City of Watsonville 2010 Urban Water Management Plan

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Section 1 – Plan Preparation

Introduction

In 1984, the California Legislature enacted Assembly Bill 797, which is known as the Urban Water Management Planning Act. This act mandates that all urban water suppliers serving more than 3,000 customers or providing more than 3,000 acre-feet of water annually develop an Urban Water Management Plan (UWMP). In order to comply with State water planning law the UWMP must be reviewed every five years and must be adopted after public review and hearing. It is then filed with the California Department of Water Resources (DWR).

The City of Watsonville's 2010 UWMP revises the 2005 UWMP. This 2010 UWMP provides information on the present and future water demands and supplies and provides an assessment of the City's water resource needs. The UWMP will act as a guide to maintain efficient use of urban water supplies, describe and evaluate existing and potentially available sources of water supply, to project population and future water demand, to promote conservation programs and policies, and to plan out strategies for responding to water shortages and drought conditions.

DWR summarizes the status of all plans submitted statewide. DWR can use these plans as a resource to set targets, such as to track progress toward decreasing daily per capita urban water use throughout the state.

> *#4. Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable (10620(d)(2)).*

Coordination

City of Watsonville staff in the Public Works and Utilities department met and coordinated the development of this plan in part with the Community Development department.

The City also worked with two adjacent County water providers - Soquel Creek Water District and the City of Santa Cruz Water Department during the preparation of this plan.

In addition, the City works cooperatively with the Pajaro Valley Water Management Agency (PVWMA). The PVWMA overlies the City water service area. The California Legislature created the PVWMA in 1984 to provide for the effective and efficient management of present and future water supplies in the Pajaro Valley. PVWMA's mission is to efficiently and economically manage existing and supplemental water supplies in order to prevent further increase in, and to accomplish continuing reduction of, long-term overdraft and to provide and ensure sufficient water supplies for present and anticipated needs within its boundaries.

Table 1.1 - (UWMP Table 1)
Coordination with appropriate agencies

Coordinating Agencies	Participated in developing the plan	Commented on the draft	Attended public meetings	Was contacted for assistance	Was sent a copy of the draft plan	Was sent a notice of intention to adopt	Not involved / No information
City of Santa Cruz, Water Dept.				X		X	
Soquel Creek Water District				X		X	
Pajaro Valley Water Management Agency						X	
City of Watsonville, Public Works	X			X	X	X	
City of Watsonville, Community Development	X			X	X	X	
General public						X	

#6. Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision (10621(b)).
#54. The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan (10635(b)).

The City contacted both the County of Santa Cruz and the City Council of Watsonville on April 1, 2011 indicating that an UWMP was being revised for 2010. Documents are included in **Appendix A**. The City Council of Watsonville will hear the UWMP on June 14, 2011. It is projected that the County of Santa Cruz will receive a copy of an approved UWMP by August 14, 2011.

#55. Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan (10642).
#56. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area (10642).

The City informed the public in the local newspaper, the *Register Pajaronian*, dated May 31, 2011 and June 7, 2011 that a UWMP was available to review, that there would be a public hearing at the June 14, 2011 City Council meeting, and encouraged the public's participation. In addition, the City's website

offered the same information. **Appendix A** includes copies of the newspaper and website announcements.

> *#7. The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640) (10621(c)).*

No changes were made to the plan after it was adopted by the City Council on June 14, 2011.

> *#57. After the hearing, the plan shall be adopted as prepared or as modified after the hearing (10642).*

A copy of the adoption resolution is included in **Appendix F**.

> *#58. An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan (10643).*
> *59. An urban water supplier shall submit to the department, the California State Library, and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be submitted to the department, the California State Library, and any city or county within which the supplier provides water supplies within 30 days after adoption (10644(a)).*

The City Council adopted the 2010 UWMP on June 14, 2011. The City submitted the UWMP to DWR, the California State Library and to the County of Santa Cruz electronically and/or by mail on July 20, 2011.

> *#60. Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours. (10645).*

The 2010 UWMP is available for public review on the City's website (http://www.watsonvilleutilities.org) and in the City's library.

Contact Information

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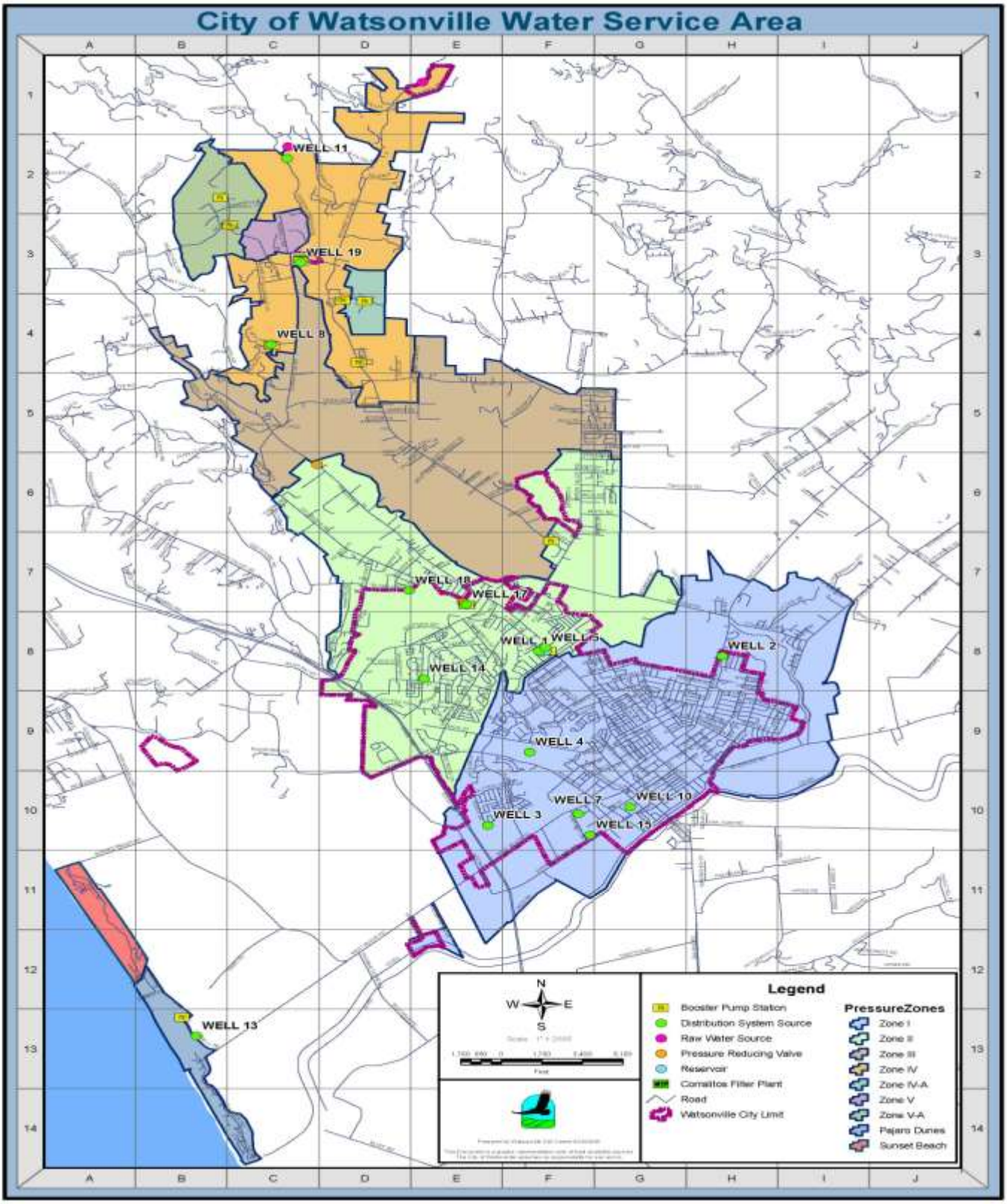

City of Watsonville Water Service Area
WELL 11
WELL 19
WELL 8
WELL 18
WELL 17
WELL 1
WELL 5
WELL 2
WELL 14
WELL 4
WELL 7
WELL 10
WELL 3
WELL 15
WELL 13
N
W
E
S
Legend
Booster Pump Station
Distribution System Source
Raw Water Source
Pressure Reducing Valve
Reservoir
Corralitos Filter Plant
Road
Watsonville City Limit
PressureZones
Zone I
Zone II
Zone III
Zone IV
Zone IV-A
Zone V
Zone V-A
Pajaro Dunes
Sunset Beach

#8. Describe the service area of the supplier (10631(a)).

Service Area and Physical Description

Watsonville is located along the Monterey Bay between Santa Cruz and Monterey, in the County of Santa Cruz. The City lies in the heart of the Pajaro Valley, surrounded by prime agricultural land and wetlands. Water is an integral component throughout the Watsonville environs. Five small lakes are located near the City's northern and eastern boundary. The City is bounded by Corralitos Creek to the north, Salisipuedes Creek to the east, and the Pajaro River to the south. The Pajaro River forms the boundary between Santa Cruz and Monterey Counties. Several small creeks and sloughs meander through the City and extend to the south and west of Highway 1, which form what is referred to as the Watsonville Slough System.

When the City of Watsonville was named after Judge John H. Watson and incorporated in 1868, it was a small settlement of less than 1,000 residents. It has since grown to a city of over 51,000 in 2010 (source: *U.S. Census Bureau*).

The water system originated in 1877 when water was piped from the Corralitos area to a reservoir on Whiskey Hill (now Freedom Reservoir on Freedom Boulevard.). It served the small community of Watsonville under the name of the Watsonville Water and Light Company until the City acquired it in 1927.

In 1931 a slow sand filtration plant was constructed in Corralitos to filter the raw water coming from Corralitos and Browns Creeks. By 1979, the water system had grown to closely represent its current state. It consisted of 8 pressure zones, 10 wells, 8 storage facilities, over 100 miles of pipeline, and a slow sand filter water treatment plant. Today, the City's water service area is larger than the City limits, extending into the unincorporated areas of Santa Cruz County. These areas include parts of Corralitos, Freedom, and Pajaro Dunes. The service area consists of 9 hydraulic pressure zones, 14 wells, 8 reservoirs and water storage facilities, 9 booster stations, over 150 miles of pipelines, and a slow sand filter water treatment plant. Today, the City's regional water system delivers to a population of over 65,000 customers.

#9. (Describe the service area) climate (10631(a)).

Climate

Watsonville has a northern Mediterranean coastal climate, with dry, mild summers and cool winters. The annual average precipitation in Watsonville is 23.27 inches, while precipitation in the nearby Santa Cruz Mountains averages approximately 50 inches per year. **Table 2.1** provides Eto[1], rainfall and temperature information for the Watsonville area.

