CHAPTER 1
INTRODUCTION

1.1 PURPOSE

The purpose of this Staff Report is to present the information and analyses developed to support the *Action Plan for the Russian River Watershed Pathogen Indicator Bacteria Total Maximum Daily Load* (TMDL Action Plan). The information and analyses presented are further supported by individual study and monitoring reports and technical memoranda. The TMDL Action Plan will be presented to the North Coast Regional Water Quality Control Board (Regional Water Board) in a public hearing as a proposed amendment to the *Water Quality Control Plan for the North Coast Region*, which is also known as the Basin Plan. The Basin Plan, Staff Report, TMDL Action Plan, supporting technical reports and memoranda, and Regional Water Board meeting schedule and agendas can be found on the Regional Water Board website (http://www.waterboards.ca.gov/northcoast/).

The purposes of the TMDL Action Plan for the Russian River Watershed Pathogen Indicator Bacteria Total Maximum Daily Load (Russian River Pathogen TMDL) are four-fold:

1. To improve the bacteriological quality of the surface waters in the Russian River Watershed so that public health is protected and water quality standards[1] are attained. The public health risk of most concern results from water contact recreation (REC-1) and incidental ingestion of contaminated river water, when and where such conditions exist or threaten to exist.

2. To set limits on the amount of bacterial discharges from non-natural controllable sources[2] into the surface waters of the Russian River Watershed that are necessary to protect water contact beneficial uses (REC-1).

3. To describe the implementation actions that are necessary to identify and control discharges of pathogenic waste and reduce bacteria concentrations in the Russian River Watershed to levels that protect public health and meet water quality standards.

4. To describe the monitoring actions that are necessary to ensure that implementation actions result in attainment of water quality standards or modify implementation actions, as necessary.

[1] Water quality standards are made up of three parts: the beneficial uses of the waterbody of interest (e.g., water contract recreation in the Russian River Watershed), water quality objectives that will ensure the reasonable protection of beneficial uses, and an antidegradation policy, which maintains and protects existing uses and high quality waters.
[2] As examples, the non-natural controllable sources of concern to the Russian River Watershed include but are not limited to leaking septic systems, leaking sewer lines, leaking or undersized manure holding ponds, and direct disposal (or indirect disposal via storm water runoff) of human or domestic animal waste into the Russian River and its tributaries.

This chapter presents an overview of the regulatory and environmental settings within which this TMDL project is developed.

1.2 REGULATORY FRAMEWORK

Several laws and regulations govern the development and implementation of TMDLs, most notably the federal Clean Water Act (CWA) and the state Porter-Cologne Water Quality Control Act. This section describes the framework and context of these laws and regulations for the Russian River Pathogen TMDL.

1.2.1 IMPAIRED WATERBODIES

Section 303(d) of the CWA requires states to develop a list of waterbodies where required pollution control mechanisms are not sufficient or stringent enough to meet water quality standards applicable to such waters (known as the Section 303(d) List). The Section 303(d) List applicable to a given region of the State is updated once every 6 years.

Pathogen indicator bacteria data collected as part of the Russian River Pathogen TMDL project indicate that all surface stream and river reaches in the Russian River Watershed are impacted during some time of the year by pathogens[3]. Table 1.1 shows those waterbodies identified on the Section 303(d) List in 2012[4] as impaired by pathogens, as well as those impaired waterbodies that are not yet listed. Figure 1.1 shows those waterbodies identified on Section 303(d) List in 2012. All the waterbodies listed as impaired in the table are included in this TMDL project. Waterbody-pollutant pairs that are not on the Section 303(d) List adopted in 2012 will be proposed for addition to the Section 303(d) List in 2018, unless new information indicates attainment of standards.

[3] No conclusions are made with respect to the lakes and reservoirs within the Russian River Watershed, which were not sampled nor assessed as part of this TMDL project.
[4] The 2012 Section 303(d) has been adopted by the Regional Water Board and State Water Resources Control Board, and on July 30, 2015 it was approved by U.S. EPA (it was partially approved on Jun 26, 2015).

Table 1.1
Waterbodies within the Russian River Watershed and their Pathogen Impairment Status

Waterbody Name			2012 303(d) Listed	Impairment Identified/ Confirmed by the TMDL
Hydrologic Area	**Hydrologic Sub Area**	**Listing Extent**		
Upper Russian River	Coyote Valley	Entire Waterbody	N	Y
	Forsythe Creek	Entire Waterbody	N	Y
	Ukiah	Entire Waterbody	N	Y
Middle Russian River	Sulphur Creek	Entire Waterbody	N	Y
	Warm Springs	Entire Waterbody	N	Y
	Geyserville	Stream 1 (unnamed tributary) on Fitch Mountain	Y	Y
		Entire Waterbody	N	Y
	Laguna	Mainstem Laguna de Santa Rosa	Y	Y
		Tributaries to the Laguna de Santa Rosa Except Santa Rosa Creek	Y	Y
	Santa Rosa	Mainstem Santa Rosa Creek	Y	Y
		Tributaries to Santa Rosa Creek	Y	Y
	Mark West	Mainstem Mark West Creek Downstream of the Confluence with the Laguna de Santa Rosa	N	Y
		Mainstem Mark West Creek Upstream of the Confluence with the Laguna de Santa Rosa	N	Y
		Tributaries to Mark West Creek Except Windsor Creek	N	Y
		Windsor Creek and its Tributaries	N	Y
Lower Russian River	Guerneville	Mainstem Russian River at Veterans Memorial Beach from the Railroad Bridge to Hwy 101	Y	Y
		Mainstem Russian River from Fife Creek to Dutch Bill Creek	Y	Y
		Mainstem Dutch Bill Creek	Y	Y
		Green Valley Creek Watershed	Y	Y
		Entire Waterbody	N	Y
	Austin Creek	Entire Waterbody	N	Y

