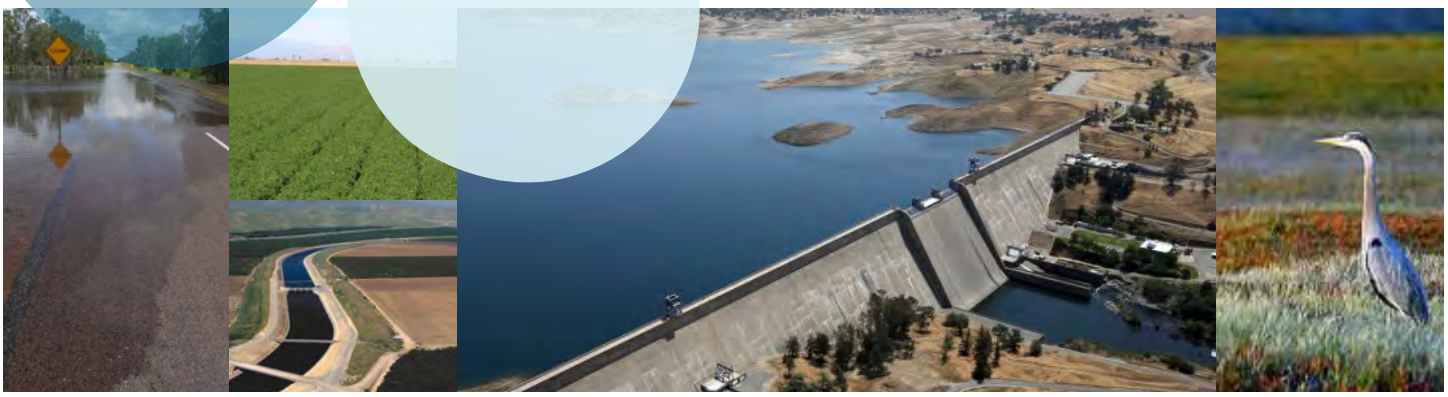
COUNTY OF MADERA

Storm Water Resource Plan

December 28, 2017



Madera County Storm Water Resource Plan (SWRP)

County of Madera | Fall Creek Engineering | Sierra Watershed Progressive | 2NDNATURE (2N)

Table of Contents

List of Tables

List of Figures

Appendices

Appendix 1: Stakeholder Meeting #1 and Meeting #2 Reports

Appendix 2: swTELR Model Inputs

Appendix 3: SWRP Project Solicitation Form

Appendix 4: Completed Project Solicitation Forms

Appendix 5: Completed Project Scoring Forms

Appendix 6: Stakeholder List as of July 28, 2017

Appendix 7: Comments from Individuals and Entities on Public Draft SWRP

List of Acronyms

AF	acre-feet
AFY	Acre feet per year
BMPs	Best Management Practices
CA	California
COOP	Cooperative Observer Program
CSA	Community Services Area
CVRWQCB	Central Valley Regional Water Quality Control Board
DAC	Disadvantaged Community
ddmm	degree minutes
DDW	Department of Drinking Water
DWR	Department of Water Resources
EC	electrical conductance
EDAs	Economically Distressed Areas
FEMA	Federal Emergency Management Agency
ft	feet
gal	gallon
GIS	Geographic Information System
GSA	Groundwater Sustainability Agencies
GSP	Groundwater Sustainability Plans
HUC	Hydrologic Unit Code
IRWMP	Integrated Regional Watershed Management Plan
LID	Low Impact Development
MEP	Maximum Extent Practicable
MG/yr	million gallons per year
MHI	Median Household Income
MOU	Memorandum of Understanding
MS4	Municipal Separate Storm Sewer
NLCD	National Land Cover Dataset
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resource Conservation Service
PPS	Public Participation Strategy
RAA	Reasonable Assurance Analyses
ReNUWIt	Re-inventing the Nation's Urban Water Infrastructure
RFMP	Regional Flood Management Plan
RUSLE	Revised Universal Soil Loss Equation
RWMG	Regional Water Management Group
RWQCB	Regional Water Quality Control Board
SDAC	Severely Disadvantaged Communities

SDWA	Federal Safe Drinking Water Act
SDWSRF	Safe Drinking Water State Revolving Fund
SEMCU	South East Madera County United
SGMA	Sustainable Groundwater Management Act
SWGP	Storm Water Grant Program
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resource Control Board
SWRP	Storm Water Resource Plan
swTELR	Stormwater Tool to Estimate Load Reductions
TAC	Technical Advisory Committee
TMDL	Total Maximum Daily Load
TSS	total suspended solids
US EPA	United States Environmental Protection Agency
USBR	United States Bureau of Reclamation
USJR	Upper San Joaquin River
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Society
WDR	Waste Discharge Requirements

Executive Summary

This Storm Water Resource Plan (SWRP) is a County wide strategy to manage storm water and dry weather runoff as a resource. In recent years, as drought conditions, climate change, and water quality impairments have affected California, a new focus has been placed on managing storm water to maximize its capture and beneficial reuse. The objective of this plan is aligned with that goal; to identify and strategize the implementation of multi-benefit storm water projects.

Since the public funds municipalities, and the activities of the public impact storm water quality, it is imperative that Stakeholders and members of the general public are given opportunities to play an active role in both the development and implementation of the SWRP. SWRP preparation occurred with Community input through direct outreach and a series of Stakeholder, Public, and Technical Advisory Committee (TAC) Meetings. Project information was submitted for inclusion in the SWRP through a Project Solicitation Form. A total of 24 projects from 12 different Stakeholders were submitted for inclusion in the SWRP. Projects in the plan will provide:

- Groundwater Recharge;
- Low Impact Development / Green Infrastructure;
- Conveyance and Infrastructure Improvements;
- Floodplain Restoration; and
- Water Quality Improvements.

Each project was evaluated based on a suite of multi-benefit criteria that included a spatial analysis and project-specific benefit analysis. Water Supply is heavily weighted relative to Water Quality and Flood Control, reflecting the overwhelmingly prevalent water resource issue in the County as expressed by both the Stakeholder Group and the TAC. The quantification of multi-benefits resulted in a project scoring, ranking, and prioritization rubric that is robust and repeatable for future plan updates and within the Integrated Regional Water Management Plan (IRWMP) planning process. With a structure in place to prioritize projects in areas with the greatest storm water runoff and water quality impacts, that also have the greatest benefits, projects can be identified that provide the most efficient path to reach water quality and water supply goals and that preserve or restore natural watershed processes throughout the region.

The Madera Region faces many challenges common to Central Valley counties including a high unemployment rate, fast population growth, and low average household income. This predominantly agricultural area is disconnected from the economy and resources of larger metropolitan areas, consequently communities are plagued by seasonal unemployment. The poverty rate in Madera County is over 23 percent, qualifying the entire County[1] including two cities and several unincorporated communities as well as two federally recognized Native American tribes as Disadvantaged Communities (DACs) and/or Economically Distressed Areas

[1] All of Madera County meets the Proposition 1 definition for an Economically Distressed Area (EDA) based on (1) a County wide unemployment rate at least 2% higher than the statewide average and (2) a low population density, defined by: ≤100 persons per square mile. Source: https://gis.water.ca.gov/app/edas/

(EDAs). About 40% of households have children living at home and over 28% of the population that is under 18 years of age is living below the poverty line. Where 2014 Median Household income (MHI) in California was $63,636, in Madera County it was $45,490. Therefore, the Median Household Income falls below 80% of the state average and includes 29 identified DACs, as well as Small and Severely Disadvantaged Communities (SDACs).[2]

Funding is the primary obstacle to storm water project planning and implementation within Madera County. The combined estimated cost of the SWRP projects is more than $35 million. All the projects require additional funding for implementation. Within Madera County the majority of Project Sponsors in and outside of the DAC/EDA communities do not have identified funding sources to provide funding match. A variety of potential funding sources will need to be identified and considered to secure the required funding match.

Additionally, a broad spectrum of regional coordination and initiatives by individual entities will be required to implement the SWRP projects. The County Regional Water Management Group (RWMG) and newly formed Groundwater Sustainability Agencies (GSAs) are well positioned to lead regional and local coordination efforts.

Water-sharing or water credit systems have been proposed as part of the solution to bring local groundwater use into sustainable limits and incentivize regional collaboration.[3] Water trading is encouraged within water-sharing systems, but first, institutional agreements are necessary to make low-cost trading possible. Similarly, a water credit system would establish a market for those who conserve water or recharge groundwater to sell those credits to others who need to withdraw more than their allocation. In both types of arrangements, robust and transparent administrative and accounting systems are necessary to support agreements. Many of the SWRP projects provide groundwater recharge benefits, therefore further exploring the opportunities through the Sustainable Groundwater Management Act (SGMA) to establish a regional water-sharing or credit system would support SWRP implementation. Hurdles to implementing water-sharing or water credit systems include political and spatial challenges within Madera County.

Many of the SWRP projects rely on inter-agency coordination to transport storm water or snow melt runoff to proposed groundwater recharge locations. In the Valley portion of the County, storm water and flood flows are transported within a regional conveyance system that is maintained by various special districts, the County, and the federal government. A critical element for successfully implementing these projects is the regional coordination for operation and maintenance of the conveyance facilities. Similarly, the cost to transport water, for example through federally operated canals, is considered by many Stakeholders to be a financial burden preventing project implementation. The current fee structure is preventing farmers from purchasing

[2] Source: U.S. Census Bureau. American Community Survey, 2010-2014 American Community Survey 5-Year Estimates, Table B19113. American FactFinder.

[3] January 2017. Sharing Groundwater: A Robust Framework and Implementation Roadmap for Sustainable Groundwater Management in California. Mike Young and Brynce McAteer https://nicholasinstitute.duke.edu/sites/default/files/publications/ni_wp_17-02.pdf

water when unrestricted flow is available. Fee negotiations for transport of storm water destined for groundwater recharge basins within conveyance facilities will be a necessary element for SWRP project implementation.

This SWRP will be adopted into the Madera County Integrated Regional Water Management Plan (IRWMP), and an approach has been outlined to adaptively manage the SWRP to incorporate new projects and update existing project information as it becomes available. The following procedures have been identified to adaptively manage the SWRP as a living document that will continue to be updated over time:

- The SWRP Goals and Objectives described in Section 1 will be monitored for consistency with the implemented projects.
- An IRWMP resource library will be created to collate RWMG plans, reports, and studies to ensure that the IRWMP and SWRP reflect Stakeholder's information. Future updates of the SWRP will review and evaluate new information in the resource library, which can serve as the technical foundation for updating the SWRP.
- The project prioritization process was designed to incorporate direct input from Stakeholders, a TAC, and the County to inform the specific weights of prioritization criteria. New input from these groups can be used to adjust the relative importance of specific project benefits as they evolve with time. New Criteria Weights can be applied into the prioritization process to update, adjust, and refine project ranks.
- New projects can be added to the SWRP, or existing projects modified, through the process outlined in Section 6.6, at a minimum of every 6-months.

SWRP updates are anticipated when substantial additional detail or project information becomes available. It is anticipated that Madera County in coordination with the RWMG would lead any future SWRP updates. Future SWRP updates will incorporate information from implemented projects, lessons learned, and regulatory updates. New information about pollutant sources, water quality priorities resulting from 303(d) impairments, or TMDLs are examples of information that may inform future SWRP updates.

1. Introduction

The Madera County Storm Water Resource Plan (SWRP) is a first of its kind watershed based storm water plan that establishes an integrated and coordinated storm water runoff management strategy for the County. Development of the SWRP is funded through a Proposition 1 planning grant and being led by the County of Madera in coordination with a Technical Advisory Committee, Stakeholder Group, and community members.

1.1. Background

Storm water is defined by United States Environmental Protection Agency (US EPA) as the runoff generated when precipitation from rain and snowmelt events flows over land or impervious surfaces without percolating into the ground. Storm water is often considered a nuisance because it mobilizes pollutants such as motor oil, sediment, and trash. In most cases, storm water flows directly to water bodies through sewer systems, contributing a major source of pollution to rivers, lakes, and the ocean[4]. However, storm water may also act as a resource and recharge groundwater when properly managed.[5] Modern storm water management designs are trending away from traditional curb, gutter, and storm drain systems towards managing storm water onsite as a resource. Low Impact Development (LID) is an example of a green infrastructure strategy intended to leverage storm water's multi-benefit potential. Additional information about LID is presented in Section 6.7 as a Design Criteria and Tool to manage storm water and dry weather runoff.

With the passage of Senate Bill 985 (Pavley, 2014), known as the Storm Water Management Act, storm water and/or dry-weather runoff projects must be included in a Storm Water Resource Plan to receive for state grant funds from any voter-approved bond measures. Starting in late Spring 2018 projects within the Madera County SWRP are expected to be eligible for bond monies, such as from Proposition 1.

1.2. Purpose and Need

Throughout history urbanization has altered the natural flow of water across our landscapes. One of the goals of modern urban development and redevelopment is to integrate systems to manage runoff in a way that restores or maintains pre-development patterns.

"Cities should be designed as sponges – introducing enough green and natural spaces in their current land use to create more flexibility in managing the next big storm. Implementation of green and living infrastructure solutions, such as green roofs, permeable pavements and green spaces which turn public spaces into multipurpose absorbing grounds and infiltration basins, can introduce more resiliency to the urban areas and reduce the impacts of future extreme events. The floodwater can ultimately recharge the groundwater basins or be stored in cisterns for future use. It is important to remember

[4] Storm water discharges in California are regulated through National Pollutant Discharge Elimination System (NPDES) permits.
[5] From: https://www.waterboards.ca.gov/water_issues/programs/stormwater/

that this strategy also requires engaging the community closely in the process by encouraging them to implement some of these practices on their property and in future development projects."[6]

- Quote from Newsha Ajami , director of urban water policy at Stanford's Water in the West program and co-lead of the Urban Water Systems & Institutions Thrust at the ReNUWIt (Re-inventing the Nation's Urban Water Infrastructure)

When managed as a resource, storm water has a multitude of benefits. For example, storm water can:

- Reduce Fire Risk and Flooding Problems;
- Recharge Groundwater which can Reduce Reliance on Imported Water Supplies;
- Provide a Non-Potable Domestic Water Supply for Irrigation; and
- Support Environmental Function and Habitat in Creeks, Streams, Rivers, and Wetlands.

The purpose of this SWRP is to identify and prioritize projects and "bring to the top" those multi-benefit projects that can best meet identified priorities on a watershed basis. The outcome of the SWRP is to provide guidance and tools to support the region in developing more competitive projects for state-wide grant funding opportunities to achieve watershed and regional planning goals.

1.3. Plan Goals and Objectives

The main goals of the Madera County SWRP are to identify and prioritize opportunities to:

- Better utilize storm water as a resource;
- Promote responsible storm water management within a sub-watershed;
- Reduce runoff volumes and pollutants entering receiving waters; and
- Realize social and community benefits not typically achieved with traditional storm water projects.

To support these goals, the SWRP includes a detailed analysis of watershed processes, surface and groundwater resources, input from Stakeholders and the public, and an analysis of the multiple benefits achievable through strategically planned storm water management projects.

Types of projects included in the SWRP include projects to sustainably capture and manage storm water, reduce flooding and pollution from storm water and snow melt runoff, improve and integrate biological systems such as plants, soils, and other natural infrastructure, and provide

[6] In a September 1, 2017 interview " Q&A with Stanford experts on climate change, infrastructure and the economic impacts of Hurricane Harvey" http://news.stanford.edu/2017/09/01/climate-change-infrastructure-economic-impacts-hurricane-harvey/

many community benefits, including cleaner air, water, and enhanced aesthetic value of local streets and neighborhoods.

1.4. Plan Organization

The SWRP is divided into the following Sections:

Section 1 – Introduction: provides an overview of the SWRP, including the SWRP goals and objectives.

Section 2 – Watershed Identification: describes watershed and subwatershed delineations in Madera County.

Section 3 – Water Quality Compliance: describes water quality issues within major watersheds and associated pollutant generating activities within Madera County, along with how the SWRP addresses compliance with applicable permits and plans.

Section 4 – Organization, Coordination, and Collaboration: summarizes the community engagement process used during SWRP development, including Stakeholder identification and outreach efforts.

Section 5 – Quantitative Methods: defines the methodology used to prioritize multi-benefit projects in Madera County.

Section 6 – Identification and Prioritization of Projects: describes the project solicitation process and presents the collated SWRP projects and their relative ranking.

Section 7 – Implementation Strategy and Schedule: outlines approach to fund, implement, and track SWRP projects.

Section 8 – Education, Outreach, and Public Participation: describes outreach strategy during SWRP implementation.

Section 9 – SWRP Checklist and Self-Certification: for Madera County SWRP approval and adoption.

Section 10 – References: resources used during SWRP development.

2. Watershed Identification

This section presents the identified watersheds and subwatersheds for storm water resource planning and defines how the SWRP was developed on a watershed basis, using boundaries as delineated by the United States Geological Society (USGS), CalWater, USGS Hydrologic Unit designations, or an applicable integrated regional water management group. This section includes a description and boundary map of each watershed and subwatershed applicable to the SWRP along with an explanation of why the watersheds and subwatersheds are appropriate for storm water management with a multiple-benefit watershed approach. This section describes the internal boundaries within the watershed, for example the boundaries of municipalities, water suppliers, wastewater service areas, and land use agencies. For the local entities that provide potable water supplies, the estimated volume of potable water provided is included.

Other boundaries described in this section include groundwater basin boundaries and other significant surface water resources, along with a description of the general quality of these resources within the plan area. This section includes a map identifying native habitats, creeks, lakes, rivers, parks, and other natural or open space within the subwatershed boundaries along with identifying (quantitatively, if possible) the natural watershed processes and how they have been disrupted within each subwatershed.

Finally, this section describes the water quality priorities in 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 Waterbodies).

2.1. Watershed Description

The Integrated Regional Watershed Management Plan (IRWMP) and subsequent updates, along with the Madera Regional Groundwater Management Plan[7] describe Madera County regional water resources, watershed process disturbances, and consumptive water use. Internal watershed boundaries are described within the context of the spatial metrics-based analysis.

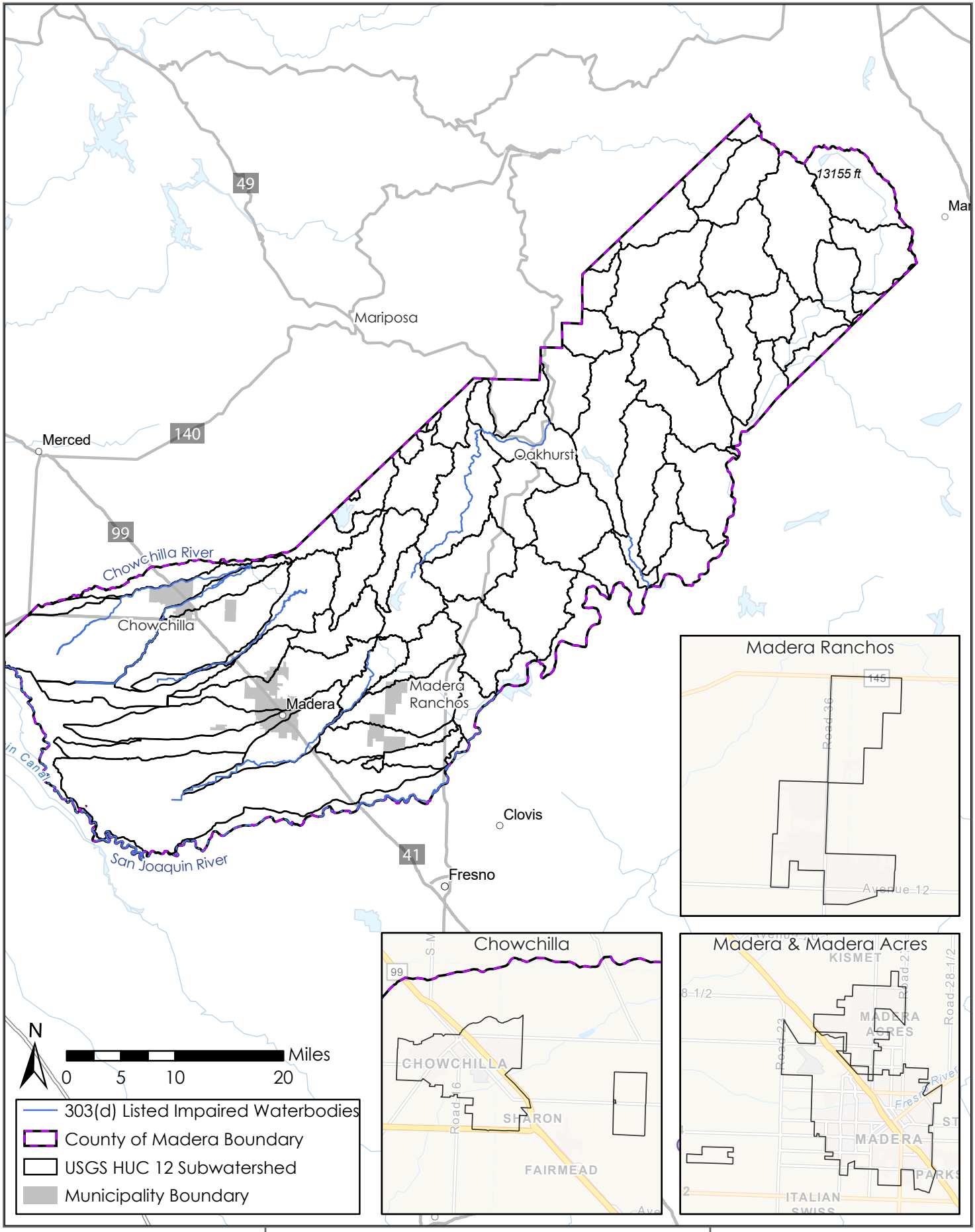
2.1.1. Watershed Boundaries

The boundary of this SWRP coincides with the County of Madera boundary. While this boundary is politically convenient, it also has a hydrologic basis, bounded by the crest of the Sierras to the east and major rivers to the north, south, and west. The San Joaquin River forms the southern and western boundaries of Madera County and is the terminal discharge point for approximately 90 percent of the County. The Fresno and Chowchilla Rivers form the other two major drainage basins within the County, which ultimately drain into the San Joaquin River. Less than 10 percent of the County drains westward into the Merced River system.

[7] Provost and Pritchard, 2014b. Madera Regional Groundwater Management Plan. December 2014.

This plan employs several smaller drainage delineations within the larger river basins for the purposes of spatial analysis and prioritization. Except for approximately seven miles downstream of Friant Dam and fifteen miles centered on Mendota Pool, the Madera County Boundary is consistent with this SWRP as well as the IRWMP region boundary (Provost and Pritchard, 2014a) (see Figure 2-1). This SWRP boundary includes lands between the north edge of the watershed of the North Fork of the San Joaquin River and the Madera County line that are also included in the Southern Sierra IRWM planning area.

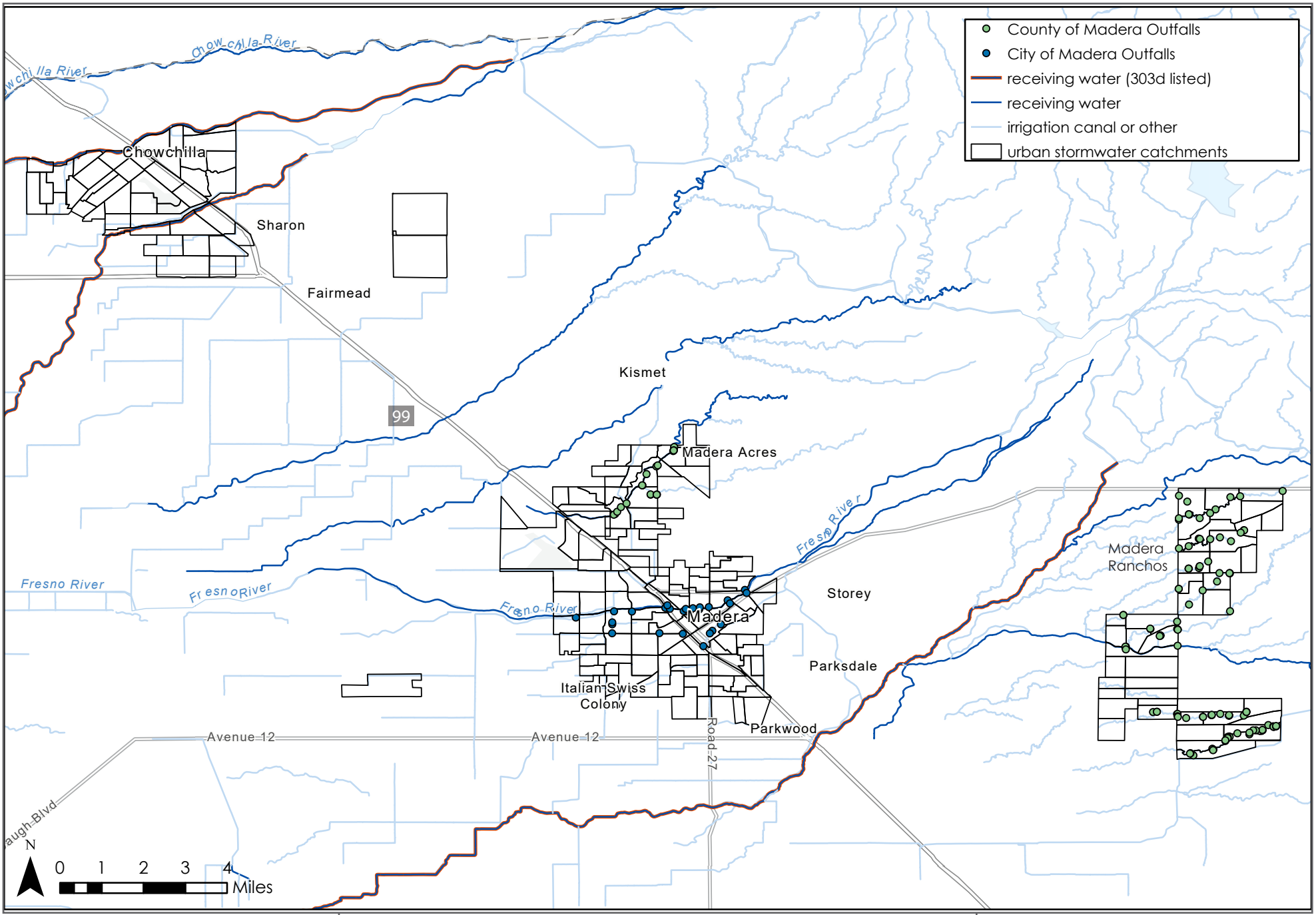
The spatial unit of analysis is integral to the quantitative metrics-based approach presented in this SWRP. Two nested spatial scales of analysis were employed that followed drainage divides within the County. Outside of the Municipal Separate Storm Sewer System (MS4) boundaries, the USGS National Hydrography Dataset Subwatersheds (10,000 to 40,000 acres) are used as units of spatial analysis (Figure 2-1). While a finer level of watershed discretization than the USGS Hydrologic Unit Code (HUC) 12 subwatersheds is available with the Calwater Planning Watersheds, the larger subwatersheds were chosen based on practical considerations. Within MS4 permit areas urban catchments (approximately 100 acres) were delineated and grouped according to receiving waters to which they drain. These catchments (shown in Figure 2-2) are appropriately sized for identifying runoff and pollutant loading patterns within MS4's and identifying actions that can improve urban storm water management, such as prioritization of areas for street sweeping, low impact development, or installation of centralized structural BMPs.



2NDNATURE LLC
www.2ndnaturellc.com

Madera SWRP boundary and USGS HUC12 Watersheds.

Figure 2-1



2NDNATURE LLC
www.2ndnaturellc.com

Catchment delineatiions for urbanized areas in Southern Madera County.

Figure 2-2

2.1.2. Internal Boundaries/Neighboring Watersheds Not Included in Plan

All USGS subwatersheds (HUC 12) within the County of Madera are considered in this Plan, although some data used for project prioritization were only available in the southern third of the County, referred to in the Madera IRWMP as the *Valley Floor (Boyle, 2008)*. Drainages of the San Joaquin, Fresno, and Merced Rivers all extend beyond the boundaries of Madera County and are covered in other planning processes such as the Southern Sierra IRWMP.

2.1.3. Surface and Groundwater Resources

Groundwater provides almost the entire urban and rural water supply and about 75 percent of the agricultural water supply in the Valley Floor, with the remaining water demand met with surface water extractions from the Fresno, San Joaquin, and Merced Rivers and their tributaries. Almost all of the water use in the foothill and mountain regions of the County is from groundwater with only three small water treatment plants relying on surface water from the San Joaquin River and its tributaries. Groundwater for the Valley Floor is pumped from the Madera, Chowchilla, and Delta-Mendota groundwater subbasins (Boyle, 2008). Historically, the direction of groundwater flow in much of the Valley Floor was to the southwest, toward the valley trough (San Joaquin River downstream of Mendota). However, as groundwater pumping has increased, instead of flowing uniformly to the southwest, groundwater has been flowing away from the San Joaquin River to the northwest (Boyle, 2008), as shown in Figure 2-5. Past groundwater contour maps indicate that one of the largest groundwater depressions in the area is south of Highway 145 northeast of the Santa Fe Railroad (Provost and Pritchard, 2014a). This depression coincides with a large area with limited surface water resources.

Groundwater quality within the Valley portion of the Region is generally acceptable for both domestic supply and agricultural use. However, variations in groundwater quality make some groundwater within the Region unacceptable for domestic and agricultural uses without treatment (Provost and Pritchard, 2014a). Some common constituents of concern include dissolved salts (as measured by the specific conductance or electrical conductance [EC]), boron, manganese, arsenic, iron, hexavalent chromium, bacteria, uranium, and methane. Many of these compounds/characteristics are naturally occurring, but contamination could also be due to regional or point sources. Typical sources of anthropogenic contamination originate from gas stations, dry cleaners, high-density animal enclosures, applied fertilizers, leaky sewer lines, wastewater treatment plants, and septic systems (Provost and Pritchard, 2014a).

2.1.4. Natural Watershed Process Interruptions

Disturbance to natural watershed processes within the County includes direct diversions from the rivers and tributaries, groundwater extractions for consumptive use and crop irrigation, flow detention, alteration of streamflow regimes via urban development, and aquatic habitat contamination by runoff from urbanized areas and agriculture. Major dams within Madera County are the Crane Valley Dam that impounds Willow Creek in Bass Lake, Hidden Dam that impounds the Fresno River in Hensley Lake, Buchanan Dam that impounds the Chowchilla River in Eastman

Lake, Mammoth Pool Dam that detains the San Joaquin River to form Mammoth Pool Reservoir, and Friant Dam on the San Joaquin River that forms Millerton Lake.

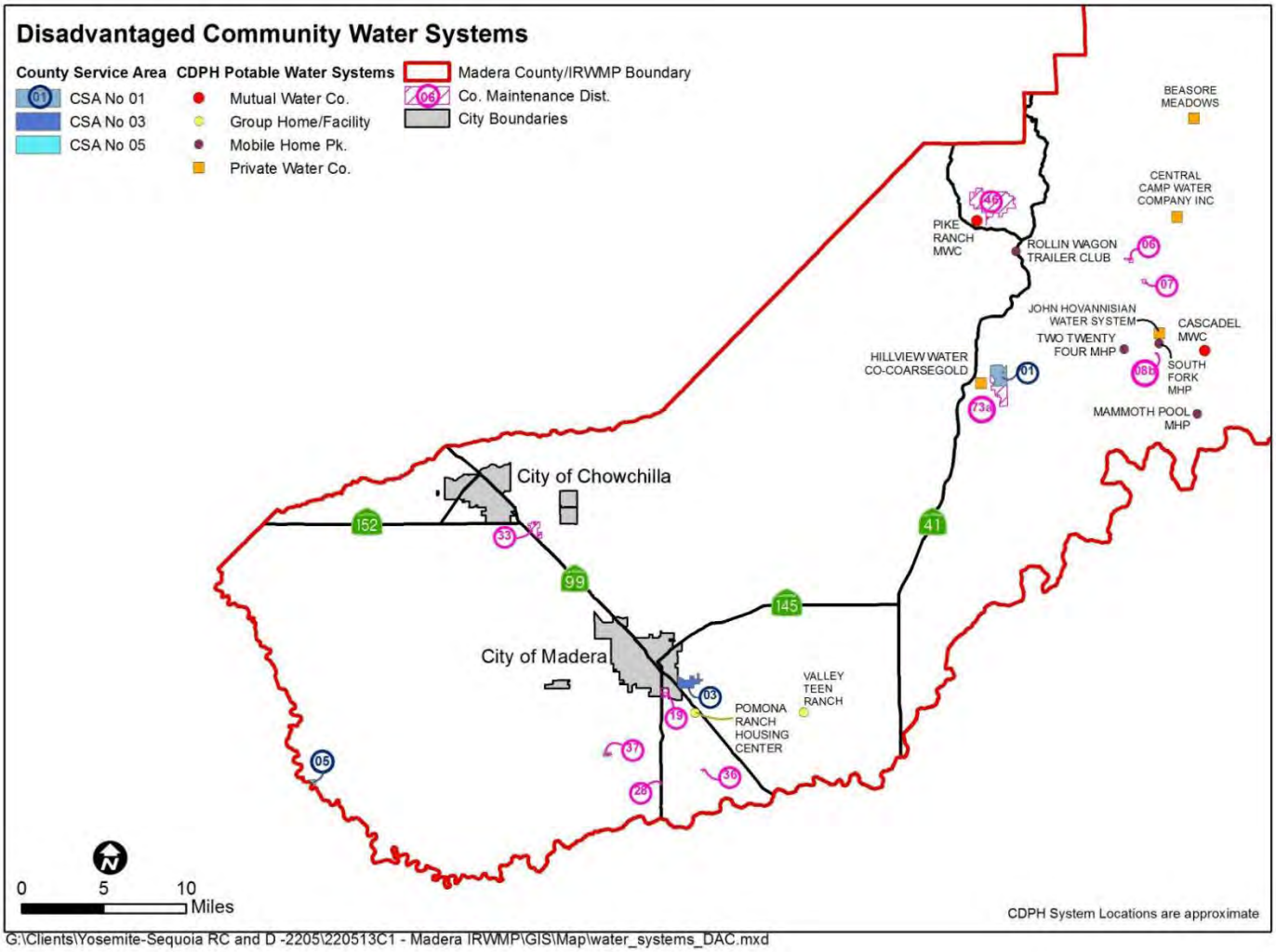
Average annual surface water deliveries were estimated to be approximately 300,000 acre-feet per year (AFY) (1996-2006), not including direct diversions from the San Joaquin River downstream of Friant Dam (Boyle, 2008). Groundwater overdraft was estimated in the Madera Regional Groundwater Management Plan to be on the order of 250,000 AFY which is almost twice the sustainable yield, estimated to an average of 130,000 AFY for the groundwater basin (Provost & Pritchard, 2014b.). Domestic water demands in the Valley are at least 24,000 AFY and agricultural water demands total slightly over 1,000,000 AFY (Provost and Pritchard 2014b). In the areas evaluated by Boyle (2008) groundwater was moving from topographically high areas toward topographically low areas (stream channels), indicating there was little or no recharge from stream channels in low topographic areas in the County. This means stream flows are not sufficient to recharge groundwater and the primary recharge is occurring from the foothill portions of the County towards the Valley.

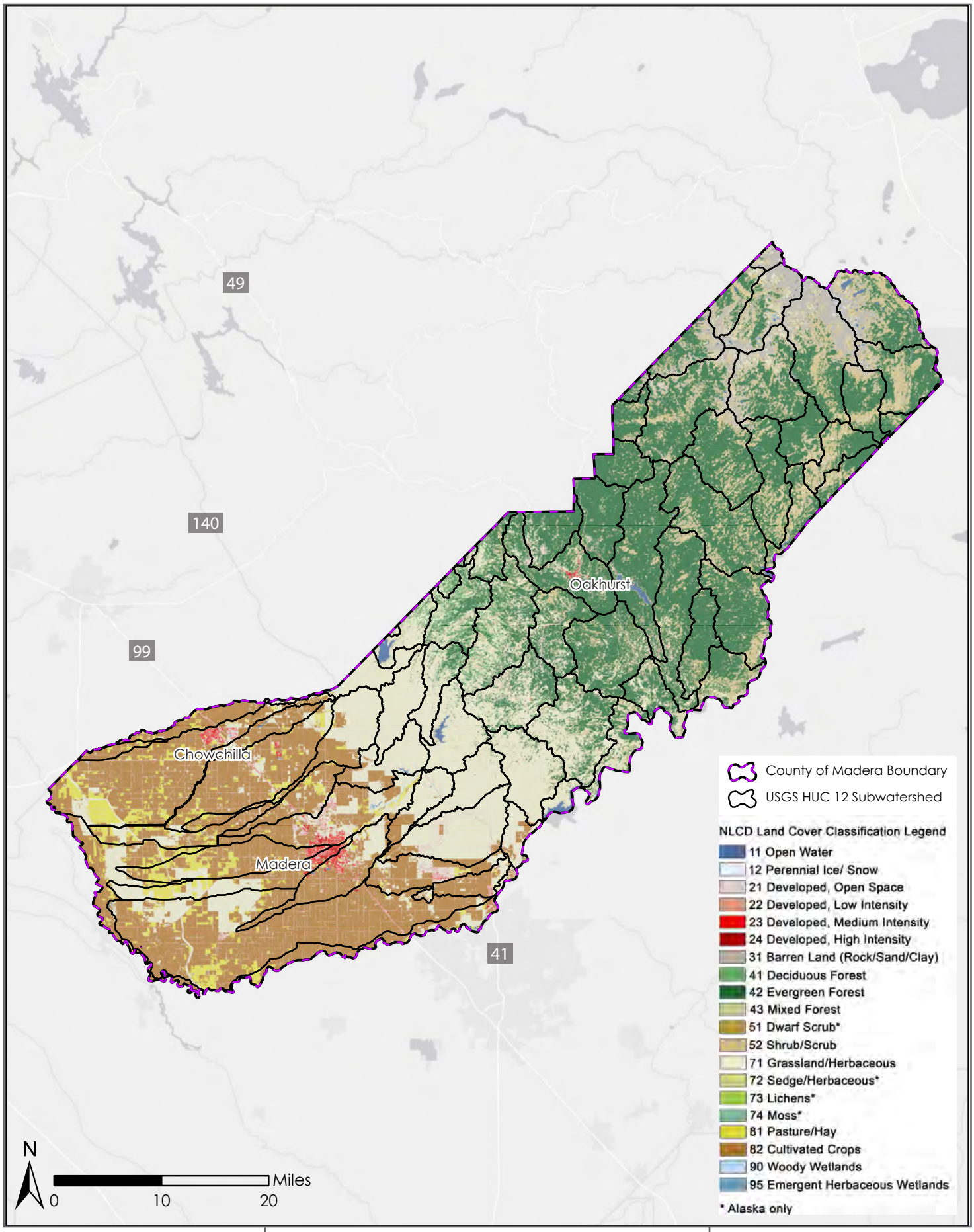
2.2. Land and Water Use

Two cities are located within Madera County; the City of Madera and the City of Chowchilla, plus unincorporated areas. The County of Madera Public Works Department oversees 36 Special Districts established for the operation and maintenance of water, wastewater, drainage, and lighting. Of these 36 districts, there are 26 Maintenance Districts, 9 County Service Areas (CSA), and 1 Lighting District. County of Madera Public Works Staff operate 30 community water systems and 14 community wastewater systems that spread from the valley floor to the Sierras. Staff also provide direct water and wastewater services to approximately 15,000 consumers within Madera County and process approximately 3.1 million gallons of potable water per day to these residents.[8] Figure 2-3 shows the general location of County Maintenance Districts, County Services Areas, City, and Private water, sewer, and/or storm drain services Districts that fall under the California Department of Water Resources (DWR) definition of Disadvantaged Community or Severely Disadvantaged Community within the region. Figure 2-4 shows the spatial distribution of different land cover types across the County. Table 2-1 summarizes the area of specific land use classifications within each of the MS4s in the County.