[1] Eto, Evapotranspiration, is used to indicate how much water is required per month to properly account for soil moisture loss via plant growth and plant moisture evaporation

Table 2.1 - Service Area Climate													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Standard Monthly Average Eto [1]	1.85	2.04	3.40	4.24	4.76	5.20	4.99	4.52	3.81	3.11	1.85	1.47	41.24
Average Rainfall (inches) [2]	4.72	4.45	3.94	1.61	0.51	0.12	0.08	0.08	0.28	1.06	2.99	3.43	23.27
Average Temperature (°F) [2]	50	52	53.5	56.5	58.5	61	62.5	63	63	60	54	49.5	57.0

[1] Data for CIMIS Station 111 from January 2006 to December 2010, downloaded on 2/17/10: www.cimis.water.ca.gov

[2] Data for average rainfall and temperature, 2/17/11, http://www.usclimatedata.com/climate.php?location=USCA1215

#10. (Describe the service area) current and projected population . . . The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier . . . (10631(a)).
#11. . . . (population projections) shall be in five-year increments to 20 years or as far as data is available (10631(a)).

Population

Table 2.2 shows the population total for the City water service area in 2010, with projections to 2035. Population projections are drawn from information provided by the Association of Monterey Bay Area Governments (AMBAG, Population Forecast Report) and the City of Watsonville Information Services, Geographic Information Systems (GIS) Department, along with figures collected from U.S. Census 2010 data. To reiterate, the water service area of Watsonville extends beyond the City limits and into unincorporated Santa Cruz County, including parts of Corralitos, Freedom, and Pajaro Dunes.

Table 2.2 (UWMP Table 2) Population - current and projected							
	2010	2015	2020	2025	2030	2035	Data Source
Service area population	65,739	66,826	68,759	71,318	73,691	75,073	AMBAG [1], C.O.W. GIS

[1] Association of Monterey Bay Area Governments, document dated 4/1/2011. Population includes water service areas of Watsonville, Corralitos, and Freedom.

#12. Describe . . . other demographic factors affecting the supplier's water management planning (10631(a)).

Constrained by environmental features, farmland, and County growth management policies, the City has developed in a compact, dense pattern. These constraints contribute to the City's density of 7,129 persons per square mile, compared to 315 in the unincorporated County, and 4,065 in the City of Santa Cruz.

According to 2010 U.S. Census data, Watsonville is the fastest growing city in Santa Cruz County, experiencing great population growth since 1980. This growth can be attributed to, among other things, the availability of more affordable housing in Watsonville than in other County communities (including

the development of several large housing projects), in-migration of agricultural workers, and annexations of inhabited areas.

The City provides significant support, housing, processing, and transportation facilities to the agricultural, manufacturing, health, real estate, wholesale and retail trade industries. Furthermore, Watsonville provides a wide range of access to employment, shopping, and recreation opportunities and government services for south County residents.

Despite its growth, within the region Watsonville continues to be a leader in preservation of productive agricultural land and significant environmental resources, including hundreds of acres of open space, parks, sloughs, wetlands, and coastal zone lands.

Section 3 - System Demands

#1. An urban retail water supplier shall include in its urban water management plan . . . due in 2010 the baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data (10608.20(e)).

Per Capita Water Use

The City of Watsonville uses information provided by its Information Services, Geographic Information Systems Department (GIS) and the Association of Monterey Bay Area Governments (AMBAG) for its population figures, and its Public Works Customer Services Department, which is responsible for all water meter reads, for determining the amount of water supplied by the City.

In order to determine its baseline daily per capita water use, the City referenced the total urban water supplied in the year 2008 (per DWR methodologies). See **Table 3.1**. Because the volume of recycled water delivered was less than 10% (there was no recycled water delivered in 2008), a 10 year range was selected to determine the base period range. It is important to note that the City develops these baselines for its water service area only and not on a regional level.

Table 3.1 - (UWMP Table 13)
Base period ranges

Base	Parameter	Value	Units
10- to 15-year base period	2008 total water deliveries	8,806.56	*AFY*
	2008 total volume of delivered recycled water	0	*AFY*
	2008 recycled water as a percent of total deliveries	0	percent
	Number of years in base period[1]	10	years
	Year beginning base period range	2001	
	Year ending base period range[2]	2010	
5-year base period	Number of years in base period	5	years
	Year beginning base period range	2006	
	Year ending base period range[3]	2010	

Units: acre-feet per year

[1] If the 2008 recycled water percent is less than 10 percent, then the first base period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater, the first base period is a continuous 10- to 15-year period.

[2] The ending year must be between December 31, 2004 and December 31, 2010.

[3] The ending year must be between December 31, 2007 and December 31, 2010.

Table 3.2 indicates the 10 year range selected, years 2001 through 2010, along with the population served and the amount of water supplied. The base daily per capita water use is 104.4 gpcd.

Table 3.2 - (UWMP Table 14) Base daily per capita water use — 10- to 15-year range				
Base period year		Distribution System Population	Daily system gross water use (mgd)	Annual daily per capita water use (gpcd)
Sequence year	Calendar year			
Year 1	2001	56,236	6,431,644	114.4
Year 2	2002	57,220	6,501,644	113.6
Year 3	2003	58,222	6,318,082	108.5
Year 4	2004	59,241	6,512,521	109.9
Year 5	2005	60,277	6,269,233	104.0
Year 6	2006	61,332	6,266,247	102.2
Year 7	2007	62,405	6,540,795	104.8
Year 8	2008	63,498	6,539,836	103.0
Year 9	2009	64,609	6,200,548	96.0
Year 10	2010	65,739	5,747,013	87.4
			Base daily per capita water use	104.4
Units: *acre-feet per year*				

Within the 10 year range, a 5 year base period range was also established. This 5 year range was chosen to be years 2006 through 2010. The base daily per capita water use is 98.7 gpcd. See **Table 3.3**.

Table 3.3 (UWMP Table 15) Base daily per capita water use — 5-year range				
Base period year		Distribution System Population	Daily system gross water use (mgd)	Annual daily per capita water use (gpcd)
Sequence year	Calendar year			
Year 1	2006	61,332	6,266,247	102.2
Year 2	2007	62,405	6,540,795	104.8
Year 3	2008	63,498	6,539,836	103.0
Year 4	2009	64,609	6,200,548	96.0
Year 5	2010	65,739	5,747,013	87.4
			Base daily per capita water use	98.7
Units: *acre-feet per year*				

It is the State of California's goal to achieve a 20% reduction in overall water usage in 2020 from today's levels. The City of Watsonville service area is located in the Central Coast region, whose target level is 123 gallons per capita per day (gpcd). The City has chosen Method 3 as its guideline to achieve and maintain a per capita water usage of 95% of the Central Coast regional level of 123 gpcd, which is 117 gpcd.

> *#25. Quantify, to the extent records are available, past and current water use, and projected water use (over the same five-year increments described in subdivision (a)), identifying the uses among water use sectors, including, but not necessarily limited to, all of the following uses: (A) Single-family residential; (B) Multifamily; (C) Commercial; (D) Industrial; (E) Institutional and governmental; (F) Landscape; (G) Sales to other agencies; (H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof; (I) Agricultural (10631(e)(1) and (2)).*

Past, Current, and Projected Water Use

Water deliveries in 2005 and 2010 recorded by the City's Customer Services Division and reported to DWR are summarized in **Tables 3.4** and **3.5.**

Table 3.4 - (UWMP Table 3)
Water deliveries - actual, 2005

	2005				
	Metered		Not metered		Total
Water use sectors	# of accounts	Volume	# of accounts	volume	volume
Single family	13,236	3,868	n/a	n/a	3,868
Multi-family	366	1,098	n/a	n/a	1,098
Commercial	1,285	1,127	n/a	n/a	1,127
Industrial	21	483	n/a	n/a	483
Institutional/governmental	205	41	n/a	n/a	41
Landscape	293	405	n/a	n/a	405
Agriculture	-	-	n/a	n/a	0
Total	15,406	7,022	n/a	n/a	7,022

Units: acre-feet per year

Table 3.5 - (UWMP Table 4) Water deliveries - actual, 2010					
	2010				
	Metered		Not metered		Total
Water use sectors	# of accounts	Deliveries AFY	# of accounts	Deliveries AFY	volume
Single family	13,773	3650	n/a	n/a	3,650
Multi-family	233	943	n/a	n/a	943
Commercial	1,226	1058	n/a	n/a	1,058
Industrial	14	362	n/a	n/a	362
Institutional/governmental	31	41	n/a	n/a	41
Landscape	318	384	n/a	n/a	384
Agriculture	1	505	n/a	n/a	505
Total	15,596	6943	n/a	n/a	6,943
Units: *acre-feet per year*					

Water deliveries projected within the City's water service area for 2015 through 2035 were calculated based on a combination of data; Urban Water Utility Statistics submitted to DWR from 1992-2010, population projections from **Table 2.2**, 10-year and 5-year base gpcd levels and Central Coast regional target gpcd levels. This projected information is shown in **Tables 3.6** thru **3.8**.

Table 3.6 - (UWMP Table 5) Water deliveries - projected, 2015					
	2015				
	Metered		Not metered		Total
Water use sectors	# of accounts	Deliveries AFY	# of accounts	Deliveries AFY	Volume
Single family	14,852	3,864	n/a	n/a	3,864
Multi-family	251	810	n/a	n/a	810
Commercial	1,322	1,077	n/a	n/a	1,077
Industrial	15	344	n/a	n/a	344
Institutional/governmental	34	286	n/a	n/a	286
Landscape	343	414	n/a	n/a	414
Agriculture	1	466	n/a	n/a	466
Total	16,818	7,261	n/a	n/a	7,261
Units: *acre-feet per year*					

Table 3.7 - (UWMP Table 6) Water deliveries - projected, 2020					
	2020				
	Metered		Not metered		Total
Water use sectors	# of accounts	Deliveries AFY	# of accounts	Deliveries AFY	volume
Single family	16,016	4,000	n/a	n/a	4,000
Multi-family	271	837	n/a	n/a	837
Commercial	1,426	1,115	n/a	n/a	1,115
Industrial	16	356	n/a	n/a	356
Institutional/governmental	36	217	n/a	n/a	217
Landscape	370	428	n/a	n/a	428
Agriculture	1	441	n/a	n/a	441
Total	18,135	7,394	n/a	n/a	7,394
Units: *acre-feet per year*					

Table 3.8 - (UWMP Table 7) Water deliveries - projected, 2025, 2030, 2035						
	2025		2030		2035	
	metered		metered		metered	
Water use sectors	# of accounts	Deliveries AFY	# of accounts	Deliveries AFY	# of accounts	Deliveries AFY
Single family	17,270	4,154	18,623	4,302	20,083	4,416
Multi-family	292	871	315	902	340	926
Commercial	1,537	1,158	1,658	1,198	1,788	1,231
Industrial	18	368	19	383	20	393
Institutional/governmental	39	173	42	116	46	9
Landscape	399	445	430	461	464	473
Agriculture	1	420	1	397	1	373
Total	19,556	7,589	21,088	7,759	22,741	7,821
Units: *acre-feet per year*						

Because the City of Watsonville is a water supplier for its service area only, it does not record or forecast water demands of other agencies into its own water use targets.