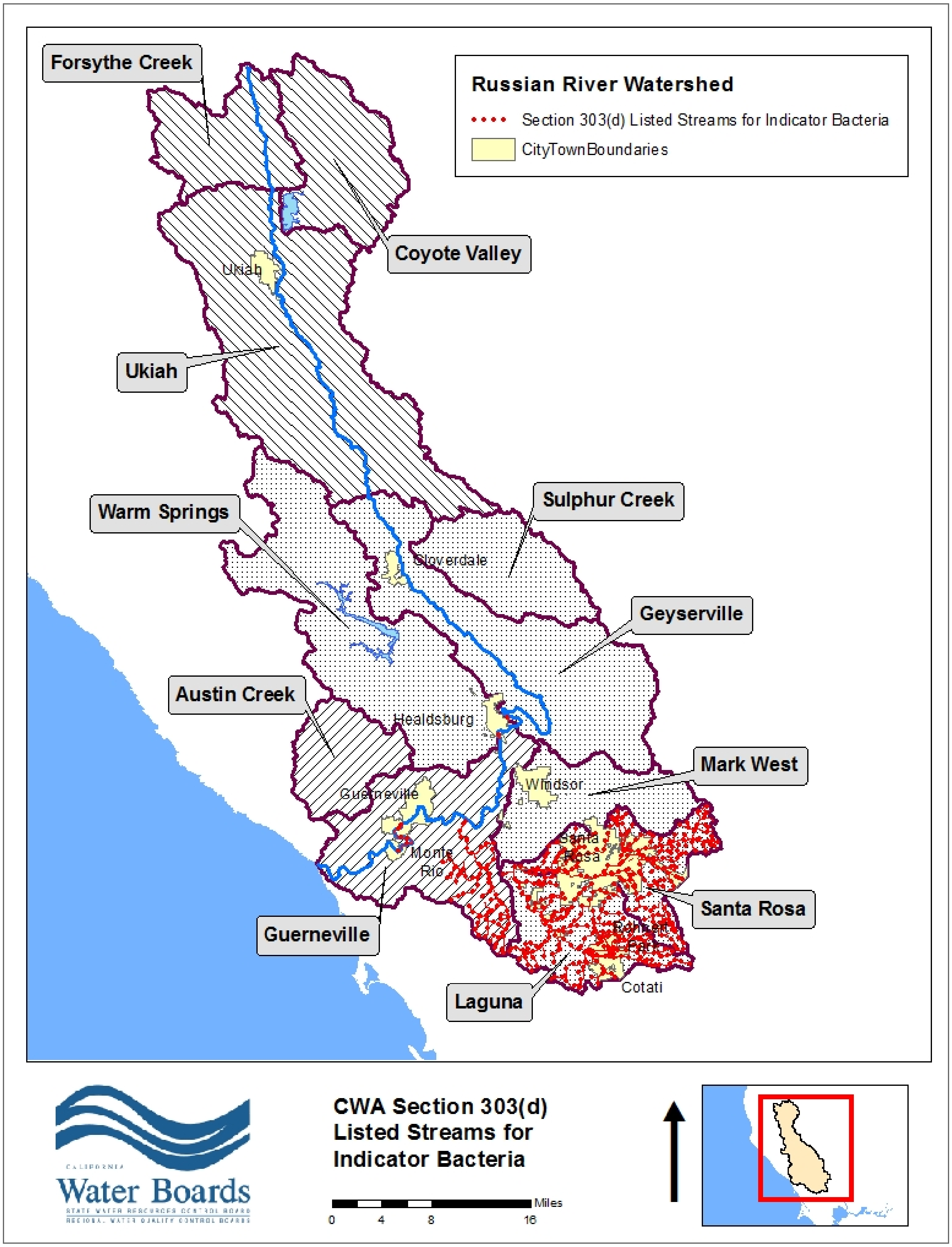

Figure 1.1: Streams that are included on the2012 Section 303(d) Listed as Impaired for REC-1 on the Russian River Watershed.

Once a waterbody is identified on the Section 303(d) List as impaired, a more detailed assessment of existing data is conducted, including assessment of data gaps. Studies are developed to fill critical data gaps so that the full spatial and temporal extent of the impairment can be defined. Chapter 3 summarizes the results of the assessment conducted for the Russian River Watershed, which constitute evidence of watershed-wide pathogen impacts and impairment of water contact recreational uses.

1.2.2 TMDL DEVELOPMENT

For waters listed as impaired, the state must develop a total maximum daily load (TMDL). A TMDL is a numerical calculation of the amount of a pollutant that a waterbody can assimilate and still meet water quality standards. This calculation includes waste load allocations (WLAs) for point sources, load allocations (LAs) for nonpoint sources, and an attribution to natural background. An allocation can be expressed as a concentration rather than a load. For pathogens, TMDLs are generally expressed as the concentration of an fecal indicator bacteria, which indicate the potential presence of pathogens.

TMDLs established for impaired waters must be submitted to U.S. EPA for approval. Impaired waterbodies will then be restored to attain water quality standards using existing regulatory tools such as individual or general waste discharge requirements, enforcement actions, basin plan amendments, or other policies for water quality control.