[8] Madera County, Proposed Budget for Special Districts for Fiscal Year Ending June 30, 2018

Figure 2-3. Disadvantaged Community Water Systems (Madera IWRMP, 2014)





2NDNATURE LLC
www.2ndnaturellc.com

Madera County Land Cover

Figure 2-4

Table 2-1. Land Use Classifications within MS4 Areas in the County

MS4	Land Use Classification Area (ac)								
	Commercial / Institutional	Industrial	Multi-Family Residential	Single-Family Residential	Cultivated	Other	High Traffic Roads	Moderate Traffic Roads	Low Traffic Roads
Madera Ranchos (Madera County)	85	1	2	6,281	160	198	0	14	224
City Chowchilla	1,630	654	44	1,027	1,817	1,936	24	57	256
Madera Acres (Madera County)	55	31	5	2,248	3	221	0	22	268
City of Madera	1,698	790	202	3,942	883	2,200	49	129	457

2.2.1. Local Water Suppliers

Across the County, 79 different utilities were identified as providing potable water to users in Madera County. The 10 largest utilities serving Madera County are shown in Table 2-2, along with an estimate of the number of people they serve and the annual demand.[9]

Table 2-2. Largest suppliers of potable water in Madera County

Number	Utility name	City	People served	Per Capita Usage* (gal/day)	Annual Demand (AFY)
1	City of Madera	Madera, CA	63,105	195	13,800
2	Chowchilla City Water Department	Chowchilla, CA	11,759	311	4,100
3	Madera Valley Water Company	Madera, CA	7,052	168	1,400
4	Yosemite Spring Park Utility Company	Madera, CA	5,921	168	1,200
5	Central Ca Womens Facility	Chowchilla, CA	3,441	168	700
6	Valley State Prison	Chowchilla, CA	3,300	168	700
7	Madera County M.d. #10a - Madera Ranchos	Madera, CA	3,039	168	600
8	Bass Lake Water Company	Bass Lake, CA	2,827	168	600
9	Hillview Water Company-oakhurst/sierra Lakes	Oakhurst, CA	2,805	168	600
10	Madera Csa No. 3 Parksdale	Madera, CA	1,750	168	400
* Per capita usage estimates from the 2014 Madera IRWMP					

[9] The Environmental Working Group (EWG) Tap Water Database
Source: https://www.ewg.org/tapwater/index.php#.Wd1k5GhSwuU

2.2.2. Native Habitat, Water Bodies, and Open Space

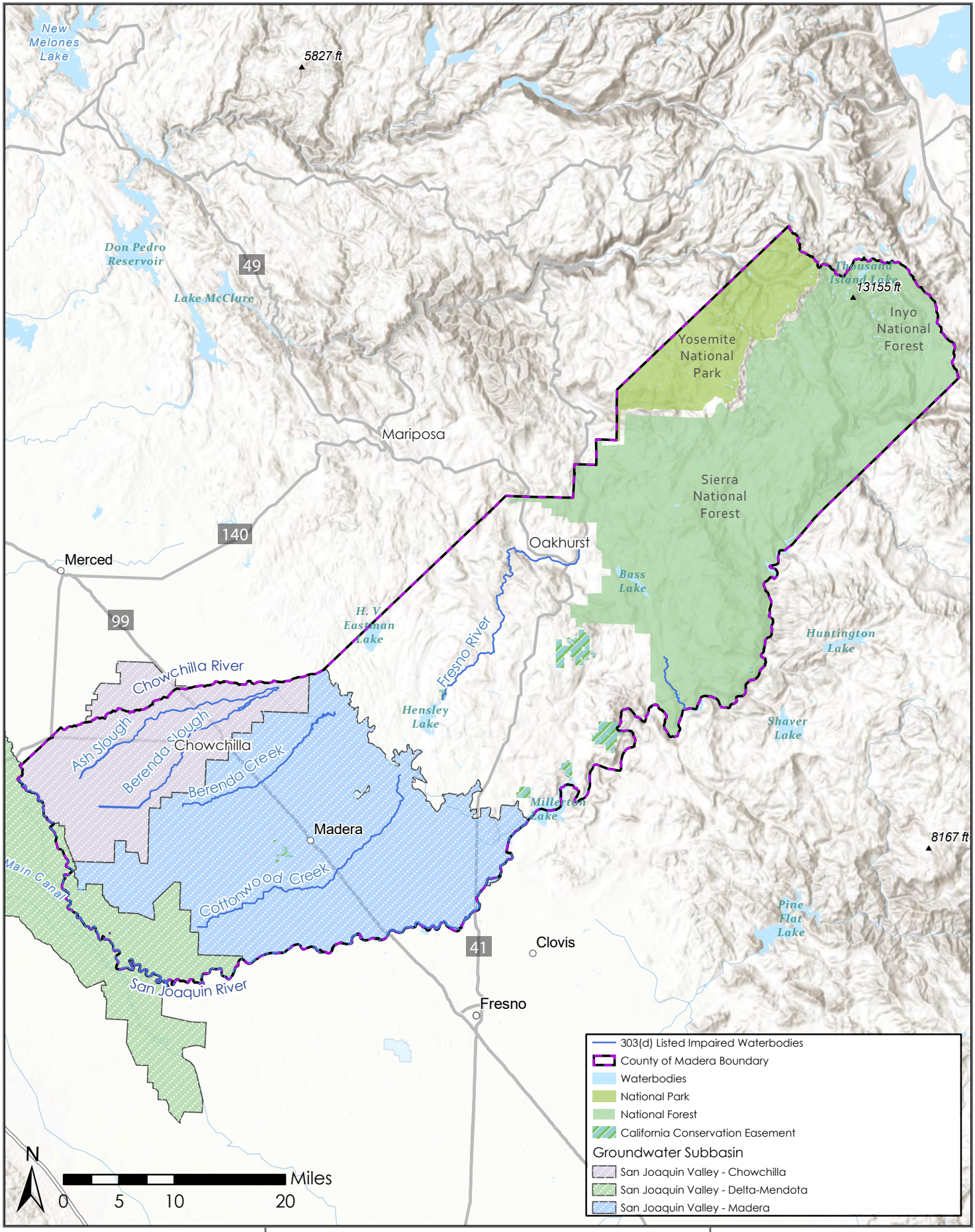
Figure 2-4 shows the spatial distribution of different land cover types across the County and Figure 2-5 identifies significant lakes, rivers, parks, and other natural or open space in the County. Significant native habitat and open space areas in the County include portions of Yosemite National Park, Sierra National Forest, and Inyo National Forest areas. Water Bodies include H.V. Eastman Lake formed by the construction of Buchanan Dam on the Chowchilla River, Hensley Lake formed by Hidden Dam on the Fresno River, and Millerton Lake formed by Friant Dam on the San Joaquin River.

2.3. Water Quality Priorities

Impacts to natural hydrologic function, habitat, and water quality may be associated with the urbanized and cultivated areas of the County including the City of Madera, City of Chowchilla, Madera Ranchos, Madera Acres, and surrounding areas. Hydrologic impacts associated with increased impervious cover are well documented and include declines in downstream receiving water quality (Arnold and Gibbons, 1996; Holman-Dodds et al., 2003; USEPA, 2013). Higher peak flows and increased total storm water runoff volumes result from the expansion of urban impervious cover that limits the infiltration of rainfall and increases the entrainment and transport of sediment, nutrients, bacteria, metals, pesticides, and other pollutants (Grove et al., 2001; Tang et al., 2005; USEPA, 2013). Application of fertilizers, pesticides, and herbicides on cultivated crops can be transported to surface waters causing water quality standards for meeting beneficial uses to be exceeded. The Regional Water Quality Control Board (RWQCB) lists several waterbodies within the County as impaired due to high levels of pollutants. Waterbodies in the County listed on the 2012 RWQCB 3030d list of impaired water bodies are shown in Table 2-3 and are described in further detail in Section 3.

Table 2-3. List of Impaired Waterbodies (303d listed) within Madera County

Waterbody	Impairment Pollutants
San Joaquin River	Boron, Chlorpyrifos, DDT, Diazinon, Group A Pesticides, Toxicity
Ash Slough	Chlorpyrifos
Brenda Slough	Chlorpyrifos
Brenda Creek	Chlorpyrifos, Toxicity
Cottonwood Creek	E. Coli, Toxicity
Millerton Lake	Mercury
Willow Creek	Temperature
Hensley Lake	Mercury, Dissolved Oxygen, pH
Fresno River	Dissolved Oxygen



2NDNATURE LLC
www.2ndnaturellc.com

Madera County Lakes, Rivers, Parks, and Other Natural or Open Space Areas

Figure 2-5

3. Water Quality Compliance

This section includes a discussion of the activities generating or contributing to polluted runoff or that impair beneficial use of storm water and dry weather runoff in the County. The description also discusses strategies in which the SWRP will be used to address pollutant runoff or sources, and how the SWRP will be consistent with and help to implement applicable regulatory permits, Total Maximum Daily Loads (TMDL), and other relevant water quality requirements.

3.1. Activities Associated with Pollution of Storm Water and/or Dry Weather Runoff

Pollution in storm water and/or dry weather runoff can originate from a variety of activities, including from point and non-point sources. Non-point sources include runoff from land uses such as developed urban areas, agricultural farmland, confined animal units, and/or grazing areas. Runoff from these land uses can include elevated concentrations of sediments, heavy metals such as arsenic, chromium and selenium, pesticides, and nutrients. Pollution from point sources occurs where runoff is directly discharged to waterways from operations such as wastewater treatment facilities, industries, and/or dairies. Point sources are typically covered by Waste Discharge Requirements (WDR) and National Pollutant Discharge Eliminations System (NPDES) permits. Existing NPDES and WDR in Madera County are described in Section 3.2.

Dry weather runoff is surface runoff that flows into storm drains, flood control channels, or other means of runoff conveyance produced by non-storm water resulting from irrigation, residential, commercial, and industrial activities.[10] Example activities associated with dry weather runoff that generate pollution are car washing in driveways or streets where the runoff is conveyed directly into storm drains and downstream conveyance channels. Water from car washing often contains oils, greases, and heavy metals. Similarly, if excess irrigation water leaves agricultural farmland or residential landscaping areas it can carry sediments and any dissolved or suspended fertilizers or pesticides. Spray drift refers to the off-target application of pesticides that can occur during dry weather and result in pesticides entering nearby waterways.

The following discusses key pollutants of concern that have resulted in water quality impairments identified in Madera County.

Invasive Species. Invasive species are plants, animals, fish, or microbes that are not native to the region and cause harm to native species, to recreation, and other uses of the waterway, and/or to human health. In general, invasive species populations spread rapidly and enter waterways by many means such as accidental or intentional releases and attachment to boats and other recreational or construction equipment. Within Madera County, an estimated 70 miles of the San

[10] Storm Water Resource Plan Guidelines, December 15, 2015, State Water Resources Control Board, California Environmental Protection Agency.

Joaquin River (Friant Dam to Mendota Pool) is on the EPA's 2012 303(d) list as impaired due to invasive species and requires a TMDL.

Mercury. Mercury can be released into the air by coal-fired power plants then it settles on land and is washed into waterways. Other sources of mercury into waterways include spills and improper treatment and disposal of mercury-containing products or wastes. Mercury can accumulate in fish tissue, which then poses health risks to people and animals that eat fish. Mercury was mined during the Gold Rush era in the California Coast Range and transported across the Central Valley for use in gold mining operations in the Sierra Nevada. The mercury (quicksilver) was ultimately deposited within the river drainages where gold mining occurred. Within Madera County, the 4,365-acre Millerton Lake and the 1,669-acre Hensley Lake are on the EPA's 2012 303(d) list as impaired due to mercury and require a TMDL.

Water Temperature. Activities associated with increased water temperatures include rain running off hot pavement, warmer water discharges from industry or agriculture, increased sunlight from streambank vegetation removal, and major water withdrawals in summer, leaving less water that heats more rapidly in the sun. High water temperatures can harm or kill fish and other life mainly by reducing the oxygen in the water or by raising temperatures above their survival limits. Warmer waters can also increase toxicity of pollutants, cause faster growth of undesirable algae blooms, and increase the spread of diseases in fish.[11] Within Madera County, an estimated 6.24 miles of Willow Creek is on the EPA's 2012 303(d) list as impaired due to water temperature and requires a TMDL.

Low Dissolved Oxygen. Activities that contribute to oxygen depletion in water include contamination from sewage wastewater, leaking septic tanks, farm and feedlot runoff, and runoff from city streets containing organic materials that decompose and use up oxygen in water; higher water temperature also lowers oxygen levels.[12] The decay of organic matter in waterways, from the activities mentioned above, reduces oxygen to below levels that fish and other aquatic life need to survive. Within Madera County, an estimated 30 miles of the Fresno River, above Hensley Reservoir to the confluence with Nelder Creek and Lewis Fork, and the 1,669-acre Hensley Lake are on the EPA's 2012 303(d) list as impaired due to low dissolved oxygen and require a TMDL.

pH. Human activities that affect acidity in waterways include mining, agricultural runoff that includes fertilizers, runoff from animal feedlots, and emissions from cars and industry. High alkaline conditions can occur by means of storm water runoff from sources associated with agriculture (lime-rich fertilizers) and urbanization (asphalt roads), wastewater discharges and leakage from sources associated with industry (e.g., soap manufacturing plants), and mining (oil

[11] Summaries of EPA Water Pollution Reporting Categories Used in the ATTAINS Data System, January 2016, Report No. EPA841-R-16-003

[12] Summaries of EPA Water Pollution Reporting Categories Used in the ATTAINS Data System, January 2016, Report No. EPA841-R-16-003

and gas brine mining wastes).[13] Acidity outside a certain range affects the health and survival of aquatic organisms. Within Madera County the 1,669-acre Hensley Lake is on the EPA's 2012 303(d) list as impaired due to pH and requires a TMDL.

Pathogens. Pathogen pollution includes bacteria and other microbes such as Esherichia coli (E.coli) which can originate from activities that cause human or animal wastes to enter waterways. Human or animal wastes can enter waters through septic tank leaks or sewage discharges, farm and feedlot manure runoff after rain, boat discharges, and pet and wildlife waste. Urban and suburban activities that contribute to pathogens in waterways include sewer overflows, failing sewer lines, slaughterhouses and meat processing facilities; tanning, textile, and pulp and paper factories, sewage dumped overboard from recreational boats, and pet waste, litter and garbage. Rural sources include livestock manure from barnyards, pastures, rangelands, feedlots, unfenced farm animals in streams, improper manure or sewage land application, and poorly maintained manure storage. Example wildlife sources include from geese, beaver, and deer. Within Madera County, an estimated 29 miles of Cottonwood Creek is on the EPA's 2012 303(d) list as impaired due to E.coli and requires a TMDL.

Unknown Toxicity. Within Madera County, an estimated 29 miles of Cottonwood Creek, 88 miles of the San Joaquin River (from Mendota Pool to Bear Creek), and 21 miles of Berenda Creek are on the EPA's 2012 303(d) list as impaired due to Unknown Toxicity and require a TMDL. This reporting category is used when a state has detected degraded conditions in a waterway but has reported no specific details about those conditions or the pollution that caused them.[14]

Pesticides. Insecticides, fungicides, and herbicides kill unwanted pests or weeds and in water can affect the health of aquatic organisms (fish, plants, animals and insects) exposed to the chemicals. Although pesticides are mainly used around homes, forestry, and agriculture, they can easily enter waters through direct application, drift from airborne applications, storm water or irrigation runoff, discharge from industries, or wastewater treatment plants. Timing and amount of pesticide used, rainfall and wind after use, and how fast the pesticide degrades all affect how much of it may reach the water.[15] Chlorpyrifos is an insecticide commonly applied to almonds, walnuts, and alfalfa. In Madera County, an estimated 21 miles of Berenda Creek, and 27 miles of Ash Slough are on the EPA's 2012 303(d) list as impaired due to Chlorpyrifos pollution and require a TMDL. The estimated 88 mile stretch of the San Joaquin River (Mendota Pool to Bear Creek) has an approved TMDL for Chlorpyrifos and Diazinon, and is also on the on the EPA's 2012 303(d) list as impaired due to DDT, Boron, and Group A Pesticides, which require a TMDL.

[13] Summaries of EPA Water Pollution Reporting Categories Used in the ATTAINS Data System, January 2016, Report No. EPA841-R-16-003
[14] Summaries of EPA Water Pollution Reporting Categories Used in the ATTAINS Data System, January 2016, Report No. EPA841-R-16-003
[15] Summaries of EPA Water Pollution Reporting Categories Used in the ATTAINS Data System, January 2016, Report No. EPA841-R-16-003

3.2. Applicable Regulatory Permits, Total Maximum Daily Loads (TMDL), and Other Relevant Water Quality Requirements

The SWRP will be implemented in accordance with applicable waste discharge permits, including:

- Phase II Small Municipal Separate Storm Sewer System (MS4) General Permit (Phase II MS4 Permit) (Order 2013-0001-DWQ);
- General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit) (Order 2009-0009-DWQ);
- Drinking Water System Discharges NPDES (WQ 201400194-DWQ);
- Waste Discharge Requirements regulated by the State Water Board (Title 27 CCR, Section 20005 et seq.); and
- General Permit for Discharges of Storm Water Associated with Industrial Activity (Industrial General Permit) (Order 2014-0057-DWQ).

This SWRP is consistent with existing permits and was reviewed by permit holders. All the projects included in the SWRP were reviewed for consistency with existing permits and none of the projects are considered to pose a waste discharge risk.

3.2.1. Compliance Requirements for Plan Implementation

The SWRP will be implemented in compliance with applicable Environmental Protection Agency (EPA), State Water Resource Control Board (SWRCB), and Central Valley Regional Water Quality Control Board (CVRWQCB) water quality provisions. The following sections review existing compliance requirements in the study area, such as impaired water bodies on the Clean Water Act Section 303(d) List and water quality standards to protect beneficial uses consistent with the State Porter-Cologne Water Quality Control Act.

3.2.2. TMDLs

Listing a water body as impaired in California is governed by the Water Quality Control Policy for developing California's Clean Water Act Section 303(d) Listing Policy. The State and Regional Water Boards assess water quality data for California's waters every two years to determine if they contain pollutants at levels that exceed protective water quality criteria and standards. This biennial assessment is required under Section 303(d) of the Federal Clean Water Act.[16]Table 2-3 summarizes and Figure 5-6 shows the waterbodies in Madera County that are listed as impaired and on the 303d list, as of 2012.

TMDLs have been identified for Chlorpyrifos and Diazinon on the San Joaquin River; the remaining waterbodies require TMDL development.

[16] From: http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml

3.2.3. NPDES Permits

The County of Madera, City of Chowchilla, and City of Madera are required to comply with three separate storm water National Pollutant Discharge Elimination System (NPDES) permits, as applicable to their jurisdictions and activities:

- Phase II Small Municipal Separate Storm Sewer System (MS4) General Permit (Phase II MS4 Permit) (Order 2013-0001-DWQ);
- General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit) (Order 2009-0009-DWQ); and
- General Permit for Discharges of Storm Water Associated with Industrial Activity (Industrial General Permit) (Order 2014-0057-DWQ).

3.3. SWRP Strategy to Address Pollutant Runoff or Sources

The SWRP supports efforts to implement TMDLs and meet waste discharge and NPDES requirements within Madera County. The NDPES Storm Water Permits and TMDLs generally require municipalities to implement a series of Best Management Practices (BMPs) 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.

3.3.1. SWRP Consistency and Support of Existing Permits and Requirements

The Madera County SWRP is consistent with and assists in attaining TMDL Waste Load Allocations (WLA) (where they have been determined) and complying with applicable NPDES permits by identifying and prioritizing potential multi-benefit projects, which provide numerous benefits, including for water quality. The SWRP quantifies the water quality benefits of the priority projects in terms of volume reduction and reductions in total suspended solids (TSS), which act as a proxy for other water quality constituents (i.e. reductions in TSS or volume result in reductions in other water quality contaminants). Projects identified in the SWRP have the potential to provide tangible water quality benefits to the County and its Stakeholders while supporting water quality improvement efforts such as the Phase II MS4 Permit, TMDLs, and the IRWMP.

In addition, depending on the types of projects selected, the SWRP projects may also support implementation of the Statewide Trash Amendments. The State Water Resources Control Board has indicated that the following types of BMPs will be considered full capture systems:

- Bioretention
- Infiltration Trench
- Infiltration Basin
- Detention Basin
- Media Filter
- Storm water Capture and Use

Through adaptive management it will be critical that the SWRP aligns with future TMDLs as they are developed and NPDES permits as they are updated, revised, and implemented.

4. Organization, Coordination, and Collaboration

This section documents the local agencies and non-governmental organizations that were consulted during SWRP development, along with the process by which community participation was provided for in the SWRP development process. This section includes a description of the existing IRWM group, and how agencies, organizations, and non-profits were identified and coordinated with to participate and support mandates to address storm water and dry weather runoff management objectives of the SWRP. This section identifies required decisions that must be made by local, state, or federal regulatory agencies for SWRP implementation and coordinated watershed based or regional monitoring and visualization. This section identifies what planning and coordination of existing local government agencies, including where necessary, new or altered governance structures, are needed to support collaboration among two or more lead local agencies responsible for plan implementation. Finally, this section describes the relationship of the SWRP to other existing planning documents, ordinances, and programs established by local agencies, and if applicable, explains why individual agency participation in various isolated efforts is appropriate.

4.1. Introduction and Overview

The Madera Public Participation Strategy (PPS) relies on public and Stakeholder collaboration to help ensure community members are aware and engaged with storm water management efforts. Overall, public outreach and facilitation efforts are coordinated to bring community members, Stakeholders, and consultants together to work on specific tasks or implementation of on-going policies and procedures. The objectives of coordination include the following:

- Reduce current and future conflicts among Stakeholders and public;
- Identify opportunities for regional or multi-agency projects;
- Increase awareness of adjacent landowners, project proponents, and innovative strategies;
- Improve awareness of tribal, state, and federal agency resources, plans, and projects;
- Provide opportunities to advance public understanding of storm water management opportunities;
- Resource identification and pooling; and
- Ensure that Stakeholders' knowledge, expertise, and needs are integrated to the project prioritization process.

4.1.1. Organization and Coordination of Public Input

The organization of the Madera PPS is based on the State Water Resource Control Board (SWRCB) SWRP Preparation Guidelines (2015). Stakeholders from the Madera Regional Water Management Group (RWMG), along with other identified representative Stakeholders from commercial, industrial, public, and disadvantaged communities (DACs) were invited to collaborate on developing a plan that meets all SWRP objectives.

Outreach to DACs is important since they have some of the greatest needs, are often underrepresented, and provide some of the best opportunities to receive grant funding. As Madera has such a significant DAC population, the Madera SWRP will continue focused efforts to recruit more DAC representatives to attend meetings and become formal members of the Madera SWRP Stakeholder group.

The Madera PPS structure allowed any Stakeholder to participate as an interested party, and established a Technical Advisory Committee (TAC) that provided Stakeholders with opportunities to provide input on specialized topics. Stakeholders participated primarily through two Madera SWRP Stakeholder meetings as listed in Section 4.4.3. During meetings, public input was documented through time-tested measures such as detailed meeting notes as well as web-based contemporary technological applications to provide visualization of real-time feedback (see

Figure 4-1, Answer Garden Public Input Diagram). Outreach coordination included a variety of public outreach methods, website, newspaper advertisements, and email, to inform Stakeholders of meetings and input opportunities, which is detailed in Section 4.4.3.

No individual agencies were interested in preparing SWRPs, independent of the County wide effort.

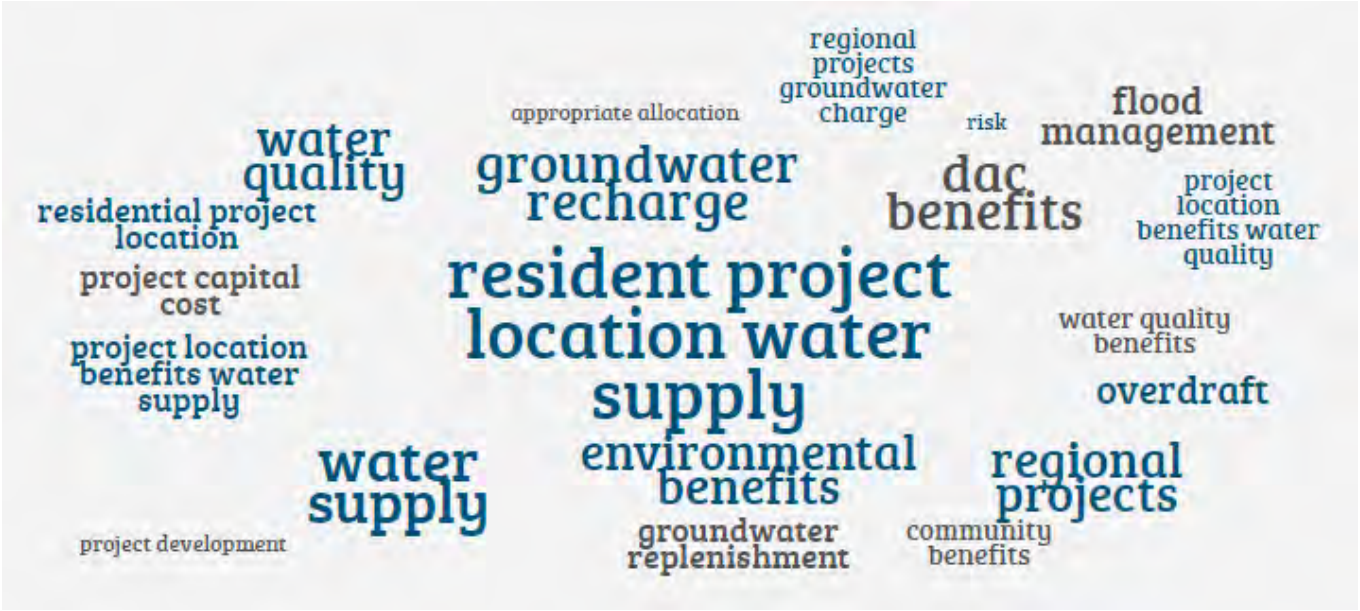


Figure 4-1. Answer Garden Public Input Diagram

4.2. Collaboration of Input from Public Outreach

Madera County contacted Stakeholder partners to achieve the objectives stated in Section 4.1, while continuing collaborative efforts with the Madera Regional Water Management Group (RWMG). The intersection of the two groups will be valuable to pursue Proposition 1 and other grant monies to assist in developing and implementing top rated integrated and multi-benefit storm water projects. Other collaborators will be invited to the process as needed and documented and recorded during Stakeholder meetings. Figure 4-2 illustrates the Madera IRWMP relationship to County and Region wide Land Use and Water Planning.

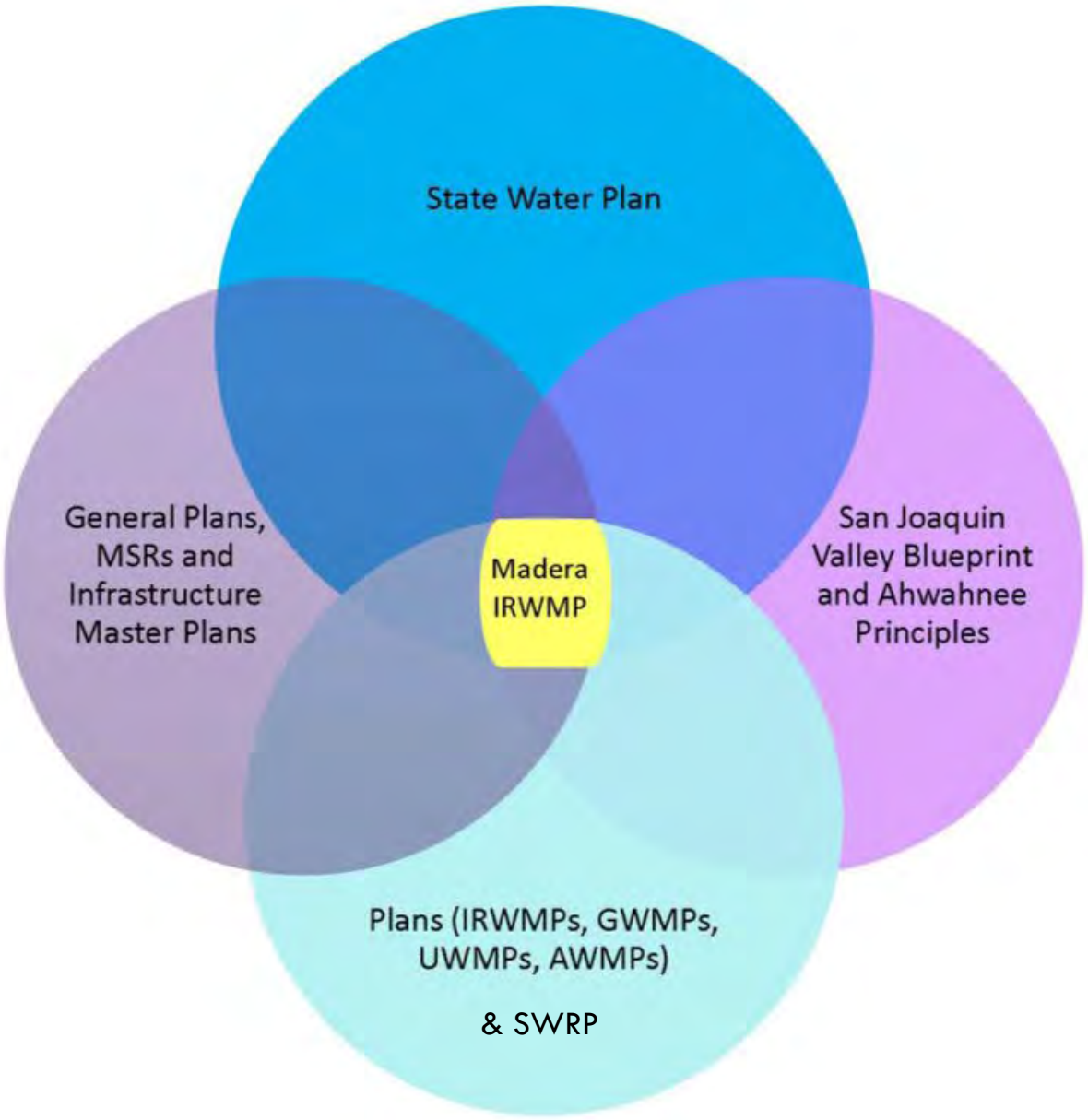


Figure 4-2. Madera IRWMP Relationship to Land Use and Water Planning

4.3. Regional Water Management Group Implementing Existing IRWMP

4.3.1. Overview of Madera IRWMP

The Madera Integrated Regional Water Management Plan (IRWMP) is a collaborative effort among the 17 public, private, and not-for-profit groups and agencies which are signatory to the Memorandum of Understanding (MOU) which formed the Madera RWMG, along with other interested groups and agencies who have participated in the process and are not signatory to the agreement, but who share an interest in managing water resources throughout Madera County and its watersheds. The spatial distribution of RWMG participating agencies is shown in Figure 4-3.

The Region's initial IRWMP, approved in 2008, was developed to improve coordination and collaboration between these agencies and Stakeholders, and to serve as a basis for pursuing funding to accomplish the goals set forth in the IRWMP. A 2014 update revises, reformats, and adds to the original IRWMP content to conform to the updated State requirements set forth in Proposition 84, the Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006 (Madera IRWMP 2014). An IRWMP update to Proposition 1 standards is planned for 2018.

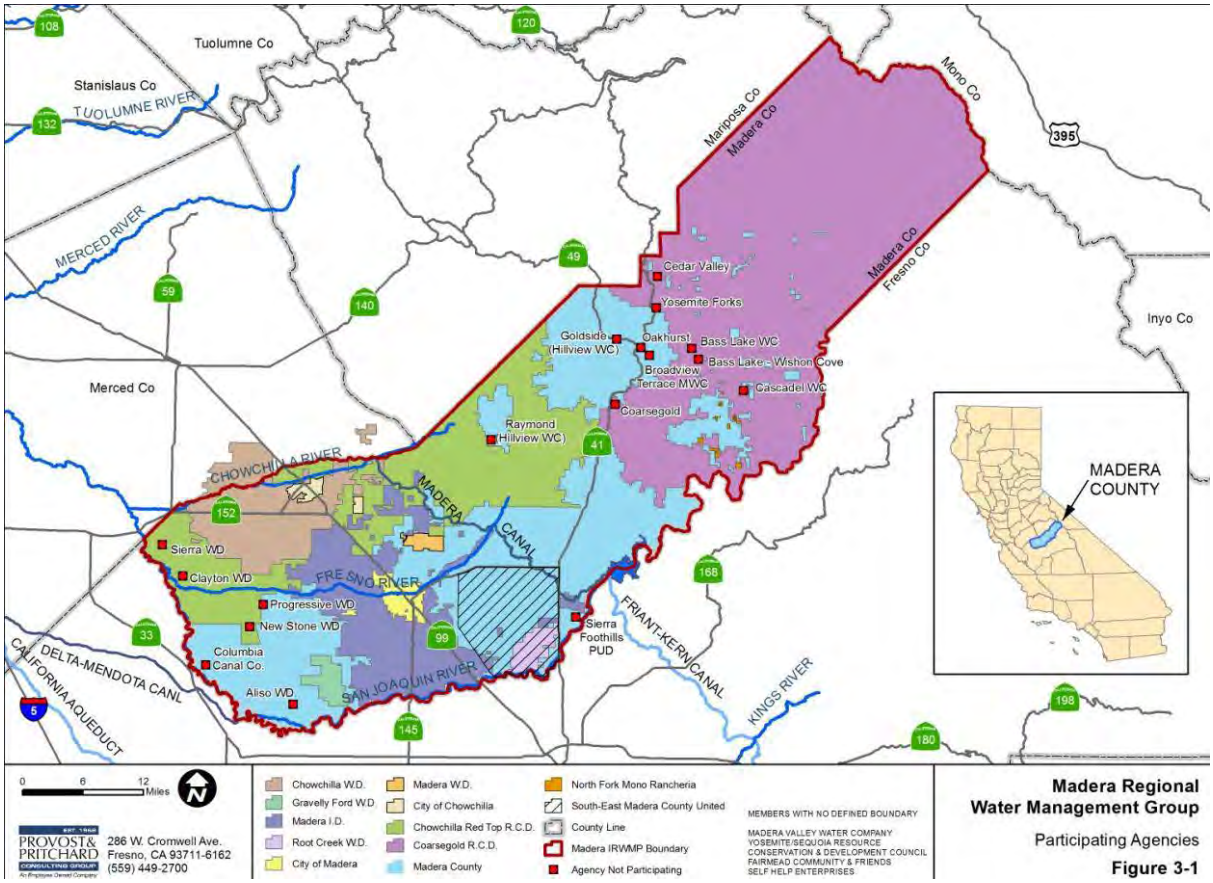


Figure 4-3. Madera IRWMP Regional Water Management Group Entities

4.4. Public Engagement/Communication Plan and Coordination

4.4.1. Overview of Public Engagement/Communication Plan

A traditional Stakeholder approach was used to solicit input, with an emphasis on outreach to DACs, which comprise a major percentage of Madera County population. Figure 4-4 illustrates the workflow overview of the Madera Public Participation Strategy, ensuring feedback to Stakeholders, as well as Local Agencies and the Outreach Coordinator for future refinements. To support SWRP development, a Technical Advisory Committee (TAC) has been convened to review and provide input at critical milestones in the plan development process. The TAC members include representatives from the State Water Resources Control Board and Central Valley Regional Water Quality Control Board, along with representatives from the City of Madera, the City of Chowchilla, water suppliers, local agencies, and non-governmental organizations.