There is a percentage of unaccounted for water that is attributed to system losses. According to the EPA, in 2010 in the United States, it is estimated that on average 10-20% of a water system's production can be classified as unaccounted for water [2] (system loss, leak, fire hydrant usage or damage, unauthorized use, etc.). The City's water losses over the last 10 years average 6.55% of distributed

[2] http://water.epa.gov/infrastructure/sustain/wec_wp.cfm, dated 4/17/2011.

water. See **Demand Management Measure C, Table 6.2**. If a water system is able to achieve a level of 5% that is considered extremely efficient. Presently, the only projected water losses are based on the annual average 6.55% unaccounted for water losses of the projected delivered water, **Table 3.9**.

Table 3.9 - (UWMP Table 10)
Additional water uses and losses

Water use [1]	2005	2010	2015	2020	2025	2030	2035
Saline barriers	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Groundwater recharge	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Conjunctive use	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Raw water	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Recycled water	n/a	n/a	n/a	n/a	n/a	n/a	n/a
System losses	551	511	476	484	497	508	512
Total	551	511	476	484	497	508	512

Units: acre-feet per year

[1] *Any water accounted for in Tables 3.4 through 3.8 are not included in this table.*

A summary of all water demands from the previous tables is shown in **Table 3.10**.

Table 3.10 - (UWMP Table 11)
Total water use

Water use	2005	2010	2015	2020	2025	2030	2035
Total water deliveries (from Tables 3.4 to 3.8)	7,022	6,943	7,261	7,394	7,589	7,759	7,821
Sales to other water agencies	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Additional water uses and losses (from Table 3.9)	551	511	476	484	497	508	512
Total	7,573	7,454	7,737	7,878	8,086	8,267	8,333

Units: acre-feet per year

> *#34. The water use projections required by Section 10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households, as defined in Section 50079.5 of the Health and Safety Code, as identified in the housing element of any city, county, or city and county in the service area of the supplier (10631.1(a)).*

Lower Income Water Allotment

The *City of Watsonville 2008-2013 Housing Element* identifies that of the City's share of the County of Santa Cruz's regional housing needs, 39% be designated to meet the needs of low, very low, and

extremely low income households in the years 2007-2014. Therefore, the projected water demands for low income housing are figured as 39% of the water use. As a retail urban water supplier, the City of Watsonville must ensure that water supplies are available for these households. **Tables 3.6** thru **3.8** show the water use by various sectors projected from 2015 to 2035. Water use has been extrapolated based upon population estimates provided in the Watsonville General Plan, AMBAG, and the City's GIS department. The City anticipates reductions in per-capita water use from 2010 onwards, as water conservation programs continue to be implemented and evaluated. The City has factored in water use projections for low income housing in the single and multi family residential deliveries row, **Tables 3.6** thru **3.8.**

> *#33. Urban water suppliers that rely upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c) (10631(k)).*

The City of Watsonville does not have any contracts with wholesale water agencies.

> *#2. Urban wholesale water suppliers shall include in the urban water management plans . . . an assessment of their present and proposed future measures, programs, and policies to help achieve the water use reductions required by this part (10608.36). Urban retail water suppliers are to prepare a plan for implementing the Water Conservation Bill of 2009 requirements and conduct a public meeting which includes consideration of economic impacts (CWC §10608.26).*

The City of Watsonville has worked diligently to design, promote and carry out a very effective water conservation program. Many of these efforts are outlined in **Section 6 – Demand Management Measures.** They have proven successful and will be continued into the future.

The Water Conservation Bill of 2009, or SBx7-7, is the water conservation component that seeks to implement water use reduction goals to achieve a 20% statewide reduction in urban per capita water use by December 31, 2020. The bill requires each urban retail water supplier to develop urban water use targets to help meet the 20% goal by 2020 and an interim 10% goal by 2015.

In an effort for urban retail water suppliers to determine targets to help achieve water reduction targets DWR has established four compliance options for urban retail water suppliers to choose from. As mentioned above the City has chosen to adopt Method 3, which is to achieve 95% of the applicable state hydrologic region target as set forth in the State's 20x2020 Water Conservation Plan. The City has chosen to comply with SBx7-7 as an individual agency and will include its reporting requirements in the 2010, 2015, and 2020 UWMPs.

While each retail agency is required to choose a compliance option in 2010, DWR allows for the agency to change its compliance option in 2015. This will allow the City to re-evaluate its water use targets for compliance. It anticipates more data to be available for targets calculation in the future.

Section 4 - System Supplies

#13. Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a) (10631(b)).

Water Supply

Table 4.1 is a summary of the current and projected water supplies through 2035. During years of normal rainfall, the City utilizes a combination of surface water and groundwater supply sources. The City's surface water treatment plant is capable of producing 2,400 acre feet per year (AFY).

The City enjoys pre-1914 water rights on two creeks north of the City limits. The surface diversions are piped to the Corralitos Filter Plant (CFP) and provided treatment via slow sand filtration and disinfection. The CFP has a capacity of 2,400 AFY and currently produces an average of 900 AFY. The CFP generally operates spring through fall; during the rainy season the plant is usually shut down due to the high turbidity of the intake water. The City has operated without the CFP for extended periods, including when it was severely damaged during the 1989 Loma Prieta Earthquake. It did not resume full operation until 1996.

The City's 14 groundwater wells are capable of providing 21,600 AFY. The City does not purchase water from any wholesale water suppliers. The City's wastewater treatment plant can provide up to 4,000 AFY of recycled water. Though this recycled water is treated to Title 22 standards it is not connected to the general distribution system and is intended for agricultural purposes only.

Table 4.1 - (UWMP Table 16)
Water supplies - current and projected

Water supply sources		2010	2015	2020	2025	2030	2035
Water Purchased From:	**Wholesaler supplied volume (yes /no)**						
Wholesaler	**no**	n/a	n/a	n/a	n/a	n/a	n/a
Supplier-produced groundwater		21,600	21,600	21,600	21,600	21,600	21,600
Supplier-produced surface water		2,400	2,400	2,400	2,400	2,400	2,400
Transfers In		n/a	n/a	n/a	n/a	n/a	n/a
Exchanges In		n/a	n/a	n/a	n/a	n/a	n/a
Recycled Water		1,597	4,000	4,000	4,000	4,000	4,000
Desalinated Water		n/a	n/a	n/a	n/a	n/a	n/a
Other		n/a	n/a	n/a	n/a	n/a	n/a
Total		25,597	28,000	28,000	28,000	28,000	28,000

Units: ***acre-feet per year***

#14. (Is) groundwater . . . identified as an existing or planned source of water available to the supplier . . . (10631(b))?

Groundwater

Fourteen groundwater wells owned and operated within the City of Watsonville water service area provide on average 7,450 acre-feet of water per year over the last five years. City water is treated at each well site and meets or exceeds State and Federal drinking water standards. The City water service area and the locations of the City's groundwater wells are shown on the map in **Section 2**, page 8. Because the recycled water is intended strictly for agricultural purposes it is not included in the total water supply volume, **Table 4.2**. The total water supply volume is thus figured as 24,000 AFY.

#20. (Provide a) detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records (10631(b)(3)).

Table 4.2 is a summary of the past five years of groundwater pumped within the water service area. The wells from which this groundwater was pumped are presented in the map in **Section 2**, page 8. The amount of the groundwater pumped, averaging less than 32% of the potential groundwater production, readily handled the City's needs.

Table 4.2 - (UWMP Table 18)
Groundwater - volume pumped

Basin name(s)	Metered or Unmetered	2006	2007	2008	2009	2010
Pajaro Basin	Metered	7,000.7	7,642.0	8,465.9	7,388.6	6,727.8
Groundwater as a percent of total water supply		29.2%	31.8%	35.3%	30.8%	28.0%

Units: acre-feet per year

#21. (Provide a) detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records (10631(b)(4)).

The City intends to continue pumping groundwater from its existing well sources. It is likely that additional sources will be explored for future use. At this time, the City's wells are capable of providing for both current and projected water demands. The groundwater projected to be pumped, **Table 4.3**, is based on current water demands coupled with population changes. In addition, it is projected that the surface water allotment up to 2,400 acre feet per year will be available to supplement demand.

Table 4.3 – (UWMP Table 19) Groundwater - volume projected to be pumped					
Basin name(s)	**2015**	**2020**	**2025**	**2030**	**2035**
Pajaro Basin	**7,737.1**	**7,877.7**	**8,085.9**	**8,267.4**	**8,333.1**
Percent of total water supply	**30.3%**	**30.8%**	**31.6%**	**32.3%**	**32.6%**
Units: ***acre-feet per year***					

#15. (Provide a) copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management (10631(b)(1)).
#16. (Provide a) description of any groundwater basin or basins from which the urban water supplier pumps groundwater (10631(b)(2)).
#17. For those basins for which a court or the board has adjudicated the rights to pump groundwater, (provide) a copy of the order or decree adopted by the court or the board (10631(b)(2)).
#18. (Provide) a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree (10631(b)(2)).

Basin Management Plan

In 1984, the Pajaro Valley Water Management Agency (PVWMA) was formed by California State statute (the Agency Act). The agency was formed to serve the common benefit of all water users and to manage water resources within the Pajaro Valley Basin for all beneficial uses in the public interest. Specific language in the Act recognizes the importance of agriculture to the area, and designates, with the exception of Aromas, that any future imported water be used for agricultural purposes only, to restrain inducements to urbanization. In November 1984, voters within the boundaries of the newly created agency overwhelmingly approved its establishment.

A Basin Management Plan (BMP) was prepared and adopted in 1993 that defined and analyzed 33 management measures that could potentially correct groundwater shortfall and seawater intrusion problems of the Pajaro Valley Basin.

The City of Watsonville uses approximately 10 percent of the groundwater pumped from the Pajaro Valley Basin. The balance of the water is used for agricultural irrigation and some industrial uses. The PVWMA prepared the Basin Management Plan 2000 (BMP 2000) to address water resources management issues in the Pajaro Valley. The BMP was revised and adopted in 2002 and a copy of this plan is provided in the **Appendix B**. The BMP provides a review and update of previous water supply studies in order to clearly outline the extent of the Pajaro Valley's over-pumping and seawater intrusion problems. The BMP also evaluates available options and recommends the most cost-effective and environmentally sound set of solutions for solving the over-pumping and seawater intrusion problems.

Environmental documentation has been completed for a series of local water supply projects, and the PVWMA is now constructing several of these projects. An aggressive water conservation program has also been developed (Water Conservation 2000).

