

3.2 Planning Area Description, Map and Boundaries

Justification of Planning Area Boundaries

The planning area addressed by the Southern Sonoma Storm Water Resource Plan will include the watersheds of two neighboring tributaries to San Pablo Bay: Petaluma River and Sonoma Creek (see Figure 1). These two watersheds are well suited for coverage under a single comprehensive Storm Water Resource Plan (SWRP) because they are substantially identical to the jurisdictional areas of Sonoma County which drain into San Pablo Bay and the larger San Francisco Bay and share water quality goals driven by similar impairments in shared receiving waters. Petaluma and Sonoma watersheds also share similar and consistent typified land uses and flooding patterns that generate collaboration across watersheds.

The Southern Sonoma County SWRP uses the CalWater 2.2 Hydrologic Area delineation for both watersheds in order to utilize the vast amount of existing data to support the project prioritization and quantification process. Supporting documents to be referenced within this plan have used this boundary for justification as have existing and original data sets and spatial layers. Concurrent planning efforts in the County, including the future Groundwater Sustainability Plans, pursuant to Sustainable Groundwater Management Act (SGMA) and the Sonoma County Agricultural Preservation and Open Space District's (SCAPOSs) *Vital Lands Initiative*, will utilize the same planning area boundary allowing collaborators to maintain consistency between regional efforts to promote land use planning and storm water management objectives, as well as potential opportunities for recharge. The hydrologic area scale was used for both watersheds as limited existing data was found through an initial analysis that would provide a comprehensive look at smaller cataloging units.

Petaluma River Watershed

Land Use

The Petaluma River Watershed is located in southern Sonoma County, and a portion of northeastern Marin County. The Petaluma River Watershed encompasses a 146 square mile, pear-shaped basin. The watershed is approximately 19 miles long and 13 miles wide with the City of Petaluma near its center. The City of Petaluma is the County's second largest city with population of 60,000. Land uses include: residential (urban and rural), industrial, institutional, commercial and agricultural.

The headwaters and ephemeral tributaries of the Petaluma River begin on the steep southwest slopes of Sonoma Mountain, the southern slopes of Mecham Hill, and the eastern slopes of Weigand's Hill and Mt. Burdell. The confluence of Willow Brook, Liberty Creek, and Weigand's Creek form the headwaters of the Petaluma Watershed just upstream of Rainsville Road and

Stony Point Road. The Petaluma River flows across the Denman Flat and through the City of Petaluma. Tidal influence extends upstream of the confluence with Lynch Creek.

Mountainous or hilly upland areas comprise 56% of the watershed. Approximately 33% of the watershed is valley, and the lower 11% are salt marshes. While the river's source lies over 300 feet above sea level, it descends to 50 feet within about 0.4 miles. The river is fully tidal 11 miles from its mouth, a product of its slight gradient through the marshes below Petaluma. The River, formerly known as Petaluma Creek, is a tidal slough that has been reshaped and renamed to suit human purposes. The U. S. Army Corps of Engineers periodically dredges this section to keep it navigable by gravel barges and pleasure craft.

The lower 12 miles of the Petaluma River flow through the Petaluma Marsh, the largest remaining tidal salt marsh in San Pablo Bay. The marsh covers 5,000 acres and is surrounded by approximately 7,000 acres of reclaimed wetlands. Prior to reclamation, marshland elevations ranged from mean sea level to three feet above mean sea level.

In the marshes west of Lakeville, the river is joined by San Antonio Creek, at which point it becomes the boundary between Marin County and Sonoma County. The river flows under State Route 37 at Green Point and enters northwest San Pablo Bay just north of Petaluma Point.