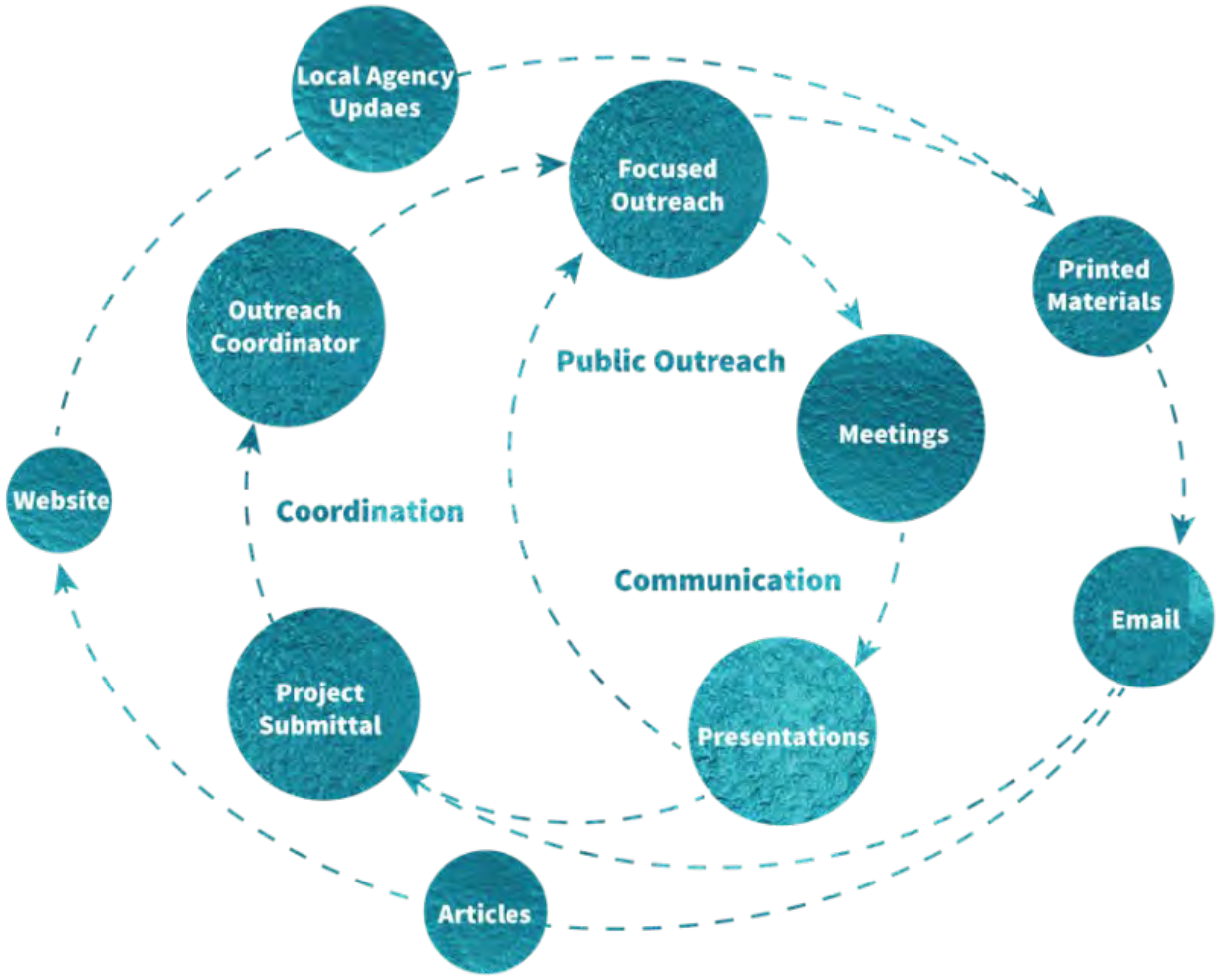


Figure 4-4. Diagram of SWRP Engagement and Communication Methods

4.4.1.1. Purpose

Historically, the Madera Region lacked coordinated water management. With the creation of the IRWM and SWRP committees as a consolidation of Stakeholders, the Region now has a vehicle to improve communication, collaboration, and cooperation; to develop a consensus on regional problems and solutions; and to resolve or proactively avoid conflicts. Since the public funds municipalities, and the activities of the public impact storm water quality, it is imperative that Stakeholders and members of the general public are given opportunities to play an active role in both the development and implementation of the SWRP. An active and involved community is crucial to the success of a Storm Water Resource Plan because it allows for:

1. Broader public support - citizens who participate in the development and decision-making process are likely to take a more active role in plan implementation;
2. An informed local community - education fosters stewardship of the land;
3. A broader base of expertise and economic benefits - since the community can be a valuable, free, intellectual resource; and
4. A conduit to other programs - as citizens involved in the storm water resource plan development and implementation process provide important cross-connections and relationships with other community and government programs.

The purpose and responsibilities of the TAC were to:

1. Review SWRP development methodologies and provide feedback on prioritization metrics;
2. Review spatial analysis;
3. Assist in defining criteria weights for project prioritization;
4. Review the draft SWRP Plan and provide feedback;
5. Provide comments throughout the SWRP process; and
6. Provide input on draft projects and new project concepts.

4.4.2. Stakeholder and Public Demographic

The Madera Region faces many challenges common to Central Valley counties including a high unemployment rate, fast population growth, and low average household income. This predominantly agricultural area is disconnected from the economy and resources of larger metropolitan areas, consequently communities are plagued by seasonal unemployment.

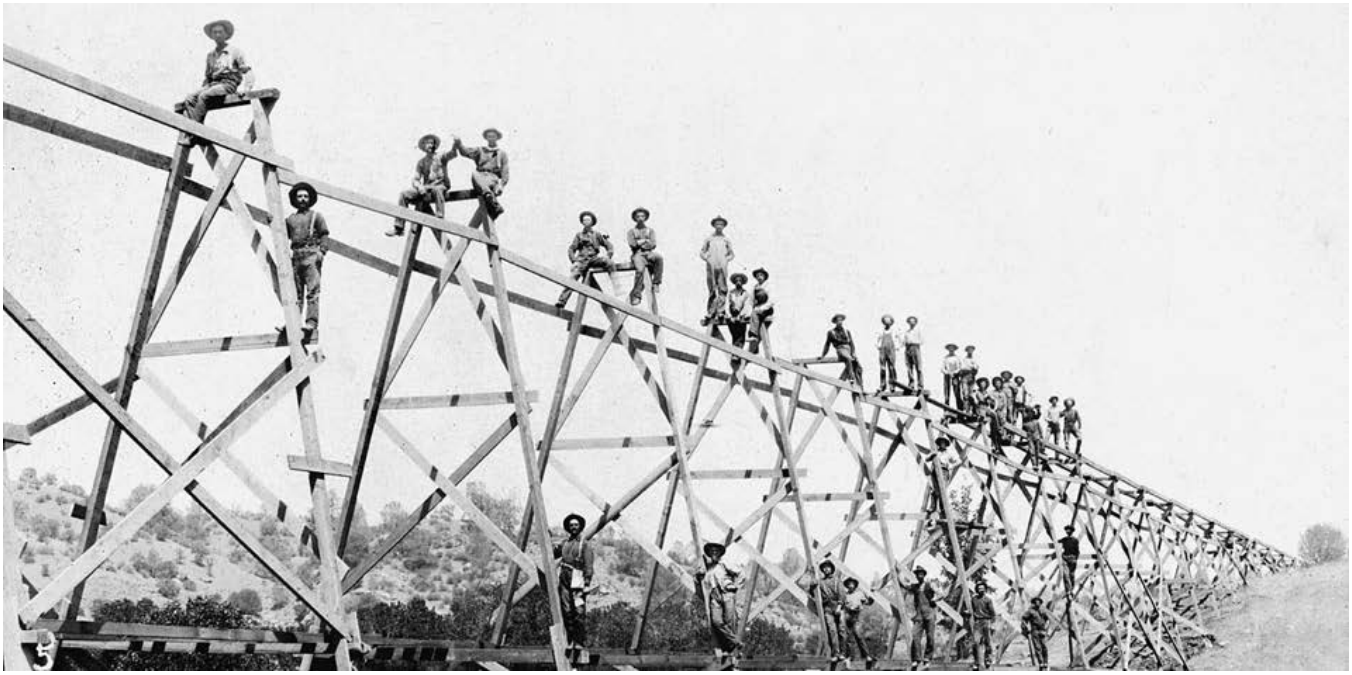


Figure 4-5. CA Lumber Company workers build a flume that results in the founding of Madera Courtesy of Madera Historical Society

The poverty rate in Madera County is over 23 percent, qualifying the entire County[17] including two cities and several unincorporated communities as well as two federally recognized Native American tribes as Disadvantaged Communities (DACs). About 40% of households have children living at home and over 28% of the population that is under 18 years of age is living below the poverty line. Where 2014 Median Household income (MHI) in California was $63,636, in Madera County it was $45,490. Therefore, the MHI falls below 80% of the state average and includes 29 identified DACs, as well as Small and Severely Disadvantaged Communities (SDACs).[18]

Communities such as Fairmead, Parkwood, and La Vina have a population of a few hundred-people compared to over 60,000 people in the City of Madera. Both DACs and SDACs have disadvantages in terms of technological, information and monetary resources necessary to prepare competitive grant applications, and participate in regional efforts, but small communities SDACs face even greater challenges.

[17] All of Madera County meets the Proposition 1 definition for an Economically Distressed Area (EDA) based on (1) a County wide unemployment rate at least 2% higher than the statewide average and (2) a low population density, defined by: ≤100 persons per square mile. Source: https://gis.water.ca.gov/app/edas/

[18] Source: U.S. Census Bureau. American Community Survey, 2010-2014 American Community Survey 5-Year Estimates, Table B19113. American FactFinder.

4.4.3. Methods

Stakeholder involvement is critical to the successful development and implementation of the SWRP therefore public outreach methods included efforts to contact and engage a diverse group of Stakeholders representative of the various communities in the region. Outreach strategies included communication through email and printed materials, in person meetings, visual presentations about SWRP project selection and evaluation, as well as a plan for ongoing updates to the Madera County website during plan evaluation and project implementation.

The primary goals of the public outreach efforts include:

1. Recruit Stakeholders to inform, prioritize, and engage in SWRP development;
2. Inform the public of water resources issues and opportunities for improved water security and more resilient resource management in the Madera region; and
3. Solicit input for identifying potential SWRP projects and developing project evaluation criteria.

Specific outreach methods include:

- **Stakeholder Meetings**
  Two Stakeholder meetings were held at the Madera County Government Center. A public outreach specialist facilitated, answered, and recorded Stakeholder questions and comments. The meetings were announced by email and on the SWRP website.
  QUANTIFIED OPPORTUNITIES: 2 (two) Stakeholder meetings

- **Public Meetings**
  One Public meeting was held at the Madera County Government Center, coinciding with Stakeholder Meeting #2. A public outreach specialist facilitated, answered, and recorded Stakeholder questions and comments. The meeting was announced by email and on the SWRP website, and in local newspaper calendars (Madera Tribune, Chowchilla News, Fresno Bee, Ranchos Independent, and Sierra Star) two weeks before the meeting date.
  QUANTIFIED OPPORTUNITIES: 1 (one) Public meeting

- **Printed Material**
  Informational fliers were used to educate the public and recruit new Stakeholders. The flier was distributed at presentations, sent to parties expressing interest in the SWRP, and posted in three newspapers distributed throughout Madera County: the Madera Tribune, Fresno Bee, and Ranchos Independent. These fliers gave the public opportunities to increase their awareness and engage in the SWRP development process.
  QUANTIFIED OPPORTUNITIES: Minimum 5 (five) Flier disbursements (prior to each of the two Stakeholder meeting and posting to three newspapers)

Page 9

RECIPE cont. from P. 8

Grated parmesan cheese

Place bread crumbs in shallow plate (pie plate works best) and place beaten egg in another shallow plate.

Cut eggplant into ½ inch rounds. Salt and pepper to taste. Dip each slice in egg then in bread crumbs. Place in bottom of baking dish. Bake 15 – 20 minutes until not quite done. Remove from oven and spoon sauce over top of eggplant. Top with cheeses and return to oven. Bake until bubbly and cheese is melted. Let stand 5 minutes before serving.

Mama always had a row of bell peppers. Our family loved stuffed bell peppers. I think they were my brother Lloyd's favorite vegetable. He would go out to the garden and eat them raw right off the plant. I remember one time the peppers were just getting ready to pick when he went out and ate two or three. Mama went out later to pick enough for dinner and there weren't enough for her dish. She was a little upset with Lloyd for ruining her plans for dinner – after all she had seven people to feed.

Stuffed Bell Peppers

Preheat oven to 350
2 lb. hamburger
1 onion – chopped
Salt and pepper
2 cans chopped tomatoes
¼ to ½ tsp. sugar
1 cup whole kernel corn
3 or 4 slices bread
6 or 8 bell peppers

Cut tops off peppers, then cut peppers in half, lengthways. Clean out seeds and membrane. Put in pan of salted boiling water and parboil until not quite done. Remove from water and place in bottom of a 13x9 baking dish, cut side up. Set aside.

With a little oil in the bottom of large pot cook onions until they begin to soften, add hamburger, breaking up as it cooks. Season with salt and pepper. After meat has cooked, with a spoon or paper towel remove as much fat from bottom of pot as possible.

Add the canned tomatoes – do not drain. Add a little sugar to cut the acid of the tomatoes. Let simmer until tomato juice is about half cooked out. Add the corn. Break bread up only a couple of slices at a time, stirring it into hamburger tomato mix until juice is absorbed. Pour mix into baking pan on top of prepared bell peppers. Bake until bubbly, about 30 minutes.

My mom didn't stuff individual peppers because she said it was easier to serve like a casserole.

Dear Readers: Thank you for bearing with me this month. I had laser surgery on both eyes last week. My eyes still burn but I was determined to write this. I could have had Randy do a repeat of an old article, but I hate that – those are only for emergencies. Thanks for all the prayers – I know they are helping me heal.

A reminder for all Ranchos residents: Madera County Health Dept. will be giving flu shots again this year. At Liberty High School – Drive Through! Thursday, Oct. 5 from 9:30 to 11 a.m. There's a $5 charge for each shot.

MADERA COUNTY
STORM WATER RESOURCE PLAN

CALL FOR PROJECTS!

The Madera County Storm Water Resource Plan (SWRP) is a first of its kind watershed based storm water plan that will establish an integrated, holistic, and coordinated storm water runoff management strategy for the entire County. Development of the SWRP is grant funded and being led by the County of Madera in coordination with a Technical Advisory Committee, Stakeholder Group, and community members.

Visit:
www.maderacountywater.com
to learn about the SWRP
and
let us know your project ideas!
Complete a project solicitation form by Sept. 30, 2017

PROJECTS IN THE SWRP WILL *be prioritized based on a common set of criteria and will* BE ELIGIBLE FOR BOND MONIES, SUCH AS FROM PROP. 1 STARTING IN SPRING 2018

- **PROJECT LOCATION.** The project must be located in Madera County to be considered for inclusion in the Madera SWRP.
- **FUNDING SOURCES:** In addition to Proposition 1 grant funds, projects included in the SWRP will be eligible for other grant monies, such as from the Department of Water Resources and California Department of Fish and Wildlife.
- **TIMELINE FOR SWRP COMPLETION:**
  - July - Sep. 2017: **Call for Projects!** Send us your completed forms this summer, until Sept. 15.
  - August - September 2017: New Project Concept Development & Project Prioritization.
  - October 2017: **Draft SWRP** ready for public review and comment.
  - November 2017: **Public Meeting**
  - December 2017: Final SWRP

9/17

Please direct any questions & send a completed project solicitation form to **Dario Dominguez** at **dario.dominguez@co.madera.ca.gov** by **Sept. 30, 2017**

MADERA COUNTY PUBLIC WORKS AND WATER & NATURAL RESOURCE DEPARTMENTS
Contact: Dario Dominguez, Program Manager | dario.dominguez@co.madera.ca.gov | (559) 675-7811
www.maderacountywater.com

www.The Ranchos.com

Figure 4-6. Tear Sheet from the Project Flier printed in the Ranchos Independent, September 2017

- **Focused Outreach**
  Focused outreach has been performed to specific groups, such as DACs (see Section 2.2) and Native American tribes. The focused outreach included directly contacting Stakeholders.
  QUANTIFIED OPPORTUNITIES: Minimum points of contact of at least 50% of DAC representative organizations.

- **Presentations**
  Technical presentations explaining the SWRP project selection process as well as defining conceptual storm water best management strategies will be given at Stakeholder Meeting #1 and #2 and at each of the four TAC meetings.
  QUANTIFIED OPPORTUNITIES: Minimum of 1 (one) Technical Presentation at each Stakeholder meetings and TAC meetings, for a total of 6 (six) Technical Presentations.

- **Website Postings**
  The SWRP meeting dates, plan development process, and opportunities for participation will be posted to the website. The website also hosts a timeline of accomplishments, and will include announcements when SWRP projects have been implemented. These will include updates of initial Stakeholder meeting announcements and meeting minutes, draft and complete SWRP, as well as funding opportunities for Project Solicitations.
  QUANTIFIED OPPORTUNITIES: Minimum of 3 (three) Website Updates.

4.4.3.2. Prioritization

Projects will be prioritized that meet basic SWRP objectives including regional benefit, DAC benefit and SWRP goals including Water Supply, Ecosystem/ Watershed, Groundwater, Flood Management and Water Management. Priority will be given to projects that have the most significant measurable impact on water quality and water supply security while also benefiting the local community (See Table 6-3). Criteria weight for each unit of measurement was determined by community representatives based on the input provided during Stakeholder Meeting #1, TAC Meeting #2, and from the County of Madera. Criteria weights, which inform the prioritization results, can be adapted with future SWRP updates based on Stakeholder and Community input.

4.4.3.3. Project Solicitation

The Project Solicitation Form information was also used to initiate contact with Project Sponsors to complete the solicitation process (see Appendix 3). The schedule for project submittals is summarized in Table 4-1.

Table 4-1. Project Submittal Timeline

Date	Project Submittal Action Item
June 2017	SWRP distributes invitations to Stakeholder Meeting #1 that includes language eliciting potential projects
June 30th 2017	Project Solicitation Forms are distributed via email and the Madera County website
July 13th 2017	Project Solicitation Forms are distributed in person at Stakeholder Meeting #1
July-September 2017	Submitted Projects are Reviewed by the SWRP
September 2017	SWRP Team identifies appropriate projects for inclusion in the SWRP
September 2017	Project sponsors are contacted for project clarification as needed.
October 2017	The SWRP processes approved projects through prioritization criteria
October - November 2017	Projects are added to the SWRP project list and reviewed during Stakeholder Meeting #2
November 2017	Public Draft SWRP available for public review

4.4.3.4. Comment Submittal

Comments on the Public Draft SWRP were requested from the Technical Advisory Committee, Stakeholders, and the Public and summarized for inclusion in the Final SWRP. All the collected comments on the Public Draft SWRP are available in Appendix 7.

4.4.3.5. Education

The public was invited to participate in the second Public/Stakeholder meeting that will include presentations on the objectives of the SWRP and project evaluation process. Education on the project selection process gave participants an opportunity to learn about storm water management issues such as nuisance flooding, water security, and sustainable management practices as well as provide critical feedback on weighing criteria. Technical experts answered questions about projects and explained conceptual ideas of innovative storm water management strategies. Various methods of interpretation were presented, audio-visual, print paper, as well as verbal presentation with question and answer.

4.4.4. Public and Stakeholder Meetings during Plan Development

The Timeline for Public Engagement and Education Actions are summarized in Table 4-2.

Table 4-2. Timeline of Public Engagement and Education Actions

Date	Action Item
June 10th	Distribution of printed and digital invitations to Stakeholder Meeting #1
July 13th 2017	Stakeholder Meeting #1
Summer 2017	Digital and printed communication updates
August 2017	TAC Meetings #1 and #2
Summer/Fall 2017	Updates on County website
October 2017	Distribution of printed and digital invitations to Stakeholder Meeting #2
November 2017	Stakeholder Meeting #2
November 2017	Public Draft SWRP available for public review
November/December 2017	TAC Meetings #3 and #4

4.4.4.6. Stakeholder Meeting #1

The first Stakeholder meeting provided a critical opportunity for the SWRP team to meet with Stakeholders face to face to review the purpose and need for a SWRP. The other critical objectives of the meeting included:

- Identifying potential projects;
- Introducing and reviewing the project submittal form;
- Identification and weighting of project metrics to be used in the project prioritization process; and Examination of high priority multi-benefits such as water quality, environmental, and community benefits.

The meeting also included an announcement for Stakeholder Meeting #2, and time for questions and discussion. To view the topics covered and records of comments from the public see Appendix 1, Stakeholder Meeting #1 Report.

4.4.4.7. Public Meeting and Stakeholder Meeting #2

During the second Stakeholder and combined Public meeting, the Public Draft SWRP was introduced and reviewed. The SWRP modeling results and project prioritization was presented, providing an opportunity for Stakeholder and public input prior to finalizing the plan. To view the topics covered and records of comments from the public see Appendix 1, Stakeholder Meeting #2 Report.

4.4.5. Stakeholders Participating in Plan Development

All the Stakeholder group categories necessary to meet the objectives of the SWRP are included on the Stakeholder list. The list continues to expanded as new Stakeholders were introduced to the

process. New Stakeholders were introduced through sign-in sheets at meetings and public workshops, recommendations from those already involved, and targeted outreach to underrepresented groups including disadvantaged and climate vulnerable communities.

- Chowchilla Water District
- City of Chowchilla
- City of Madera
- Coarsegold Resource Conservation District
- Fairmead Community & Friends
- Gravelly Ford Water District
- County of Madera
- Madera County Special Districts
- Madera Irrigation District
- Madera Valley Water Company
- Madera Water District
- North Fork – Mono Rancheria
- Root Creek Water District
- Self Help Enterprises
- SEMCU - Southeast Madera County United
- Yosemite/Sequoia Resource Conservation and Development Council
- Picayune Rancheria of Chukchansi Indians

The list above represents a broad range of interests including: water supply, water quality, environment/habitat, recreation, agriculture, resource management, hydropower, sanitation, Disadvantaged Communities, cultural, non-profit organizations, and local and state agencies.

4.4.6. Non-profit Organizations working on Storm Water and Dry Weather Resource Planning

The following non-profit groups are involved in storm water and dry weather resource planning in Madera County and were consulted as part of the SWRP development process:

- Fairmead Community and Friends
- Southeast Madera County United
- Self Help Enterprises

4.5. Decisions Required by Local, State, or Federal Regulatory Agencies for Plan Implementation and Coordinated Watershed-based or Regional Monitoring and Visualization

SWRP Implementation and coordinated watershed-based or regional monitoring and visualization requires broad support from local agencies in the Madera County. The County, Cities, and many

of the local Water Districts have supported SWRP development. The Madera SWRP will be submitted to the Madera RWMG for incorporation into the Madera IRWMP. An update of the Madera IRWMP is anticipated by spring 2018, and at that time the SWRP would be adopted by the RWMG into the IRWMP. The SWRP will also be provided to the Engineering, Public Works, and Capital Improvement Planning (CIP) divisions of Stakeholder agencies for incorporation or reference into their existing or future planned project documents. Upon completion, SWRP adoption or reference is expected into applicable Storm Water Management Plans, Storm Water Permits, General Plans, and Climate Action Plans as those plans are updated or completed.

4.6. Planning and Coordination of Existing Local Government Agencies, Including where Necessary, New or Altered Governance Structures to Support Collaboration Among Two or More Lead Local Agencies Responsible for Plan Implementation

A broad spectrum of regional coordination and initiatives by individual entities will be required to implement the SWRP projects. The County RWMG and newly formed GSAs are well positioned to lead regional and local coordination efforts.

Water-sharing or water credit systems have been proposed as part of the solution to bring local groundwater use into sustainable limits and incentivize regional collaboration.[19] Water trading is encouraged within water-sharing systems, but first, institutional agreements are necessary to make low-cost trading possible. Similarly, a water credit system would establish a market for those who conserve water or recharge groundwater to sell those credits to others who need to withdraw more than their allocation. In both types of arrangements, robust and transparent administrative and accounting systems are necessary to support agreements. Many of the SWRP projects provide groundwater recharge benefits, therefore further exploring the opportunities through the Sustainable Groundwater Management Act (SGMA) to establish a regional water-sharing or credit system would support SWRP implementation. Hurdles to implementing water-sharing or water credit systems include political and spatial challenges within Madera County.

Many of the SWRP projects rely on inter-agency coordination to transport storm water or snow melt runoff to proposed groundwater recharge locations. In the Valley portion of the County, storm water and flood flows are transported within a regional conveyance system that is maintained by various special districts, the County, and the federal government. A critical element for successfully implementing these projects is the regional coordination for operation and maintenance of the conveyance facilities. Similarly, the cost to transport water, for example through federally operated canals is considered by many Stakeholders to be a financial burden preventing project implementation. The current fee structure is preventing farmers from purchasing water when unrestricted flow is available. Fee negotiations for transport of storm water destined

[19] January 2017. Sharing Groundwater: A Robust Framework and Implementation Roadmap for Sustainable Groundwater Management in California. Mike Young and Brynce McAteer https://nicholasinstitute.duke.edu/sites/default/files/publications/ni_wp_17-02.pdf

for groundwater recharge basins within conveyance facilities will be a necessary element for SWRP project implementation.

4.7. Relationship of SWRP with Other Existing Planning Documents, Ordinances, and Programs

The following plans were referenced during SWRP development and staff from the responsible entities for each of these plans was consulted during the SWRP development process.

4.7.1. Storm Water Management Plans and Flood Protection

Flood Protection and storm water drainage in the County are provided by Madera County, the City of Madera and the City of Chowchilla. The City and the County are subject to Phase II of the MS4 NPDES Permit for Storm Water Discharges administered by the Central Valley Regional Water Quality Control Board. The Cities and County Storm Water Management Plans are closely related to the SWRP.

4.7.2. Integrated Regional Water Management Plan

The SWRP is closely aligned with the Madera IRWMP and is described in more detail in Section 4.3.

4.7.3. Sustainable Groundwater Management Act (SGMA) Groundwater Sustainability Plans

The state's 2014 Sustainable Groundwater Management Act (SGMA) required key Stakeholders of high and medium priority groundwater basins to form Groundwater Sustainability Agencies (GSAs) to manage groundwater extraction. Madera County is currently coordinating an effort to create and implement Groundwater Sustainability Plans (GSPs) that identify how to bring groundwater pumping and recharge rates into alignment. High Priority groundwater basins are required to have GSPs adopted by January 21, 2020; medium priority basins have until January 31, 2022. The California Department of Water Resources (DWR) is responsible for reviewing GSPs with the goal of eliminating overdraft conditions by 2042.

Madera County is comprised of three basins, designated by DWR as critically overdrafted, and "high priority:" (1) the Chowchilla Subbasin, (2) the Madera Subbasin and (3) a portion of the Delta-Mendota Subbasin. Each of these basins must complete and submit a GSP by January 2020, and these basins are required to achieve "sustainability" by the year 2040. The method by which sustainability will be achieved will be illustrated in the GSP, which will be drafted in partnership by the irrigation district, water districts, cities, and Madera County. The process is meant to be a public and participatory process. Madera County will consider input from Stakeholders and seeks to achieve public support toward a common goal of long-term sustainability.

The Chowchilla Subbasin is comprised of the following GSAs: Chowchilla Water District, Madera County, and Merced County. The Madera Subbasin is comprised of seven (7) GSAs: Madera County, City of Madera, Madera Irrigation District, Root Creek Water District, Madera Water

District, New Stone Water District, and Gravelly Ford Water District. Madera County encompasses a small portion of the Delta-Mendota Subbasin, including the following GSAs: Aliso Water District, Madera County, and the San Joaquin River Exchange Contractors.[20]

The SWRP includes numerous projects with water supply, and particularly groundwater recharge benefits. It is anticipated that the SWRP projects can be considered, and where applicable, incorporated into GSPs.

4.7.4. Upper San Joaquin River Regional Flood Management Plan (RFMP)

The Upper San Joaquin River (USJR) regional flood management planning area extends into Madera County, from the western edge of the County, east towards Highway 99 as shown in Figure 4-7. The RFMP identifies a series of smaller structural and nonstructural system improvements and actions that address a range of critical flood-related problems.[21] The USJR RFMP includes valuable information about portions of Madera County within the SJR Regional Flood Management Plan area, and includes storm water resource projects for potential inclusion in the SWRP.

4.7.5. Local Hazard Mitigation Plans

The City of Chowchilla Local Hazard Mitigation Plan (LHMP) identifies potential projects in the City of Chowchilla for incorporation into the SWRP. For example, projects that could manage storm water at facilities with an elevated flood risk and/or relocate repetitive loss properties to provide storm water recharge/management areas.

The Madera County Local Hazard Mitigation Plan (LHMP) identifies potential projects in the County of Madera, City of Madera, North Fork Rancheria, and facilities owned by the Madera County Office of Education, for incorporation into the SWRP. For example, projects that could manage storm water at facilities with an elevated flood risk and/or relocate repetitive loss properties to provide storm water recharge/management areas.

4.7.6. Cities Urban Water Management Plans

The Cities of Chowchilla and Madera each have Urban Water Management Plans, as required by the Urban Water Management Planning Act, that describe current and future water uses, reliability of water sources, and existing and planned water conservation measures in the Cities.

4.7.7. Storm Water Pollution Prevention Plans

The California Industrial General Permit (IGP, Order No. 2014-0057-DWQ) is a statewide, general NPDES permit that regulates the discharge of storm water associated with industrial

[20] For more information visit: http://www.maderacountywater.com/

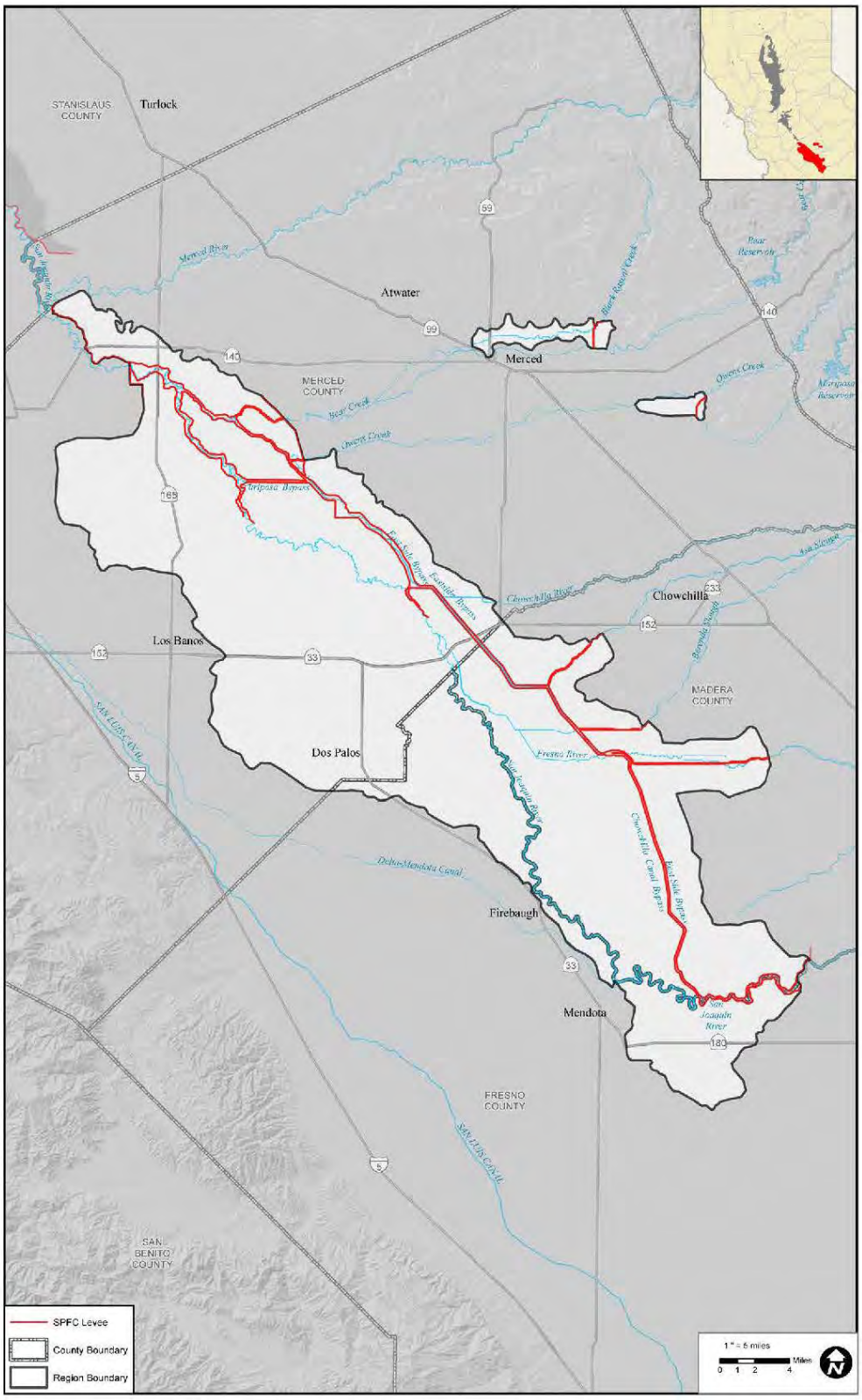
[21] http://usjrflood.org/2015/03/09/final-rfmp/

activity as defined by the US EPA. Any facility covered under an IGP is required to have developed and implemented site-specific Storm Water Pollution Prevention Plans. These SWPPPs include minimum and advanced Best Management Practices (BMPs) to reduce pollutant loading in storm water discharges. Within Madera County there are 29 Industrial General Permit holders with SWPPPs. These facilities conduct monitoring, including visual observations and analytical storm water monitoring for indicator parameters; compare monitoring results to applicable numeric action levels (NALs); perform appropriate Exceedance Response Actions (ERAs) when there are exceedances of NALs; and certify and submit data and permit-related compliance documents to the state via database.

4.7.8. Madera Regional Groundwater Management Plan

The goal of the Madera Regional Groundwater Management Plan is to provide the framework and technical data to allow for effective groundwater management which moves to restore, where possible, and maintain a high quality and dependable groundwater resource. The Plan documents groundwater management efforts throughout the Groundwater Management Plan (GMP) area and planned efforts to improve groundwater management. The GMP Participants include Chowchilla Water District, City of Chowchilla, City of Madera, Madera County, Madera Irrigation District, and South-East Madera County United. The Plan identifies measures that may be feasible for each partner agency and leaves the final decisions on implementation to the individual boards of directors and city councils of the GMP Participants.

Figure 4-7. Upper San Joaquin River Regional Flood Management Planning Area (USJR RFMP, February 2015)



5. Quantitative Methods

This section describes the integrated metrics-based analysis that was used to demonstrate the SWRP projects and programs satisfy the SWRP water management objectives and multiple benefits. A description of the water quality analysis indicates how each project or program (1) complies with or is consistent with applicable NPDES permits, (2) was analyzed to simulate the proposed watershed-based outcomes, and (3) will contribute to the preservation, restoration, or enhancement of watershed processes. A description of the storm water capture and reuse analysis will describe how the projects and programs in the watershed will collectively capture and use the proposed amount of storm water and dry weather runoff. A description of the water supply and flood management project analysis will describe how each project and program will maximize and/or augment water supply. A description of the environmental and community benefit analysis describes how each project and program will benefit the environment and/or community, with some type of quantitative measurement. This section also includes a description of the data collection and management strategy, specifically identifying (1) mechanisms by which data will be managed and stored; (2) how data will be accessed by Stakeholders and the public; (3) how existing water quality monitoring data will be accessed; (4) the frequency at which data will be updated; and (5) how data gaps will be identified.

5.1. Introduction

The outputs from the spatial prioritization analysis provide a quantitative way to objectively and consistently compare storm water resource projects that can achieve the greatest overall benefits. Mapped summaries allow visualization of patterns of storm water impacts and potential project benefits throughout the region. The resulting geodatabase provides a spatial framework for incorporation of new information as it becomes available for future prioritization processes and communication of both funding needs and of how decisions were made about which types of projects should be implemented and where to maximize environmental benefits. There are two primary components to the Project Prioritization:

1) a Spatial Prioritization Analysis, which measures storm water mitigation opportunities; and

2) a Project Multi-Benefits assessment which measures anticipated benefits from projects.

Both components are based on a set of quantitative metrics that reflect Multi-Benefit criteria and the outputs are combined in a scoring matrix to yield the final project prioritization ranking. Both the spatial metrics and the process to combine them were vetted via a series of meetings and exercises with the local Stakeholder Group and the SWRP Technical Advisory Committee (TAC) (Section 4).

The approach, methods, and data used in the Spatial Prioritization Analysis and the Project Multi-Benefits Assessment are detailed in this section. Section 5.2 presents an overview of the approach used in the spatial prioritization analysis and Sections 5.3 – 5.7 describe the data sources,

processing, and calculation of metrics used. To provide an objective standardized project prioritization, both the Spatial Prioritization Analysis and the Project Multi-Benefits Assessment rely strongly on modeled outputs from the Storm Water Tool to Estimate Load Reductions (swTELR) to quantify both baseline storm water impacts and anticipated benefits from implementation projects when feasible based on their design specifications. Section 5.2.2 describes the conceptual basis, inputs, scales of operation, inputs and functioning of the swTELR model.

5.2. Project Prioritization

5.2.1. Approach

The Spatial Prioritization Analysis was designed to integrate relevant datasets and objectively identify regional subwatersheds and urban catchments that are most likely to receive the greatest benefit from storm water mitigation projects and a location-based ranking of catchment and watershed opportunities. It is designed to address the question of ***where*** storm water resource projects can have the greatest benefits within the context of regional storm water management multi-benefits. Both the Spatial Prioritization Analysis and the Project Multi-Benefits Assessment rely on the selection of metrics and the weight of those metrics that reflect regional storm water management objectives in a manner to coincide with regional priorities.

Metrics were specified via an iterative process using the following steps:

1. Identify data that align with SWRP multi-benefits;
2. Process the spatial data to the defined drainage units of analysis;
3. Define the quantitative method for combining spatial data layers and metric weights;
4. Seek input from the Stakeholder Group, TAC, and County on metric appropriateness, weighting, and alignment with regional needs; and
5. Refine the final metrics list and weights according to Stakeholder Group, TAC, and County input.

This process is intended to ensure that prioritization uses an objective approach whenever possible and incorporates other information from Stakeholders and the TAC to fill gaps that can result from a purely data-driven approach. The identification of the metrics is driven by conceptual understanding of the relevant hydrologic systems and bounded by availability of spatial data throughout Madera County. Metrics for the Spatial Prioritization Analysis and the Project Multi-Benefits Assessment are listed in Table 5-1 along with measurement units and data sources. The scoring system, along with the weights assigned to each multi-benefit criteria and metric is presented for the Spatial Prioritization and the Project Multi-Benefits Assessment in the sections that follow. Two nested spatial scales of analysis were used (described in Section 2) for the Spatial Prioritization Analysis while the Project Multi-Benefits Assessment was performed at the site level based on project specific details.