#19. For basins that have not been adjudicated, (provide) information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition (10631(b)(2)).

Overdraft in the Pajaro Valley Basin

The key to eliminating seawater intrusion is to reduce groundwater pumping to within the sustainable basin yield. This can be accomplished in one of two ways - reduce demand (with demand management and/or land retirement) or increase management and availability of supply (by employing increased levels of conservation and developing new supplemental water supplies).

With basin-wide pumping as it presently exists, the sustainable basin yield is approximately 25,000 acre-feet per year. This is the level of pumping that the groundwater basin can sustain without inducing seawater intrusion. With an average of approximately 70,000 acre-feet per year of groundwater pumping, there is an existing shortfall of approximately 45,000 acre-feet per year. Once the additional 5,000 acre-feet per year of increased conservation is achieved, there will be an annual shortfall of approximately 40,000 acre-feet per year (assuming current demand).

The basin sustainable yields can be increased if pumping is eliminated in the coastal area. The sustainable basin yield with no pumping in an area immediately adjacent to the coast is approximately 48,000 acre-feet per year, double what it is with basin-wide groundwater pumping reductions. Thus, coastal pumping reduction reduces the existing shortfall by over 50% to approximately 20,000 acre-feet per year.

PVWMA is currently updating its BMP and will use this to develop supplemental water supplies to address the groundwater pumping demand that is in excess of the sustainable basin yield.

The City of Watsonville currently pays an augmentation fee to the PVWMA to address the existing overdraft. The PVWMA uses these funds to implement their BMP.

The City pays fees to the PVWMA based on the quantity of water extracted from groundwater sources. These payments provide a significant source of funds to the PVWMA, and support the proposed water projects that will ultimately prevent further groundwater overdraft and seawater intrusion.

Other Potential Water Supplies

The City's Water Supply and Distribution Master Plan identified a number of water sources available to the City. The following is a general description of each.

Groundwater Wells

New wells can be placed within the valley hydraulically upstream of the seawater intrusion areas. However, additional wells may contribute to the groundwater overdraft, and would be considered a short-term solution until other alternatives are developed and implemented by the PVWMA.

Surface Water Sources

Both the Corralitos and Browns Creeks could be better utilized as surface water sources. Currently, the filter plant cannot operate when the intake water has a turbidity of greater than 10 NTU (Nephelometric Turbidity Units). Heavy rains create high turbidity in the creeks, making the filter plant inoperable during the periods of highest flow. The City continues to explore options to allow year-round use of the filter plant, which could provide a substantial increase to the City surface water supply. Most recently in 2009, the City conducted a successful pilot study on the potential of a ceramic membrane filtration plant capable of producing up to 2.5 MGD, even during times of high turbidity. The water could be used directly through the Corralitos Filter Plant or diverted to storage and ground water recharge. Various lakes exist in the area and could be used for surface water storage. The lakes have poor recharge potential, but could be used for irrigation supply or diverted to better recharge areas during non-runoff periods.

Water Conservation

The PVWMA Basin Management Plan estimates that approximately 500 acre-feet of water can be saved annually through City water conservation programs. The City believes this number is too low and anticipates up to 1,000 acre-feet per year of water savings by 2020. In 1991 the City Council approved a Water Waste Ordinance, discussed in the **Section 6: Demand Management Measures** section of this report.

> *#24. Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis (10631(d)).*

The City does not have any plans to transfer or exchange water. However, the PWMA entered into an agreement for the assignment of 6,260 AFY of contracted CVP water from the Mercy Springs Water District in November 1998. The agency has explored options to exercise this agreement through construction of a pipeline to link the Pajaro Valley with the San Felipe water system. This is detailed in the attached PVWMA Basin Management Plan. Currently, this option is not being considered.

> *#31. Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply (10631(i)).*

Desalination of wastewater, groundwater, or seawater is an option that has been explored in the PVWMA Basin Management Plan. It is generally considered cost-prohibitive, and is not likely to be pursued by the City or PVWMA.

> *#44. Provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area (10633).*
> *#45. (Describe) the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal (10633(a)).*

#46. (Describe) the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project (10633(b)).

Wastewater Collection and Treatment

Long before the Federal government dedicated the Monterey Bay as a National Marine Sanctuary, the Watsonville Wastewater Treatment Facility (WWTF) was serving as a first line of defense in protecting the Bay's precious water quality. The WWTF is located on the Pajaro River, southwest of Watsonville between Highway 1 and the Monterey Bay. It was first constructed in the 1920s, and has been through several expansions and upgrades. The WWTF has seen its mission grow from servicing a small agricultural community to treating wastewater for as many as 55,000 residents, commercial and industrial dischargers. The WWTF collects and treats all of the wastewater (excluding storm water run-off) from a 21 square mile service area comprising users within the City of Watsonville, Freedom County Sanitary District, Pajaro County Sanitary District and Salsipuedes Sanitary District. More than 170 miles of pipeline are used to transport wastewater to the facility for treatment.

The WWTF treats a daily average of 6-7 million gallons of wastewater in dry weather, and is permitted to treat up to 12 million gallons per day. The wastewater treatment process includes primary sedimentation, biological filtration, aeration, and secondary clarification. In 2010, tertiary treatment began. The recycled water is used for agricultural irrigation. All secondary treated water undergoes extensive monitoring and testing to insure compliance with all State and Federal pollution prevention laws prior to being discharged to the Monterey Bay over a mile off shore. The Recycled Water Facility is designed and expected to treat 4,000 acre feet per year of wastewater to recycled water standards (Title 22). See **Table 4.5**. The amount of recycled water that is currently being produced and is available for use is outlined in **Table 4.6**.

A new Watsonville Area Water Resources Center supports the larger Water Recycling Project, a joint effort of the City of Watsonville and the Pajaro Valley Water Management Agency, **Table 4.4**, to provide recycled water to farmers throughout the coastal areas of South Santa Cruz and North Monterey counties. By treating wastewater and making it available to the $400 million local agricultural industry, the Water Recycling Project protects groundwater that is being consumed more quickly than it is replenished, resulting in saltwater intrusion into coastal wells. In addition, the use of recycled water for irrigation reduces wastewater discharges into the Monterey Bay National Marine Sanctuary.

Table 4.4 – Participating Agencies

Agency	Role in Plan Development
Watsonville Public Works	Planning, design and grant application.
Watsonville Wastewater Division	Participates in project design and development
Pajaro Valley Water Management Agency	Planning, design and grant application.
Watsonville Planning	CEQA review.

Eighty-five percent of the Pajaro Valley's water use directly supports its $400 million agricultural industry. However, the local aquifer is draining more quickly than it can be replenished, creating an

imbalance that has resulted in saltwater intrusion into coastal wells that endangers agriculture in the region. The Water Recycling Project recharges the aquifer, providing 4,000 acre-feet per year of recycled water for irrigation. This accounts for over 20% of the 18,500 acre-feet per year of coastal pumping needed to halt seawater intrusion into the local aquifer.

Table 4.5 - (UWMP Table 21)
Recycled water - wastewater collection and treatment

Type of wastewater	2005	2010	2015	2020	2025	2030	2035
Wastewater collected & treated in service area	9,733	6,764	7,232	7,672	8,176	8,703	9,215
Volume that meets recycled water standard	0	1,597	4,000	4,000	4,000	4,000	4,000

Units: acre-feet per year

Table 4.6 – (UWMP Table 22)
Recycled water - non-recycled wastewater disposal

Method of disposal	Treatment Level	2010	2015	2020	2025	2030	2035
Ocean discharge	Secondary	2,764	3,232	3,672	4,176	4,703	5,215
	Total	2,764	3,232	3,672	4,176	4,703	5,215

Units: acre-feet per year

#47. (Describe) the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use (10633(c)).

Recycled Water

The amount of recycled water that is currently being used within the water service area is outlined in **Table 4.7**.

#48. (Describe and quantify) the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses (10633(d)).
#49. (Describe) the projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision (10633(e)).

In 2010, the City of Watsonville's completed its upgrade of the wastewater treatment plant to include tertiary treatment. It recycles wastewater for crop irrigation in a joint project with the PVWMA. The treatment plant upgrade allows the City to produce up to 4,000 acre-feet per year of treated wastewater. This figure can be met based on the demand of the agricultural users ordering water in conjunction with PVWMA.

Table 4.7 – (UWMP Table 23) Recycled water - potential future use							
User type	Description	Feasibility [1]	2015	2020	2025	2030	2035
Agricultural irrigation	Tertiary treated waste water	Very likely	4,000	4,000	4,000	4,000	4,000
Total			4,000	4,000	4,000	4,000	4,000

Units: acre-feet per year

[1] *Technical and economic feasibility.*

Table 4.8 - (UWMP Table 24) Recycled water — 2005 UWMP use projection compared to 2010 actual		
User type	2010 actual use	2005 projection for 2010 [1]
Agricultural irrigation	505.1	4,000
Landscape irrigation [2]	0	0
Commercial irrigation [3]	0	0
Golf course irrigation	0	0
Wildlife habitat	0	0
Wetlands	0	0
Industrial reuse	0	0
Groundwater recharge	0	0
Seawater barrier	0	0
Geothermal usage	0	0
Indirect potable reuse	0	0
Total	505.1	4,000

Units: acre-feet per year

[1] *From the 2005 UWMP. There has been some modification of use types. Data from the 2005 UWMP can be left in the existing categories or modified to the new categories, at the discretion of the water supplier.*

[2] *Includes parks, schools, cemeteries, churches, residential, or other public facilities)*

[3] *Includes commercial building use such as landscaping, toilets, HVAC, etc) and commercial uses (car washes, laundries, nurseries, etc)*

#50. (Describe the) actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year (10633(f)).

The City has teamed with the PVWMA to utilize up to 3.5 million gallons per day of tertiary treated recycled water that will become available in 2010. Because there is such a great need for additional water in the Pajaro Valley, the recycled water has already been allocated for agricultural irrigation and groundwater recharge projects. Additional uses for the recycled water will continue to be explored by the City and the PVWMA.

#51. (Provide a) plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use (10633(g)).
#30. (Describe) all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single-dry, and multiple-dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program (10631(h)).

Proposed PVWMA Water Supply Projects

- **Water Conservation** - Implementation of the Water Conservation 2000 plan will provide up to approximately 5,000 acre-feet per year per year of reduced water demand through agricultural and domestic water conservation programs.

- **Local Water Supplies** - In addition to development of the Harkins Slough, Murphy Crossing, and College Lake projects, a project to utilize recycled water from the City of Watsonville Wastewater Treatment Plant has been developed. The flow through the Watsonville Plant that can be effectively utilized is approximately 4,000 acre-feet per year.

The 2005 estimated cost of this series of projects is summarized in **Table 4.9**.

