Use average percent removal for pollutant in Table 7.</p>	0 to 10 points based on load reduction relative to the maximum load reduction for all implementation SWRP Projects.
- Total Nitrogen	lb/year of Nitrogen removed		<p>- Calculate flow per year to project within drainage watershed. - Calculate loading to project per year, using average inflow concentration in Table 7. - Use average percent removal for pollutant in Table 7.</p>	0 to 10 points based on load reduction relative to the maximum load reduction for all implementation SWRP Projects.
- Total Phosphorus	lb/year of Phosphorus removed		<p>- Calculate flow per year to project within drainage watershed. - Calculate loading to project per year, using average inflow concentration in Table 7. - Use average percent removal for pollutant in Table 7.</p>	0 to 10 points based on load reduction relative to the maximum load reduction for all implementation SWRP Projects.
- Infiltration	acre-feet/year		<p>-Estimate the amount of flow to the project - Estimate the amount of infiltration based on BMP design and saturated hydraulic conductivity</p>	0 to 10 points based on infiltration volume relative the maximum infiltration volume for all implementation SWRP Projects.
Possible Points				110.00
Water Supply Benefit Category				
- Water supply reliability		None, Low, Medium, High	<p>High = augments a water supply, replaces a water supply, and reduces dependence on imported water Medium = does 2 out of the 3 Low = does 1 out of the 3 None = does 0 out of the 3</p>	None (0 pts), Low (3 pts), Medium (6 pts), High (10 pts)
- Conjunctive Use		Not Improved, Improved	Improved = Stormwater used as an additional or alternative water supply	Not Improved (0 pts), Improved (10 pts)
- Water Conservation	acre-feet/year		Estimate the amount of water this project may conserve	0 to 10 points based on estimated volume relative to total range of estimated volumes for all implementation SWRP Projects.
Possible Points				30.00

Table 4-5. Method of Evaluation for Implementation SWRP Projects				
Evaluation Criteria	Quantitative Evaluation Criteria (Metric)	Qualitative Evaluation Criteria (Metric)	Method of Analysis	Point Allocation
Flood Management Benefit Category				
- Reduction of runoff rate/volume		None, Low, Medium, High	None = project does not reduce runoff rate/volume Low = reduce runoff rate/volume slightly Medium = reduces runoff rate/volume High = eliminates runoff	None (0 pts), Medium (5 pts), High (10 pts)
- Sanitary sewer overflow reduction	acres of urban floodplain reduction		Estimate how many acres are removed from the floodplain	0 to 10 points based on estimated acreage reduced relative to maximum acreage reduced for all implementation SWRP Projects.
- Improved flood protection	number of houses/businesses protected		Estimate how many buildings are removed from the floodplain	0 to 10 points based on estimated number protected relative to maximum of estimated buildings protected for all implementation SWRP Projects.
- Reduction of flood risk-life and safety		None, Low, Medium, High	None = project does not reduce flooding Low = reduces flooding slightly Medium = reduces street flooding High = protects houses and businesses	None (0 pts), Low (3 pts), Medium (6 pts), High (10 pts)
Possible Points				40.00
Environmental Benefit Category				
- Create or improve wetland/riparian habitat	acres		Estimate amount of acres created or improved	0 to 10 points based on estimated acreage relative to total range of estimated acreages for implementation SWRP Projects.
- Environmental flow (Instream Flow)		Degrade, No change, Enhance	Degrade = Degrade/decrease environmental flows through reduction in runoff No change = no change Enhance = Enhance/increase environmental flows	Degrade (0 pts), No change (5 pts), Enhance (10 pts)
- Urban green space		Decrease, No change, Increase	Decrease = decrease in urban green space No change = no change Increase = increase in urban green space	Decrease (0 pts), No change (5 pts), Increase (10 pts)
- Energy use and greenhouse gas		Increase, No change, Decrease	Project specific evaluation	Increase (0 pts), No change (5 pts), Decrease (10 pts)
- Restore natural hydrograph		Degrade, No change, Restore	Degrade = less infiltration is allowed No change = project does not change infiltration Restore = project provides increase in infiltration	Degrade (0 pts), No change (5 pts), Restore (10 pts)
- Water temperature		Degrade, No change, Restore	Degrade = riparian trees are removed, hardscapes are added No change Restore = plant trees along creeks for shade or remove dark colored hardscapes to decrease heat islands	Degrade (0 pts), No change (5 pts), Restore (10 pts)
Possible Points				60.00
Community Benefit Category				
- Employment opportunities		Decrease, No change, Increase	Decrease = Project will eliminate jobs No change = project will not change employment Increase = project will create or expand job opportunities (i.e. increase in maintenance)	Decrease (0 pts), No change (5 pts), Increase (10 pts)
- Public education		None, Low, Medium, High	(Educational signs, educational programs, media reports) None = Uses 0 out of 3 Low = Uses 1 out of 3 Medium = Uses 2 out of 3 High = Uses 3 out of 3	None (0 pts), Low (3 pts), Medium (6 pts), High (10 pts)
- Community involvement		None, Low, Medium, High	None = project will not involve community at all Low = project will have educational signs Medium = project will have outreach programs to educate community on how project works High = community will help implement project	None (0 pts) Low (3 pts), medium (6 pts), high (10 pts)
- Public use / recreation	acres		Project specific evaluation	0 to 10 points based on estimated acreage relative to total range of estimated acreages for implementation SWRP Projects.
Possible Points				40.00
Total Possible Points				280.00
Legend:				
<i>Italics = background info</i>				

Table 4-6. Method of Evaluation for Planning SWRP Projects

Evaluation Criteria	Qualitative Evaluation Criteria (Metric)	Method of Analysis	Point Allocation	Possible Points
Water Quality Benefit Category	None, Low, Medium, High	Project Specific Evaluation	None (0 pts), Low (3 pts), Medium (6 pts), High (10 pts)	110
Water Supply Benefit Category	None, Low, Medium, High	Project Specific Evaluation	None (0 pts), Low (3 pts), Medium (6 pts), High (10 pts)	30
Flood Management Benefit Category	None, Low, Medium, High	Project Specific Evaluation	None (0 pts), Low (3 pts), Medium (6 pts), High (10 pts)	40
Environmental Benefit Category	None, Low, Medium, High	Project Specific Evaluation	None (0 pts), Low (3 pts), Medium (6 pts), High (10 pts)	60
Community Benefit Category	None, Low, Medium, High	Project Specific Evaluation	None (0 pts), Low (3 pts), Medium (6 pts), High (10 pts)	40
Total Possible Points				280

4.5 STORM WATER QUALITY EVALUATION CRITERIA FOR IMPLEMENTATION PROJECTS

The evaluation criteria listed in Table 4-6 are analyzed using either qualitative or quantitative methods. The qualitative water quality evaluation criteria methods are explained below:

To calculate the annual runoff volume to each project:

1. Delineate a tributary watershed to the SWRP implementation project using the City's storm drain mapping or site visits.
2. Estimate impervious and pervious areas of a tributary watershed based on the tributary land uses. The City's land uses are shown on Figure 4-1. The impervious coverage for each City land use type is presented in Table 4-7.
3. Estimate the annual runoff volume based on the annual runoff depth per year, shown in Table 4-8.

To calculate pollutant loading and removal for each project:

1. Estimate the pollutant load using the typical pollutant concentration shown in Table 4-9 multiplied by the annual runoff volume.
2. Estimate the volume of infiltration using saturated hydraulic conductivity for each BMP and estimate the percent of pollutant removed through infiltration, shown in Table 4-9.
3. Estimate the volume of flow through each project, the infiltration volume, and the pollutant load reduction for each project by multiplying the pollutant load by its associated removal percentage for both the flow through the treatment facility and the infiltrated flow, shown in Table 4-9.
4. For trash removal load reduction calculations: the trash load rates are available by land use type, and are independent of the runoff volume. Consequently, the trash load is estimated by multiplying the area of the tributary land uses by the trash generation rates. Table 4-10 has trash generation rates by land use.

Quantitative metric units were not included for chlorpyrifos, diazinon, and oxyfluorfen because no project will address these contaminants. The City does not use these pesticides, and all the projects are located in the City. In addition, typical values of these pesticides in urban storm water runoff could not be located. If projects address these pesticides in a future SWRP update, then a quantitative metric will need to be included at that time. At that time, there may be more data available.

4.5.1 Land Uses and Impervious Percent

Subsheds and the percent of the subshed that is impervious and pervious were delineated for each project site. Typical impervious percentages for various land uses are provided in Table 4-7. Figure 4-1 shows land uses in the City.

Table 4-7. Typical Impervious Percent for Land Uses

Land Use	Impervious Percent
Commercial and Services	90
Industrial/Manufacturing	85
High Density Residential	70
Public, Government Facilities, K-12 Schools, Mixed Use	50
Low Density Residential	40
Urban Parks	5
Agriculture/Open Space/Vacant	2

4.5.1.1 Annual Runoff Volume to Project Site

The runoff depth to a project site per year was estimated using the mean annual precipitation depth and subtracting out the infiltration and depression storage. The annual runoff depth for impervious areas depends on depression storage. A depression storage value of 0.1 inch per storm was used for impervious surfaces. The annual runoff depth for pervious areas depends on both the depression storage and infiltration. A depression storage value of 0.35 inch per storm was used for pervious surfaces. Infiltration capacity depends on the HSG in the watershed, so a different runoff depth was estimated for each HSG. Figure 4-2 shows HSG for the PAW.

Table 4-8 shows the annual runoff depth for each HSG and impervious areas. This runoff volume was used in conjunction with the inflow concentrations in Table 4-9 to estimate a pollutant loading to the site.

Table 4-8. Annual Runoff Depths and Parameters

	Impervious Area	Pervious Area, HSG A	Pervious Area, HSG B	Pervious Area, HSG C	Pervious Area, HSG D
Mean Annual Precipitation, in/year	19.5	19.5	19.5	19.5	19.5
Depression Storage, in	0.1	0.35	0.35	0.35	0.35
Infiltration rate, in/hr	N/A	0.35	0.19	0.11	0.08
Annual Runoff Depth, in/year	19.27	1.6	2.6	3.8	4.7

4.5.2 Pollutant Concentrations

Table 4-9 has pollutant concentrations found in urban storm water runoff averaged from a variety of land uses that are used to estimate the benefit the SWRP projects will have on water quality.

Table 4-9. Average Inflow Concentrations for Urban Storm Water Runoff Pollutants and Percent Removals for LID

Storm Water Contaminant	Average Inflow Concentration	Average Percent Removal for BMPs					Source
		Bio-retention	Swales	Wet Basins	Dry Basins	Infiltration	
Sediment – TSS, mg/L	47.0	67%	16%	78%	67%	90%	WE&RF, 2016 CWP, 2007
Fecal Coliform, MPN/100 mL	4857.1	89%	10%	70%	76%	90% ^(b)	WE&RF, 2016 Hathaway, et. al., 2009
Heavy Metals ^(a) , ug/L	725.7	66%	21%	59%	36%	76%	WE&RF, 2016 CWP, 2007
Total Nitrogen, mg/L	1.3	46%	30%	27%	10%	42%	CASQA, 2003
Total Phosphorus, mg/L	0.2	5%	38%	60%	19%	65%	CASQA, 2003
Polychlorinated biphenyls (PCBs), ng/L	14.5	67% ^(b)	16% ^(b)	78% ^(b)	50%	90% ^(b)	CSN, 2015
Polyaromatic Hydrocarbons (PAHs), ng/L	9600.0	87%	62%	78%	22%	90% ^(b)	CSN, 2015 NSCEP, 1999

(a) Heavy metals include total cadmium, total copper, total lead, and total zinc.

(b) Values for this percent removal were not found in literature, and therefore were assumed to act like sediment.

The averages for each of the inflow concentrations and percent removals were derived from a highly variable data set. Using averages is sufficient for the SWRP as the point of this evaluation is to compare *relative* performance to develop a prioritization of the SWRP projects relative to each other.

Trash will be evaluated using averages of the BASMAA (2014) trash generation rates for high generating land uses only as required by the Trash Amendments. See Table 4-10 for trash generation rates in urban storm water runoff.

Table 4-10. Trash Generation Rates for High Generating Land Uses (Adapted from BASMAA, 2014)	
Land Use	Average for this study, gal/acre
Commercial and Services	6.2
Commercial and Services for areas with a mean household income of under \$50,000/year ^(a)	114.1
Industrial	8.4
High Density Residential, Multi-Family Residential, and Mobile Homes	47.7
(a) Yuba City has disadvantaged communities with a median household income of under \$50,000/year. These are shown in Figure 4-1 as hatched areas.	

4.5.3 Infiltration to Groundwater

Infiltration is calculated by evaluating the amount of runoff that enters the project for an “average” rain year relative to the infiltration properties of the soil. As infiltration occurs, groundwater becomes recharged.

4.6 RANKING AND PRIORITIZING PROJECTS

SWRP Planning projects were assigned a qualitative result for each benefit category of None, Low, Medium, or High. Points were assigned corresponding to the qualitative result, where None = 0 points, Low = 3 points, Medium = 6 points, and High = 10 points. The points for each benefit category was then normalized based on the total possible points (from Table 4-5) and the maximum score possible for each benefit category (from Table 4-4).