The scoring rubric has a total of 120 possible points, with points allocated to the Benefit Criteria for both the Spatial Prioritization Analysis and the Multi-Benefits Assessment based on input from the Stakeholder Group and the TAC. The Stakeholder Group provided a relative ranking of these

Benefit Criteria during facilitated meetings, and the TAC and County provided proportional weights for each Benefit Criteria via survey responses. The results from these three groups were weighted equally and the responses were averaged for each Multi-Benefit criteria to inform the individual metric weights that are presented in Sections 5.3 and 5.3.1.

The Spatial Prioritization was performed at the regional subwatershed, and within MS4 boundaries at the urban catchment scales, to allow more precise identification of storm water action opportunities within the urbanized areas. The benefits assessment for individual projects was performed at the individual site scale to facilitate incorporation of unique drainage, environmental, and community characteristics of each location to most accurately estimate potential project benefits.

Table 5-1. Metrics used to quantify Multi-Benefits for the Project Prioritization, with the Unit defining how each metric is measured.

Prioritization Element	Benefit	Metric	Unit	Data Source
Spatial Prioritization	Water Supply	Subwatershed runoff	% Annual	Estimated using a modified version of the Stormwater Tool to Estimate Load Reductions (Beck, et al. 2017) https://www.swtelr.com/
		Dry season water use	MG/yr	EPA EnviroAtlas Water Usage data, per 12-digit HUC, California created by the Conservation Biology institute using USGS water usage data and refined with USDA Cropland Data and National Land Cover database
		Groundwater recharge potential	% Area	Areas where GW recharge is the most likely, derived by CA Water Institute from NRCS SSURGO and STATSGO datasets based on drainage class and slope index https://www.epa.gov/enviroatlas/forms/enviroatlas-data-download
		Groundwater level reductions	ft/yr	Groundwater level changes 2011-2016. Interpolated surface from contours downloaded from Groundwater Information Center Interactive Map Application (https://gis.water.ca.gov/app/gicima)
		Subsidence	ft/yr	Raster dataset created by NASA delivered to DWR in October 2016. https://ca.water.usgs.gov/land_subsidence/central-valley-subsidence-data.html
		Impervious area	Acres	Impervious coverage from the National Land Cover Database 2011derived from Landsat Satellite imagery. (Homer, et al. 2011)
	Water Quality	Impaired waterbodies	miles/acre	Downloaded from EPA June, 2017 https://www.epa.gov/waterdata/waters-geospatial-data-downloads

		Soil erodibility	Ton/mi2/yr	Soil Erodibility Index derived from the Revised Universal Soil Loss Equation. Weighted average gross soil erosion derived from USGS HUC 8 boundaries. Based on the revised universal soil loss equation (RUSLE). US EPA/ORD/NERL/ESD Landscape Ecology Branch
		Subwatershed pollutant loading	Ton/mi2/yr	Estimated using Stormwater Tool to Estimate Load Reductions (Beck, et al. 2017) https://www.swtelr.com/
		Urban runoff	% Annual	
		Urban pollutant loading	Ton/ac/yr	
	Flood Control	Potential flooded area	% Area	FEMA's National Flood Hazard Layer. Downloaded from FEMA GeoPortal June, 2017
Project Multi-Benefits Assessment	Water Supply	Water supply reliability, water conservation, conjunctive use	Ac-ft/yr	Yes/No determination from project description and specifications. Benefit magnitude estimated using Stormwater Tool to Estimate Load Reductions (Beck, et al. 2017) https://www.swtelr.com/ when technically feasible. Otherwise, benefit estimates rely primarily upon project design specifications and parameters, and location-specific information.
	Water Quality	Support of TMDL compliance, Increased runoff infiltration/treatment, NPS pollution control, re-establish natural drainage patterns	Yes/no, Ton/ac/yr	
	Flood Control	Decreased flooding risk, reduced sanitary sewer overflows	Ac-ft/yr	

Environmental	a. Provide environmental and habitat protection or improvement, via wetland enhancement/creation; Riparian enhancement; and/or Instream flow improvement b. Reduce energy use, greenhouse gas emissions, or provide carbon sink c. Reestablish the natural hydrograph d. Increase urban green space e. Improve water temperature	Yes/no	Yes/No determination from project description and specifications
Community Benefits	Employment opportunities, community involvement, public education, enhance and/or create recreational and public use areas	Yes/No, Count	Yes/no and count or community impact determination from project description and specifications.
DAC Community	Direct benefit to DAC communities	Yes/No	Yes/no. Community impact determination from project description and specifications.
Capital Cost	Estimated capital cost for each project with most expensive alternatives ranking less favorably	Dollars	Determined from project cost estimate

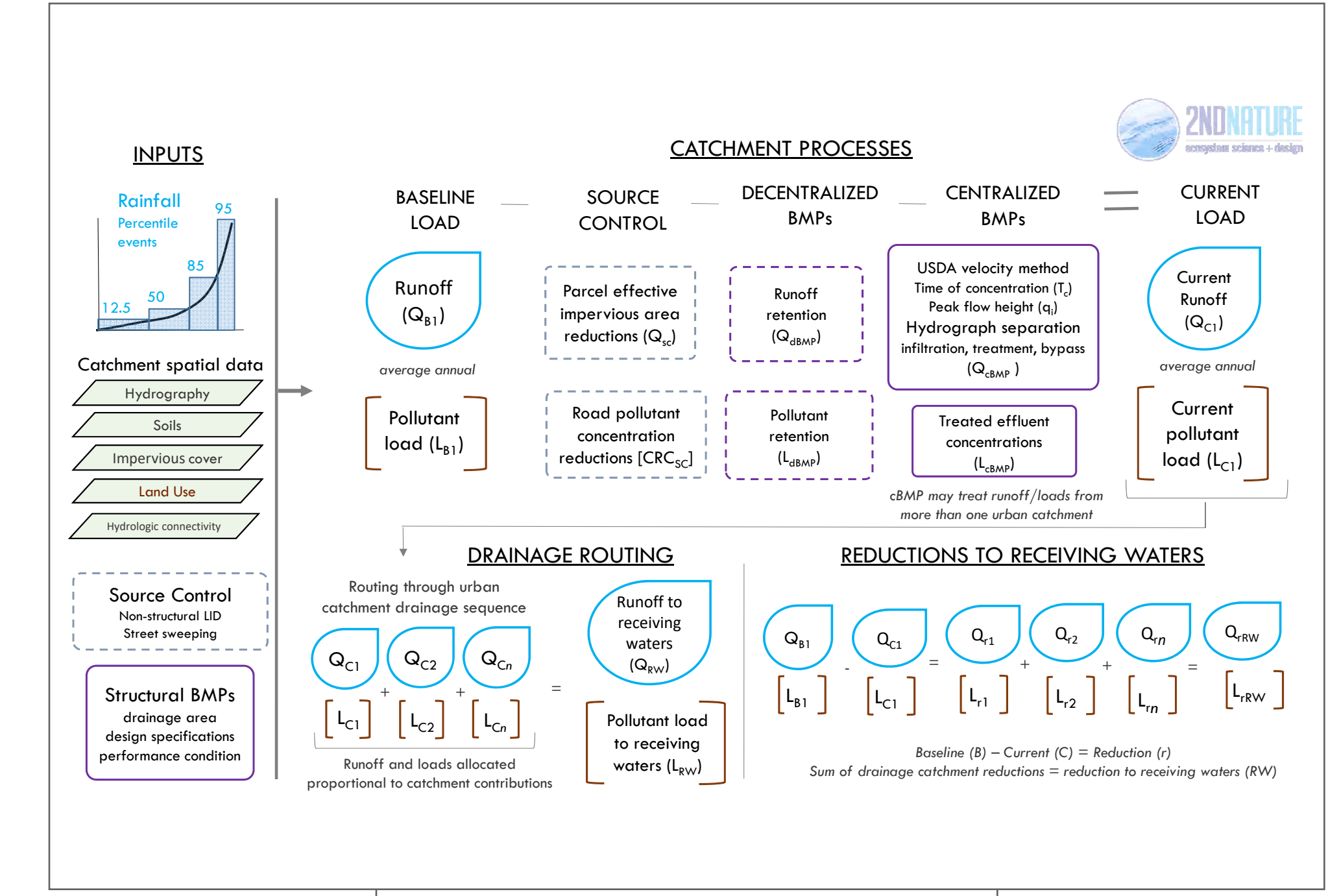
	Project Development	a. Project developed using a metrics driven approach? b. Does the project provide Regional Benefits?	Yes/no and/or %	Determined from project description
	Project Readiness	a. Ready to implement? b. Cost well defined? c. Land currently owned by a public agency? d. Environmental permitting process complete? e Funds available to satisfy the 50% local funding match?	Yes/no and/or %	Determined from project description

5.2.2. Storm Water Modeling

The Stormwater Tool to Estimate Load Reductions (swTELR) is a spatially distributed hydrologic model, with landscape characteristics and processes represented explicitly throughout a network of urban catchments or regional subwatersheds to provide average annual runoff and pollutant loading estimates. The model has been developed as a user-friendly web-based storm water tools platform by 2NDNATURE to provide spatially explicit outputs to satisfy MS4 permit reporting requirements and track progress over time to reduce reporting compliance effort on the part of permitees (see www.2nform.com). Validation experiments have shown that runoff estimation aligns closely with high-resolution monitoring data as well as results generated from more complex, well-accepted continuous simulation models (Beck et al., 2017). This makes swTELR well-suited to applications where annual-scale estimates are of sufficient time resolution, spatially explicit estimates are important, and there is a need for ongoing direct use by storm water managers.

Hydrologic computations in swTELR employ well-tested algorithms for rainfall runoff transformation and routing, using the USDA Curve Number technique (USDA-SCS, 1986). Hydrologic computations combine a set of metrics that describe a 30-year rainfall distribution with spatial drainage characteristics including land-use and impervious cover from the National Land Cover Dataset (NLCD) or local parcel assessor layers, soils data from the Natural Resource Conservation Service (NRCS), impervious cover from the NLCD, and hydrography from the USGS National Hydrography Data Set and local storm water infrastructure and drainage mapping (see Appendix 2 for a summary of TELR inputs). Total Suspended Solids (TSS) estimates serve as a proxy for other hydrophobic particulate pollutants with a tendency to adsorb to soil participles (e.g. total nitrogen, total phosphorus, bacteria, metals, pesticides/herbicides) via land-use based characteristic runoff concentrations. Initial runoff volumes and particulate pollutant loads are termed *baseline* outputs, which can be reduced with implementation of source control actions, decentralized BMPs, and centralized BMPs (see Figure 5-1). Runoff and pollutants are routed downstream across urban catchments to receiving waters, accumulating both storm water impacts and mitigation benefits. The conceptual basis and technical aspects of the model are described further in the technical report detailing its development by 2NDNATURE and the Central Coast RWQCB (2NDNATURE, 2017).

Because TELR was initially developed as an urban storm water model for use in catchments of approximately 100 acres (Beck, et al, 2017), modifications have been made to allow the model to be used at the regional subwatershed scale throughout Madera County. Changes include incorporation of distributed rainfall inputs, soil-type variation within regional subwatersheds, a greater range of land-use types and associated characteristic pollutant runoff concentrations, removal of urban channelization components of the flow routing routine, and adjustments for precipitation as snowfall. For estimation of runoff and particulate pollutants in urban catchments, the model remains unchanged for modeling in urban catchments to that reported in Beck et al. 2017.



2NDNATURE LLC
www.2ndnaturellc.com

Schematic diagram of the Stormwater Tool to Estimate Load Reductions (swTELR www.swtelr.com).

Figure 5-1

For regional subwatersheds (USGS HUC 12, 10,000 – 40,000 acres), rainfall is derived from 4 gauges throughout Madera County to adequately cover the range of climatic variation, driven largely by the elevation gain as the northeast end of the County ascend into foothills and the Sierra Mountains. Daily rainfall data were downloaded from the NOAA National Weather Service Cooperative Observer Program (COOP)[22] for the stations listed in Table 5-2., audited for completeness, and processed to create the probabilistic rainfall event inputs for a 30-year data time series. Snowmelt runoff for watersheds above approximately 6,000 feet which receive most precipitation as snowfall was adjusted using empirical equations developed by Hunsaker et al. (2012) in Sierra watersheds adjacent to Madera County which relate elevation, aspect and runoff ratios. Runoff Curve Numbers were specified directly from NLCD Land Cover and soils data from NRCS, rather than by proportion of impervious area as is done when modeling runoff at the urban catchment scale. This regional-scale implementation of swTELR includes land-use based characteristic runoff concentrations applied to estimate particulate pollutant loading derived from 15 studies drawn from the peer-reviewed literature along with an analysis of the National Stormwater Quality Database (Pitt, 2003).

Table 5-2. Rainfall stations used for swTELR runoff and pollutant modeling

Station Name	COOP ID	Lat (ddmm)	Long (ddmm)	Elevation (ft.)
Madera	45233	3657	12002	272
Friant Government Camp	43261	3659	11943	410
North Fort Ranger Station	46252	3417	11930	2,630
Huntington Lake	44176	3714	11913	7,020

5.3. Spatial Prioritization Analysis

Spatial metrics were chosen to reflect potential storm water opportunities and/or existing storm water impacts and align with the SWRP Multi-Benefits of water supply, water quality, and flood control (see Table 5-3). These are the three Multi-Benefit categories that lent themselves to consistent regional spatial analysis, given the data and tools available. The other multi-benefit categories (environment and community) were assessed relative to specific projects in the Project Multi-Benefits Assessment in addition to these three categories. Choice of specific metrics follows from understanding of urban and rural watershed hydrology, and depends partly on availability of data to quantify critical factors at the scales of analysis.

Spatial metrics associated with each Multi-Benefit Criteria (water supply, water quality, flood control) were assigned points according to how representative and appropriate they are for

[22] http://www.weather.gov/rah/coop

spatial quantification and the proportional weighting information provided by the Stakeholder Group and the TAC. Each spatial metric was combined in a matrix to generate an index value that quantifies the relative storm water mitigation opportunities for each regional subwatershed throughout the County. This index was calculated by summarizing the relevant data at subwatershed and urban catchment spatial scales and calculating a percentile rank (1-100) to place each data type on the same numeric scale. The spatial opportunity index was calculated as the sum of the product of each of these percentile rankings and the total points possible assigned to each metric (Table 5-3). This process creates a linear relationship between metric weights and their impact on the final storm water opportunity score so that adjustments are easily interpreted. The weights in Table 5-3 show that Water Supply is heavily weighted relative to Water Quality and Flood Control, reflecting the overwhelmingly prevalent water resource issue in the County as expressed by both the Stakeholder Group and the TAC.

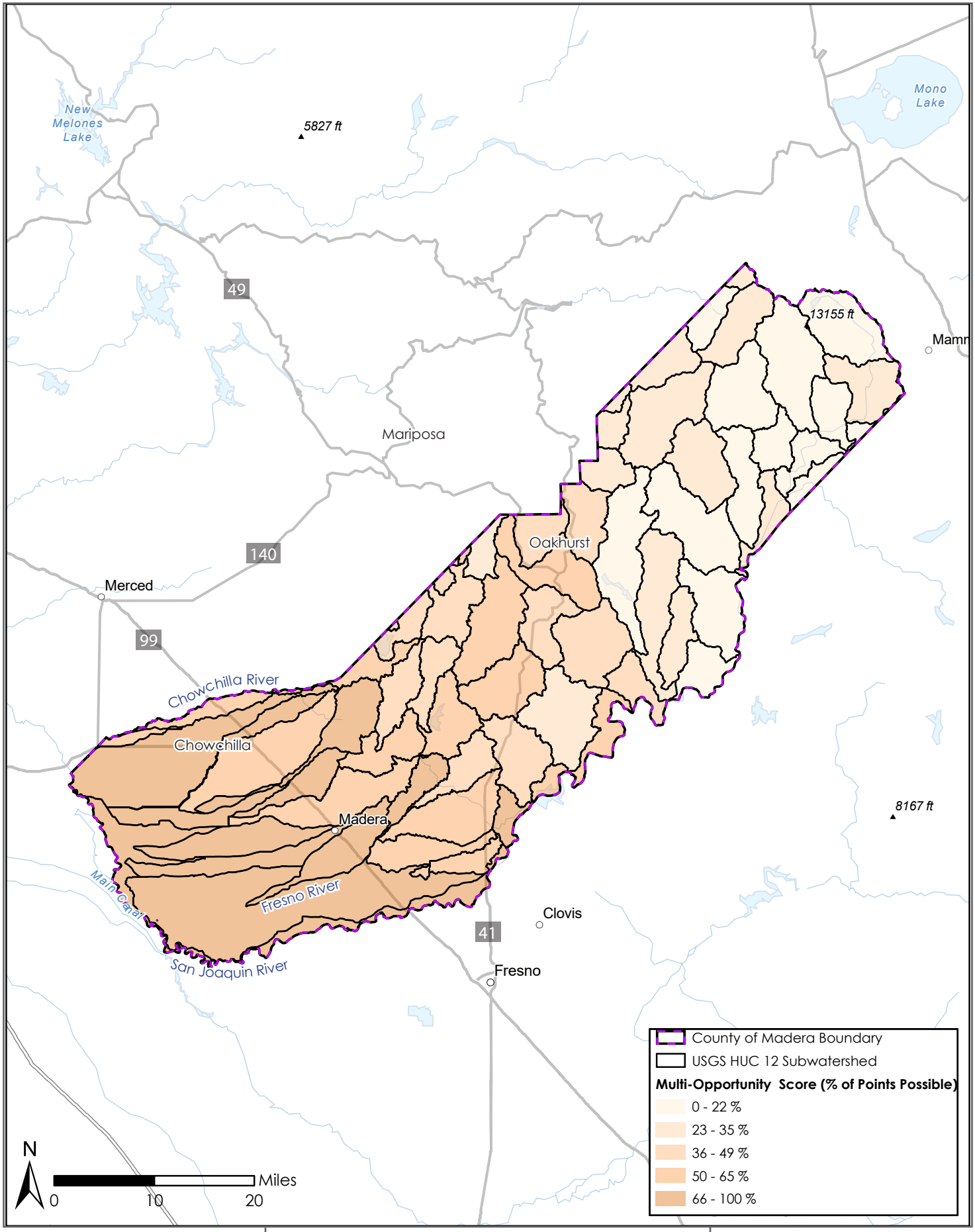
Table 5-3. Metrics used in the Spatial Prioritization Analysis. Each Benefit Criteria has a possible score of 10 points and these point totals were weighted according to the criteria weight column.

Benefit Criteria	Metric	Metric Points	Criteria Weight
Water Supply	Subwatershed runoff	1	16.6%
	Dry season water use	2	
	Groundwater recharge potential	2	
	Groundwater level reductions	2	
	Subsidence	2	
	Impervious area	1	
Water Quality	Impaired Waterbodies	5	6.5%
	Subwatershed pollutant loading	1.5	
	Soil erodibility	1	
	Urban runoff	1	
	Urban pollutant loading	1.5	
Flood Control	Potential flooded area	10	8.2%

The spatial metrics were processed within GIS to create a subwatershed-based index ranking layer of the calculated storm water mitigation opportunities that provide a succinct, visual summary of where storm water mitigation projects are most likely to have relatively high Multi-Benefit impacts that reflect regional priorities. Outputs include watershed-based maps of each metric and a spreadsheet that lists

each subwatershed and its score for each metric. These outputs provide transparency to the Spatial Prioritization Analysis along with more granular information that can be used during the overall Project Prioritization process if necessary. The Spatial Prioritization Analysis is intended to provide a framework for ongoing project assessment, within which metrics may be added or removed depending on regional relevance, and weightings adjusted such that the index reflects regional priorities appropriately as they evolve over time.

The mapped outputs of the Spatial Prioritization Analysis with the weights applied to each individual metric listed in Table 5-3 for Water Supply, Water Quality, and Flood Control are shown in Figure 5-2. In the map shown in Figure 5-2 darker colors represent subwatersheds that generally have a greater potential for storm water mitigation compared to the lighter colored subwatersheds. The pattern approximately mirrors the degree of disturbance in these subwatersheds from urbanization and crop cultivation as these activities are most impactful to water supplies, which are the most heavily valued metrics in the analysis. The calculation and methods of analysis for individual metrics that contributed to the overall scores shown in Figure 5-2 are discussed in the sections that follow.



2NDNATURE LLC
www.2ndnaturellc.com

Overall spatial prioritization scores for regional subwatersheds based on point totals from the metrics listed in Table 5-3 at the HUC 12 subwatershed scale. Darker shaded subwatersheds indicate relatively higher priority areas to treat stormwater as a resource.

Figure 5-2

5.3.1. Project Multi-Benefits Assessment

Like the Spatial Prioritization Analysis, the Project Multi-Benefits Assessment metrics were chosen based on their appropriateness for measuring project benefits, data that would likely be available to quantify those benefits, along with guidelines from the SWRCB. Metrics represent each of the Multi-Benefit criteria: Water Supply, Water Quality, Environmental, and Community and were weighted based on system understanding along with input from the Stakeholder Group and the TAC. Table 5-4 shows the metric weights that resulted from collation of data from the Stakeholder Group, County, and TAC input. Metric processing is similar to the Spatial Prioritization Analysis, with values ranked as percentile values when necessary so they can be combined on the same scale while maintaining a continuous scale. Water supply metrics are most heavily weighted, which reflects priorities expressed by the Stakeholder Group and the TAC, but given a greater number of Multi-Benefits considered, compared to the Spatial Prioritization Analysis, the skew towards water supply is not as pronounced. The Project Multi-Benefits Assessment provides the remaining Project Prioritization points (approximately 70%) that were not allocated to the Spatial Prioritization Analysis.

Table 5-4. Metrics used in the Project Multi-Benefits Assessment. Each Benefit Criteria has a possible score of 10 points and these points were weighted according the criteria weight column.

Benefit	Metric	Metric points	Criteria Weight
Water Supply	Water supply reliability	4	16.5%
	Water conservation	2	
	Conjunctive use	4	
Water Quality	Support of TMDL compliance	3	6.5%
	Increased runoff infiltration/treatment	3	
	NPS pollution control	2	
	Reestablish natural drainage patterns	2	
Flood Control	Decreased flooding risk	7	8.2%
	Reduced sanitary sewer overflows	3	
Environmental	Environmental habitat protection/improvement, via i. Wetland enhancement/creation ii. Riparian enhancement and/or iii. Instream flow improvement	4	10.4%
	Reduced energy use, greenhouse gas emissions or provide carbon sink	1	
	Reestablish natural hydrograph	3	
	Increased urban green space	1	
	Improve water temperatures	1	

Community	Employment opportunities	2.5	5.5%
	Community involvement	2.5	
	Public education	2.5	
	Enhance/create recreational opportunities and public use areas	2.5	
DAC	Direct benefit to DAC	10	10.1%
Cost	Project capital cost	10	5.2%
Project Development	Use of metrics driven approach	5	4.3%
	Provides regional benefits	5	
Project Readiness	Ready to implement	2	2.0%
	Cost well defined	2	
	Land owned by public agency	2	
	Environmental permitting complete	2	
	Funds available for 50% match	2	

Benefits assessment is done in a standardized, quantitative manner whenever possible, using modeled outputs to measure potential storm water runoff and pollutant loading reductions. In cases where quantification of benefits cannot be inferred directly from project design parameters and standard methods or these are not appropriate, other qualitative information has been provided by project proponents (e.g. to specify project readiness or degree of community involvement). In these cases, metrics are structured to reflect a lesser degree of precision form this type of information, often relying on a binary yes/no value. In this way, the precision of each metric is designed to match the resolution of the information available.

5.4. Water Quality Analysis

The purpose of the water quality analysis is to estimate the current level of water quality impacts to prioritize actions and provide a basis to assess anticipated project water quality benefits. There are significant practical challenges to using monitoring data to define priorities or reliably quantify the effectiveness of conservation efforts (Tomer and Locke, 2011). Monitoring costs severely limit the spatial and temporal extent of measurements relative to management information needs for reporting to regulators and making resource allocation decisions (Maheepala et al., 2001). Monitoring designs commonly fail to maximize the ability to detect changes distinct from natural variations (Karr, 1999). Therefore, both planning processes, and compliance reporting often relies upon modeled estimates of baseline conditions and action benefits.

As described in the sections above, water quality metrics used in the Spatial Prioritization analysis rely upon model-based outputs that specify the degree of existing water quality impacts at multiple spatial scales. Whenever feasible, the same method was used to estimate water quality benefits for each project so that benefits estimates align with the baseline water quality impacts. In this way, benefits can be reliably combined to yield comparable estimates of cumulative storm water reduction and water quality benefits from multiple projects within the same watershed. Runoff and pollutant modeling was

conducted at two scales – for regional subwatersheds (HUC 12) and urban catchments. Regional subwatershed pollutant loading was used in the Water Quality Spatial Prioritization, and the outputs are shown in Figure 5-3.

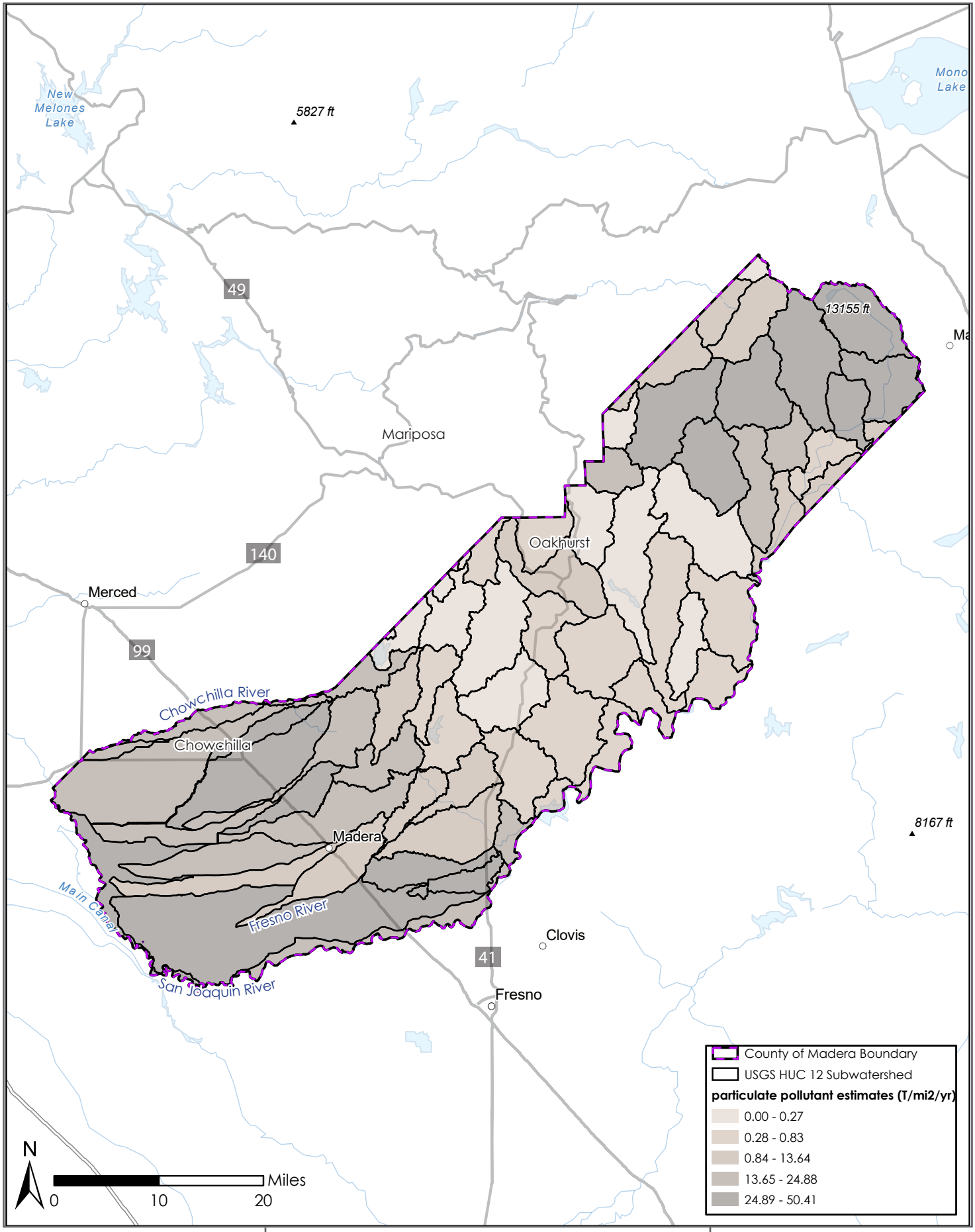
Urban catchments were mapped for the urbanized areas in the Valley Floor areas of Madera County using high resolution DEM and spatial data on storm drain infrastructure provided by the City and County of Madera. This catchment mapping exercise was required for urban storm water modeling, and provides the hydrographic infrastructure for ongoing water quality assessment and progress tracking. Baseline runoff and pollutant loading estimates from the swTELR model are shown in Figure 5-4 and Figure 5-5. They illustrate spatial patterns of unmitigated storm water impacts at the urban catchment scale throughout the urban areas of southern Madera County. Darker shaded catchments represent areas with the greatest opportunity for storm water infiltration and pollutant loading reductions and contribute to a higher prioritization score in the Spatial Prioritization Analysis. These tend to be more densely populated impervious areas within the cities.

The National Pollutant Discharge Elimination System (NPDES) and associated municipal separate storm sewer system (MS4) permits require that storm water management programs protect downstream surface water quality and reduce pollutant discharge to the maximum extent practicable (USEPA, 2014). The County of Madera, the City of Madera, and the City of Chowchilla are all required to provide annual reporting to satisfy MS4 permit compliance. Outputs from swTELR satisfy several MS4 permit compliance requirements such as E.9.a and E.14.a-b of the CA State Phase II MS4 General Permit.[23]

Project runoff and pollutant load reduction estimates are based on the design specification of projects, BMP types, and drainage characteristics. The water quality benefits of specific projects and BMPs are described in Section 6 as part of the Identification and Prioritization of Projects. With a structure in place to prioritize projects in areas with the greatest storm water runoff and water quality impacts, that also have the greatest benefits, the County can identify projects that provide the most efficient path to reach water quality and water supply impact reduction goals and that preserve or restore natural watershed processes throughout the region.

In addition to modeled runoff and pollutant loading estimates, water quality metrics include impaired waterbodies from SWRCB data (Figure 5-6) and soil erodibility estimated via the Revised Universal Soil Loss Equation to create a composite score (Figure 5-7). Metrics are generally normalized by subwatershed area, so that outputs are independent of watershed size, providing outputs that readily illustrate spatial patterns of water quality impacts. In combination with the swTELR model outputs, these data create a composite score to quantify the overall opportunity for water quality improvements throughout the County.

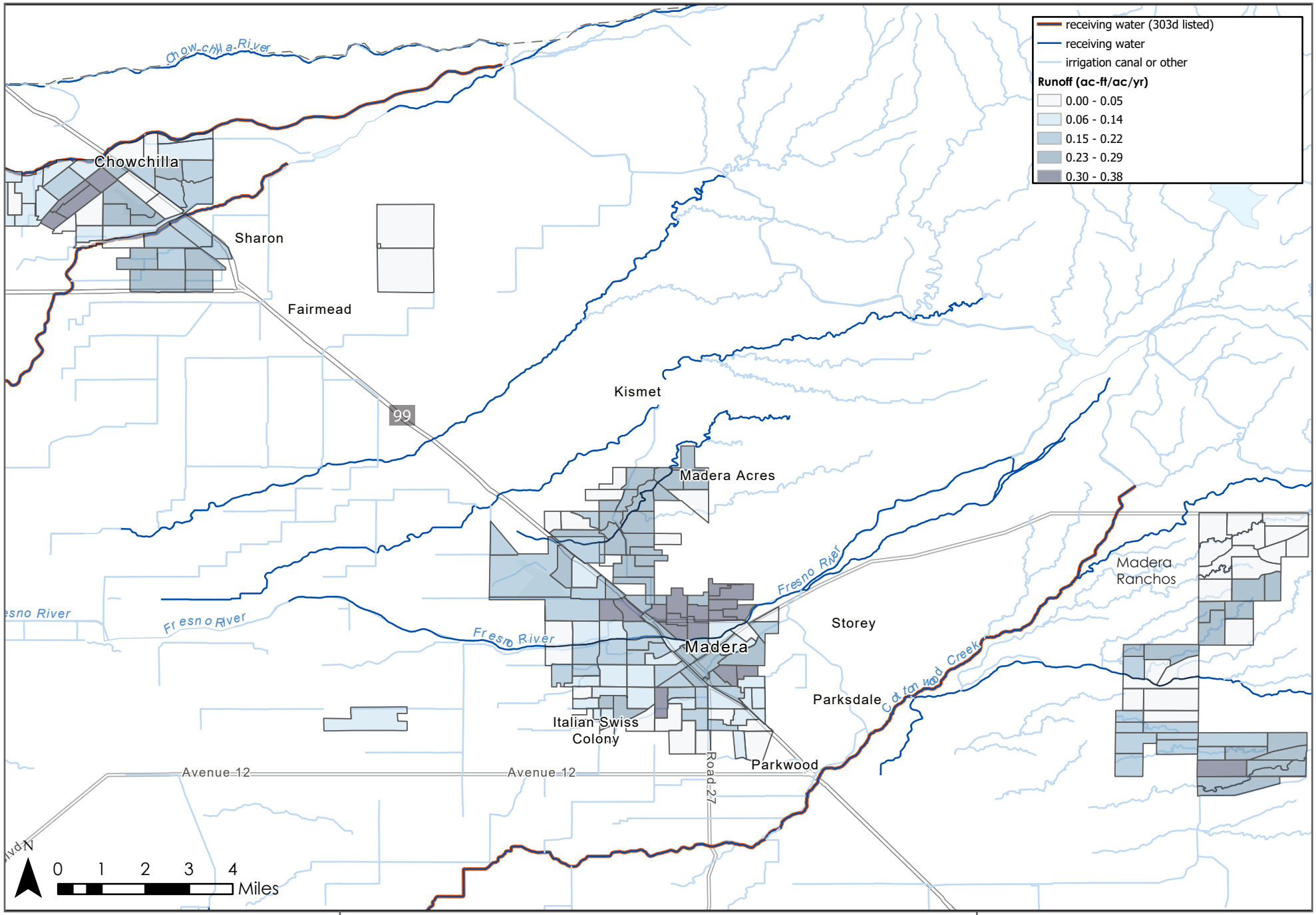
[23] Use of the BMP inventory and inspection tools linked with swTELR facilitate the achievement of several other BMP inspection, maintenance and performance requirements as recognized in the Central Coast Region. Municipalities are adopting the 2NFORM storm water suite (www.2nform.com) to move towards a more efficient, standardized way for to fulfill requirements related to catchment mapping, asset inventory, BMP benefit condition assessment and quantification, and ultimately more efficient storm water management programs.



2NDNATURE LLC
www.2ndnaturellc.com

Particulate pollutant loads estimated via the regionally adjusted swTELR model for HUC 12 subwatersheds. Darker shaded catchments indicate relatively higher loading rates.

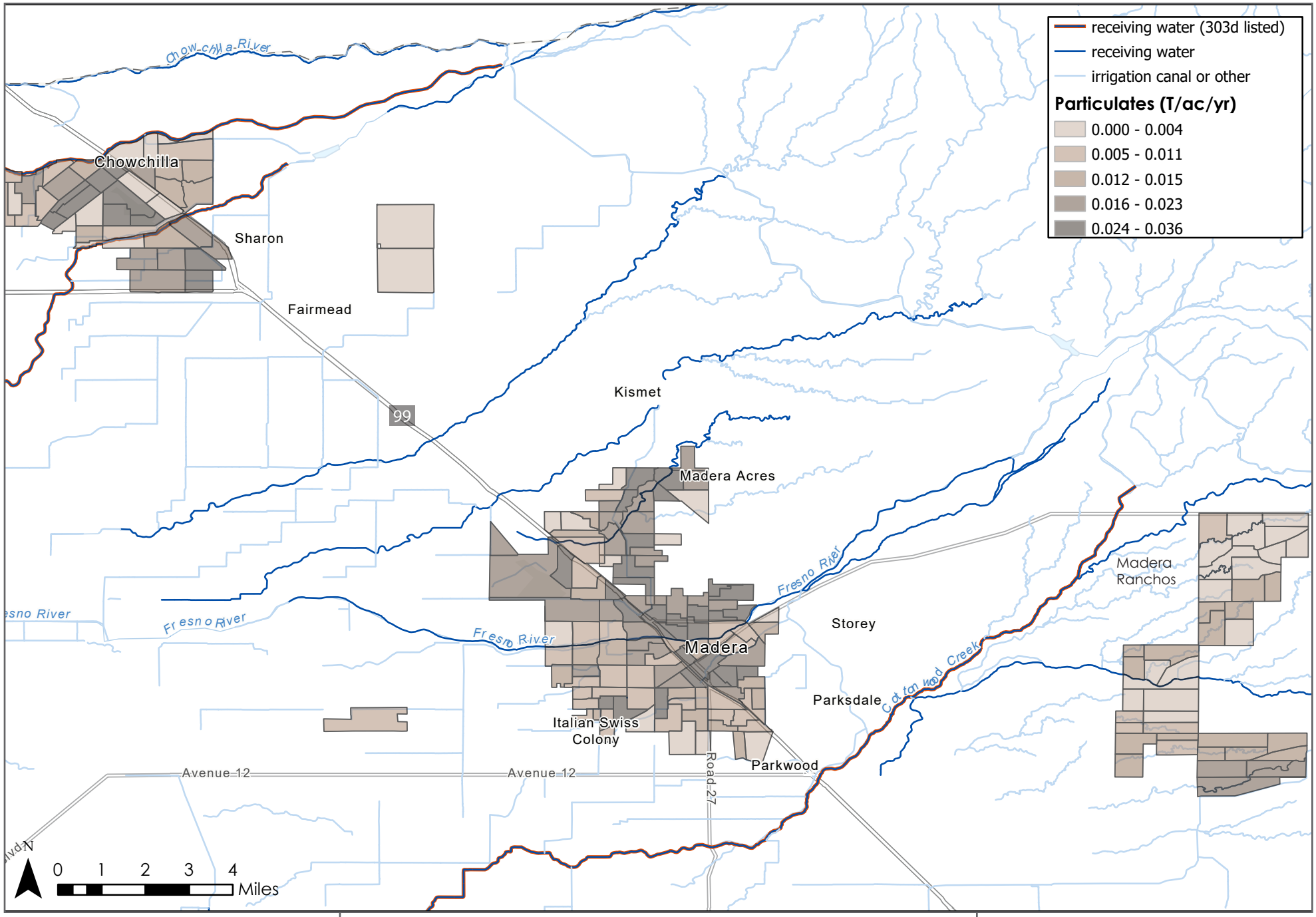
Figure 5-3



2NDNATURE LLC
www.2ndnaturellc.com

Runoff estimates from the swTELR model for urbanized areas in the Southern Madera County. Darker shaded catchments represent relatively higher stormwater runoff rates.