Table 4.9 - PVWMA Water Supply Projects

Project Element	Average Yield (acre feet per Year)	Capital Cost (Million Dollars)
Conservation	5,000	$1
Harkins Slough / Murphy Crossing	3,000	$10
Water Recycling	4,000	$17
Coastal Distribution System	-	$27
Inland Distribution System	-	$16
Total	12,000	$71

Section 5 - Water Supply Reliability and Water Shortage Contingency Planning

#5. An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions (10620(f)).
#23. For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable (10631(c)(2)).

The City has incorporated a number of resource maximization tools into the management and operation of the water utility. The City's main emphasis is in water conservation as detailed in **Section 6 - Demand Management Measures** of this report. City coordination with the Pajaro Valley Water Management Agency (PVWMA) on the basin management plan is aimed at reducing the current overdraft. This will help reduce the amount of water potentially required for basin management through importation from outside wholesalers or regions.

The City does not import or buy water from any other sources. It relies solely on the groundwater in the Pajaro Valley Basin and the surface water from Corralitos Creek and Browns Creek in the Pajaro River watershed.

Fourteen groundwater wells currently provide the City with an approximate average of 6,850 acre-feet of water per year [3]. All City water is treated at each well site and meets or exceeds State and Federal drinking water standards.

The City enjoys pre-1914 water rights on Corralitos and Browns creeks, north of the City limits. The surface diversions are piped to the Corralitos Filter Plant (CFP) and are treated via slow sand filtration and disinfection. The CFP averages approximately 900 acre-feet of water per year, though it has a capacity of 2,400 acre-feet per year. Its operation is limited by the amount of surface water available in the Corralitos and Browns Creeks. At the Eureka Canyon Intake minimum bypass flows must be maintained by the City to allow for fish passage. The CFP operates seasonally, typically starting in late spring through the fall. During the rainy season the CFP is usually shut down due to the high turbidity of the intake water. Higher turbidity waters are not conducive to the efficiency of a slow sand filtration plant so a creek water turbidity of 10 NTU or less is desired. Only when these conditions are being met does the City collect and treat surface water for distribution.

The City has operated without the CFP for extended periods of time. When it was severely damaged during the 1989 Loma Prieta Earthquake it was placed offline and did not resume full operation until 1996.

[3] Based on years 1992-2000.

Table 5.1 (UWMP Table 29) Factors resulting in inconsistency of supply							
Water supply sources [1]	**Specific source name, if any**	**Limitation quantification**	**Legal**	**Environmental**	**Water quality**	**Climatic**	**Additional information**
Supplier-produced groundwater		**none**	**none**	**none**	**none**	**none**	
Supplier-produced surface water	**Browns, Corralitos Creeks**	**2,400**	**none**	**none**	**High turbidity**	**Severe drought**	
Units: *acre-feet per year* [1] *From Table 4.1.*							

#37. Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster (10632(c)).

The City has made a number of preparations to provide water during emergencies. Historically, the most common emergencies have been regional power outages and earthquakes. The City has learned from its experience of the 1989 Loma Prieta earthquake, and has taken many steps since then to prepare for similar situations. The City's *Water Supply and Distribution System Emergency Response Plan* is included in **Appendix C**.

The City water system is designed as a network, so that if one source of water or zone is damaged, water can be supplied from another area of the City. Additionally, each area within the service system is served by multiple wells, thus limiting dependence on a single supply source. Nearly all source water sites are equipped with emergency back-up generators and fuel tanks that will keep the system operational during emergencies for at least 1-3 days depending on the site; this time can be extended indefinitely by refilling fuel tanks.

Table 5.2 – Emergency Response	
Possible Catastrophe	**Summary of Actions**
Regional Power Outage	Activate and monitor the generators and direct drive equipment for proper operation.
Earthquake	Assess what system components are unavailable. Isolate and substitute an alternate source

#38. Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning (10632(d)).

#39. Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply (10632(e)).
#40. Penalties or charges for excessive use, where applicable (10632(f)).
#41. An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments (10632(g)).
#42. A draft water shortage contingency resolution or ordinance (10632(h)).
#43. A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis 10632(i).

Water Shortage Contingency Ordinance/Resolution

The City adopted a "No-Waste" Ordinance in 1992. This ordinance is described in Demand Management Measure 13. The City has developed the following plan to deal with water shortages.

Stages of Action

The City has developed a five-stage rationing plan, **Table 5.8**, to invoke during declared water shortages. During such shortages, the City will use the State's *Method 3, Urban Water Use Targets for Hydrologic Regions*, Central Coast value of 117 gallons per capita per day as its baseline usage. The plan is included in the draft *Resolution Declaring a Water Supply Emergency and Establishing Water Use Reductions* (**Appendix D**). The draft resolution has not been adopted or incorporated into an ordinance, but is ready for City Council action if necessary. It is important to note that the Supply and Demand Comparison Section of this report shows that a water shortage for the City of Watsonville is highly unlikely over the next 20 years due to the stable supply of groundwater and the City's groundwater pumping and distribution capacity.

Mandatory Prohibitions on Water Wasting

The City of Watsonville "No Waste" Ordinance is included under **Section 6 - Demand Management Measure M**. It includes prohibitions on various wasteful water uses such as lawn watering during mid-day hours, excessive washing of sidewalks and driveways with potable water, and allowing plumbing leaks to go uncorrected.

The following is a brief summary of the action levels. See **Appendix D** for more details.

Level One

Level One occurs when the differential between actual or predicted supply and the theoretic maximum day requires a reduction in consumption of zero to sixteen percent. Level one actions consist of those already taken by the City's conservation efforts previously described in Demand Management Measures section of this report. The goal is to reduce residential consumption to 98 gallons per person per day.

Level Two

Level Two occurs when the differential between actual or predicted supply and the theoretic maximum day requires a reduction in consumption of 17 to 20 percent.

- Continuance of Level One actions.
- Provide messages in restaurants, restrooms, and other public places.
- Reduce residential consumption from 98 gallons per person per day to 94 gallons per person.
- Cease water used in training exercises.
- Expand irrigation conservation information.

Level Three

Level Three occurs when the differential between actual or predicted supply and the theoretic maximum day requires a reduction in consumption of 21 to 22 percent.

- Continuance of Level Two actions.
- Stop use of fountains.
- Prohibit water using air conditioners or coolers.
- Reduce residential consumption to 91 gallons per person per day.
- Mandatory promotion of low-flow fixtures.
- Mandatory school program.
- Mandatory irrigation program.

Level Four

Level Four occurs when the differential between actual or predicted supply and the theoretic maximum day requires a reduction in consumption of 23 to 26 percent.

- Continuance of Level Three action.
- Reduce residential consumption to 87 gallons per person per day.
- No refilling of pools from evaporation.
- No vehicle washing.
- Landscape watering every fourth day.
- Leak repair within one hour.
- Cease letters of water availability and collecting connection charges.

Level Five

Level Five occurs when the differential between actual or predicted supply and the theoretic maximum day requires a reduction in consumption of at least 27 percent.

- Continuance of Level Four actions.
- Water Rationing to 85 gallons per day per person.
- Landscape irrigation every fourth day but limited by Ration amount.
- No outdoor cleaning with water.
- No new water connections without a Building Permit and previously paid connection charges.
- Rationing established by owner returned affidavit of residents in the home.
- $10 per 100 cubic foot penalty for exceeding ration.

Monitoring Program

1. Water Level Monitoring (City Facilities)
The Utilities Department is charged with the determination of the available supply and calculation of the Maximum Day Demand. The Department will monitor its wells and surface water sources to determine any losses in capacity that cannot be mitigated through rehabilitation of the facility.

2. City will coordinate its water supply determination efforts with the PVWMA.

Analysis of Revenue Impacts of Reduced Sales During Shortages

The City of Watsonville has not conducted a formal study on the financial impacts of the water shortage contingency plan. Under a prolonged water shortage scenario, such as a drought, the City would anticipate expenses to increase as a result of actions to augment water supply and to reduce consumer use. The City has set up a Water Conservation Fund to cover the expenses associated with implementing all levels of the water shortage contingency plan.

New development projects within the City Water Service Area are required to pay a groundwater impact fee to the City along with their water connection charges. The impact fee was established by calculating the cost of retrofit facilities necessary to mitigate the water demands of the new development. The City assigns the impact fees collected to the Water Conservation Fund, which also finances the water conservation programs and water use reduction projects.

Reduction Measuring Mechanism

Under normal water supply conditions, automated flow meters and a computer network record potable water production figures continuously. The Water Operations Manager tracks totals regularly.

If it is determined that a Level 2 or greater rationing stage is in effect, the City may begin instituting mandatory prohibitions. Examples of these are listed in **Table 5.3**. During a Level 1 or 2 water shortage, weekly production figures will be reported to the Director of Public Works and Utilities. The Director will compare the weekly production to the target weekly production to verify that the reduction goal is being met.

During a Level 3 through 5 water shortage, the procedure listed above will be followed, with the addition of a daily production report to the Director. During emergency shortages, production figures will be reported to the Director as often as requested.

Table 5.3 - (UWMP Table 36) Water shortage contingency — mandatory prohibitions	
Examples of Prohibitions	**Stage When**
No Water Use In Fire Training Exercises	Level 2
No Water Fountains	Level 3
No Water Using Air Conditioners and Coolers	Level 3
No refilling pool for water lost due to evaporation	Level 4
No vehicle washing	Level 4
Cease letters of water availability or collection of new connection charges.	Level 4
Landscape Irrigation every fourth day only	Level 4
No outdoor cleaning with water	Level 5
No new connections without building permit and previously paid connection charge.	Level 5

Table 5.4 - (UWMP Table 37) Water shortage contingency — consumption reduction methods		
Consumption	**Stage When**	**Projected Reduction %**
Messages in Restaurants, Restrooms and Other Public Places	Level 2	Unknown
Expand Irrigation Conservation Information	Level 2	Unknown
Mandatory Irrigation Conservation Program	Level 3	Unknown
Mandatory Vehicle Washing Ban	Level 4	Unknown
Landscape Watering Every Fourth Day	Level 4	Unknown
No Outdoor Cleaning With Water	Level 5	Unknown
Landscape Irrigation Every Fourth Day, and Limited to Ration Amount	Level 5	Unknown

Table 5.5 - (UWMP Table 38) Water shortage contingency — penalties and charges	
Penalties or Charges	**Stage When Penalty Takes Effect**
$10 per 100 cubic feet above 85 gpd/person	Level 5

#52. The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability (10634).

Water Quality

Based on review of water quality monitoring data ranging from 1990 to the present, there are no significant changes in the City's primary or secondary water quality standards. Overall groundwater quality is very good and water quality objectives are achieved in all wells. As such, the City does not believe that water quality will be an impact on the reliability of its water supplies.

The City will strictly follow the requirements established by federal and state regulatory agencies and ensure that it continues to deliver high quality drinking water.

