



**WATER DEPARTMENT  
MEMORANDUM**

DATE: October 17, 2014  
TO: Water Supply Advisory Committee  
FROM: Toby Goddard  
SUBJECT: Future Water Demand

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**BACKGROUND:** This report is the second of two parts exploring community growth and development in Santa Cruz. The first report focused on the rate and type of growth and development experienced over the last two decades and the effect of that development on system demand. This report looks at potential future growth and development within the service area and summarizes the approach the Water Department used in 2010 to develop a forecast for water demand out to 2030.

**Regulatory Background**

Two key state laws are important in guiding water agencies in how they go about describing and evaluating their future water resource supplies and needs:

1. Urban Water Management Planning Act (CA Water Code section 10608 – 10656), and
2. Senate Bill 610 (Chapter 643, Statutes of 2001)

Under the Urban Water Management Planning Act, water suppliers are all required to follow a common framework for reporting their water use projections. This framework includes:

- 20-year planning horizon
- 5-year increments
- Breakdown by water use sector (single-family residential, multi-family, commercial, etc.)

This same basic framework, a 20-year forecast presented in 5-year increments, is used for comparing total water supply sources with the total projected water use for assessing an agency's water service reliability under other provisions of the Act. This approach is

also consistent with the way regional population and growth forecasts are typically presented.

The second main regulatory requirement is set forth under Senate Bill 610 of 2001. This law was intended to improve the linkage between land use decisions made by cities and counties and water supply availability. It recognizes Urban Water Management Plans as important source documents for cities and counties, just as General Plans are for water suppliers, and seeks to ensure coordination and collaboration when developing and updating these long-range planning documents. Pursuant to SB 610, a Water Supply Assessment is required for projects that are subject to CEQA and meet certain size thresholds.

In 2010, the City was well along towards completing a comprehensive General Plan update, and had elected to prepare a [Water Supply Assessment](#) on the document to support the environmental review process. With the City's new General Plan and next Urban Water Management Plan sharing the same 2030 planning horizon, it was an opportune time to align the projected land use changes envisioned in the General Plan with projected future water needs of the City.

Another related regulatory factor that needs to be considered in connecting future land use and water use is the statewide and regional process for determining housing needs in cities and counties. In Santa Cruz, the Regional Housing Needs Allocation, or RHNA, is developed by AMBAG as part of the state-mandated housing element law. It establishes the total number of housing units, as well as the breakdown for various income categories, that each city and county must plan for within an eight year planning cycle. The [current RHNA](#) extends from 2014 through 2023.

### **Basis for Updated Water Demand Projections**

Any long-term projection involves uncertainties and estimates which may or may not prove to be correct over time. Recognizing this fact, the most recent Urban Water Management Plan evaluated two possible "scenarios" for future demand. One of these scenarios, the higher of the two, ultimately was eliminated as being unlikely, given the recent statewide mandate calling for reduction in per capita water use by 2020. The plan also included some narrative discussion about another possible scenario in which water demand might actually remain relatively constant into the foreseeable future.

Each demand scenario was built around two main components of demand: 1) existing water demand, and 2) potential new water demand from 2010 to 2030. The two components were then added together, along with a factor for miscellaneous unmetered uses and system losses, to produce a projection of total water demand to 2030.

## 17a Forecasting Water Demand

The first component was the existing water demand associated with the City's 24,350 active accounts. This includes all residential, commercial, institutional, and irrigation accounts connected to the system and using water as of 2010.

One of the challenges in establishing the level of water demand for the existing customer base at the time was the dynamic nature of water use. In 2009, the City experienced a sharp downturn in water use that was considered a temporary phenomenon caused by the implementation of Stage 2 water restrictions, the broader economic recession, and other factors. This downward trend persisted into 2010. Therefore, instead of using the actual level of demand at the time, the approach that was taken was to combine the number of existing accounts in 2010 and average water use per account in each sector during the period immediately preceding the downturn. This approach was believed to be more representative of normal system water demand without being distorted by the external influences of drought and economy. The City tracks long-term changes in average water use per account over time by customer sector, both inside and outside the City. These tracking models, and the number of accounts obtained from the utility billing system, were the primary sources of information used to estimate demand for existing customers.