1.2.3 BASIN PLAN AMENDMENT DEVELOPMENT

The federal Clean Water Act requires states to address impaired waters by developing a TMDL, fully implementing existing programs, or implementing additional water quality programs that will result in the attainment of water quality standards. Development of TMDLs and an implementation plan are required to address the pathogen impairment of the Russian River Watershed. The TMDLs and implementation plan are contained in the *Action Plan for the Russian River Watershed Pathogen Indicator Bacteria Total Maximum Daily Load,* which is proposed as an amendment to the Basin Plan. The Basin Plan establishes the regulations by which the Regional Water Board protects and restores water quality within the North Coast Region.

The Basin Plan identifies the beneficial uses of water within the North Coast Region, the water quality objectives necessary to protect those uses, implementation programs that ensure objectives are attained, and monitoring programs. The Basin Plan also incorporates state policies, including the Antidegradation Policy (Resolution 68-16), which requires the maintenance of high quality waters, unless degrading those high quality waters is otherwise in the maximum benefit of the people of the state.[5] The specific requirements for basin plans are described in the California Water Code (also known as the Porter-Cologne Water Quality Control Act), Division 7, Article 3, sections 13240 to 13247.

[5] High quality waters are those waters whose ambient water quality exceeds or is better than the water quality objective established for the pollutant in question.

A Basin Plan amendment is appropriate for the Russian River Pathogen TMDL because control of existing direct and indirect discharges of pathogenic waste, protection of public health via application of REC-1 indicator bacteria criteria, and attainment of water quality standards will require multiple implementation actions. The California Administrative Procedures Act and the State's *Water Quality Control Policy for Addressing Impaired Waters: Regulatory Structure and Options* (Impaired Waters Policy) require the use of a Basin Plan amendment to tie together numerous actions by the Regional Water Board to ensure that persons subject to regulations have the opportunity to participate in the process of developing the implementation plan.

Through the Basin Plan amendment process, the Regional Water Board meets the requirements of the California Environmental Quality Act (CEQA) to analyze and disclose environmental effects. Because the basin planning process is certified as an exempt regulatory program meeting the requirements of Public Resources Code section 21080.5 (Cal. Code Regs., tit.14, § 15251), the Regional Water Board is not required to prepare an initial study, a Negative Declaration, or an Environmental Impact Report. Instead, the basin planning process uses substitute environmental documentation. This Staff Report is a critical part of that documentation as it includes the required environmental analysis. (See Chapter 11 for the CEQA checklist and a programmatic analysis of the potential environmental effects resulting from implementation of the draft TMDL Action Plan).

The Staff Report, TMDL Action Plan, and substitute environmental documentation will be presented before the Regional Water Board at a public hearing for the purpose of adopting the TMDL Action Plan as an amendment to the Basin Plan. Should the Regional Water Board adopt the TMDL Action Plan, the State Water Resources Control Board (State Water Board) will hold a hearing to consider approving the decision of the Regional Water Board. California's Office of Administrative Law provides a final legal review before the TMDL Staff Report and TMDL Action Plan are forwarded to the U.S. EPA. The U.S. EPA approves only the technical elements of TMDL, not the implementation plan components. The TMDL and implementation plan components take effect upon approval of the TMDL Action Plan by the Office of Administrative Law

1.3 WATERSHED DESCRIPTION & ENVIRONMENTAL SETTING

The Russian River Watershed encompasses 1,484 square miles (949,982 acres) in Sonoma and Mendocino counties, California (Figure 1.2). Major municipalities within the watershed include Santa Rosa, Rohnert Park, Windsor, Healdsburg, Sebastopol, Cloverdale, and Ukiah. The watershed also includes numerous unincorporated communities such as, Forestville, Guerneville, Monte Rio, Hopland, and Calpella.

The Russian River Watershed has been divided into eleven (11) Hydrologic Subareas which are listed Table 1.2 and shown in Figure 1.3.

Figure 1.2: Russian River Watershed Overview Map
Source: North Coast Regional Water Quality Control Board

