CHAPTER 3: REGION DESCRIPTION

CONTENTS

3.1 Introduction 5
3.2 Physical Setting 5
3.3 Region Boundaries 6
3.3.1 Overlap with Pajaro River Watershed Region 7
3.3.2 Shared Border with Bay Area IRWM Region 7
3.4 Population and Demographics 8
3.5 Historic and Projected Population 9
3.6 Land Use 10
3.7 Economic Overview 11
3.7.1 Economic Activity 12
3.7.2 Disadvantaged Communities in the Planning Region 13
3.7.3 Cost of Living 16
3.8 Climate and Precipitation 17
3.9 Climate Change 18
3.10 Watersheds 19
3.10.1 San Lorenzo River 22
3.10.2 Soquel Creek 23
3.10.3 Scott Creek 23
3.10.4 Waddell Creek 23
3.10.5 Aptos Creek 23
3.10.6 Baldwin Wilder 24
3.10.7 San Andreas 24
3.10.8 San Vicente Creek 24
3.10.9 Watsonville Slough 24
3.10.10 Año Nuevo Creek 25
3.10.11 Davenport 25
3.10.12 Laguna Creek 25
3.10.13 Liddell Creek 25
3.10.14 Majors 25
3.10.15 Swanton Bluffs 25
3.10.16 Arana Gulch-Rodeo 26
3.10.17 Pajaro River 26
3.11 Biological Resources 27
3.11.1 Rare and Endangered Terrestrial Species 29

3.11.2 Rare and Endangered Salmonid Species 29
3.12 Watershed Management 31
3.12.1 City of Santa Cruz Water Resources Management Section 31
3.12.2 Santa Cruz County 31
3.12.3 Resource Conservation District of Santa Cruz County 32
3.13 Water Supply 33
3.13.1 Streamflow 33
3.13.2 Water Supply Watersheds 34
3.14 Groundwater 35
3.14.1 Santa Margarita Groundwater Basin 35
3.14.2 Soquel-Aptos Groundwater Basin 36
3.14.3 Pajaro Valley Groundwater Basin 37
3.14.4 Miscellaneous Water Bearing Units 38
3.15 Water Suppliers 38
3.15.1 City of Santa Cruz Water Department 39
3.15.2 Soquel Creek Water District 41
3.15.3 San Lorenzo Valley Water District 42
3.15.4 Scotts Valley Water District 43
3.15.5 Central Water District 44
3.15.6 Davenport County Sanitation District 45
3.15.7 Lompico County Water District 45
3.15.8 Small Drinking Water Systems and Private Users 45
3.16 Water Supply and Demand 46
3.16.1 Historical Water Use 46
3.16.2 Current Water Use 47
3.16.3 Projected Water Use 48
3.16.4 Environmental Water 49
3.17 Wastewater 50
3.17.1 City of Santa Cruz 51
3.17.2 City of Scotts Valley 51
3.17.3 Davenport County Sanitation District 51
3.17.4 Freedom County Sanitation District 51
3.17.5 Santa Cruz County Sanitation District 52
3.17.6 Salsipuedes Sanitary District 52
3.17.7 County Service Areas – CSAs 2, 5, 7, 10, 12, 20 52
3.17.8 San Lorenzo Valley Water District 53

3.17.9 Private Sewer Systems 53
3.18 Flood Control and Drainage Agencies 53
3.18.1 Santa Cruz County Flood Control and Water Conservation District 54
3.18.2 Zones 5, 6, and 8 54
3.18.3 Zones 7 and 7A, Pajaro Storm Drain Maintenance District 55
3.18.4 CSA 57 – Graham Hill 55
3.18.5 City of Santa Cruz 55
3.18.6 City of Capitola 55
3.18.7 City of Scotts Valley 56
3.19 Water Quality 56
3.19.1 Impaired Waterbodies 56
3.19.2 Central Coast Basin Plan Objectives 58
3.19.3 Watershed Management Initiative Goals 58
3.19.4 Beach Water Quality 59
3.20 Water Related Issues and Challenges 60

FIGURES

Figure 3- 1 Santa Cruz IRWM Region 6
Figure 3-2 Santa Cruz County Population by Ethnicity, 2012 8
Figure 3- 3 Santa Cruz IRWM Region Land Cover 11
Figure 3- 4 Percent of Households Overpaying on Housing Costs 16
Figure 3- 5 Percent of Households Below Self-Sufficiency Income Standards, Santa Cruz County, 2007 . 17
Figure 3- 6 Water Year Types 18
Figure 3- 7 Watersheds and Groundwater Basins 20
Figure 3- 8 Salmonid Supporting Streams in the Santa Cruz Region 30
Figure 3- 9 Mean Monthly Streamflow 33
Figure 3- 10 Soquel-Aptos Groundwater Basin 37
Figure 3- 11 Santa Cruz IRWM Water Supply 39
Figure 3- 12 Urban Water Production and Connections – Large Water Districts in Santa Cruz Region 47
Figure 3- 13 Significant Water Resources Issues 57
Figure 3- 14 Santa Cruz County Beach Postings, 2005 – 2013 60

TABLES

Table 3-1 Population of Cities and Communities in the Region 8
Table 3- 2 Languages Spoken in Santa Cruz County 9
Table 3- 3 Historical Population Growth, 1970 – 2010 9
Table 3- 4 Population Growth Projections, 2010 – 2035 10
Table 3- 5 Annual Crop Production (in Millions of Dollars) – Santa Cruz County 13
Table 3- 6 Tourism Revenue (in Millions of Dollars) – Santa Cruz County 13
Table 3- 7 Economically Disadvantaged Communities (DAC) within the IRWM Region 14
Table 3- 8 Income Distribution Categories and Corresponding Income Ranges in Santa Cruz County Based on 2010 Median Household Income of Three-Person Households 14
Table 3- 9 Low Income Three-Person Households in Communities within the Santa Cruz Region 15
Table 3- 10 Monthly Climatological Data 17
Table 3- 11 Santa Cruz IRWM Watersheds 20
Table 3- 12 Highly Significant Terrestrial Biological Systems 28
Table 3- 13 Highly Significant Aquatic Biological Systems in Santa Cruz County 29
Table 3- 14 U.S. Geological Survey Surface Flow Gages 33
Table 3- 15 Water Supply Watersheds and Related Water Systems 34
Table 3- 16 City of Santa Cruz Supply and Demand Projections (water units are acre-feet per year unless otherwise specified)..... 41
Table 3- 17 Soquel Creek Water District Water Supply and Demand Projections 42
Table 3- 18 San Lorenzo Valley Water District Water Supply and Demand Projections 43
Table 3- 19 Scotts Valley Water District Water Supply and Demand Projections 44
Table 3- 20 Central Water District Water Supply and Demand Projections..... 45
Table 3- 21 Water Supply and Demand, 2012 48
Table 3- 22 Regional Water Demand Projections 49
Table 3- 23 Wastewater Management Roles 50
Table 3- 24 Flood Control Agencies 53
Table 3- 25 Zones of the County Flood Control and Water Conservation District 54
Table 3- 26 Santa Cruz Region 303(d) Listings by Pollutant Category 57
Table 3- 27 Sources of Impairment of Waterbodies in the Santa Cruz IRWM Region 57

3.1 INTRODUCTION

Although relatively small geographically, the Santa Cruz IRWM Region features a complex mix of entities involved with water resources management who face a number of water supply, environmental, and social issues. Blessed with a beautiful and diverse landscape, the Region's natural resources support agriculture and tourism, the two main industries that drive the local economy. The region is dominated by residential land use, including rural and mountain residential; timber harvesting; and a mix of commercial and special districts.

The Region faces significant water resource challenges including impaired water quality, overdrafted groundwater basins, depleted streams, and locally degraded riparian habitat. Historic salmon and steelhead populations have been greatly diminished by reductions in streamflow, increased erosion and sedimentation, barriers to migration, and removal of large woody material from streams. Coastal water quality has been degraded by urban runoff and leaky sewer systems. The natural benefits of wetlands, floodplains, riparian corridors, and groundwater recharge areas have been significantly diminished by development and agricultural use.

Domestic supply within the Santa Cruz IRWM Region is provided by eight public agencies, small public water systems, and individual and shared wells and springs. Groundwater provides 55-60% of public water agency supply in the Santa Cruz Region, with the remainder coming from local surface water sources. The Region has a long history of collaborative watershed planning, and agencies and organizations are actively implementing recommendations from watershed plans and studies conducted over the years. Sanitation and flood management services are provided by a mix of city and county departments and special districts.

3.2 PHYSICAL SETTING

The physical environment of the Santa Cruz IRWM Region is one of the most beautiful and diverse in California. The topography of the Region is varied, containing the rugged, geologically active and forested Santa Cruz Mountains in the north and east, the mid-county coastal terraces where a large portion of the population is located, and the alluvial south that is predominantly in agricultural use. The central California coast location and the Region's topographic features contribute to the mild Mediterranean climate featuring warm, dry summers and cool, wet winters.

The Region is situated on the northern end of Monterey Bay, 65 miles south of San Francisco, 35 miles north of Monterey, and 35 miles southwest of the Silicon Valley. The mountainous topography encompasses 15 principal watersheds, which can be grouped and generally characterized as: North Coast streams that drain the western slope of Ben Lomond Mountain; the San Lorenzo River and its tributaries; Soquel and Aptos Creeks; and the Watsonville Sloughs, which discharge to the Pajaro River mouth. These watersheds are comprised of 58 smaller drainage basins or subwatersheds, each having unique characteristics based on variations in size, aspect, elevational gradient, precipitation, geology, and soils. With the exception of the Pajaro River, which originates in San Benito County, the Region's streams originate within the Region and they all drain to Monterey Bay south of Año Nuevo. Together, the two rivers and numerous streams that traverse the Region total over 850 miles in length.[1]

[1] Mackenzie, A., J. McGraw, and M. Freeman. 2011. *Conservation blueprint for Santa Cruz County: An Assessment and Recommendations from the Land Trust of Santa Cruz County.* Land Trust of Santa Cruz County. Santa Cruz, CA. May 2011. 180 pages. Available at: http://www.landtrustsantacruz.org/blueprint

3.3 REGION BOUNDARIES

The Santa Cruz Integrated Regional Water Management (IRWM) boundaries were selected primarily on the basis of common water management issues, regulatory, and jurisdictional boundaries. The Region generally mirrors Santa Cruz County, and includes approximately 95% of the population and 85% of the geographic extent of the county. The eastern and western boundaries are defined by the ridgeline of the Santa Cruz Mountains and the coastline of the Pacific Ocean, respectively. The northern boundary is roughly based on the county's boundary and follows the ridge between Whitehouse and Gazos Creek watersheds, which straddle the county line near Point Año Nuevo. The southern boundary is an overlapping border with the Pajaro River Watershed IRWM Region. Most of the Pajaro River Watershed is within the adjacent Pajaro River Watershed IRWM Region with the exception of the Watsonville Sloughs, for which both Regions share management responsibilities. Specifically, the Santa Cruz IRWM is responsible for water quality and watershed resource management in the shared area while the Pajaro IRWM is responsible for water supply and flood management.

The Region is appropriate for IRWM planning because it is consistent with past and ongoing water resources management efforts and partnerships; is based upon shared issues and concerns; and provides for the necessary jurisdictional and statutory authorities for project implementation.

Figure 3- 1 Santa Cruz IRWM Region

3.3.1 OVERLAP WITH PAJARO RIVER WATERSHED REGION

As noted above, the Pajaro and Santa Cruz IRWM Regions overlap in the Watsonville Sloughs watershed. The Watsonville Sloughs system drains a 12,500-acre watershed from the coastal plain and foothills of southern Santa Cruz County into Monterey Bay. The Watsonville Sloughs watershed includes six individual sloughs: Watsonville, Harkins, Struve, West Branch, Gallighan, and Hanson. These are located around the mouth of the Pajaro River. These sloughs sustain large wetland marsh and riparian habitats, economically important agricultural lands, and the City of Watsonville, the fastest-growing area in Santa Cruz County in terms of development. Because of the extensive wetland habitats and unique pressures in the Watsonville Sloughs Watershed, considerable effort has been placed on implementing watershed conservation and restoration plans. These efforts have been coordinated in large part by the Resource Conservation District of Santa Cruz County (RCD) through its Integrated Watershed Restoration Program.

Water supply reliability for both agriculture and municipal uses is also a significant concern in the Watsonville Sloughs watershed. Underlying groundwater is part of the larger Pajaro Basin, which is in a state of overdraft caused by a combination of overuse and reduced recharge. Wells as far inland as Harkins Slough have become too brackish for domestic or agricultural use due to seawater intrusion. Similarly, flooding has been an ongoing concern in the Region, which has experienced repeated floods in 1955, 1982-1986, and 1995. Considering these existing management responsibilities, the Santa Cruz IRWM Region is responsible for water quality and watershed management efforts in the Watsonville Sloughs while the Pajaro Region coordinates flood control and water supply concerns. Both the Santa Cruz and Pajaro Regions acknowledge the overlap and are in agreement on the shared responsibilities.

3.3.2 SHARED BORDER WITH BAY AREA IRWM REGION

The Bay Area and Santa Cruz IRWM Regions connect in rather remote areas – in the upper Santa Cruz Mountains and on the coast near Año Nuevo. Whitehouse, Año Nuevo, and Waddell Creek watersheds straddle the San Mateo/Santa Cruz county line, but because these watersheds are primarily within the Santa Cruz County boundary as well as the jurisdiction of the Central Coast Regional Water Quality Control Board, they are included as part of the Santa Cruz IRWM Region. Gazos Creek is adjacent to Whitehouse and Waddell Creek watersheds, but is not under the jurisdiction of any Santa Cruz IRWM partners and is not included in the Santa Cruz Region or the Bay Area Region. The portion of the Pescadero Creek watershed that extends into Santa Cruz County is included in the Bay Area IRWM Region. San Mateo County agencies are more active and have jurisdictional authority and management opportunities in these areas. Both Regions have agreed upon these assignments.

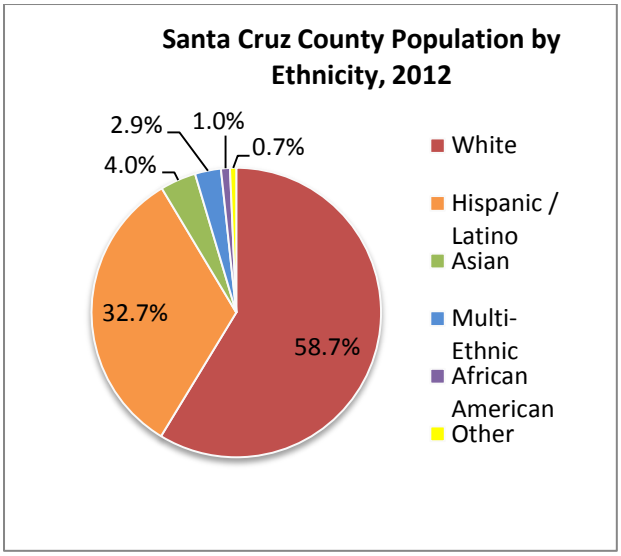
3.4 POPULATION AND DEMOGRAPHICS

The Santa Cruz IRWM Region encompasses approximately 250,000 people, which is approximately 95% of Santa Cruz County's total population (262,340).[2] The County includes the four incorporated cities of Santa Cruz, Watsonville, Scotts Valley and Capitola. Approximately half of the population lives in unincorporated portions of Santa Cruz County. The Region features national and ethnic communities from Mexico, Central and South America, Africa, Europe, Asia, and the Pacific Islands (Figure 2), with Hispanics representing the fastest growing segment of the population. The Region includes a portion of the territory of the Amah Mutsun tribal band of Ohlone/Costanoan Native Americans.

Table 3-1 Population of Cities and Communities in the Region [3]

Geography	Population
Santa Cruz County	*262,340*
Aptos CDP	6,317
Aptos Hills-Larkin Valley CDP	1,636
Ben Lomond CDP	6,317
Bonny Doon CDP	2,743
Boulder Creek CDP	5,188
Brookdale CDP	1,887
Capitola city	9,914
Davenport CDP	235
Day Valley CDP	3,416
Felton CDP	4,043
Freedom CDP	3,368
La Selva Beach CDP	2,537
Live Oak CDP	16,747
Lompico CDP	1,029
Mount Hermon CDP	1,115
Pajaro Dunes CDP	265
Paradise Park CDP	513
Pasatiempo CDP	1,183
Pleasure Point CDP	5,254
Rio del Mar CDP	8,993
Santa Cruz city	60,319
Scotts Valley city	11,532
Seacliff CDP	3,133
Soquel CDP	9,919
Twin Lakes CDP	5,147
Watsonville city	50,945
Zayante CDP	790
CDP is Census Designated Place	

Figure 3-2 Santa Cruz County Population by Ethnicity, 2012 [4]



[2] U.S. Census Bureau; American Community Survey, 2012 American Community Survey 5-Year Estimates / California Department of Finance.
[3] U.S. Census Bureau; American Community Survey, 2012 American Community Survey 5-Year Estimates / California Department of Finance.
[4] US Census Bureau 2010.

English is the only language spoken in the majority of homes in the County; however, there is an increasing trend in the number of homes where English is not the primary language.

Table 3- 2 Languages Spoken in Santa Cruz County [5]

Language	2006	2007	2008	2009	2010	2011	2012	'06 – '12 percentage point change
English Only	**72.0%**	**71.4%**	**70.6%**	**72.5%**	**69.1%**	**67.8%**	**68.1%**	**-3.9%**
Language other than English	**28.0%**	**28.6%**	**29.4%**	**27.5%**	**30.9%**	**32.2%**	**31.9%**	**3.9%**
Spanish	22.9%	23.8%	23.5%	22.7%	25.6%	26.5%	25.5%	2.6%
Other Indo-European Languages	3.2%	2.5%	3.6%	2.6%	2.2%	2.5%	2.9%	-0.3%
Asian, Pacific Islander Languages	1.8%	2.1%	2.1%	2.0%	2.5%	2.9%	2.9%	1.1%
Other Languages	0.2%	0.2%	0.2%	0.2%	0.5%	0.3%	0.6%	0.4%
Total Population (Ages 5+)	**233,221**	**235,598**	**236,235**	**239,206**	**248,383**	**249,132**	**251,704**	

3.5 HISTORIC AND PROJECTED POPULATION

Over the past decade, Santa Cruz County's population increased by 6,700 (0.27%), a growth rate that is less than half that of the State of California as a whole (Table 3-3). This rate is in stark contrast to the rapid rates of growth experienced in the county between 1970 and 1980, when annual rates of growth exceeded 5%. Approximately 85% of development during the 1970s was single-family residences, which exerted many pressures on the county's natural resources and open space. In response, in 1978 the voters of Santa Cruz County passed Measure J, a ballot referendum that instituted a comprehensive growth management system in the county that included population growth limits, limitations on issuance of building permits, limits on growth outside urban areas, provision of affordable housing, and preservation of agricultural lands and natural resources.

Table 3- 3 Historical Population Growth, 1970 – 2010 [6]

Year	County		State of California	
	Population	Annual Growth Rate	Population	Annual Growth Rate
1970	123,790	-	19,957,304	-
1980	188,141	5.2	23,668,145	1.86
1990	229,734	2.21	29,758,213	2.57
2000	255,602	1.13	33,873,086	1.38
2010	262,382	0.27	37,253,956	1

[5] United Way of Santa Cruz County. "Community Assessment Project, 2013." Applied Survey Research, 2013. Pg. 22.

[6] California Department of Finance, 2013, U.S. Census Bureau.

Table 3- 4 Population Growth Projections, 2010 – 2035 [7]

	2010	2020	2025	2030	2035	Compound Annual Growth Rate	Change Over Forecast Period
Santa Cruz County	262,382	279,381	287,512	298,095	308,582	0.65%	17.61%
Capitola	9,918	9,119	9,427	9,758	10,088	0.07%	1.71%
Santa Cruz	59,946	66,860	70,058	73,375	76,692	0.99%	27.94%
Scotts Valley	11,580	11,638	11,696	11,754	11,813	0.08%	2.01%
Watsonville	51,199	59,446	61,452	63,607	65,762	1.01%	28.44%
Balance Of County	129,739	132,318	134,879	139,601	144,227	0.42%	11.17%

The Association of Monterey Bay Area Governments (AMBAG) projects that between 2010 and 2035, Santa Cruz County's compound annual growth rate is less than 1% resulting in an additional 46,242 residents in the county. Proportionally speaking, that would result in approximately 44,000 residents in the IRWM Region. The County's housing element portion of the General Plan estimates that 17,000 units could be added in the county by 2035. Despite increasing population, water use in the county has been declining for a number of years. This is due to the successful implementation of local conservation programs by municipalities and water districts. However, this trend will be difficult to sustain. As additional growth occurs and opportunities for additional water use efficiency diminish, there will be a tendency for increased water demand.