> *#22. Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following: (A) an average water year, (B) a single dry water year, (C) multiple dry water years (10631(c)(1)).*

Climatalogical Considerations

Tables 5.6 and **5.7** show the effects of a single dry year and multiple dry weather years. Surface water comprises only about 10% of the total water supply. In the event of a drought or breakdown of the surface water filtration plant, such as occurred from 1989 through 1996, the City would depend more heavily on groundwater. City wells are not currently run at full capacity, and can supply additional water when needed. The maximum safe yield is the quantity of water that can be produced from the City groundwater system, based on the historical production capacity of the aquifer and the pumping capacity of the well equipment. **Table 5.9** assumes no surface water is available in the dry water years, and that groundwater wells produce at the maximum safe yield.

The City is able to supply its customers with adequate water through several years of drought. However, during drought conditions, the City would also make significant increases in its water conservation program. The City uses about 10% of the groundwater in the Pajaro Valley Basin, and would take all possible action to reduce the demand on the already over-drafted groundwater basin. The City will continue to work cooperatively with the PVWMA to find additional water supply options.

Using the guidelines of DWR, the City will reference **Table 5.6** when determining drought conditions:

Average Year = 20.07" inches of rainfall.

- **Year 2004** is considered the reference **average year** as it is the median year for rainfall over a 30 year period (from 1980 to 2010).

Single Dry Year = 10.66" inches of rainfall.

- **Year 1976** is considered the reference **single dry year** as it is the lowest recorded year of rainfall since 1903 (http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca9473).

Multiple Dry Year period = 14.79" average inches of rainfall.

- **Years 1989-1992** is considered the reference **multiple dry year** period. This is the period generally considered to be the lowest average runoff for a consecutive multiple year period (three years or more) for a watershed since 1903. The two longest droughts in California history are considered to be 1987-1992 and 1923-1935.

Table 5.6 - (UWMP Table 27) Basis of water year data	
Water year type	**Base year(s)**
Average Water Year	**2004**
Single-Dry Water Year	**1976**
Multiple-Dry Water Years	**1989 - 1992**

During past dry water year events more water was used in previous dry water years than is typically used in a normal water year. See **Table 5.7.** This shift can be attributed to the success of water conservation measures and changes in water usage among other things. The City can provide reliable water supplies not only under normal conditions but also under both the single driest year and the multiple dry year events.

Table 5.7 - (UWMP Table 28) Supply reliability — historic conditions					
Average / Normal Water Year	**Single dry water**	**Multiple Dry Water Years**			
2004	**1976**	**1989**	**1990**	**1991**	**1992**
7,295	**Unknown**	**7,761**	**7,325**	**6,691**	**6,860**
Percent of Average / Normal Year	**-**	**106.4%**	**101.4%**	**91.7%**	**94.0%**
Units: acre-feet per year					

#35. Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage (10632(a)).

Table 5.8 - (UWMP Table 35) Water shortage contingency — rationing stages to address water supply shortages		
Stage No.	**Water Supply Conditions**	**% Shortage**
Level 1	**Demand exceeds supply by 0 - 16 %**	**0-16**
Level 2	**Demand exceeds supply by 17 - 20 %**	**17-20**
Level 3	**Demand exceeds supply by 21 - 22 %**	**21-22**
Level 4	**Demand exceeds supply by 23 - 26 %**	**23-26**
Level 5	**Demand exceeds supply by > 27 - 50 %**	**> 27**
[1] *One of the stages of action must be designed to address a 50 percent reduction in water supply.*		

#36. An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply (10632(b)).

Based on the multiple dry year scenario, **Table 5.9** shows the water supply available. It is presumed that no surface water would be available.

Table 5.9 – (UWMP Table 31) Supply reliability — historic conditions				
Water Supply Sources [1]	Average / Normal Water Year Supply [2]	Multiple Dry Water Supply [2]		
		Year 1	Year 2	Year 3
Supplier-produced groundwater	21600	21600	21600	21600
Supplier-produced surface water	2400	0	0	0
Percent of normal year:	100.00%	90.0%	90.0%	90.0%

Units: acre-feet per year

[1] *From Table 4.1*

[2] *See Table 5.6 for basis of water type years.*

> *#53. Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier (10635(a)).*

Tables 5.10 - 5.12 illustrate the City's water supply and demand projected through 2035 in times of an average year, single dry year, and multiple dry years. This projection is based on the availability of 24,000 AFY during normal rainfall years from the City's groundwater and surface water sources respectively.

Table 5.10 - (UWMP Table 32) Supply and demand comparison — normal year					
	2015	2020	2025	2030	2035
Supply totals (from Table 4.1)	24,000	24,000	24,000	24,000	24,000
Demand totals (From Table 3.10)	7,737	7,878	8,086	8,267	8,333
Difference	16,263	16,122	15,914	15,733	15,667
Difference as % of Supply	67.8%	67.2%	66.3%	65.6%	65.3%
Difference as % of Demand	210.2%	204.6%	196.8%	190.3%	188.0%

Units are in acre-feet per year.

Table 5.11 - (UWMP Table 33) Supply and demand comparison — single dry year					
	2015	2020	2025	2030	2035
Supply totals	21,600	21,600	21,600	21,600	21,600
Demand totals [1]	7,737	7,878	8,086	8,267	8,333
Difference	13,863	13,722	13,514	13,333	13,267
Difference as % of Supply	64.2%	63.5%	62.6%	61.7%	61.4%
Difference as % of Demand	179.2%	174.2%	167.1%	161.3%	159.2%

Units are in acre-feet per year.
[1] The urban water target determined in this UWMP will be considered when developing the 2020 water demands included in this table.

Table 5.12 - (UWMP Table 34) Supply and demand comparison — multiple dry-year events						
		2015	2020	2025	2030	2035
Multiple-dry year first year supply	Supply totals [1,2]	21,600	21,600	21,600	21,600	21,600
	Demand totals [2,3,4]	7,737	7,878	8,086	8,267	8,333
	Difference	13,863	13,722	13,514	13,333	13,267
	Difference as % of Supply	64.2%	63.5%	62.6%	61.7%	61.4%
	Difference as % of Demand	179.2%	174.2%	167.1%	161.3%	159.2%
Multiple-dry year second year supply	Supply totals [1,2]	21,600	21,600	21,600	21,600	21,600
	Demand totals [2,3,4]	7,737	7,878	8,086	8,267	8,333
	Difference	13,863	13,722	13,514	13,333	13,267
	Difference as % of Supply	64.2%	63.5%	62.6%	61.7%	61.4%
	Difference as % of Demand	179.2%	174.2%	167.1%	161.3%	159.2%
Multiple-dry year third year supply	Supply totals [1,2]	21,600	21,600	21,600	21,600	21,600
	Demand totals [2,3,4]	7,737	7,878	8,086	8,267	8,333
	Difference	13,863	13,722	13,514	13,333	13,267
	Difference as % of Supply	64.2%	63.5%	62.6%	61.7%	61.4%
	Difference as % of Demand	179.2%	174.2%	167.1%	161.3%	159.2%

Units are in acre-feet per year.
[1] Consider the same sources as in Table 4.1. If new sources of water are planned, add a column to the table and specify the source, timing, and amount of water.
[2] Provide in the text of the UWMP text that discusses how single-dry-year water supply volumes were determined and amount of water.
[3] Consider the same demands as in Table 3.10. If new water demands are anticipated, add a column to the table and specify the source, timing, and amount of water.
[4] The urban water target determined in this UWMP will be considered when developing the 2020 water demands included in this table and amount of water.

Section 6 - Demand Management Measures

#26. (Describe and provide a schedule of implementation for) each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following:
(A) water survey programs for single-family residential and multifamily residential customers;
(B) residential plumbing retrofit;
(C) system water audits, leak detection, and repair;
(D) metering with commodity rates for all new connections and retrofit of existing connections;
(E) large landscape conservation programs and incentives;
(F) high-efficiency washing machine rebate programs;
(G) public information programs;
(H) school education programs;
(I) conservation programs for commercial, industrial, and institutional accounts;
(J) wholesale agency programs;
(K) conservation pricing;
(L) water conservation coordinator;
(M) water waste prohibition;
(N) residential ultra-lowflush toilet replacement programs (10631(f)(1) and (2).

The City of Watsonville is committed to water conservation and water recycling programs, two important elements of any water resources strategy developed for the Pajaro River watershed. The City has made a good faith effort to promote such efforts in a variety of ways including; public education methods, the use of local print and electronic English and Spanish language media, articles in the City's quarterly newsletter, and inserts in the City utility bills. Furthermore, the City evaluates its programs on an ongoing basis and will be proactive in implementing changes and/or additions to the following fourteen **Demand Management Measures (DMMs).** Each DMM is listed with their descriptions and level of performance.

A. Water Survey Programs for Single Family Residential and Multi Family Residential Customers

Since 1992, the City has offered water audits for residential customers who request them when confronted with unusually high water bills. No data is available regarding the number of water audits conducted prior to 2008. The City generally focuses its limited resources on more general education programs, since they have proven to more efficiently reach a larger number of people. In addition, the City offers free plumbing accessories to help reduce and conserve residential water usage.

In 2006, the City began to conduct water use surveys of single family and multiple family residential customers in an attempt to identify the top water users in single family and multiple family residential units. Following a survey of exterior and indoor water uses, City staff may provide recommendations to the customers regarding ways to reduce water consumption. Specific survey activities may include, but are not limited to:

- Checking for leaks.
- Installation of low flow showerheads and faucet aerators.
- Identifying high use water fixtures and providing information on opportunities to replace such units with water conserving units.
- Evaluating exterior water uses.
- Providing information on low water use landscaping.
- Recommending adjustments to irrigation system controls.
- Providing site-specific recommendations for water efficient and pollution prevention landscaping practices.

Table 6.A - Water Survey Programs including Toilet retrofits

	2006	2007	2008	2009	2010
Number of Single and Multi Family Residential Surveys	750	640	725	746	750
Costs	$75,000	$64,000	$72,500	$95,243	$100,343
Projected Water Savings (Acre Feet/Year) *	30	25.6	29	28.9	29.7

* Each survey is estimated to save 25 -35 gallons per day (0.028 - 0.040 AFY)

In a measure to evaluate the effectiveness of DMM A City staff will conduct surveys on an ongoing basis and will periodically follow-up and analyze water use of customers who already have been surveyed.

The City has $130,000 budgeted per year for DMMs A and B.

B. Residential Plumbing Retrofit

In 1992, the City started providing residents with free plumbing retrofit kits that included low-flow showerheads and hose nozzles. Kitchen and bathroom faucet aerators have since been made available as well. A bilingual brochure for this program (included in the **Appendix E**) is sent out regularly with the City utility bills. All items are offered to City residents and available to be picked up at the City's Utility Payment Center. The City also presents these items to its customers at various community events and fairs. At these events, the City also distributes water use surveys and conservation educational materials. On average, the City distributes 1,850 showerheads, 800 hose nozzles, 1,200 kitchen aerators and 1,000 bathroom aerators each year over the past five years.