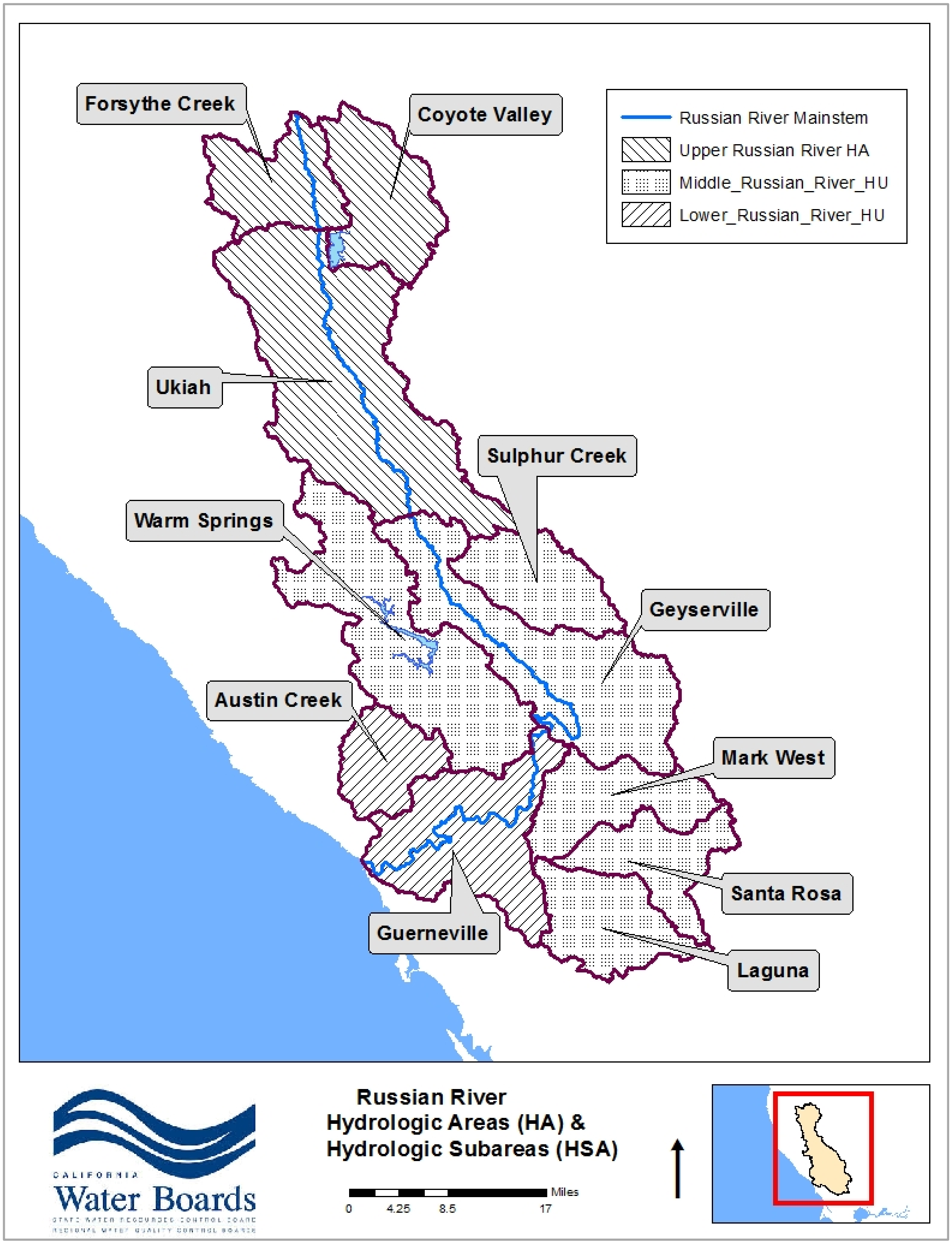

Figure 1.3: Hydrologic Subareas of the Russian River Watershed

Table 1.2 Hydrologic Areas and Subareas of the Russian River			
Hydrologic Area Name	**Hydrologic Subarea Name**	**Acres**	**Relative Area (%)**
Upper Russian River	Coyote Valley	67,011	7%
	Forsythe Creek	53,965	6%
	Ukiah	200,235	21%
Middle Russian River	Sulphur Creek	52,655	6%
	Warm Springs	139,536	15%
	Geyserville	133,007	14%
	Laguna	56,644	6%
	Santa Rosa	49,511	5%
	Mark West	55,248	6%
Lower Russian River	Guerneville	102,303	11%
	Austin Creek	39,867	4%
Russian River Watershed		**949,982**	**100%**

1.3.1 HYDROLOGY

The Russian River Watershed is hydrologically and geomorphologically diverse, containing 238 streams, 23 named springs, 14 natural lakes, 15 named reservoirs, all or portions of 10 groundwater basins, steep ridges, ephemeral streams, rolling hills, and wide alluvial valleys. The Russian River, in conjunction with Lake Mendocino and Lake Sonoma, serves as the primary water source for more than 500,000 residents in Mendocino, Sonoma and Marin counties, and for agricultural production in Mendocino and Sonoma counties. Lake Mendocino, located on the East Fork of the Russian River, has a capacity of 118,900 acre-feet and captures a drainage area of about 105 square miles. Lake Sonoma, located at the confluence of Warm Springs Creek and Dry Creek, about 14 miles northwest of the city of Healdsburg, has a capacity of 381,000 acre-feet and captures a drainage area of about 130 square miles.

The Russian River drainage basin includes all of the tributaries to the river and is affected by the interactions between the hillslopes, the channel, and its floodplain. Sediment produced in the headwaters of the Russian River basin is stored in the channel or in reservoirs, extracted as aggregate, or transported toward the Pacific Ocean. The main channel of the Russian River flows through a series of wide alluvial valleys separated by relatively narrow bedrock constrictions. These bedrock constrictions act as geologic controls such that each alluvial valley is relatively independent with respect to adjustments in slope, width and depth (Florsheim and Goodwin 1995).

The 110-mile mainstem channel of the Russian River originates in the Redwood Valley of central Mendocino County about 15 miles north of Ukiah. From its origin, the Russian River flows in a south to southeast direction to the Wohler Bridge area, where it changes to a southwest direction, crosses the Coast Range, and empties into the Pacific Ocean near the town of Jenner 20 miles west of Santa Rosa. Elevations range from zero at the Pacific Ocean to 4,343 feet at Mount St. Helena in the Mayacamas Mountains. Nine sub-basins containing fifty-seven valleys comprise the watershed.

The Russian River originates upstream of the Ukiah Valley and passes through the alluvial valley until the valley constricts at the Hopland Gage. The river again passes through another alluvial valley that contains the Town of Hopland before again being constricted in the Frog Woman Rock region.

Downstream of Ukiah and Hopland, in the Alexander Valley reach, the river enters a mountainous area east of Healdsburg known as the Fitch Mountain Constriction where it is confined by steep bedrock banks. The section of the river in the Healdsburg Valley downstream to Wohler Bridge, where another bedrock constriction occurs, is known as the middle reach. The middle reach contains several permanent in-stream structures including the Healdsburg Dam, two bridges in Healdsburg, Wohler Bridge, and Highway 101. The lower reach is a narrow alluvial valley that terminates at the Pacific Ocean, near the town of Jenner.