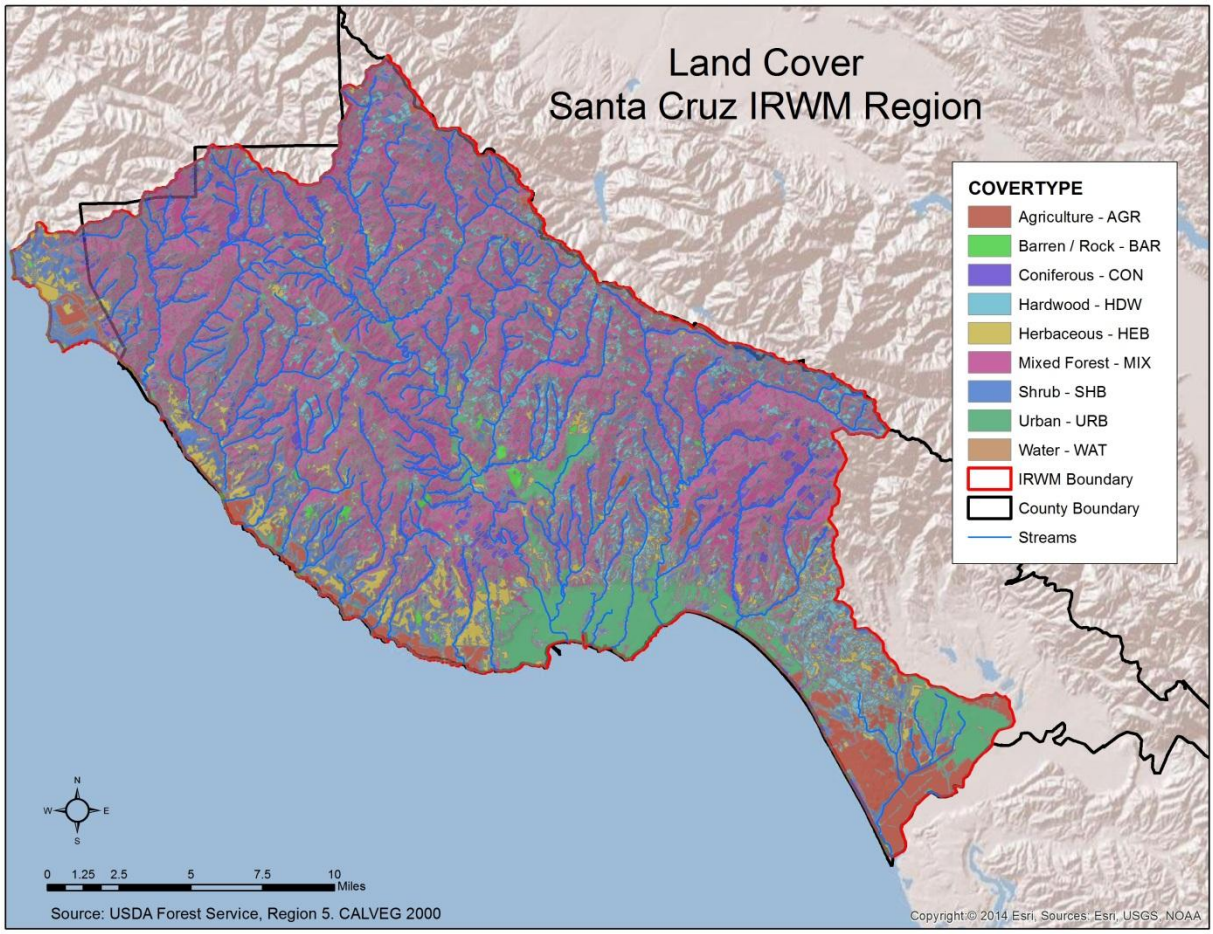
3.6 LAND USE

Land use in the region is dominated by residential use (including rural and mountain residential) timber preserve, agriculture, and a mix of commercial and special districts. The lower portions of the watersheds, close to Monterey Bay, are more urbanized with residential, commercial, light industrial, and special district land uses. Upper watershed land use consists predominantly of rural residential, timberland and/or open space, some mining, and limited agriculture. On the north coast, the coastal terraces are utilized for agriculture and grazing. Figure 3-3 illustrates land cover in the region.

Agriculture represents approximately 14% (40,000 acres) of the total land area. Residential land is approximately 4% (11,428 acres) of the land area; developed non-residential uses comprise approximately 1.5% (4,285 acres). Parks, recreation and open space comprise 1.4% (4,000 acres); and miscellaneous uses comprise 3.6% (10,286 acres) of the land area. The remaining acreage is undeveloped.[8] In 2010, the California Department of Conservation identified 21,828 acres as Important Farmland and 17,952 acres as grazing land.[9] In 2013, 19,227 acres were designated as protected under Williamson Act contracts.[10]

[7] Association of Monterey Bay Area Governments (AMBAG), 2014, 2014 Regional Growth Forecast.
[8] Santa Cruz County, 2013.
[9] Department of Conservation, 2010.
[10] AMBAG. 2035 MTP/SCS and RTPs for Monterey, San Benito and Santa Cruz EIR. Draft February 2014.

Figure 3- 3 Santa Cruz IRWM Region Land Cover [11]



3.7 ECONOMIC OVERVIEW

Early industries of the Santa Cruz IRWM Region drew heavily on the region's seemingly unlimited natural resources. Lumber camps were established in the redwood forests of the Santa Cruz Mountains, concentrating in the San Lorenzo Valley and Aptos areas. Besides lumber, fine grade limestone was seen as a critical source for building materials. The largest limestone industry was operated by Henry Cowell on what is now the University of California, Santa Cruz (UCSC) campus. Its earliest quarry dates from the 1850s.

Today, mild weather, natural beauty, a major university, and proximity to the Silicon Valley are elements that contribute to the economic activity and quality of life in the Santa Cruz IRWM Region. With its spectacular coastline and accessible beaches and mountains, the Region is a popular vacation and recreation area.

[11] County of Santa Cruz, Water Resources Division. 2014.

3.7.1 ECONOMIC ACTIVITY

Santa Cruz County's labor force includes 153,291 workers.[12] The agriculture-related production employs approximately 9,078 people, which includes direct agricultural production employment (5,378) and an additional 3,700 jobs through related indirect employment (purchases of farm equipment, fertilizer, seed, insurance, banking, other).[13] Within non-farm employment, government remains the largest source of jobs in the county at 20,500 jobs, followed by wholesale/retail trade with 15,000 jobs, 13,900 in health and education, 11,600 in leisure and hospitality, 9,700 in professional services, 5,600 jobs in manufacturing, and 3,000 in construction.

Currently, the county's overall unemployment rate is 7.1% (May 2014), however certain areas of the county are much higher. For example, the City of Watsonville (characterized as a disadvantaged community) currently has an unemployment rate of 15.5%.[14] The county's median household income is $66,571, and 14.4% of county residents live below the poverty level.[15]

Like much of California, Santa Cruz County suffered during the economic recession that began in 2008 but appears to be rebounding, albeit modestly. Between 2013 and 2018, employment growth is projected to be broad-based. However, the largest gains are expected to occur in education and healthcare, wholesale and retail trade, leisure and hospitality, and government. Together, it is projected that these sectors will account for 61% of net job creation in the county.[16]

The Santa Cruz IRWM Region's two primary industries include tourism and agriculture. In 2012, Santa Cruz County saw $717 million in direct travel spending, resulting in over $45 million in local and state tax receipts.[17] In 2013, the overall crop production value in the county was $599 million. Over the ten-year period from 2003 to 2013, overall crop production value in the county increased by 61% (from $371 million to $599 million). Strawberries continue to be the highest grossing crop produced in the county, valued at $202 million in 2013. Raspberries are the second highest valued crop, valued at $152 million.[18]

Growing flowers in Larkin Valley

[12] Santa Cruz County Chamber of Commerce, 2014.
[13] Agricultural Impact Associates LLC, 2013. Economic Contributions of Santa Cruz County Agriculture.
[14] State of California Employment Development Department, 2014. Santa Cruz County June 20, 2014 Report. Available at: http://www.labormarketinfo.edd.ca.gov
[15] ACS 2012 Five-year estimate.
[16] California Department of Transportation, 2013. Santa Cruz County Employment Forecast (2006-2012 History, 2013-2040 Forecast).
[17] Dean Runyan Associates, 2014. California Travel Impacts by County, 1992-2012. 2012 Preliminary State & Regional Estimates. Prepared by Dean Runyan Associates for the California Travel & Tourism Commission, May 2014.
[18] Santa Cruz County Agricultural Commissioner's Office, 2013. Santa Cruz County 2013 Crop Report.

Table 3- 5 Annual Crop Production (in Millions of Dollars) – Santa Cruz County [19]

Crop	2009	2010	2011	2012	2013	5-year % Change
Berries	$306.2	$324.6	$363.2	$367.9	$390.1	27.4%
Nursery / Ornamental Crops	$118.5	$118.8	$122.6	$113.5	$107.9	-8.9%
Vegetables	$47.0	$61.8	$55.8	$57.8	$74.2	57.9%
Tree and Vine Products	$10.7	$16.7	$14.7	$18.1	$16.8	57.0%
Livestock and Animal Products	$5.6	$5.8	$6.6	$6.5	$6.9	23.2%
Field Crops	$0.1	$0.1	$0.1	$0.0	$0.0	-100.0%
Total Crops Value	$488.1	$527.8	$562.9	$563.9	$595.9	22.1%
Timber Farming	$3.5	$4.8	$2.8	$2.3	$3.4	-2.9%
Total Production Value	$491.6	$532.5	$565.7	$566.2	$599.3	21.9%

Table 3- 6 Tourism Revenue (in Millions of Dollars) – Santa Cruz County [20]

Category	2008	2009	2010	2011	2012	5-year % Change
Direct Travel Spending	$649.6	$609.8	$651.9	$699.9	$717.0	10.4%
Industry Earnings	$197.4	$194.6	$195.1	$193.8	$206.0	4.4%
Local Tax Receipts	$14.2	$12.8	$14.0	$15.5	$16.3	14.8%
State Tax Receipts	$25.7	$26.8	$29.0	$29.9	$29.0	12.8%
Total	$886.9	$844.0	$890.0	$939.1	$968.3	9.2%
# of Jobs Generated By Tourism	8,030	8,040	7,920	7,910	8,210	2.2%

3.7.2 DISADVANTAGED COMMUNITIES IN THE PLANNING REGION

A disadvantaged community is defined as a community that has an annual median household income (MHI) that is less than 80% of the statewide MHI, or less than $49,120.[21] According to American Community Survey 2012 5-year survey data conducted by the U.S. Census Bureau, the Santa Cruz IRWM Region contains one city plus several census tracts that qualify as "disadvantaged communities." The City of Watsonville (population 51,586), which is largely contained within the planning region, had a MHI of $46,603 in 2012. Watsonville comprises almost 19% of the total population of the county (266,766). Two census tracts within the City of Watsonville qualified as "severely disadvantaged," with a MHI less than 60% of the statewide MHI. In addition, two census tracts within the City of Santa Cruz qualified as

[19] Santa Cruz County Agricultural Commissioner Crop Reports, 2009 - 2013.
[20] Dean Runyan Associates, Inc. May 2014. California Travel Impacts by County, 1992-2012, 2013 Preliminary State & Regional Estimates. Prepared for the California Travel & Tourism Commission.
[21] Department of Water Resources. U.S. Census Bureau. American Community Survey, 2008-2012.

"disadvantaged," with one of them qualifying as "severely disadvantaged." The table below shows the disadvantaged communities in the Santa Cruz IRWM Region along with population and MHI.

Table 3- 7 Economically Disadvantaged Communities (DAC) within the IRWM Region [22]

Census Designated Place (CDP)	Population	Median Household Income
City of Watsonville	50,945	$46,603
Census Tract 1007 (Santa Cruz)	1,710	$40,813
Census Tract 1010 (Santa Cruz)	7,943	$32,804
Census Tract 1101 (Watsonville)	7,410	$42,201
Census Tract 1103 (Watsonville)	7,182	$32,664
Census Tract 1105.01 (Watsonville)	6,652	$36,711
Census Tract 1105.02 (Watsonville)	6,817	$48,561

Note that census methodology may not capture all pockets of lower income residents within the Region, such as the town of Davenport, where an independent 2008 income survey was completed that showed the town met the criteria of a disadvantaged community.

In addition to the designated disadvantaged communities, several communities have a high percentage of residents' household earning "low," "very low," or "extremely low" incomes. Table 6 below shows the income distribution categories in the county, expressed as a percentage of the county median household income ($62,100) as defined by the U.S. Census Bureau, and the corresponding income ranges for a three-person household. For example, households earning at "extremely low" levels make less than $15,525, while households earning at "very low" levels earn between $15,525 and $35,397.

Table 3- 8 Income Distribution Categories and Corresponding Income Ranges in Santa Cruz County Based on 2010 Median Household Income of Three-Person Households

Category	2010 Income Range
Extremely Low Income (0%-24% Median)	$0-$15,525
Very Low Income (25%-56% Median)	$15,525-$35,397
Low Income (57%-80% Median)	$35,397-$50,301
Moderate Income (81%-120% Median)	$50,301-$75,141
Above Moderate Income (121%+ Median)	$75,141+

Table 3-9 illustrates the large income disparities in the county. Despite a fairly high countywide median income, the table shows large percentages of households in each community within the Region that earn "extremely low" or "very low" incomes.

Four communities, including the City of Watsonville, have 15% or more of three-person families with "extremely low" incomes, while 10 of the 15 "low income" communities have more than 10% of their households in this category. Seven communities have at least one-third of three-person households in

[22] U.S. Census Bureau. American Community Survey, 2008-2012.

either the "extremely low" or "very low" income categories, earning less than $35,397, with the City of Watsonville showing nearly half of its families earning below this level. The large numbers of families with such low earnings are due in part to a large agricultural sector with many migrant workers whose earnings are exceptionally low. Finally, six communities have more than half of their three-person households earning a "low" income ($50,301) or less. Given the extremely high cost of housing described below, the difficulties of these households are exacerbated.

Table 3- 9 Low Income Three-Person Households in Communities within the Santa Cruz Region [23]

Community	Percentage of 'Extremely Low' Income Households *Income below $15,625*	Percentage of 'Extremely Low' or 'Very Low' Income Households *Income below $35,397*	Percentage of 'Extremely Low', 'Very Low', or 'Low' Income Households *Income below $50,301*
Watsonville	15.9%	46.0%	62.8%
Twin Lakes	16.6%	44.8%	59.0%
Opal Cliffs	16.4%	39.3%	57.3%
Felton	15.0%	33.3%	55.2%
City of Capitola	13.7%	36.6%	54.6%
Live Oak	10.5%	34.8%	52.4%
City of Santa Cruz	14.5%	35.1%	49.4%
Soquel	12.1%	26.7%	45.8%
Ben Lomond	10.2%	27.7%	43.4%
Boulder Creek	11.3%	31.6%	42.1%
Aptos	8.4%	25.5%	39.2%
Day Valley	7.4%	21.2%	36.8%
Aptos Hills- Larkin Valley	8.2%	22.3%	34.8%
City of Scotts Valley	5.8%	22.8%	34.7%
Rio Del Mar	8.0%	19.3%	32.0%

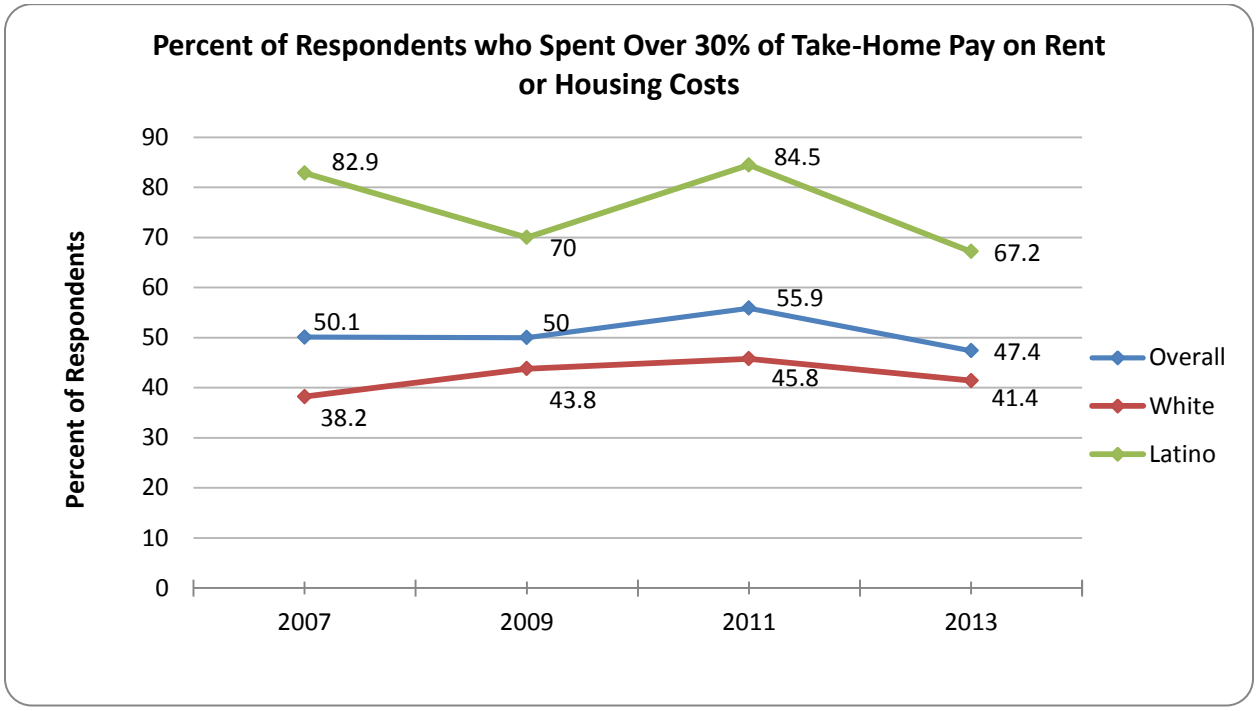
From fall 2013 to fall 2014, with financial support from a DWR IRWM Grant for disadvantaged community outreach, the Santa Cruz Region is working to identify, assess, and engage DACs in the IRWM planning process. Additional information on this specific effort is provided in Chapter 13 Stakeholder Involvement. This effort will identify and advance projects to meet water resource needs in Watsonville and Davenport. In addition, work includes the potential identification of other low income communities in the Region not previously identified nor engaged in IRWM. Census data, mapping tools, and local community knowledge are being used to identify these areas. This task is intended to aid in identifying other economically disadvantaged pockets in the region that may not meet the DAC criteria based upon census data, but may warrant further assessment and outreach for engagement in IRWM planning efforts.

[23] Ibid.

3.7.3 COST OF LIVING

The Santa Cruz IRWM Region is known for its high cost of living. Nearly 14% of county households live at or below the federal poverty line, yet the county consistently has been near the top for the country's least most affordable areas. The median house value, while decreasing significantly during the recession, is still over $600,000, and only 54% of homes in the county are affordable for median income families. Rents are similarly high, and while median sale price decreased during the recession, rents rose during the same time period. Nearly 56% of residents spend more than 30% of take-home pay on housing costs.

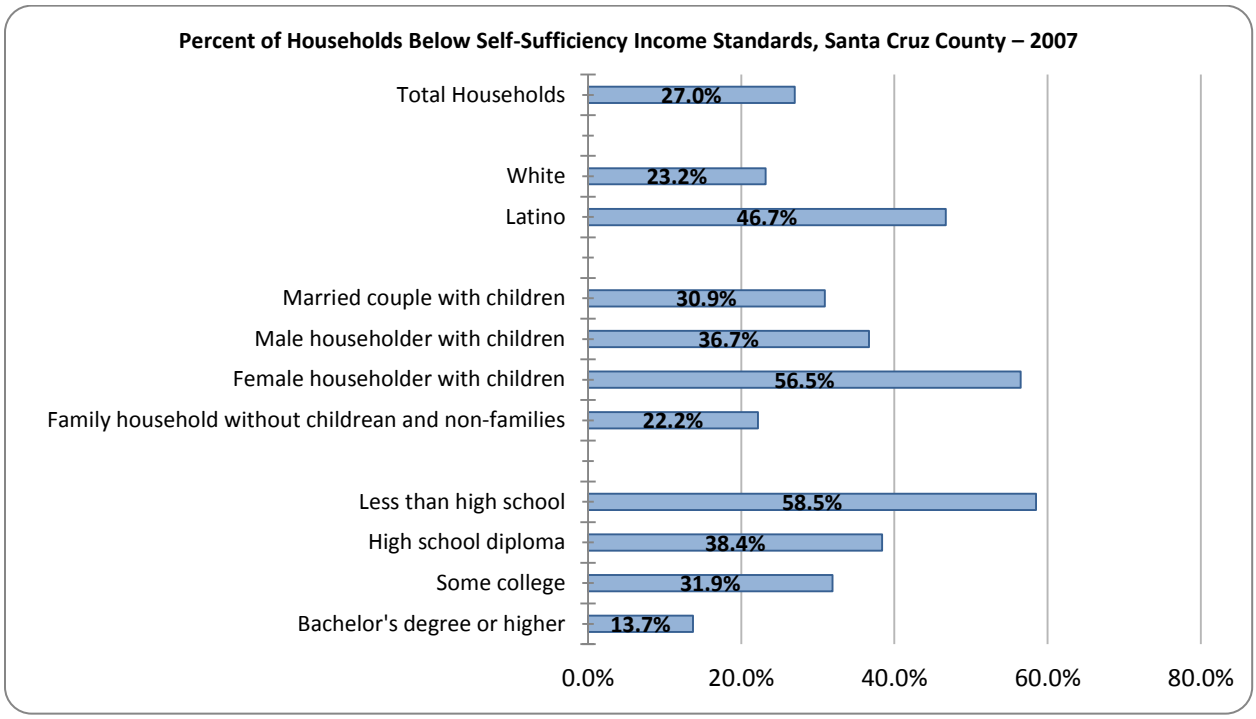
Figure 3- 4 Percent of Households Overpaying on Housing Costs [24]



The Self-Sufficiency Standard for California provides information on how much income is needed in different counties in order for families of different sizes to meet their basic needs without public or private assistance. This standard provides a much more comprehensive measure of income adequacy than Federal Poverty Thresholds by taking into account housing, child care, health care, transportation, food, taxes, and miscellaneous costs, as well as economic differences between counties. It also accounts for changing costs over time, and at various rates. A single adult in Santa Cruz County would need to earn $15.28 per hour in 2011 in order to be self-sufficient; rising to $25.17 for a single adult with a teenage and a school age child.