SWRP Implementation projects were assigned either a qualitative or the calculated quantitative result, depending on the evaluation criteria. For qualitative evaluation criteria, points were assigned corresponding to the qualitative result as shown in Table 4-6, i.e. None = 0 points, Low = 3 points, Medium = 6 points, and High = 10 points. For quantitative evaluation criteria, points were scaled from 0-10 relative to the performance of the other SWRP Projects. Points were summed within each benefit category and then normalized based on the total possible points (from Table 4-6) and the maximum score possible for each benefit category (from Table 4-4). The normalized points for each benefit category are then summed to calculate the Total Project Score.

The Total Project Scores for both the planning projects and the implementation projects were combined, ranked, and prioritized based on the Total Project Score, with higher scores being better than lower scores.

4.7 DATA MANAGEMENT

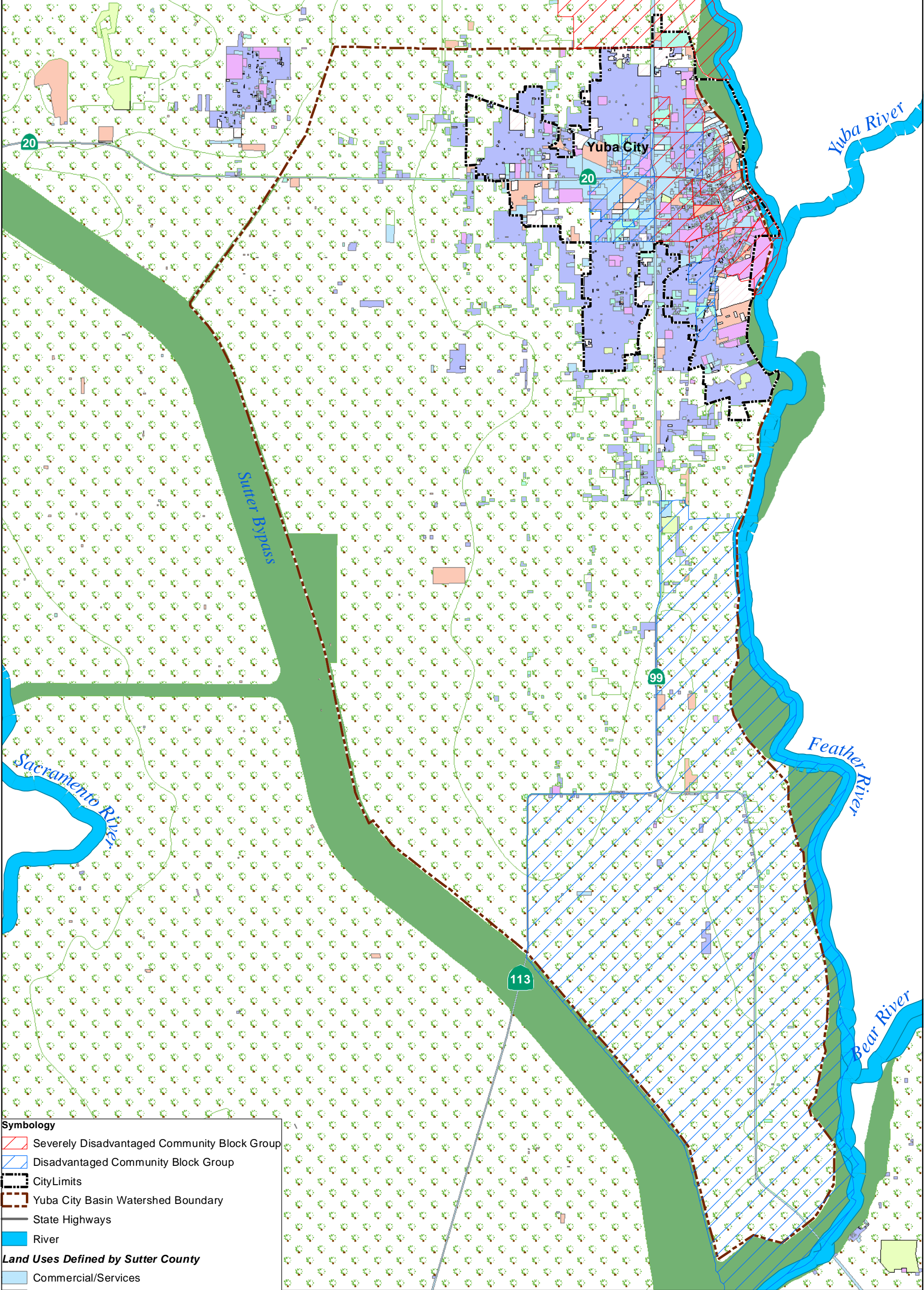
As indicated in the SWRP Guidelines, the intent of the section of Data Management is to discuss the following:

- Mechanisms by which data will be managed and stored
- How data will be accessed by stakeholders and the public
- How existing water quality and water quantity monitoring will be assessed
- Frequency at which data will be updated
- How data gaps will be identified

During the process of developing the SWRP, the Consultant was responsible for managing and storing the project data submitted by project proponents. The Consultant collected information in the form of reports, plans, permits, and geographic information system (GIS) data. Data collection occurred in the form of project submittals and data requests. The information in the forms of reports, plans, permits, assessments, etc. were managed in Excel to reference the documents and relevance to watershed area and SWRP checklist item.

Once the SWRP is approved by the Yuba City City Council (see Chapter 6 for the implementation schedule), it will be incorporated into the IRWMP. Data management responsibilities outlined in the IRMP plan are to include the identification and use of a relevant platform for uploading data in the proper format for coordination with State databases. Data will be accessible to stakeholders and the public through the Yuba City SWRP website at www.yubacity.org/SWRP, which will provide summaries of SWRP projects and their benefits.

Currently, no monitoring has been identified as part of this SWRP. As progress is made on implementing the various SRWP projects, the data available on the City's website will be updated and data gaps will be identified and filled.



Symbology

- Severely Disadvantaged Community Block Group
- Disadvantaged Community Block Group
- City Limits
- Yuba City Basin Watershed Boundary
- State Highways
- River

Land Uses Defined by Sutter County

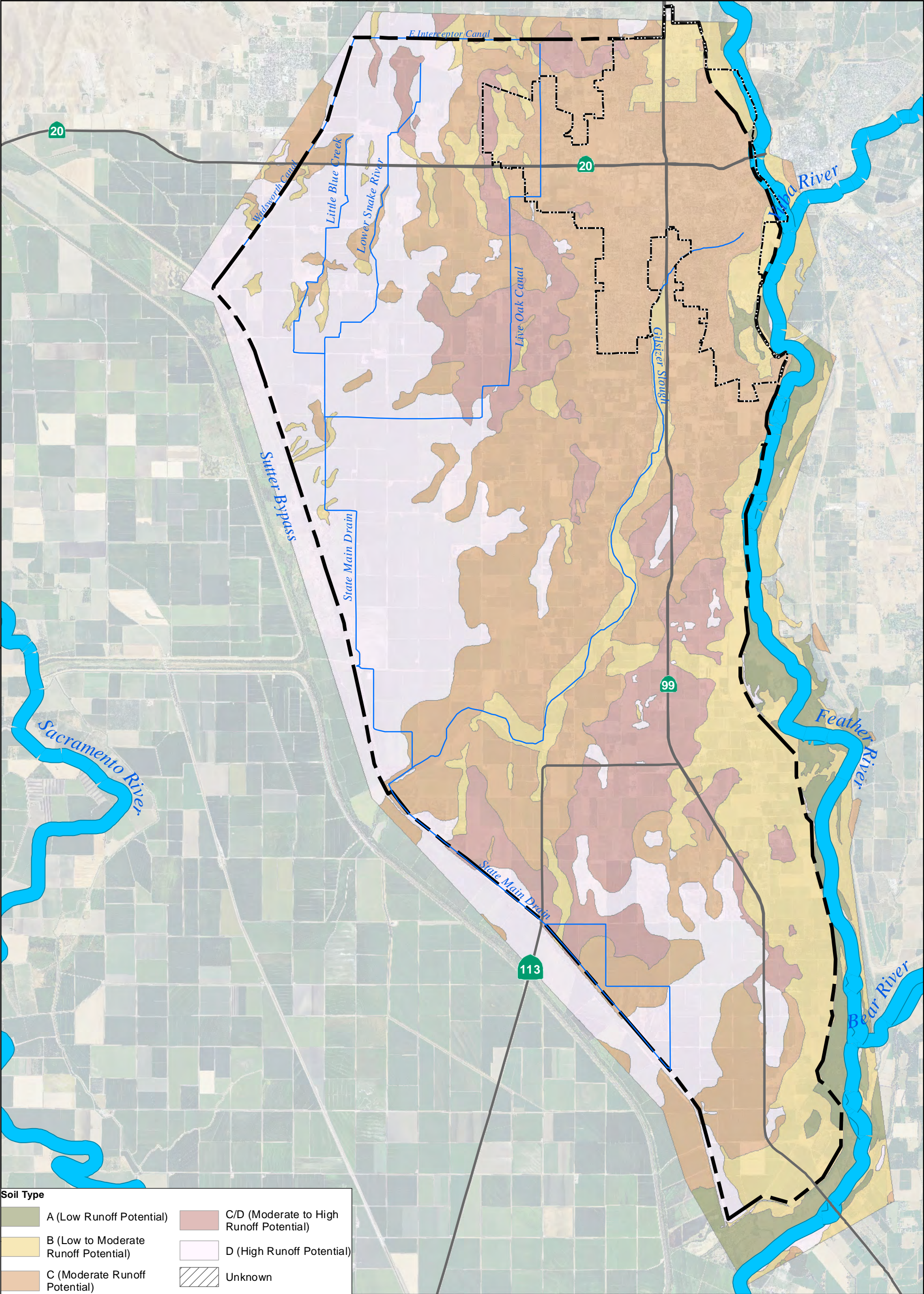
- Commercial/Services
- Industrial
- Public/Government Facilities
- High Density Residential
- Low Density Residential
- Parks
- Open Space
- Agriculture
- Vacant

0 0.75 1.5
Miles

YUBA CITY
STORM WATER
GRANT PROGRAM
WEST YOST
ASSOCIATES

Figure 4-1
Existing
Land Uses

Yuba City Basin
Storm Water
Resource Plan





CHAPTER 5: SWRP PROJECT EVALUATIONS QUANTITATIVE METHODS AND PROJECT RANKING/PRIORITIZATION

Chapter Contents

- Project Screening
- Project Descriptions
- SWRP Project Evaluations
- Project Ranking
- Low Impact Development Standards
- Collective Benefits of Project Implementation
- Consistency with NPDES Permit



CHAPTER 5

SWRP Project Evaluations, Quantitative Methods, and Project Ranking/Prioritizations



This chapter includes the following sections:

- Project Screening Summary
- Project Descriptions
- SWRP Project Quantitative Evaluations
- Project Ranking/Prioritization

5.1 PROJECT SCREENING

The project screening process was presented in Chapter 4 (Table 4-3). From the initial screening, twelve projects were selected for further consideration including nine implementation projects and three planning projects. Among implementation projects, one of the “Category A” detention basin projects was found to be redundant, and three of the “Category F” trash capture projects were grouped into one large project for cost and scaling efficiencies. A draft project description was developed for each project that includes details on scope of the project, possible benefits, and a preliminary project schematic.

The projects are categorized as follows:

Category A – Detention Basin Projects:

- A1 – Gilsizer North Detention Basin Modifications
- A4 – Shanghai Bend Detention Pond Modifications
- A7 – Detention Pond East of WWTP Modifications

Category F – Trash Capture Projects:

- F1, F2 & F4 – Gilsizer Slough at Lincoln Road Trash Capture (grouped project mentioned above)
- F3 – Madrone and Orchard/Park Trash Capture
- F5 – Jefferson Ditch Improvements
- F6 – Live Oak Canal at Franklin Road Trash Capture

Category E – Planning Projects:

- E1 – Standards for Detention Basins
- E2 – Standards for Gilsizer Slough
- E3 – Trash Capture Master Plan

5.2 PROJECT DESCRIPTIONS

The ten draft SWRP Project Descriptions were prepared and sent to the TAC for review on March 7, 2018. A one-week public review period was provided, and the comment period was closed on March 14, 2018. Several comments were received from the City, and the Project Descriptions were revised and finalized based on the comments. The final Project Descriptions are provided in Appendix 5A.

5.3 SWRP PROJECT EVALUATIONS

The methodology for evaluating the SWRP Projects was described in the Yuba City Basin SWRP - Multiple Benefits Evaluation Methodology Technical Memorandum (dated December 21, 2017). This TM is included as Appendix 5B. Using this methodology, the implementation project quantitative and qualitative evaluations were summarized and normalized into points as shown in Table 5-1. Planning project qualitative evaluations were summarized and normalized into points as shown in Table 5-2. Justification behind the evaluation and ratings for each project is discussed below and in Appendix 5C.

5.3.1 Project A1: Gilsizer North Detention Basin Modifications

This project was categorized as an implementation project and was evaluated both quantitatively and qualitatively according to the multiple benefit criteria. Evaluation criteria and results are presented in Table 5-1 and briefly summarized below. Appendix 5C provides a more detailed analysis and justification of the evaluation result for each criterion including any design criteria utilized in the analysis.

- **Water Quality** – This project will provide treatment of storm water runoff in swales via both infiltration through the channel bottom and channel flow-through (bio-treatment). New roof and covers constructed over City Corp Yard facilities will reduce the transport of contaminants to the storm water system through the reduction of flow from these previously uncovered surfaces. Trash will be captured by devices which meet the State’s Trash Amendment requirements for full capture.