Three major reservoir projects provide water supply for the Russian River Watershed: Lake Pillsbury on the Eel River, Lake Mendocino on the East Fork of the Russian River, and Lake Sonoma on Dry Creek. The Potter Valley Project is an interbasin water transfer project, delivering water from the Eel River basin to the headwaters of the Russian River. The main facilities are two dams on the Eel River, a diversion tunnel and hydroelectric plant. The project derives water from above Scott Dam and approximately 50 square miles between Scott Dam and Cape Horn Dam, where water is diverted to the Russian River. In the Russian River Valley and under agreements with the US Army Corps of Engineers, the Sonoma County Water Agency manages the stored water supply in Lake Mendocino and Lake Sonoma to provide water for agriculture, municipal, and industrial uses in accordance with its water-right permit. In addition, the Sonoma County Water Agency also releases water from these reservoirs to contribute the minimum stream flow requirements in the Russian River and Dry Creek established in 1986 by the State Water Board's Decision 1610. These minimum stream flows provide water for recreation and fish passage for salmon and steelhead in the mainstem Russian River and Dry Creek.

The Sonoma County Water Agency operates an inflatable dam on the Russian River in the Wohler Bridge area to increase water production capacity during peak demand months. The dam is inflated in the early spring to create pool conditions in the river. In the fall, the dam is deflated to provide passage for fish migration. Operation of the inflatable dam increases water production capacity in two important ways. First, surface water immediately behind the dam can be diverted to a series of infiltration ponds that are constructed adjacent to the three Mirabel collector wells. Second, infiltration to the underlying aquifer behind the dam is significantly improved by increasing the recharge area from the river.

1.3.2 LAND USES

Primary land uses in the Russian River Watershed include urban, rural, agricultural, and undeveloped lands as shown in Table 1.3 and Figure 1.4, which are based on Landsat satellite imagery (Fry et al. 2006). Most of the land in the watershed is privately owned (89.78%), with federal (5.41%), state (2.59%), local (2.15%), and tribal lands (0.08%) making up the remaining ownership. Land cover is primarily open space with fifty-one percent of the watershed having less than one housing unit per 160 acres (WCW 2007). Almost 300,00 people live in municipalities of the Russian River watershed (Table 1.4).

Table 1.3
Land Cover in the Russian River Watershed

Land Cover Category	Acres	Percent of Watershed Area
Shrub/Scrub	260,269	27.4%
Evergreen Forest	231,347	24.4%
Grassland/Herbaceous	163,358	17.2%
Mixed Forest	104,836	11.0%
Developed, Open Space	57,173	6.0%
Cultivated Crops	55,813	5.9%
Deciduous Forest	23,096	2.4%
Developed, Low Intensity	22,233	2.3%
Developed, Medium Intensity	16,312	1.7%
Open Water	7,130	0.8%
Woody Wetlands	2,564	0.3%
Developed, High Intensity	1,948	0.2%
Pasture/Hay	1,719	0.2%
Barren Land	1,469	0.2%
Herbaceous Wetlands	343	<0.1%
Total	949,611	100%

Table 1.4 **Population of Municipalities in the Russian River Watershed**		
Municipality	**Population[1]**	**Percent of Municipal Population**
Santa Rosa	171,990	60.1%
Rohnert Park	41,398	14.5%
Windsor	27,243	9.5%
Ukiah	15,871	5.5%
Healdsburg	11,517	4.0%
Sebastopol	7,596	2.7%
Cloverdale	8.738	0.0%
Guerneville	4,534	1.6%
Forestville	3,293	1.2%
Monte Rio	1,152	0.4%
Hopland	756	0.3%
Calpella	679	0.2%
Total Municipal Population	286,038	100%