[24] United Way of Santa Cruz County. "Community Assessment Project, 2012." Applied Survey Research. 2012.

Figure 3- 5 Percent of Households Below Self-Sufficiency Income Standards, Santa Cruz County, 2007 [25]



3.8 CLIMATE AND PRECIPITATION

The Region has a temperate coastal climate with warm, dry summers and mild wet winters. The average maximum temperature varies between approximately 60 degrees Fahrenheit in December and January, to approximately 75 degrees Fahrenheit in August and September. Mountains in the county rise dramatically from the coast, reaching more than 3,000 feet in elevation in the span of just a few miles. High peaks and cooler winter temperatures, especially at higher elevations, combine to generate substantial rainfall. Average annual rainfall ranges from about 28 inches near Santa Cruz to more than 60 inches along the ridge of Ben Lomond Mountain.

Table 3- 10 Monthly Climatological Data [26]

	Annual	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Maximum Temperature (°F)	68.5	59.8	62.2	64.2	67.4	70.5	73.5	74.1	75	75.8	72.7	65.8	60.4
Average Precipitation (Inches - Santa Cruz)	30.66	6.56	5.49	4.34	2.14	0.66	0.2	0.08	0.09	0.34	1.27	3.86	5.63

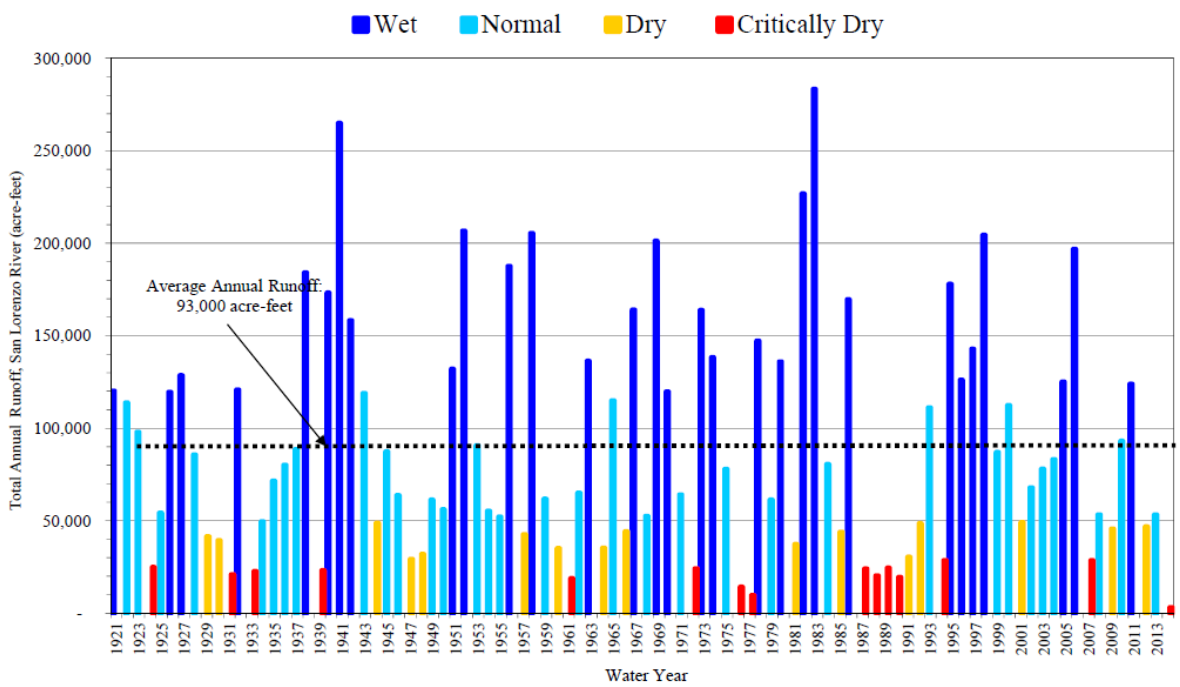
In this Mediterranean climate, 85% of the annual rainfall occurs between December and May. These rains drive stream flows in the Santa Cruz Mountains, with the highest flows typically occurring between

[25] United Way of Santa Cruz County. "Community Assessment Project, 2012." Applied Survey Research. 2012.
[26] Proposed scwd2 Regional Seawater Desalination Project Draft Environmental Impact Report SCH# 2010112038. Prepared for City of Santa Cruz and Soquel Creek Water District.

December and March when winter storms are at their peak and when soils are saturated. Peak flows drop off considerably after the winter rains cease, although many streams maintain smaller but steady flows in the dry months due to the slow release of stored subsurface water.

A driving factor in the area's water supply picture is the annual variability in rainfall amounts (Figure 3-6). Santa Cruz has a recorded rainfall history that goes back to 1868. Over this period, the average rainfall is 28.5 inches, but annual totals range from a low of 10.2 inches in 1924 to a high of 61.3 inches in 1941. There are well documented dry periods with below average rainfall that extended for three or more years in a row: 1868-71, 1896-99, 1917-20, 1928-34, 1953-55, 1959-63, 1975-77, and 1987-92.[27] The City of Santa Cruz is almost totally reliant upon local surface water for its supply, and the San Lorenzo Valley Water District relies upon local surface water for approximately 60% of its supply. With limited surface storage in the region, the annual rainfall variability can have significant impacts on water supply reliability.

Figure 3- 6 Water Year Types [28]



3.9 CLIMATE CHANGE

Projected climate changes are expected to have a number of negative impacts on watersheds and water resources in the Santa Cruz IRWM Region. Findings from a study conducted by the USGS[29] showed

[27] Griggs. G., and Haddad, B. City of Santa Cruz City Climate Change Vulnerability Assessment. 2011. Pg. 36.
[28] URS, 2013. Proposed scwd2 Regional Seawater Desalination Project Draft Environmental Impact Report SCH# 2010112038. Prepared for City of Santa Cruz and Soquel Creek Water District.
[29] Flint, L.E., and Flint, A.L. 2012. Simulation of climate change in San Francisco Bay Basins, California: Case studies in the Russian River Valley and Santa Cruz Mountains: U.S. Geological Survey Scientific Investigations Report 2012–5132, 55 p.

strong evidence for temperature changes for the Santa Cruz Region due to global climate change, but disagreement between models for future precipitation patterns. Temperature projections showed an increase of 3-4 degrees Celsius for average monthly maximums and an increase in the variability (20-30% larger standard deviation) above the historic reference period (1971-2000), with spring and fall months experiencing warmer temperatures. Groundwater recharge is projected to diminish by 31% by 2100, which will impact both groundwater supply and stream baseflow. Sea level is projected to rise 1.0-1.4 cm above 2010 levels, expanding the coastal areas inundated during a 100-year flood event. While there is disagreement amongst climate model projections as to the timing of precipitation patterns, there is agreement that the future will be generally drier, resulting in a higher frequency of droughts and less groundwater recharge. Predicted impacts to the region include:

- Anticipated changes in rain patterns and intensity adding to the uncertainty of water supply and to creek instability
- Potential impacts from sea level rise and storm surges on coastal aquatic resources and water infrastructure
- Exacerbation in saltwater intrusion in groundwater basin from sea level rise
- Anticipated increase in number and severity of wildfire events, with subsequent erosion and water quality problems
- Potential increase in flooding due to climate change

Modeled climate projections and hydrologic responses in the Santa Cruz Region are described in more detail in the Climate Change chapter of this IRWM Plan (Chapter 16). In some instances projected changes may dramatically exacerbate the severity of local watershed and water resource issues. The Regional Water Management Group (RWMG) recognizes that, in light of climate projections, historical records will only go so far in predicting future water resource conditions in the Region. While historical water records show the Region's water supplies to be constrained under existing conditions, water supplies will likely be considerably more constrained under future conditions of climate change. During this 2014 IRWM Plan update process, the RWMG has evaluated potential impacts of climate change to identify opportunities for adaptation to reduce the vulnerability of water supply, water quality, aquatic ecosystems, and flood hazards in the Santa Cruz Region (see Chapter 16).

3.10 WATERSHEDS

The following sections provide an overview of the physical and biological elements of the Region's watersheds. As summarized in Table 3-12 below, the Santa Cruz IRWM Region is comprised of 15 major watersheds that are all tributary to coastal waters of the Monterey Bay National Marine Sanctuary.

Figure 3- 7 Watersheds and Groundwater Basins [30]

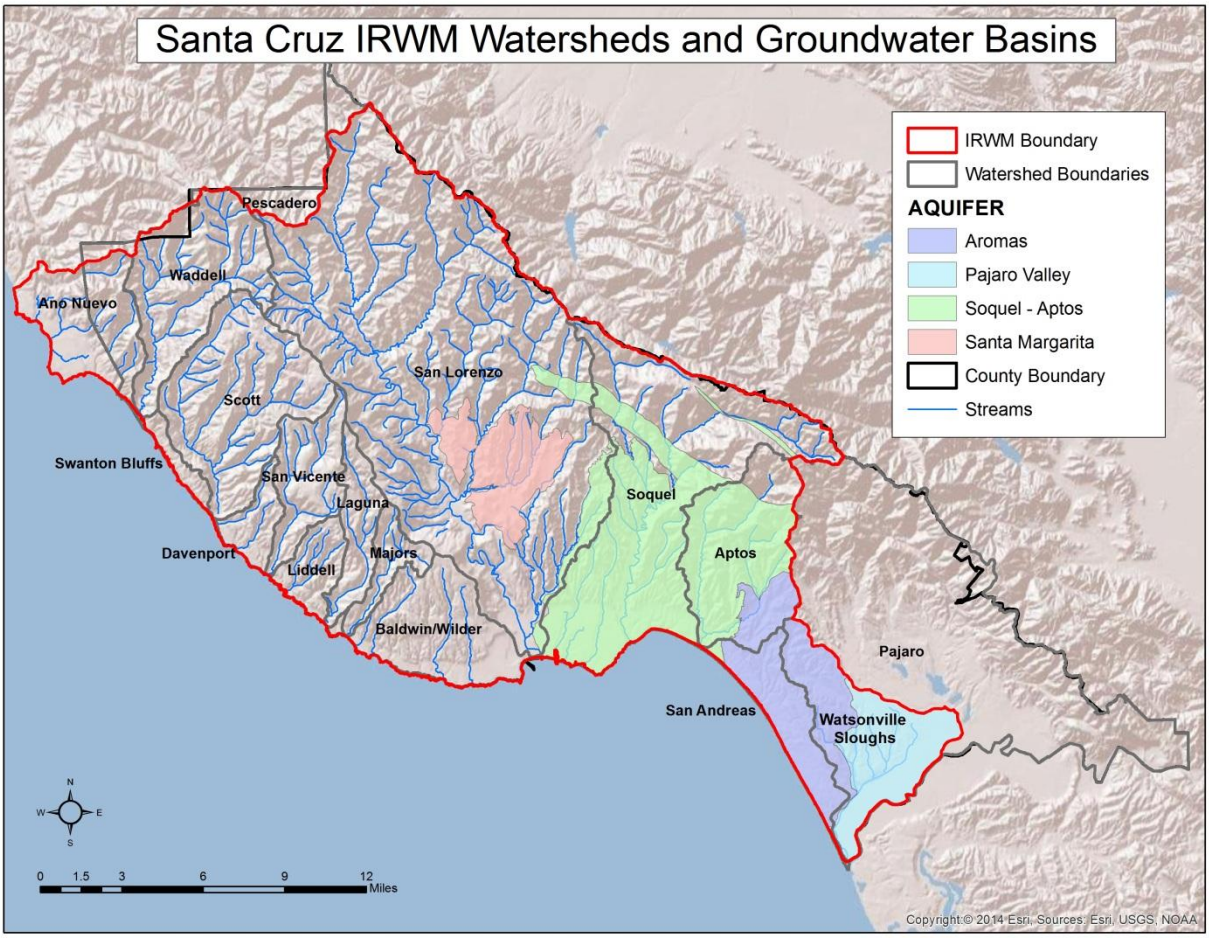


Table 3- 11 Santa Cruz IRWM Watersheds [31]

Watershed Name	Area (Sq. Mi.)	Main Tributaries	Water Supply Watershed	Impaired
San Lorenzo	138	Branciforte, Carbonera, Zayante, Bean, Fall, Newell, Bear, Boulder, Kings Creeks	San Lorenzo; Hare, Jamison, Corvin, Forest Springs; Bracken Brae Creek; Peavine, Silver, Foreman, Clear, Sweetwater Crreks; Fall, Bennet, Bull	San Lorenzo - Pesticides, Pathogens, Nutrients, Sediment; Zayante - Pesticides, Pathogens, Sediment; Bean - Sediment; Boulder - Sediment; Lockhart Gulch - Sediment, Micellaneous; Bear - Sediment; Branciforte - Sediment, Pathogens; Carbonera - Nutrients, Sediment, Pathogens; Fall - Sediment; Kings - Sediment;

[30] County of Santa Cruz
[31] County of Santa Cruz General Plan; updated to reflect current conditions.

Watershed Name	Area (Sq. Mi.)	Main Tributaries	Water Supply Watershed	Impaired
			Creeks; Lompico Creek; Tunnell Gulch	Lompico - Nutrients, Pathogens, Sediment; Love - Sediment; Mountain Charlie - Sediment; Newell - Miscellaneous, Sediment; Shingle Mill Creek - Nutrients, Sediment
Soquel	42	West, East Branch Soquel Creek; Noble, Porter, Tannery Gulches; Borregas Creek	Laurel Creek	Soquel Creek - Pathogens, Sediment; Nobel Gulch - Pathogens; Porter Gulch - Pathogens; Corcoran Lagoon - Pathogens, Miscellaneous
Scott	39	Big, Little, Queseria, Berry, Boyer, Dead Man's, Winter, Archibald Creeks	No	No
Waddell	27	Last Chance, East and West Branch Waddell Creeks	No	No
Aptos	25	Valencia Creek; Mangels, Trout Gulches	No	Aptos Creek - Pathogens, Sediment; Valencia Creek - Sediment, Pathogens
Baldwin / Wilder	20	Lombardi, Sandy Flat, Old Dairy Gulches, Wilder, Moore Creeks	No	No
San Andreas	15	Busch Gulch	No	No
San Vicente	14	Mill Creek	Mill, San Vicente Creeks	San Vicente - Sediment
Watsonville Sloughs	14	Harkins, Gallighan, Hanson, Main and West Branch Struve Soughs	No	Hanson Slough - Pathogens; Harkins Slough - Pathogens, Nutrients; Watsonville Slough - Pathogens, Nutrients, Sediment

Watershed Name	Area (Sq. Mi.)	Main Tributaries	Water Supply Watershed	Impaired
Año Nuevo	10	Whitehouse, Cascade, Elliot, Wilson, Green Oaks, Finnery Creeks, Willows Gulch	No	No
Davenport	8	Molino Creek	No	No
Laguna	8	Reggiardo Creek	Reggiardo, Laguna Creeks	No
Liddell	8	West Liddell, Yellow Bank Creeks	Liddell Creek	No
Majors	5	N / A	Yes	No
Swanton Bluffs	5	N / A	No	No
Arana Gulch-Rodeo	3.5	Arana Gulch, Leona Creek, Schwan Lake, Rodeo Creek Gulch	No	Arana: Chlorpyrifos, E. coli, fecal coliform

3.10.1 SAN LORENZO RIVER

The San Lorenzo River is a 138 square mile watershed located in northern Santa Cruz County. It is the largest watershed lying completely within Santa Cruz County. Originating in the Santa Cruz Mountains, the watershed consists of a 25-mile long main stem and 9 principal tributaries that include the following (with associated smaller waterways shown in parentheses: Branciforte (Glen Canyon Creek, Redwood Creek, Granite Creek, Crystal Creek, Tie Gulch, and Blackburn Gulch), Carbonera (Camp Evans Creek and several unnamed streams), Zayante (Lompico Creek, Mill Creek, and Mountain Charlie Gulch), Bean, Fall, Newell (Loch Lomond Reservoir), Bear (Hopkins Gulch, whalebone Gulch, Deer Creek, Connely Gulch, and Shear Creek), Boulder (Foreman Creek, Silver Creek, Pea Vine Creek, Bracken Brae Creek, Jamison Creek, and Hare Creek), and Kings Creeks (Logan's Creek). Smaller creeks and waterways include Powder Mill Creek, Eagle Creek, Gold Gulch, Shingle Mill Creek, Bull Creek, Bennett Creek (Fall Creek and South Fall Creek), Mason Creek, Love Creek (Smith Creek and Fritch Creek), Hubbard Gulch, Alba Creek, Clear Creek, Malosky Creek, Spring Creek Gulch, Two Bar Creek, Spring Creek, and numerous unnamed streams and creeks. The watershed includes the cities and communities of Santa Cruz, Scotts Valley, Felton, Ben Lomond, and Boulder Creek. Much of the watershed is forested with the exception of these pockets of urban areas. The San Lorenzo River is listed on the 2002 Clean Water Act Section 303(d) List of Water Quality Limited Segments for sediment, pathogens, and nutrients. Sediment Total Maximum Daily Load (TMDL) for the San Lorenzo River (and associated tributaries Carbonera Creek, Lompico Creek, and Shingle Mill Creek) has been adopted by the Regional Board.

3.10.2 SOQUEL CREEK

Located between the cities of Santa Cruz and Watsonville, the Soquel Creek watershed drains an area of 42 square miles. Major tributaries include the West Branch (Burns, Laurel, Hester Creek, Amaya Creek, Fern Gulch, Ashbury Gulch, Hinkley Creek, and numerous unnamed waterways) and the Main Branch (fed by Moore's Gulch, Grover Gulch, Love Creek and Bate's Creek). Smaller tributaries include Noble Gulch, Porter Gulch, Tannery Gulch and Borregas Creek. Principal land use in the watershed includes urban development, rural residential development, agriculture, parks and recreation, and mining and timber harvesting. The unincorporated town of Soquel and the City of Capitola are both located in the lower reaches of the watershed. Sedimentation and impairment of important fish habitat have been identified as principal resource concerns in this watershed. Soquel Lagoon is listed on the Clean Water Act Section 303(d) List of Water Quality Limited Segments for nutrients, pathogens, and sedimentation/siltation.

3.10.3 SCOTT CREEK

Scott Creek encompasses a 39 square mile watershed in northern Santa Cruz County. Big Creek and Little Creek are the major tributaries to Scott Creek. Smaller tributaries include Queseria Creek, Berry Creek, Boyer Creek, Deadman Gulch, Winter Creek, Mill Creek, Archibald Creek, and numerous unnamed streams and creeks. Principal land uses in the watershed include agriculture and timber, industrial use (particularly in the vicinity of lands held by Lockheed-Martin), residential use, and recreation. The stream provides salmonid habitat for both spawning and rearing anadromous salmonids. Coho salmon spawn naturally in Scott Creek, making it the only major stream south of San Francisco where this occurs. Serious aggradation has occurred in the lower reaches of Scott Creek resulting in accelerated sedimentation that threatens to impair critical spawning habitat of the coho and steelhead. Invasive and exotic plant species such as French broom (*Genista monspessulana*), Cape ivy (*Senecio mikanioides*), and other nonnative invasive species are also a problem and are present throughout the riparian corridors of the watershed.

3.10.4 WADDELL CREEK

The Waddell Creek watershed drains an area of approximately 27 square miles and is comprised by Last Chance Creek, the two major tributaries of Waddell Creek, East Waddell and West Waddell, and numerous unnamed tributaries. East Waddell Creek is fed by Blooms Creek, Sempervirens Creek, Maddocks Creek, Rogers Creek, Opal Creek, and Union Creek. West Waddell is fed by Henry Creek and Berry Creek. Big Basin State Park constitutes the majority of land cover in the watershed with small pockets of rural residential and agricultural use near the coast.

3.10.5 APTOS CREEK

The Aptos Creek watershed drains an area of approximately 25 square miles in southern Santa Cruz County. Aptos Creek and Valencia Creek are the principal tributaries in the watershed. Aptos Creek converges with Valencia Creek approximately 1 mile inland of the Bay. Bridge Creek and Mangels Gulch empty into the Aptos Creek portion of the watershed and Trout Gulch empties into Valencia Creek. Land use in this watershed is comprised of forested lands, state parks and some rural residential areas. More than half of the Aptos Creek portion of the watershed is forested, with the majority of the creek running through the southern portion of the Nisene Marks State Park. Land use in the Valencia Creek portion of

the watershed is primarily rural residential and urban development. There are historical and modern day logging sites in both sub-watersheds. The Aptos Creek watershed provides important habitat to coho and steelhead. Excessive sedimentation, low stream flow resulting from overpumping of groundwater in the region, fish barriers, loss of channel complexity, and poor water quality in the coastal lagoon are some principal resource concerns associated with the Aptos Creek watershed.

San Lorenzo River

3.10.6 BALDWIN WILDER

The Baldwin Wilder watershed is located just south of and adjacent to Majors watershed and the San Lorenzo River watershed. It drains an area of approximately 20 square miles and is comprised of Baldwin Creek, Lombardi Gulch, Sandy Flat Gulch, Old Dairy Gulch, Wilder Creek (Peasley Gulch, Adams Creek, and Cave Gulch), and Moore Creek. The majority of the watershed is comprised of Wilder Ranch State Park with some agriculture along the coast and a quarry along Old Dairy Gulch.

3.10.7 SAN ANDREAS

The San Andreas watershed is bordered on the north and east by the Pajaro River watershed and to the west by the Aptos Creek watershed. San Andreas drains an area of approximately 15 square miles and is comprised of Bush Gulch and two unnamed streams. Land use is predominantly agriculture with some rural and urban residential areas.