The City conducted a summer and fall door-to-door educational campaign in 2000 and 2004. Bilingual student interns visited over 4,000 homes and gave residents a presentation about the local groundwater overdraft situation, and ways they could conserve water. Residents received a low-flow showerhead, a hose nozzle, and water conservation brochures. The presentation also included information on recycling and stormwater pollution prevention. In recent years the City has focused on presentations to larger groups and the general public at community events. Because of the positive feedback from the community, the City hopes to re-launch its door-to-door effort in the future.

Free Residential Retrofit Program

In 2006, City Council approved the implementation of a free residential retrofit program. This program allows any homeowner in the City water system to sign up for a free water conservation inspection and retrofit by contacting the Customer Services Division. The inspection is conducted by an approved contractor, who will identify which fixtures need to be replaced. The contractor will arrive at the property with all necessary tools and fixtures, including ultra low flow toilets.

Table 6.B - Toilet Replacement Program

	2006	2007	2008	2009	2010
Number of Residential Toilets	750	640	725	690	725
Costs ($100 per toilet)	$75,000	$64,000	$72,500	$69,000	$72,500
Projected Water Savings AF/Y *(0.04 AF/Unit)*	30.0	25.6	29.0	27.6	29.0

Several studies suggest that water use savings resulting from miscellaneous interior retrofit fixtures can range between 25 and 65 gallons per day per housing unit. The studies also suggest that installation of retrofit fixtures in older single-family homes tend to produce more savings, while newer multi-family homes tend to produce fewer saving per housing unit.

The City has $130,000 budgeted to cover water conservation devices and brochures per year for this program and DMM A.

C. System Water Audits, Leak Detection, and Repair

Description: The City routinely conducts distribution system water audits, leak detection, and repair. The City has permanently incorporated these programs into its utility operations.

City staff reviews and compares the water production records and water metered records annually. Over the last 10 years the annual "unaccounted" for water losses average **6.55%.** The City's unaccounted-for water rate is below the ten percent limit set forth by the California Urban Water Conservation Council (CUWCC) in its *Memorandum of Understanding Regarding Urban Water Conservation Best Management Practices* (MOU) in 1992.

Table 6.C.1 - Unaccounted for Water
(in Million Gallons)

Year	Produced	Metered out	% Unaccounted
2010	2428.8	2262.3	6.86
2009	2528.8	2411.2	4.65
2008	2869.2	2662.6	7.20
2007	2812.4	2618.7	6.89
2006	2578.9	2366.4	8.24
2005	2467.8	2288.3	7.27
2004	2542.8	2377.1	6.52
2003	2487.8	2306.1	7.30
2002	2503.4	2373.1	5.20
2001	2481.4	2347.6	5.39

The Field Services division of Public Works inspects and repairs all water service mains in the service area. Leaks on either service lines or main-lines are repaired in a timely manner. Following is a summary of their work over the last five years.

Table 6.C.2 - Distribution lines Maintenance and Costs

	2006	2007	2008	2009	2010
Miles Of Mains Maintained	172	176	177	177	177
Number of Service Connection Breaks / Leaks	85	59	55	69	57
Number of Main Breaks / Leaks	10	16	6	14	7

Funds for this program are included in the annual operations and maintenance budget.

D. Metering with Commodity Rates for all new Connections and Retrofit of Existing Connections

The City is fully metered for all customer sectors, including separate meters for single-family and multi-family residential, commercial, large landscapes, and all institutional/governmental facilities. Metering is an effective conservation measure that directly associates cost with the amount of water used. It also provides the means for the City to identify and monitor high use customers.

The City will continue to install and read meters on all new services. To help ensure that the water is metered correctly, the City has a proactive meter calibration and replacement program. Small meters (1 inch or less) are replaced at 20 year intervals. Large meters (1½ inch and greater) are replaced at 15 year intervals. Meter installation costs are part of new service connection fees.

The City Utility Code requires irrigation water meters for all large landscape customers (greater than 5,000 square feet), to separate outside from interior water use, and easily allow recycled water conversions. During water shortages, this will help develop equitable rationing allocations for non-residential customers with both interior and landscape uses.

The City has an inclining multi-block rate structure, with four tiers. See DMM K.

Periodic reviews of customer water use are done to evaluate the effectiveness of this measure, comparing current water use per capita with historic data. Studies have shown that metered accounts may result in a 20% reduction in demand, compared to non-metered accounts.

E. Large Landscape Conservation Programs and Incentives

In 2000, the Watsonville Municipal Code was revised to guide new development within the City, and to shape water conservation programs. These programs have since been superseded by the California Water Efficient Landscape model ordinance (WELO) which the City enforces. The City intends to adopt its own WELO in 2011, which will be consistent with the State model.

The following elements were incorporated into the Municipal Code:

Sec. 6-3.433. Water Conservation in Development . *(§ 1, Ord. 1088-00 C-M, eff. April 14, 2000)*

All development shall utilize water conservation, water recycling, and xeriscaping to the maximum extent possible.

Sec. 6-3.434. Landscape Water Meters . *(§ 1, Ord. 1088-00 C-M, eff. April 14, 2000)*

Separate landscape water meters shall be required in locations with a combined landscaped area greater than five thousand (5,000) square feet.

Sec. 6-3.435. Landscape Irrigation Systems . *(§ 1, Ord. 1088-00 C-M, eff. April 14, 2000)*

Irrigation systems shall be designed and maintained to avoid run-off, over-spray, low head drainage or other similar conditions where water flows to waste.

Sec. 6-3.436. Turf Restrictions . *(§ 1, Ord. 1088-00 C-M, eff. April 14, 2000)*

Turf shall not be used in median strips, parking islands, or in areas less than eight (8) feet wide, or on slopes that will result in excess irrigation water run-off. These limitations may be exempted if required for storm water erosion control by the Public Improvement Standards.

Sec. 6-3.437. Water Use in Landscaped Areas . *(§ 1, Ord. 1088-00 C-M, eff. April 14, 2000)*

Water use, in combined landscaped areas greater than five thousand (5,000) square feet, shall be monitored for comparison to the Maximum Applied Water Allowance (MAWA)[4]. Landscaped areas with water use lower than or equal to the MAWA shall be designated as water efficient. Landscaped areas with water use greater than MAWA will require an audit. The Director shall determine the appropriate mitigation measure to reduce water usage so as not to exceed the MAWA. Failure to implement such mitigation measure is a violation of this Code.

The City has also adopted a Water smart gardening program and encourages all landscape professionals and residents to use its Online Gardening Tool (see **Appendix E**). This informational website allows one to view local water smart gardens for design ideas. Additionally, the City sponsors a Landscape Water

[4] **MAWA**. This is the upper limit of the annual allowed water for an established landscape area. The calculated number is based upon the size of the Landscape and evapotranspiration (ETo).

Conservation (LWC) Program service tool. Commercial and residential water users have successfully implemented many of the water use efficiency tips to save water and money.

The City is working on an irrigation control system that considers weather and ETo conditions to reduce water consumption for large landscaped areas such as parks and landscaped medians. To date, there are five weather based irrigation controllers at four City properties. These include the City Plaza (2), Crestview Park (1), City Hall (1), and Pinto Lake Park (1).

The City has permanently incorporated DMM E into its ordinances. Public Works staff checks all new development and redevelopment projects for compliance with the State of California WELO. No data is available for landscape conservation activities conducted prior to 2005. In the last four years, 3 projects of 5000 square feet or more were reviewed by City staff and subsequently constructed. They were in compliance with the ordinance. Several other projects were reviewed but never built.

A segment of the Public Works Engineering budget is set aside for DMM E.

Water use at surveyed locations will be checked at the follow-up visits as part of the current LWC program and to assess the program's efficacy. It is the program's goal of continuing to evaluate the top 10% of water users.

F. High-efficiency Washing Machine Rebate Programs

The City initiated a high-efficiency clothes washer rebate program in 2001 and provides a $100 rebate for customers who purchase a high efficiency washer. The City continues to promote this program in both newsprint and City newsletters (see **Appendix E**) and has provided rebates for more than 1500 high efficiency washers since the program's inception.

Table 6.F - Washing Machine Program					
	2006	**2007**	**2008**	**2009**	**2010**
Actual Number of Washers	332	201	153	132	249
Costs ($100 per washer)	$33,200	$20,100	$15,300	$13,200	$24,900
Estimated Water Savings AF/Y *(0.0184 AF/Unit)**	6.1	3.7	2.82	2.43	4.58
***Based on 400 loads of laundry year, 38% savings on water use (40 gallons/load vs. 25 gallons/load)**					

The annual budget is $30,000 for the rebate program. The City will allocate more funds when necessary.

G. Public Information Programs

The City has provided water conservation information to the public since 1995 in the following ways:

- Bilingual water conservation tips and brochures are included in the City utility bills. Copies of the brochures are included in **Appendix E**.
- The City regularly publishes newspaper advertisements promoting water conservation and promotes feature stories in the local newspapers about water conservation. The City also participates, along with all of the other local water purveyors, the PVWMA and the County of Santa Cruz, in an education project designed to raise awareness about important water issues.
- City staff participates in local events including the annual Santa Cruz County Fair, the Strawberry Festival at Monterey Bay, Día de los Niños event, Cinco de Mayo celebration, and Fourth of July parade. Educational activities and information are provided for children and adults.
- The City implemented a door-to-door educational campaign. See DMM B.
- The City provides videos and books to the Watsonville Public Library on water conservation.
- The City has co-funded the Green Gardener Certification Program at the Watsonville Adult School since 2008, which has graduated 90 landscape maintenance professionals that live and/or work in the Pajaro Valley. Irrigation related classes in the Green Gardener program include water-wise plant selection, soil and water relationships, efficient irrigation scheduling, and irrigation system troubleshooting.
- The City collaborated with other local water agencies to develop the Watersmart Gardening website and CD. This interactive tool features low water-use plants and allows users to create customized plants list that are suitable for their particular sites.
- The LWC program has developed several publications that are given to customers during site evaluations. These publications contain specific information about maintaining landscapes with resource efficient and pollution prevention practices along with local resources for efficient irrigation equipment and sustainable landscaping services.

The City has made an effort to promote its web site as a reference tool and guide for all of its water conservation programs. The City's Public Works and Utilities site (http://www.watsonvilleutilities.org) provides users with the most recent documents and links to the myriad of conservation programs available to them.

The City will continue to provide information services and materials to inform the public about water conservation and other resource issues. The City will track the public's commentary regarding the information provided to evaluate effectiveness.