The second component making up each scenario was the incremental new water demand possible from 2010 out to 2030. Different methods were used inside the City and outside the City to quantify these potential future water demands, as follows:

- Land use changes envisioned in the [General Plan 2030](#) (not including the University) served as the basis for water demand projections within the City limits. The General Plan 2030 "buildout" estimate envisions a total of 3,350 new residential units, 3.1 million square feet of additional commercial, office, and industrial development, and some 300+ new hotel rooms (Design, Community & Environment, 2009). Within the City, water duties were developed from the utility billing system for each of the various residential and commercial sectors listed in the General Plan 2030 buildout analysis. These water duties were combined with 2030 land use projections to estimate water demands associated with new development, presented below.

The City's General Plan did not provide specific information about new landscape irrigation or municipal parks. Growth in landscape irrigation was assumed to parallel the rate of new residential and commercial development. Additional water for new municipal facilities was estimated based on the potential for new park acreage.

**General Plan 2030 Water Demand**

	<b>Buildout Projections (a)</b>	<b>Water Factor</b>	<b>Water Demand (mgy)</b>
<b>Single Residential (b)</b>	840	194 gal/unit/day	59.6
<b>Multiple Residential (b)</b>	2,510	70 gal/unit/day	64.3
<b>Business/Industry:</b>			
- <b>Commercial Sq Ft</b>	1,087,983	66 gals/ft <sup>2</sup> /year	71.8
- <b>Hotel Rooms</b>	311	93 gal/room/day	10.6
- <b>Office Sq Ft</b>	1,273,913	18 gal/ ft <sup>2</sup> /year	22.9
- <b>Industrial Sq Ft</b>	776,926	12 gal/ ft <sup>2</sup> /year	9.3
<b>Total</b>			<b>238.5</b>

**Notes:**

(a) Source DC&amp;E, 2009

(b) Assumes a breakdown of 75% MFR and 25% SFR for 3,350 new dwelling units

- Water demands for UCSC were based on the University's 2005 LRDP, as modified by the final EIR for the 2005 LRDP and the Comprehensive Settlement Agreement resulting from litigation of the EIR.
- For the portion of the City's service water area outside the Santa Cruz city limits, future water demand was scaled up based on population projections developed by AMBAG. This population-based approach was used instead because of the lack of useful information about land use changes in either the unincorporated part of the service area or the part of the city of Capitola served by the Santa Cruz City water system.

Other than past growth rates and future population projections, there really was nothing to help inform the rate of change going forward other than the one overall buildout estimate for the General Plan at the end of the 2030 planning horizon within the City. Therefore water demands were calculated only for year 2030, and then broken down into five-year increments though interpolation.

The 2030 water demand forecast associated with Scenario 2 is summarized in Tables 1-4 and is illustrated, alongside historic water demand, in Figure 1. The existing water demand component is shown in blue, and the future increment of demand shown in red. The total projected water demand in the City's water service area was estimated in 2010 to rise from 3.5 billion gallons per year to slightly over 4.0 billion gallons in 2030.

More detail about the methods and assumptions used to develop the current water demand forecast is contained in the [2010 Urban Water Management Plan](#), Chapter 4 and Appendix I.

### **Effect of Additional Water Conservation Measures**

At the time this forecast was prepared in 2010, the City was in the process of developing information on market saturation of water conserving fixtures, devices, equipment and features within residential and commercial properties. This information was being gathered to support an analysis of additional water conservation potential and the development of a new Water Conservation Master Plan. Although this project has not been completed, the analysis performed to date shows that the potential exists for gains in water use efficiency at both existing and new water service accounts could compensate for the growth in water demand anticipated with the City's General Plan and other parts of the service area over the next twenty years.

Figure 2 shows how future water demands would be modified downward with implementation of the recommended water conservation measures in Program C.

### **Next Water Demand Forecast**

State law requires Urban Water Management Plans to be updated every five years. Under legislation signed by the governor in September, the next update will be due July 1, 2016. The Water Department will be preparing a new forecast using a different approach that would take into account additional socio-economic characteristics including pricing, elasticity of demand, and income into the forecast of demand. The next forecast would extend to 2035. It would also take into account the [latest regional growth forecast](#) prepared by AMBAG earlier this year (AMBAG, 2014).