3.10.8 SAN VICENTE CREEK

The San Vicente watershed drains an area of approximately 14 square miles and is comprised of San Vicente Creek fed by Mill Creek and several unnamed tributaries. Land use in the watershed is predominantly residential with 2 quarries located on Mill Creek and on one of the unnamed tributaries to San Vicente Creek. There is also a small pocket of agricultural land along the coast. Anadromous fish passage is thought to be limited to about 4 miles due to past quarry activities.

3.10.9 WATSONVILLE SLOUGH

Watsonville Slough drains 14 square miles from the hills of southern Santa Cruz County into the Pajaro River and Monterey Bay. The Watsonville Slough system is comprised of six individual sloughs including Watsonville Slough, Harkins Slough, Gallighan Slough, Hanson Slough, the main branch of the Struve Slough, and the western branch of Struve Slough. The Sloughs represent significant water supply resources, part of which is being used to offset salt-contaminated coastal wells in the region. Nutrient

loading, oftentimes exacerbated by the absence of marsh vegetation, coupled with poor water circulation has resulted in eutrophic conditions in many areas of the Sloughs. Watsonville Slough is listed on the 2002 Clean Water Act Section 303(d) List of Water Quality Limited Segments for pathogens, pesticides, and sedimentation/siltation (Swanson Hydrology and Geomorphology 2003).

3.10.10 AÑO NUEVO CREEK

The Año Nuevo watershed is located in the northwestern portion of the County along the border of San Mateo County. The watershed covers an area of approximately 10 square miles. The headwaters of this watershed begin in Santa Cruz County but empty into the Monterey Bay along the San Mateo coastline. The portion of this watershed in Santa Cruz County includes the headwaters of Whitehouse Creek, Cascade Creek, Elliot Creek, Wilson Creek, Green Oaks Creek, Año Nuevo Creek, Finney Creek, and Willows Gulch. Big Basin Redwood State Park is present in the eastern portion of the watershed. Other land uses in the watershed include residential and agricultural land use.

3.10.11 DAVENPORT

Davenport watershed is located between Scotts Creek and San Vicente and drains an area of approximately 8 square miles. Molino Creek and several unnamed creeks comprise this watershed. Major land uses in this area include agriculture and mountain residential commercial and residential uses in the town of Davenport.

3.10.12 LAGUNA CREEK

The Laguna Creek watershed drains an area of approximately 8 square miles and is comprised of Laguna Creek, Reggiardo Creek, and several unnamed streams. Approximately half of the land use in the watershed is agriculture with the remaining area comprised of residential and resource conservation uses.

3.10.13 LIDDELL CREEK

The Liddell Creek watershed drains and area of approximately 8 square miles and is comprised of Liddell Creek, West Liddell Creek, and Yellow Bank Creek. Land use in the watershed is predominantly agriculture (about 60%) with the remainder comprised of mountainous residential areas.

3.10.14 MAJORS

Majors watershed is located between the Laguna and Baldwin Wilder watersheds. It drains an area of approximately 5 square miles and is comprised of Majors Creek and three unnamed tributaries. Land use is predominantly parkland with the remainder comprised by rural residential and a small area of agricultural production.

3.10.15 SWANTON BLUFFS

Swanton Bluffs is a small watershed adjacent to the Scotts Creek and Waddell Creek watersheds. The watershed is approximately five square miles and is comprised of two unnamed streams. Land use is

predominantly agriculture with small strips of parkland along the coast as well as some residential areas.

3.10.16 ARANA GULCH-RODEO

The Arana Gulch-Rodeo watershed drains a 3.5 square-mile area at the outer (eastern) edges of the City of Santa Cruz. Major waterways and water bodies in this watershed include Arana Gulch, Leona Creek, Schwann Lake, Rodeo Creek Gulch, and several unnamed waterways. Principal land uses in the watershed are urban, primarily residential, commercial, and light industrial, plus institutional areas such as schools, hospitals, and cemeteries. Habitat types present in the watershed include wetlands and freshwater marsh, streambank vegetation, mixed evergreen/mixed broadleaf forest, and a few patchy areas of chaparral habitat. High sediment loads threaten the quality of habitat for the steelhead and other aquatic species in Arana Gulch. Reducing the delivery of sand and sediments to Arana Gulch, its tributaries, and the Santa Cruz Small Craft Harbor and providing passage for migrating adult steelhead to the eastern and central branches of Arana Gulch are identified as principal goals for the Arana Gulch watershed.

3.10.17 PAJARO RIVER

The Pajaro River Watershed drains an area of approximately 1,300 square miles of land in Central California in Santa Cruz, San Benito, Santa Clara, and Monterey Counties. Approximately fifteen percent, or 200 square miles, of the Pajaro River Basin lies within Santa Cruz County. Only the Watsonville Slough System is within the Santa Cruz IRWM Region; the entirety of the watershed is in the Pajaro Watershed IRWM. The Pajaro River watershed is comprised of the Watsonville Slough System (fed by Gallighan Slough, Harkins Slough, and Struve Slough), Corralitos Creek (fed by Rider Creek, Eureka Gulch, Diablo Gulch, Redwood Creek, Browns Creek, and Ramsey Creek), and Salsipuedes Creek (fed by College Creek, Green Valley Creek, Hughes Creek, Pinto Lake, Casserly Creek, and Gaffey Creek). Predominant land use practices in the Lower Pajaro and its tributaries include irrigated croplands, rangelands, timberlands, urbanization, and rural residential development. The watershed is home to several special status species including the tidewater goby, steelhead trout, Santa Cruz long-toed salamander, and the California red-legged frog. The Pajaro River and several tributary streams are considered to be water quality impaired due to sedimentation.

3.11 BIOLOGICAL RESOURCES

In 2011, the Land Trust of Santa Cruz County worked with other partners and stakeholders to prepare the *Conservation Blueprint for Santa Cruz County*[32] that collected, synthesized, and analyzed relevant land use, conservation, and resource data for the County, resulting in a comprehensive biodiversity assessment for the region. The assessment noted Santa Cruz County to be a global hotspot of biodiversity that supports:

- More than 1,200 native vascular plant species
- Rich and abundant wildlife, including more than 350 birds and 18 endemic animals found nowhere else
- Mosaic of natural communities including the globally rare old-growth redwood forests, Santa Cruz sandhills, northern maritime chaparral, and coastal prairie
- Coastal streams totaling 850 miles that support steelhead and coho salmon
- More than 1,500 acres of wetlands including sloughs and sag ponds that support diverse wildlife assemblages

Peregrine Falcon *Photo courtesy: Gary Kittleson*

Despite ongoing conservation efforts, numerous challenges to biodiversity in the Region persist, including the loss of important habitat, which threatens the persistence of many of the Region's endemic species. Remaining habitat is fragmented by urban and intensive agricultural land use. Additionally, localized threats, such as pollution and non-native species (e.g., sticky eupatorium weed, Arundo donax., Cape ivy, zebra mussels), as well as climate change, are increasingly problematic.

The function and condition of aquatic systems is inextricably linked to the adjacent and upland land use in which they occur. The amount and quality of water in streams and wetlands depends upon the condition of the watershed, with intact vegetation promoting essential hydrologic functions including recharge and filtration. Upland habitats exchange materials and energy with the aquatic systems and are essential for species that require both environments to complete their lifecycle, including amphibians such as the Santa Cruz long-toed salamander and California red-legged frog. Most aquatic systems in the Region have been altered as a result of urbanization, cultivation, road building and other land uses that alter their hydrologic function. Streams have been channelized and natural hydrology altered; wetlands have been filled or drained; and riparian vegetation altered or removed altogether. Many aquatic systems have been significantly degraded by sediment, nutrients, and pathogens.

[32] Mackenzie, A., J. McGraw, and M. Freeman. 2011. *Conservation blueprint for Santa Cruz County: An Assessment and Recommendations from the Land Trust of Santa Cruz County.* Land Trust of Santa Cruz County. Santa Cruz, CA. May 2011. 180 pages. Available at: http://www.landtrustsantacruz.org/blueprint

Table 3- 12 Highly Significant Terrestrial Biological Systems [33]

Name	Description	Biological Conservation Value	Occurrence and Conservation Status in Santa Cruz County
unique costal prairies and pocket meadows	small herb-dominated communities often on thin soils on coastal terraces or in forest openings within the mountains	high native plant richness including numerous locally unique species, endemic, and undescribed species	small pocket meadows dot the mountains; remnant patches of prairie occur on the coastal terraces and foothills.
coastal grasslands	herb-dominated communities on the coastal terraces and foothills	support populations of many rare or locally unique animal species; contain patches of native coastal prairie	historically widespread along the coast but now limited to the North Coast, Pajaro Hills, and isolated patches elsewhere
Swanton floristic area	plant species diversity hot spot within the Scott Creek and Swanton Bluffs watersheds	area of exceptionally high plant species richness that contains more than 600 plant species, including many rare, locally unique, and undescribed species	precise boundary has not been delimited
sandstone outcroppings	areas of exposed Butano, Lompico, Vaqueros, and Zayante sandstone	support rich and unique native plant assemblages; feature an abundance of native insects and unique bird assemblages	scattered locations throughout county

[33] Ibid.

Table 3- 13 Highly Significant Aquatic Biological Systems in Santa Cruz County [34]

Name	Description	Biological Conservation Value	Occurrence and Conservation Status in Santa Cruz County
high priority coastal watersheds	perennial streams that flow to the Pacific ocean, many of which feature lagoons and associated marshes	support rare salmonids: coho salmon and steelhead; feature other native animals including tidewater goby, Monterey roach, speckled dace, Pacific lamprey, California red-legged frog, foothill yellow-legged frog, western pond turtle and San Francisco garter snake	experts identified 29 watersheds totaling 174,000 acres that are critical to streams of important conservation value
Watsonville Sloughs	one of the largest remaining coastal wetlands in California	exceptionally important habitat for birds including migratory and wintering waterbirds, shorebirds, and riparian species; support aquatic species including California red-legged frog and western pond turtle	complex of several sloughs totaling approximately 800 acres with adjacent upland habitat is essential to slough habitat condition and many aquatic species' persistence
Santa Cruz long-toed salamander (SCLTS) ponds	ponds in the Larkin Valley and Rio Del Mar areas and adjacent chaparral and woodlands	ponds that support breeding Santa Cruz long-toed salamanders, and endangered species endemic to coastal southern Santa Cruz and northern Monterey counties; the ponds provide breeding habitat for California red-legged frog, western pond turtle, and other amphibians and reptiles, as well as birds; adjacent maritime chaparral and San Andreas oak woodland, which provide important upland habitat	17 known breeding ponds. Upland habitat and corridors between ponds are essential to the species' long-term persistence. Highway 1 bisects the range and is a barrier to SCLTS.

3.11.1 RARE AND ENDANGERED TERRESTRIAL SPECIES

As presented in the *Conservation Blueprint for Santa Cruz County*, the Region supports 73 known rare plant species, 16 of which are endemic to Santa Cruz County, and 13 of which have been listed as threatened or endangered. The region also supports 81 rare or locally unique animal species, 19 of which are endemic to Santa Cruz County, and 13 of which are threatened or endangered.

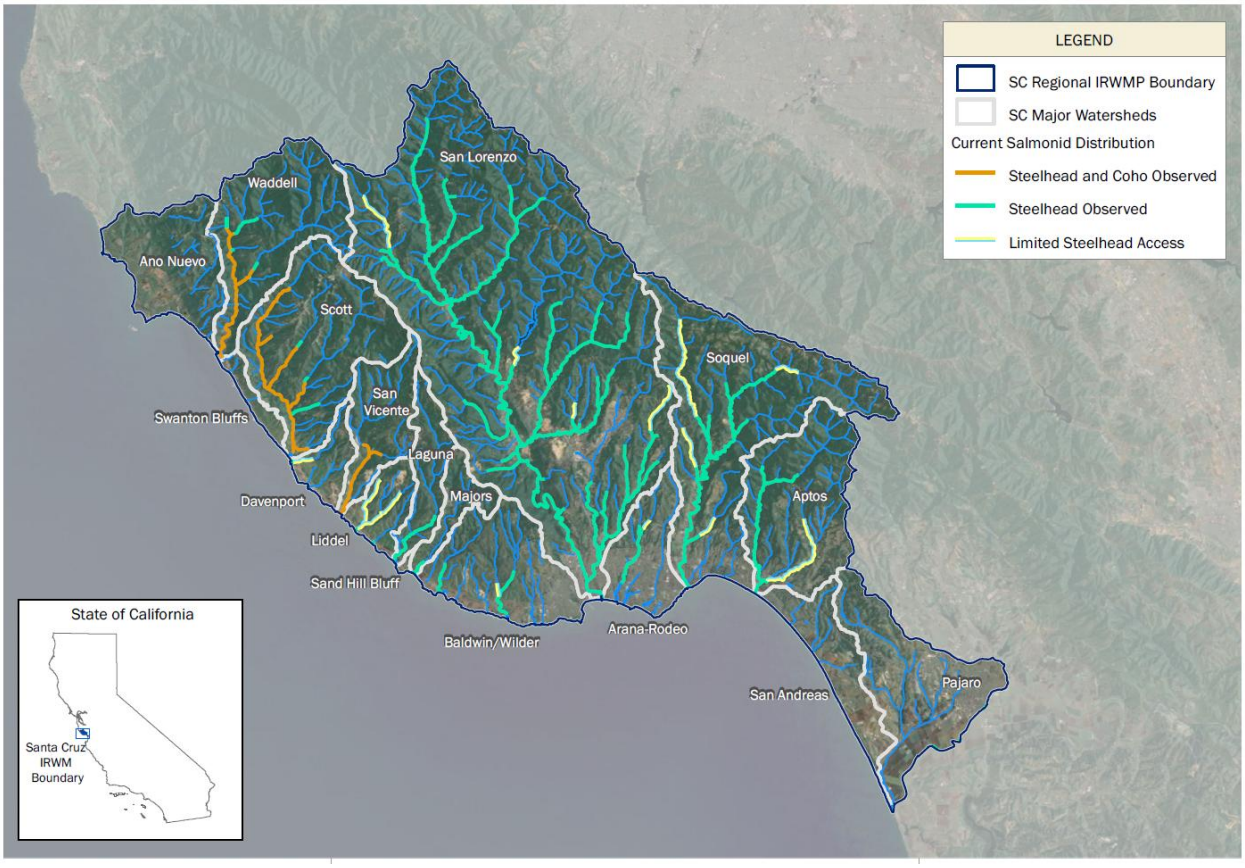
3.11.2 RARE AND ENDANGERED SALMONID SPECIES

[34] Ibid.

The Santa Cruz IRWM region supports populations of steelhead *(Oncorhynchus mykiss)* and coho salmon *(Oncorhynchus kisutch).* Water needs for the salmonids are discussed under the subsequent section on environmental water needs. Steelhead are listed as threatened under the federal Endangered Species Act (ESA) and belong to the Central California Coast Distinct Population Segment (DPS-a genetically similar population group). Steelhead have core populations in Scott, San Lorenzo, Soquel and Aptos creeks and also occur in most perennial streams throughout the region. While steelhead numbers are low compared to historical estimates, projects and activities that improve stream habitat will conserve and restore local steelhead populations.

Coho salmon are listed as endangered under both the Federal and State ESA and belong to the Central California Coast Evolutionary Significant Unit (ESU - a genetically similar population group). This ESU includes Santa Cruz County's North Coast streams and the San Lorenzo River, Soquel Creek and Aptos Creek. Coho salmon are critically endangered in Santa Cruz County and no longer occur in most streams. A conservation hatchery supports a small population in Scott Creek and contributes to another small population in San Vicente Creek. The National Marine Fisheries Service has prepared a Coho Salmon Recovery Plan that includes actions to restore coho salmon to the San Lorenzo, Soquel and Aptos creeks, where coho are currently absent.

Figure 3- 8 Salmonid Supporting Streams in the Santa Cruz Region [35]



[35] 2NDNATURE, LLC. Santa Cruz IRWM Conceptual Framework. Final Draft March 2013.

3.12 WATERSHED MANAGEMENT

Various agencies have active roles in watershed management within the Santa Cruz IRWM Region. A variety of projects and programs are implemented across the region including water quality projects focusing on nutrients and sediment, fish passage and stream restoration, and rural roads management.

3.12.1 CITY OF SANTA CRUZ WATER RESOURCES MANAGEMENT SECTION

The Water Resources Management Workgroup in the Watershed Section of the City of Santa Cruz Water Department is responsible for drinking water source protection, environmental regulatory compliance, and general natural resource management work that is an important part of the delivery of clean drinking water to city customers. Water Resources Management Workgroup staff have worked for over a decade on a habitat conservation plan for coho salmon and steelhead trout. Water Resources Management Workgroup staff develop drinking water source assessments; and perform outreach and education with drinking water source watershed stakeholders (i.e. agencies, schools, landowners, conservationists, and other City staff).

Along with other responsibilities, Water Resource Management staff participate in technical advisory committees (TAC) including the San Lorenzo River TAC, San Lorenzo River Alliance, San Lorenzo Urban River Task Force, San Lorenzo "Cost-Share for Roads" TAC, On-site Wastewater Disposal, (Septic) TAC, Manure Management TAC, City of Santa Cruz Watershed Resources Technical Advisory Task Force, Comparative Lagoon Ecological Assessment Plan (CLEAP) TAC, Climate Change TAC, Karst Protection Zone Planning TAC and others. Water Resources Management Workgroup staff provide environmental review and compliance support for the Water Department with respect to the Endangered Species Act, California Fish and Game Code, California Water Code, Safe Drinking Water Act, Clean Water Act, California Environmental Quality Act, and the California Coastal Act.

The Water Resources Management Workgroup conducts biological and hydrologic surveys that include monitoring of 12 drinking water source stream gaging stations including the USGS gages on the San Lorenzo River, terrestrial monitoring and anadromous fishery habitat typing/population assessments. Other chemical/physical monitoring work is performed on the North Coast and San Lorenzo River systems to measure sediment, turbidity and temperature, and a variety of other analytes. Watershed Section staff also manage Loch Lomond Reservoir and monitor, restore, and protect habitat in the City's 3,880 acres of watershed lands. Restoration work Watershed staff are engaged in includes, but is not limited to, the following: Mountain Charlie Creek Passage, Apple Orchard Acacia removal and revegetation, numerous pipeline leak, slide, and access road related projects, San Vicente Creek Coho Rescues, E. Zayante Rd improvements, Trinkling Creek Rd. improvements, San Lorenzo and North Coast Juvenile Salmonid Monitoring, Felton Fish Trapping, Newell Creek Fuel Work, the Riparian Conservation Program.

3.12.2 SANTA CRUZ COUNTY

Santa Cruz County's Water Resources Program is organized within the Environmental Health Services Division of the Health Services Agency. The Water Resources Program is not a water supply agency, but rather works in collaboration with other county departments, agencies, special districts and non-governmental organizations to solve water resources and environmental issues through long-range water supply planning, water quality protection, and watershed management.

Environmental Health Services also has responsibility for Zone 4 of the Santa Cruz County Water Conservation and Flood Control District. Zone 4 is a countywide zone established to preserve and enhance the county's watershed resources, including water quality, groundwater, surface water, fish, and wildlife. Services include reviewing timber harvest plans and participating in pre-harvest inspections; protecting and enhancing groundwater recharge; monitoring fish populations and stream habitat quality; evaluating and funding necessary log jam removal by the Department of Public Works; funding environmental code compliance activities in the Planning Department; administering stream enhancement projects; promoting water conservation and water quality protection; participating in countywide stormwater management; conducting water supply planning; implementing groundwater recharge projects and well destructions; and supporting administration and development of IRWM in the Santa Cruz Region. Zone 4 is funded through an annual, countywide property tax assessment, grants and contributions from other agencies.

Other County departments are also involved in watershed management activities. Public Works has implemented programs to improve road maintenance activities, upgrade culverts and crossings, improve drainage and stormwater management, promote water infiltration, and improve flood protection while restoring riparian habitat. The Planning Department implements environmental code compliance and various aspects of development review and approval to require the protection of riparian corridors, groundwater recharge areas, floodplains, and biotic resources, and to limit land clearing grading and erosion.

3.12.3 RESOURCE CONSERVATION DISTRICT OF SANTA CRUZ COUNTY

The mission of the Santa Cruz County Resource Conservation District (RCD) is to help people protect, conserve, and restore natural resources through information, education, and technical assistance programs. The RCD provides a broad range of services related to soil and water conservation throughout Santa Cruz County. The RCD operates pursuant to the Resource Conservation District Act; it is a public resource agency but does not have any regulatory or enforcement authority. The RCD leverages available technical, financial, and educational resources to meet the needs of the local land users within three primary areas of service:

Agricultural Community: Through a cooperative agreement with the US Department of Agriculture's Natural Resources Conservation Service (NRCS), the RCD offers the services of NRCS Conservationists to assist agricultural landowners with land management issues, including irrigation, soil development, erosion control, crop cover, etc. The RCD places a high priority on issues and work related to the protection of prime and important farmland within Santa Cruz County.

Erosion Control and Sedimentation: The RCD prioritizes controlling accelerated runoff, erosion and sedimentation from human activities, including the following: rural roads, inadequate drainage, major land use changes, and erosion and reactivation of chronic landslide masses from landslides induced by human activities as well as natural events. To address these issues the RCD offers conservation assistance to road associations, timberland owners, environmental organizations, government resource agencies and the general public through conferences, workshops, demonstrations, and direct technical and financial assistance funded by grants.