[1] Per U.S. Census Bureau 2010 and U.S. Census Bureau 2013

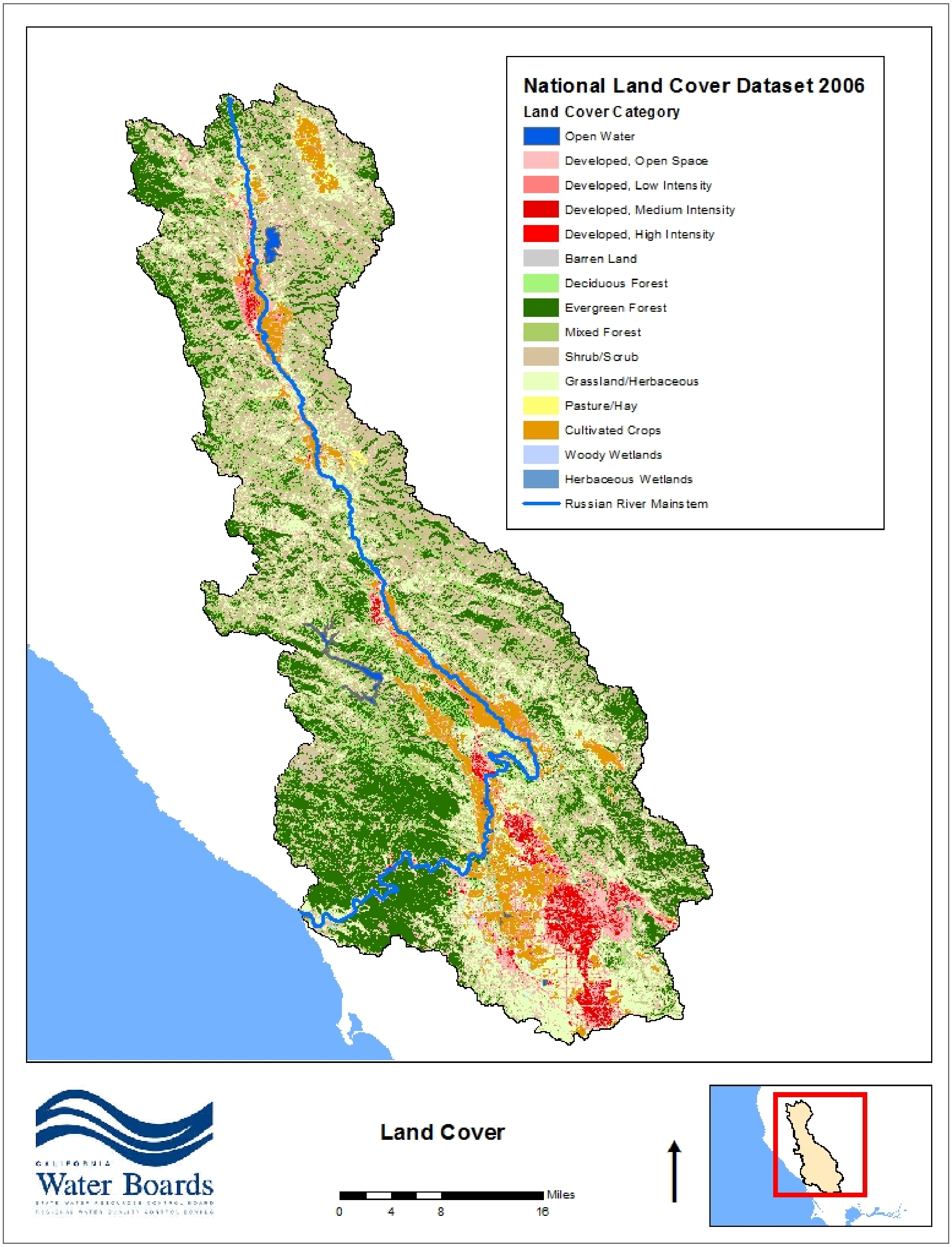

Figure 1.4: Land Cover in the Russian River Watershed

1.3.2.1 RECREATIONAL USES

The Russian River and tributary creeks are enjoyed by many swimmers, waders, canoers, kayakers, fishermen, and enthusiasts that partake in water contact and non-contact water recreation. The Russian River is one of the most intensively used rivers for recreation in the North Coast Region. On holiday weekends in the summer, beach visitors along the river number in the thousands. Several of the most popular beaches are listed in Table 1.5 and shown in Figure 1.5. The greatest number of popular swimming beaches are located in the Guerneville HSA, in the lower part of the Russian River Watershed.

Table 1.5
Popular Swimming Beaches along the Russian River

Hydrologic Area Name	Hydrologic Subarea Name	Recreational Beach Name	Location
Upper Russian River	Coyote Valley	Mill Creek Park	Potter Valley
	Forsythe Creek	Mariposa Swimming Hole	Redwood Valley
	Ukiah	Vichy Springs Park	Ukiah
		Mill Creek Park	Ukiah
Middle Russian River	**Geyserville**	**Cloverdale River Park**	**Cloverdale**
		Alexander Valley Campground	Healdsburg
Lower Russian River	Guerneville	Veteran Memorial Beach	Healdsburg
		Riverfront Park	Windsor
		Mirabel Park Campground	Forestville
		Steelhead Beach	Forestville
		River Access Beach	Forestville
		Sunset Beach	Forestville
		Johnson's Beach	Guerneville
		Monte Rio Beach	Monte Rio
		Casini Ranch Campground	Duncans Mills

Figure 1.5: Popular Swimming Beaches on the Russian River

1.3.3 CLIMATE

The Russian River Watershed has a Mediterranean climate with hot, dry summers and wet winters. Average precipitation varies across the watershed with generally wetter conditions in the north and west. Summer temperatures can reach over 100° F in inland valleys for weeks at a time, with coastal conditions cool and moist. Drought and severe storms occur periodically but mostly unpredictably; El Niño/ La Niña Southern Oscillation climatic conditions can exacerbate climatic extremes.

Precipitation in the Russian River Watershed is distinctly seasonal; about 80 percent of the total occurs during five months, November through March. The bulk of the precipitation occurs during moderately intense general storms of several days' duration. Snow falls in modest amounts at altitudes above 2,000 feet, but it seldom remains on the ground for more than a few days. Mean annual precipitation varies from about 30 inches in the flat valley lands north of Santa Rosa to more than 80 inches in parts of the mountains. Summers are dry, with total rainfall from June through August averaging less than 0.5 inch (Zhang and Johnson 2010).

The spatial distribution of mean annual rainfall in the Russian River Watershed is shown in Figure 1.6. These precipitation zones were derived statewide by the California Department of Forestry and Fire Protection for the period 1900-1960. Table 1.6 presents the area weighted precipitation for each Hydrologic Subarea in the Russian River.