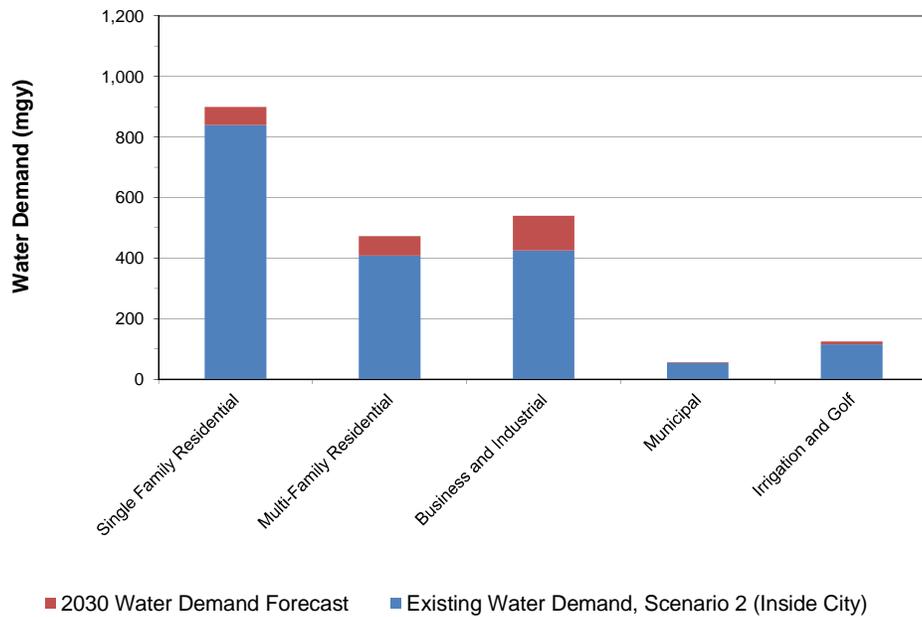
#### Attachments:

- Table 1. Projected Water Demand Inside the City of Santa Cruz
- Table 2. Projected Water Demand Outside the City of Santa Cruz
- Table 3. Projected Water Demand Service Area Total
- Table 4. Projected Water Demand Service Area Total
- Figure 1. Historic and Projected Water Production
- Figure 2. Future Water Demand with Program C

**Table 1**  
**Projected Water Demand**  
 Inside City of Santa Cruz, California

Category	Water Demand (mgd)		
	Existing Water Demand, Scenario 2 (Inside City)	Incremental Water Demand from General Plan 2030 Buildout	2030 Water Demand Forecast
Single Family Residential	839	60	899
Multi-Family Residential	408	64	472
Business and Industrial	425	115	540
Municipal	54	2	57
Irrigation and Golf	115	10	125
<b>Totals</b>	<b>1,843</b>	<b>251</b>	<b>2,094</b>

**Projected Water Demands Inside City  
 (EWD Scenario 2)**



**Abbreviations:**

EWD - existing water demand  
 mgd - million gallons per year

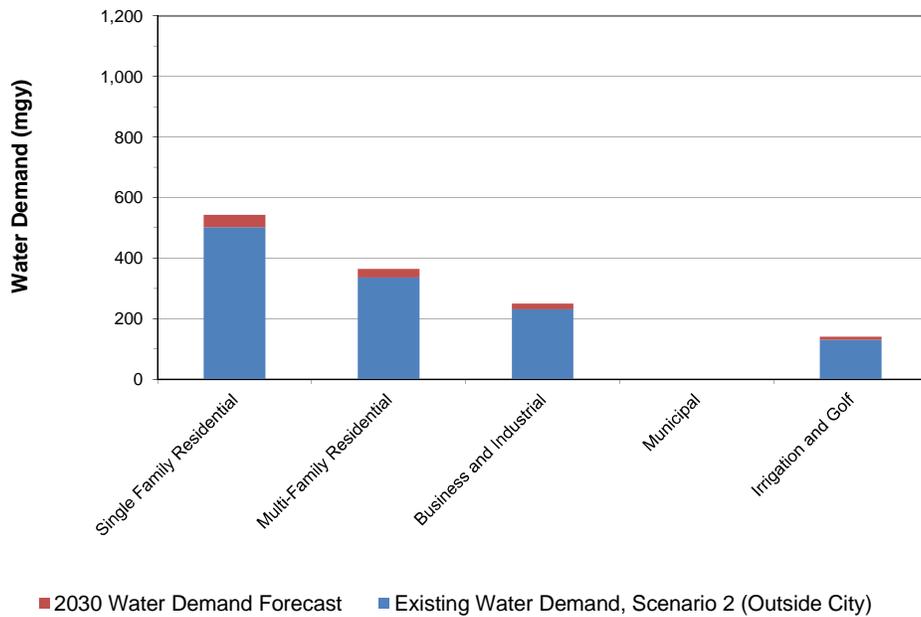
**Reference:**

1 Santa Cruz, 2010. Memorandum to Bill Kocher, Water Director (City of Santa Cruz) entitled: *Updated 2010-2030 Water Demand Forecast*, dated 15 October 2010.