Watershed Management: Soil and water conservation is an important element of watershed planning and management. Through the Integrated Watershed Restoration Program (IWRP) the RCD is directly involved in a number of watershed management initiatives. The RCD assists watershed groups and landowners with dissemination of conservation information and implementation of on-the-ground resource enhancement projects, including managing grant programs. In conjunction with the NRCS, the RCD offers permit coordination services through the Santa Cruz Countywide Permit Coordination Program.

3.13 WATER SUPPLY

3.13.1 STREAMFLOW

Streamflow is a major element of the water cycle, and refers to the flow of water in streams, rivers, and other channels. Ephemeral streams only flow during periods of stormwater runoff during the winter months, whereas perennial streams flow year-round, supplied by groundwater discharge groundwater. Streamflow is determined by topography, land use, and permeability, and the frequency, intensity, and timing of rainfall events.

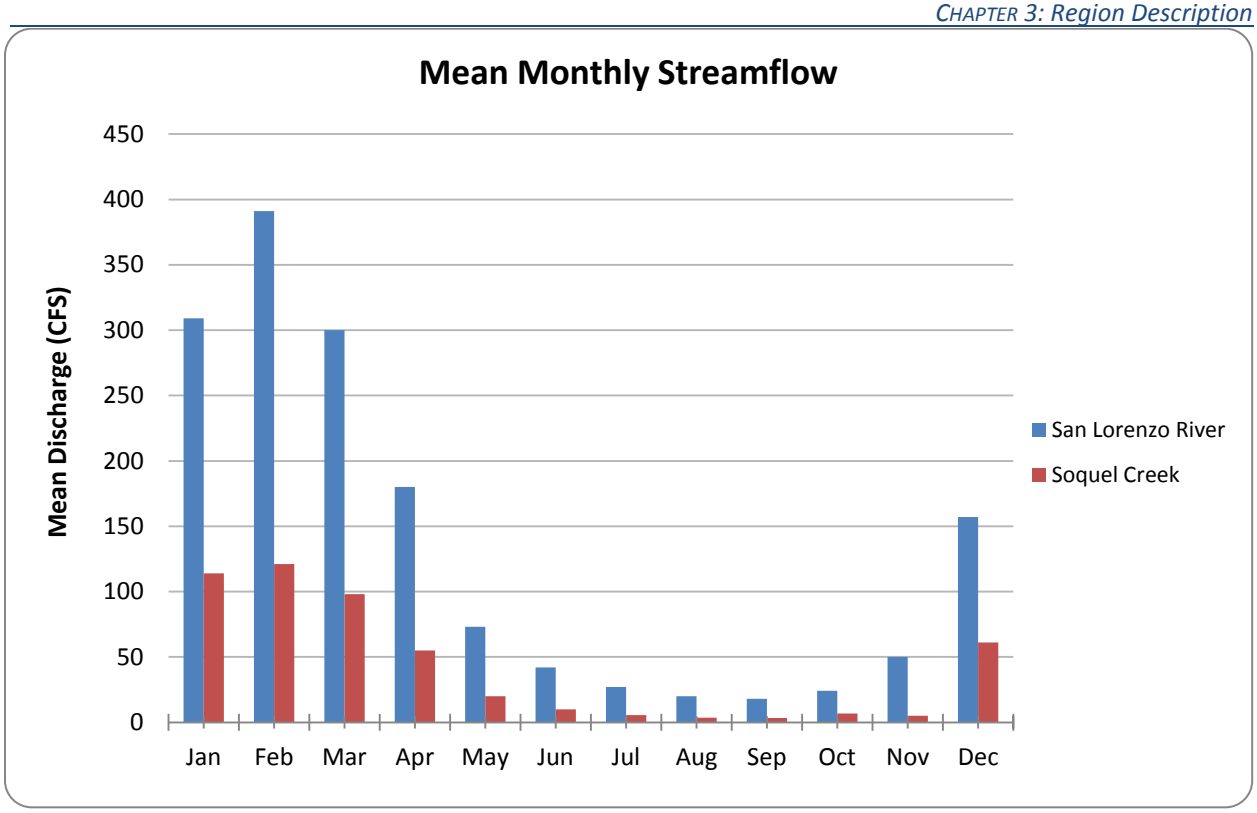
Streamflow has historically been measured in many county streams by the US Geological Survey (USGS), County, water agencies, and others. Currently operating USGS gages exist on only two streams in the Region – the San Lorenzo River and Soquel Creek. Table 3-11 shows the period of record associated with each of these gages, and Figure 3-7 illustrates the seasonal variability in streamflow for the Region. The vast majority of streamflow volume on an annual basis is derived from precipitation and direct runoff primarily during the five-month period between December and April.

Table 3- 14 U.S. Geological Survey Surface Flow Gages [36]

Watershed	Gages	Period of Record
San Lorenzo River	San Lorenzo River @ Santa Cruz	10/01/1952 - current
	San Lorenzo River @ Big Trees	10/01/1936 - current
Soquel Creek	Soquel Creek @ Soquel	5/01/1951 - current

Figure 3- 9 Mean Monthly Streamflow [37]

[36] U.S. Geological Survey National Water Information System: http://waterdata.usgs.gov/nwis/sw
[37] U.S. Geological Survey National Water Information System: Web Interface http://waterdata.usgs.gov/nwis/rt



3.13.2 WATER SUPPLY WATERSHEDS

The fact that the Region's water supply is locally derived provides special opportunities to adopt and enact land use policies that protect that supply. As indicated in Table 3-15, there are a number of watersheds with supply streams that are directly used for municipal or domestic water supply and are designated as water supply watersheds. Objective 5.5a of the County's General Plan is to manage the watersheds of existing and future surface water supplies to preserve the quality and quantity of water produced and stored in these areas to meet the needs of county residents, local industry, agriculture, and the natural environment. Several General Plan policies are in place to protect these watersheds through minimum parcel sizing for development and runoff retention (please refer to Chapter 13, Relationship to Local Water and Land Use Planning for additional information).

Table 3- 15 Water Supply Watersheds and Related Water Systems [38]

North Coast	
San Vicente Creek, Mill Creek	Davenport Water System
Liddell Spring, Laguna Creek, Majors Creek	City of Santa Cruz
Reggiardo Creek	City of Santa Cruz
Redwood Spring (Trib. to Majors Ck.)	Redwood Spring Mutual Water Company
Sempervirens Creek	Big Basin State Park
San Lorenzo	
San Lorenzo River	City of Santa Cruz
Hare Creek, Jamison Springs, Corvin Spring, Forest Spring	Big Basin Water Company

[38] County of Santa Cruz, Water Resources Division.

Forest Spring	Forest Spring Mutual Water Company / Big Basin Water Company
Bracken Brae Creek / Spring trib. to Bracken Brae	Bracken Brae County Club
Peavine, Silver, Foreman, Clear, Sweetwater Creeks	San Lorenzo Valley Water District
Newell Creek Reservoir (aka Loch Lomond)	City of Santa Cruz
Fall, Bennet, Bull Creeks	San Lorenzo Valley Water District
Lompico Creek	Lompico County Water District
Spring (Trib. To Zayante Creek)	Zayante Acres Mutual Water Company
Tunnell Gulch (Trib. to Gold Gulch)	River Grove Mutual Water Company
Soquel – Aptos	
Laurel Creek	Villa del Monte Mutual Water Company
Laurel Creek	Summit Mutual Water Company
Spring (Trib. to W.B. Soquel Ck.)	Redwood Lodge Mutual Water Company
Spring (Trib. to W.B. Soquel Ck.)	Cathedral Wood Mutual Water Company
Pajaro	
Corralitos, Browns Valley Creeks	City of Watsonville

3.14 GROUNDWATER

There are three major groundwater basins in the Santa Cruz IRWM Region – the Santa Margarita (Scotts Valley, north region), Mid-county (Soquel-Aptos, Purisima and Aromas, central region), and Pajaro Valley (south region).The Region's water purveyors generally utilize permeable bedrock aquifers due to both the limited extent of alluvial basins as well as the presence of the large, permeable geologic formations in the county. Alluvial groundwater basins coincide with surface watershed areas, but in contrast, bedrock basins can underlie and interact with multiple watersheds. For example the Purisima formation begins under the eastern portion of the San Lorenzo Watershed and extends under the Soquel, Aptos, and Pajaro watersheds. The Aromas formation overlies the Purisima and provides water supply beginning in the eastern portion of the mid-county area, but extends under the Pajaro watershed and serves as the primary water-bearing formation of the Pajaro groundwater basin.

3.14.1 SANTA MARGARITA GROUNDWATER BASIN

The Santa Margarita Basin, located in the San Lorenzo River watershed, is roughly triangular shaped and bounded on the west by the Ben Lomond Fault, on the north by the Zayante Fault, and on the east by a granitic bedrock high. The basin consists of a sequence of Tertiary-age sandstone, siltstone, and shale underlain by the granite. The sedimentary rocks are divided into several geologic formations that are defined on the basis of rock type and relative geologic age.

The majority of the water supply in the Scotts Valley area is derived from three main formations – the Santa Margarita, Lompico, and Butano, although limited amounts are drawn from sandy zones within the Monterey Formation and the Locatelli formation. In 2006, the consultant for Scotts Valley Water District completed a groundwater model of the Santa Margarita Basin. The model calculated sustainable yield for the Scotts Valley subarea was estimated to be 2,600 AFY. At that average groundwater withdrawal rate, the model results indicate that there should be no additional groundwater level declines or stream baseflow loss beyond the current conditions. Although current pumping rates are less than the modeled sustainable yield, groundwater pumping is concentrated in the Lompico because of

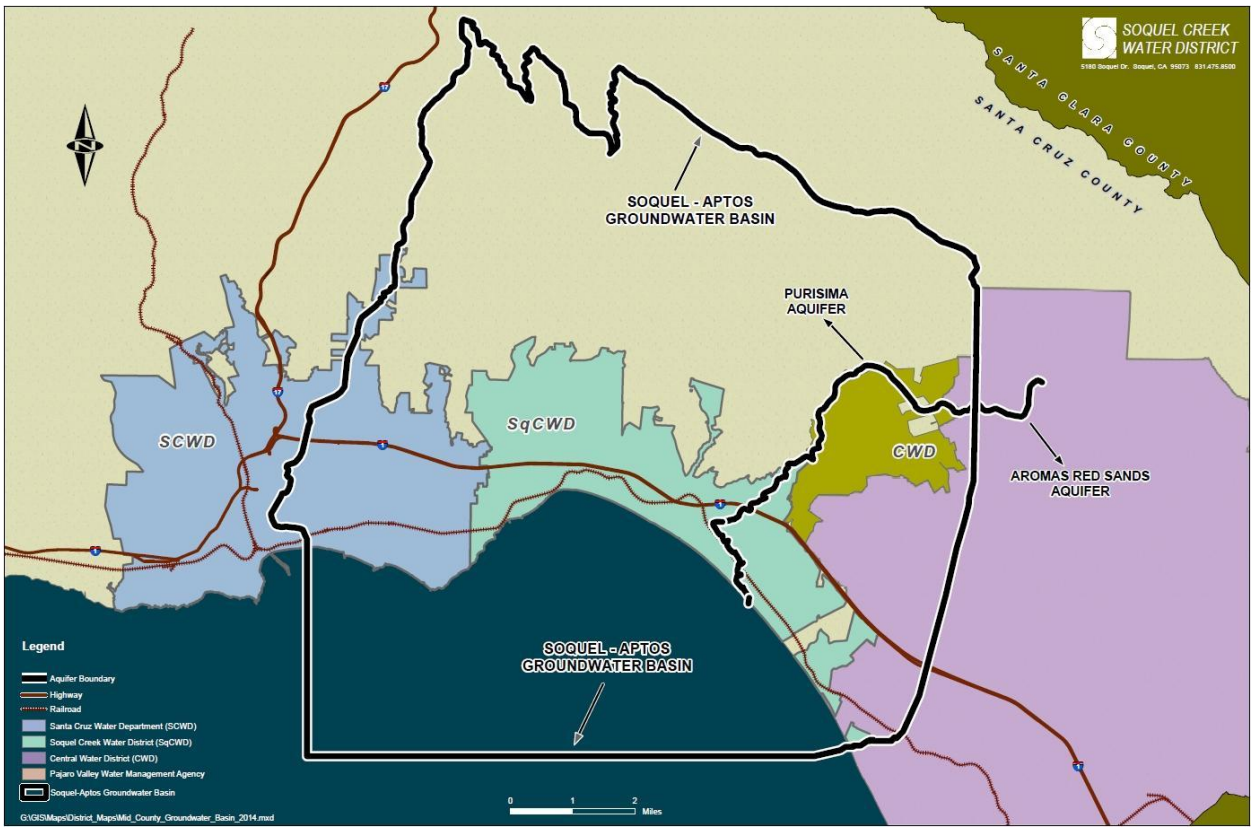
technical and logistical difficulties accessing the other aquifers. Because of this, groundwater levels in the Lompico are still declining in many parts of the Scotts Valley subarea; therefore, recharging the Lompico is a priority for the region.

3.14.2 SOQUEL-APTOS GROUNDWATER BASIN

The Soquel-Aptos (Mid-County) Groundwater Basin consists of the Purisima Formation, an older undifferentiated Tertiary sandstone that occurs at depth in the western portion of the mid-county area, and the Aromas formation that overlies the Purisima in the eastern portion of the basin. Both the Purisima Formation and the Aromas formation extend under the Pajaro Valley. The Soquel-Aptos basin is bounded on the north by the Zayante Fault, to the south by Monterey Bay, and to the west by a granitic high. The boundary to the east is less well defined by a slight hydrologic high before the formations and the groundwater gradient dip beneath the Pajaro Valley. Where uneroded, the Purisima is approximately 2,000 feet thick. The Purisima consists of several distinct water bearing units separated by aquicludes, and the Aromas directly overlays the permeable upper layers of the Purisima. In the western area, most of the younger Purisima has been removed by erosion. No detailed numeric groundwater model has been developed for the Soquel-Aptos groundwater basin, although models have been developed for the Pajaro Basin, and more recently for the Aromas area of the mid-county basin in the vicinity of Central Water District. An updated mass balance estimate by Hydrometrics WRI (2012) suggests that the sustainable yield of the Purisima area is less than 4,300-5,300 AFY, however there is some uncertainty of the sustainable yield as a peer review of this estimate discussed at a Soquel Creek Board meeting July 15, 2014 resulted in a higher estimate for sustainable yield[39]. Groundwater production over the past five years is estimated by the Santa Cruz County Water Resources staff to have averaged 5,250 AFY. In 2012 pumping from the Purisima is estimated to have been approximately 5,100 AFY. Because the Purisima and Aromas Formations extend offshore beneath Monterey Bay, the aquifer is in hydrologic connection with the Pacific Ocean. Consequently, overdraft of the basin has the potential to pull seawater into the aquifer beneath the inland areas. Seawater influence has already been detected in the western portion of the Purisima at Soquel Point and in the eastern part of the basin in the Aromas formation.

[39] Hydrometrics WRI, 2012, Revised Protective Groundwater Elevations and Outflows for Aromas Area and Updated Water Balance for Soquel-Aptos Groundwater Basin, letter to Laura Brown, Soquel Creek Water District, April 12, 2012.

Figure 3- 10 Soquel-Aptos Groundwater Basin [40]



3.14.3 PAJARO VALLEY GROUNDWATER BASIN

The Pajaro Valley Groundwater Basin consists of younger and older alluvium overlying the Quaternary-Tertiary aged Aromas Formation. The Purisima Formation is encountered at depth, but groundwater production from the Purisima in Pajaro Valley usually only occurs along the margins of the basin. The basin extends into Santa Cruz, Monterey, Santa Clara, and San Benito counties. In Santa Cruz County the basin is bounded on the north by the San Andreas Fault, on the south by Monterey Bay, and on the west by the shallow hydrologic high at the eastern edge of the mid-county basin. The Aromas Formation has been generally divided into upper and lower units that are often separated by a low permeability clayey zone.

All the water bearing units of the Pajaro Basin extend offshore and are in hydrologic connection with Monterey Bay. Groundwater use in the basin is estimated at 55,000 to 60,000 AFY. Sustainable yield is estimated to be between 30,000 and 50,000 AFY. A key symptom of overdraft in coastal basins is seawater intrusion. Seawater intrusion has been an ongoing problem in the Pajaro Basin and was first documented in a 1953 Department of Water Resources report. Currently, constituents of seawater have been detected in wells in excess of two miles inland from the coast. In the Pajaro Valley, seawater intrusion has been expanding inland from the coast at an average rate of 100-250 feet per year. The Pajaro Valley Water Management Agency has detected seawater with chloride concentrations greater than 500 mg/L in wells one mile inland. Sixty percent of the basin now has groundwater levels below sea level.

[40] Soquel Creek Water District, 2014.

3.14.4 MISCELLANEOUS WATER BEARING UNITS

Ben Lomond Mountain: While not considered a typical groundwater "basin," the Ben Lomond Mountain area of northern Santa Cruz County is an important source of groundwater for this relatively sparsely populated region. Groundwater is extracted from relatively thin deposits of Santa Margarita sand, karst deposits of intermingled marble and schist, and from weathered granite that is often exposed at or near the ground surface. While the transmissivity of these units is typically very high (i.e., they can transmit large volumes of groundwater very rapidly), due to the thin nature of these water-bearing materials, the total volume of groundwater they can store is very limited. The permeable surface materials capture significant amounts of the high volume of rainfall that occurs on Ben Lomond Mountain and slowly feed the captured water through weathered material and fractures to support private wells and maintain a high level of dry season baseflow in streams draining to the north coast and San Lorenzo watersheds. As such, Ben Lomond mountain provides a substantial portion of the surface water used by the San Lorenzo Valley Water District and the City of Santa Cruz.

Summit Area: There is limited groundwater in the Summit area. Due to the limited porosity, geologic units in the Summit area do not contain large amounts of water and water availability is limited to favorable fracture zones. Most potable water along the Summit is drawn from bedrock wells or springs, imported from Santa Clara County, or hauled in by water trucks during the dry season when marginal wells cannot meet demand.

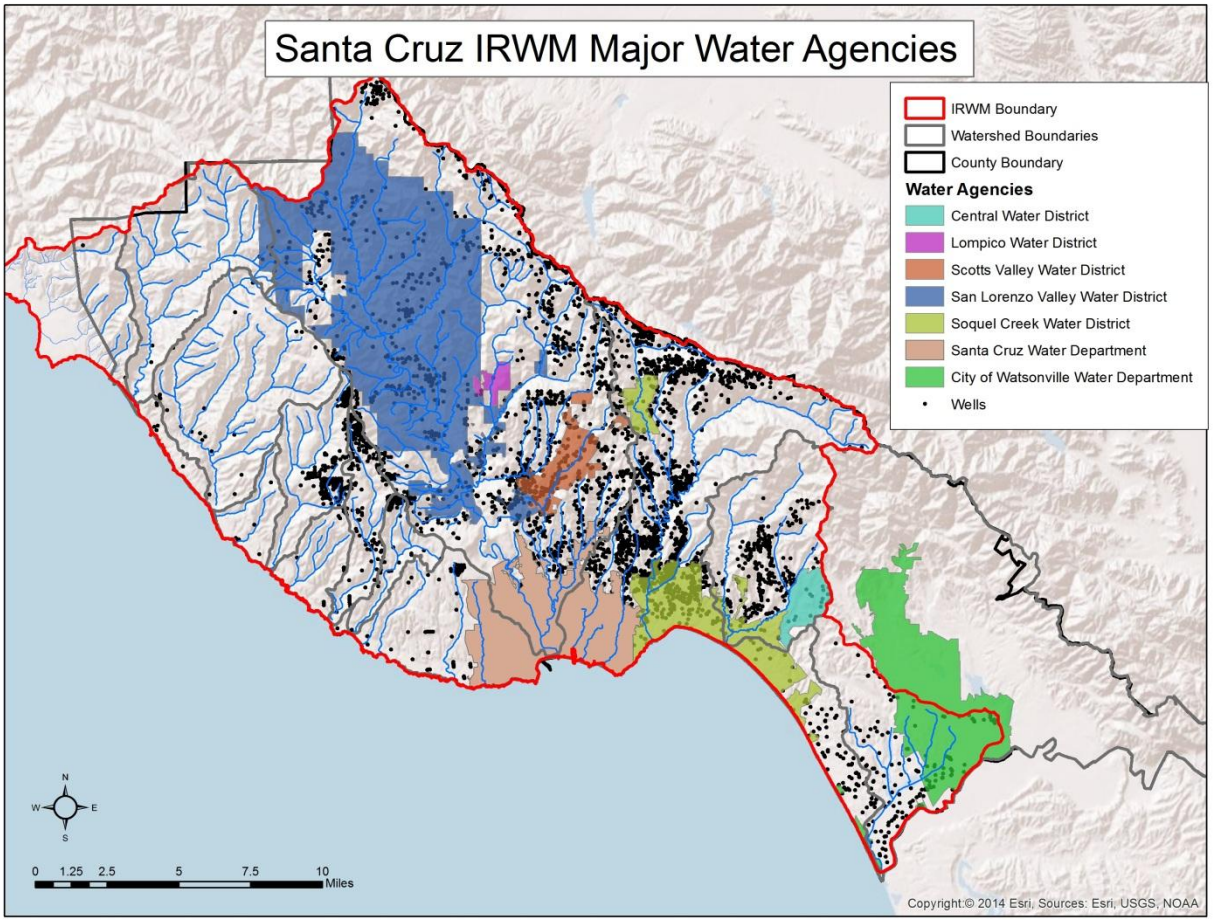
3.15 WATER SUPPLIERS

Domestic water supply within the Santa Cruz IRWM Region is provided by seven public agencies, by small public water systems, and by individual and shared wells and springs (Figure 3-9). Groundwater provides 55-60% of public water agency supply in the Santa Cruz Region, with the remainder coming from local surface water sources. With the exception of a small volume obtained through surface diversions, the non-agency water users (agriculture and rural residences and businesses) rely entirely on groundwater. Except for 200-300 parcels in the Summit area that receive water through the Monte Vina pipeline from the San Jose Water Company, the Santa Cruz Region is supplied exclusively by local water sources. This situation is unusual in California; most communities rely to some extent on imported water to support their populations.