There are four disadvantaged community census blocks within the Petaluma watershed. Two tracts run along the river at North McDowell that are listed on the Department of Water Resources (DWR) Disadvantaged Community Map as severely disadvantaged with a high social vulnerability ranking according to the Agency for Toxic Substances and Diseases Registry's Social Vulnerability Index. Another tract is across from the Sonoma Marin Fairgrounds, and the fourth is near Petaluma High School. Indicators include a large number of mobile homes, residents age 65 and up and low median incomes suggests that this community's mobilization and response to disaster, especially flooding, could be weakened and a sustained burden.

Open Space

Parks and open spaces are integral to Petaluma's character, comprising a substantial portion of land nearly 1,300 acres, or 18% of acreage, within the Urban Growth Boundary. The City owns and maintains a full range of open space and recreational resources, including regional, community, neighborhood, and pocket parks. Petaluma possesses a multifaceted park and recreation system in addition to surrounding rural lands, which allows for the preservation of its unique identity. Policies continue to focus on the Petaluma River to expand land conservation and preservation.

The California Department of Fish and Wildlife (CDFW) manages the 1,950 acre Petaluma Marsh Wildlife Area. It is located approximately six miles southeast of the City of Petaluma and bordered by the Petaluma River on the east, San Antonio Creek on the south, private property (Neils Island) on the west, and Schultz Slough on the north. The 300-acre Rush Creek Marsh

managed by Marin County Open Space District is located south of Basalt Creek and north of Novato. The California State Coastal Conservancy and U.S. Fish and Wildlife Service (USFWS) own and manage approximately 430 acres of marsh as part of the Baylands Project, at the San Pablo Bay National Wildlife Refuge (Refuge), located in the southwest corner of Lakeville Highway and Highway 37.

The Sonoma Land Trust owns and manages over 1,000 acres adjacent to the Refuge. Of this acreage, about half is in oat hay, half grazed (in combination with seasonal wetlands) and 528 acres are preserved through an agricultural easement. East of Lakeville Highway and Reclamation Road, the Sonoma Land Trust manages 1,800 acres. Close to 1,000 acres of the Sonoma Land Trust's total acreage in the watershed will eventually be restored to tidal marsh. The SCAPOSD has numerous conservation easements on agricultural properties in the watershed that include hay, sheep, dairy, and grazing use.

The City of Petaluma owns the following open space parcels: Lafferty Ranch on Sonoma Mountain, small parcels related to water supply on Manor Road, Petaluma River Marina, oxidation ponds and related water treatment facilities near Lakeville, Schollenberger Park - a dredge disposal and wildlife sanctuary, Rocky Memorial Dog Park (on an old landfill), the Alman Marsh near the marina, a portion of the McNear Peninsula near downtown Petaluma, and 160 acres of important salt marsh and oxidation ponds near Schollenberger Park. On the eastern side of its boundaries, the City of Petaluma owns a municipal airport on East Washington Street, Prince Park, Wiseman Park, a golf course, and urban separator lands.

Other open space land in the watershed includes: Helen Putnam Park (Sonoma County Regional Parks), the Burdell Ranch (CDFW), Petaluma Adobe State Historic Park and Olompali State Historic Park (both owned by (California Department of Parks and Recreation).

The Tolay Lake Regional Park illustrates a long presence of Native American cultural history throughout the landscape that includes 1,769 acres of ecologically and historically rich lands. The preservation of such areas has been vital to the community, cultural histories, and natural resources that support a number of threatened species. The land has been identified as a historic spiritual center for Native Americans across California and is considered by the Federated Indians of Graton Rancheria as an area of spiritual significance.

Surface and Groundwater Resources

City of Petaluma Water Resources and Conservation (WRC) serves the majority of water to customers within the city boundary. Water is also served to customers outside the boundary for a variety of reasons. WRC's largest customer outside of the boundary is the U. S. Coast Guard training station located eight miles west of town. WRC also provides recycled water for agricultural irrigation customers outside the City boundary. These customers are all located to the southeast, near the City's water recycling facility. In the upper watershed, the Penngrove Water Company serves the unincorporated community of Penngrove with surface water from

the Sonoma County Water Agency (Water Agency). The North Marin Water District serves a small portion of the lower watershed and the Marin County community of Novato with surface water supplies from the Water Agency. See Figure 2 for a service area map.