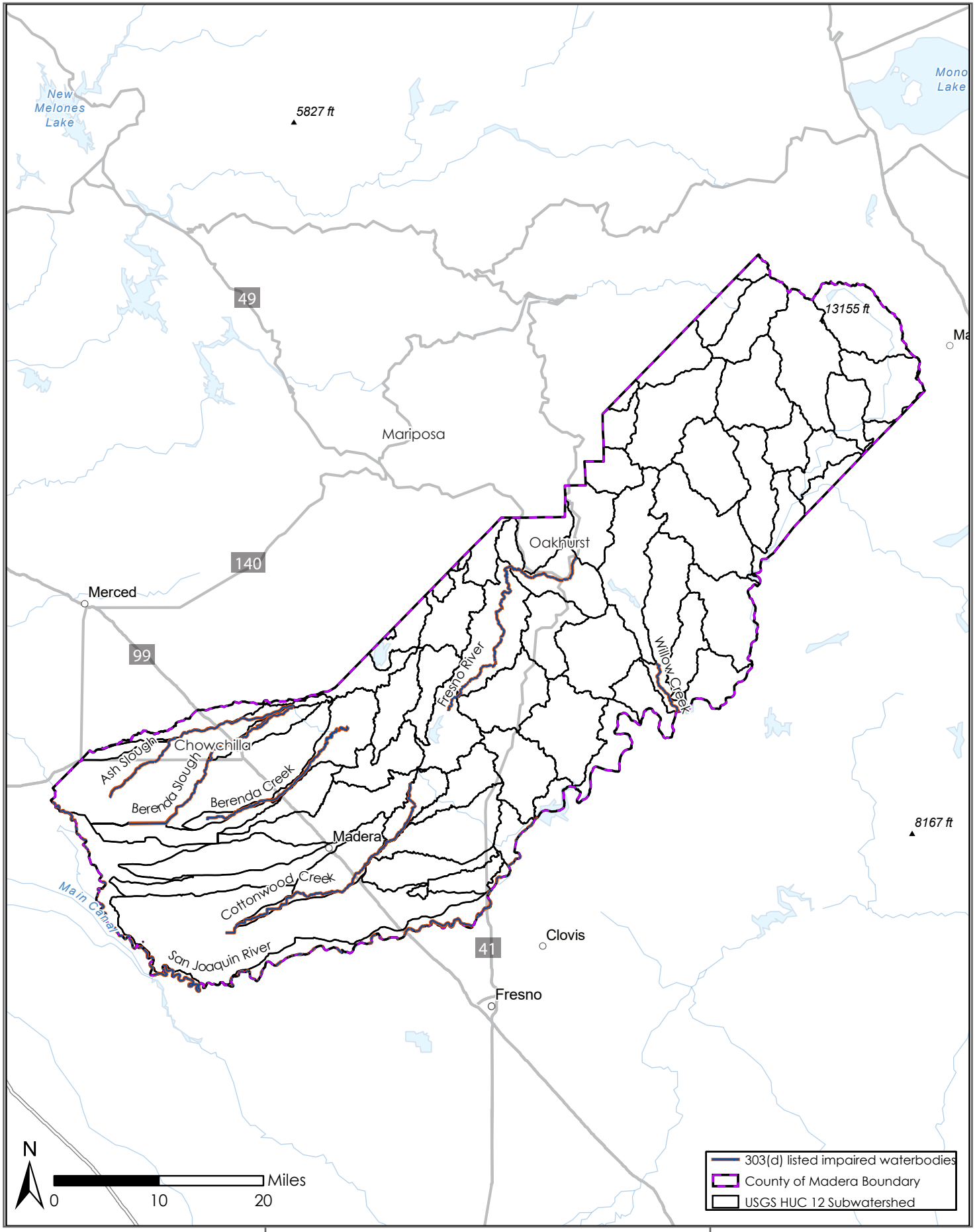
Figure 5-4



2NDNATURE LLC
www.2ndnaturellc.com

Particulate pollutant load estimates from the swTELR model for urbanized areas in Southern Madera County. Darker shaded catchments represent relatively higher pollutant loading rates.

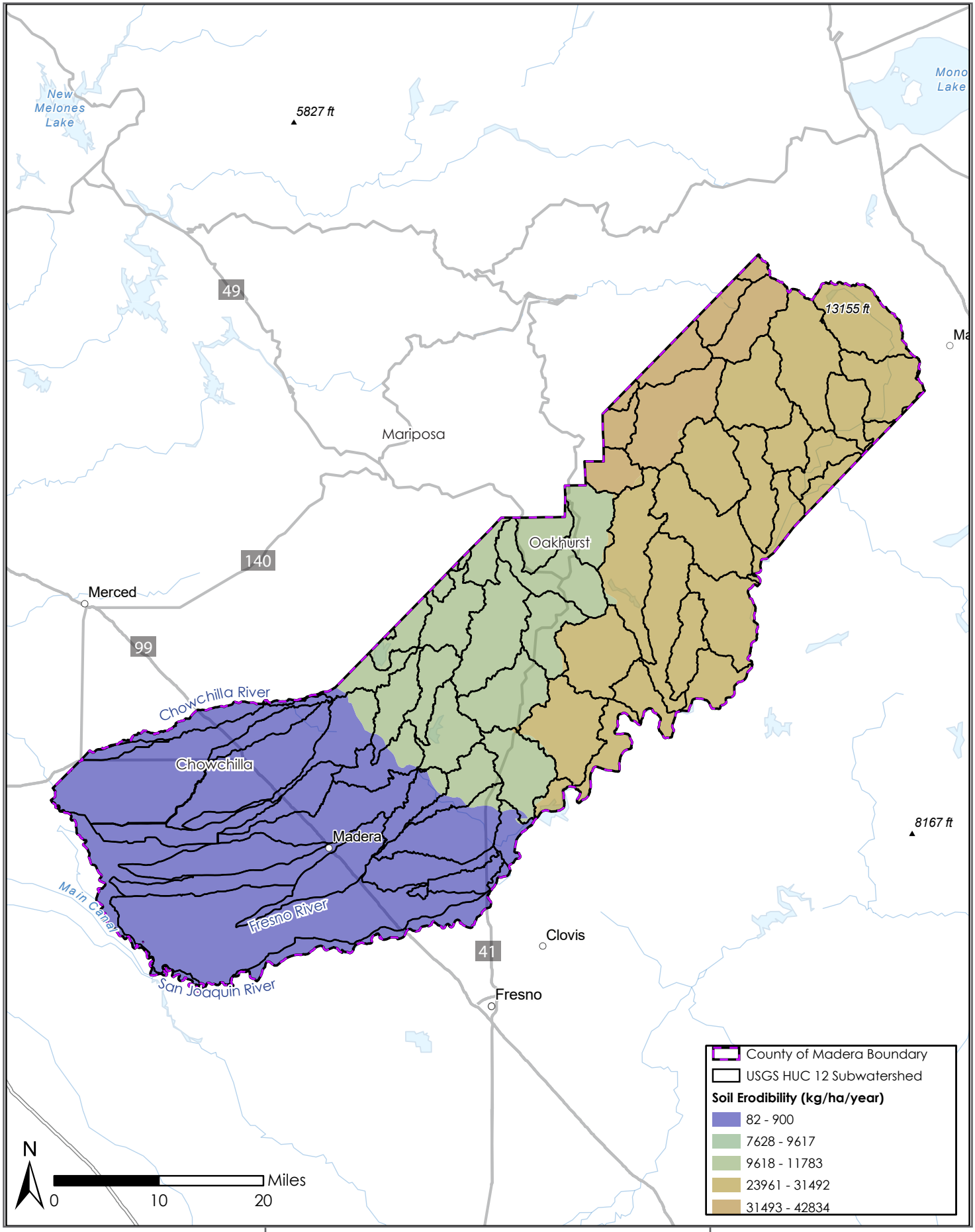
Figure 5-5



2NDNATURE LLC
www.2ndnaturellc.com

Impaired Waterbodies (303d listed) within Madera County for HUC 12 subwatersheds.

Figure 5-6



2NDNATURE LLC
www.2ndnaturellc.com

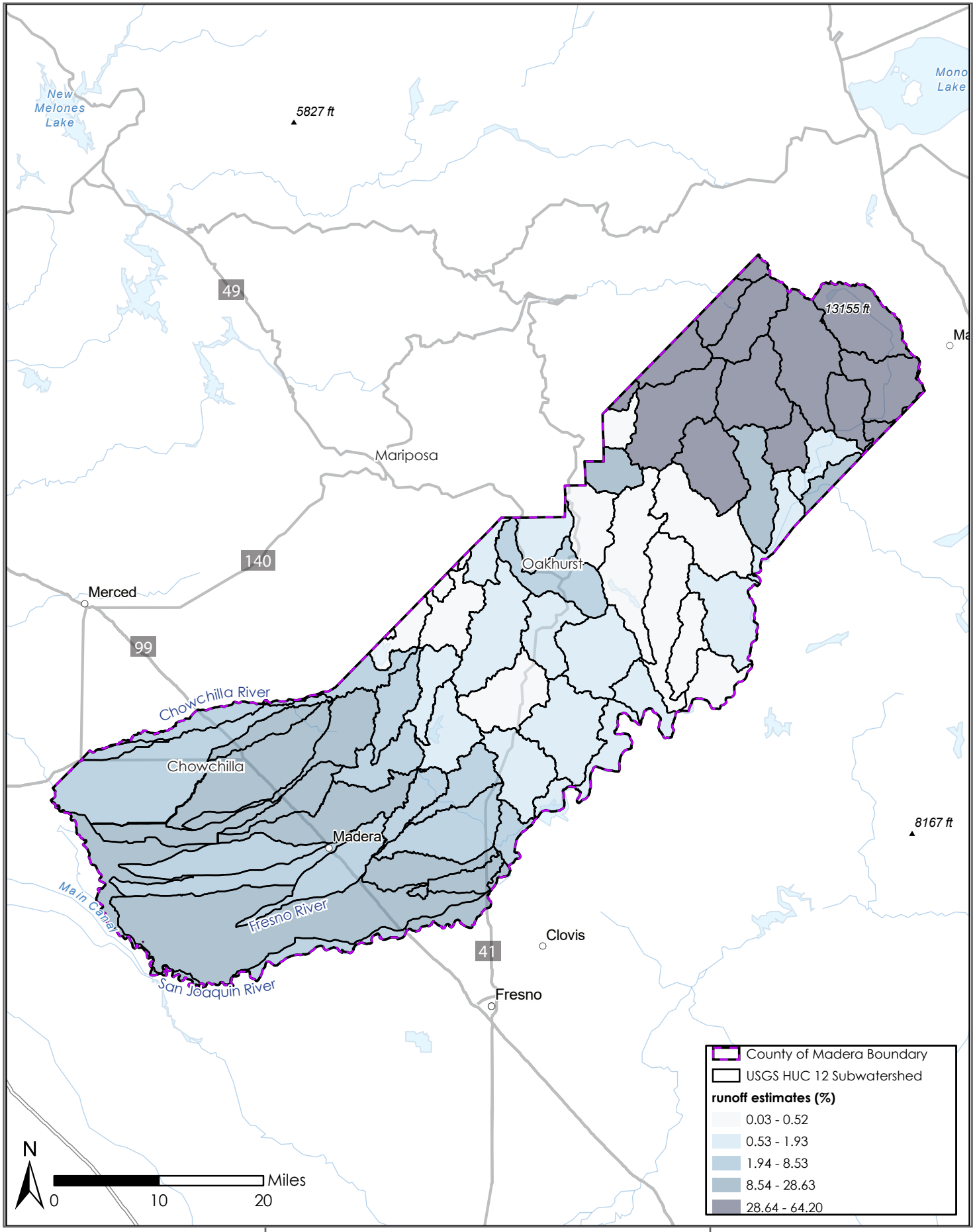
Erosion potential based on the Revised Universal Soil Loss Equation (RUSLE) for HUC 12 subwatersheds.

Figure 5-7

5.5. Storm Water Capture and Reuse Analysis

Storm water capture and reuse projects can provide the largest overall value when they yield large storm water volumes captured in areas where storm water runoff is shown to be relatively high. Like the Water Quality Analysis, the Storm Water Capture and Reuse Analysis uses outputs from the swTELR storm water model (with regional modifications described in Section 5.2) to identify priority areas where storm water runoff is relatively high. Within regional subwatersheds and urban catchments, the model runoff timing is based on the USDA Velocity Method to calculate time of concentration and peak flow magnitude and timing.

Runoff estimates from baseline swTELR outputs along with drainage area and BMP specifications are used in the swTELR model to estimate storm water capture benefits. Storm water and dry weather flow reuse estimates are specified within project descriptions and are not modeled explicitly in swTELR. The regional subwatershed scale (HUC 12) storm water runoff outputs are shown in Figure 5-8. Darker shaded areas represent greater runoff per unit area of the watershed and indicate subwatersheds with the greatest opportunities for storm water capture and reuse. High relative runoff rates are usually driven by soil types with lower infiltration rates and higher proportions of landscape disturbance such as urbanization or crop cultivation. Runoff rates also tend to be higher in mountainous areas of the County where substantial proportions of precipitation are delivered as snowfall and subsequently transformed to runoff during spring and summer snowmelt events. At elevations above approximately 6,000 ft., annual runoff ratios in the region have been measured to range from 26% to 53% (Hunsaker, et al. 2012). While these subwatersheds represent storm water infiltration opportunities in terms of pure runoff volumes available, since excess runoff is not due to human disturbance other potential Multi-Benefits associated with storm water capture would not be realized, which is reflected in the overall mitigation opportunity score (see Figure 5-2).



2NDNATURE LLC
www.2ndnaturellc.com

Runoff estimates from the regionally adjusted swTELR model for HUC 12 subwatersheds. Darker shaded subwatersheds represent relatively higher runoff rates.

Figure 5-8

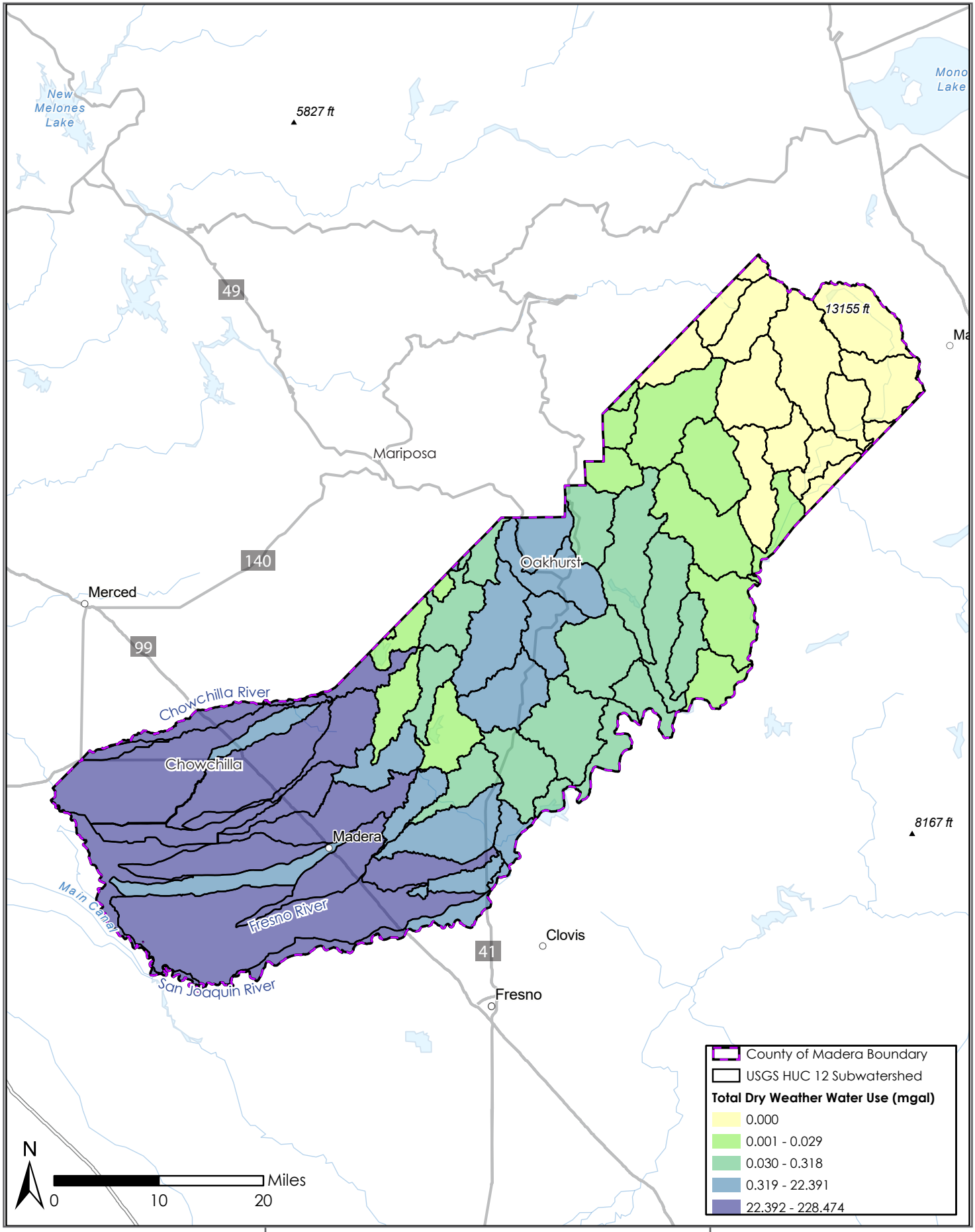
5.6. Water Supply and Flood Management Project Analysis

The purpose of using the Spatial Prioritization Analysis in conjunction with the Project Multi-Benefits Assessment is to identify areas that will maximize water supply augmentation and/or flood risk reduction. Water Supply and Flood Management opportunities were quantified using the regionally modified swTELR storm water model to estimate both opportunities and potential project benefits in terms of storm water runoff and infiltration using the methods described above to quantify storm water capture and reuse, along with other metrics that quantify water supply and flooding impacts/opportunities (see Table 5-3). Dry season water use for residential, agricultural, and industrial users derived from the USGS and the USDA data were used to quantify total dry season water use impacts to local groundwater aquifers. Figure 5-9 illustrates that total dry season water use is substantially higher in subwatersheds located in the southern portion of the County, primarily driven by agricultural cultivation. Groundwater recharge potential was quantified using data from the CA Water Institute derived from the NRCS STATSGO and SSURGO datasets[24] based on drainage class and slope/storage index. Figure 5-10 shows areas of high groundwater recharge potential. For the spatial prioritization analysis, regional subwatersheds were scored per the areal proportion of each subwatershed with groundwater recharge areas. Groundwater level reductions were quantified using average fall groundwater elevation change form 2011- 2016 as shown in Figure 5-11derived from the Groundwater Information Center. The spatial prioritization analysis used the average groundwater elevation change in each subwatershed. Subsidence data from USGS measurements was used as an additional metric to characterize groundwater basin impacts shown in Figure 5-12. Since impervious surfaces impede infiltration of storm water and recharge of groundwater basins, impervious cover was used as the final metric to quantify water supply impacts, but was weighted lower compared to other metrics (see Appendix 2).

Flood management opportunities were quantified according to the FEMA National Flood Hazard spatial data layer with the spatial prioritization metric calculated using the proportion of regional subwatersheds within FEMA specified 'High Risk' flood zones (Figure 5-13).

Whenever technically feasible, water supply reliability, water conservation, and conjunctive use metrics associated with water supply benefits were quantified using modeled outputs from swTELR to estimate storm water runoff volumes captured and available for infusion into dry wells or other groundwater recharge projects; as were decreased flood risks. When unique project implementation parameters provided barriers to direct use of the swTELR model, quantification of benefits relied more strongly on design specifications and information provided by the project proponents along with simpler methods to calculate benefits or ad-hoc use of swTELR model components. In each case, runoff and pollutant reduction benefits calculated for specific projects depend primarily on the storm water runoff available for infiltration and the capacity of individual projects to infiltrate storm water based on their storage capacity and specified infiltration rates of either BMP media or local soils. These calculated volumes provide objective, quantitative estimates of storm water volumes available to recharge groundwater aquifers that is standardized across the County and this can be used to estimate the cumulative recharge from several projects.

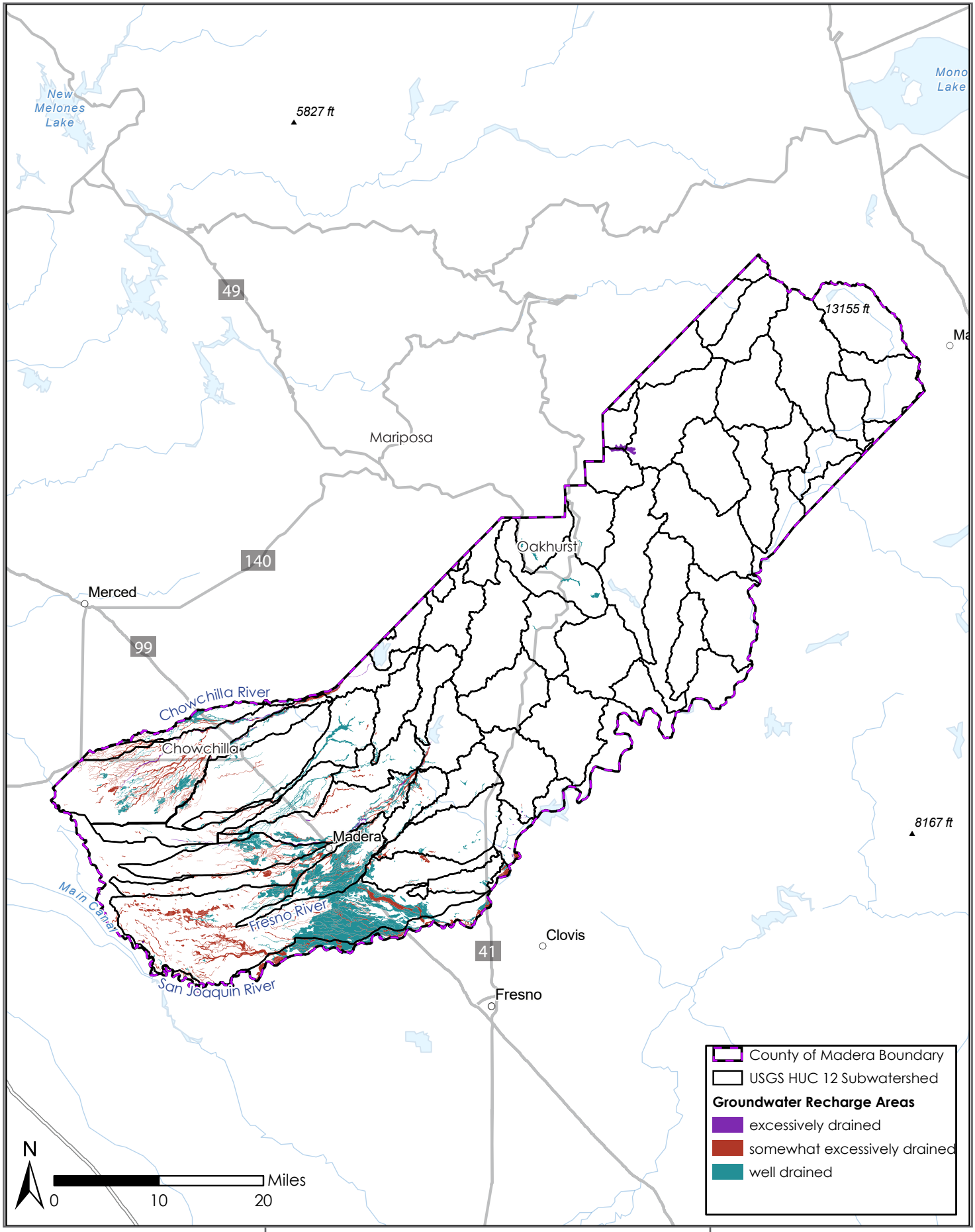
[24] https://www.epa.gov/enviroatlas/forms/enviroatlas-data-download



2NDNATURE LLC
www.2ndnaturellc.com

Total dry weather water use for HUC 12 subwatersheds. (Source: https://www.epa.gov/enviroatlas/forms/enviroatlas-data-download)

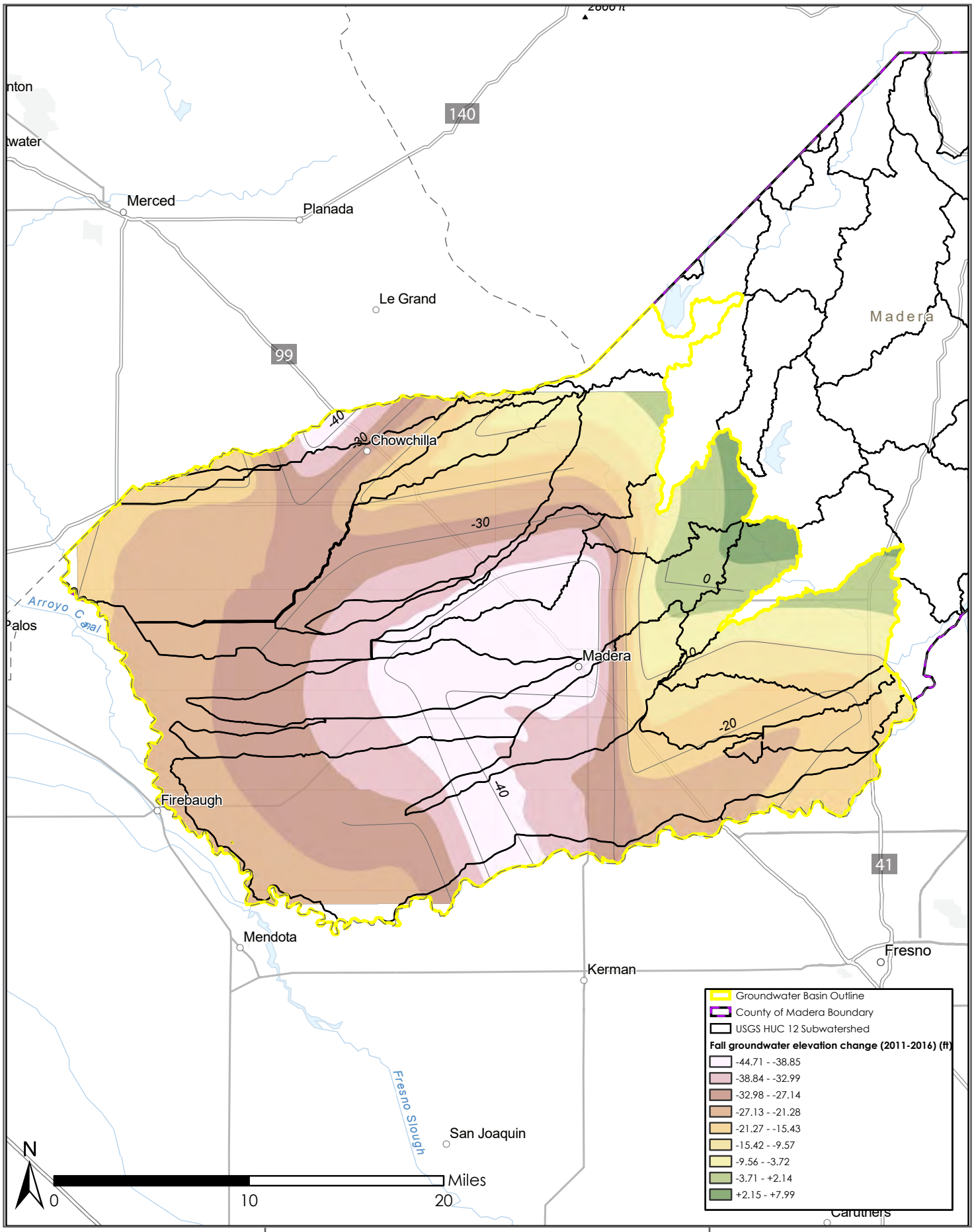
Figure 5-9



2NDNATURE LLC
www.2ndnaturellc.com

Groundwater recharge areas within HUC 12 subwatersheds. (Source: https://www.epa.gov/enviroatlas/forms/enviroatlas-data-download)

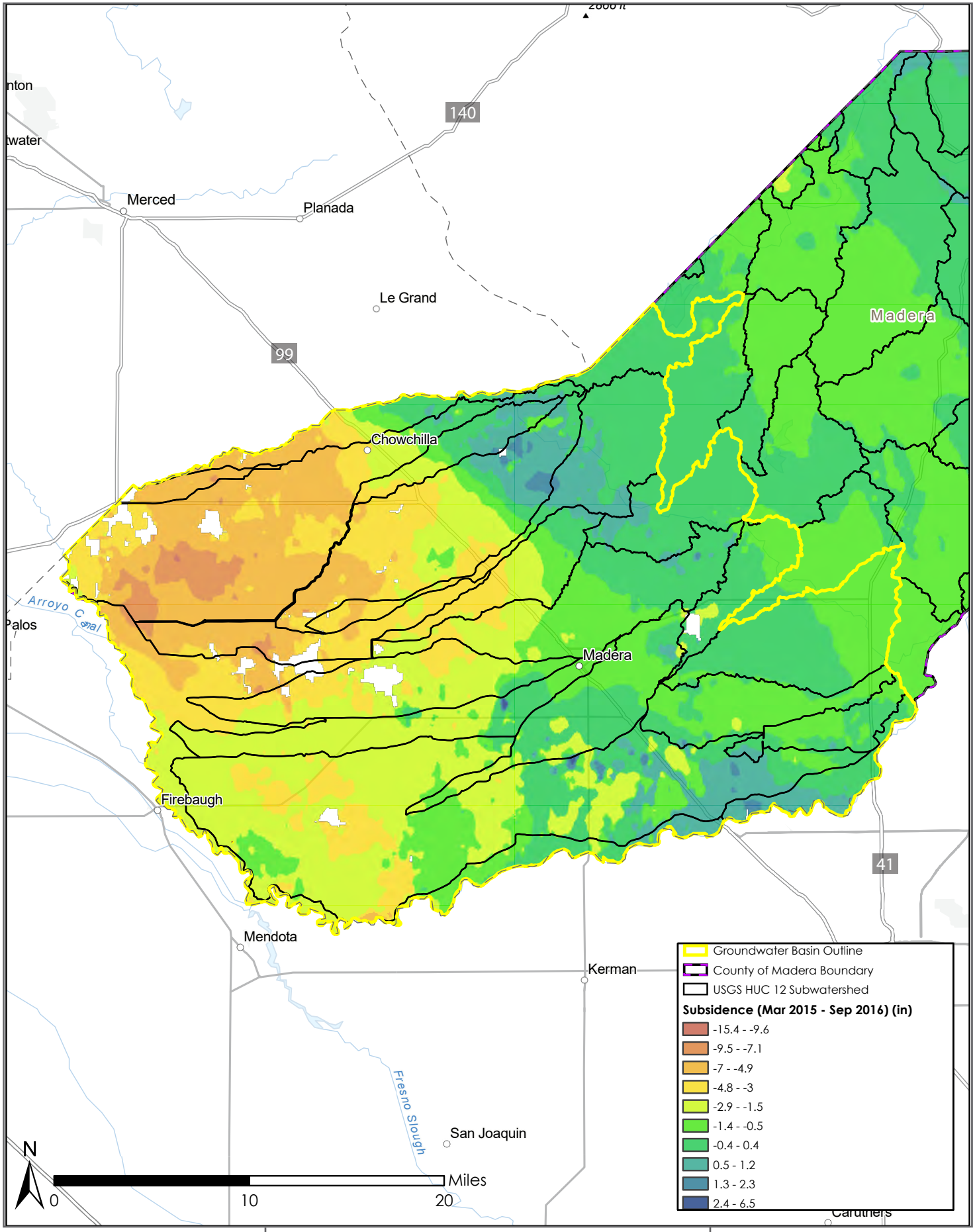
Figure 5-10



2NDNATURE LLC
www.2ndnaturellc.com

Fall groundwater elevation change for 2011-2016. (Source: https://gis.water.ca.gov/app/gicima)

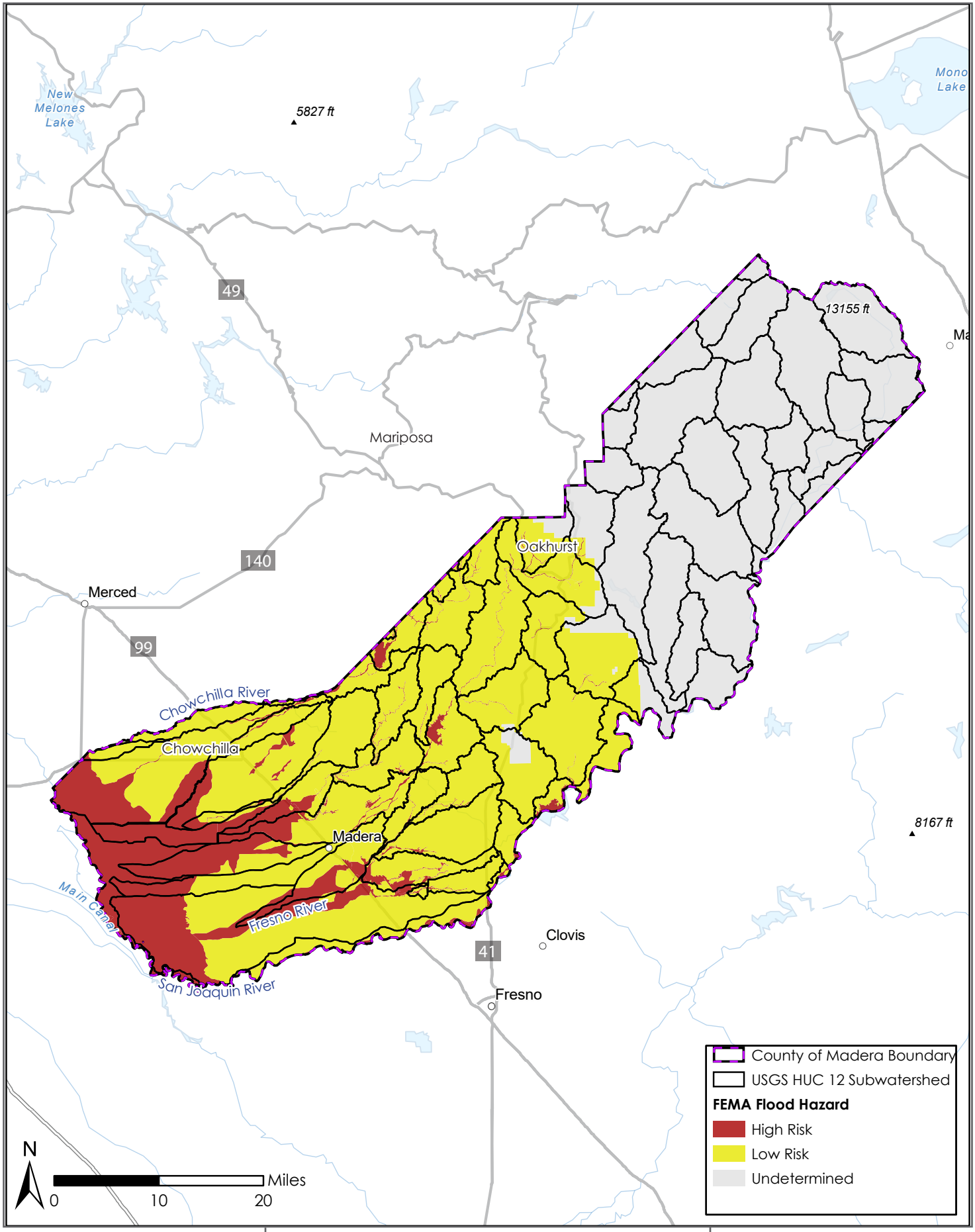
Figure 5-11



2NDNATURE LLC
www.2ndnaturellc.com

Subsidence areas in Southern Madera County. (Source: https://ca.water.usgs.gov/land_subsidence/central-valley-subsidence-data.html)

Figure 5-12



2NDNATURE LLC
www.2ndnaturellc.com

FEMA Flood Hazard areas in Madera County. (Source: https://fema.maps.arcgis.com/home/index.html)

Figure 5-13

5.7. Environmental and Community Benefit Analysis

Environmental and community benefits were quantified in a manner that is intended to be inclusive of a diversity of benefit types and match the quality of information available to quantify them. Because assessment of environmental and community benefits can be very complex, there is substantial uncertainty associated with their estimation. As such, metrics associated with these benefit types rely upon either a count value or a binary yes/no rather than attempting to more precisely quantify benefit magnitude with insufficient information to do so in a robust manner. Environmental benefits metrics included in the Project Multi-Benefits Assessment included environmental habitat protection or improvements, such as wetland, riparian, or instream flow enhancements; reductions of energy impacts via energy use reductions, greenhouse gas emission reductions, or carbon uptake; restoration of the natural hydrologic patterns; increases of urban green space; and water temperature improvements. When projects clearly demonstrated the capacity to provide these environmental benefits, they were awarded points for one or more of these metrics.

Community benefits were quantified in terms of the estimated number of employment opportunities created, community involvement opportunities created, individuals reached by public education and outreach efforts and enhancement or creation of recreational and public use areas. The Disadvantaged Community (DAC) benefits metric relies upon a determination of whether the project location is within a DAC community Block Group, Tract, or Place per the data provided by the Disadvantaged Community Mapping Tool[25]. Projects received the maximum score for this metric if they were within any of these three types of delineated DAC areas.