Although the water agencies are independent, they share the same water resources and are facing similar constraints and resource management issues, and have conducted collaborative planning and project implementation accordingly. The following sections describe the water suppliers in the Santa Cruz IRWM Region.

Compiling information on supply and demand for many of the water agencies has been very challenging as these figures have been frequently updated in recent years, particularly for Santa Cruz City and Soquel Creek Water District. There are also many unknowns, including the effect of recovery from the recession, climate change, the extent and effectiveness of future water conservation measures and the need to reduce extraction from existing sources to address aquatic habitat needs or reduce groundwater overdraft. All of the major water agencies completed urban water management plans in 2011, according to a prescribed methodology. These were used to provide a common basis for information and compilation. More recent information for some agencies is also provided as available.

Figure 3- 11 Santa Cruz IRWM Water Supply [41]



3.15.1 CITY OF SANTA CRUZ WATER DEPARTMENT

The City of Santa Cruz Water Department (SCWD or City) is a municipal utility that is owned and operated by the City. The SCWD serves a 20-square-mile area that extends from the agricultural lands west of the City to 41st Avenue in the City of Capitola. The service area includes the developed portion of UC Santa Cruz campus, Live Oak, Pasatiempo, and some other unincorporated areas surrounding the city. The SCWD serves ~24,351 connections of which 88% are residential, with a total population of approximately 94,000. Approximately 61,100 people, or about two-thirds of the total population, live inside the city limits.

SCWD is primarily a surface water user (~96% of total supply), all of which is derived from the northern county watersheds. The remaining ~4% percent of the SCWD water supply comes from groundwater, all of which is extracted from wells in the Purisima Formation in the mid-county area. In addition to surface diversions on four north coast streams (Reggiardo, East Branch Liddell, Majors, and Laguna creeks) and on the San Lorenzo River at Tait Street and Felton, SCWD utilizes Loch Lomond, an 8,600 acre-foot (2,817 million gallons) capacity reservoir on Newell Creek, a major tributary to the San Lorenzo River.

[41] County of Santa Cruz, Water Resources Division. 2014.

Approximately 500 acre-feet per year (AFY) of water is derived from groundwater via the Beltz wells, located in the Live Oak area of the unincorporated county. Except for the water produced by the Beltz wells, all raw water is treated at the Graham Hill Water Treatment Plant. The City currently has a total treated water storage capacity of 44.4 acre-feet (14.8 million gallons), or 1.3 times average daily demand.

One of the challenges the City faces is a lack of adequate water supply during periods of drought. Because the City is primarily supplied by surface water, it has surplus water in wet years and is seriously impacted during periods of drought. In single dry years, the system relies heavily on water stored in Loch Lomond reservoir to satisfy demand, which draws down the reservoir level lower than usual and depletes available supply in the event of a subsequent dry year. In multiple dry years, or drought conditions, very low surface water flows in the San Lorenzo River and North Coast creeks and springs, combined with depleted supply stored in Loch Lomond reservoir, reduces that City's available supply to a level that cannot support water demand.

Table 13 below shows supply and demand projections based on the 2010 UWMP. These projections have been updated since and continue to be evaluated by the Water Supply Advisory Committee. SCWD has already reduced available supply since the 2010 UWMP was completed due to the need to reduce their diversions and bypass more flow downstream to help restore passage and rearing habitat for steelhead and salmon. Negotiations with fishery agencies and modelling work are continuing. Preliminary estimates suggest that SCWD could see a reduction in stream diversions of 700-1400 af/yr. The impact of this becomes more pronounced when peak daily demand is compared to available supply during a critical dry year. Preliminary estimates suggest shortages could range from 21-48%, however this continues to be evaluated.[42]

The SCWD acknowledges that it would only be able to service approximately half of the normal dry season demand during a worst case multiple-year drought. Along with conservation and use curtailment, the City's Integrated Resources Water Management Plan identifies seawater desalination as the preferred alternative to provide backup supply. The City had been pursuing a joint desalination facility with Soquel Creek Water District, and a draft EIR was prepared for that project. However, in the face of community concerns about the project, the City decided to pause work on the project in order to facilitate a community discussion about water supply, demand, and alternatives. Meanwhile, conservation efforts have been successful; in 2011 Santa Cruz users averaged 106[43] gallons per capita per day (gpcd), which is well below the statewide average of 192 gpcd, the Central Coast Regional average of 154 gpcd, and the year 2020 Urban Water Use Target of 117 gpcd.[44] The City has implemented water rationing and is developing a water conservation master plan that is evaluating various water conservation actions. Water demand will vary depending on the level of conservation actions implemented and the success of those efforts. Recent information from the City has projected demand in the year 2030 to range from 12,409 AFY to 14,555 AFY[45].

[42] URS, 2013. Proposed **scwd²** Regional Seawater Desalination Project Draft Environmental Impact Report SCH# 2010112038. Prepared for City of Santa Cruz and Soquel Creek Water District.

[43] City of Santa Cruz Water Department. "Memorandum – Per Capita Water Use Calculations." May 2, 2011.

[44] Ibid.

[45] City of Santa Cruz Water Department (T. Goddard). "Memorandum to Water Commission" Meeting dated 01/29/14.

The number of water supply sources and their current volumes has provided flexibility to SCWD to select water of highest quality for treatment and distribution to its customers. As the requirements of the City's diversions become more complex and stringent, SCWD must treat water of reduced quality to meet customer demand. In the face of drought and long term uncertainty with regard to water supplies, the City is evaluating its treatment and operations to ensure its customers continue to receive high quality water.

Table 3- 16 City of Santa Cruz Supply and Demand Projections (water units are acre-feet per year unless otherwise specified)

City of Santa Cruz						
	Normal Year		**Single Dry Year**		**Multiple Dry Years**	
	2010	**2030**	**2010**	**2030**	**2010**	**2030**
Population	91,291	98,600	91,291	98,600	91,291	98,600
Supply	14,749	14,855	12,748	14,034	11,428	10,106
Demand	12,577	14,448	12,577	14,448	12,577	14,448
Difference	2,172	407	171	(414)	(1,149)	(4,342)
Per Capita Use (GPD)	123	131	123	131	123	131
References						
	Normal Year		Single Dry Year		Multiple Dry Years	
	2010	2030	2010	2030	2010	2030
Population	*UWMP Table 2-3*					
Supply	*UWMP Table 5-6*		*UWMP Table 5-7*		*UWMP Table 5-8*	
Demand						
Difference	*Calculated*					
Per Capita Use (GPD)	*Calculated*					

3.15.2 SOQUEL CREEK WATER DISTRICT

The Soquel Creek Water District (SqCWD) serves a portion of the City of Capitola as well as the unincorporated areas of Soquel, Aptos, Seacliff, Rio Del Mar, Seascape, La Selva Beach, and Canon del Sol. The district's service area encompasses 14 square miles including seven miles of coastline. The district serves 13,570 connections with 94% residential and a total population of approximately 37,000. The district is entirely dependent on groundwater from two aquifers, drawing 62% of its water supply from the Purisima Formation and 38% from the Aromas Red Sands aquifer, with all water being treated at the wellheads. These aquifers are shared with adjoining water agencies and a multitude of private well users. The Aromas is already experiencing seawater intrusion along the coastline in the SqCWD service area. Depressed groundwater elevations in the Purisima indicate a strong potential for future seawater intrusion into the aquifer.

The District's consultant has concluded that the mid-county (Soquel-Aptos) groundwater management area is in overdraft based on low groundwater levels. that create the potential for seawater intrusion into the drinking water aquifers. Increasing salt concentrations have been detected in coastal monitoring wells for much of the Aromas and at limited locations in the Purisima Formation. The current

long term sustainable yield estimate for the basin is approximately 4,600-7,000 AFY, which is utilized by the district and other users. However, because the basin has experienced long term and overdraft and pumping needs to be reduced in order to recover the basin, the district has set a target pumping goal of 2,900 AFY for 20 years. SqCWD average per capita daily water usage (108 gpcd over past five years) is well below the state and central coast averages, but significant, additional conservation will be required to reach the new target, which is expected to also involve developing a supplemental supply. SqCWD had been evaluating the desalination plant with the SCWD as a supplemental water supply to help it reach that lower pumping threshold, but since that project was put on hold, the District has been revisiting other potential supply options including water transfers and recycled water.

Table 3- 17 Soquel Creek Water District Water Supply and Demand Projections

Soquel Creek Water District						
	Normal Year		**Single Dry Year**		**Multiple Dry Years**	
	2010	**2030**	**2010**	**2030**	**2010**	**2030**
Population	37,720	39,550	37,720	39,550	37,720	39,550
Supply	4,610	2,900	4,610	2,900	4,610	2,900
Demand	4,615	4,116	4,615	4,116	4,615	4,116
Difference	(5)	(1,216)	(5)	(1,216)	(5)	(1,216)
Per Capita Use (GPD)	109	93	109	93	109	93
References						
Population	*UWMP Table 2-2*					
Supply	*UWMP Table 5-5*	*HydroMetrics WRI 4/3/12*	*UWMP Table 5-5*	*HydroMetrics WRI 4/3/12*	*UWMP Table 5-5*	*HydroMetrics WRI 4/3/12*
Demand	*UWMP Page 2-4*	*UWMP Table 5-11*	*UWMP Page 2-4*	*UWMP Table 5-12*	*UWMP Page 2-4*	*UWMP Table 5-13*
Difference	*calculated*					
Per Capita Use (GPD)	*calculated*					

3.15.3 SAN LORENZO VALLEY WATER DISTRICT

The San Lorenzo Valley Water District serves a 58-square-mile area that covers most of the western portion of the San Lorenzo River Watershed and serves an average of 2,300 AFY to a population of approximately 22,000. The district provides water service to the communities of Boulder Creek, Brookdale, Ben Lomond, Zayante, Felton, and portions of the City of Scotts Valley. The district has three separate major service areas with independent systems and sources of supply. The northern area serves the unincorporated area of the San Lorenzo Valley north of Felton, including Zayante. Water supply in the northern San Lorenzo Valley area is obtained from the Santa Margarita groundwater basin as well as surface water from tributaries to the San Lorenzo River. The Felton subarea is supplied by springs and surface streams near Felton. Water supply in the southern area around Scotts Valley is obtained from the Santa Margarita basin. The district derives approximately 1,200 AFY of water from surface sources, and nearly 1,100 AFY from groundwater. Between 2000 and 2010, average per capita daily use ranged from approximately 85 to 109 gpcd.[46] Because the northern area is supplied both by surface and

[46] San Lorenzo Valley Water District. "Draft – SLVWD Urban Water Management Plan." 2012. Pg. 3-4.

groundwater, it has a more reliable water supply and has opportunities conjunctive use. However, during a multiple year drought there is not enough groundwater available to make up for the decline in surface sources and demand reduction is required. Current supply limitations are discussed by Johnson (2014). SLVWD is initiating the process to evaluate the effects of its diversions on fish habitat and may have to reduce its diversions in the future to adequately protect habitat. The supply and demand table below assumes that there will be a 10% loss of supply in the future. Efforts are currently underway to link all the areas with emergency interties, which have the potential to be used in future for conjunctive use once fishery and water rights issues are resolved.

Table 3- 18 San Lorenzo Valley Water District Water Supply and Demand Projections [47]

San Lorenzo Valley Water District						
	Normal Year		**Single Dry Year**		**Multiple Dry Years**	
	2010	**2030**	**2010**	**2030**	**2010**	**2030**
Population	22,174	22,527	22,174	22,527	22,174	22,527
Supply	2,490	2,290	2,250	2,050	1,900	1,700
Demand	2,211	2,072	2,211	2,072	2,211	2,072
Difference	279	218	39	(22)	(311)	(372)
Per Capita Use (GPD)	89	82	89	82	89	82
References						
Population	*Table 2-9 Draft UWMP*					
Supply	*Johnson, 2014, Drought Plan Presentation, 2030 estimate based on 10% reduction for fish release*					
Demand	*Table 3-9, 3-14, Draft UWMP*					
Difference	*calculated*					
Per Capita Use (GPD)	*calculated*					

3.15.4 SCOTTS VALLEY WATER DISTRICT

The Scotts Valley Water District (SVWD) service area encompasses a six-square-mile area that includes the City of Scotts Valley and unincorporated areas to the north. The district currently serves 3,700 connections, of which 93% are residential, and includes a population of approximately 10,000. According to its 2010 Urban Water Management Plan, the district is projecting build-out in 2020. Water supply is obtained from three water-bearing formations within the Santa Margarita Groundwater Basin: the Santa Margarita Sandstone, the Lompico, and the Butano. Storage capacity is equivalent to 2.25 times average day demand.

Groundwater production from the various formations is approximately 1,400 AFY. The SVWD also owns and operates a wastewater tertiary-level treatment plant that provides an average of 140 AFY of recycled water for irrigation. The part of the Santa Margarita groundwater basin from which SVWD extracts groundwater has experienced significant declines in groundwater levels since the mid-1980s. Groundwater levels in the vicinity of Scotts Valley have dropped between 100 and 200 feet since that time. Ten-year average per capita use for the district (1995-2004) is approximately 180 gpcd. The 2020

[47] Johnson, Nicholas M., 2014, Hydrologic Basis for SLVWD Drought Management Plan, presented to SLVWD Board of Directors, March 6, 2014.

target for the district is approximately 144 gpcd.[48]

Table 3- 19 Scotts Valley Water District Water Supply and Demand Projections

Scotts Valley Water District						
	Normal Year		**Single Dry Year**		**Multiple Dry Years**	
	2010	**2030**	**2010**	**2030**	**2010**	**2030**
Population	10,309	11,076	10,309	11,076	10,309	11,076
Supply	1,507	1,766	1,507	1,501	1,507	1,412
Demand	1,507	1,766	1,507	1,501	1,507	1,412
Difference	0	0	0	0	0	0
Per Capita Use (GPD)	131	142	131	121	131	114
References						
Population	*UWMP Table 2-2*					
Supply	*Table 6-6 UWMP*		*Table 6-7 UWMP*		*Table 6-8 UWMP*	
Demand						
Difference	*calculated*					
Per Capita Use (GPD)	*calculated*					

3.15.5 CENTRAL WATER DISTRICT

The Central Water District (CWD) has a five-square-mile service area in the rural area of Aptos. CWD serves 2,700 customers through 842 connections, all of which are residential with the exception of seven commercial and 16 for irrigation and public facilities. Approximately 5% of the water demand is for agricultural use; the water supplied is all potable. The district relies on groundwater from the Aromas Red Sands and Purisima aquifers for supply. The district has five wells.

Although the CWD has wells in both the Purisima and Aromas formations, the Purisima wells, due to high levels of iron and manganese, are infrequently used. CWD is evaluating the construction of a treatment facility so that the Purisima wells can be used on a more regular basis. Because CWD is in what is believed to be a recharge area for the Aromas, and possibly Purisima formations, groundwater levels have been stable since records were first kept in the mid-1970s. Because CWD is smaller than the state threshold for UWMP reporting, no formal projections for future water use in the district have been made.

[48] Scotts Valley Water District, 2011. "2010 Urban Water Management Plan – Section 2 – Water Use." Pg. 2-10, 11.

Table 3- 20 Central Water District Water Supply and Demand Projections

Central Water District Water District						
	Normal Year		Single Dry Year		Multiple Dry Years	
	2010	2030	2010	2030	2010	2030
Population	2,700	2,900	2,700	2,900	2,700	2,900
Supply	580	600	580	600	580	600
Demand	580	600	580	600	580	600
Difference	0	0	0	0	0	0
Per Capita Use (GPD)	192	185	192	185	192	185
References						
Population	*CWD Personal Communication with County Water Resources Staff*					
Supply						
Demand						
Difference						
Per Capita Use (GPD)	*calculated*					

3.15.6 DAVENPORT COUNTY SANITATION DISTRICT

The Davenport County Sanitation District serves 114 water connections in the Old Town, New Town, and San Vicente areas of Davenport. The district relies on surface water diverted from Mill Creek and San Vicente Creek for supply. The District is managed by the County Department of Public Works and infrastructure needs are funded by water and sewer rates and grants.

3.15.7 LOMPICO COUNTY WATER DISTRICT

The Lompico County Water District serves the Lompico community near Felton. The District's service area encompasses two square miles and all 498 connections are for residential service. The community is considered built-out and is under a moratorium on any new water hook-ups. Water supply is obtained from the Santa Margarita and Monterey aquifers as well as Lompico Creek. In 2014, the Lompico and San Lorenzo Valley Water District have been working with the County and the Local Agency Formation Commission (LAFCo) to dissolve the Lompico District and merge with San Lorenzo. An emergency intertie was constructed between the two service areas in 2014.

3.15.8 SMALL DRINKING WATER SYSTEMS AND PRIVATE USERS

There are three other small water systems that are not public agencies: Big Basin Water Company (598 connections, 85% surface water); Mount Hermon Association (530 connections, groundwater) and Forest Lakes Mutual Water Company (330 connections, groundwater). There are an additional 130 small water systems serving 5 - 199 connections in the county serving roughly 2,500 households. The large majority of these use groundwater. Additionally, there are at least 8,000 private wells in the Santa Cruz Region that serve between 1 and 4 households.

Some landowners use small stream diversions for irrigation and occasional domestic use. There is not a complete inventory of these and most have not registered their use with the State Division of Water Rights. Extensive stream surveys of the San Lorenzo River and its major tributaries in the 1970s indicated a total of 100 private diversions. More recent surveys of individual reaches have shown about a 50-70% reduction in the number of diversions since the 1970s.

3.16 WATER SUPPLY AND DEMAND

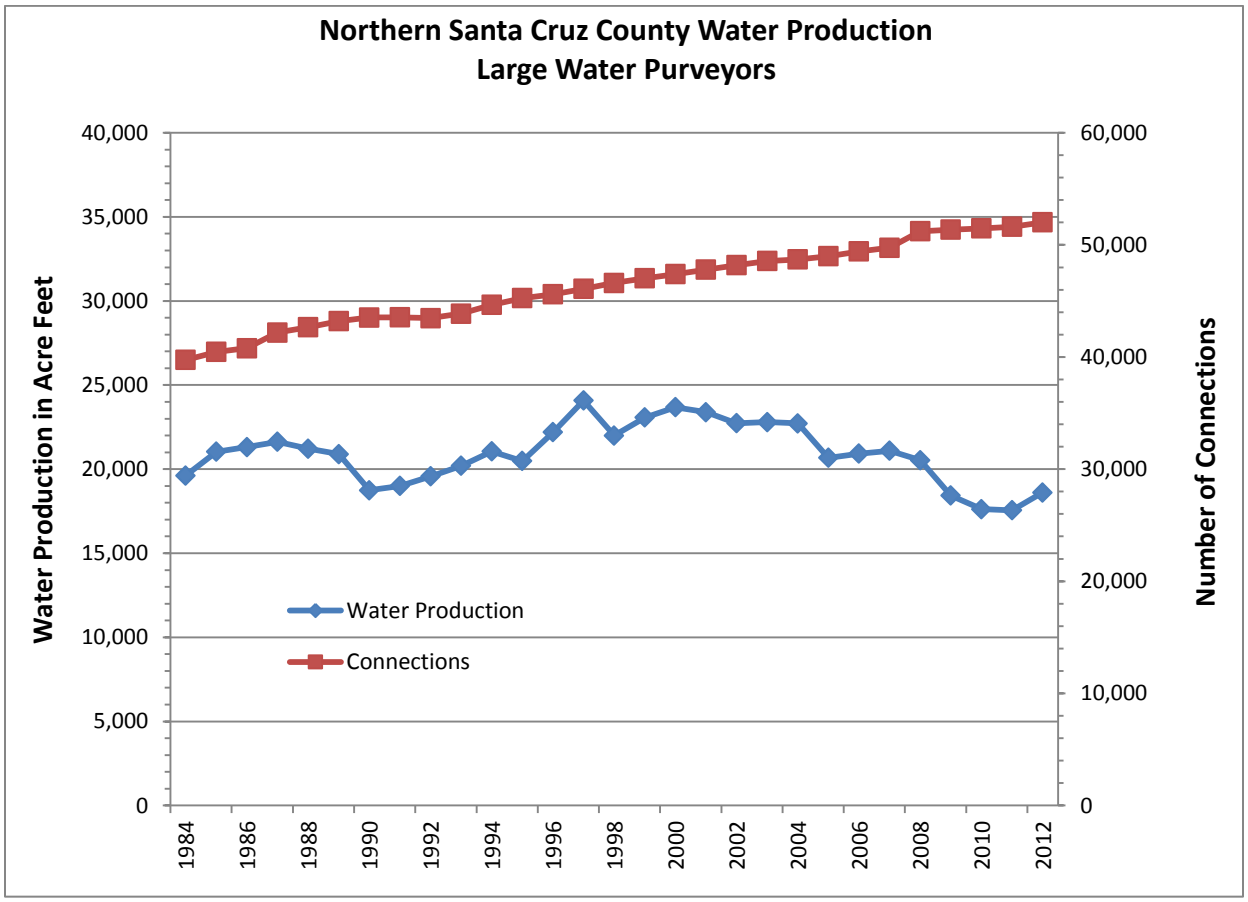
Although the water agencies in the Region all vary in size and source of supply, they all face challenges related to water supply reliability, including threats to baseline supplies, increasing demands, regulatory constraints, hydrologic variations, and infrastructure limitations. These challenges are described in more detail in Chapter 5, Resource Management Strategies. Generally, these challenges include:

- Seasonal demand versus seasonal supply: Like much of the rest of the state, water demand in the Santa Cruz Region is highest in the summertime when surface supply is at its lowest, and least in the winter when potential supplies are at their greatest. This juxtaposition presents both a challenge and an opportunity for water supply planning.
- Source of supply: Districts that rely upon surface water usually have more than sufficient supplies during winter months, but can face challenges in meeting summertime demand in dry and critically dry years. Groundwater agencies, for the most part, utilize overdrafted basins and are constantly challenged with balancing supply and demand.
- Conservation and changing economy: The Santa Cruz Region's water users have recently demonstrated a strong water conservation ethic demonstrated through low per-capita usage. Also, as several large industries have left the Region, total use has gone down.
- Climatic variability: As illustrated in Figure 5 (seasonal variability in streamflow), the annual precipitation varies greatly in the Santa Cruz Region. This fact along with limited storage capacity and the Region's complete dependence upon a local water supply greatly impact the Region's ability to meet demand – particularly for those agencies relying upon surface water for supply. Climate change is expected to exacerbate this situation by increasing the intensity of storms and shortening the traditional rainy season.
- Inter-district variability: Water supply and demand varies by the type of user within each district as well as the overall water supply outlook for that district.
- Environmental flow needs: Historical stream diversions and groundwater extractions have reduced streamflow available for fish habitat. Promoting recovery of threatened and endangered salmonid habitat will require reducing water extractions to restore streamflow needed for critical life stages.