The Petaluma Valley groundwater basin is faulted and discontinuous with relatively low well capacities. Water quality is inadequate in some areas for potable standards showing high total dissolved solids, iron and manganese, and nitrate contamination in the northwestern area. Ground water levels near the City of Petaluma dropped from the mid-1950 until the early 1960's, allowing greater intrusion of salt water into the aquifers along the lower Petaluma River. Delivery of Russian River Project water to the City of Petaluma began in 1962 with completion of the Water Agency's Petaluma Aqueduct. This allowed a reduction in the volume of municipal groundwater pumped and recovery of ground water levels. Groundwater levels have remained relatively steady since that time except during the drought of 1976-77. No appreciable change appears to have occurred in the last 20 years in the volume of ground water affected by sea water intrusion. As long as ground water pumping near the tidal portion of the Petaluma River does not substantially increase, the volume of affected ground water should not increase.

The Petaluma Groundwater Basin has been listed in medium overdraft by the DWR and has undergone a Groundwater Sustainability Agency formation process for the past several years consistent with the implementation of SGMA. In 2014, U.S. Geologic Survey (USGS) and the Water Agency partnered to conduct a three year groundwater study of the Petaluma Valley, which is scheduled to be completed this year.

WRC does not rely on groundwater as a significant portion of supply due to specific yield and water quality limitations. Since 2000, groundwater is only used for peak water demand needs or to minimize short-term supply cost impacts to customer rates. Currently, only six of the existing 12 active wells are used for production. Many of the wells are inactive due to low yields, poor water quality, or deteriorating well conditions. WRC reduced its groundwater use to zero from 2004 to 2006. However, groundwater use was increased in 2007 and 2008 due to a temporary surface water supply shortage due to Water Agency financial operational constraints. The Utility intends to only use groundwater in the future as emergency backup supply, peaking needs, or other short term scenarios. WRC did use 328 million gallons of groundwater in 2010 as a short term measure to mitigate the impacts of the Water Agency's wholesale rate increase.

The City of Petaluma purchases surface water from the Water Agency. The Water Agency is supplied by the federal Russian River Project, which it operates along with the Water Agency's appurtenant water transmission system. The key elements to the Russian River system are the Coyote Valley Dam, which creates Lake Mendocino on the East Fork Russian River, and Warm Springs Dam, which creates Lake Sonoma on Dry Creek (a tributary to the Russian River). Water from the Russian River is diverted by the Water Agency near Forestville and conveyed via its transmission system to its wholesale customers, which includes the City. The City receives the Water Agency supply through the Petaluma Aqueduct previously mentioned. The Petaluma

Aqueduct has a diameter of 33 inches. This provides a physical limitation of 38 million gallons per day at 10 feet per second. The City of Petaluma, along with the other Water Agency contractors, signed the Restructured Agreement for Water Supply (Restructured Agreement) in 2006. The Restructured Agreement provides for the financing, construction, and operation of diversion facilities, transmission lines, storage tanks, booster pumps, conventional wells, and appurtenant facilities. The agreement does not provide for a fixed supply or daily rate. Instead, the agreement states that Water Agency is not obligated to provide the City of Petaluma more than 13,400 acre-feet per year or more than 21.8 million gallons per day as an average daily rate during any one month. The City of Petaluma does not hold any water rights to the Water Agency supply.