Environmental and Community metrics are quantified as part of the Project Multi-Benefits Assessment, but omitted from the Spatial Prioritization Analysis. The Communality metrics were determined to be best assessed at the project site level during the Project Multi-Benefits Assessment rather than at the subwatershed scale. Environmental impacts weren't quantified in the Spatial Prioritization Analysis due to a lack of datasets with adequate spatial coverage throughout the County that would be required for consistent identification of levels of environmental impact over space. For example, several data sets are available to quantify hydro-ecological impacts, such as the California Rapid Assessment Method[26] , and the California Stream Condition index (Rehn et al., 2008), but both provide sparse coverage throughout the County, making them less appropriate for the Spatial Prioritization Analysis. While these data provide some information about problematic areas within the County, without greater coverage, results would be biased towards the few areas assessed.

Section 6 and Appendix 5 provide additional detail related to the environmental and community benefit analysis for specific projects. Table 6-2 provides a summary of the tangible and intangible benefits from each of the SWRP projects.

[25] https://gis.water.ca.gov/app/dacs/
[26] http://www.cramwetlands.org/

5.8. Data Management

5.8.1. Data Collection and Management

Data for the Spatial Prioritization Analysis were collated either from previous data compilation efforts such as the Madera IRWMP, or from their original sources which are documented in this Plan (see Table 4). Data and relevant metadata were transferred from County of Madera, City of Madera, and City of Chowchilla via an online file sharing system and collated into a geodatabase. Data sets from other sources used in the Spatial Prioritization Analysis were processed in GIS (e.g. clipping data to the Madera County boundary and subwatersheds) and compiled into the same geodatabase, as were the storm water model input and outputs data files. These files have been made available to the Stakeholder Group and the TAC for review, future reference, or other uses. These data are available on the same file server as GIS shapefiles or pdf map files, several of which are included as figures or appendices in this plan. The urban runoff and pollutant modeling results have also been made available to staff from the City of Madera, City of Chowchilla, and the County of Madera via the spatial web-based 2NFORM storm water tools platform[27] to facilitate ongoing access to the modeling data and dissemination of spatial outputs to mangers, Stakeholders, and the public to improve decision making communication and transparency.

Data used to determine metric weights were compiled from meeting notes in the case of the Stakeholder Group or an online survey in the case of the TAC. The data were processed and combined with the metrics using Microsoft Excel spreadsheets to determine project scoring for both the Spatial Prioritization Analysis and the Project Multi-Benefits Assessment. Outputs from the spreadsheet scoring calculations were used to generate the regional subwatershed storm water mitigation opportunity map (Figure 5-2) that are also included in the geodatabase. These spreadsheets were also used to generate scores for the Project Multi-Benefits Assessment and made available to the Stakeholder Group and the TAC via the same file sharing service as the spatial data to facilitate transparency of the scoring process.

Project description and specification data have been collected via a standardized form to collect information relevant to project prioritization. The first three projects submitted were processed through the scoring rubric and the preliminary results were presented to the TAC to solicit feedback on the metrics and scoring process. These data will be updated as the SWRP is updated and as new projects are submitted to the County for prioritization. These updates will also include a review of any new data available, assessment of appropriateness of these data for project prioritization, and identification of data gaps for either the Spatial Prioritization Analysis or the Project Multi-Benefits Assessment. Data gaps will be identified by comparing the information available with requirements for County-wide quantification of spatial opportunities and project benefits and review by Stakeholders. For example, currently, greater coverage of stream habitat data throughout the County would provide a better basis for quantification of current environmental impacts.

5.8.2. Integration into Existing Monitoring Efforts

The SWRP hydrographic framework creates the spatial infrastructure for integration of monitoring data with the project prioritization and progress tracking process. This spatial framework can be used to focus

[27] www.2nform.com

existing monitoring efforts to better understand existing impacts and/or progress towards storm water runoff and water quality goals. Additionally, the SWRP will be adopted as part of the Madera Integrated Regional Water Resources Plan (IRWMP) as part of the forthcoming IRWMP update. This will allow regional efforts to improve water quality conditions, water supply reliability, reduce flood risks, and enhance environmental habitats and local communities to be efficiently coordinated with local storm water mitigation efforts. In addition, it will provide a mechanism by which climate change impacts and benefits associated with storm water impacts and project benefits can integrate with watershed-scale efforts to improve climate change adaptation and mitigation.

6. Identification and Prioritization of Projects

This section describes the results of the quantitative and geospatial methods used to prioritize projects 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 in the County. This section identifies opportunities (1) to augment local water supply through groundwater recharge or storage of storm water and dry weather runoff; (2) for source control for both pollution and dry weather runoff volume, onsite and local infiltration, and use of storm water and dry weather runoff; (3) for projects that reestablish natural water drainage treatment and infiltration systems, or mimic natural system functions to the maximum extent feasible; (4) to develop, restore, or enhance habitat and open space through storm water and dry weather runoff management, including wetlands, riverside habitats, parkways, and parks; (5) 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. As applicable for new or redevelopment the SWRP identifies potential design criteria and BMPs 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.

6.1. Introduction

One of the primary Storm Water Resource Plan goals is to identify eligible storm water and dry weather runoff capture projects, and through inclusion in the SWRP, make these projects eligible for State bond monies. The projects presented in this section have been solicited from a diverse group of project proponents: public and private entities, private landowners, cities, not-for-profit organizations, and Madera County. Consistent with the SWRP guidelines, each of these projects has been evaluated based on its ability to achieve at least two or more Main Benefits and the maximum number of Additional Benefits as list in Table 4 of the Guidelines[28].

6.2. Project Solicitation

6.2.1. New Project Proposals

The timelines and process of soliciting Madera SWRP project proposals was announced and emailed to all project proponents identified in the initial Stakeholder Meeting #1 (Section 4). The Project Solicitation Form was used to solicit sponsors for all relevant storm water concepts and projects/programs currently being considered throughout Madera County. Additionally, the Project Solicitation Form collected basic information on concepts and projects/programs, and provided the opportunity for inclusion of all storm water related project types regardless of their current implementation status. A blank Project Solicitation Form is included in Appendix 3.

[28] Storm Water Resource Plan Guidelines, December 15, 2015

6.2.2. Ensuring Quality Input

A Project Solicitation Form was used to query quality control and present to the public for input. The Project Solicitation Form includes questions regarding water quality, water supply, flood management, environmental benefits, community and DAC benefits, as well as project cost and readiness. Additionally, projects were evaluated against criteria for Statewide Priorities, Program Preferences, and Water Plan Management Strategies. An introduction and instruction page accompany the Project Solicitation Form to ensure quality control, minimize translation errors and increase data usability. The Project Solicitation Form is included as Appendix 3.

All the projects submitted by Stakeholders were reviewed for inclusion into the Draft Final SWRP. After the initial solicitation period, only three (3) completed Project Solicitation Forms were submitted for consideration. As a result, the solicitation period was extended, and technical assistance provided to Stakeholders throughout the County to support and encourage development of additional project submissions. All the projects with sufficient information and detail available for inclusion in the SWRP were prioritized using Stakeholder input and criteria weights assigned during Stakeholder meetings (as described in Section 5). The prioritization criteria and weights were used to identify the projects of highest potential benefit and impact.

The Madera SWRP's decision-making process was transparent and efforts to communicate the process clearly were made at Stakeholder and TAC meetings. All Stakeholders were given opportunities to provide input and recommendations at meetings during the SWRP development. Comments from Stakeholders and the general public will continue to impact the decision-making process during plan implementation.

6.3. Introduction of Projects

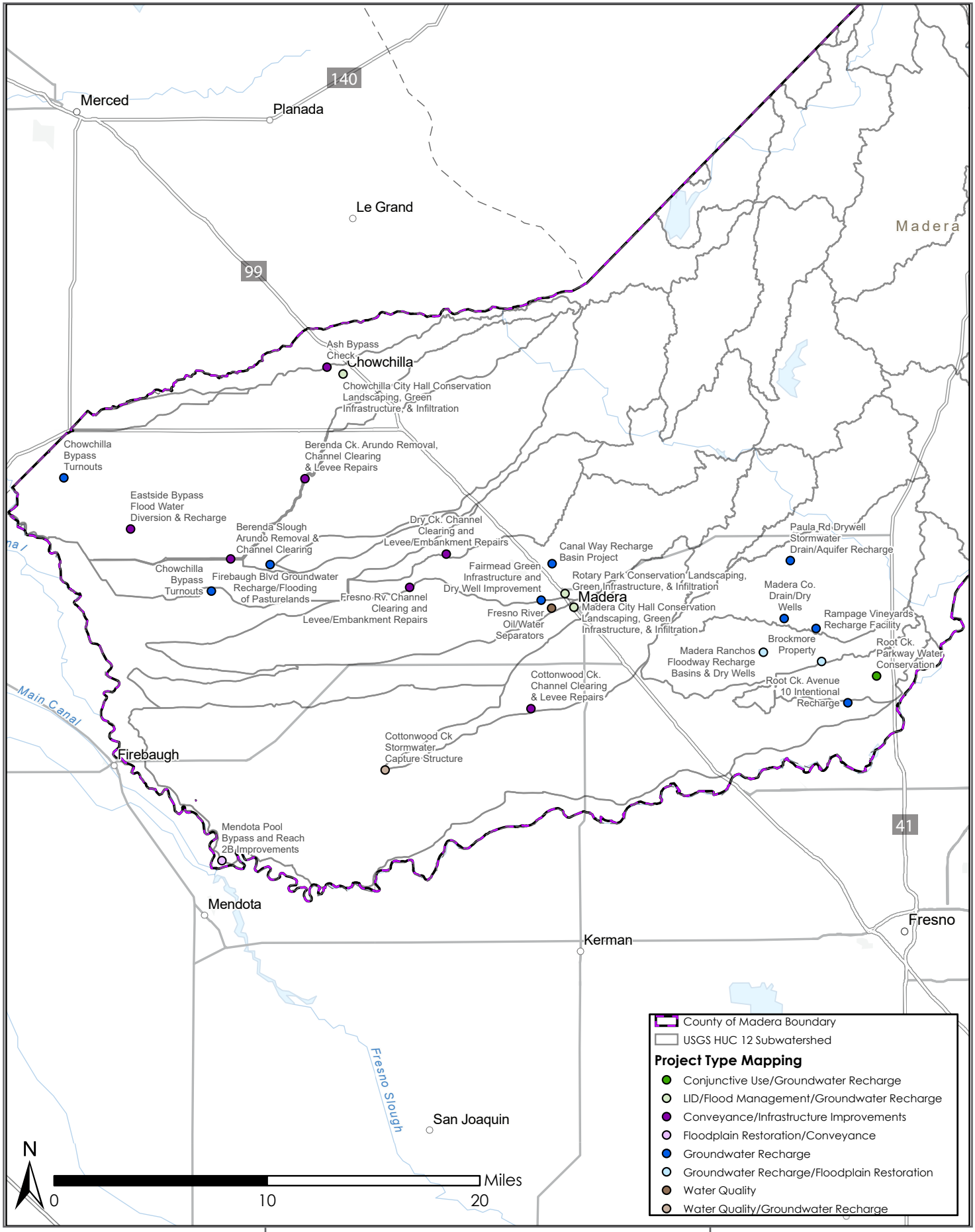
Project Solicitation Forms were collected for a total of 24 projects from 12 different Stakeholder groups or individuals. The Completed Project Solicitation Forms, which form the foundation of the SWRP project database, are included in SWRP Appendix 4. Table 6-1 identifies each of the projects within the County by the corresponding project number; it presents an unranked summary of the proposed projects, with the projects listed in order of their anticipated implementation or construction timeframe (i.e., those projects listed first are anticipated to be implemented soonest). Figure 6-1 identifies the project locations, names, and types. The SWRP Project locations generally align with the priority subwatersheds identified in the Spatial Prioritization Analysis as summarized in Figure 5-2. Table 6-2 summarizes the quantified multi-benefits where sufficient project information was available to estimate or describe the benefit.

Table 6-1. Unranked Summary of SWRP Projects

Project Number	Project Sponsor	Project Name	Project Type	Location Description	Latitude	Longitude
1	South East Madera County United (SEMCU)	Madera County Drain/Dry Wells	200 Dry Well Installations	Bounded by Hwy 41 on the East, Hwy 145 to the North, San Joaquin River to the South, and BNSF Railroad to the West	36.9539267 / -119.8860054 (Various, Approximate Centroid of Proposed Improvement Area)	
2	Root Creek Water District	Root Creek Avenue 10 Intentional Recharge Project	Groundwater Recharge	40 acres of an 80 acre Agricultural Field (orchard/tree crop) along Avenue 10, associated with the proposed Gateway Village development	36.896263	-119.832495
3	Root Creek Water District	Root Creek Parkway Water Conservation Project	Conjunctive Use/Groundwater Recharge	Root Creek Stream Corridor adjacent to the proposed Riverstone development	36.914348	-119.807926
4	U.S. Bureau of Reclamation	Mendota Pool Bypass and Reach 2B Improvements Project	Floodplain Restoration and Conveyance	From the Chowchilla Bypass Bifurcation Structure to below Mendota Dam	36.79056	-120.36361
5	Madera County Water and Natural Resources Department	Rampage Vineyards Recharge Facility	Recharge Basin	Township 11, range 19 East, portion of Sections 25, 26, 27, 36, Mount DiabloBaseline, Meridian / Avenue 13 to the South, Road 36 to the West amd Road 39 to the East	36.947	-119.859
6	Gabriel G Haney, Heather Haney	16824 Paula Rd Drywell Stormwater Drain/Aquifer Recharge	Dry Well	West side of property 16824 Paula Rd, Madera	36.993389	-119.880496
7	Hancock Farmland Services	Chowchilla Bypass Turnouts	Bypass Diversions for Groundwater Recharge	Left bank of Chowchilla Bypass, site 1: 1/4-mile south of Ave. 21 in Madera Co., site 2: 3/4-mile east of Hemlock Road in Madera Co.	37.05138889	-120.4975
					36.97416667	-120.3722222
8	Hancock Farmland Services	Eastside Bypass Flood Water Diversion and Recharge Project	Installation of Slant Pumps at three ranches to divert flood flows for groundwater recharge	Triangle T Ranch, Madera 23 Ranch, Madera 1 Ranch	37.0165085 / -120.4408141 (Various, Approximate Location)	
9	County of Madera	Madera Ranchos Floodway Recharge Basins and Dry Wells	Groundwater Recharge/Floodplain Restoration	North of Avenue 12 1/2, West of Road 35 1/2	36.9310424	-119.9038303
10	Madera County	Berenda Creek Arundo Removal, Channel Clearing and Levee Repairs	Conveyance / Infrastructure Improvements	Berenda Creek between Avenue 20 1/2 and Road 14	37.0506015 / -120.2925516 (Various, Approximate Location)	
11	Madera County	Berenda Slough Arundo Removal and Channel Clearing	Conveyance Improvements	On Berenda Slough between Rd 17 and Road 9	36.9960488 / -120.3558388 (Various, Approximate Location)	
12	Madera County	Cottonwood Creek Channel Clearing and Levee Repairs	Conveyance / Infrastructure Improvements	Cottonwood Creek between Rd 29 and Road 20	36.8934473 / -120.1013015 (Various, Approximate Location)	
13	Madera County	Dry Creek Channel Clearing and Levee/Embankment Repairs	Conveyance / Infrastructure Improvements	Dry Creek between Rd 24 and Road 17	36.9989690 / -120.1726589 (Various, Approximate Location)	
14	Madera County	Fresno River Channel Clearing and Levee/Embankment Repairs	Conveyance / Infrastructure Improvements	On the Fresno River between Rd 28 1/2 and Road 9	36.9764176 / -120.2038628 (Various, Approximate Location)	

Table 6-1. Unranked Summary of SWRP Projects (continued)

Project Number	Project Sponsor	Project Name	Project Type	Location Description	Latitude	Longitude
15	Chowchilla Water District	Ash Bypass Check	Infrastructure Improvements to Facilitate Conveyance and Recharge	On Ash Slough near Avenue 26 in Chowchilla	37.126567	-120.273611
16	County of Madera	Canal Way Recharge Basin Project	Groundwater Recharge	North of Temple Drive, West of Canal Way	36.9921594	-120.0828059
17	Madera County Water and Natural Resources Department	Cottonwood Creek Stormwater Capture Structure	Stormwater Recharge	Intersection of Ave 7 and Road east 1 mile, south by 1/2 mile, where Cottonwood Creek runs through property	36.8520504	-120.2251301
18	City of Chowchilla	Chowchilla City Hall Conservation Landscaping, Green Infrastructure, and Storm Water Infiltration Project	Low Impact Development/Flood Management/Recharge	Trinity Avenue and S 2nd Street	37.1218611	-120.2599295
19	City of Madera	Rotary Park Conservation Landscaping, Green Infrastructure, and Storm Water Infiltration Project	Low Impact Development/Flood Management/Recharge	Southeast of Avenue 15 1/2, Southwest of N Gateway Drive	36.9717416	-120.0719338
20	City of Madera	Madera City Hall Conservation Landscaping, Green Infrastructure, and Storm Water Infiltration Project	Low Impact Development/Flood Management/Recharge	4th and N H St	36.9624452	-120.0644422
21	City of Madera	Fresno River Oil/Water Separators	Oil/Water Separators	Location and Number To be confirmed	36.9679048 / -120.0830609 (Various, One Approximate Location)	
22	Gravelly Ford Water District	Firebaugh Boulevard Groundwater Recharge/Flooding of Existing Pasturelands	Groundwater Recharge	North of Firebaugh Boulevard adjacent to the Chowchilla Canal Bypass	36.9921594	-120.3223127
23	Fairmead Community and Friends	Community of Fairmead Green Infrastructure and Dry Well Improvement Projects	Green Infrastructure/Dry Wells/Community Drainage Improvements	Community of Fairmead, East of Highway 99, Chowchilla, CA	36.9679048 / -120.0830609 (Various, One Approximate Location)	
24	County of Madera	Brockmore Property	Groundwater Recharge/Floodplain Restoration	North of Avenue 12, East of Road 38	36.9245081	-119.8545023



2NDNATURE LLC
www.2ndnaturellc.com

SWRP Project Locations

Figure 6-1

Table 6-2. Quantified Project Specific Multi-Benefits

Project Number	Project Sponsor	Project Name	Water Quality Benefits	Water Supply Benefits	Flood Management Benefits	Environmental and Habitat Enhancement Benefits	Community Stewardship Benefits	Timeline	Cost
1	South East Madera County United (SEMCU)	Madera County Drain/Dry Wells	2,000 - 10,000 AF/yr	2,000 - 10,000 AF/yr	2,000 - 10,000 AF/yr	Reduction of Nuisance Flooding	Community Education and Employment During Construction	2017/2018	$100k - $1M
2	Root Creek Water District	Root Creek Avenue 10 Intentional Recharge Project	Yes	1,000 AF/yr	1,000 AF/yr, 50 cfs	Create 40 ac of Wetland Enhancement and Urban Green Space	Employment During Construction	Construction 2018-2019	$1M - $10M
3	Root Creek Water District	Root Creek Parkway Water Conservation Project	1,000 AF/yr	1,000 AF/yr	1,000 AF/yr	Create 150 ac of Wetland Enhancement and Urban Green Space	Employment During Construction	Construction 2018-2019	$1M - $10M
4	U.S. Bureau of Reclamation	Mendota Pool Bypass and Reach 2B Improvements Project	Yes	--	Yes	Improve instream flow up to 4,500 cfs	Employment ~10 years	Construction 2018-2028	>$10M
5	Madera County Water and Natural Resources Department	Rampage Vineyards Recharge Facility	Yes	Yes	Yes	--	Yes	Feasibility Study Complete 2018-2019	$100k - $1M
6	Gabriel G Haney, Heather Haney	16824 Paula Rd Drywell Stormwater Drain/Aquifer Recharge	Yes	Yes	Yes	--	Employment During Construction (5 people, 1-2 months)	Construction 2019	<$100k
7	Hancock Farmland Services	Chowchilla Bypass Turnouts	36,200 AF/yr	36,200 AF/yr	134 cfs	--	Employment During Construction	Construction 2019	$1M - $10M
8	Hancock Farmland Services	Eastside Bypass Flood Water Diversion and Recharge Project	25,700 AF/yr	25,700 AF/yr	90 cfs	--	Employment During Construction	Construction 2019	$1M - $10M
9	County of Madera	Madera Ranchos Floodway Recharge Basins and Dry Wells	159 AF/yr	159 AF/yr	159 AF/yr	0.5 acre floodplain restoration	Community Education and Employment During Construction	Construction 2020	$1M - $10M
10	Madera County	Berenda Creek Arundo Removal, Channel Clearing and Levee Repairs	Yes	100s of AF	100-500 cfs	Yes	Yes	Construction 2020	$1M - $10M
11	Madera County	Berenda Slough Arundo Removal and Channel Clearing	Yes	100s of AF	500-1500 cfs	Yes	Yes	Construction 2020	$1M - $10M
12	Madera County	Cottonwood Creek Channel Clearing and Levee Repairs	Yes	100s of AF	100-500 cfs	Yes	Yes	Construction 2020	$1M - $10M
13	Madera County	Dry Creek Channel Clearing and Levee/Embankment Repairs	Yes	100s of AF	500 cfs	Yes	Yes	Construction 2020	$1M - $10M
14	Madera County	Fresno River Channel Clearing and Levee/Embankment Repairs	Yes	100s of AF	1000-2500 cfs	Yes	Yes	Construction 2020	$1M - $10M
15	Chowchilla Water District	Ash Bypass Check	--	Yes	Yes	--	Employment During Construction	Construction 2020	$1M - $10M
16	County of Madera	Canal Way Recharge Basin Project	510 lb/yr TSS	31 AF/yr	0.2 AF/day	0.25-0.65 acre Urban Green Space	Community Education and Employment During Construction	Construction 2021	$1M - $10M

Table 6-2. Quantified Project Specific Multi-Benefits (continued)

Project Number	Project Sponsor	Project Name	Water Quality Benefits	Water Supply Benefits	Flood Management Benefits	Environmental and Habitat Enhancement Benefits	Community Stewardship Benefits	Timeline	Cost
17	Madera County Water and Natural Resources Department	Cottonwood Creek Stormwater Capture Structure	Yes	--	Yes	--	--	Construction 2022	<$100k
18	City of Chowchilla	Chowchilla City Hall Conservation Landscaping, Green Infrastructure, and Storm Water Infiltration Project	61 lb/yr TSS	0.5 AF/yr	0.5 AF/yr	Yes	Community Education and Employment During Construction	Construction 2025	$100k - $1M
19	City of Madera	Rotary Park Conservation Landscaping, Green Infrastructure, and Storm Water Infiltration Project	350 lb/yr TSS	74,320 gal/yr conserved	4.1 AF/yr	Yes	Community Education and Employment During Construction	Construction 2025	$100k - $1M
20	City of Madera	Madera City Hall Conservation Landscaping, Green Infrastructure, and Storm Water Infiltration Project	96 lb/yr TSS	120,140 gal/yr conserved	2.1 AF/yr	Yes	Community Education and Employment During Construction	Construction 2025	$100k - $1M
21	City of Madera	Fresno River Oil/Water Separators	Yes	--	--	--	Employment During Construction (5 people, 2 months)	Construction 2025	$1M - $10M
22	Gravelly Ford Water District	Firebaugh Boulevard Groundwater Recharge/Flooding of Existing Pasturelands	120,000 AF/yr	120,000 AF/yr	400 cfs	--	Employment During Construction (4 people, 6 months)	Construction 2025	>$10M
23	Fairmead Community and Friends	Community of Fairmead Green Infrastructure and Dry Well Improvement Projects	70,600 lb/yr TSS	200 AF/yr	200 AF/yr	1-2 acres of Urban Green Space across 9 sites	Community Education and Employment During Construction	Construction 2025	$1M - $10M
24	County of Madera	Brockmore Property	100 AF/yr	100 AF/yr	25 AF/yr	5 acres of Wetland Enhancement/Creation	Community Education and Employment During Construction	--	$1M - $10M

6.3.1. Opportunities and Benefits of Identified Projects

The following projects are opportunities to augment local water supply through groundwater recharge or storage of beneficial use of storm water and dry weather runoff:

- South East Madera County United (SEMCU), Madera County Drain/Dry Wells
- Root Creek Water District, Root Creek Avenue 10 Intentional Recharge Project
- Root Creek Water District, Root Creek Parkway Water Conservation Project
- Madera County Water and Natural Resources Department, Rampage Vineyards Recharge Facility
- Gabriel G Haney, Heather Haney, 16824 Paula Rd Drywell Storm Water Drain/Aquifer Recharge
- Hancock Farmland Services, Chowchilla Bypass Turnouts
- Hancock Farmland Services, Eastside Bypass Flood Water Diversion and Recharge Project
- County of Madera, Madera Ranchos Floodway Recharge Basins and Dry Wells
- Chowchilla Water District, Ash Bypass Check
- County of Madera, Canal Way Recharge Basin Project
- Madera County Water and Natural Resources Department, Cottonwood Creek Storm Water Capture Structure
- City of Chowchilla, Chowchilla City Hall Conservation Landscaping, Green Infrastructure, and Storm Water Infiltration Project
- City of Madera, Rotary Park Conservation Landscaping, Green Infrastructure, and Storm Water Infiltration Project
- City of Madera, Madera City Hall Conservation Landscaping, Green Infrastructure, and Storm Water Infiltration Project
- Gravelly Ford Water District, Firebaugh Boulevard Groundwater Recharge/Flooding of Existing Pasturelands
- Fairmead Community and Friends, Community of Fairmead Green Infrastructure and Dry Well Improvement Projects

The following projects will provide source control for both pollution and dry weather runoff volume, onsite and local infiltration, and use of storm water and dry weather runoff:

- South East Madera County United (SEMCU), Madera County Drain/Dry Wells
- Root Creek Water District, Root Creek Avenue 10 Intentional Recharge Project
- Root Creek Water District, Root Creek Parkway Water Conservation Project
- Madera County Water and Natural Resources Department, Rampage Vineyards Recharge Facility
- Gabriel G Haney, Heather Haney, 16824 Paula Rd Drywell Storm Water Drain/Aquifer Recharge
- County of Madera, Canal Way Recharge Basin Project
- Madera County Water and Natural Resources Department, Cottonwood Creek Storm Water Capture Structure
- City of Chowchilla, Chowchilla City Hall Conservation Landscaping, Green Infrastructure, and Storm Water Infiltration Project
- City of Madera, Rotary Park Conservation Landscaping, Green Infrastructure, and Storm Water Infiltration Project

- City of Madera, Madera City Hall Conservation Landscaping, Green Infrastructure, and Storm Water Infiltration Project
- City of Madera, Fresno River Oil/Water Separators
- Fairmead Community and Friends, Community of Fairmead Green Infrastructure and Dry Well Improvement Projects

The following projects would reestablish natural water drainage treatment and infiltration systems, or mimic natural system functions to the maximum extent feasible:

- Root Creek Water District, Root Creek Avenue 10 Intentional Recharge Project
- Root Creek Water District, Root Creek Parkway Water Conservation Project
- U.S. Bureau of Reclamation, Mendota Pool Bypass and Reach 2B Improvements Project
- Hancock Farmland Services, Chowchilla Bypass Turnouts
- Hancock Farmland Services, Eastside Bypass Flood Water Diversion and Recharge Project
- County of Madera, Madera Ranchos Floodway Recharge Basins and Dry Wells
- Madera County, Berenda Creek Arundo Removal, Channel Clearing and Levee Repairs
- Madera County, Berenda Slough Arundo Removal and Channel Clearing
- Madera County, Cottonwood Creek Channel Clearing and Levee Repairs
- Madera County, Dry Creek Channel Clearing and Levee/Embankment Repairs
- Madera County, Fresno River Channel Clearing and Levee/Embankment Repairs
- Chowchilla Water District, Ash Bypass Check
- County of Madera, Canal Way Recharge Basin Project
- Madera County Water and Natural Resources Department, Cottonwood Creek Storm Water Capture Structure
- City of Chowchilla, Chowchilla City Hall Conservation Landscaping, Green Infrastructure, and Storm Water Infiltration Project
- City of Madera, Rotary Park Conservation Landscaping, Green Infrastructure, and Storm Water Infiltration Project
- City of Madera, Madera City Hall Conservation Landscaping, Green Infrastructure, and Storm Water Infiltration Project
- Gravelly Ford Water District, Firebaugh Boulevard Groundwater Recharge/Flooding of Existing Pasturelands
- Fairmead Community and Friends, Community of Fairmead Green Infrastructure and Dry Well Improvement Projects

The following projects would develop, restore, or enhance habitat and open space through storm water and dry weather runoff management, including wetlands, riverside habitats, parkways, and parks:

- Root Creek Water District, Root Creek Avenue 10 Intentional Recharge Project
- Root Creek Water District, Root Creek Parkway Water Conservation Project
- U.S. Bureau of Reclamation, Mendota Pool Bypass and Reach 2B Improvements Project

- County of Madera, Madera Ranchos Floodway Recharge Basins and Dry Wells
- Madera County, Berenda Creek Arundo Removal, Channel Clearing and Levee Repairs
- Madera County, Berenda Slough Arundo Removal and Channel Clearing
- Madera County, Cottonwood Creek Channel Clearing and Levee Repairs
- Madera County, Dry Creek Channel Clearing and Levee/Embankment Repairs
- Madera County, Fresno River Channel Clearing and Levee/Embankment Repairs
- County of Madera, Canal Way Recharge Basin Project
- City of Chowchilla, Chowchilla City Hall Conservation Landscaping, Green Infrastructure, and Storm Water Infiltration Project
- City of Madera, Rotary Park Conservation Landscaping, Green Infrastructure, and Storm Water Infiltration Project
- City of Madera, Madera City Hall Conservation Landscaping, Green Infrastructure, and Storm Water Infiltration Project
- Fairmead Community and Friends, Community of Fairmead Green Infrastructure and Dry Well Improvement Projects

The following projects would use existing publicly owned (or agency owned, publicly accessible) 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 either onsite or offsite:

- South East Madera County United (SEMCU), Madera County Drain/Dry Wells
- Root Creek Water District, Root Creek Parkway Water Conservation Project
- U.S. Bureau of Reclamation, Mendota Pool Bypass and Reach 2B Improvements Project
- County of Madera, Madera Ranchos Floodway Recharge Basins and Dry Wells
- Madera County, Berenda Creek Arundo Removal, Channel Clearing and Levee Repairs
- Madera County, Berenda Slough Arundo Removal and Channel Clearing
- Madera County, Cottonwood Creek Channel Clearing and Levee Repairs
- Madera County, Dry Creek Channel Clearing and Levee/Embankment Repairs
- Madera County, Fresno River Channel Clearing and Levee/Embankment Repairs
- County of Madera, Canal Way Recharge Basin Project
- City of Chowchilla, Chowchilla City Hall Conservation Landscaping, Green Infrastructure, and Storm Water Infiltration Project
- City of Madera, Rotary Park Conservation Landscaping, Green Infrastructure, and Storm Water Infiltration Project
- City of Madera, Madera City Hall Conservation Landscaping, Green Infrastructure, and Storm Water Infiltration Project
- City of Madera, Fresno River Oil/Water Separators
- Fairmead Community and Friends, Community of Fairmead Green Infrastructure and Dry Well Improvement Projects

6.4. Project Prioritization Methodology

A project prioritization approach provides a structured and objective method to separate high and low priority projects. A prioritization matrix organizes a diverse set of items into an order of importance by assigning a numerical value to the priority of each item. The resulting matrix ranks projects based on criteria considered important by Stakeholders, the TAC, and the County. The benefit of this prioritization approach is its flexibility to add projects in the future and (re)evaluate/compare using the same criteria. The spreadsheet approach is easy to update when additional site information becomes available, for example about biotic, cultural, or geologic constraints.

With input from Stakeholders, a group of criteria were selected to assess the importance of each project and a rating scale established to assess how well a project satisfies that criteria. With input from the County, TAC, and Stakeholders each criteria was assigned a weight based on its relative importance (See Sections 4 and 5). The numeric rating a project is given for a particular criterion is multiplied by the criteria's weight to create a priority score for each project. The sum of all the weighted values across all criteria determines a project's total score. Table 6-3 summarizes each of the criteria used to evaluate individual projects based on inputs from the spatial analysis (described in Section 5) and project information provided on the solicitation forms along with the associated rating scale.

A four-step process was applied to calculate a Project Score for each of the submitted projects:

Step #1: Determine the Project Score

The Project Score is a measure of how well a project satisfies a specific criteria. The higher a Project Score the more a project is aligned with providing the criteria benefits.

Step #2: Project Score x Criteria Weight = Criteria Score

Each Project Score for an individual criteria is multiplied by the Criteria Weight to determine the Criteria Score. The Criteria Weights were determined through input from Stakeholders, TAC, and the County, as described in Section 4 and Section 5.

Step #3: Sum of all Criteria Scores = Final Project Score

The Final Project Score is a measure of how well a project satisfies ALL the criteria and is a sum of the individual Criteria Scores identified in Step #2.

Step #4: Compare Final Project Scores of all Projects and Rank Projects

Table 6-3. Prioritization Criteria based on Spatial Analysis and Project Multi-Benefit Assessment.

Project Prioritization Inputs							
Criteria Number	Project Task	Criteria/Benefit	Criteria Description	Unit of Measurement	Rating Scale: Possible Points	Rating Scale: Project Score	Criteria Weight[1] Proposed
1	Spatial Analysis	Water Supply	Subwatershed runoff	Location (in/out)	1		16.6%
			Dry season water use		2		
			Groundwater recharge potential		2		
			Groundwater level reductions		2		
			Subsidence		2		
			Impervious area		1		
2		Water Quality	Impaired waterbodies	Location (in/out)	5		6.5%
			Subwatershed pollutant loading		1.5		
			Soil erodibility		1		
			Urban runoff		1		
			Urban pollutant loading		1.5		
3		Flood Control	Potential flooded area	Location (in/out)	10		8.2%
4	Project Solicitation & Multi-Benefit Assessment	Water Supply	a. Water supply reliability	Volume Added or Saved	4		16.6%
			b. Water conservation		2		
			c. Conjunctive use		4		
5		Water Quality	a. Support compliance with applicable permit and/or TMDL requirements	Yes/No	3		6.5%
			b. Increase the filtration and/or treatment of runoff	Volume Treated	3		
			c. Provide nonpoint source pollution control	Pollutant Load Reduction	2		
			d. Re-establish natural water drainage and treatment	Volume Treated	2		
6		Flood Management	a. Decrease flood risk by reducing runoff rate and/or volume	Volume Decreased	7		8.2%
			b. Reduce sanitary sewer		3		
7		Environmental (Protection and Improvement)	a. Provide environmental and habitat protection improvement, via	Yes/No, Size and/or Rate	4		10.4%
			i. Wetland enhancement/creation;				
			ii. Riparian enhancement; and/or				
			iii. Instream flow improvement				
			b. Reduce energy use, greenhouse gas emissions, or provide carbon sink		1		
			c. Reestablish the natural hydrograph		3		
			d. Increase urban green space		1		
			e. Improve water temperature		1		
8		Benefit to a Disadvantaged Community (DAC)	Is the project located in, and/or directly benefit a DAC?	Yes/No and Size	10		10.1%
9		Project Capital Cost	Compares the estimated capital cost for each project, with the most expensive alternatives ranking less favorably.	Dollars	10		5.2%
10		Community Benefits	a. Employment opportunities	Size and/or #	2.5		5.5%
			b. Community Involvement		2.5		
			c. Public education		2.5		
			d. Enhance and/or create recreational and public use areas		2.5		
11		Project Development	a. Project Developed Using a Metrics Driven Approach?	Yes/No and %	5		4.3%
			b. Does the project provide Regional Benefits?		5		
12		Project Readiness	a. Is the project ready to implement?	Yes/No and/or %	2		2.0%
			b. Is the project cost well defined?		2		
			c. Is the land currently owned by a public agency or does it need to be acquired?		2		
			d. Is the environmental permitting process complete or not yet started?		2		
			e. Does the lead agency have funds available to satisfy the 50% local funding match?		2		
1. From Stakeholder, TAC, and County input.				points sum	120	0	100.0%

6.5. Prioritized List of Projects

Table 6-4 summarizes the ranked list of all the Final Project Scores for the 24 SWRP projects. The projects are ranked based on the spatial analysis and project specific benefits analysis based on each project's ability to provide Main and Additional Benefits. The Completed Project Scoring Forms are provided in Appendix 5.

Projects that provide more benefits will score higher, which encourages Stakeholders to develop and submit projects that achieve a greater number of benefits.

6.6. Process for Submitting New or Modifying Existing Project Proposals

The SWRP is intended to be updated periodically with new project submittals or updates and/or revisions to the existing projects included in the SWRP. It is anticipated that future SWRP updates would coincide with availability of future rounds of grant funding and the RWMG will add new or modified project information to the SWRP every 6 months.

6.6.1. New Project Proposals

Completing a Project Solicitation Form is the first step in the process of submitting a project for inclusion in the SWRP. A blank Project Solicitation Form is provided in Appendix 3. The form should be completed with as much detail as possible with information that is known about the project. Where possible, quantification of the project benefits should be estimated, particularly the water quality, water supply, and flood management benefits. The completed Project Solicitation Form can then be submitted to the County Public Works Department grant manager Dario Dominguez, dario.dominguez@co.madera.ca.gov or mcpublicworks@madera-county.com.

6.6.2. Modifications or Revisions to Existing Project Proposals

If a Stakeholder needs to modify information in the SWRP about an existing project, a new Project Solicitation Form should be completed based on the revised information. A blank Project Solicitation Form is provided in Appendix 3. The form should be completed with as much detail as possible with information that is known about the project. Where possible, quantification of the project benefits should be estimated, particularly the water quality, water supply, and flood management benefits. The completed Project Solicitation Form can then be submitted to the Madera Regional Water Management Group for consideration and review along with a copy of the previously submitted Project Solicitation Form. The revised Project Solicitation Form can be submitted to the County Public Works Department grant manager Dario Dominguez, dario.dominguez@co.madera.ca.gov or mcpublicworks@madera-county.com.