The overall normalized score for water quality was 28.9 out of 80 possible points.

- **Water Supply** – This project will increase infiltration by an estimated 2.14 acre-feet per year which can potentially provide a benefit by augmenting the groundwater supply or recharging surface water sources. However, watering requirements from new recreational areas will likely offset any augmentation of the water supply from infiltration.

The overall normalized score for water supply was 0 out of 81 possible points.

- **Flood Management** – This project will reduce runoff conveyed to receiving waters and slightly increase the available capacity of the detention basin through increased infiltration.

The overall normalized score for flood management was 14.1 out of 94 possible points.

Table 5-1. SWRP Implementation Project Evaluations

Evaluation Criteria	Evaluation Result Units or Rating	A1. Gilsizer North Detention Basin Modifications		A4. Shanghai Bend Detention Pond Modifications		A7. Detention Pond East of WWTP Modifications		F1, F2 & F4. Gilsizer Slough at Lincoln Road Trash Capture		F3. Madrone and Orchard/Park Trash Capture		F5. Jefferson Ditch Improvements		F6. Live Oak Canal at Franklin Road Trash Capture	
		Evaluation Result	Evaluation Points	Evaluation Result	Evaluation Points	Evaluation Result	Evaluation Points	Evaluation Result	Evaluation Point Score	Evaluation Result	Evaluation Point Score	Evaluation Result	Evaluation Point Score	Evaluation Result	Evaluation Point Score
Water Quality Benefit Category															
- Natural water drainage and treatment	Not Improved, Improved	Improved	10	Improved	10	Improved	10	Not Improved	0	Not Improved	0	Improved	10	Not Improved	0
- Nonpoint source pollution control. See Priority Pollutants, (i.e. 303(d) List Pollutants) listed below:															
- Sediment, mercury, Group A Pesticides, and oxygen demanding substances	lbs/year of sediment (TSS) removed	1929	2.99	2538	3.9	6448	10	0	0.00	0	0	134	0.21	0	0
- Chlorpyrifos, Diazinon, Oxyfluorfen	None, Medium, High	None	0	None	0.0	None	0	None	0	None	0	None	0	None	0
- PCBs	lb/year of PCBs removed	4.50E-04	2.26	7.83E-04	3.9	1.99E-03	10	0.00E+00	0.00	0	0	4.12E-05	0.21	0	0
- Trash	amount of trash captured based on trash generation by land-use rate	15,380	2.55	104	0.0	441	0.07	60,312	10.00	13,996	2.32	629	0.10	2,380	0.39
- Common storm water contaminants:															
- Fecal Coliform	MPN/year	4.71E+11	1.63	9.97E+11	3.4	2.89E+12	10	0.00E+00	0.00	0	0	4.02E+10	0.14	0	0
- Heavy Metals (cadmium, copper, lead, and zinc)	lbs/year of heavy metals removed	27.78	3.10	41.02	4.6	89.48	10	0.00	0.00	0	0	2.66	0.30	0	0
- Oils and grease (polyaromatic hydrocarbons or PAHs)	lb/year of PAHs removed	1.01	5.76	1.16	6.6	1.76	10	0.00	0.00	0	0	0.10	0.58	0	0
- Total Nitrogen	lb/year of Nitrogen removed	66.07	5.88	75.48	6.7	112.39	10	0.00	0.00	0	0	6.68	0.59	0	0
- Total Phosphorus	lb/year of Phosphorus removed	13.01	5.19	15.51	6.2	25.08	10	0.00	0.00	0	0	1.30	0.52	0	0
- Infiltration	acre-feet/year	2.14	0.43	12.55	2.5	49.62	10	0.00	0.00	0	0	0.06	0.01	0	0
Water Quality Points		39.8		48.0		90.1		10.0		2.3		12.7		0.4	
Normalized Score (out of 80)		28.9		34.9		65.5		7.3		1.7		9.2		0.3	
Water Supply Benefit Category															
- Water supply reliability	None, Low, Medium, High	None	0	None	0	Low	3	None	0	None	0	Low	3	None	0
- Conjunctive Use	Not Improved, Improved	Not Improved	0	Not Improved	0	Not Improved	0	Not Improved	0	Not Improved	0	Not Improved	0	Not Improved	0
- Water Conservation	acre-feet/year	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Water Supply Points		0		0		3		0		0		3		0	
Normalized Score (out of 81)		0		0		8.1		0		0		8.1		0	

Table 5-1. SWRP Implementation Project Evaluations

Evaluation Criteria	Evaluation Result Units or Rating	A1. Gilsizer North Detention Basin Modifications		A4. Shanghai Bend Detention Pond Modifications		A7. Detention Pond East of WWTP Modifications		F1, F2 & F4. Gilsizer Slough at Lincoln Road Trash Capture		F3. Madrone and Orchard/Park Trash Capture		F5. Jefferson Ditch Improvements		F6. Live Oak Canal at Franklin Road Trash Capture	
		Evaluation Result	Evaluation Points	Evaluation Result	Evaluation Points	Evaluation Result	Evaluation Points	Evaluation Result	Evaluation Point Score	Evaluation Result	Evaluation Point Score	Evaluation Result	Evaluation Point Score	Evaluation Result	Evaluation Point Score
Flood Management Benefit Category															
- Reduction of runoff rate/volume	None, Low, Medium, High	Low	3	Low	3	Low	3	None	0	None	0	Low	3	None	0
- Sanitary sewer overflow reduction	acres of urban floodplain reduction	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Improved flood protection	number of houses/businesses protected	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Reduction of flood risk-life and safety	None, Low, Medium, High	Low	3	Low	3	Low	3	None	0	Low	3	None	0	None	0
Flood Management Points		6		6		6		0		3		3		0	
Normalized Score (out of 94)		14.1		14.1		14.1		0.0		7.1		7.1		0	
Environmental Benefit Category															
- Create or improve wetland/riparian habitat	acres	0.194	6.8	0.285	6.8	0.000	0.0	0	0.0	0	0	0.092	3.2	0	0
- Environmental flow (Instream Flow)	Degrade, No change, Enhance	Enhance	10	Enhance	10	Enhance	10	No change	5	No change	5	Enhance	10	No change	5
- Urban green space	Decrease, No change, Increase	Increase	10	Increase	10	No change	5	No change	5	No change	5	No change	5	No change	5
- Energy use and greenhouse gas	Increase, No change, Decrease	Decrease	10	Decrease	10	Decrease	10	No change	5	No change	5	No change	5	No change	5
- Restore natural hydrograph	Degrade, No change, Restore	Restore	10	Restore	10	Restore	10	No change	5	No change	5	Restore	10	No change	5
- Water temperature	Degrade, No change, Restore	No change	5	No change	5	No change	5	No change	5	No change	5	No change	5	No change	5
Environmental Points		51.8		51.8		40.0		25.0		25		38.2		25	
Normalized Score (out of 40)		34.5		34.5		26.7		16.7		16.7		25.5		16.7	
Community Benefit Category															
- Employment opportunities	Decrease, No change, Increase	Increase	10	Increase	10	Increase	10	Increase	10	Increase	10	Increase	10	Increase	10
- Public education	None, Low, Medium, High	Low	3	Low	3	None	0	None	0	None	0	None	0	None	0
- Community involvement	None, Low, Medium, High	Low	3	Low	3	None	0	None	0	None	0	None	0	None	0
- Public use / recreation	acres	2.78	5.18	5.37	10	0	0	0	0	0	0	0	0	0	0
Community Points		21.2		26		10		10		10		10		10	
Normalized Score (out of 54)		28.6		35.1		13.5		13.5		13.5		13.5		13.5	
Total Project Scores (out of 349)		106.2		118.6		127.9		37.4		38.9		63.3		30.5	

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SWRP Project Evaluations, Quantitative Methods, and Project Ranking/Prioritizations



Table 5-2. SWRP Planning Project Evaluations

Evaluation Criteria	Evaluation Result Units or Rating	E1. Detention Basin Standards		E2. Gilsizer Slough Standards		E3. Trash Capture Master Plan	
		Evaluation Result	Evaluation Points	Evaluation Result	Evaluation Points	Evaluation Result	Evaluation Points
Water Quality Benefit Category	None (0 pts), Low (3 pts), Medium (6 pts), High (10 pts)	Medium	6	Medium	6	Medium	6
	Normalized Score (out of 80)		4.4		4.4		4.4
Water Supply Benefit Category	None (0 pts), Low (3 pts), Medium (6 pts), High (10 pts)	Medium	6	None	0	Low	3
	Normalized Score (out of 81)		16.2		0		8.1
Flood Management Benefit Category	None (0 pts), Low (3 pts), Medium (6 pts), High (10 pts)	High	10	High	10	Low	3
	Normalized Score (out of 94)		23.5		23.5		7.1
Environmental Benefit Category	None (0 pts), Low (3 pts), Medium (6 pts), High (10 pts)	Low	3	Low	3	Low	3
	Normalized Score (out of 40)		2		2		2
Community Benefit Category	None (0 pts), Low (3 pts), Medium (6 pts), High (10 pts)	Medium	6	None	0	Low	3
	Normalized Score (out of 54)		8.1		0		4.1
Total Project Scores (out of 349)			54.16		29.86		25.56

The Gilsizer North Detention Basin Modifications project received a total of 106.2 out of 349 possible points from the multiple benefit evaluation. Based on the results of the multiple benefit evaluation, the project ranked sixth out of the ten total projects, and third out of the three detention basin projects.

In addition to the multiple benefit evaluation, all projects were assessed for cost, permitting, and environmental impacts. Assessment summaries are provided below.

- **Initial Costs** – The cost of installing this facility is estimated to be \$612,000. The project evaluation included in Appendix 5C provides a detailed cost breakdown.
- **Maintenance Costs** – The annual cost for operating and maintaining this facility is estimated to be \$26,800. The project evaluation in Appendix 5C provides a detailed cost breakdown.
- **Permit and Approval Requirements** – Permits required for this project include applicable City permits and a general construction permit from the State Water Resources Control Board to implement water quality controls during construction.

The proposed “rigid basket” trash capture devices are not currently included in the State’s Certified Trash Amendment devices list. As discussed in the Trash Rack Selection Process letter (March 7, 2018) found in Appendix 5D, the City would be required to seek Water Board approval for use of this device. Approval would be based on the criteria of a full capture device that has a 5-mm mesh screen and a design treatment capacity of not less than the peak flow rate from a 1-year, 1-hour storm event in the watershed area. Once certified, the trash capture devices would meet the State’s Trash Amendment requirements for full capture, allowing the City to maintain their Track 1 Trash Amendment status.

- Environmental Impacts – The purpose of this project is to improve the environment; however, the construction of this project could result in temporary impacts. An environmental review of this project will be performed prior to construction.

5.3.2 Project A4: Shanghai Bend Detention Pond Modifications

This project was categorized as an implementation project and was evaluated both quantitatively and qualitatively according to the multiple benefit criteria. Evaluation criteria and results are presented in Table 5-1 and briefly summarized below. Appendix 5C provides a more detailed analysis and justification of the evaluation result for each criterion including any design criteria utilized in the analysis.

- Water Quality – This project will provide treatment of storm water runoff in swales via both infiltration through the channel bottom and channel flow-through (bio-treatment). Trash will be captured by devices which meet the State’s Trash Amendment requirements for full capture.

The overall normalized score for water quality was 34.9 out of 80 possible points.

- Water Supply – This project will increase infiltration by an estimated 12.55 acre-feet per year which can potentially provide a benefit by augmenting the groundwater supply or recharging surface water sources. However, watering requirements from new recreational areas will likely offset any augmentation of the water supply from infiltration.

The overall normalized score for water supply was 0 out of 81 possible points.

- Flood Management – This project will reduce runoff conveyed to receiving waters and slightly increase the available capacity of the detention basin through increased infiltration.

The overall normalized score for flood management was 14.1 out of 94 possible points.

- Environmental Benefit – The creation of swales with this project will improve wetland/urban habitat, enhance environmental flows, and partially restore the natural hydrograph.

The overall normalized score for environmental benefit was 34.5 out of 40 possible points.

- **Community Benefit** – This project involves construction of recreational areas in the detention basin bottom with public access that can be limited during heavy rainfall. This provides an opportunity for public education of storm water best practices. This could be achieved through encouraging community involvement in construction and/or maintenance of the facility, or through signage, media coverage, or educational programs for the site.

The overall normalized score for community benefit was 35.1 out of 54 possible points.

The Shanghai Bend Detention Pond Modifications project received a total of 118.6 out of 349 possible points from the multiple benefit evaluation. Based on the results of the multiple benefit evaluation, the project ranked fifth out of the ten total projects, and second out of the three detention basin improvement projects. This project was ranked first in the community benefit category due to the recreation area to be created, and associated potential for community and public involvement.

In addition to the multiple benefit evaluation, all projects were assessed for cost, permitting, and environmental impacts. Assessment summaries are provided below.

- **Initial Costs** – The cost of installing this facility is estimated to be \$786,800. The project evaluation included in Appendix 5C provides a detailed cost breakdown.
- **Maintenance Costs** – The annual cost for operating and maintaining this facility is estimated to be \$24,800. The project evaluation included in Appendix 5C provides a detailed cost breakdown.
- **Permit and Approval Requirements** – Permits required for this project include applicable City permits and a general construction permit from the State Water Resources Control Board to implement water quality controls during construction.