Water Quality Priorities

The Petaluma River watershed supports beneficial uses for cold and warm freshwater habitat, fish migration, preservation of rare and endangered species, fish spawning, estuarine habitat, navigation, wildlife habit, and contact and non-contact water recreation. Impacts from urban, construction, land development, atmospheric deposition, and agricultural runoff have resulted in the 2012 Clean Water Act's Section 303(d) listing of the river, stream and tidal portions of the Petaluma River for the medium priority pollutants of nutrients, pathogens, sediment (river and stream only) and low priority pollutants of diazinon, nickel (tidal only). The watershed was listed for trash (river and stream only). The Petaluma River pathogen and nutrient Total Maximum Daily Load (TMDL) is under development. Expected completion dates for all TMDLs are 2019 to 2021.

Sonoma Creek Watershed

Land Use

The Sonoma Creek watershed encompasses a 170 square mile, oval-shaped basin (60% freshwater and 40% tidally influenced). The headwaters of Sonoma Creek lie in Sugarloaf Ridge State Park, 31 stream miles inland from San Pablo Bay. It is bounded on the east by the Maycamas Mountains, on the west by the Sonoma Mountains and on the north, near Kenwood, where it separates from the Laguna de Santa Rosa watershed. The near 92,000 acre watershed drains southward and discharges into San Pablo Bay, at the southern end of the watershed. The watershed is approximately 24 miles long and seven miles wide.

Sonoma Creek flows past and through three populated areas supporting a total population of approximately 42,000 people, including Kenwood and Glen Ellen. Further downstream, Sonoma Creek flows through a more densely urbanized area including Agua Caliente, Boyes Hot Springs and the City of Sonoma. With a combined population of 42,000, this area includes medium and high density residential land uses and significant commercial, urban park, and institutional land uses. Only 15% of the watershed lands are developed. Lower in the watershed, Sonoma Creek becomes a perennial stream flowing through vineyards and some hayfields that dominate the

agricultural landscape throughout the watershed. Extensive recurrent flooding affects the lower Sonoma Creek watershed, state highway, with a history of flooding in Glen Ellen and Sonoma.

There are several census block groups listed as disadvantaged outside of the City of Sonoma on the DWR Disadvantaged Communities Map. The census tracts in the Boyes Hot Springs and El Verano areas are also listed with high social vulnerability indexes given indicators including median income, language isolation and almost half the tract population without high school diplomas.

Open Space

The City of Sonoma owns over 95 acres of public parks and preserves that comprise roughly 10% of the acreage within the City's Urban Growth Boundary. In the unincorporated communities of Kenwood and Glen Ellen, small community parks and the larger Sonoma Valley Regional Park provide public access to recreation and open space maintained by the County. The City manages the 98 acre Montini Open Space Preserve, providing open space and access to trails and other nearby recreation opportunities and natural areas.

There are approximately 19 properties that fall within or on the watershed boundary overseen by the SCAPOSD. The largest publicly accessible parcels include the 1,290 acre Calabazas Creek Open Space Preserve and the 162 acre Van Hoosear Wildflower Preserve. Additional open space within City limits include Nathanson Preserve, the Sonoma Garden Park and the Maxwell Farm Regional Park. The Johnson and Lawson properties in the upper watershed provide a 547 acre expansion to the nearly 2,000 acre Hood Mountain Regional Park.

One of the largest State parks within the watershed is the 3,900 acre Sugarloaf Ridge State Park, which also contains the headwaters of Sonoma Creek in the Mayacamas Mountains in Kenwood. Elevations reach roughly 2,729 feet at the summit of Bald Mountain with a broad range of habitat types and plant communities throughout the park itself. California State Parks also own and maintain Sonoma State Historic Park within the City limits as well as the Jack London Ranch State Park. In the upper watershed near Glen Ellen, the 860 acre property where the Sonoma Development Center (SCD) resides is owned by the State with closure plans underway. The property includes two reservoirs and a vitally important 5 mile riparian habitat that links to an 85 mile wildlife corridor stretching from Lake County to Marin.

In the lower watershed, the USFWS administers the San Pablo Bay National Wildlife Refuge (Refuge). In 2013, the 1,092 acre Haire Ranch was acquired by the Sonoma Land Trust and transferred to USFWS for restoration and inclusion into the Refuge.