Table 6-4. Prioritized List of SWRP Projects

Project Number	Project Sponsor	Project Name	Project Type	Scoring	Rank
23	Fairmead Community and Friends	Community of Fairmead Green Infrastructure and Dry Well Improvement Projects	Green Infrastructure/Dry Wells/Community Drainage Improvements	7.05	1
8	Hancock Farmland Services	Eastside Bypass Flood Water Diversion and Recharge Project	Installation of Slant Pumps at three ranches to divert flood flows for groundwater recharge	6.62	2
7	Hancock Farmland Services	Chowchilla Bypass Turnouts	Bypass Diversions for Groundwater Recharge	6.62	2
24	County of Madera	Brockmore Property	Groundwater Recharge/Floodplain Restoration	6.32	4
19	City of Madera	Rotary Park Conservation Landscaping, Green Infrastructure, and Storm Water Infiltration Project	Low Impact Development/Flood Management/Recharge	6.07	5
20	City of Madera	Madera City Hall Conservation Landscaping, Green Infrastructure, and Storm Water Infiltration Project	Low Impact Development/Flood Management/Recharge	5.88	6
22	Gravelly Ford Water District	Firebaugh Boulevard Groundwater Recharge/Flooding of Existing Pasturelands	Groundwater Recharge	5.86	7
18	City of Chowchilla	Chowchilla City Hall Conservation Landscaping, Green Infrastructure, and Storm Water Infiltration Project	Low Impact Development/Flood Management/Recharge	5.73	8
15	Chowchilla Water District	Ash Bypass Check	Infrastructure Improvements to Facilitate Conveyance and Recharge	5.64	9
1	South East Madera County United (SEMCU)	Madera County Drain/Dry Wells	200 Dry Well Installations	5.58	10
2	Root Creek Water District	Root Creek Avenue 10 Intentional Recharge Project	Groundwater Recharge	5.50	11
3	Root Creek Water District	Root Creek Parkway Water Conservation Project	Conjunctive Use/Groundwater Recharge	5.44	12
9	County of Madera	Madera Ranchos Floodway Recharge Basins and Dry Wells	Groundwater Recharge/Floodplain Restoration	5.33	13
16	County of Madera	Canal Way Recharge Basin Project	Groundwater Recharge	5.33	14
10	Madera County	Berenda Creek Arundo Removal, Channel Clearing and Levee Repairs	Conveyance / Infrastructure Improvements	5.28	15
4	U.S. Bureau of Reclamation	Mendota Pool Bypass and Reach 2B Improvements Project	Floodplain Restoration and Conveyance	5.17	16
11	Madera County	Berenda Slough Arundo Removal and Channel Clearing	Conveyance Improvements	5.07	17
12	Madera County	Cottonwood Creek Channel Clearing and Levee Repairs	Conveyance / Infrastructure Improvements	4.94	18
14	Madera County	Fresno River Channel Clearing and Levee/Embankment Repairs	Conveyance / Infrastructure Improvements	4.85	19
13	Madera County	Dry Creek Channel Clearing and Levee/Embankment Repairs	Conveyance / Infrastructure Improvements	4.76	20
21	City of Madera	Fresno River Oil/Water Separators	Oil/Water Separators	4.43	21
17	Madera County Water and Natural Resources Department	Cottonwood Creek Stormwater Capture Structure	Stormwater Recharge	3.91	22
5	Madera County Water and Natural Resources Department	Rampage Vineyards Recharge Facility	Recharge Basin	3.67	23
6	Gabriel G Haney, Heather Haney	16824 Paula Rd Drywell Stormwater Drain/Aquifer Recharge	Dry Well	3.57	24

6.7. Design Criteria and BMPs to Prevent Storm Water and Dry Weather Runoff

As applicable for new or redevelopment projects the SWRP identifies design criteria and BMPs 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.

6.7.1. Low Impact Development (LID) BMPs

Low Impact Development (LID) is a water quality and storm water management strategy concerned with maintaining or restoring the natural ecological and hydrologic functions of a community and/or site to protect and improve water quality, manage storm water runoff, achieve natural resource protection objectives and fulfill environmental regulatory requirements. LID employs a variety of natural and non-structural best management practices or features that reduce the rate of runoff, filter out its pollutants, and facilitate the infiltration of water into the ground. By reducing water pollution and increasing groundwater recharge, LID helps to improve the quality of receiving surface waters and stabilize the flow rates of nearby streams.

LID incorporates a set of overall site design strategies, as well as, highly localized, small-scale, decentralized source control techniques. Rather than collecting runoff in piped or channelized networks and controlling the flow downstream in a large storm water management facility, LID takes a decentralized approach that treats non-point source pollution, disperses flows and manages runoff closer to where it originates. Because LID embraces a variety of useful techniques for controlling runoff, designs can be customized according to local resource protection requirements, as well as, site constraints. New projects, redevelopment projects, and capital improvement projects can all be viewed as candidates for implementation of LID.

Implementing LID practices can also provide other potential benefits, such as improving neighborhood aesthetics, reducing heating and cooling costs, decreasing landscape maintenance and water use, increasing property values, and improving urban wildlife habitat.

6.7.2. Why Use LID Practices?

Low Impact Development (LID) is a form of regenerative (or restorative) design that can be used to retrofit and restore a neighborhood or site based on natural and ecologic principals. Regenerative design can be used to reduce heat island affects, reduce water pollution, and create ecological areas. Ecological areas in turn provide opportunities for wildlife habitat, passive recreation, open space and community gardens. Regenerative design can treat runoff and greywater, reduce flooding and erosion issues caused by earlier hydromodifications (e.g. storm drains and channelization projects).

For substantial and new development projects, LID BMPs should be used to inform the site planning and design process. The project architect, landscape architect, and civil engineers should work together at the early stage of a project to develop strategies to reduce impervious cover at a site by reducing the number of roads and parking areas. By integrating permeable pavements, natural landscape based drainage facilities and storm water retention facilities into a site design the overall character of the site is enhanced and environmental benefits are realized.

Adopting better site design or LID techniques at the onset of a project can reduce non-point source pollution and the amount of storm water runoff generated, and also reduce the cost of both the storm water conveyance system and storm water practices. Better site design stresses the principles of minimizing land disturbances, reducing runoff, increasing infiltration, filtering and adsorbing pollutants, retaining natural drainage and minimizing imperviousness. Several better site design goals can be applied early in the design process:

- Preservation of natural areas, stream, and river buffers;
- Reducing impervious cover in site design;
- Disconnecting and distributing runoff; and
- Utilizing landscaping as storm water management features.

The SWRCB and RWQCBs are advancing LID in California in various ways.[29]

6.7.3. LID Guiding Principals

Reduction of Impervious Surfaces. Impervious surface areas associated with development can increase the speed, volume and frequency of storm water flows resulting in erosion and stream channel scour, down cutting of stream channels and costly washout of habitat and infrastructure (roads and pipelines). Less impervious surface reduces the volume of runoff needing treatment and infrastructure to safely convey it. Impervious cover reduces the amount of rainfall and runoff that directly infiltrates and recharges groundwater. Impervious land coverage greater than 10% has been shown to degrade water quality and the natural hydrology of a stream or river.

Integration of Natural Landscaping. Integrated landscape BMPs filter and clean storm water runoff and recharge groundwater with little effort. Storm water that is treated and managed on-site reduces infrastructure for large scale storm water management projects. Initial development costs and long-term maintenance costs and needs are reduced. When storm water management is integrated into the site, storm water can be a beneficial resource or a functional amenity and can enhance liveability through the creation of water features and green spaces.

Preserving and Planting Trees. Preserving or planting trees and vegetation are key elements of LID. Trees and vegetation intercept rain, slowing, and reducing storm water runoff. The resulting runoff requires less treatment and minimizes downstream impacts. Trees and vegetation absorb and filter pollutants from soil, water and air, shade and cool air and water, and filter dust and airborne particles. Roots loosen soil, increasing rainfall infiltration, which reduces overland flows.

Create Vegetative Buffers. Natural vegetative corridors along rivers and streams filter pollutants, intercept rainfall and allow rain to infiltrate slowly to groundwater and streams. Buffers are important to accommodate natural shifts and widening of streams which provide space for flood flows and protect adjoining and nearby properties. Buffers provide open space corridors that can be used for passive recreation and exercise. Vegetated buffers protect and stabilize river and stream banks reducing the amount of erosion and property damage to roads and bridges.

[29] https://www.waterboards.ca.gov/water_issues/programs/low_impact_development/index.html

Green Streets and Green Parking Lots. In developed areas, streets and parking areas can make up to 25 to 30% of the land area and account for 50% of the total impervious cover. Street and parking lot runoff carries sediment, nutrients, oil, grease, heavy metals and other potential toxins. Green street and green parking lot design can reduce impervious coverage by 10 to 15% when compared to traditional street design. Green streets designed with natural drainage systems such as swales generally cost 10 to 20% less than streets designed with traditional curbs, gutters, catch basins, asphalt, and sidewalks.

7. Implementation Strategy and Schedule

This section identifies the resources for SWRP implementation including (1) projection of additional funding needs and sources for administration and implementation needs; and (2) schedule for arranging and securing implementation funding. This section identifies the projects and plans to ensure effective implementation of the SWRP and the development of appropriate decision support tools with the necessary data to use those tools. The implementation strategy describes the (1) timeline for submitting the SWRP into existing plans as applicable (for example into the Madera IRWMP); (2) specific actions by which the plan will be implemented; (3) entities responsible for project implementation; (4) description of community participation strategy; (5) procedures to track the status of each project; (6) timelines for all active or planned projects; (7) procedures for ongoing review, updates and adaptive management of the SWRP; and (8) the strategy and timeline for obtaining necessary federal, state and, local permits. This section describes how SWRP implementation performance measures will be tracked.

7.1. Projection of Additional Funding Needs

Funding is the primary obstacle to storm water project planning and implementation within Madera County. The combined estimated cost of the SWRP projects is more than $35 million. All the projects require additional funding for implementation.

Madera County was successful in requesting a reduced funding match from the State Water Resources Control Board (SWRCB) for projects receiving bond monies through Proposition 1 that are located in or benefiting Disadvantaged Communities (DACs) and/or Economically Distressed Areas (EDAs). Specifically, for projects that are located within or benefiting a DAC/EDA, a 25% grant match will be required. Projects outside of a DAC/EDA will require a 50% match of grant funds.[30]

Within Madera County most of the Project Sponsors in and outside of the DAC/EDA communities do not have identified funding sources to provide funding match. A variety of potential funding sources will need to be identified and considered to secure the required funding match.

7.1.1. Resources for SWRP Administration and Implementation

Development of the Madera SWRP is being funded from a Proposition 1 Planning Grant with matching funds from Madera County. Implementing individual projects within the SWRP is the responsibility of the specific Project Sponsors identified in Section 6. Madera County, in coordination with the RWMG, will administer the project database and update it as needed as new projects are identified or existing projects are updated and/or revised (See Sections 6.6 for more information).

In-kind services of Project Sponsors are expected to provide the technical and administrative oversight required for project implementation and grant administration.

[30] January 27, 2017. Storm Water Resource Plan Request for Reduced Funding Match of Disadvantaged Communities and Economically Distressed Areas. From Julia Berry, Director Water and Natural Resource Department to Michelle Stebbins and Harish Bagha SWRCB.

7.1.2. Funding Sources

The Madera RWMG maintains a list of Grant Programs and Funding Sources[31] available from tribal, federal, state, local, and private funding sources. The following potential sources include state and federal funding programs available for storm water resource projects like those included in the SWRP.

7.1.2.1. State Funding Programs

The following State Funding Programs were identified and summarized in the Kern County SWRP.[32]

Proposition 1 Storm Water Grant Program (SWRCB)

The SWRCB provides grant funds for multi-benefit storm water management projects through the Proposition 1 Storm Water Grant Program (SWGP). Proposition 1 designated $200 million in grant funds for projects that improve regional water self-reliance, security, and adapt to the effects on water supply arising from climate change. Storm water and dry weather runoff are underutilized sources of water supplies and may cause pollution or impairment of rivers, lakes, streams, and coastal waters. The SWGP will fund projects that have multiple benefits including water supply, flood control, habitat enhancement/restoration, and creating green spaces.

The SWGP has two types of grants available: Planning Grants and Implementation Grants. The Planning Grant had one funding round of $19 million (occurred in Spring 2016) that will be used for developing SWRPs and planning for specific projects throughout the state. Two rounds of Implementation Grant funding have been designated under Proposition 1. The Proposition 1 Implementation Round 2 solicitation is anticipated to occur in late 2018 or early 2019[33]. Implementation Grant awards can range from $250,000 to $10,000,000 per project. The local funding match is set at 50 percent of the project cost with reductions available for DACs or Economically Distressed Areas (EDAs).

Integrated Regional Water Management Implementation Grants (DWR)

The DWR is the state agency responsible for overseeing the IRWM programs statewide, which includes administering the Proposition 1 IRWM Grant Program, which provides funding for projects that help meet the long term water resource needs within IRWM Regions. The first round of Proposition 1 implementation grant funding is expected to begin in 2018. Criteria for obtaining Proposition 1 grant funds include: assisting water infrastructure systems to mitigate impacts from climate change; providing incentives throughout each watershed to collaborate in managing a region's water resources and setting regional priorities for water infrastructure; and improving regional water self-reliance, while reducing reliance on Sacramento-San Joaquin Delta. Plan Projects are required to be included in their respective IRWMP and may be eligible for potential funding.

http://www.water.ca.gov/floodmgmt/funding/small-communities.cfm

[31] IRWMP, 2014, Appendix H
[32] Provost and Pritchard Consulting Group, December 2016, Kern County Storm Water Resource Plan
[33] Per communication with SWRCB Grant Manager, Harish Bagha on December 15, 2017.

Federal 319 Program (SWRCB)

This program, administered by the SWRCB, is a NPS pollution control program that is focused on controlling activities that impair beneficial uses and on limiting pollutant effects caused by those activities. The program is federally funded on an annual basis. Project proposals that address TMDL implementation and those that address problems in impaired waters are favored in the selection process. There is also a focus on implementing management activities that reduce and/or prevent release of pollutants that impair surface and groundwater. Nonprofit organizations, local government agencies including special districts, tribes, and educational institutions qualify. State or federal agencies may qualify if they are collaborating with local entities and are involved in watershed management or proposing a statewide project.

Water Recycling Funding Grant and Loan Program (SWRCB)

This is a long-term program operated by the SWRCB that offers grants and low-interest loans for the planning, design, and construction of water recycling facilities. This program can also be used to fund groundwater recharge facilities for indirect potable reuse (IPR). Grants are provided for facilities planning studies to determine the feasibility of using recycled water to offset the use of fresh/potable water from state and/or local supplies. Pollution control studies, in which water recycling is an alternative, are not eligible. Public agencies and privately-owned utilities regulated by the California Public Utilities Commission (CPUC) are eligible. The Water Recycling Funding Program receives funding from various sources, including Proposition 1 and the State Revolving Fund (SRF). Due to the varying funding sources, preferences for funding can vary.

Clean Water State Revolving Fund (SWRCB)

The Federal Water Pollution Control Act (Clean Water Act or CWA), as amended in 1987, provides for establishment of a Clean Water State Revolving Fund (CWSRF) program. The program is funded by federal grants, state funds (including Propositions 50, 84, and 1), and revenue bonds. The purpose of the CWSRF program is to implement the CWA and various state laws by providing financial assistance for the construction of facilities or implementation of measures necessary to address water quality problems and to prevent pollution of the waters of the State.

The CWSRF Loan Program provides low-interest loan funding for construction of publicly-owned wastewater treatment facilities, local sewers, sewer interceptors, water recycling facilities, as well as, expanded use projects such as implementation of NPS projects or programs, development and implementation of estuary Comprehensive Conservation and Management Plans, and storm water treatment. Publicly owned treatment works, local public agencies, non-profit organizations, and private parties are eligible for funding. Matching funds are not required. Applications are continuously accepted and $200 to $300 million is available annually.

Infrastructure State Revolving Fund - California Infrastructure and Economic Development Bank

Through I-Bank, this program funds public infrastructure projects deemed important to California communities. The financing is available to cities, counties, special districts, assessment districts, joint powers authorities, and redevelopment agencies. Eligible projects may include streets and highways, sewage collection and treatment, water treatment and distribution, drainage, flood control, solid waste

collection and disposal. The financing can be paired with other grant and loan programs to complete the funding of a project although no matching is required, and the funds may serve as the sole source for the project.

Safe Drinking Water State Revolving Fund (DDW)

The Federal Safe Drinking Water Act (SDWA) Amendments of 1996 authorized the creation of a revolving fund program for public water system infrastructure needs specific to drinking water. There is similar state legislation and the Safe Drinking Water State Revolving Fund (SDWSRF) reflects the intent of federal and state laws to provide grant funding or low-interest loans to correct deficiencies in public water systems based on a prioritized system. Highest priority is given to projects that address public health risk, projects that will assist a public water system with compliance with the SDWA, and projects that assist those public water systems most in need. Funding is available for construction/ enhancement of public water systems. The program is funded by federal grants, state funds (including Propositions 50 and 84), and revenue bonds. The program is administered by the SWRCB Department of Drinking Water (DDW). The entity must be a public water system to be eligible and preference is given to DACs.

Agricultural Drainage Loan Program (SWRCB)

The Agricultural Drainage Loan Program was created by the Water Conservation and Water Quality Bond Law of 1986 to address treatment, storage, conveyance, or disposal of agricultural drainage water that threaten waters of the State.

Agricultural Water Use Efficiency Program (DWR)

This grant program funds agricultural water use efficiency projects. The water use efficiency Guidelines and Proposal Solicitation Package (PSP) directly supports California Water Plan - Action Number One: Make Conservation a California Way of Life, as well as supporting several other Actions, either directly or indirectly. Funding through this program is also directed towards agricultural water management planning and water use efficiency projects and programs developed pursuant to Part 2.8 (commencing with Section 10800) of Division 6 of the California Water Code.

http://www.water.ca.gov/wuegrants/SolicitationsProp1AG.cfm

7.1.2.2. Federal Funding Programs

The following Federal Funding Programs were identified and summarized in the Kern County SWRP.[34]

WaterSMART (USBR)

The USBR Sustain and Manage America's Resources for Tomorrow Program (WaterSMART) was established for USBR to work with states, tribes, local governments, and NGOs to secure and stretch water supplies for use by existing and future generations. In addition to sustainable water resources goals, the program also addresses adaptive measures needed to address climate change and future demands. The programs described below are part of the WaterSMART program.

[34] Provost and Pritchard Consulting Group, December 2016, Kern County Storm Water Resource Plan

Water and Energy Efficiency Grants (USBR)

The Water and Energy Efficiency Grants program offered through USBR is an annual grant program in which the applicant will need to provide a minimum of a 50 percent match. The projects need to demonstrate both water and energy savings.

Grants to Develop Climate Analysis Tools (USBR)

These grants, offered annually, provide funding to universities, non-profits, or entities with water or energy delivery authority in the Western United States for the development of tools to better manage water resources with the caveat the tool must consider climate change. Seven areas of research are listed as eligible under this program with the ultimate goal of better water resource management.

Advanced Water Treatment Grants (USBR)

The Advanced Water Treatment (ADWT) Grant Program offered by USBR funds demonstration and pilot projects which utilize advanced water treatment systems. The purpose of this program is to create a new economically feasible water supply from brackish groundwater, seawater, or impaired waters. The ADWT grant encourages water agencies to accelerate the adoption of advanced water technologies including reverse osmosis, filtration, electrodialysis, pretreatment methods, advanced oxidation, concentrate disposal or any other process that removes dissolved and suspended matter such as salts, viruses, bacteria, or any other difficult to remove matter. The projects should not be the full-scale plant but a pilot to demonstrate the viability of the project. Operations and maintenance (O&M) costs are not included in the funding, cost sharing is required, and the projects must be completed within the specified timeframe of the grant.

Cooperative Watershed Management Program (USBR)

The Cooperative Watershed Management Program provides funding for Phase II watershed management projects. Phase II funding will support local watershed groups in implementing collaborative solutions to water management issues.

Drought Resiliency Project Grants and Drought Contingency Planning Grants (USBR)

This Program establishes a framework to provide federal leadership and assistance for using water efficiently, integrating water, and energy policies to support the sustainable use of all natural resources, and coordinating the water conservation activities of various U.S. Department of the Interior (DOI) bureaus and offices. Through the program, the DOI is working to achieve a sustainable water strategy to meet the nation's water needs. The objective of this Program is to invite states, tribes, irrigation districts, water districts, and other organizations with water or power delivery authority to leverage their money and resources by cost-sharing Drought Contingency Planning with USBR to build resilience to drought in advance of a crisis.

Title XVI Feasibility Studies (USBR)

The objective of this Program is to invite applicants to submit proposals to develop new Title XVI feasibility studies. Applicants must provide 50 percent non-federal cost share for the proposed activity. Under Title XVI of Public Law 102-575, USBR works to identify and investigate opportunities to reclaim

and reuse wastewaters and naturally impaired ground and surface water in the 17 Western States and Hawaii. Title XVI also provides authority for USBR to provide up to 50 percent of the costs of studies to determine the feasibility of water reclamation and reuse projects. Prior to construction funding of any project authorized under Title XVI, USBR must determine that a feasibility study for the project complies with the provisions of Title XVI. Under this Program, funding is being made available to assist Project Sponsors with the development of new Title XVI feasibility studies.

FEMA/California Emergency Management Agency Infrastructure Improvement Grants

FEMA, through the California Emergency Management Agency, funds grants to improve existing infrastructure to increase protection from hazards (such as wildfires, earthquakes, etc.). The intent is to improve infrastructure, particularly lifeline infrastructure (water systems, hospitals, fire) to reduce injuries, loss of life, and damage and destruction of property. Grants are also available for the creation of Local Hazard Mitigation Plans.

North American Wetlands Conservation Act Grant (USFWS)

This grant provides funds for projects that provide long-term protection of wetlands, and the fish and wildlife that depend upon wetlands. Applicants must provide local match equal to that requested. Entities that are eligible include organizations and individuals who have developed partnerships to carry out wetlands conservation projects in the U.S., Canada, and Mexico. Applications are continuously accepted by the USFWS for this grant.

Environmental Protection Agency, Pollution Prevention (EPA)

The EPA created the Pollution Prevention (P2) Grant Program (formerly Pollution Prevention Incentives for States) under the authority of the Pollution Prevention Act of 1990. The grant program provides matching funds to state and tribal programs to support P2 activities across all environmental media and to develop state-based programs. The purpose of the P2 Grant Program is to give states and tribes the capability to assist businesses and industries in identifying better environmental strategies and solutions for complying with federal and state environmental regulations. It also aims to improve business competitiveness without increasing environmental impacts. The majority of P2 Grants fund state-based projects for technical assistance, training, outreach, education, regulatory integration, data collection, research, demonstration projects, and recognition programs.

Environmental Protection Agency, Source Reduction Assistance (EPA)

The EPA annually awards grants and cooperative agreements under the Source Reduction Assistance (SRA) Grant Program. The purpose of this program is to prevent the generation of pollutants at the source and ultimately provide an overall benefit to the environment. This program seeks projects that support source reduction, pollution prevention, and/or source conservation practices. Source reduction activities include: modifying equipment or technology; modifying processes or procedures; reformulating or redesigning products; substituting raw materials; and generating improvements in housekeeping, maintenance, training, or inventory control. Pollution prevention activities reduce or eliminate the creation of pollutants via such procedures as: using raw materials, energy, water or other resources more efficiently; protecting natural resources through conservation; preventing pollution; and promoting the reuse of materials and/or conservation of energy and materials. Eligible organizations include units of

state, local, and tribal government; independent school district governments; private or public colleges and universities; nonprofit organizations; and community-based grassroots organizations.

Environmental Protection Agency, Wetlands Program Development Grants (EPA)

This program seeks projects that promote the coordination and acceleration of research, investigations, experiments, training, demonstrations, surveys, and studies relating to the causes, effects, extent, prevention, reduction, and elimination of water pollution. The EPA has identified three priority areas: (1) the development of a comprehensive monitoring and assessment program; (2) the improvement of the effectiveness of compensatory mitigation; and (3) the refinement of the protection of vulnerable wetlands and aquatic resources. Eligible entities include states, tribes, local governments, interstate associations, intertribal consortia, and national non-profit, NGOs.

Natural Resources Conservation Service, Watershed Protection and Flood Prevention Grant (NRCS)

The purpose of the program is to support activities that promote soil conservation and that promote the preservation of the watersheds of rivers and streams throughout the U.S. This program seeks to preserve and improve land and water resources via the prevention of erosion, floodwater, and sediment damages. The program supports improvement of: (1) flood prevention including structural and land treatment measures; (2) conservation, development, utilization, and disposal of water; or (3) conservation and proper utilization of land. Successful applicants under this program receive support for watershed surveys and planning, as well as watershed protection and flood prevention operations. Funding for watershed surveys and planning is intended to assist in the development of watershed plans to identify solutions that use conservation practices, including nonstructural measures, to ultimately solve problems.

Matching funds are not required; however, applicants must generally provide matches ranging from 0 to 50 percent in cash or in-kind resources depending on such factors as project type and the kinds of structural measures which a project proposes.

Eligible entities include: states, local governments, and other political subdivisions; soil or water conservation districts; flood prevention or control districts; and tribes. Potential applicants must be able to obtain all appropriate land and water rights and permits to successfully implement proposed projects.

Water and Waste Disposal Program (USDA)

The Water and Waste Disposal Program provides financial assistance in the form of grants and loans for the development and rehabilitation of water, wastewater, and storm drain systems within rural communities. Funds may be used for costs associated with planning, design, and construction of new or existing water, wastewater, and storm drain systems. Eligible projects include storage, distribution systems, and water source development. Projects must benefit cities, towns, public bodies, and census-designated places with population less than 10,000 persons. The intent of the program is to improve rural economic development and improve public health and safety.

Rural Development Program (USDA)

The U.S. Department of Agriculture (USDA), through its Rural Development Program, offers grants and financing for utilities in communities of less than 10,000 persons. Public agencies and Native American

tribes are eligible grantees. Eligible utilities include electric, telecommunications, water, and environmental (wastewater, solid waste, storm drainage).

Rural Water Supply Program (USBR)

Through this program, USBR assists rural communities in the western United States with planning and design of projects to develop and deliver potable water supplies. Public agencies and Native American tribes serving communities of less than 50,000 persons are eligible to receive funding for appraisal investigations and feasibility studies related to water supply.

Agricultural Water Conservation Grants (USBR)

The USBR and the Natural Resources Conservation Service (NRCS) collaborate to make federal funding available in California to improve the efficiency of agricultural water use throughout the state. The projects funded through this partnership are intended to help communities build resilience to drought, including the modernization of their water infrastructure and efficiently using scarce water resources, while supporting the agricultural economy. USBR has the authority to provide financial assistance to entities with water or power delivery authority, including water districts and irrigation districts, whereas NRCS has the authority to provide on-farm assistance.

San Joaquin River Restoration Program Part III of Title X (USBR)

The San Joaquin River Restoration Program provides financial assistance to local agencies within the CVP of California for the planning, design, environmental compliance, and construction of local facilities to bank water underground or to recharge groundwater to reduce, avoid, or offset the quantity of expected water supply impacts to Friant Division long-term contractors caused by the interim and restoration flows.

7.1.3. Schedule for Arranging and Securing Implementation Funding

SWRP implementation will require on-going funding sources to support capital and operating expenditures. Project Sponsors will need to coordinate as soon as possible to begin securing SWRP implementation funds and balance funding sources to meet project needs over time. Starting in 2018, monthly Stakeholder Meetings of the SWRP Project Sponsors and Stakeholders are proposed to evaluate potential funding opportunities and coordinate regional grant applications. It is anticipated that these regional coordination meetings can occur in collaboration with SGMA and RWMG efforts.

7.2. Implementation Strategy and Timeline

7.2.1. Timeline for Submitting the SWRP into Existing Plans

The Madera SWRP will be submitted to the Madera RWMG for incorporation into the Madera IRWMP. An update of the Madera IRWMP is anticipated by spring 2018, and at that time the SWRP would be adopted by the RWMG into the IRWMP. The SWRP will also be provided to the Engineering, Public Works, and Capital Improvement Planning (CIP) divisions of Stakeholder agencies for incorporation or reference into their existing or future planned project documents. Upon completion, SWRP adoption or

reference is expected into applicable Storm Water Management Plans, Storm Water Permits, General Plans, and Climate Action Plans as those plans are updated or completed.

7.2.2. Specific Actions by which the SWRP will be Implemented

Within the RWMG, a Funding Committee has been convened to identify funding sources for IRWMP projects (which by extension include SWRP projects). Implementation is anticipated across three scales: Individual Projects, Individual Programs, and Regional Programs. Individual Projects are the responsibility of specific Project Sponsors. Individual Programs such as in the Cities of Chowchilla and Madera will incorporate SWRP projects into their existing MS4 and/or CIP programs. Regional Programs such as SGMA can facilitate the collaboration necessary to implement projects with regional benefits. Identifying and applying for Capacity Grants to support community group involvement in the RWMG is recommended to support SWRP implementation.

7.2.3. Entities Responsible for Project Implementation

Implementing individual projects within the SWRP is the responsibility of the specific Project Sponsors identified in Section 6.

7.2.4. Community Participation Strategy

RWMG meetings are open to the public, SWRP Project Sponsors, and the broader community. Monthly meetings will be publicized on social media, via email invitations, and on the County's website to encourage participation of the broader Madera Community in the SWRP planning and implementation process. More information about the Community Participation Strategy is described in Section 8.

7.2.5. Timelines for all Active or Planned Projects

Project timelines are under development. Implementation and project planning estimates have been provided by Project Sponsors and are summarized in Table 6-2.

7.2.6. Obtaining necessary federal, state, and local permits

Once funding has been secured, specific Project Sponsors will identify the necessary permits and approvals required for project implementation. Permits will vary based on the type and location of specific projects. The implementation timeline for each specific project will need to incorporate adequate time to obtain the necessary federal, state, and local permits.

7.3. Procedures to Track Project Status and Performance Measures

7.3.1. Procedures to Track Each Project

Madera County, in coordination with the RWMG, will administer a project database and update it as needed as new projects are identified or existing projects are implemented, updated and/or revised (See Sections 6.6 for more information). As projects are implemented, the database will be updated with information about project cost and achieved benefits and in this way inform the planning of future projects.

7.3.1.3. Implementation Performance Measures Tracking

Each Project Sponsor will be responsible for project-specific tracking and monitoring that will be reported to the County on an on-going basis. Tracking and monitoring implemented projects will provide valuable feedback about project performance and if the projects are implemented and functioning as designed. Upon implementation, SWRP Project Sponsors will have project specific responsibilities[35]:

- Prepare project-specific monitoring and quality assurance project plans, as necessary, prior to the start of project construction or implementation.
- Conduct pre, during, and post-project monitoring in accordance with the project-specific monitoring plan.
- Ensure that data is recorded and managed according to all local and state requirements (i.e., California Environmental Data Exchange Network (CEDEN), California Statewide Groundwater Elevation Monitoring (CASGEM), etc.).
- Seek opportunities to integrate, where possible and practical, multi-benefit elements to better achieve regional goals.
- Compile, organize, and provide updated project-specific monitoring information to the RWMG for posting on the website or including in fact sheets.
- Identify a point person for contact regarding monitoring methods, results, and data.
- Comply with grant requirements, including submitting project information to the Natural Resources Project Inventory (NRPI), as identified by the funding agency.

Project-specific monitoring plans shall reflect various grant program guidelines, such as the State Water Resources Control Board's Storm Water Project Guidelines, and the Department of Water Resources requirements identified in the 2012 IRWM Grant Program Guidelines, which include the following:

- A description of what is being monitored. Examples include:
    - Water quality: Estimated pollutant load reduction
    - Water supply: Increase in local water supplies
    - Water supply: Amount of water conserved
    - Water supply: Acre-feet water storage and conjunctive management of surface and groundwater resources
    - Climate change mitigation: Megawatt or kilowatt reduction in energy use
- A description of measures to remedy problems encountered during monitoring.
- A description of the location of monitoring and monitoring frequency.
- A description of monitoring protocols and methodologies, and assignment of responsibility for monitoring.
- A description of what data will be shared with SWRP and IRWM Plan Stakeholders and with what frequency.
- Identification of the state databases that information will be provided to, and requirements for data submittal.

[35] As identified in the Santa Cruz County Storm Water Resource Plan, December 2016.

- Resources and procedures to ensure the monitoring schedule will be maintained (e.g., identify responsible parties and alternates, and funding for monitoring).

7.3.2. Decision Support Tools and Data

Sections 5 and 6 of this SWRP described the decision support tools that were used to evaluate the benefits and costs of multi-benefit storm water projects. This SWRP provides the data necessary to use these tools throughout SWRP implementation. swTELR can be used in the future as a decision support tool by estimating the load reduction within specific catchments based on project implementation.

Each of the projects selected for implementation will be monitored to ensure that the multiple benefits are achieved.

7.3.3. Ongoing Review, Updates, and Adaptive Management of the SWRP

The following procedures have been identified to adaptively manage the SWRP as a living document that will continue to be updated over time:

- The SWRP Goals and Objectives described in Section 1 will be monitored for consistency with the implemented projects.
- An IRWMP resource library will be created to collate RWMG plans, reports, and studies to ensure that the IRWMP and SWRP reflect Stakeholder's information. Future updates of the SWRP will review and evaluate new information in the resource library, which can serve as the technical foundation for updating the SWRP. County Public Works will manage the IRWMP library through the Flood Control webpage and no additional funding requirements are expected to support creation and maintenance of the IRWMP library.
- The project prioritization process was designed to incorporate direct input from Stakeholders, a TAC, and the County to inform the specific weights of prioritization criteria. New input from these groups can be used to adjust the relative importance of specific project benefits as they evolve with time. New Criteria Weights can be applied into the prioritization process to update, adjust, and refine project ranks.
- New projects can be added to the SWRP or existing project modified through the process outlined in Section 6.6.

SWRP updates are anticipated when substantial additional detail or project information becomes available. It is anticipated that Madera County in coordination with the RWMG would lead any future SWRP updates. Future SWRP updates will incorporate information from implemented projects, lessons learned, and regulatory updates. New information about pollutant sources, water quality priorities resulting from 303(d) impairments, or TMDLs are examples of information that may inform future SWRP updates.

8. Education, Outreach, and Public Participation

This section describes how community participation is provided for during SWRP implementation, including (1) the public education and participation opportunities to engage the public when considering major technical and policy issues related to the SWRP development and implementation; (2) the mechanisms, processes, and milestones that have been or will be used to facilitate public participation and communication during SWRP development and implementation; (3) the mechanisms to engage communities in project design and implementation; (4) identifying specific audiences such as local ratepayers, developers, locally regulated commercial and industrial Stakeholders, non-profit organizations and the general public, that will be notified when relevant SWRP outreach efforts are occurring; (5) specific strategies to engage DAC and climate vulnerable communities and tracking their involvement in the planning process; (6) efforts to identify and address environmental injustice needs and issues within the County. This section also includes a schedule for initial public engagement and education.

8.1. Public Education and Participation Opportunities

The Madera SWRP outreach strategy will include regular Stakeholder and Public meetings that provide opportunities for Stakeholders and the general public to participate directly in plan implementation and funding strategies. Meetings will also include technical presentations aimed at informing attendees on nomenclature, intent, process, and opportunities.

8.1.1. Identifying Key Stakeholders

Outreach efforts to include Stakeholders in the development of the SWRP have targeted specific audiences and constituencies such as DACs as well as the general public; these same efforts are expected to continue during the SWRP implementation. An initial Stakeholder list was developed around already identified Stakeholders from Regional Water Management Group members. The Stakeholder list was expanded through research and brainstorming organizations that might be affected by and/or interested in contributing to the SWRP. An invitation to participate in meetings during the SWRP planning process was sent to each of those Stakeholders. The current Stakeholder list includes about 24 individuals representing over 26 agencies, organizations, and interest groups (see Appendix 6). Caltrans could be a potential partner, collaborator, and future SWRP Stakeholder to support integrating storm water and roadway improvements and evaluating the feasibility of a Sustainable Water Infrastructure Plan to identify roadway related recharge projects for inclusion in the SWRP.

8.1.2. Public Outreach/Participation Actions

8.1.2.1. Public Engagement

The SWRP Public Engagement Actions, locations, and formats proposed during plan implementation are summarized in Table 8-1.

Table 8-1. Public Engagement Actions

Action Item	Location/Format
Distribution of invitations to Stakeholder Meetings	Email
Stakeholder Meetings	Conference call & Madera County Government Center & coinciding with existing community group meetings and locations (e.g., Kiwanis Club or SEMCU)
Technical Advisory Committee Meetings	Conference call & Madera County Government Center & coinciding with existing community group meetings and locations (e.g., Kiwanis Club or SEMCU)
SWRP Implementation Updates	Posted to County website, distributed in digital and print newsletters, and newspapers
Document Review	Available on Madera County website

Coordinating public meetings with Supervisor "Coffee and Conversation" meetings and community meetings (e.g., Kiwanis Club or SEMCU) is recommended to increase public participation, especially in Mountain portions of the County.

8.1.2.2. Printed and Digital Communication

Printed and digital materials will be distributed to Stakeholders, and the public, including DAC's, during plan implementation. Printed and digital materials will include verbal as well as accessible visual communication in the form of diagrams and drawings.

8.2. Involvement of Disadvantaged and Climate Vulnerable Communities

Disadvantaged communities (DAC) are prevalent throughout the Madera Region and have many critical and unique water supply, water quality, and wastewater issues and needs. The Madera SWRP Team took proactive steps to ensure inclusion of the DAC's needs and interests in the planning process of the SWRP and in developing the prioritization criteria. After the DAC representatives were identified, the Madera SWRP extended invitations to attend both Stakeholder meetings. Presentations and educational materials were made available during meetings to help DAC representatives become familiar with and engage in developing the SWRP. Partnerships with local agencies and non-profit organizations that have existing relationships with the communities are critically important to a successful outreach strategy targeting DACs. The Madera SWRP Team coordinated with local agencies and organizations in advance of outreach to DACs to gain awareness about community-specific issues. The following discussion points were identified as critical issues for ongoing DAC involvement:

- Important Cultural/Social Values of the Region
- Tribal Government Involvement and Collaboration
- Economic Conditions/Trends of the Region
- Disadvantaged Communities within the Region

- Disadvantaged Community Issues & Barriers to Participation and Building Trusting Relationships
- Strategies to overcome barriers and promote increased involvement

8.2.1. Communicating with and Educating DACs

Aside from income level, the Disadvantaged Communities of the Madera Region have several significant obstacles to surmount to obtain information and engage in contemporary discourse around regional planning and storm water management. Lack of computer technology and internet access is an especially challenging communication barrier. The Madera SWRP Team adopted communication and education strategies that address concerns identified during the IRWM process through informal canvassing of Disadvantaged Community members. The following observations were derived from the Madera IRWM. Disadvantaged Communities often prefer:

- Direct mailings and postings at churches and community centers. Those that have access to the internet will commonly spread information they receive by word of mouth.
- Print material that is not overly technical or overly wordy and graphical illustrations to help convey essential message.
- Meetings following notices.
- Face-to-face contact rather than more impersonal, written material.
- Need known points of contact.
- Translated materials to reach a broader and more diverse audience.