3.16.1 HISTORICAL WATER USE

Detailed records of water used by the major purveyors have been compiled for approximately 30 years. Water use demonstrates variability from year to year (Figure 3-11) depending upon on the factors previously discussed. Between 1984 and 1997, there was a general upward trend in water use that primarily reflected a growing population. Since 1997, there has been a steady downward trend in per-capita water use as the local economy has changed and conservation programs have been implemented and have taken effect.

Figure 3- 12 Urban Water Production and Connections – Large Water Districts in Santa Cruz Region [49]



Note: Totals exclude small drinking water systems, individual users, and agriculture

3.16.2 CURRENT WATER USE

Recent water demand figures compiled (for the calendar year 2012) show that the Region as a whole used approximately 29,000 acre-feet of water. Additional water use in the Pajaro Groundwater Basin, which partly underlays the Santa Cruz region, accounted for an additional 33,000 acre-feet, primarily for agriculture and the City of Watsonville. Within the IRWM Region, in 2012, 57% of the water supply was from groundwater, 42% from surface water with an additional 1% coming from recycled water. Including the Pajaro Basin in these figures, the percentage swing to 79% groundwater, 20% surface water, and 2% recycled water (Table 3-21).

[49] County of Santa Cruz, Water Resources Division.

Table 3- 21 Water Supply and Demand, 2012 [50]

Water Supplier	Connects	Popul-ation Served	Total Dry Year Demand	Ground Water AF	Surface Water AF	Recycled Water AF	Ground water	Surface Water	Recycled Water	% Overall Use	Per Capita gpd
Santa Cruz City Water Dept.	24,425	93,339	10,134	523	9,611	0	5%	95%	0%	15.3%	97
Soquel Creek Water District	15,562	38,000	4,171	4,171	0	0	100%	0%	0%	6.3%	98
San Lorenzo Valley WD	7,278	22,200	2,238	1,030	1,208	0	46%	54%	0%	3.4%	90
Scotts Valley Water District	3,900	11,700	1,537	1,356	0	181	88%	0%	12%	2.3%	117
Central Water District	810	2,700	535	535	0	0	100%	0%	0%	0.8%	177
Lompico County Water District	495	1,287	93	72	21	0	77%	23%	0%	0.1%	65
Smaller Water Systems	3,600	10,800	2,410	2,120	290	0	88%	12%	0%	3.6%	199
Individual Users	8,000	20,000	5,000	4,750	250	0	95%	5%	0%	7.5%	223
Mid- & North-County Agriculture	-	-	2,400	1,800	600	0	75%	25%	0%	3.6%	
Subtotal Santa Cruz IRWM Region	*64,070*	*200,026*	*28,518*	*16,357*	*11,980*	*181*	*57%*	*42%*	*1%*		
Pajaro Agriculture (SC Co only)	-	-	25,254	25,254	0	900	100%	0%	4%	38.1%	
Watsonville City Water Dept.	14,843	65,000	7,760	7,127	633	0	92%	8%	0%	11.7%	107
Subtotal Pajaro Basin (SC County)	14,843	65,000	33,014	32,381	633	900	98%	2%	3%		
Total	**78,913**	**265,026**	**61,532**	**48,738**	**12,613**	**1,081**	**79%**	**20%**	**2%**		

3.16.3 PROJECTED WATER USE

Past projections of urban water demand tended to be high because they were typically based on usage trends prior to 2000, roughly the time when per capita usage started to decline. The first standardized projections of urban water use in California occurred in 2005 with the state mandated Urban Water Management Plan requirements of AB 610 and AB 221. The 2005 UWMPs by SCWD, SVWD, SqCWD, and the City of Watsonville indicated a combined growth in water demand of 14% from 2005 to 2030.
For the 2010 UWMPs, the same county water purveyors indicated a demand of 26,733 AFY growing to a projected demand of 29,197, depending upon the water year type, by the year 2030. This represents an increase in usage of 9% over the 20-year analysis period. These projections are currently being re-evaluated as a part of current water planning.

[50] County Water Resources Status Report, presented to Santa Cruz County Board of Supervisors , January 28, 2014, Health Services Agency

Table 3- 22 Regional Water Demand Projections [51]

Regional Water Demand Projections						
	Normal Year		Single Dry Year		Multiple Dry Years	
	2010	2030	2010	2030	2010	2030
Population	230,933	248,344	230,933	248,344	230,933	248,344
Supply	31,390	30,678	29,149	29,352	27,479	24,985
Demand	28,944	31,269	28,944	31,004	28,944	30,915
Difference	2,446	(591)	205	(1,652)	(1,465)	(5,930)
Per Capita Use (GPD)	112	111	112	111	112	111

Projections of future private and agricultural water use are more difficult. However, it is anticipated that private well water use will be stable as new growth rates in rural areas are low and households will tend to implement water conservation and replace less efficient water using appliances (e.g., dish and clothes washers). Additionally, the County has a water conservation ordinance that requires sellers of properties in the unincorporated areas to replace showerheads and toilets with high efficiency water fixtures. These replacements will contribute to less household water use. Future water use is also expected to decline as part of landscape conservation requirements that have been mandated by the state beginning in 2011. Agricultural use is expected to be relatively stable as there is little new agricultural land conversion, except for scattered small, vineyards, which generally have low water use. The effect of conversion of some crop types to higher water use is offset by increased irrigation efficiency and water conservation measures implemented by growers, as documented by water use trends in the Pajaro Valley where wells are metered.

3.16.4 ENVIRONMENTAL WATER

Adequate streamflow must be left in the streams to maintain aquatic habitat, riparian habitat and wetlands. In most of the Santa Cruz region, endangered coho salmon and threatened steelhead are the primary species of concern. If habitat conditions are maintained for them, other environmental values will be supported. Adequate flows must be maintained at different times of the year to support the various life cycle needs of the salmonids: adult migration in winter, spawning and incubation in winter and spring, juvenile down migration in spring and summer, rearing in summer and fall, and sufficient flow for maintenance of cool temperatures and suitable water quality. During dry periods (June – November) and droughts, natural flows are usually well below optimal flows needed for habitat and any reduction in flow will result in a direct loss of habitat and reduction of fish populations.

Water for the environment is specified in various water rights documents or more recently in studies developed to determine how much existing diversions need to be reduced to support recovery of coho salmon and steelhead trout. The level of specificity and degree of protection varies significantly. Minimum downstream bypass flows have been established for newer water rights on Fall Creek, Newell

[51] 2010 Urban Water Management Plans (UWMP) City of Santa Cruz, Soquel Creek Water District, Scotts Valley Water District, City of Watsonville; Draft UWMP San Lorenzo Valley Water Dist.; Central Water District personnel communication

Creek and the Felton Diversion on the San Lorenzo River. Maximum diversion rates are specified for the City's Tait Street diversion on the San Lorenzo, but no minimum bypass flows are specified.

The City of Santa Cruz is currently negotiating with the fishery agencies regarding the amount of water that needs to be left in their water supply streams. Specific flow targets have been developed for different seasons and different classes of water year, but these numbers are still being finalized. The San Lorenzo Valley Water District is starting the process to evaluate the impact of their diversion and then to establish minimum bypass requirements.

Surface water rights for Soquel Creek were adjudicated in 1977. Although the adjudication itself does not specify environmental water, the appropriative permits that were issued in 1955 specify maintenance of 15 cfs or the natural flow from December 1 to June 1, and 4 cfs or the natural flow from June 1 to December 1 to maintain fish life. The mean discharge for Soquel in September is 3.1 cfs, but many years it is much lower. There are no records of any instream flow requirements for Aptos or Valencia Creeks. Soquel, Aptos and Valencia are not subject to municipal diversions, but flow is subject to depletion resulting from private diversions and depressed groundwater levels.

3.17 WASTEWATER

Wastewater services within the Santa Cruz IRWM Region are provided by three cities and 12 special districts as shown in Table 3-23. Facilities range from individual or small community septic systems to local wastewater collection systems and regional treatment plants.

Table 3- 23 Wastewater Management Roles [52]

Agency	Wastewater Collection	Wastewater Treatment	Recycled Water	Septic System Oversight
Cities				
Santa Cruz	✓	✓	✓	
Scotts Valley	✓	✓	✓	
City of Watsonville	✓	✓	✓	
Special Districts				
Davenport Sanitation District	✓	✓	✓	
Freedom Sanitation District	✓			
Santa Cruz County Sanitation District	✓			
CSA 2 – Place de Mer	✓	✓		
CSA 5 – Sand Dollar Beach and Canon del Sol	✓	✓		
CSA 7 – Boulder Creek Country Club	✓	✓	✓	
CSA 10 – Rolling Woods/Pasatiempo	✓	✓		
CSA 12 – Wastewater Management				✓
CSA 20 – Trestle Beach	✓	✓		
San Lorenzo Valley Water District	✓	✓		
Private Systems				
Mount Hermon Association	✓	✓		
Big Basin Water Company	✓	✓		

[52] County of Santa Cruz, Water Resources Division.

Various camps, conference centers, small communities	✓	✓		

3.17.1 CITY OF SANTA CRUZ

The City of Santa Cruz maintains a wastewater collection system that serves approximately 130,000 residents through 15,000 connections and operates the wastewater treatment facility, which serves the city as well as the Santa Cruz County Sanitation District, CSA 10, and UC Santa Cruz. Approximately 50% of the wastewater treated at the plant is generated within the city. On average 8 MGD of effluent is treated to a full secondary level with UV treatment and disposed of with effluent from the City of Scotts Valley through a deep ocean outfall constructed in 1985. . Approximately 150 acre-feet per year (135 gallons per day) of treated water is retained for use at the treatment plant. The City's Wastewater Treatment Facility was designed to treat 17 MGD in dry weather. The collection system includes 23 lift stations with a total capacity of 10.6 million gallons per day.

3.17.2 CITY OF SCOTTS VALLEY

The City of Scotts Valley provides wastewater services to 3,922 connections including 30 that are outside of the city's boundary. The city has eight lift stations, all with backup pumps and alarm systems that automatically notify personnel in case of a power outage or high-level conditions. The Scotts Valley Wastewater Treatment Plant has a permitted capacity of 1.5 million gallons per day and treats water to secondary and tertiary levels. Secondarily treated effluent that is not used for recycled water is transmitted via a main to Santa Cruz and discharged to the ocean through the outfall shared with the City of Santa Cruz. Recycled water was first produced in 2002 and used in the city's landscape medians. Initially, 250,000[53] gallons of recycled water was produced, which has been expanded to a current capacity of 150 AFY.[54] There is presently capacity to produce up to1 mgd of tertiary water, which is well in excess of current demand.

3.17.3 DAVENPORT COUNTY SANITATION DISTRICT

The Davenport County Sanitation District (DCSD) serves 89 connections in the Davenport community in northern Santa Cruz County. The District provides collection and treatment services as well as recycled water. The district is managed by the County Department of Public Works and governed by the County Board of Supervisors. The DCSD sanitary sewer system facilities include approximately three miles of gravity sewers, 1.3 miles of force main, and three pump stations.

3.17.4 FREEDOM COUNTY SANITATION DISTRICT

The Freedom County Sanitation District (FCSD) provides wastewater collection service for the Buena Vista/Calabasas area of Freedom and the Green Valley Road corridor outside the Watsonville city limits. The district also serves three connections outside its boundaries, including one duplex, one single family

[53] LAFCO. "Countywide Service Review – Wastewater Services." 2005. Pg. 3-18.

[54] Scotts Valley Water District. "Groundwater Management Program 2011 Annual Report." 2011. Pg. 9.

dwelling, and the Pinto Lake County park ranger's residence. Wastewater is treated at the Watsonville Wastewater Treatment Plant. The FCSD sanitary sewer system facilities include approximately 15.3 miles of gravity sewers, 1.2 miles of force main, and eight pump stations.

3.17.5 SANTA CRUZ COUNTY SANITATION DISTRICT

The Santa Cruz County Sanitation District (SCCSD) provides wastewater collection service for the City of Capitola and the unincorporated communities of Aptos, Soquel, and Live Oak. The district also serves Harbor High School, a satellite medical center, and the Port District that are within the City of Santa Cruz and outside the district's boundary. SCCSD has treatment capacity rights of 8 million gallons per day at the City of Santa Cruz Wastewater Treatment Plant. The SCCSD sanitary sewer system facilities include approximately 188 miles of gravity sewers, 14 miles of force main, and 35 pump stations. The district is managed by the County Department of Public Works and governed by a three member board that consists of one Capitola City Council member and two members of the County Board of Supervisors.

The DCSD, FCSD and SCCSD proactively clean all gravity sewers that are 12 inches in diameter and smaller every three years, and preventively clean sewers with a history of problems every 1, 3, 6 or 12 months. SCCSD visually inspects the condition of its larger sewers every three years and cleans them as needed. The DCSD, FCSD and SCCSD all use close circuit television to determine the condition of the gravity sewers and to determine the primary cause of blockages and sanitary system overflows. Each district also uses chemical root control throughout their systems on an as-needed basis. Pump stations are inspected weekly, and emergency generators are exercised monthly.

3.17.6 SALSIPUEDES SANITARY DISTRICT

The Salsipuedes Sanitary District provides wastewater collection services for 507 connections within an unincorporated area northeast of Watsonville. Treatment is provided by the Watsonville Wastewater Treatment Plant. The district has two lift stations and seven miles of sewer pipeline. The Salsipuedes district is entirely outside of the Santa Cruz IRWM region.

3.17.7 COUNTY SERVICE AREAS – CSAS 2, 5, 7, 10, 12, 20

There are six County Service Areas (CSAs) within the Santa Cruz Region that provide wastewater services. These districts are managed by the County Department of Public Works and governed by the County Board of Supervisors

CSA 2 serves the Place de Mer subdivision which encompasses 0.02 square miles. The wastewater system is a community septic system.

CSA 5 serves the Sand Dollar Beach and Canon Del Sol subdivisions with a total estimated population of 450. The wastewater system consists of two on-site interconnected package treatment plants that provide secondary treatment.

CSA 7 serves the Boulder Creek Country Club on Highway 236. The service area encompasses 0.3 square miles and has an estimated population of 640. The wastewater system is a full treatment plant offering secondary and tertiary treatment with primary disposal via a community leach field and some recycled water used seasonally on the golf course.

CSA 10 serves the Rolling Woods and Woods Cove subdivisions and the Graham Hill corridor and encompasses about 1 square mile with a population of 500.Wastewater generated in CSA 10 is treated at the City of Santa Cruz Wastewater Treatment Plant.

CSA 20 serves the Trestle Beach subdivision near La Selva Beach which encompasses 0.02 square miles and has a population of 50. The wastewater system provides on-site treatment to a secondary level.

CSA 12 provides funding for septic system management and oversight in the unincorporated areas of the county not served by sewer systems. The CSA funds capacity at the Watsonville and Santa Cruz Wastewater Treatment Plants for disposal of septic tank sludge, operation and maintenance of the Santa Cruz Septage Disposal Facility, annual inspections and monitoring of nonstandard systems, and computerized tracking of septic system performance. A separate zone, Zone A, was established to provide financing for the implementation of the San Lorenzo Wastewater Management Plan. Implementation is required by the Regional Water Quality Control Board as a condition for allowing the continued use of septic systems in the watershed. Enhanced services in Zone A include regular inspections of septic systems, promotion of septic system upgrades and maintenance, property owner education, water quality monitoring, and development of alternative wastewater disposal methods where conventional septic systems are not suitable.

3.17.8 SAN LORENZO VALLEY WATER DISTRICT

The San Lorenzo Valley Water District provides wastewater collection and treatment services for 54 connections in portions of the Bear Creek Estates residential subdivision. The District's wastewater system has two lift stations and a treatment capacity of 16,500 gallons per day.

3.17.9 PRIVATE SEWER SYSTEMS

Big Basin Water Company provides sewer service to a small community of some 30 homes off of Highway 236. Mount Hermon Association provides sewer collection and treatment to its conference facilities as well as homes within the Mount Hermon community. A number of other private sewer collection, treatment, and onsite disposal systems are operated in the region by large camps or small communities.

3.18 FLOOD CONTROL AND DRAINAGE AGENCIES

Flood protection and stormwater drainage is provided by the county and four cities as well as two dependent special districts (see table below). The Santa Cruz County Flood Control and Water Conservation District was formed by a special act of the State Legislature and is the designated flood protection agency for the county. Six zones of benefit have been established to provide additional funding for flood protection. In addition to these agencies, CSA 57 provides drainage services for the Woods Cove Subdivision on Graham Hill Road. The agencies providing flood protection and drainage services within Santa Cruz County are as follows:

Table 3- 24 Flood Control Agencies [55]

[55] County of Santa Cruz, Water Resources Division.

Jurisdiction	Flood Protection	Stormwater Collection
Cities		
City of Capitola		✓
City of Santa Cruz	✓	✓
City of Scotts Valley		✓
City of Watsonville	✓	✓
Special Districts		
Santa Cruz County Flood Control and Water Conservation District (including Zones 7, 7A)	✓	✓
Pajaro Storm Drain Maintenance District	✓	✓
Santa Cruz County Flood Control and Water Conservation District Zones 5, 6, 8		✓
CSA 57 – Graham Hill Road/Woods Cove		✓

3.18.1 SANTA CRUZ COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

The Santa Cruz County Flood Control and Water Conservation District, operated through the County Public Works Department, performs a broad range of services related to the monitoring of water conditions and control of surface waters. There are three distinct geographic zones within the Santa Cruz IRWM Region that deal with specific drainage and stormwater management. The County Board of Supervisors serves as the Board of Directors for the general Flood Control District. The Supervisors also serve on the boards of zone 5 and Zone 7, with addition of other local agency representatives for Zone 7 (Watsonville and Pajaro Valley Water Management Agency) and Zone 5 (City of Capitola and Soquel Creek Water District).

Table 3- 25 Zones of the County Flood Control and Water Conservation District

Zone	Area	Square Miles
5	Live Oak, Capitola and Soquel	8.75
6	Aptos	4.74
8	San Lorenzo Valley	76.44

3.18.2 ZONES 5, 6, AND 8

The facilities within Zones 5, 6, and 8 include underground storm drain systems and above ground ditches and watercourses. The Storm Water Management section of Public Works provides engineering services and coordination for the Santa Cruz County Flood Control and Water Conservation Districts Zones 5, 6, and 8. Funding comes from one-time development impact fees. Zone 5 also has some ongoing property tax increment. Services include:

- Development and building permit reviews for all developments within the unincorporated area of Santa Cruz County.
- Design of storm drain flood control projects within the flood control zones.
- Advising the public on drainage issues and resolving drainage complaints when possible.
- Coordination of the County's National Pollutant Discharge Elimination System (NPDES) Phase II

3.18.3 ZONES 7 AND 7A, PAJARO STORM DRAIN MAINTENANCE DISTRICT

Zone 7 provides funding for the operations and maintenance of the federal flood control project on the Pajaro River and Salsipuedes Creek, as well as related long-term debt service. This reach of the Pajaro River experienced catastrophic flooding in 1995 and 1998. Flood issues on the Pajaro River are addressed through the Pajaro IRWM Region.

Zone 7A was established in December 2004 to augment existing funding for flood control improvements in the Pajaro River Watershed area in Santa Cruz County, excluding the City of Watsonville. The district provides administrative and engineering services for the replacement, upgrading, and maintenance of drainage and flood control facilities in the district. The boundary of Zone 7A is coterminous with the Pajaro Storm Drain Maintenance District., and includes the Watsonville Slough system. The district notes that one of the challenges it faces over the next few years is implementing the Phase II NPDES permit to protect water quality.

3.18.4 CSA 57 – GRAHAM HILL

CSA 57 – Graham Hill is a dependent special district formed to provide enhanced stormwater drainage services to the Woods Cove subdivision. The CSA encompasses approximately one-tenth of a square mile. The county maintains the CSA's underground storm drain systems and above ground drainage ditches and watercourses as well as the storm drain line between the subdivision and the San Lorenzo River where the outfall is located. The CSA was formed in 2001 and the infrastructure is new. There have been no reported flooding incidents and no infrastructure deficiencies noted.