Surface and Groundwater Resources

The Sonoma Valley relies on groundwater and imported surface water to meet domestic, agricultural and urban demands. Based on the USGS study (2006), in 2000 more than half the

water demand was met with groundwater (57%), followed by imported water (36 percent), with the remaining demand met from recycled water (7%), and local surface water.

The Valley of the Moon Water District (VOMWD) relies primarily on surface water purchased from the Water Agency to meet customer demands. VOMWD's service area extends from the Trinity Oaks Subdivision, located north of the town of Glen Ellen, to the Temelec Subdivision located at the southern end of the Sonoma Valley, and encompasses a total area of approximately 7,545 acres. VOMWD provides potable water to approximately 23,000 people through over 6,940 connections. Local groundwater production from wells owned and leased by VOMWD comprises the remaining portion of VOMWD's water supply portfolio. Under normal water year conditions, approximately 85% of VOMWD's water supply is surface water purchased from the Water Agency. Under the Restructured Agreement, VOMWD is entitled to 8.5 million gallons per day during any month and an annual maximum of 3,200 acre feet per year. Provided the supply is available the Restructured Agreement permits VOMWD to take delivery of water in excess of its entitlement during a given month, provided specific conditions specified in the agreement are met. The remainder of VOMWD's water supply, amounting to approximately 15% in the average year, is provided by local groundwater supply wells.

The City of Sonoma's water supply comes predominantly from purchased surface water from the Water Agency. In a normal water year, approximately 10% of the City's water supply is from local groundwater supply wells. The City pumps groundwater from a total of five active local wells that all supplement the water obtained from the Water Agency. The City meets the water supply needs of their customers by importing water into the City's service area from the Water Agency, pumping local groundwater within Sonoma Valley, and implementing water conservation programs. However, in order to further supplement and enhance the City's water supply sources, the City has been in discussion with the Sonoma Valley County Sanitation District (SVCSD) to acquire recycled water in the future. Treated wastewater is currently either discharged to the San Pablo Bay via Schell and Hudeman Slough or is reused by dairy operations, vineyard irrigation and wetland enhancement in the southern part of the Sonoma Valley and southwest portion of Napa County. On average in the last five years, approximately 1,500 acre feet of recycled water was reused, thus offsetting groundwater pumping by this amount. The City recognizes that recycled water will help increase the reliability of their water supply by offsetting groundwater pumping, particularly in the southern end of Sonoma Valley. The City also recognizes the benefit of expanded recycled water use to offset agricultural pumping in the southern portion of the Sonoma Valley in terms of increasing the reliability of their groundwater supplies.

Two small mutual water companies, Kenwood Village Water Company and Lawndale Mutual Water Company, utilize surface water purchased from the Water Agency to serve the unincorporated communities of Kenwood and Lawndale in the upper watershed. See Figure 2 for a service area map.

Rural domestic demand is met by groundwater extracted from privately owned and operated wells. Agricultural water demands are largely met by Sonoma Valley groundwater supplies.

Deep zone groundwater level declines are present primarily southeast of the City of Sonoma and in the El Verano/Fowler Creek area. The two areas of decline have persisted for several decades or more, and appear to be expanding and deepening. These deep zone declines indicate that groundwater withdrawals are occurring at a rate that exceeds natural recharge. Groundwater levels in many wells in these two areas are declining at rates of several feet per year and have fallen well below sea level.

The Sonoma Valley Groundwater Basin has been listed in medium overdraft by the Department of Water Resources and as such has undergone a Groundwater Sustainability Agency formation process for the past several years consistent with the implementation of the SGMA. Local stakeholders representing diverse groundwater users and interests continue to guide implementation of the Groundwater Management Plan through a Basin Advisory Panel (BAP) and a Technical Advisory Committee (TAC). The BAP identified four primary management strategies consisting of water conservation, increased use of recycled water and implementation of groundwater banking and storm water recharge.