The proposed “rigid basket” trash capture devices are not currently included in the State’s Certified Trash Amendment devices list. As discussed in the Trash Rack Selection Process letter (March 7, 2018) found in Appendix 5D, the City would be required to seek Water Board approval for use of this device. Approval would be based on the criteria of a full capture device that has a 5-mm mesh screen and a design treatment capacity of not less than the peak flow rate from a 1-year, 1-hour storm event in the watershed area. Once certified, the trash capture devices would meet the State’s Trash Amendment requirements for full capture, allowing the City to maintain their Track 1 Trash Amendment status.

- **Environmental Impact Report Requirements** – The purpose of this project is to improve the environment; however, the construction of this project could result in temporary impacts. An environmental review of this project will be performed prior to construction.

5.3.3 Project A7: Detention Pond East of WWTP Modifications

This project was categorized as an implementation project and was evaluated both quantitatively and qualitatively according to the multiple benefit criteria. Evaluation criteria and results are presented in Table 5-1 and briefly summarized below. Appendix 5C provides a more detailed analysis and justification of the evaluation result for each criterion including any design criteria utilized in the analysis.

- **Water Quality** – This project will provide treatment of storm water runoff in swales via both infiltration to the channel bottom and channel flow-through. Trash will be captured by devices which meet the State’s Trash Amendment requirements for full capture.

The overall normalized score for water quality was 65.5 out of 80 possible points.

- **Water Supply** – This project will increase in infiltration by an estimated 49.62 acre-feet per year which can potentially provide a benefit by augmenting the water supply or recharging surface water sources.

The overall normalized score for water supply was 8.1 out of 81 possible points.

- **Flood Management** – This project will reduce runoff conveyed to receiving waters and slightly increase the available capacity of the detention basin through increased infiltration.

The overall normalized score for flood management was 14.1 out of 94 possible points.

- **Environmental Benefit** – The creation of swale area with this project will enhance environmental flows and partially restore the natural hydrograph.

The overall normalized score for environmental benefit was 26.7 out of 40 possible points.

- **Community Benefit** – This project is located near an industrial area and thus limits the potential for public and community involvement.

The overall normalized score for community benefit was 13.5 out of 54 possible points.

The Detention Pond East of the WWTP project received a total of 127.9 out of 349 possible points from the multiple benefit evaluation. Based on the results of the multiple benefit evaluation, the project ranked fourth out of the ten total projects. This project was ranked first out of all projects in the water quality category primarily due to the high soil hydraulic conductivity value, which determines infiltration rate and associated pollutant removals.

In addition to the multiple benefit evaluation, all projects were assessed for cost, permitting, and environmental impacts. Assessment summaries are provided below.

- **Initial Costs** – The cost of installing this facility is estimated to be \$236,100. The project evaluation included in Appendix 5C provides a detailed cost breakdown.
- **Maintenance Costs** – The annual cost for operating and maintaining this facility is estimated to be \$4,000. The project evaluation included in Appendix 5C provides a detailed cost breakdown.

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- **Permit and Approval Requirements** – Permits required for this project include applicable City permits and a general construction permit from the State Water Resources Control Board to implement water quality controls during construction.
- **The proposed “rigid basket” trash capture devices** are not currently included in the State’s Certified Trash Amendment devices list. As discussed in the Trash Rack Selection Process letter (March 7, 2018) found in Appendix 5D, the City would be required to seek Water Board approval for use of this device. Approval would be based on the criteria of a full capture device that has a 5-mm mesh screen and a design treatment capacity of not less than the peak flow rate from a 1-year, 1-hour storm event in the watershed area. Once certified, the trash capture devices would meet the State’s Trash Amendment requirements for full capture, allowing the City to maintain their Track 1 Trash Amendment status.
- **Environmental Impact Report Requirements** – The purpose of this project is to improve the environment; however, the construction of this project could result in temporary impacts. An environmental review of this project will be performed prior to construction.

5.3.4 Project F1-F2-F4: Gilsizer Slough at Lincoln Road Trash Capture

This project was categorized as an implementation project and was evaluated both quantitatively and qualitatively according to the multiple benefit criteria. Evaluation criteria and results are presented in Table 5-1 and briefly summarized below. Appendix 5C provides a more detailed analysis and justification of the evaluation result for each criterion including any design criteria utilized in the analysis.

- **Water Quality** – This project will provide trash capture in Gilsizer Slough which meets the State’s Trash Amendment requirements for full capture.
The overall normalized score for water quality was 7.3 out of 80 possible points.
- **Water Supply** – This project will not provide any benefit to water supply or conservation.
The overall normalized score for water supply was 0 out of 81 possible points.
- **Flood Management** – This project will not provide any benefit to flood management.
The overall normalized score for flood management was 0 out of 94 possible points.
- **Environmental Benefit** – This project may cause an enhancement in riparian habitat from the creation of small pools around the in-line trash capture device, however, the impact is not considered to be significant.
The overall normalized score for environmental benefit was 16.7 out of 40 possible points.
- **Community Benefit** – This project is located in an existing slough and thus limits the potential for public and community involvement.
The overall normalized score for community benefit was 13.5 out of 54 possible points.

The Gilsizer Slough at Lincoln Road Trash Capture project received a total of 37.4 out of 349 possible points from the multiple benefit evaluation. Based on the results of the multiple benefit evaluation, the project ranked ninth out of the ten total projects. This project was ranked first for the trash capture criteria within the water quality category due to the watershed's large tributary area and large acreage of high trash generating land use.

In addition to the multiple benefit evaluation, all projects were assessed for cost, permitting, and environmental impacts. Assessment summaries are provided below.

- Initial Costs – The cost of installing this facility is estimated to be \$398,100. The project evaluation included in Appendix 5C provides a detailed cost breakdown.
- Maintenance Costs – The annual cost for operating and maintaining this facility is estimated to be \$6,000. The project evaluation included in Appendix 5C provides a detailed cost breakdown.
- Permit and Approval Requirements – Permits and approvals required for this project include:
 - Applicable City permits.
 - General construction permit from the State Water Resources Control Board to implement water quality controls during construction.
 - U.S. Army Corps of Engineers (USACE) – Clean Water Act Section 404 Permit: According to the current US EPA definition, Gilsizer Slough is considered a navigable water of the United States (Clean Water Act, 40 CFR 230.3(s)). Section 404 requires USACE authorization prior to discharging dredged or fill materials into waters of the United States.
 - Regional Water Quality Control Board (RWQCB) – CWA) Section 401 Permit: Section 401 of the CWA requires that any application for a federal permit or license, which may result in a discharge of pollutants into waters of the United States, must obtain a state water quality certification that the activity complies with all applicable water quality standards, limitations, and restrictions. A USACE Section 404 Permit triggers a RWQCB 401 Permit.
 - California Department of Fish and Wildlife – Lake and Streambed Alteration (LSA) notification: Installation of the trash capture device in Gilsizer Slough will involve alteration of the slough bottom. This work will require an LSA notification to the California Department of Fish and Wildlife (Fish and Game, Code Section 1602).
 - Gilsizer Slough is a local drainage course which is pumped into to the Sutter Bypass. Modifications to the slough may require permits from local drainage agencies including Sutter County and Gilsizer County Drainage District.

- The proposed “rigid basket” trash capture device is not currently included in the State’s Certified Trash Amendment devices list. As discussed in the Trash Rack Selection Process letter (March 7, 2018) found in Appendix 5D, the City would be required to seek Water Board approval for use of this device. Approval would be based on the criteria of a full capture device that has a 5-mm mesh screen and a design treatment capacity of not less than the peak flow rate from a 1-year, 1-hour storm event in the watershed area. Once certified, the trash capture device would meet the State’s Trash Amendment requirements for full capture, allowing the City to maintain their Track 1 Trash Amendment status.
- Environmental Impact Report Requirements – The purpose of this project is to improve the environment; however, the construction of this project could result in temporary impacts. An environmental review of this project will be performed prior to construction.

5.3.5 Project F3: Madrone and Orchard/Park Trash Capture

This project was categorized as an implementation project and was evaluated both quantitatively and qualitatively according to the multiple benefit criteria. Evaluation criteria and results are presented in Table 5-1 and briefly summarized below. Appendix 5C provides a more detailed analysis and justification of the evaluation result for each criterion including any design criteria utilized in the analysis.

- Water Quality – This project will provide trash capture in a concrete-channelized portion of Gilsizer Slough. The device will meet the State’s Trash Amendment requirements for full capture.
The overall normalized score for water quality was 1.7 out of 80 possible points.
- Water Supply – This project will not provide any benefit to water supply or conservation.
The overall normalized score for water supply was 0 out of 81 possible points.
- Flood Management – This project will reduce flood risk by improving the ability to clear the Park Avenue trash rack.
The overall normalized score for flood management was 7.1 out of 94 possible points.
- Environmental Benefit – This project does not provide any significant environmental benefits.
The overall normalized score for environmental benefit was 16.7 out of 40 possible points.
- Community Benefit – This project is located in an existing slough and thus limits the potential for public and community involvement.
The overall normalized score for community benefit was 13.5 out of 54 possible points.

The Madrone and Orchard/Park Trash Capture project received a total of 38.9 out of 349 possible points from the multiple benefit evaluation. Based on the results of the multiple benefit evaluation,

the project ranked eighth out of the ten total projects. This project was ranked third for the trash capture criteria within the water quality category due to the watershed's large amount of high trash generating land use.

In addition to the multiple benefit evaluation, all projects were assessed for cost, permitting, and environmental impacts. Assessment summaries are provided below.

- Initial Costs – The cost of installing this facility is estimated to be \$180,800. The project evaluation included in Appendix 5C provides a detailed cost breakdown.
- Maintenance Costs – The annual cost for operating and maintaining this facility is estimated to be \$6,000. The project evaluation included in Appendix 5C provides a detailed cost breakdown.
- Permit and Approval Requirements – Permits and notifications required for this project include:
 - Applicable City permits.
 - General construction permit from the State Water Resources Control Board to implement water quality controls during construction.
 - USACE – Clean Water Act Section 404 Permit: According to the current US EPA definition, Gilsizer Slough is considered a navigable water of the United States (Clean Water Act, 40 CFR 230.3(s)). Section 404 requires USACE authorization prior to discharging dredged or fill materials into waters of the United States.
 - RWQCB – Clean Water Act (CWA) Section 401 Permit: Section 401 of the CWA requires that any application for a federal permit or license, which may result in a discharge of pollutants into waters of the United States, must obtain a state water quality certification that the activity complies with all applicable water quality standards, limitations, and restrictions. A USACE Section 404 Permit triggers a RWQCB 401 Permit.
 - California Department of Fish and Wildlife – LSA notification: Installation of the trash capture device in Gilsizer Slough will involve alteration of the slough bottom. This work will require an LSA notification to the California Department of Fish and Wildlife (Fish and Game, Code Section 1602).
 - Gilsizer Slough is a local drainage course from which runoff is pumped into the Sutter Bypass. Modifications to the slough may require permits from local drainage agencies including Sutter County and Gilsizer County Drainage District.
 - The proposed “rigid basket” trash capture device is not currently included in the State’s Certified Trash Amendment devices list. As discussed in the Trash Rack Selection Process letter (March 7, 2018) found in Appendix 5D, the City would be required to seek Water Board approval for use of this device. Approval would be based on the criteria of a full capture device that has a 5-mm mesh screen and a design treatment capacity of not less than the peak flow rate from a 1-year, 1-hour storm event in the watershed area. Once certified, the trash capture device would meet the State’s Trash Amendment requirements for full capture, allowing the City to maintain their Track 1 Trash Amendment status.

- Environmental Impact Report Requirements – The purpose of this project is to improve the environment; however, the construction of this project could result in temporary impacts. An environmental review of this project will be performed prior to construction.

5.3.6 Project F5: Jefferson Ditch Improvements

This project was categorized as an implementation project and was evaluated both quantitatively and qualitatively according to the multiple benefit criteria. Evaluation criteria and results are presented in Table 5-1 and briefly summarized below. Appendix 5C provides a more detailed analysis and justification of the evaluation result for each criterion including any design criteria utilized in the analysis.

- Water Quality – This project will provide treatment of storm water runoff in the widened ditch via both infiltration through the channel bottom and channel flow-through (bio-treatment). Trash will be captured by a device which meets the State’s Trash Amendment requirements for full capture.

The overall normalized score for water quality was 9.2 out of 80 possible points.

- Water Supply – This project will increase in infiltration by an estimated 0.06 acre-feet per year which can potentially provide a benefit by augmenting the water supply or recharging surface water sources.

The overall normalized score for water supply was 8.1 out of 81 possible points.

- Flood Management – This project will reduce runoff conveyed to receiving waters and slightly increase the capacity of the ditch through increased infiltration.

The overall normalized score for flood management was 7.1 out of 94 possible points.

- Environmental Benefit – Widening of the ditch in this project will improve wetland/urban habitat, enhance environmental flows, and partially restore the natural hydrograph.

The overall normalized score for environmental benefit was 25.5 out of 40 possible points.

- Community Benefit – This project is located in an existing drainage ditch and thus limits the potential for public and community involvement.

The overall normalized score for community benefit was 13.5 out of 54 possible points.

The Jefferson Ditch Improvements project received a total of 63.3 out of 349 possible points from the multiple benefit evaluation. Based on the results of the multiple benefit evaluation, the project ranked seventh out of the ten total projects.

In addition to the multiple benefit evaluation, all projects were assessed for cost, permitting, and environmental impacts. Assessment summaries are provided below.