**Table 2**  
**Projected Water Demand**  
 Outside City of Santa Cruz, California

Category	Water Demand (mgd)		
	Existing Water Demand, Scenario 2 (Outside City)	Incremental Water Demand	2030 Water Demand Forecast
Single Family Residential	502	41	543
Multi-Family Residential	336	28	364
Business and Industrial	231	19	250
Municipal	0	0	0
Irrigation and Golf	130	11	141
<b>Totals</b>	<b>1,199</b>	<b>99</b>	<b>1,298</b>

**Projected Water Demands Outside City  
 (EWD Scenario 2)**



**Abbreviations:**

EWD - existing water demand  
 mgd - million gallons per year

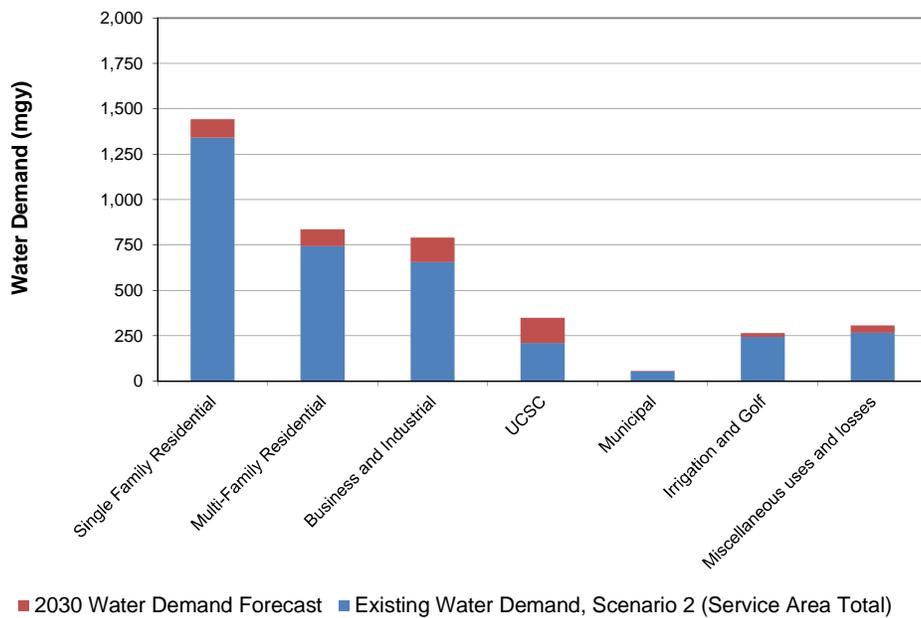
**Reference:**

1 Santa Cruz, 2010. Memorandum to Bill Kocher, Water Director (City of Santa Cruz) entitled: *Updated 2010-2030 Water Demand Forecast*, dated 15 October 2010.

**Table 3**  
**Projected Water Demand**  
 Service Area Total

Category	Water Demand (mgy)		
	Existing Water Demand, Scenario 2 (Service Area Total)	Incremental Water Demand	2030 Water Demand Forecast
Single Family Residential	1,341	101	1,442
Multi-Family Residential	744	92	836
Business and Industrial	656	134	790
UCSC	212	137	349
Municipal	54	2	56
Irrigation and Golf	245	21	266
Miscellaneous uses and losses	268	39	307
<b>Totals</b>	<b>3,522</b>	<b>526</b>	<b>4,046</b>

**Projected Water Demands - Total service Area**  
**(EWD Scenario 2)**



**Abbreviations:**

EWD - existing water demand  
 mgy - million gallons per year

**Reference:**

1 Santa Cruz, 2010. Memorandum to Bill Kocher, Water Director (City of Santa Cruz) entitled: *Updated 2010-2030 Water Demand Forecast*, dated 15 October 2010.