Water Quality Priorities

Sonoma Creek is currently listed on the U.S. EPA's Clean Water Act 303d list of impaired water bodies for excess nutrients, sediment and pathogens. TMDLs for sediment and pathogens have been established with compliance activities underway.

Pathogens: Due to the presence of pathogens in Sonoma Creek and its tributaries, the beneficial uses of water contact and noncontact recreation are impaired. Waterborne pathogens pose a risk to human health. In ambient waters, the presence of human and animal fecal waste and associated pathogens is inferred from high concentrations of fecal coliform and E. coli bacteria. Bacteria levels in Sonoma Creek and its tributaries are higher than the bacteria water quality objectives established to protect people who swim, wade, and fish in these waters. Consequently, humans who recreate in Sonoma Creek and its tributaries are at risk of contracting waterborne disease. Contributing pathogen sources include septic systems, sanitary sewer systems, municipal runoff, grazing lands, dairies, municipal wastewater treatment facilities and wildlife. Water quality monitoring data indicate that on-site sewage disposal systems are potentially a significant pathogen source to Sonoma Creek downstream of the community of Kenwood. Municipal runoff and sanitary sewer lines are the primary pathogen sources in the urban areas. Livestock grazing and dairies are potentially significant pathogen sources, occurring in limited areas of rural sectors of the watershed.

Sediment: Due to excess erosion and sedimentation in the Sonoma Creek Watershed, the narrative water quality objectives for sediment and settleable material are not being met and cold freshwater habitat, wildlife habitat, fish spawning, recreation, and preservation of rare and endangered species beneficial uses are impaired. In addition, channel incision has caused habitat simplification, which has reduced the quantity and quality of spawning and rearing habitat for salmonids and other native aquatic species. Channel incision is a controllable water

quality factor that is contributing to a violation of the narrative water quality objective for population and community ecology. Contributing sediment sources include natural processes (landslides, surface erosion, channel incision), human actions (roads and stream crossings, landslides, channel erosion, surface erosion including grazed lands, vineyards and minor agriculture), and urban storm water.