- **Initial Costs** – The cost of installing this facility is estimated to be \$110,000. The project evaluation included in Appendix 5C provides a detailed cost breakdown.
- **Maintenance Costs** – The annual cost for operating and maintaining this facility is estimated to be \$4,000. The project evaluation included in Appendix 5C provides a detailed cost breakdown.
- **Permit and Approval Requirements** – Permits required for this project include applicable City permits and a general construction permit from the State Water Resources Control Board to implement water quality controls during construction. Jefferson Ditch is a local drainage course which discharges to the Live Oak Canal. Modifications to the ditch may require permits from local agencies including Sutter County and the Gilsizer County Drainage District.

The proposed “rigid basket” trash capture device is not currently included on the State’s Certified Trash Amendment devices list. As discussed in the Trash Rack Selection Process letter (March 7, 2018) found in Appendix 5D, the City would be required to seek Water Board approval for use of this device. Approval would be based on the criteria of a full capture device that has a 5-mm mesh screen and a design treatment capacity of not less than the peak flow rate from a 1-year, 1-hour storm event in the watershed area. Once certified, the trash capture device would meet the State’s Trash Amendment requirements for full capture, allowing the City to maintain their Track 1 Trash Amendment status.

- **Environmental Impact Report Requirements** – The purpose of this project is to improve the environment; however, the construction of this project could result in temporary impacts. An environmental review of this project will be performed prior to construction.

5.3.7 Project F6: Live Oak Canal at Franklin Road Trash Capture

This project was categorized as an implementation project and was evaluated both quantitatively and qualitatively according to the multiple benefit criteria. Evaluation criteria and results are presented in Table 5-1 and briefly summarized below. Appendix 5C provides a more detailed analysis and justification of the evaluation result for each criterion including any design criteria utilized in the analysis.

- **Water Quality** – This project will provide trash capture in Live Oak Canal which meets the State’s Trash Amendment requirements for full capture.

The overall normalized score for water quality was 0.3 out of 80 possible points.

- **Water Supply** – This project will not provide any benefit to water supply or conservation.

The overall normalized score for water supply was 0 out of 81 possible points.

- Flood Management – This project will not provide any benefit to flood management. The overall normalized score for flood management 0 out of 94 possible points.
- Environmental Benefit – This project may cause an enhancement in riparian habitat from the creation of small pools around the in-line trash capture device, however, the impact is not considered to be significant. The overall normalized score for environmental benefit was 16.7 out of 40 possible points.
- Community Benefit – This project is located in an existing canal and thus limits the potential for public and community involvement. The overall normalized score for community benefit was 13.5 out of 54 possible points.

The Live Oak Canal at Franklin Road Trash Capture project received a total of 30.5 out of 349 possible points for the multiple benefit evaluation. This ranked the project tenth out of the ten projects.

In addition to the multiple benefit evaluation, all projects were assessed for cost, permitting, and environmental impacts. Assessment summaries are provided below.

- Initial Costs – The cost of installing this facility is estimated to be \$71,700. The project evaluation included in Appendix 5C provides a detailed cost breakdown.
- Maintenance Costs – The annual cost for operating and maintaining this facility is estimated to be \$6,000. The project evaluation included in Appendix 5C provides a detailed cost breakdown.
- Permit and Approval Requirements – Permits and approvals required for this project include:
 - Applicable City permits.
 - General construction permit from the State Water Resources Control Board to implement water quality controls during construction.
 - U.S. Army Corps of Engineers – Clean Water Act Section 404 Permit: According to the current US EPA definition, Live Oak Canal is considered a navigable water of the United States (Clean Water Act, 40 CFR 230.3(s)). Section 404 requires USACE authorization prior to discharging dredged or fill materials into waters of the United States.
 - Regional Water Quality Control Board – Clean Water Act Section 401 Permit: Section 401 of the CWA requires that any application for a federal permit or license, which may result in a discharge of pollutants into waters of the United States, must obtain a state water quality certification that the activity complies with all applicable water quality standards, limitations, and restrictions. A USACE Section 404 Permit triggers a RWQCB 401 Permit.

- California Department of Fish and Wildlife – LSA: Installation of the trash capture device in Live Oak Canal will involve alteration of the canal bottom. This work will require an LSA notification to the California Department of Fish and Wildlife (Fish and Game, Code Section 1602).
- Live Oak Canal is a local drainage course which is ultimately pumped into to the Sutter Bypass. Modifications to the canal may require permits from local drainage agencies including Sutter County and Gilsizer County Drainage District.
- The proposed “rigid basket” trash capture device is not currently included on the State’s Certified Trash Amendment devices list. As discussed in the Trash Rack Selection Process letter (March 7, 2018) found in Appendix 5D, the City would be required to seek Water Board approval for use of this device. Approval would be based on the criteria of a full capture device that has a 5-mm mesh screen and a design treatment capacity of not less than the peak flow rate from a 1-year, 1-hour storm event in the watershed area. Once certified, the trash capture device would meet the State’s Trash Amendment requirements for full capture, allowing the City to maintain their Track 1 Trash Amendment status.
- Environmental Impact Report Requirements – The purpose of this project is to improve the environment; however, the construction of this project could result in temporary impacts. An environmental review of this project will be performed prior to construction.

5.3.8 Project E1: Standards for Detention Basins

This project was categorized as a planning project and therefore, is evaluated qualitatively. The qualitative evaluation of this set of standards is presented in Table 5–2 and discussed below:

- Water Quality – This project was assigned a Medium water quality rating because implementing the standards included in this manual will:
 - Reduce trash in the receiving waters through the implementation of trash capture devices in future detention basins.
 - Promote infiltration and bio-treatment through the implementation of grassy swales and small water quality basins in low flow channels.
- Water Supply – This project was assigned a Medium water supply rating because implementing the standards included in this manual will promote infiltration to groundwater.
- Flood Management - This project was assigned a High flood management rating because implementing the standards included in this manual will:
 - Determine or clarify when detention basins should be designed and constructed.
 - Identify structural requirements for how detention basins should be sized, designed, and constructed to optimize flood management, and reduce operations, maintenance, and energy costs.

- Define the maintenance procedures for grassy swales in detention basins, the frequency of trash removal and screen cleaning to reduce potential clogging, and other maintenance activities that will help the detention basin perform as designed.
- Environmental Benefit - This project was assigned a Low environmental benefit rating because implementing the standards included in this manual will help reduce trash in the drainage ways, which are eventually pumped to rivers and streams that provide habitat.
- Community Benefit - This project was assigned a High community benefit rating because implementing the standards included in this manual will include the guidance for the construction of parks or playfields in detention basins and guidelines on how to provide an appropriate level of public access.
- Initial Costs - The level of effort and cost of preparing this standard manual is provided in Table 5-3. These costs include consultant time and an administration cost at 5 percent of the total project cost to account for City Staff time.

Table 5-3. Estimated Cost for Detention Basin Standard Manual		
Task	Estimated Level of Effort, hours	Estimated Cost, dollars
Review Existing and Other Local Standards	20	\$4,000
Develop New/Updated Design/Construction Standards	40	\$8,000
Develop Operations and Maintenance (O&M) Guidelines	20	\$4,000
Project Management	15	\$3,000
Administration Costs (5 percent)	--	\$1,000
Total for Detention Basin Standards Manual	95	\$20,000

- Permit Requirements – No permits will be required for the preparation of the Standards for Detention Basins. However, the permits that will likely be required for the implementation of the standards identified in the manual include applicable City and County permits and attaining coverage under the California General Permit for Storm Water Discharge Associated with Construction Activities.
- Environmental Impacts – No environmental impacts will occur from the preparation of this standards manual.

5.3.9 Project E2: Standards for Gilsizer Slough

This project was categorized as a planning project and therefore, is evaluated qualitatively. The qualitative evaluation of this set of standards is presented in Table 5–2 and discussed below:

- **Water Quality** – This project was assigned a Medium water quality rating because implementing the standards to be included in this manual will:
 - Reduce trash in the Gilsizer Slough through the implementation of trash capture devices.
 - Reduce runoff into Gilsizer Slough by standardizing requirements for new development and limiting installation of new inlets.
 - Minimize erosion through structural and non-structural improvements, which will decrease sediment in drainage ways.
- **Water Supply** – This project was assigned a None water supply rating because none of the standards included in this manual will promote infiltration in the channels or replace an existing water supply.
- **Flood Management** - This project was assigned a High flood management rating because implementing the standards included in this manual will:
 - Reduce trash entering Gilsizer Slough, which will reduce the likelihood of debris clogging the channel.
 - Reduce runoff entering Gilsizer Slough by limiting new discharges.
 - Update maintenance practices to help Gilsizer Slough perform as designed.
- **Environmental Benefit** - This project was assigned a Low environmental benefit rating because implementing the standards included in this manual will help reduce trash in the drainage ways.
- **Community Benefit** - This project was assigned a None community benefit rating because implementing the standards included in this manual will not impact the community.
- **Initial Costs** - The level of effort and cost of preparing this standard manual is provided in Table 5-4. These costs include consultant time and an administration cost at 5 percent of the total project cost to account for City Staff time.

Table 5-4. Estimated Cost for Gilsizer Slough Standards Manual

Task	Estimated Level of Effort, hours	Estimated Cost, dollars
Review existing and Other Local Standards	20	\$4,000
Develop New/Updated Standards	40	\$8,000
Develop O&M Guidelines	20	\$4,000
Project Management	15	\$3,000
Administration Costs (5 percent)	--	\$1,000
Total for Gilsizer Slough Standards Manual	95	\$20,000

- Permit Requirements – No permits will be required for the preparation of the Standards for Gilsizer Slough.
- Environmental Impacts – No environmental impacts will occur from the preparation of this standards manual.

5.3.10 Project E3: Trash Capture Master Plan

This project was categorized as a planning project and therefore, is evaluated qualitatively. The qualitative evaluation of this planning project is presented in Table 5–2 and discussed below:

- Water Quality – This project was assigned a Medium water quality rating because implementing the projects included in this plan will remove trash from the receiving waters.
- Water Supply – This project was assigned a Low water supply rating because most full capture trash devices likely to be included in this plan are not designed to promote infiltration, nor do they offset an existing water supply. However, some trash capture devices can include multi-benefit treatment systems, which could promote infiltration, if selected by the City.
- Flood Management - This project was assigned a Low flood management rating because this plan will include a maintenance plan for the trash capture devices that identifies frequency of trash removal and screen cleaning to reduce potential clogging.
- Environmental Benefit - This project was assigned a Low environmental benefit rating because implementing the projects included in this plan will help reduce trash in the drainage ways, which are eventually pumped to rivers and streams that provide habitat.
- Community Benefit - This project was assigned a Low community benefit rating because implementing the projects included in this plan will remove trash from drainage ways. This plan may also evaluate the effectiveness of involving the public in a trash reduction campaign.
- Initial Costs - The level of effort and cost of preparing this plan is provided in Table 5-5.

Chapter 5

SWRP Project Evaluations, Quantitative Methods, and Project Ranking/Prioritizations



Table 5-5. Estimated Cost for Trash Capture Master Plan

Task	Estimated Level of Effort, hours	Estimated Cost, dollars
Review and Refine Land Uses	40	\$8,000
Update Jurisdictional Maps and Locate FCS Devices (<i>desktop analysis only</i>)	70	\$14,000
Create Implementation Plan	120	\$24,000
Develop O&M Program	75	\$15,000
Project Management (includes outreach)	60	\$15,000
Administration (5 percent)	--	\$3,800
Total for Trash Master Plan	350	\$79,800

- Permit Requirements – No permits will be required for the preparation of the Trash Capture Master Plan.
- Environmental Impacts – No environmental impacts will occur from the preparation of this plan.

5.4 PROJECT RANKING

Projects are ranked in Table 5-6; 1 is the highest ranked and 10 is the lowest ranked, based on their anticipated benefits, per the State's Guidelines. This ranking does not include estimated cost or regulatory requirements that impact project scheduling and therefore, this ranking is revised in Chapter 6 to account for these factors.

5.5 LOW IMPACT DEVELOPMENT STANDARDS

The City's Post-Construction Standards 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. No new design criteria and best management practices will be developed as part of this SWRP document.