Table 1.6
Average Annual Precipitation

Hydrologic Area Name	Hydrologic Subarea Name	Mean Precipitation (inches/year)
Upper Russian River	Coyote Valley	41.1
	Forsythe Creek	46.0
	Ukiah	43.1
Middle Russian River	Sulphur Creek	51.4
	Warm Springs	48.6
	Geyserville	41.6
	Laguna	31.3
	Santa Rosa	38.5
	Mark West	39.0
Lower Russian River	Guerneville	45.1
	Austin Creek	65.5
Russian River Watershed Mean		44.2

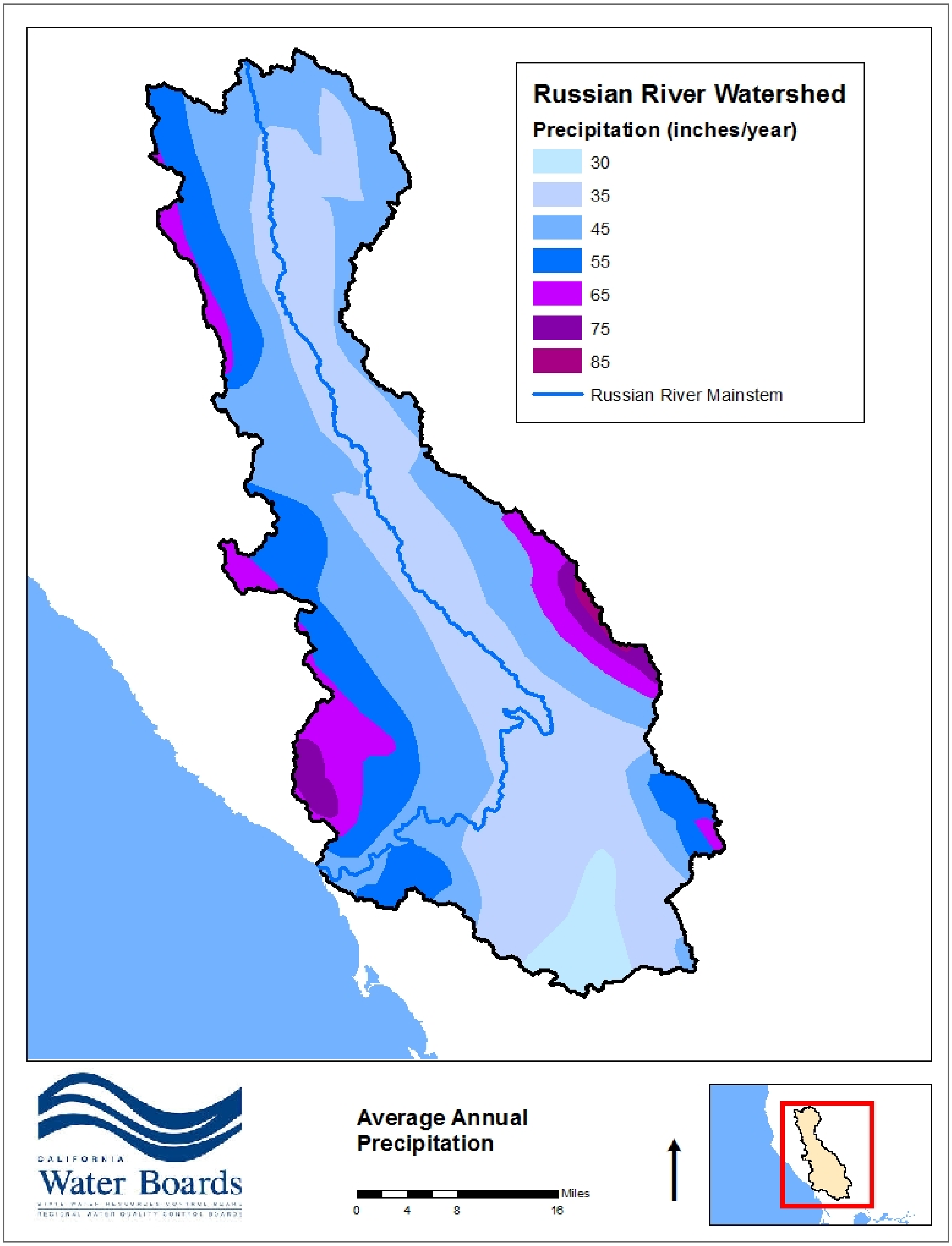

Figure 1.6: Average Annual Precipitation Patterns in the Russian River Watershed

1.3.4 GEOLOGY AND SOILS

The Russian River Watershed is underlain predominantly by the Franciscan Assemblage, which is a highly erodible mélange that formed during the Jurassic-Cretaceous age. The Franciscan Assemblage forms the bulk of the coast range; the sediment consists of muddy sandstones and cherts jumbled together and layered with basalt lava flow. This lithology is very unstable with landslides common throughout the mountainous regions of the basin. Many of the streams within the basin, including the upper mainstem Russian River, follow the northwest to southeast orientation of geologic faults. The Rodgers Creek Fault enters Sonoma County at San Pablo Bay and extends northward through the City of Santa Rosa, where it meets up with the Healdsburg Fault, which continues northward passing east of the Town of Windsor. The Mayacama Fault lies to the east of the Healdsburg Fault and continues northward, passing east of the City of Cloverdale.

The Russian River flows through a series of broad alluvial valleys and narrow bedrock constrictions. Historic photographs show that the historic river channel once meandered across a broad natural floodplain and that the elevation of the active channel was once close to the elevation of the floodplain. Traces of the channel remained on the irregular floodplain as a series of "sloughs" or side channels. Subsequent land use changes in the Russian River Basin have leveled the floodplain, filled the side channels, and constrained the river channel into a narrow and straighter course (Florsheim and Goodwin 1995).