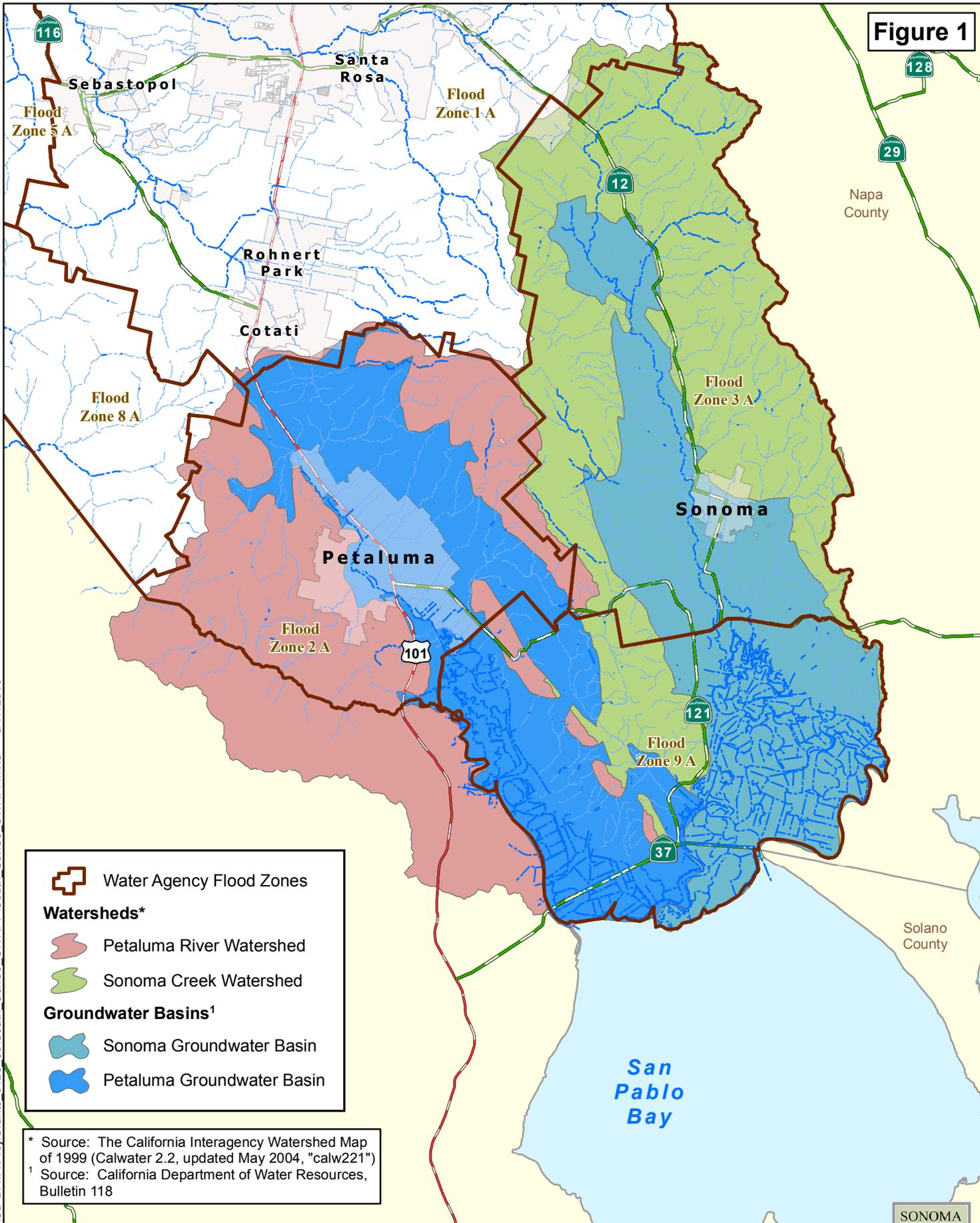
The Sonoma Creek sediment TMDL is established at 65,400 tons per year, which is approximately 125% of natural background load. The percentage based TMDL, 125% of natural background, applies throughout the watershed. In order to achieve the TMDL, controllable sediment delivery resulting from human actions needs to be reduced by approximately 80% from current proportion of the total load.

Nutrients: Sonoma Creek is on the U.S. EPA's 303(d) list of impaired water bodies due to nuisance algae growth caused by the excessive concentrations of nutrients. After extensive monitoring during the summer and fall of 2011 and 2012, the San Francisco Bay Regional Water Quality Control Board approved a proposal to delist Sonoma Creek for nutrients resulting in excessive algae growth and to remove this water body from the U.S. EPA 303(d) list. This de-listing will be included in the Integrated Report submitted to U.S. EPA for the 2018 listing cycle.

Figures

- Figure 1: Watershed Boundaries
- Figure 2: Water Utility Service Boundaries

Figure 1



Water Agency Flood Zones

Watersheds*

- Petaluma River Watershed
- Sonoma Creek Watershed

Groundwater Basins¹

- Sonoma Groundwater Basin
- Petaluma Groundwater Basin

* Source: The California Interagency Watershed Map of 1999 (Calwater 2.2, updated May 2004, "calw221")
¹ Source: California Department of Water Resources, Bulletin 118

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**Southern Sonoma County Storm
Water Resource Planning Project**