Chapter 5

SWRP Project Evaluations, Quantitative Methods, and Project Ranking/Prioritizations



Table 5-6. Project Ranking Summary Based on Multiple Benefit Evaluation

Rank	Project Number	Project Title	Total Points	Main Benefits	Additional Benefits
1	A7	Detention Pond East of WWTP Modifications	128	Increased filtration and treatment of runoff, Increased urban green space, Environmental and habitat protection and improvement	Reestablish natural water drainage and treatment
2	A4	Shanghai Bend Detention Pond Modifications	119	Increased filtration and treatment of runoff, Increased urban green space, Environmental and habitat protection and improvement	Reestablish natural water drainage and treatment, create public use areas
3	A1	Gilsizer North Detention Basin Modifications	106	Increased filtration and treatment of runoff, Increased urban green space, Environmental and habitat protection and improvement	Reestablish natural water drainage and treatment, create public use areas
4	F5	Jefferson Ditch Improvements	63	Increased filtration and treatment of runoff, riparian enhancement	Reestablish natural water drainage and treatment
5	E1	Detention Basin Standards	54	Increased filtration and treatment of runoff, Decreased flood risk by reducing runoff rate/volume, Increased urban green space	Reestablish natural water drainage and treatment, create public use areas
6	F3	Madrone and Orchard/Park Trash Capture	39	Increased treatment of runoff, Environmental and habitat protection	Nonpoint source pollution control
7	F1, F2 & F4	Gilsizer Slough at Lincoln Road Trash Capture	37	Increased treatment of runoff, environmental and habitat protection	Nonpoint source pollution control
8	F6	Live Oak Canal at Franklin Road Trash Capture	31	Increased treatment of runoff, environmental and habitat protection	Nonpoint source pollution control
9	E2	Gilsizer Slough Standards	30	Increased treatment of runoff, environmental and habitat protection	Nonpoint source pollution control
10	E3	Trash Capture Master Plan	26	Increased treatment of runoff, environmental and habitat protection	Nonpoint source pollution control

5.6 COLLECTIVE BENEFITS OF PROJECT IMPLEMENTATION

5.6.1 Groundwater Recharge and Water Supply

The projects evaluated as part of this SWRP will primarily capture storm water and dry weather runoff through infiltration and groundwater recharge. Once all projects are implemented, approximately sixty-four acre-feet of storm water and dry weather runoff will infiltrate and recharge groundwater. As discussed in Chapter 1, groundwater is primarily used on the east side of the PAW for irrigation water supply. The additional sixty-four acre-feet of groundwater recharge will be available for irrigation water supply.

5.6.2 Pollutant Reduction and Source Control

The infiltration that results from the implementation of SWRP projects will reduce the quantity of pollutants that reach receiving waters, which will increase receiving water quality.

Additionally, pollution source control was identified for Project A1: Gilsizer North Detention Basin Modifications. The implementation of retractable covers over material storage areas and a permanent roof over the gas station will help reduce pollutants in runoff.

5.7 CONSISTENCY WITH NPDES PERMIT

The Phase II MS4 Permit is the NPDES General Permit that regulates small MS4 storm water discharges in the YCB watershed. The Water Quality Benefit Category evaluation criteria listed in Table 5-1 include an analysis of how each project reduces several specific pollutant loadings and thereby helps comply with and is consistent with the General NPDES permit.



CHAPTER 6: IMPLEMENTATION STRATEGY AND SCHEDULE

Chapter Contents

- Assignment of SWRP Projects to Funding Agencies and Organizations
- Capital Funding Sources
- Operational and Maintenance Funding Sources
- SWRP Project Capital and O&M Costs
- Implementation Plan
- Projects Selected for Conceptual Design
- Interdependencies Between Projects
- General SWRP Management



CHAPTER 6

Implementation Strategy and Schedule



This chapter includes the following sections:

- Assignments of SWRP Projects to Funding Agencies and Organizations
- Capital Funding Sources
- O&M Funding Sources
- SWRP Project Capital and O&M Costs
- Implementation Plan
- Miscellaneous Items

6.1 ASSIGNMENT OF SWRP PROJECTS TO FUNDING AGENCIES AND ORGANIZATIONS

The City is projected to sponsor and fund all the SWRP projects identified previously in Chapter 5.

6.2 CAPITAL FUNDING SOURCES

The estimated available capital funding for SWRP projects for the next 20 years is \$100,000 per year (in 2018 dollars). This 20-year projection of future funding extends beyond the City's budgeting horizon and, consequently, the reliability of the future funding beyond the year 2022 is not certain.

6.3 OPERATIONS AND MAINTENANCE FUNDING SOURCES

The estimated available O&M funding for SWRP projects for the next 20 years is \$50,000 per year. This 20-year projection of future funding extends beyond the City's budgeting horizon and, consequently, the reliability of the future O&M funding beyond the year 2022 is not certain.

6.4 SWRP PROJECT CAPITAL AND O&M COSTS

The estimated planning / engineering, construction, total capital, and O&M costs of each project are summarized in Table 6-1. For the planning projects, there is only a planning/engineering cost; there are no construction, total capital, or O&M costs. For implementation projects; planning and engineering, construction, total capital, and O&M costs are estimated.

Table 6-1. Project Cost Summary (Summarized from Chapter 5)

SWRP Project	Planning / Engineering Costs, dollars	Construction Cost, dollars	Land or Right -of-Way Acquisition Costs, dollars	Total Capital Cost, dollars	Annual O&M Costs, dollars per year
A1. Gilsizer North Detention Basin	98,700	513,300	0	612,000	26,800
A4. Shanghai Bend Detention Basin	126,900	659,900	0	786,800	24,800
A7. Detention Basin East of WWTP	38,100	198,000	0	236,100	4,000
F1., F2., F4., Trash Capture in Gilsizer Slough at Lincoln Road	64,200	333,900	0	398,100	6,000
F3. Trash Capture at Orchard and Park	29,200	151,600	0	180,800	6,000
F5. Trash Capture at Jefferson Ditch	17,800	92,200	0	110,000	4,000
F6. Trash Capture in Live Oak Canal at Franklin Road	11,600	60,100	0	71,700	6,000
E1. Standards for Detention Basins	20,000	--	--	20,000	--
E2. Standards for Gilsizer Slough	20,000	--	--	20,000	--
E3. Trash Capture Master Plan	79,800	--	--	79,800	--
Total	\$506,300	\$2,009,000	\$0	\$2,515,300	\$77,600

6.5 IMPLEMENTATION PLAN

Table 6-2 presents the implementation schedule of capital and O&M expenditures for SWRP projects. The SWRP projects were scheduled for the years 2018 through 2030, based on the following guidelines (listed from most important to least important):

- The importance of the project to the funding agency and organization (i.e., how the City intends to comply with State-mandated Trash Amendment requirements);
- Projects that have the widest range of benefits (i.e., projects that scored very highly because they performed well in only one category were prioritized lower than projects that didn't score quite as well, but had points distributed over more categories);
- The interdependencies of projects (meaning that the Trash Capture Master Plan needs to be completed prior to the installation of any trash capture projects, as discussed further below);
- The prioritization of the SWRP projects from Chapter 5;
- The availability of capital funds; and
- The availability of annual O&M funds.

Eight of the SWRP projects are trash capture projects and are scheduled for implementation within or near a ten-year time frame to meet the Trash Amendment Requirements. As only \$100,000 is available annually for engineering, design, and construction costs, implementing many of these projects will require additional funding sources. Similarly, O&M costs increase every time a new project is implemented, and therefore, additional sources of O&M funding will be required after the year 2026.

Table 6-2. SWRP Project Funding and Implementation Plan/Schedule																							
SWRP Project	Planning/ Engineering Cost	Construction Cost	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Capital Costs																							
Annual Available Capital Funds	--	--	\$ 200,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000
A1. Gilsizer North Detention Basin	\$ 98,700	\$ 513,300	98,700	513,300																			
A4. Shanghai Bend Detention Basin	\$ 126,900	\$ 659,900							126,900	659,900													
A7. Detention Basin East of WWTP	\$ 38,100	\$ 198,000									38,100	198,000											
F1., F2., F4., Trash Capture in Gilsizer Slough at Lincoln Road	\$ 64,200	\$ 333,900					64,200	333,900															
F3. Trash Capture at Orchard and Park	\$ 29,200	\$ 151,600			29,200	151,600																	
F5. Trash Capture at Jefferson Ditch	\$ 17,800	\$ 92,200											17,800	92,200									
F6. Trash Capture in Live Oak Canal at Franklin Road	\$ 11,600	\$ 60,100											11,600	60,100									
E1. Standards for Detention Basins	\$ 20,000	--													20,000								
E2. Standards for Gilsizer Slough	\$ 20,000	--													20,000								
E3. Trash Capture Master Plan	\$ 79,800	--	79,800																				
Cumulative Available Capital Funds	--	--	\$ 21,500	\$ (391,800)	\$ 70,800	\$ 19,200	\$ 55,000	\$ (178,900)	\$ (26,900)	\$ (559,900)	\$ 61,900	\$ (36,100)	\$ 70,600	\$ 18,300	\$ 78,300	\$ 178,300	\$ 278,300	\$ 378,300	\$ 478,300	\$ 578,300	\$ 678,300	\$ 778,300	\$ 878,300
Grants or Loans Needed	--	--	\$ -	\$ 391,800	\$ -	\$ -	\$ -	\$ 178,900	\$ 26,900	\$ 559,900	\$ -	\$ 36,100	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
O&M Costs																							
Annual Available O&M Funds	--	--	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000
A1. Gilsizer North Detention Basin	--	\$ 26,800			26,800	26,800	26,800	26,800	26,800	26,800	26,800	26,800	26,800	26,800	26,800	26,800	26,800	26,800	26,800	26,800	26,800	26,800	26,800
A4. Shanghai Bend Detention Basin	--	\$ 24,800									24,800	24,800	24,800	24,800	24,800	24,800	24,800	24,800	24,800	24,800	24,800	24,800	24,800
A7. Detention Basin East of WWTP	--	\$ 4,000													4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000
F1., F2., F4., Trash Capture in Gilsizer Slough at Lincoln Road	--	\$ 6,000							6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000
F3. Trash Capture at Orchard and Park	--	\$ 6,000					6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000
F5. Trash Capture at Jefferson Ditch	--	\$ 4,000														4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000
F6. Trash Capture in Live Oak Canal at Franklin Road	--	\$ 6,000														6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000
E1. Standards for Detention Basins	--	--																					
E2. Standards for Gilsizer Slough	--	--																					
E3. Trash Capture Master Plan	--	--																					
Cumulative O&M Costs			\$ -	\$ -	\$ 26,800	\$ 26,800	\$ 32,800	\$ 32,800	\$ 38,800	\$ 38,800	\$ 63,600	\$ 63,600	\$ 67,600	\$ 67,600	\$ 77,600	\$ 77,600	\$ 77,600	\$ 77,600	\$ 77,600	\$ 77,600	\$ 77,600	\$ 77,600	\$ 77,600
Additional Source of O&M Funds Needed			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,600	\$ 13,600	\$ 17,600	\$ 17,600	\$ 27,600	\$ 27,600	\$ 27,600	\$ 27,600	\$ 27,600	\$ 27,600	\$ 27,600	\$ 27,600	\$ 27,600

Table 6-3 summarizes the implementation schedule of SWRP projects, in chronological order.

Table 6-3. Project Implementation Schedule Summary		
SWRP Project	Planning, Year	Construction, Year
E3. Trash Capture Master Plan	2018	--
A1. Gilsizer North Detention Basin	2018	2019
F3. Trash Capture at Orchard and Park	2020	2021
F1., F2., F4., Trash Capture in Gilsizer Slough at Lincoln Road	2022	2023
A4. Shanghai Bend Detention Basin	2024	2025
A7. Detention Basin East of WWTP	2026	2027
F5. Trash Capture at Jefferson Ditch	2028	2029
F6. Trash Capture in Live Oak Canal at Franklin Road	2028	2029
E1. Standards for Detention Basins	2030	--
E2. Standards for Gilsizer Slough	2030	--

6.6 PROJECTS SELECTED FOR CONCEPTUAL DESIGN

As part of the implementation strategy, the TAC selected the following five projects for conceptual design to help secure grant funding and to facilitate future design and construction of these projects. The TAC selected the first five implementation projects on the schedule (Table 6-3).

- A1. Gilsizer North Detention Basin
- F3. Trash Capture at Orchard and Park
- F1., F2., F4., Trash Capture in Gilsizer Slough at Lincoln Road
- A4. Shanghai Bend Detention Basin
- A7. Detention Basin East of WWTP

6.7 INTERDEPENDENCIES BETWEEN PROJECTS

The independence and interdependencies between projects is summarized below.

6.7.1 Dependent Projects

The Trash Capture Master Plan should be completed prior to the implementation of all the other trash capture projects. This master plan will analyze the cost effectiveness of installing a few large trash capture devices or many small trash capture devices. Therefore, this analysis should be completed prior to the construction of the following SWRP trash capture projects:

- A1. Gilsizer North Detention Basin
- A4. Shanghai Bend Detention Basin

- A7. Detention Basin East of WWTP
- F1., F2., F4., Trash Capture in Gilsizer Slough at Lincoln Road
- F3. Trash Capture at Orchard and Park
- F5. Trash Capture at Jefferson Ditch
- F6. Trash Capture in Live Oak Canal at Franklin Road

All of the trash projects were originally prioritized higher than E3. Trash Capture Master Plan, as explained in Chapter 5. Based on this dependency requirement, the Trash Capture Master Plan becomes the highest priority.

6.7.2 Independent Projects

The following projects are independent of the other projects:

- E1. Standards for Detention Basins
- E2. Standards for Gilsizer Slough

6.8 GENERAL SWRP MANAGEMENT

Additional items required for the implementation plan are discussed below.

6.8.1 Required Decision Support Tools

The following decision support tools are recommended for evaluating the implementation of the SWRP:

- **Budgeting Decision Support Tool** – Annually, the required funding should be compared with the City-budgeted funding to help ensure adequate funding is available. Decisions from this tool could include increasing the prioritization of the SWRP projects in comparison to other City projects, and to seek grant funding for projects.
- **Staffing Decision Support Tool** – The required staffing should be compared with the level of effort needed to start and complete the SWRP projects. Decisions from this tool could include seeking additional staff positions for implementation of the SWRP projects and use of consultants for implementation of the SWRP projects.