**Table 4**  
**Projected Water Demand**  
 Service Area Total

Location:	Customer Class	2010	2015	2020	2025	2030
City of Santa Cruz	Single Residential	839	854	869	884	899
	Multiple Residential	408	424	440	456	472
	Business/Industry	425	454	483	511	540
	Municipal	54	54	55	55	56
	Irrigation/Golf	115	118	120	122	125
	UC Santa Cruz	212	276	339	344	349
<b>Inside City Subtotal</b>		<b>2,055</b>	<b>2,180</b>	<b>2,306</b>	<b>2,373</b>	<b>2,441</b>
Outside City: <i>County, Capitola, &amp; North Coast Irrigation</i>	Single Residential	502	513	523	533	543
	Multiple Residential	336	343	350	357	364
	Business/Industry	231	236	240	245	250
	Municipal	-	-	-	-	-
	Irrigation/Golf	130	133	135	138	141
<b>Outside City Subtotal</b>		<b>1,199</b>	<b>1,224</b>	<b>1,248</b>	<b>1,273</b>	<b>1,297</b>
Other miscellaneous uses including water losses		268	280	292	300	307
<b>Total System Water Demand</b>		<b>3,522</b>	<b>3,684</b>	<b>3,847</b>	<b>3,946</b>	<b>4,046</b>

**Figure 1**  
**Historic and Projected Water Production**  
 Scenario 2

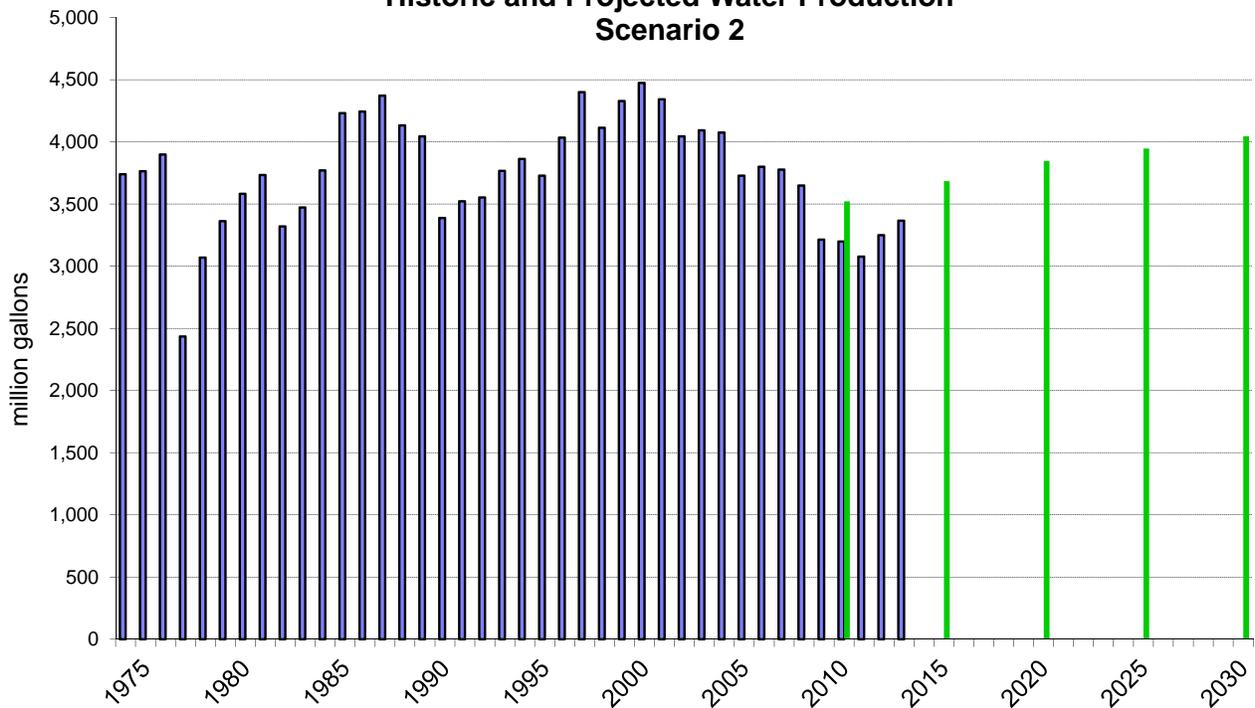


Figure 2  
Future Water Demand with Conservation Program C