In response to these preferences the Madera SWRP Team has focused on a communication and education strategy that prioritizes face-to-face contact during Stakeholder meetings with ample time for questions. During these meetings participants were asked to list projects that would be beneficial for their community. In addition to meetings, printed and digital materials will be distributed to Stakeholders, and the general public, including DAC's, during plan implementation. Printed and digital materials will include visual communication in the form of diagrams and drawings.

8.3. Addressing Environmental Injustice Issues

Communities in Madera County face a variety of water-related environmental injustice challenges, including flooding, clean water supply, and effective wastewater treatment. Due to constraints such as financial hardship, education, technology and language barriers, water resource problems disproportionately impact communities that lack the capacity to address such challenges. Environmental injustice is also relevant where projects meant to convey "general" public benefit do not in fact benefit disadvantaged communities proportionately. Additionally, many DACs and environmental justice communities in Madera County lack access to water-based recreation and open space[36]. The Madera SWRP Stakeholders weighted environmental injustice issues heavily in project criteria while also ensuring that projects included in the SWRP address the critical water supply needs of DACs.

[36] Though water-based recreation and open space exist in the County, transportation constraints and/or entrance fees can limit access.

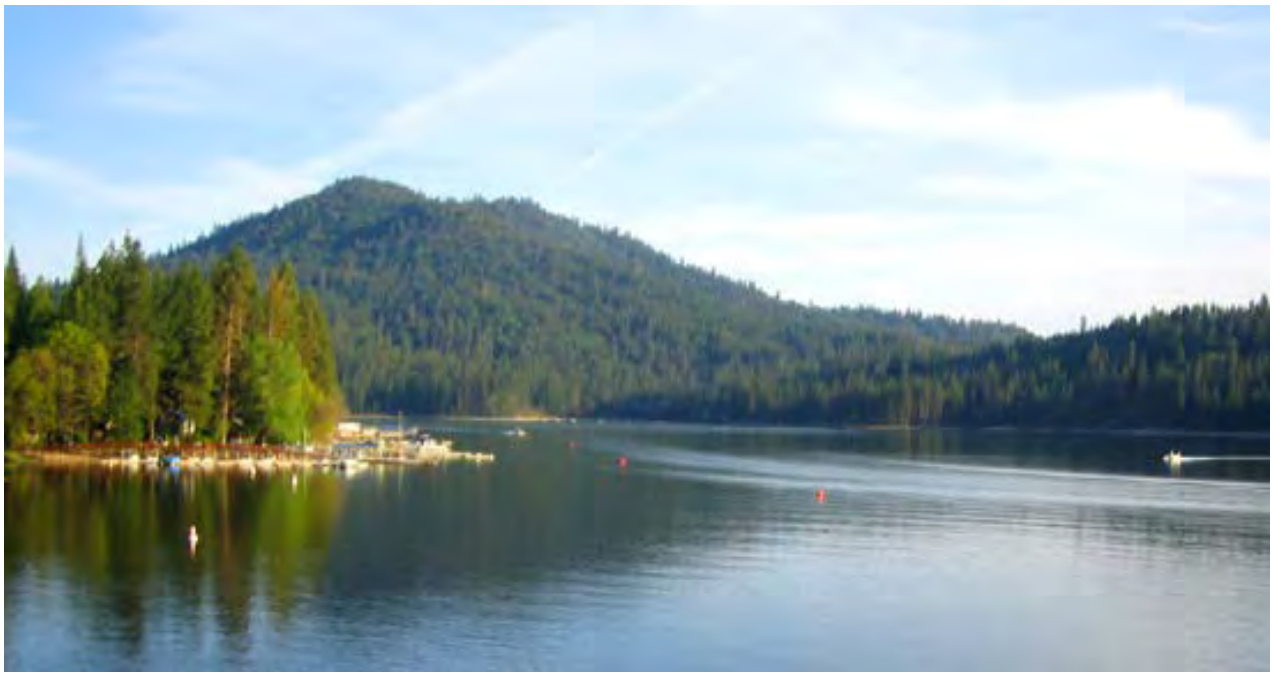


Figure 8-1. Water Based Recreation Bass Lake (By Guy Welch 2000)

8.3.1. Summary of Environmental Issues Addressed

- Nuisance Flooding
    - Managing storm water by increasing catchment and infiltration can alleviate flooding and structural damage.
- Water Quality
    - Educational programs can promote community awareness of potential water quality issues including practices that lead to a higher level of contaminates in the local supply.
- Water supply
    - Opportunities for increasing a resilient water supply include recycling municipal water and pursuing CalFed and regional and local opportunities for surface water storage.
- Groundwater Management
    - By increasing Madera's capacity for direct groundwater recharge a more robust local water supply is ensured.
- Topsoil Loss
    - Excessive erosion and sedimentation can negatively impact wetlands, water courses and storage capacity of reservoirs. Measures to reduce erosion and sedimentation include slope stabilization, road maintenance, grading and drainage improvements, and best management practices during construction.

8.4. Public Engagement and Education Schedule

The Timeline for Public Engagement and Education Actions during SWRP implementation are summarized in Table 8-2.

Table 8-2. Timeline of Public Engagement and Education Actions in 2018

Date	Action Item
January 2018	RWMG Meeting to Review SWRP Projects and Funding Opportunities
March 2018	Stakeholder/Project Sponsor Meeting
April 2018	Digital and printed communication updates about funding and grant availability
Summer/Fall 2018	- Digital and printed communication, including newspaper printings, with updates about funding and grant availability Workshops to support Project Sponsors completing grant applications
Fall 2018	- RWMG Meeting to Review SWRP Projects and Funding Opportunities; Strategy for Near Term SWRP Project Implementation - Stakeholder/Project Sponsor Meeting to Review Project Implementation Opportunities
Winter 2018	- Stakeholder/Project Sponsor Meeting when SWRCB Prop 1 Grant Funding Application Released

8.5. Recommendations for Ongoing Outreach and Education During Plan Implementation

Ongoing outreach and communication will allow community members to provide additional input concerning appropriate storm water resource projects and program activities. During plan implementation information and discussion items will be posted on the Madera County website for comments. Major items that may have an impact on the implementation of the plan may require public meetings. Important topics identified for future educational efforts include groundwater overdraft, land subsidence, and the impacts from the San Joaquin River Restoration on water supplies. The following list of recommendations was developed to ensure ongoing public participation that will inform SWRP project development and implementation:

- Storm Water Speaker Series;
- IRWM/SWRP Summary Case Study presentations;
- Project site walks with Stakeholders recording comments, insights, community stories;
- Organize a Madera County CFCC Funding Fair;
- Film night with educational presentations in schools/community centers;
- Onsite visits to BMP demonstration projects;
- Regular status updates and information at public meetings (County and RWMG);
- Presentations at local community and city council meetings;
- Posting updates to community webpages;

- Coordinated support of implementing LID, Drought Responsiveness, and Water Conservation types of projects at schools in the County;
- Duplication of outreach events at non-City of Madera location(s); and
- Facebook page project and informational updates.

Possible alternative methods of communication may include radio or television spots, postings at bus stops, announcements in neighborhood newsletters, announcements at civic organization meetings, and distribution of fliers.

9. SWRP Checklist and Self-Certification

9.1. Checklist Instructions

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

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

STORM WATER RESOURCE PLAN GENERAL CONTACT INFORMATION	
Contact Info: **Name** **Phone Number** **Email**	**Dario Dominguez** **(559) 675 – 7811, x3322** **dario.dominguez@co.madera.ca.gov**
Date Submitted to State Water Resource Control Board:	
Regional Water Quality Control Board:	
Title of attached documents (expand list as needed):	**1. Storm Water Resources Plan (SWRP)** **2.** **3.**

STORM WATER RESOURCE PLAN INFORMATION	
Storm Water Resource Plan Title:	**County of Madera Storm Water Resource Plan (SWRP)**
Date Plan Completed/Adopted:	
Public Agency Preparer:	**County of Madera**
IRWM Submission:	
Plan Description:	

Checklist Instructions:

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

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

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

STORM WATER RESOURCE PLAN CHECKLIST AND SELF-CERTIFICATION		
Mandatory Required Elements per California Water Code are Shaded and Text is **Bold**		
Y/N	**Plan Element**	**Water Code Section**
WATERSHED IDENTIFICATION (GUIDELINES SECTION VI.A)		
Y	**1. Plan identifies watershed and subwatershed(s) for storm water resource planning.**	**10565(c) 10562(b)(1) 10565(c)**
References: SWRP,Section 2.1 Watershed Description, page 12		
Y	2. Plan is developed on a watershed basis, using boundaries as delineated by USGS, CalWater, USGS Hydrologic Unit designations, or an applicable integrated regional water management group, and includes a description and boundary map of each watershed and sub-watershed applicable to the Plan.	
References: SWRP,Section 2.1.12.1. Watershed Boundaries, page 18		

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

WATERSHED IDENTIFICATION (GUIDELINES SECTION VI.A)	
Y	3. Plan includes an explanation of why the watershed(s) and sub-watershed(s) are appropriate for storm water management with a multiple-benefit watershed approach;
References: SWRP,Section 2.1.12.1. Watershed Boundaries, page 18	
Y	4. Plan describes the internal boundaries within the watershed (boundaries of municipalities; service areas of individual water, wastewater, and land use agencies, including those not involved in the Plan; groundwater basin boundaries, etc.; preferably provided in a geographic information system shape file);
References: SWRP,Section 2.1.2. Internal Boundaries/Neighboring Watersheds Not Included in Plan, page 22 SWRP,Section 2.1.3.Surface and Groundwater Resources, page 22 SWRP,Section 2.22.1.3.Land and Water Use, page 23	
Y	5. Plan describes the water quality priorities within the watershed based on, at a minimum, applicable TMDLs and consideration of water body-pollutant combinations listed on the State's Clean Water Act Section 303(d) list of water quality limited segments (a.k.a impaired waters list);
References: SWRP,Section 2.32.22.1.3.Water Quality Priorities, page 27 SWRP,Section 3.Water Quality Compliance, page 29	
Y	6. Plan describes the general quality and identification of surface and ground water resources within the watershed (preferably provided in a geographic information system shape file);
References: SWRP,Section 2.1.3.Surface and Groundwater Resources, page 22 SWRP,Section 5. Quantitative Methods, page 53 SWRP,Section 5.4.Water Quality Analysis, page 67 SWRP,Section 5.5.Storm Water Capture and Reuse Analysis, page 74 SWRP,Section 5.6.Water Supply and Flood Management Project Analysis, page 76	
Y	7. Plan describes the local entity or entities that provide potable water supplies and the estimated volume of potable water provided by the water suppliers;
References: SWRP,Section 2.1.3.Surface and Groundwater Resources, page 22 SWRP,Section 2.2.Land and Water Use, page 23	
Y	8. Plan includes map(s) showing location of native habitats, creeks, lakes, rivers, parks, and other natural or open space within the sub-watershed boundaries; and
References: SWRP,Figure 2-4. Madera County Land Cover, page 25 SWRP,Figure 2-5. Lakes, Rivers, Parks, and other Natural or Open Space in Madera County, page 28	
Y	9. Plan identifies (quantitative, if possible) the natural watershed processes that occur within the sub-watershed and a description of how those natural watershed processes have been disrupted within the sub-watershed (e.g., high levels of imperviousness convert the watershed processes of infiltration and interflow to surface runoff increasing runoff volumes; development commonly covers natural surfaces and often introduces non-native vegetation, preventing the natural supply of sediment from reaching receiving waters).

References:
SWRP,Section 2.1.4.Natural Watershed Process Interruptions, page 22
SWRP,Section 5.4.Water Quality Analysis, page 67
SWRP,Section 5.5. Storm Water Capture and Reuse Analysis, page 74
SWRP,Section 5.6.Water Supply and Flood Management Project Analysis, page 76

WATER QUALITY COMPLIANCE
(GUIDELINES SECTION V)

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

References:
SWRP,Section 2.3.Water Quality Priorities, page 27
SWRP,Section 3.1.Activities Associated with Pollution of Storm Water and/or Dry Weather Runoff, page 29
SWRP,Section 5.4.Water Quality Analysis, page 67

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

References:
SWRP,Section 3.2.Applicable Regulatory Permits, Total Maximum Daily Loads (TMDL), and Other Relevant Water Quality Requirements, page 32
SWRP,Section 3.3.SWRP Strategy to Address Pollutant Runoff or Sources, page 33

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

References:
SWRP,Section 3.2.Applicable Regulatory Permits, Total Maximum Daily Loads (TMDL), and Other Relevant Water Quality Requirements, page 32
SWRP,Section 3.3.SWRP Strategy to Address Pollutant Runoff or Sources, page 33

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

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

References:
SWRP,Section 4.Organization, Coordination, and Collaboration, page 35
SWRP,Section 4.4.5.Stakeholders Participating in Plan Development, page 46
SWRP,Section 4.4.6.Non-profit Organizations working on Storm Water and Dry Weather Resource Planning, page 47

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

References:
SWRP,Section 4.Organization, Coordination, and Collaboration, page 35
SWRP,Section 4.4.Public Engagement/Communication Plan and Coordination, page 39

Y	15. Plan includes description of the existing integrated regional water management group(s) implementing an integrated regional water management plan.

References:
SWRP,Section 4.3.Regional Water Management Group Implementing Existing IRWMP, page 38

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

Y	16. Plan includes identification of and coordination with agencies and organizations (including, but not limited to public agencies, nonprofit organizations, and privately owned water utilities) that need to participate and implement their own authorities and mandates in order to address the storm water and dry weather runoff management objectives of the Plan for the targeted watershed.

References:
SWRP,Section 4.Organization, Coordination, and Collaboration, page 35
SWRP,Section 4.4.5.Stakeholders Participating in Plan Development, page 46
SWRP,Section 4.4.6.Non-profit Organizations working on Storm Water and Dry Weather Resource Planning, page 47

Y	17. Plan includes identification of nonprofit organizations working on storm water and dry weather resource planning or management in the watershed.

References:
SWRP,Section 4.4.6.Non-profit Organizations working on Storm Water and Dry Weather Resource Planning, page 47

Y	18. Plan includes identification and discussion of public engagement efforts and community participation in Plan development.

References:
SWRP,Section 4.Organization, Coordination, and Collaboration, page 35
SWRP,Section 4.4.Public Engagement/Communication Plan and Coordination, page 39

Y	19. Plan includes identification of required decisions that must be made by local, state or federal regulatory agencies for Plan implementation and coordinated watershed-based or regional monitoring and visualization
References: SWRP,Section 4.5.Decisions Required by Local, State, or Federal Regulatory Agencies for Plan Implementation and Coordinated Watershed-based or Regional Monitoring and Visualization, page 47	
Y	20. Plan describes planning and coordination of existing local governmental agencies, including where necessary new or altered governance structures to support collaboration among two or more lead local agencies responsible for plan implementation.
References: SWRP,Section 4.6.Planning and Coordination of Existing Local Government Agencies, Including where Necessary, New or Altered Governance Structures to Support Collaboration Among Two or More Lead Local Agencies Responsible for Plan Implementation, page 48	
Y	21. Plan describes the relationship of the Plan to other existing planning documents, ordinances, and programs established by local agencies.
References: SWRP,Section 4.7.Relationship of SWRP with Other Existing Planning Documents, Ordinances, and Programs, page 49	
Y	22. (If applicable)Plan explains why individual agency participation in various isolated efforts is appropriate.
References: SWRP,Section 4.4.1.Overview of Public Engagement/Communication Plan, page 39	

QUANTITATIVE METHODS
(GUIDELINES SECTION VI.C)

Y	23. **For all analyses:** Plan includes an integrated metrics-based analysis to demonstrate that the Plan's proposed storm water and dry weather capture projects and programs will satisfy the Plan's identified water management objectives and multiple benefits.
References: SWRP,Section 5.Quantitative Methods, page 53	
Y	24. **For water quality project analysis (section VI.C.2.a)** Plan includes an analysis of how each project and program complies with or is consistent with an applicable NPDES permit. The analysis should simulate the proposed watershed-based outcomes using modeling, calculations, pollutant mass balances, water volume balances, and/or other methods of analysis. Describes how each project or program will contribute to the preservation, restoration, or enhancement of watershed processes (as described in Guidelines section VI.C.2.a)
References: SWRP,Section 5.Quantitative Methods, page 53 SWRP,Section 5.4.Water Quality Analysis, page 67 SWRP,Table 6-2. Quantified Project Specific Multi-Benefits, page 90	

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

References:
SWRP,Section 5.Quantitative Methods, page 53
SWRP,Section 5.5.Storm Water Capture and Reuse Analysis, page 74
SWRP,Table 6-2. Quantified Project Specific Multi-Benefits, page 90
SWRP Appendix 4: Completed Project Solicitation Forms

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

References:
SWRP,Section 5.Quantitative Methods, page 53
SWRP,Section 5.6.Water Supply and Flood Management Project Analysis, page 76
SWRP,Table 6-2. Quantified Project Specific Multi-Benefits, page 90
SWRP Appendix 4: Completed Project Solicitation Forms

Y	27. **For environmental and community benefit analysis (section VI.C.2.d):** Plan includes a narrative of how each project and program will benefit the environment and/or community, with some type of quantitative measurement.

References:
SWRP,Section 5.Quantitative Methods, page 53
SWRP,Table 6-2. Quantified Project Specific Multi-Benefits, page 90
SWRP,Section 5.7.Environmental and Community Benefit Analysis, page 82
SWRP Appendix 4: Completed Project Solicitation Forms

Y	28. **Data management (section VI.C.3):** Plan describes data collection and management, including: a) mechanisms by which data will be managed and stored; b) how data will be accessed by stakeholders and the public; c) how existing water quality and water quality monitoring will be assessed; d) frequency at which data will be updated; and e) how data gaps will be identified.

References:
SWRP,Section 5.8.Data Management, page 83

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

Y	**29. Plan identifies opportunities to augment local water supply through groundwater recharge or storage for beneficial use of storm water and dry weather runoff.**	**10562(d)(1)**

References:
SWRP,Section 6. Identification and Prioritization of Projects, page 85
SWRP,Section 6.3.1.Opportunities and Benefits of Identified Projects, page 92

Y	**30. Plan identifies opportunities for source control for both pollution and dry weather runoff volume, onsite and local infiltration, and use of storm water and dry weather runoff.**	**10562(d)(2)**

References:
SWRP,Section 6. Identification and Prioritization of Projects, page 85
SWRP,Section 6.3.1.Opportunities and Benefits of Identified Projects, page 92

Y	**31. Plan identifies projects that reestablish natural water drainage treatment and infiltration systems, or mimic natural system functions to the maximum extent feasible.**	**10562(d)(3)**

References:
SWRP,Section 6. Identification and Prioritization of Projects, page 85
SWRP,Section 6.3.1.Opportunities and Benefits of Identified Projects, page 92

Y	**32. Plan identifies opportunities to develop, restore, or enhance habitat and open space through storm water and dry weather runoff management,**	**10562(d)(4)**

References:
SWRP,Section 6. Identification and Prioritization of Projects, page 85
SWRP,Section 6.3.1.Opportunities and Benefits of Identified Projects, page 92

Y	**33. Plan identifies opportunities to use existing publicly owned lands and easements, including, but not limited to, parks, public open space, community gardens, farm and agricultural preserves, school sites, and government office buildings and complexes, to capture, clean, store,**	**10562(d)(5), 10562(b)(8)**

References:
SWRP,Section 6. Identification and Prioritization of Projects, page 85
SWRP,Section 6.3.1.Opportunities and Benefits of Identified Projects, page 92

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

Y	**34. For new development and redevelopments (if applicable): Plan identifies design criteria and best management practices to prevent storm water and dry weather runoff pollution and increase effective storm water and dry weather runoff management for new and upgraded infrastructure and residential, commercial, industrial, and public development.**	**10562(d)(6)**

References: SWRP,Section 6.7.Design Criteria and BMPs to Prevent Storm Water and Dry Weather Runoff, page 99	
Y	**35. Plan uses appropriate quantitative methods for prioritization of projects. 10562(b)(2) (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.)**
References: SWRP,Section 5.3.Spatial Prioritization Analysis, page 62 SWRP,Section 6. Identification and Prioritization of Projects, page 85 SWRP,Section 6.4.Project Prioritization Methodology, page 95	
Y	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.
References: SWRP,Section 5.Quantitative Methods, page 53 SWRP,Section 5.3.Spatial Prioritization Analysis, page 62 SWRP,Section 6. Identification and Prioritization of Projects, page 85 SWRP,Section 6.4.Project Prioritization Methodology, page 95	
Y	37. *Multiple benefits:* Each project in accordance with the Plan contributes to at least two or more **Main Benefits** and the maximum number of **Additional Benefits** as listed in Table 4 of the Guidelines. (Benefits are not counted twice if they apply to more than one category.)
References: SWRP,Section 6.3.Introduction of Projects, page 86 SWRP Appendix 4: Completed Project Solicitation Forms SWRP Appendix 5: Completed Project Scoring Forms	

IMPLEMENTATION STRATEGY AND SCHEDULE
(GUIDELINES SECTION VI.E)

Y	38. Plan identifies resources for Plan implementation, including: 1) projection of additional funding needs and sources for administration and implementation needs; and 2) schedule for arranging and securing Plan implementation financing.

References:
SWRP,Section 7. Implementation Strategy and Schedule, page 102
SWRP,Section 7.1. Projection of Additional Funding Needs, page 102
SWRP,Section 7.1.3.Schedule for Arranging and Securing Implementation Funding, page 109

Y	**39. Plan projects and programs are identified to ensure the effective implementation of the storm water resource plan pursuant to this part and achieve multiple benefits.**	**10562(d)(8)**

References:
SWRP,Section 6.Identification and Prioritization of Projects, page 85
SWRP,Section 7. Implementation Strategy and Schedule, page 102
SWRP,Section 7.2.2.Specific Actions by which the SWRP will be Implemented, page 110

Y	**40. The Plan identifies the development of appropriate decision support tools and**	**10562(d)(8)**

References:
SWRP,Section 7. Implementation Strategy and Schedule, page 102
SWRP,Section 7.3.2. Decision Support Tools and Data, page 112

Y	41. Plan describes implementation strategy, including: a) Timeline for submitting Plan into existing plans, as applicable; b) Specific actions by which Plan will be implemented; c) All entities responsible for project implementation; d) Description of community participation strategy; e) Procedures to track status of each project; f) Timelines for all active or planned projects; g) Procedures for ongoing review, updates, and adaptive management of the Plan; and h) A strategy and timeline for obtaining necessary federal, state, and local permits.

References:
SWRP,Section 7. Implementation Strategy and Schedule, page 102
SWRP,Section 7.2. Implementation Strategy and Timeline, page 109
SWRP,Section 7.3.Procedures to Track Project Status and Performance Measures, page 110

Y	**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)**

References:
SWRP,Section 7.2.1. Timeline for Submitting the SWRP into Existing Plans, page 109

IMPLEMENTATION STRATEGY AND SCHEDULE
(GUIDELINES SECTION VI.E)

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

References:
SWRP,Section 7.3.Procedures to Track Project Status and Performance Measures, page 110

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

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

References:
SWRP,Section 8.Education, Outreach, and Public Participation, page 113

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

References:
SWRP,Section 8.1 Public Education and Participation Opportunities, page 113

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

References:
SWRP,Section 8.1.2.Public Outreach/Participation Actions, page 113
SWRP,Section 8.4.Public Engagement and Education Schedule, page 116
SWRP,Section 8.5.Recommendations for Ongoing Outreach and Education During Plan Implementation, page 117

Y	47. Plan describes mechanisms to engage communities in project design and implementation.

References:
SWRP,Section 8.1.2.Public Outreach/Participation Actions, page 113
SWRP,Section 8.4.Public Engagement and Education Schedule, page 116
SWRP,Section 8.5.Recommendations for Ongoing Outreach and Education During Plan Implementation, page 117

Y	48. Plan identifies specific audiences including local ratepayers, developers, locally regulated commercial and industrial stakeholders, nonprofit organizations, and the general public.

References:
SWRP,Section 8.1.1.Identifying Key StakeholdersRecommendations for Ongoing Outreach and Education During Plan Implementation, page 113

EDUCATION, OUTREACH, PUBLIC PARTICIPATION (GUIDELINES SECTION VI.F)	
Y	49. Plan describes strategies to engage disadvantaged and climate vulnerable communities within the Plan boundaries and ongoing tracking of their involvement in the planning process.
References: SWRP,Section 8.2.Involvement of Disadvantaged and Climate Vulnerable CommunitiesRecommendations for Ongoing Outreach and Education During Plan Implementation, page 114	
Y	50. Plan describes efforts to identify and address environmental injustice needs and issues within the watershed.
References: SWRP,Section 8.3.Addressing Environmental Injustice Issues Recommendations for Ongoing Outreach and Education During Plan Implementation, page 115	
Y	51. Plan includes a schedule for initial public engagement and education.
References: SWRP,Section 8.4.Public Engagement and Education ScheduleRecommendations for Ongoing Outreach and Education During Plan Implementation, page 116	

9.2. Declaration and Signature

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

Authorized Signature	Title	Date
Authorized Signature	Title	Date

Public Agency

10. References

2NDNATURE LLC 2017. Stormwater Tool to Estimate Load Reduction (swTELR) Final Technical Document v1.2. July 2017.

Arnold Jr., C.L., Gibbons, C.J., 1996. Impervious surface coverage: the emergence of a key environmental indicator. J. Am. Plan. Assoc. 62 (2), 243e258. http://dx.doi.org/10.1080/01944369608975688.Holman-

Beck, N.G., Conley, G., Kanner, L., Mathias, M. 2017. An urban runoff model designed to inform stormwater management decisions. Journal of Environmental Management v193: 257-269. http://dx.doi.org/10.1016/j.jenvman.2017.02.007

City of Chowchilla (2010). *Local Hazard Mitigation Plan.* Retrieved from http://www.madera-county.com/index.php/lhmp

Grove, N.E., Edwards, R.T., Conquest, L.L., 2001. Effects of scale on land use and water quality relationships: a longitudinal basin-wide perspective. J. Am. Water Resour. Assoc. 37 (6), 1721e1734. http://dx.doi.org/10.1111/j.1752-1688.2001.tb03672.x.

Holman-Dodds, J.K., Bradley, A.A., Potter, K.W., 2003. Evaluation of hydrologic benefits of infiltration based urban stormwater management. J. Am. Water Resour. Assoc. 39 (1), 205e2015. http://dx.doi.org/10.1111/j.1752-1688.2003.tb01572.x.USEPA, 2013

Homer, C.G., Dewitz, J.A., Yang, L., Jin, S., Danielson, P., Xian, G., Coulston, J., Herold, N.D., Wickham, J.D., and Megown, K., 2015, Completion of the 2011 National Land Cover Database for the conterminous United States-Representing a decade of land cover change information. Photogrammetric Engineering and Remote Sensing, v. 81, no. 5, p. 345-354

Hunsaker, C.T., Whitaker, T.W., Bales, R.C., 2012. Snowmelt runoff and water yield along elevation and temperature gradients in California's southern Sierra Nevada. J. Am. Water Resour. Assoc. 48, 667–678. http://dx.doi.org/10.1111/ j.1752-1688.2012.00641.x.

Karr, J.R., 1999. Defining and measuring river health. Freshw. Biol. 41, 221e234. http://dx.doi.org/10.1046/j.1365-2427.1999.00427.

Maheepala, U.K., Tkyi, A.K., Perera, B.J.C., 2001. Hydrological data for urban stormwater drainage systems. J. Hydrol. 245, 32e47.

Pitt, R., Maestre A., and Morquecho R. 2003. Evaluation of NPDES Phase I Municipal Stormwater Monitoring Data. In: National Conference on Urban Stormwater: Enhancing the Programs at the Local Level. EPA/625/R-03/003

Provost and Pritchard, 2014a. Madera Integrated Regional Watershed Management Plan. December, 2014

Provost and Pritchard, 2014b. Madera Regional Groundwater Management Plan. December 2014.

Provost and Pritchard Consulting Group. (September 2014). *Madera Integrated Regional Water Management Plan.*

Provost and Pritchard Consulting Group, December 2016, Kern County Storm Water Resource Plan.

Rehn, A.C., May, J.T., & Ode, P.R. (2008). An index of biotic integrity (IBI) for perennial streams in California's Central Valley. Unpublished technical report for the California State Water Quality Control Board. Accessed June, 2012 at, http://www.swrcb.ca.gov/water_issues/programs/swamp/docs/reports/ibi_perstrms_cen_val.pdf

ROA/URS. (February 2011). *Madera County, California, Local Hazard Mitigation Plan.* Retrieved from http://www.madera-county.com/index.php/lhmp

San Joaquin River Flood Control Project Agency. (February 2015). *Upper San Joaquin River Regional Flood Management Plan.*

State Water Resources Control Board (December 15, 2015). *Storm Water Resource Plan Guidelines.*

Tang, A., Engel, B.A., Pijanowski, B.C., Lim, K.J., 2005. Forecasting land use change and its environmental impact at watershed scale. J. Environ. Manag. 76 (1), 35e45. http://dx.doi.org/10.1016/j.jenvman.2005.01.006.

Tomer, M.D., Locke, M.A., 2011. The challenge of documenting the water quality benefits of conservation practices: a review of USDA-ARS's conservation effects assessment project watershed studies. Water Sci. Technol. 64 (1), 300e310.http://dx.doi.org/10.2166/wst.2011.555.

USEPA, 2013. Our Built and Natural Environments: a Technical Review of the Interactions between Land Use, Transportation, and Environmental Quality, second ed. EPA 231-K-13e001.

USEPA, 2014. Municipal Separate Stormwater Sewer System (MS4) Main Page. Available at. http://water.epa.gov/polwaste/npdes/stormwater/Municipal-Separate-Storm-Sewer-System-MS4-Main-Page.cfm (Accessed in July 2014

GIS Mapping Geodatabase Citations

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at https://websoilsurvey.nrcs.usda.gov/.

NRCS soils data are used for modeling stormwater runoff and pollutants to support project prioritization

Xian, G., Homer, C., Dewitz, J., Fry, J., Hossain, N., and Wickham, J., 2011. The change of impervious surface area between 2001 and 2006 in the conterminous United States. *Photogrammetric Engineering and Remote Sensing*, Vol. 77(8): 758-762.

Satellite-derived impervious surface data are used for modeling stormwater runoff and pollutants to support project prioritization

National Elevation Dataset (NED), 30 meters. Data available from the U.S. Geological Survey. See USGS Visual Identity System Guidance for further details.

Elevation data are used for modeling stormwater runoff and pollutants to support project prioritization

12 Digit Watershed Boundary Dataset in HUC8, NRCS Version. Data available from the U.S. Geological Survey. See USGS Visual Identity System Guidance for further details.

USGS Watershed boundary data are used for modeling stormwater runoff and pollutants to support project prioritization

County of Madera (2004). *Madera County Assessor's Office Use Codes.*

Land-use codes are used for modeling stormwater runoff and pollutants to support project prioritization

California Department of Water Resources (CDWR) Agricultural Land and Water Use Estimates. *http://www.water.ca.gov/landwateruse/anlwuest.cfm Accessed, May 2017.*

Water used data are used to identify areas with intensive dry season water use to project prioritization

California Water Institute (2017). Groundwater Recharge Areas. Retrieved from *https://databasin.org/datasets/52072bcadb5246cb8ceb2c921c97ce95*

Groundwater recharge area data are used to identify areas with potential to replenish groundwater aquifers to support project prioritization

California Interagency Watershed Map (Calwater 2.2.1) (2015). *CALWATER Planning Watershed (PWS).*

CalWater watershed boundary data are used for modeling stormwater runoff and pollutants to support project prioritization

California Department of Transportation. *California Road Systems (CRS) GIS dataset* (2016). Retrieved from http://www.dot.ca.gov/hq/tsip/gis/datalibrary/Metadata/CRS.html

Roads data are used for modeling stormwater runoff and pollutants to support project prioritization.

Environmental Protection Agency (2015). *303(d) Listed Impaired Waters NHDPlus Indexed Dataset.* Retrieved from https://www.epa.gov/exposure-assessment-models/303d-listed-impaired-waters

Impaired waterbodies data are used to identify areas with water quality impacts to support project prioritization

Han W., Z. Yang, L. Di, P. Yue, 2014. A geospatial Web service approach for creating on-demand Cropland Data Layer thematic maps. Transactions of the ASABE, 57(1), 239-247 (*https://nassgeodata.gmu.edu/CropScape*)

Groundwater recharge area data are used to identify areas with potential to replenish groundwater aquifers to support project prioritization\

National Land Cover Dataset: http://landcover.usgs.gov/uslandcover.php

Satellite-derived land cover data are used for modeling stormwater runoff and pollutants to support project prioritization

US Environmental Protection Agency Summary of State Information, Impaired Waters Listed by State: https://ofmpub.epa.gov/waters10/attains_nation_cy.control#imp_water_by_state

Impaired waterbodies data are used to identify areas with water quality impacts to support project prioritization

US EPA/ORD/NERL/ESD Landscape Ecology Branch, RUSLE (2017). Weighted average gross soil erosion (A value) for the western USA. Retrieved from *https://databasin.org/datasets/7432f101133a463a8d477ca18a856b74*

Satellite-derived land cover data are used for modeling stormwater runoff and pollutants to support project prioritization

Key Modeling References

The references below support the theoretical basis, specification, and parameterization of the runoff and pollutant loading model that is used as part of the spatial prioritization analysis. They provide the specific methods and calculations used for runoff generation, flow routing, erosion, and pollutant loading simulation along with the data sets that are used to parameterize model components such as land-use specific event mean pollutant concentrations. Hydrologic papers support the modeling philosophy that drives the approach of avoiding undue complexity that does not add either utility or performance gains at the scale of model outputs relevant to stormwater management.

Arnold Jr., C.L., Gibbons, C.J., 1996. Impervious surface coverage: the emergence of a key environmental indicator. J. Am. Plan. Assoc. 62 (2), 243e258. http:// dx.doi.org/10.1080/01944369608975688. Atchison, D., Dussailliant, A., Severson, L., 2012

2NDNATURE LLC 2017. Stormwater Tool to Estimate Load Reduction (swTELR) Final Technical Document v1.1. March 2017.

Beck, N.G., Conley, G., Kanner, L., Mathias, M. 2017. An urban runoff model designed to inform stormwater management decisions. Journal of Environmental Management v193: 257-269. http://dx.doi.org/10.1016/j.jenvman.2017.02.007\

Beven, K. 1996. The limits of splitting: Hydrology. Science of the Total Environment. 183(1/2): 89-97.

Booth, D. B., Karr, J. R., Schauman, S., Konrad, C. P., Morley, S. A., Larson, M. G. and Burges, S. J. 2004. Reviving urban streams: Land use, hydrology, biology and human behavior. *JAWRA Journal of the American Water Resources Association*, 40: 1351–1364.

Brezonik, P.L., Stadelmann, T.H. (2002) Analysis and predictive models of stormwater runoff volumes, loads, and pollutant concentrations from watersheds in the Twin Cities metropolitan area, Minnesota, USA. 36 (7) 1743-1757.

Chen, H.J., and H. Chang. 2014. Response of discharge, TSS and E. coli to rainfall events in urban, suburban and rural watersheds. Environmental Science Processes and Impacts. DOI: 10.1039/c4em00327f

Jakeman, A.J., G.M. Hornberger, 1993. How much complexity is warranted in a rainfall runoff model? Water Resources Research 29, 2637-2649.

Kayhanian, M., B.D. Fruchtman, J.S. Gulliver, C. Montanaro, E. Ranieri, and S. Wuertz. 2012. Review of highway runoff characteristics: Comparative analysis and universal implications. Water Research 46(2012): 6609-6624.

Lee, H.L., K.W. Bang, 2000. Characterization of urban stormwater runoff. Water Resources 34(6) 1773-1780.

Line, D., N. White, D. Osmon, G. Jennings, C. Mojonnier, 2002. Pollutant export from various land uses in the Upper Neuse River Basin. Water Environment Research 74(1): 100-108.

Schueler, T. 1987. Controlling Urban Runoff: A Practical Manual for Planning and Designing Urban Best Management Practices. MWCOG. Washington, D.C.

Stein, E., L. Tiefenthaler, L., Schiff, Kenneth, 2007. Sources, patterns and mechanisms of storm water pollutant loading from watersheds and land uses of the greater Los Angeles are, CA, USA. Southern California Coastal Water Research Project Final report. 103 pp.

Swanson Hydrology and Geomorphology, 2003. Assessment of Seasonal Pollutant Loading and Removal Efficiency of Detention Basins. Prepared for the Tahoe Regional Planning Agency and the US Environmental Protection Agency. February 2003. 59pp.

USDA-SCS (U.S. Department of Agriculture-Soil Conservation Service), 1986. Urban hydrology for small watersheds. Technical release 55, NTIS PB87-101580, 2nd edn. USDA SCS, Springfield, Virginia.

USDA SCS (US Department of Agriculture-Soil Conservation Service), 2007. Part 630 Hydrology National Engineering Handbook, Chapter 7 Hydrologic Soil Groups. 210-VI-NEH, Washington, DC.

USDA SCS (US Department of Agriculture-Soil Conservation Service), 2010. Part 630 Hydrology National Engineering Handbook, Chapter 15 Time of Concentration. 210-VI-NEH, Fort Worth, Texas.

USEPA, 1983. Final Report. Results of the Nationwide Urban Runoff Project. Washington, DC.

USEPA, 2014. Municipal Separate Stormwater Sewer System (MS4) Main Page. Available at http://water.epa.gov/polwaste/npdes/stormwater/Municipal-Separate-Storm-Sewer-System-MS4-Main-Page.cfm. Accessed in July 2014.

Walsh, C.J., D.B Booth, M.J. Burns, T.D. Fletcher, R.L. Hale, L.N. Hoang, G Livingston, M. A. Rippy, A.H. Roy, M. Scoggins, A. W. 2016. Principles for urban stormwater management to protect stream ecosystems. Freshwater Science, 35(1) 398-411