6.8.2 Monitoring and Implementation Performance Measures

The status of SWRP projects and various project elements should be monitored and documented annually. The results of annual status updates should be published on the City's SWRP website. The following implementation performance measures should be used to evaluate the success of the SWRP project implementation:

- Revise the SWRP project completion schedule (Tables 6-2 and 6-3) as-needed so the document remains a realistic and meaningful projection of when the SWRP project should be implemented.
- Annually compare the SWRP Projects and project elements completed with the estimated project completion schedule (Table 6-2 and 6-3) and subsequent revisions of the schedule).

6.8.3 Adaptive Management Plan

For the SWRP to be effective, an adaptive management strategy is needed. The pace for implementation of projects, timing, and project funding will be heavily influenced by outside drivers, including available funding, new regulatory mandates, and environmental influences. As these influences change the landscape of storm water planning, and as new and updated project designs become available while other projects receive funding and are implemented, the SWRP will require updates to remain a relevant document for planning the future of storm water in the watershed.

6.8.3.1 Potential Obstacles and Solutions

The adaptive management plan for the YCB SWRP is intended to help ensure that the SWRP projects are successfully implemented. The likely obstacles to the implementation of the SWRP are listed below, followed by adaptive management strategies to help overcome the obstacles.

Obstacle 1: Inadequate Funding – This is the most likely obstacle that will prevent or delay the implementation of the SWRP projects. This obstacle includes lack of capital funding for the preparation of plans, design of projects, and construction of projects. This also includes lack of annual funds for the O&M of the projects after they are constructed. The following adaptive management strategies are intended to help address this obstacle:

- As part of the City’s annual budgeting process, review the scheduled capital and O&M expenditures and ensure adequate funds are requested in the next year’s budget.
- Adopt amendments to the City’s General Plan that commit the City to fund the SWRP project capital and O&M requirements.
- Promote collaboration among agencies to collectively provide required funding, such as Sutter County and Gilsizer County Drainage District, and to optimize use of volunteers for project implementation.
- Seek grant funding for implementation of the SWRP projects.
- Adopt a storm water funding mechanism to cover capital and O&M expenses. Agencies’ ability to implement storm water taxes, assessments and fees are governed by Proposition 218, which limits the methods by which taxpayers are subjected to these costs without voter approval. Examples of potential mechanisms include:

- **Special Taxes** – Proposition 218 defines “general taxes” and “special taxes”, of which “special tax” is most applicable and means “any tax imposed for specific purposes”. The mechanism by which the City might impose these taxes is with the establishment of a Community Facilities District (CFD). Special taxes and CFD charges do not require a detailed cost basis, but they must be submitted to the area’s electorate via ballot and approved by a two-thirds majority vote. Because of this relatively high approval requirement, special taxes for storm water have a higher chance of being rejected than other funding options.
- **Storm Water Fees** – According to Proposition 218, a property-related fee is a “fee or charge imposed upon a parcel as an incident of property ownership”, and must reflect the cost of service for the affected property owners, supported by an engineer’s report or rate study. These fees typically appear on a monthly bill, and sometimes are collected on the property tax roll. Users with a larger impact on the storm water system are charged a larger fee as a reflection of the cost to serve them. For example, impact measurement can be based on a user’s impervious surface area. Each property owner in the area must be given a 45-day notice of a public hearing on the proposed rates. If a majority of property owners (50 percent + 1) protest the proposed fee at the hearing, the fee may not continue to ballot. If there is no majority protest, the city may choose to submit the fee to a ballot for either all property owners or only the electorate within the fee area. The property owner vote requires a simple majority (50 percent) approval from submitted ballots.
- **Storm Water Property Assessment** – A property assessment is a charge based on an engineer’s report which outlines the proposed area of benefit and determines the value of the direct cost to provide storm water service and improvements on each parcel. The amount of benefit received by each parcel can also refer to the amount of impact that a parcel is estimated to have on the storm water system. The benefit can be assessed based on impervious surface area. Assessments would appear on the property tax roll and are generally a more secure source of revenue than a property-related fee because assessments come with the ability to place a lien on properties who are delinquent in paying. Assessments can be charged over the benefit area using a Benefit Assessment District. Assessments do not require an initial public hearing before moving to a mailed ballot for all affected property owners. Ballot votes must be weighted in proportion to the amount of the assessment that each property owner will pay. Assessments require a simple majority (50 percent) approval of received ballots using these weighted votes.
- **Storm Water Utility** – Senate Bill Number 231 (SB 231) clarified that storm drains are sewers for the purposes of Proposition 218. This simple clarification allows Cities, Counties, and Districts to fund their storm water infrastructure capital costs, operations and maintenance costs, storm water quality regulatory costs, and the cost of services being provided. By establishing this clarification, storm water systems can be funded like sanitary sewer systems, and potable water systems have been funded since Proposition 218 was passed in 1996.

Obstacle 2: Inadequate Staffing –This obstacle includes lack of staff to manage and implement the SWRP Projects. The following adaptive management strategies are intended to help address this obstacle:

- Establish and fill a part time or full-time staff position that is dedicated to implementing the SWRP projects.
- Where appropriate, utilize consultants to perform highly technical or specialized tasks that would be difficult for agency and organization staff to perform.

Obstacle 3: Uncertainty in Trash Regulatory Requirements – This obstacle addresses the uncertainty in the requirements for the California Trash Amendments. Yuba City has selected Track 1 (installation of approved full capture devices in all high priority land uses areas) to meet the Trash Amendments; but, a Trash Capture Master Plan needs to be completed prior to the implementation of any trash capture projects. Therefore, it is not certain which Track Yuba City will eventually select. Additionally, as the California Trash Amendment requirements are new, knowledge and existence of high-flow and in-channel trash capture devices and configurations are limited. If the City remains Track 1, the trash capture devices included in the SWRP projects that involve Gilsizer Slough and Live Oak Canal will need to be certified by the State Water Board, a process which could take years. The determination of Track 1 or 2 and the certification process will determine the implementation schedule for the SWRP trash capture projects. The following adaptive management strategies are intended to help address this obstacle:

- Complete the trash capture master plan.
- Coordinate with the State Water Board throughout the development of the trash capture master plan.
- Allow one to three years for certification of full capture trash devices in implementation schedules for trash capture projects.

Obstacle 4: Project Permit Acquisition – This obstacle addresses the difficulty of acquiring the needed permits to implement the SWRP projects and the subsequent projects that are identified through preparation of the SWRP planning projects. The following adaptive management strategies are intended to help address this obstacle:

- Engage the permitting agencies early in the project planning and design processes.
- Allow one to three years for permit acquisition in the project implementation schedules.
- Where appropriate, utilize consultants to provide permit acquisition support.

6.8.3.2 New Project Submissions

New projects can be submitted to the SWRP at any time. Each time the SWRP is updated, the new projects will be screened as described in Chapter 4. If they pass the screening criteria, the projects will be evaluated using the method described in Chapter 4 and Table 5-1. It is crucial that that a master Excel spreadsheet of Table 5-1 be updated with each SWRP update and integrated with all projects so scores will update as new projects are added to Table 5-1. The new projects will be incorporated into the benefit evaluation ranking in Chapter 5 based on their total scores. The project will then be incorporated into the implementation schedule on a project-by-project basis based on the priorities listed in Section 6.5.

6.8.3.3 SWRP Updates

The SWRP will be updated at least once every 5 years, but can be updated more frequently if needed to remain current with the activities that have occurred within the Yuba City Basin Watershed (e.g. implementation projects and submission of new projects). The elements of the SWRP that will require updating include the project list, screening, benefit evaluation rankings, and the implementation schedule. The City will be responsible for incorporating the updates.

6.8.4 Submission of SWRP to Existing Integrated Regional Watershed Management Plan

The final SWRP will be submitted to the North Sacramento Valley Integrated Regional Watershed Management Plan for adoption in October 2018 following the adoption of the SWRP by City Council.

6.8.5 Community Participation Strategy

Community outreach and involvement will be undertaken for the future planning and design of the SWRP projects. It is expected that community involvement will occur for the portions of projects that are most visible to the public, i.e. the development of community parks or play areas within the detention basin SWRP projects. Public meetings will be held during the planning phase of each detention basin SWRP project to receive feedback on the types of parks or play areas to be included in the SWRP detention basin projects.

6.8.6 Permitting Strategy and Timeline

As stated in Section 6.6.4, there is the need to include several years in the timeline to acquire permits for pertinent projects.

All implementation projects will be required to obtain applicable local permits through the City or County as well as the General Construction Permit through the State Water Resources Control Board. These permits are referred to as Standard Permits in Table 6-4. Table 6-4 also shows anticipated permits specific to each project.

Table 6-4. Anticipated Permits

SWRP Project	Anticipated Permits	Strategy to Obtain Permits
A1. Gilsizer North Detention Basin	Standard permits;	See summary below
A4. Shanghai Bend Detention Basin	Standard permits	See summary below
A7. Detention Basin East of WWTP	Standard permits	See summary below
F1., F2., F4., Trash Capture in Gilsizer Slough at Lincoln Road	USACE, RWQCB, CDFW, Approval of trash device from SWQCB	See summary below
F3. Trash Capture at Orchard and Park	USACE, RWQCB, CDFW, SWRCB	See summary below
F5. Trash Capture at Jefferson Ditch	USACE, RWQCB, CDFW, SWRCB	See summary below
F6. Trash Capture in Live Oak Canal at Franklin Road.	USACE, RWQCB, CDFW, SWRCB	See summary below
E1. Standards for Detention Basins	None	None
E2. Standards for Gilsizer Slough	None	None
E3. Trash Capture Master Plan	None	None

The strategy to obtain permits includes the following:

- Determine if each project area is within an agency's jurisdiction – Although the channels proposed for installation of trash capture devices are trapezoidal, engineered channels for the sole purpose of conveying drainage, they will likely require a CDFW Lake and Streambed Alteration Agreement, a USACE CWA Section 404 permit, and a RWQCB CWA Section 401 certification.
- Include permitting time in the project's schedule - Even if no permit is needed, allow at least one year to confirm that no permits are needed.



CHAPTER 7: STANDARD PROVISIONS

Chapter Contents

- California Environmental Quality Act Compliance
- Consistency with Water Quality Control Plans, Applicable Water Quality Control Policies, and Water Rights
- Submission to Entities Overseeing the Integrated Regional Water Management Plans and Other Local Plans
- Consistency with Applicable Permits
- Consistency with California Health and Safety Code – Pest and Mosquito Abatement
- Modification of a River or Stream Channel
- Monitoring



This chapter includes details on how this SWRP and associated projects address standard provisions as identified in the State's SWRP Guidelines.

7.1 CALIFORNIA ENVIRONMENTAL QUALITY ACT COMPLIANCE

Planning and implementation projects proposed as part of this SWRP will be in compliance with the California Environmental Quality Control Act (Public Resources Codes § 21000 et seq.).

Many of the SWRP projects will improve environment; however, the project could cause temporary, construction related impacts or permanent environmental impacts. Therefore, a CEQA review will be performed for each SWRP implementation project and the appropriate CEQA document will be prepared (categorical exemption, negative declaration, mitigated negative declaration, or environment impact report) will be prepared to identify impacts; and if needed, recommend corrective mitigation measures.

7.2 CONSISTENCY WITH WATER QUALITY CONTROL PLANS, APPLICABLE WATER QUALITY CONTROL POLICIES, AND WATER RIGHTS

The SWRP prioritizes projects that will be consistent with and contribute toward compliance with the Basin Plan and other applicable water quality control plans and water rights. The YCB SWRP identifies, prioritizes, and selects projects that reduce stormwater and dry weather runoff, reduces pollutants in stormwater discharges, increases infiltration/groundwater recharge, improves flood control, and protects water quality in receiving waters. These objectives will be accomplished by employing an array of appropriate non-structural, structural, regional and green infrastructure BMPs to reduce runoff volume, velocity, and erosion and sediment transport, maximize the use of green infrastructure for catchment, infiltration, and treatment, and by conducting public outreach and education. Such BMPs have benefits across multiple pollutant categories (e.g., pesticides, trash, heavy metals).

7.3 SUBMISSION TO ENTITIES OVERSEEING THE INTEGRATED REGIONAL WATER MANAGEMENT PLANS AND OTHER LOCAL PLANS

The final SWRP will be submitted to the NSV IRWMP for adoption in October 2018 following the adoption of the SWRP by City Council.

The projects and objectives of this SWRP fit within the broader water management goals identified by the IRWMP, shown in Table 2-1 of the IRWMP. These goals include water supply reliability, flood protection and planning, water quality protection and enhancement, watershed protection and management, and integrated regional water management sustainability, and public education and information dissemination. Within each goal, the IRWMP identifies multiple objectives. The SWRP includes projects that correlate directly with several of the goals and objectives identified in Table 2-1 from the IRWMP, as summarized in Table 7-1.

Table 7-1. IRWMP Goals and Objectives Correlated with SWRP Goals and Objectives

Goal	Objective
Flood Protection and Planning	Implement mutually beneficial flood risk reduction and floodplain ecosystem enhancement programs and projects on a voluntary basis.
Water Quality Protection and Enhancement	Meet State and Federal standards for water quality in surface water bodies and groundwater basins
Water Quality Protection and Enhancement	Minimize adverse water quality impacts from non-point sources to surface and ground water.
Watershed Protection and Management	Integrate recreational opportunities within water resource programs and projects

7.4 CONSISTENCY WITH APPLICABLE PERMITS

The SWRP enhances efforts to achieve pollutant reductions by TMDLs by prioritizing those projects that have multiple benefits. For example, stormwater infiltration provides groundwater recharge and reduces the volume of stormwater discharged to surface water, which reduces pollutant loads discharged to surface water. Monitoring data collected under TMDL implementation requirements will be used to evaluate constituent levels and assess attainment of WLAs in urban discharges. Water quality improvements will be realized as discharges of stormwater and dry weather runoff to waterbodies are reduced through multi-benefit stormwater projects.