3.18.5 CITY OF SANTA CRUZ

The City of Santa Cruz maintains seven miles of underground stormwater pipelines, eight miles of surface storm ditches, one pump station, approximately 1,500 catch basins, and 125 outfalls. The city also maintains the US Army Corps of Engineers levee system on the San Lorenzo River, which is approximately three miles long with five pump stations. The city's operations and maintenance program for the flood control facilities on the San Lorenzo River includes removal of sand and silt from the channels of the river and Branciforte Creek; maintenance of pumps, gates and levees; and removal of weeds and growth in drainage ditches and catch basins. As a best management practice the city has routine street sweeping and regularly cleans the storm drain pipeline system, among other activities.

3.18.6 CITY OF CAPITOLA

The City of Capitola maintains its street drainage systems and relies on the county to provide major storm drain services through the Santa Cruz County Flood Control and Water Conservation District Zone 5. In the past, Capitola has experienced minor intersection flooding which was corrected through maintenance. The city constructed the Lawn Way pump station in the past few years to alleviate village flooding. Capitola has implemented several best management practices related to its drainage infrastructure, including outfall inspection and cleaning, annual storm drain cleaning in the fall, dry weather diversions from stormdrains to the sanitary sewer in the Esplanade area, and zero discharge

sidewalk cleaning.

3.18.7 CITY OF SCOTTS VALLEY

The City of Scotts Valley provides drainage and stormwater management within the city's boundary. Stormwater is discharged into Carbonera Creek, its two tributaries, and a tributary of Bean Creek.

3.19 WATER QUALITY

The Region's water quality is impacted by runoff from urban, rural, and agricultural areas. Known as nonpoint source pollution, runoff picks up pollutants from across the landscape and delivers them to creeks and streams and ultimately to the ocean. Primary pollutants of concern include sediment, nutrients, and pathogens. Herbicides, pesticides, and metals are also sometimes detected at low levels in streams draining developed watersheds and regular but scattered occurrences of pesticides have been found in south Region's streams and sloughs. These pollutants have a variety of impacts, including damaged riparian systems, toxicity to aquatic organisms, increased treatment costs for potable water supply, flooding, fisheries decline, and public health impacts from recreating in contaminated waters.

Pollutant sources are as varied as the different land uses occurring in the county. Sediment sources include road networks, land development, illegal grading, timber harvest activities, agriculture and landscapes scarred by wildfires. Bacteria and nitrate originate from septic and sewer systems, storm drains, homeless encampments, livestock, and agricultural operations. Hydromodification, or the alteration of natural runoff timing and volume, has occurred throughout much of the developed areas of the Region. The effects of hydromodification include increased runoff, erosion, sedimentation, and pollutant loads in receiving waters. Toxicity can be caused by a variety of contaminants including improperly disposed automotive fluids or other discarded materials that break down to toxic substances.

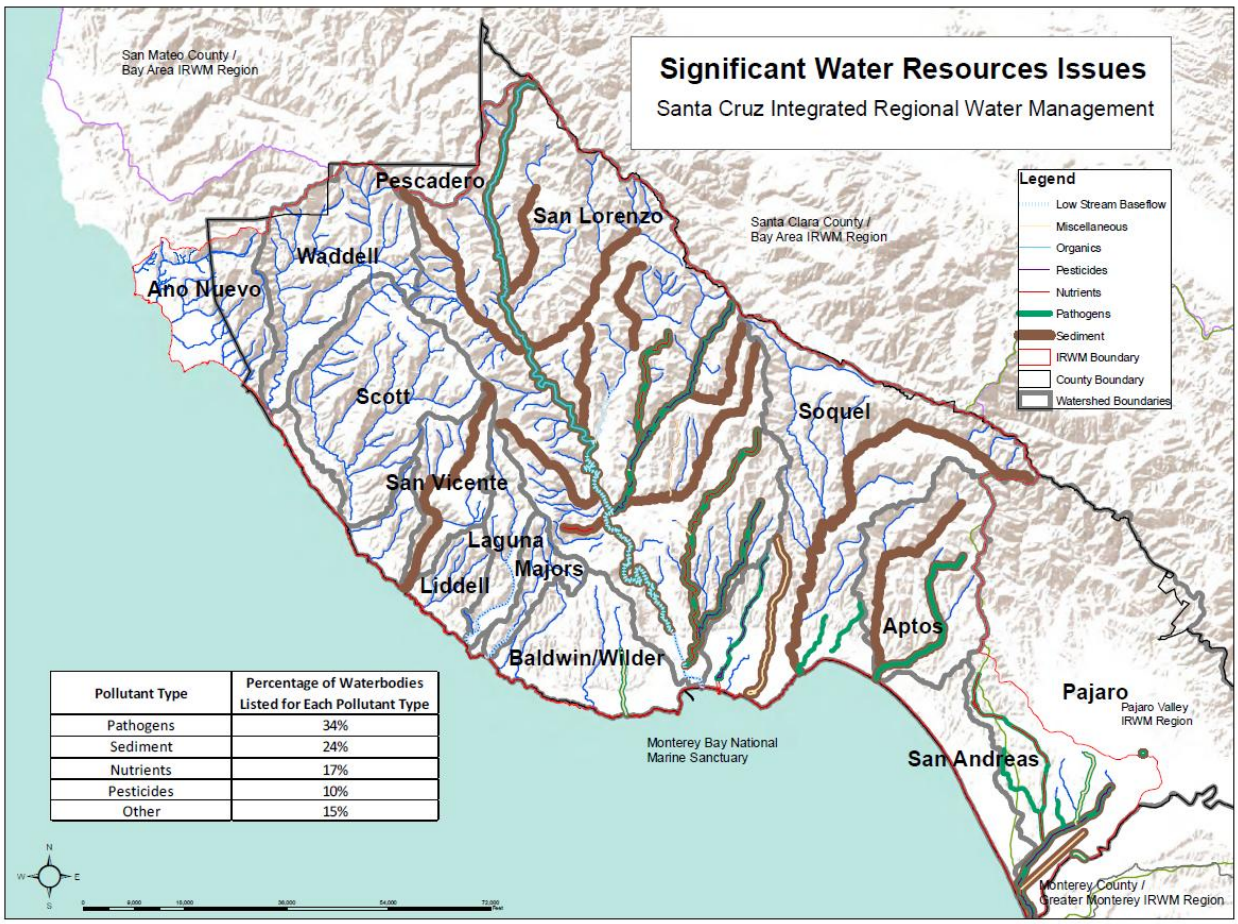
3.19.1 IMPAIRED WATERBODIES

Section 303(d) of the 1972 Federal Clean Water Act requires states to identify waterbodies that do not meet water quality objectives and are not supporting beneficial uses, such as swimming, aquatic habitat, or municipal water supply. Each state must submit an updated list, called the 303(d) list, to the U.S. EPA every two years. In addition to identifying the waterbodies that are not supporting beneficial uses, the list also identifies the pollutant or stressor causing impairment, and establishes a priority for developing a control plan (TMDL) to address the impairment. The list also identifies waterbodies where 1) a TMDL has been approved by U.S. EPA and implementation is available, but water quality standards are not yet met, and 2) waterbodies where the water quality problem is being addressed by an action other than a TMDL and water quality standards are not yet met. The most recent 303(d) list for the State of California was adopted by the U.S. EPA in late 2011. There are over 100 303(d) listings for waterbodies within the Santa Cruz IRWM boundary, as summarized below. Refer to Table 3-12 for the 303(d) listing containing waterbody, pollutant, and potential sources for waterbodies in the Santa Cruz IRWM Region.

Table 3- 26 Santa Cruz Region 303(d) Listings by Pollutant Category [56]

Pollutant Category	Count
Pathogens	36
Sediment	26
Nutrients	18
Pesticides	18
Other	16

Figure 3- 13 Significant Water Resources Issues [57]



Pollutant Type	Percentage of Waterbodies Listed for Each Pollutant Type
Pathogens	34%
Sediment	24%
Nutrients	17%
Pesticides	10%
Other	15%

The EPA identifies sources that contribute to each 303(d) listing, and for most of the listings there are multiple sources. The two sources contributing to the highest number of listings each are agriculture and urban runoff (Table 3-27).

Table 3- 27 Sources of Impairment of Waterbodies in the Santa Cruz IRWM Region[58]

[56] 2010 303(d) list dated revised 11/30/2011 provided by the Central Coast Regional Water Quality Control Board.
[57] 2NDNATURE, LLC. Santa Cruz IRWM Conceptual Framework. Final Draft March 2013.

Source Category	# of Listings
Urban Runoff	39
Agriculture	71
Construction / Land Development	26
Habitat Modification	23
Source Unknown	35
Natural Sources	29
Waste Storage and Disposal (Septic Systems)	21
Miscellaneous (Homeless Camps)	11
Other	63
Total	**318**

3.19.2 CENTRAL COAST BASIN PLAN OBJECTIVES

The objective of the Central Coastal Basin Plan is to show how the quality of the surface and ground waters in the Central Coast Region should be managed to provide the highest water quality reasonably possible. The Basin Plan lists various water uses (Beneficial Uses), describes the water quality which must be maintained to allow those uses (Water Quality Objectives), and finally, describes the programs, projects, and other actions necessary to achieve the standards established in the plan. The Central Coast Regional Water Quality Control Board (RWQCB) has established the following planning goals for water quality in the Central Coast Region:

1. Protect and enhance all basin waters, surface and underground, fresh and saline, for present and anticipated beneficial uses, including aquatic environmental values.
2. The quality of all surface waters shall allow unrestricted recreational use.
3. Manage municipal and industrial wastewater disposal as part of an integrated system of fresh water supplies to achieve maximum benefit of fresh water resources for present and future beneficial uses and to achieve harmony with the natural environment.
4. Achieve maximum effective use of fresh waters through reclamation and recycling.
5. Continually improve waste treatment systems and processes to assure consistent high quality effluent based on best economically achievable technology.
6. Reduce and prevent accelerated (man-caused) erosion to the level necessary to restore and protect beneficial uses of receiving waters now significantly impaired or threatened with impairment by sediment.

The Basin Plan objectives are reflected in the goals, objectives, and strategies outlined in this Santa Cruz IRWM Plan (see Chapter 4, Goals and Objectives).

3.19.3 WATERSHED MANAGEMENT INITIATIVE GOALS

Each of the nine RWQCBs in the state is responsible for developing a Watershed Management Initiative (WMI) Chapter as part of the State's five-year Strategic Plan for water resource protection. Together the nine Chapters constitute the State's Watershed Management Initiative Integrated Plan. The aim of the WMI is to plan and prioritize activities within and amongst watersheds; integrate various surface and

[58] 2010 303(d) list dated revised 11/30/2011 provided by the Central Coast Regional Water Quality Control Board.

groundwater regulatory programs; promote local, collaborative efforts; and focus limited resources on priorities.

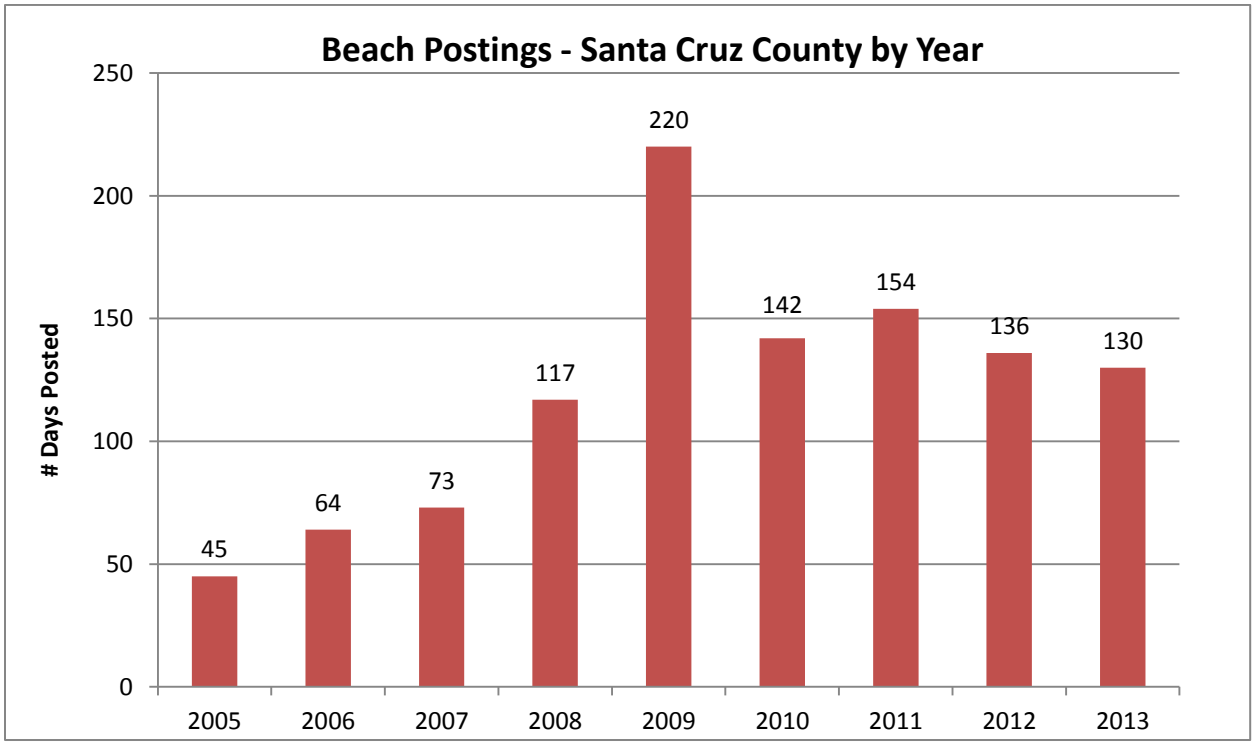
In the Central Coast WMI, the RWQCB outlines water quality priorities for the region, identifies priority watersheds and water quality issues, and describes watershed management strategies. The San Lorenzo Watershed is listed as one of the three highest priority targeted watersheds in the WMI. Targeted activities in the San Lorenzo Watershed include sediment TMDL implementation (sediment reduction from private and public roads, timber harvest activities, and urban runoff), and riparian and wetland protection and restoration. These WMI goals are reflected in the objectives of this IRWM Plan.

3.19.4 BEACH WATER QUALITY

There is a direct connection between water quality in the county's lakes, rivers, and streams and the health of Monterey Bay. Polluted urban and agricultural runoff degrades Monterey Bay water quality during winter storm events, and can impact the nearshore environment and marine habitats. Periodic upwelling and extensive year-round mixing with the open ocean result in well-buffered, highly productive, and well-oxygenated coastal waters, and water quality is generally considered to be good. However, the nearshore waters are more problematic, specifically with regard to beach and lagoon water quality. Urban runoff in developed areas has degraded water quality at moderate levels in coastal lagoons and at ocean beaches, and unusual algal blooms have recently occurred, particularly troublesome in inland lakes. All urban coastal lagoons in the Region are posted as unsafe for swimming year round due to high bacteria levels, and local beaches are periodically posted in response to elevated bacteria. The deaths of at least 21 southern sea otters were linked to microcystin, a toxin also known as blue-green algae, which thrives in warm, stagnant, nutrient-rich water. High concentrations of microcystin were found in the Salinas, Pajaro, and San Lorenzo rivers, Pinto Lake, and in ocean water at the Santa Cruz wharf.[59] Beach water quality samples continue to show elevated levels of indicator bacteria resulting in beach postings warning visitors of potentially harmful water quality.

[59] NOAA Monterey Bay National Marine Sanctuary, 2010. Sanctuary Integrated Monitoring Network 2010.

Figure 3- 14 Santa Cruz County Beach Postings, 2005 – 2013 [60]



3.20 WATER RELATED ISSUES AND CHALLENGES

The goals and objectives for the Santa Cruz IRWM Region were developed through a conceptual framework process that began with an evaluation and assessment of water resource issues and challenges in the Region (see Chapter 4, Goals and Objectives, and Chapter 5, Resource Management Strategies). The following summarizes some of the specific water resources issues and challenges in the Santa Cruz Region that have informed both the development of the Plan's objectives as well as aspects of the IRWM planning process more generally.

Water Supply

Water supply is not sustainable within the Santa Cruz IRWM region in normal years, a situation that is exacerbated when below average water years occur. Surface water supply is highly dependent upon local precipitation, timing, and available storage capacity. A greater volume of water is extracted annually from regional groundwater aquifers than is naturally recharged. Overdraft can cause many serious problems including seawater intrusion, ground subsidence, permanent loss of groundwater storage capacity, reduced stream flow, loss of riparian habitat, and other serious impairments. In Scotts Valley, which overlies the Santa Margarita Groundwater Basin, extensive development over recharge areas has reduced groundwater recharge by as much as 50%. Water supply issues are expected to be greatly exacerbated by climate change impacts in the Region. The achievement of a reliable and sustainable local water supply requires both increased supply and reduced demand. Increased flexibility

[60] Beach Posting Data compiled by Water Resources Section, Environmental Health Services Division, Health Services Agency, County of Santa Cruz, 2014.

in regional water management, alternative/supplemental supply, and increased groundwater recharge are necessary to improve regional water supply reliability and improve resource conditions.

Water Quality

Water quality impairments caused by elevated bacteria and sediment levels are among the most pressing water quality concerns in the Santa Cruz Region. Elevated bacteria levels in surface waters can limit recreational activities and create human health threats. The supply of sand-sized sediment to streams significantly degrades the aquatic habitat quality, resulting in a myriad of negative ecosystem impacts that particularly affect the spawning and rearing habitat of sensitive salmonid species. There are over 100 waterbodies within the Santa Cruz IRWM boundary listed as impaired on the state's 303(d) list. Water quality impairments are primarily due to agricultural and urban runoff, and include: nitrates and other nutrients from agriculture, livestock management, septic system failures, and urban sources; sediment due to land use practices (e.g., construction, agricultural practices, and poorly constructed/maintained roads); pesticides; metals (e.g., mercury, arsenic, chromium, copper, zinc); bacteria; salts; trash; and unknown impairments in surface waters and the ocean from emerging pollutants (such as pharmaceuticals and personal hygiene products).

Seawater intrusion in local aquifers is occurring in the mid-county and Watsonville Sloughs Watersheds, jeopardizing that source of supply. Much of the Region's groundwater has naturally high concentrations of chromium VI, and newly proposed regulations by the State of California may require huge investments in treatment to meet the new standard. Septic systems, livestock, and agricultural operations in unincorporated areas of the Region have the potential to contribute nitrate to groundwater. Current impacts are generally low. Leakage and spills from gas stations, dry cleaners, and other hazardous materials sites have caused localized groundwater contamination and pose additional threats to water supplies. This is the greatest threat in the Scotts Valley area in the San Lorenzo Watershed.

Impairment to drinking water quality, particularly in small communities in North and South County (including both private and municipal wells) is of special concern. Many small water system managers face significant challenges in complying with water quality regulations. There is a recognized need for increased public education about water quality issues.

Watershed Resources

Riparian encroachment and hydrologic modifications of wetlands, streams, estuaries, and lagoons impact the preservation and quality of habitat by affecting circulation (water quality), habitat structure (geomorphology), and the exchange of energy and nutrients. There is a general need for increased watershed management and flood management in the Region, and a need to better educate rural landowners about land management/development practices that affect water resources. Watershed resource issues of particular concern include:

- Need to protect and restore functioning watersheds and upland riparian habitat
- Food safety issues impacting wildlife and habitat protection
- Habitat protection, including problems caused by erosion and invasive species
- Steelhead protection, specifically related to sustaining flows and fish passage
- Protection of other special status species

Climate Change

The effects of climate change are expected to have significant impacts on environmental and water resources in the Santa Cruz Region. Local watersheds and water systems will be increasingly vulnerable to the effects of drought, extreme temperatures, and rainfall pattern changes. The issues and challenges related to climate change impacts are described in detail in Chapter 16, Climate Change.

Regulatory and Intergovernmental Issues

State or federal regulatory agencies may work at cross-purposes related to local water supply planning efforts. Regulatory and permitting agency decisions are on project-by-project basis not on a more watershed basis. There may be conflicting agency priorities between permitting or implementation of new cutting-edge technology, and inconsistent or conflicting mandates and regulations. Current regulations may be infeasible to implement from a cost and technology perspective, and implementation requirements may not yield desired benefits. Issues that arise may present difficulties associated with project approvals that are necessary for the Region's water managers to move forward with water management efforts.

Inter-agency Coordination

There are numerous entities involved in water management, including federal, state, and local agencies, non-governmental organizations, and other stakeholders in the community. Also, a significant number of individual well owners and small drinking water systems have an impact on the overall water supply picture for the Region. While Santa Cruz has a long history of collaboration, conflicts between jurisdictional and interested parties as well as beneficial uses are unavoidable, and demonstrate a need for integrated planning. There is also an ongoing need for water suppliers and land use jurisdictions to coordinate to ensure protection of water quality, water supplies, and other water-related issues.

Funding

Given the limited amount of funding available through DWR's IRWM Program and ongoing funding limitations for public water management agencies, there is a need to prioritize water management needs and find affordable solutions to address water-related issues.

The issues and challenges described above were considered by the IRWM Steering Committee and stakeholder working group in developing the goals and objectives for the IRWM Plan during the 2014 Plan update process. These issues and challenges are also what continue to drive the IRWM planning process. The Santa Cruz IRWM planning effort is designed to help water resource managers address the Region's water issues in a comprehensive and holistic way. By bringing together all of the Region's water resource decision makers and stakeholders in a collaborative and organized decision making process, it is the intention that this IRWM Plan will result in greater integration of water management activities, and greater efficiency and coordination of agency and organizational efforts.