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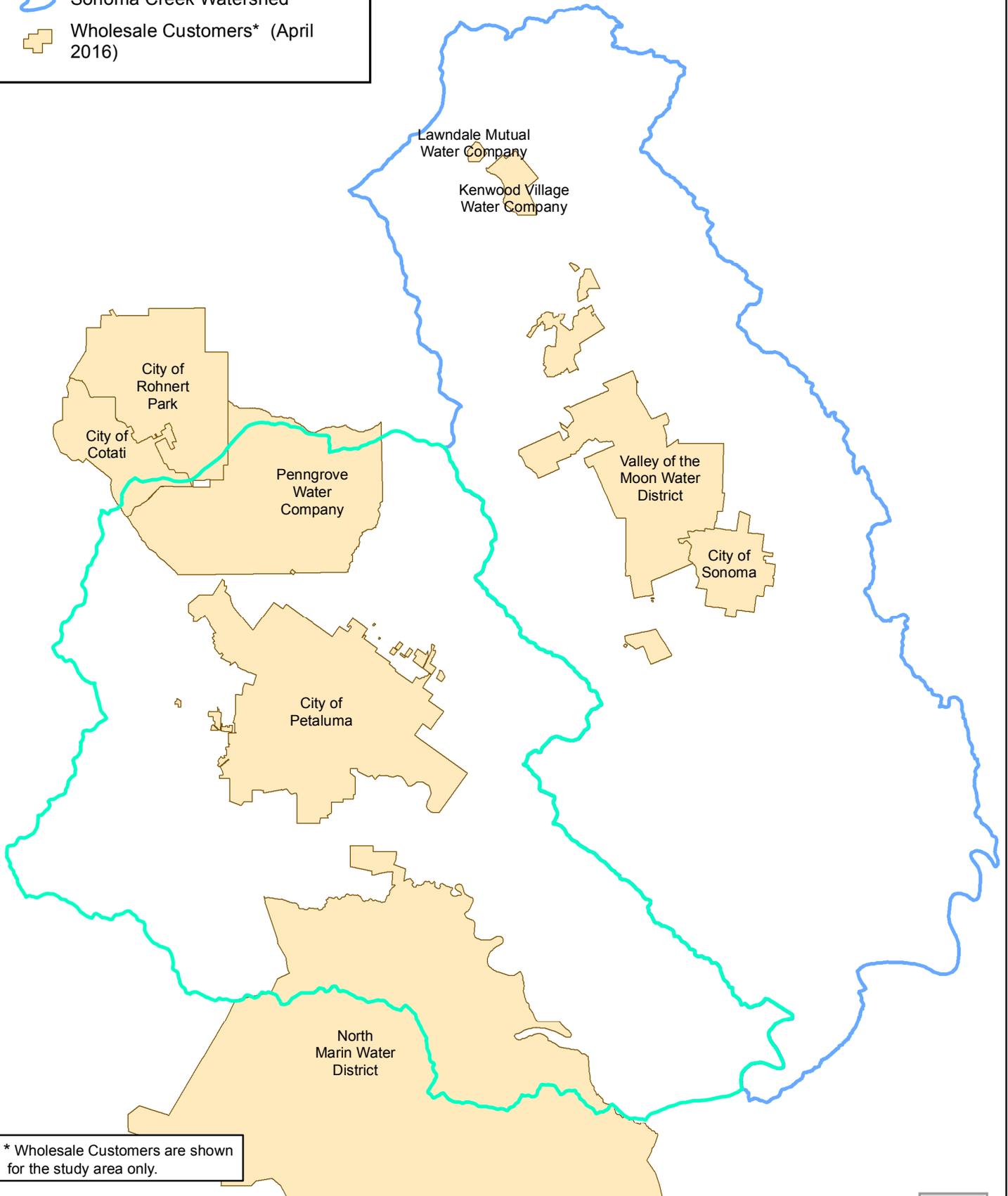


0 1.75 3.5 Miles



Figure 2

 Petaluma River Watershed
 Sonoma Creek Watershed
 Wholesale Customers* (April 2016)



* Wholesale Customers are shown for the study area only.

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Water Utility Service Boundaries

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0 1.5 3 Miles