Multi-benefit SWRP projects will also support and assist with Phase II MS4 Permit compliance and contribute toward attainment of TMDL WLAs. The SWRP will prioritize projects that will be consistent with LID and green infrastructure-type solutions, such as site design and stormwater treatment measures to achieve infiltration, evapotranspiration, harvesting/reuse, and/or bioretention. SWRP projects that incorporate green infrastructure employ a variety of natural and constructed features that reduce the rate and volume of stormwater runoff to the MS4 or surface water, filter pollutants out of runoff, facilitate the infiltration of water into the ground, replenish local natural surface water systems, and/or allow for on-site storage of water for a beneficial use (SWRCB 2015b).

The SWRP will also be consistent with and support compliance with Waste Discharge Requirements if future SWRP projects direct stormwater runoff from agricultural lands to groundwater recharge. Benefits will be realized in groundwater quantity and quality through groundwater replenishment, particularly in groundwater basins with elevated concentrations of salts. Reducing the volume of runoff to surface water will reduce pollutant loads including pesticides, sediment, nutrients, salts, pathogens and heavy metals, contributing to surface water quality improvements and attainment of TMDL WLAs.

Other national and local permit requirements have been identified in the individual Project Evaluations (Appendix 5C), and further discussed in Chapter 6.

7.5 CONSISTENCY WITH CALIFORNIA HEALTH AND SAFETY CODE – PEST AND MOSQUITO ABATEMENT

Projects proposed as part of this SWRP will involve installation of green infrastructure including vegetated and grassy swales. These swales promote increased infiltration and evapotranspiration of storm water runoff which protects and restores the natural water cycle. This may result in less water reaching other impermeable areas where it can stagnate and become habitat for vector larvae.

City operations and maintenance staff will oversee and maintain any new infrastructure installed within City boundaries. Existing practices for pest and mosquito abatement will be employed.

The Administrative Draft SWRP was submitted to the Sutter-Yuba Mosquito and Vector Control District for review and comment.

7.6 MODIFICATION OF A RIVER OR STREAM CHANNEL

Several of the SWRP implementation projects will involve modifications to existing drainage courses including; Gilsizer Slough, Live Oak Canal, and Jefferson Ditch. According to the current U.S. EPA definition, these may be considered navigable waters of the United States (CWA, 40 CFR 230.3(s)). Section 404 of the CWA requires USACE authorization prior to discharging dredged or fill materials into waters of the United States. A Clean Water Act Section 404 Permit will be obtained for qualifying projects.

A USACE Section 404 Permit triggers a RWQCB 401 Certification. Section 401 of the CWA requires that any application for a federal permit or license, which may result in a discharge of pollutants into waters of the United States, must obtain a state water quality certification that the activity complies with all applicable water quality standards, limitations, and restrictions.

A CDFW LSA notification will also be required for projects in Gilsizer Slough, Live Oak Canal, and Jefferson Ditch.

7.7 MONITORING

7.7.1 Monitoring of SWRP Implementation

To assess the effectiveness of SWRP implementation on a watershed basis, projects and various project elements should be monitored and documented annually. The results of annual status updates should be published on the City's SWRP website. The following implementation performance measures should be used to evaluate the success of the SWRP project implementation:

- **SWRP Project Completion:** A measurement of actual projects implemented compared to the estimated project completion schedule. Using the SWRP project completion schedule (Table 6-4), the number of projects or project elements completed will be compared (at least once every five years, or any time the SWRP is updated) with the number of projects planned for completion.

- **Water Quality:** A measurement of the impact to water quality, indicated by the amount of trash removed by trash capture devices. Many of the implementation projects will provide water treatment through infiltration and bio-treatment. Although common stormwater pollutant removals are difficult to measure in these projects, volume of trash removed from trash capture devices can be monitored and documented. One of the City's high priority pollutants is trash, and therefore, monitoring trash capture by the SWRP projects helps the City meet their goals.

Implementation projects which secure grant funding may be subject to additional monitoring requirements. These monitoring efforts will be integrated with existing local, regional, and statewide monitoring programs where applicable.

7.7.2 Monitoring Required by MS4 Permit

To date, the City has not been required to conduct urban discharge monitoring for their stormwater program. However, the City is identified as a responsible party in the Phase II Permit, Attachment G1, Region Specific Requirements for the Diazinon and Chlorpyrifos TMDL for the Sacramento and Feather Rivers (Resolution No. R5-2007-0034). As such, the City is required to conduct an assessment to (1) determine the diazinon and chlorpyrifos levels and attainment of waste load allocations in urban discharge, and (2) evaluate attainment of established water quality objectives applicable to diazinon and chlorpyrifos for the receiving water. To obtain information for this assessment, the City is developing a monitoring approach which may include monitoring Gilsizer Slough for chemical and physical characteristics, including diazinon and chlorpyrifos concentrations.

¹ On May 31, 2017, the State Water Quality Control Board proposed revisions to Attachment G. This amendment was adopted on December 19, 2017 and becomes effective January 1, 2019.



CHAPTER 8: CHECKLIST

Chapter Contents

- SWRP Checklist



8.1 SWRP CHECKLIST

The SWRP Guidelines (SWRCB, 2015b) has requirements that must be met through the SWRP document. Table 8-1 shows each requirement and where in the SWRP that requirement was met. The following information is provided per the SWRP Guidelines Checklist and Self-Certification instructions:

1. All requirements have been met through the development of this SWRP document.
2. Table 8-1 shows the appropriate chapter/section that meets each SWRP Guideline requirement in the column labeled “SWRP Section.” The corresponding page number for the start of each section is shown in the column labeled “SWRP Page Number.”
3. The Consultant Team (consisting of West Yost Associates and Larry Walker Associates) prepared all documentation.
4. The Administrative Draft SWRP was prepared April 30, 2018. Comments were received by May 14, 2018. A summary of comments is included in Appendix 8A.
5. The Public Draft SWRP was prepared and published June 4, 2018. Comments were received by July 5, 2018. A summary of comments is included in Appendix 8B.
6. The Final Draft SWRP was prepared and sent to the TAC and State Grant Manager for review on July 16, 2018. Comments were received by July 24, 2018. A summary of comments is included in Appendix 8C.
7. The SWRP can be accessed on the City’s website, www.yubacity.net/stormwater.

Table 8-1. YCB SWRP Checklist and Self-Certification				
Storm Water Resources Plan General Contact Information				
Name:		Manu Dhaliwal		
Phone Number:		530-822-7685		
Email:		mdhaliwa@yubacity.net		
Date Submitted to State Water Resources Control Board:		7/30/2018		
Date Submitted to Regional Water Quality Control Board:		5/1/2018		
Title of Attached Documents:		Yuba City Basin Storm Water Resource Plan		
Storm Water Resources Plan Information				
Storm Water Resources Plan Title:		Yuba City Basin Storm Water Resource Plan		
Date Plan Completed/Adopted:		10/31/2018		
Public Agency Preparer:		City of Yuba City		
IRWM Submission:		North Sacramento Valley IRWM		
Plan Description:		The Yuba City Basin Storm Water Resource Plan (SWRP) is a comprehensive document that identifies and evaluates storm water projects within the Yuba City Basin watersheds.		
No.	Plan Element	Water Code Ref	SWRP Section	SWRP Page Number
WATERSHED IDENTIFICATION (GUIDELINES SECTION V)				
1	Plan identifies watershed and subwatershed(s) for storm water resource planning.	10565(c) 10562(b)(1) 10565(c)	1.2 Figure 1-1	1-1
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.		1.2 Figure 1-1	1-1
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;		1.2	1-2
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);		1.3, Figure 1-2, Figure 1-3	1-2, 1-22, 1-23
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);		1.4.2	1-4
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);		1.4, 1.4.1, 1.5, 1.5.1, 1.5.3, Figure 1-3	1-3, 1-4, 1-17, 1-23
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;		1.3, 1.4	1-2, 1-3
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		Figures 1-1, 1-3, 1-6, 1-7, 1-8	1-21, 1-23, 1-25, 1-26, 1-27
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).		1.6	1-17
WATER QUALITY COMPLIANCE (GUIDELINES SECTION V)				
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)	1.4.2, 1.4.3	1-4, 1-13
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)	1.4.2, 1.4.3	1-4, 1-13
12	Plan identifies applicable permits and describes how it meets all applicable waste discharge permit requirements.	10562(b)(6)	1.4.2, 1.4.3	1-4, 1-13
ORGANIZATION, COORDINATION, COLLABORATION (GUIDELINES SECTION VI.B)				
13	Local agencies and nongovernmental organizations were consulted in Plan development.	10565(a)	2.2, 2.3	2-2, 2-3
14	Community participation was provided for in Plan development.	10562(b)(4)	2.4	2-5
15	Plan includes description of the existing integrated regional water management group(s) implementing an integrated regional water management plan.		2.5	2-6
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.		2.2	2-2
17	Plan includes identification of nonprofit organizations working on storm water and dry weather resource planning or management in the watershed.		2.2	2-2
18	Plan includes identification and discussion of public engagement efforts and community participation in Plan development.		2.4	2-5
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.		2.6, 6.8.4	2-7, 6-10
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.		2.2, 2.6	2-2, 2-7
21	Plan describes the relationship of the Plan to other existing planning documents, ordinances, and programs established by local agencies.		2.5	2-6
22	(If applicable)Plan explains why individual agency participation in various isolated efforts is appropriate.		N/A. The City worked with multiple agencies.	N/A
QUANTITATIVE METHODS (GUIDELINES SECTION VI.C)				
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.		4.4, 4.5, Table 4-5, Table 4-6	4-7, 4-8, 4-10, 4-11
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)		5.7 4.4, Table 5-1, Appendix 5B Table 4-5, Table 5-1, Appendix 5C	5-21 4-7, 5-3, Appendix 5B 4-8, 5-3, Appendix 5C
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.		Table 5-1, 5.6.1	5-3, 5-21
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.		4.5.3, Table 5-1, Appendix 5C	4-14, 5-3, Appendix 5C
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.		Table 4-5 and Table 5-1, Appendix 5C	4-8, 5-3, Appendix 5C
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.		4.7	4-15

Table 8-1. YCB SWRP Checklist and Self-Certification				
No.	Plan Element	Water Code Ref	SWRP Section	SWRP Page Number
IDENTIFICATION AND PRIORITIZATION OF PROJECTS (GUIDELINES SECTION VLD)				
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)	5.6.1	5-21
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)	5.6.2	5-21
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)	5.3, Table 5-1	5-2, 5-3
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)	5.3, Table 5-1	5-2, 5-3
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)	4.3, Table 4-3, 5.3	4-3, 4-6, 5-2
34	For new development and redevelopment (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)	2.5.3, 3.2.15, 5.5	2-7, 3-4, 5-21
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)	Table 4-5, Table 5-1	4-8, 5-3
36	Overall: Plan prioritizes projects 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.		Chapters 4 and 5	Chapters 4 and 5
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.)		Table 5-1, Table 5-6	5-3
IMPLEMENTATION STRATEGY AND SCHEDULE (GUIDELINES SECTION VLE)				
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.		Table 6-2, 6.8.3 (Obstacle 1)	6-4, 6-7
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)(6)	5.4, 6.6	5-20, 6-3
40	The Plan identifies the development of appropriate decision support tools and the data necessary to use the decision support tools.	10562(d)(8)	6.8.1	6-6
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.		6.8.4, 6.5, Table 6-2, Table 6-3, 6.8.3.1 6.1 6.8.5 6.8.2 Table 6-3 6.8.3.2 6.8.6	6-10 6-3, 6-4, 6-5, 6-7 6-1 6-10 6-9 6-5 6-9 6-10
42	Applicable IRWM plan: The Plan will be submitted, upon development, to the applicable integrated regional water management (IRWM) group for incorporation into the IRWM plan.	10562(b)(7)	6.8.4	6-10
43	Plan describes how implementation performance measures will be tracked.		6.8.2	6-6
EDUCATION, OUTREACH, PUBLIC PARTICIPATION (GUIDELINES SECTION VLF)				
44	Outreach and Scoping: Community participation is provided for in Plan implementation.	10562(b)(4)	2.4, 6.8.5	2-5, 6-10
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.		2.4	2-5
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.		2.4, 6.8.5	2-5, 6-10
47	Plan describes mechanisms to engage communities in project design and implementation.		2.4	2-5
48	Plan identifies specific audiences including local ratepayers, developers, locally regulated commercial and industrial stakeholders, nonprofit organizations, and the general public.		2.4	2-5
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.		2.4, 2.7	2-5, 2-8
50	Plan describes efforts to identify and address environmental injustice needs and issues within the watershed.		2.7	2-8
51	Plan includes a schedule for initial public engagement and education.		2.4	2-5
Light blue indicates mandatory required elements per California Water Code. The rest of the checklist is required as well, although not referenced in the Water Code.				

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.

<u>Diana Langley</u> Authorized Signature	<u>Public Works Director</u> Title	<u>7/26/18</u> Date
<u>City of Yuba City</u> Public Agency		



CHAPTER 9: REFERENCES

Chapter Contents

- References



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Chapter 9

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