The Russian River Watershed contains a large number of different soils types (NRCS 2013). Hydrologic soil characteristics influence the delivery of bacteria to surface waters. Soils with a greater potential to runoff also have a greater potential to deliver bacteria with the soil particles. Impervious lands, such as urban paved areas, deliver storm water and associated bacteria directly to the river and its tributaries. Identification of hydrologic soil groups is based on comparison of the characteristics of soil profiles, which include hydraulic conductivity, texture, bulk density, structure, strength, clay mineralogy, and organic matter content. Four hydrologic soil groups are categorized (NRCS 2007: Table 1.7 and Figure 1.7):

Table 1.7
Hydrologic Soil Characteristics of the Russian River Watershed

Hydrologic Soil Group	Runoff Potential	Acres	Relative Watershed Area (%)
A	Low when thoroughly wet. Water is transmitted freely through the soil.	1,756	0.2%
B	Moderately low when thoroughly wet. Water transmission through the soil is unimpeded.	477,416	50%
C	Moderately high when thoroughly wet. Water transmission through the soil is somewhat restricted.	218,774	23%
D	High when thoroughly wet. Water movement through the soil is restricted or very restricted.	251,664	27%
	Total	949,611	100%

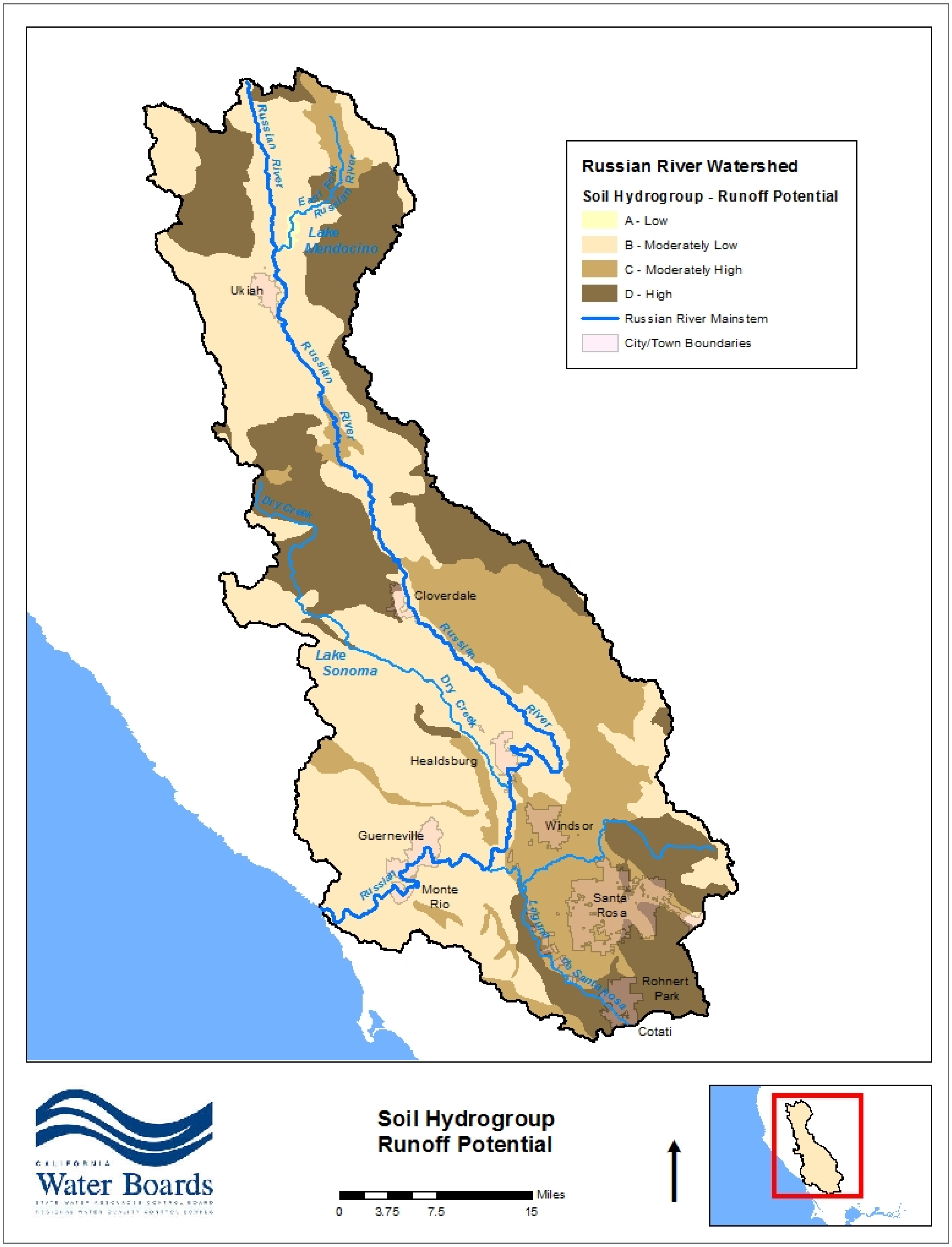

Figure 1.7: Hydrologic Soil Characteristics of the Russian River Watershed

In summary, the Russian River Watershed is a very important watershed in the North Coast Region. It contains one of the largest population centers in the region, dependent on the water supplies provided by the Russian River. Similarly, the river provides broad recreational value, attracting a large tourist population. The Russian River Watershed supports multiple thriving landuses, which produce a variety of anthropogenic influences, stemming both from urban and rural living. The Mediterranean climate ensures that most of the precipitation in the Russian River Watershed falls during the winter season. This, coupled with the steep slopes of the watershed, ensure significant storm water runoff during the wet season. Similarly, the broad valleys ensure significant agricultural production within the river corridor. The Russian River TMDL as described in the following chapters defines the extent and seasonality of the pathogen problem and the sources of pathogenic waste discharges. It establishes appropriate numeric targets by which to monitor attainment of water quality objectives and defines the waste load and load allocations necessary to meet those targets. Finally, the Russian River TMDL describes the implementation measures necessary to control the discharge of pathogenic waste in the Russian River Watershed and the monitoring appropriate to measure program success