Table 6.G - Public Information Programs					
	2006	2007	2008	2009	2010
Newspaper Ads	4	4	4	4	4
Bill Inserts	1	1	1	1	1
Special Events	5	5	5	5	5
Website	continuous	continuous	continuous	continuous	continuous
Presentations To Civic Organizations	2	2	2	2	2
City Newsletter	1	1	1	1	1
Costs	$13,000	$13,000	$13,000	$13,000	$13,000

The annual budget for these programs is $15,000 (from the Water Conservation Fund) for staff and materials.

H. School Education Programs

The City employs one full time Environmental Education Coordinator who provides classroom presentations and field trips to twenty five schools in the City of Watsonville water service area. Water curriculum and videos are also provided at each school site. On average, more than 3,000 students, teachers, and parents participate in the program each year. The grade-leveled program has been designed to increase water conservation awareness and behavior in Watsonville students and their families. The program is structured as follows:

- Fourth graders visit the new Wetlands of Watsonville (WOW) Nature Center and trail system. The WOW program provides the public with strategies for watershed protection.
- Fifth graders learn about water conservation when they visit the surface water intake, Corralitos slow sand filter plant, and a groundwater well. Models of a water filter and groundwater well are created. Students learn specific strategies to conserve water and are encouraged to teach their families to save water at home. A re-usable water bottle is provided to better appreciate that City's tap water meets or exceeds all federal and state guidelines for drinking water.
- Sixth graders experience a field trip that focuses on wastewater recycling and pollution prevention. Students learn how they can limit watershed pollution in their neighborhood and view firsthand how the City protects the watershed through treatment of wastewater. Students and parents witness how the City conserves water on a larger scale through the recycling of wastewater.
- *Our Water Works in Santa Cruz County: An Activity Guide about our Fresh Water Resources* is provided free of charge for every fifth and sixth grade student in the City's water service area. The booklet is tied with California education content standards and is in large demand from public and private schools

The City will continue to implement DMM H at the levels described. The City will continue to track attendance as well as survey the institutions and educators to better understand how the programs, materials, and activities have served them.

The City has not developed a method to quantify the savings of DMM H but believes that this program is in the public's interest.

Table 6.H - School Education Programs
Number of Participating Students per Academic Year

	2005-2006	2006-07	2007-08	2008-09	2009-10
4th – 6th	2,844	2,485	2,794	2,592	2,677
Parents / Teachers	344	595	399	324	345

The annual budget is $98,500 for staff and materials.

I. Conservation Programs for Commercial, Industrial, and Institutional Accounts

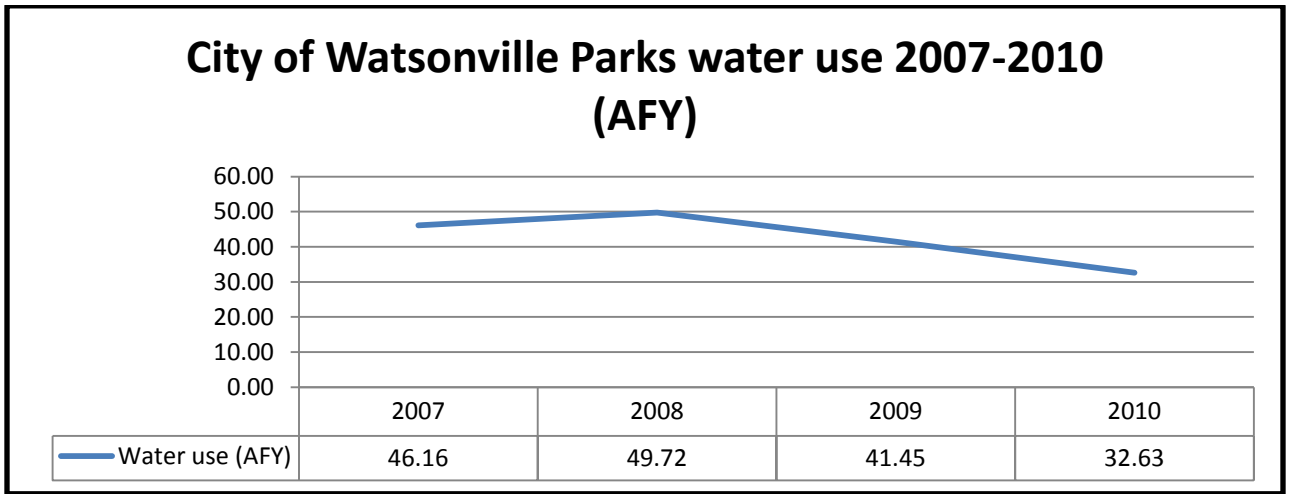
The City's Source Control Program (part of the Wastewater Enterprise) works with commercial and industrial users to reduce water use. Annual inspections of the larger industrial facilities (wastewater flows > 25,000 GPD) focus on pollution prevention and water conservation. Water use by industrial and large commercial users is measured monthly.

The City also inspects some of its institutional accounts (i.e. City parks) using the following two steps:

1. Find projected savings: Compare pre-audit Commercial and Parks irrigation accounts to MAWA/budgets.
2. Find actual savings: Compare pre- and post- audit Commercial and City Parks irrigation accounts.

Table 6.I – Commercial Water Survey Programs			
	2008	**2009**	**2010**
Number of Commercial Surveys	**-**	**14**	**29**
Number of Institutional (City parks) Surveys	**4**	**9**	**5**
Costs	**n/a**	**$26,243**	**$27,843**

The chart below represents a 29% decrease in water use from 2007 to 2010 at thirteen of the City's parks properties, a total water savings realization equivalent to over 13.5 AFY.



The annual budget for this program is $28,000 for staff and consultants.

J. Wholesale Agency Programs

As the City of Watsonville is not a wholesaler of water, DMM J is not applicable to the City of Watsonville.

K. Conservation Pricing

Since 1995, the City has had an inclining multi-block water rate structure. A billing unit is one hundred cubic feet (748 gallons), commonly abbreviated CCF. The City has implemented a tiered rate structure, most recently revised in October 2010. The City will continue to evaluate the effectiveness of rate blocks and how to increase the financial incentives to conserve water.

Table 6.K – Water Rates

Inside City			Outside City		
Meter Size		**Oct-10**	**Meter Size**		**Oct-10**
5/8 & 3/4"	$	9.13	5/8 & 3/4"	$	12.96
1"	$	13.53	1"	$	18.99
1-1/2"	$	24.52	1-1/2"	$	29.03
2"	$	37.71	2"	$	41.14
3"	$	72.87	3"	$	85.98
4"	$	112.43	4"	$	107.48
6"	$	182.27	6"	$	210.17
8"	$	411.93	8"	$	471.72
10"	$	507.42	10"	$	580.35
Additional Connections					
Each	$	2.67		$	4.23
Non-residential Rate					
Per Ccf	$	1.58		$	2.10
Residential-Single & Multi Family Rate					
Tier 1 (1-8 Units)	$	1.47	Tier 1 (1-8 Units)	$	1.96
Tier 2 (9-11 Units)	$	2.09	Tier 2 (9-11 Units)	$	2.75
Tier 3 (12-15 Units)	$	2.80	Tier 3 (12-15 Units)	$	3.72
Tier 4 (Over 15 Units)	$	4.01	Tier 4 (Over 15 Units)	$	5.39
Irrigation					
Tier 1 (1-8 Units)	$	1.50	Tier 1 (1-8 Units)	$	1.96
Tier 2 (Over 8 Units)	$	2.09	Tier 2 (Over 8 Units)	$	2.75

The proposed annual budget is included in the Administrative Services personnel budget.

Annually, City staff can monitor the number of customers who show excessive water use.

The goal of DMM K is to decrease the customer's water use through price incentives.

L. Water Conservation Coordinator

The City employs an Environmental Projects Manager in charge of water conservation efforts. This position receives additional support from various groups within the Utilities Department including Water Operations, Customer Service (metering) and Engineering. Tasks include oversight and implementation of the conservation programs, program reporting, and communication of water conservation issues within the City organization and to the public.

The City assigns water conservation duties to several staff. The Environmental Project Manager serves as the water conservation coordinator, and works with other City staff to implement the listed DMMs. Another staff person (30% time) is assigned to the school water conservation education program, DMM H.

Table 6.L - Water Conservation Coordinator

	2006	2007	2008	2009	2010
Number of **Full-Time** Positions	0	0	1	1	1
Number of **Part-Time** Positions	0.5	0.5	0.3	0.3	0.3
Costs	$35,477	$37,344	$82,343	$82,343	$82,343

The City will continue to utilize existing Public Works staff to support this DMM. The funds for this role are included in Public Works personnel budget for staff time.

M. Water Waste Prohibition

The prohibitions upon water waste and use of non-essential water are authorized by Ordinance 884-92(CM) enacted February 11, 1992. The ordinance, included below, has been permanently incorporated into the City Utility Code. The Utility Code is used to guide new development within the City, and to shape water conservation programs. The City focuses its efforts on public education programs to promote water conservation activities, but will enforce the code and issue citations when necessary.

Reports of water wasting in the City service area are handled by the Customer Services Division. Customer Service Technicians are dispatched to respond to these notices. The most common reports are of people not using shut off nozzles when washing cars, or for irrigation systems that are poorly adjusted. City staff provides technical assistance to customers to help address water wasting. If measures are not corrected, notices of violation are issued and a timeline to correct the problem given. Fines are implemented for chronic offenders.

Sec. 6-3.432. Wasting of Water.

It is unlawful for any person to use water for any of the following:

I. Watering of grass, lawn, ground cover, shrubbery, open ground, crops, trees, including agricultural irrigation, or an indiscriminate running of water or washing with water in a manner or to an extent which allows water to run to waste.
II. Permit the loss of water through leaks, breaks, or malfunction within the customer's plumbing.
III. The use of a hose without a quick-acting positive shut-off nozzle.
IV. Maintenance or operation of any new ornamental fountain which does not re-circulate one-hundred percent (100%) of water used.
V. Operation of a new car wash that does not use the best available water conservation technology.
VI. Irrigation of turf, lawns, gardens or ornamental landscaping between 9:00 a.m. and 5:00 p.m. except by drip irrigation or hand watering with a quick-acting shut-off nozzle.

Sec. 6-3.435. Landscape Irrigation Systems .

Irrigation systems shall be designed and maintained to avoid run-off, over-spray, low head drainage or other similar conditions where water flows to waste.

Sec. 6-3.437. Water Use in Landscaped Areas .

Water use, in combined landscaped areas greater than five thousand (5,000) square feet, shall be monitored for comparison to the MAWA. Landscaped areas with water use lower than or equal to the MAWA shall be designated as water efficient. Landscaped areas with water use greater than MAWA will require an audit. The Director shall determine the appropriate mitigation measure to reduce water usage so as not to exceed the MAWA. Failure to implement such mitigation measure is a violation of this Code.

Budget and enforcement costs are a part of the Public Works Utility Department's overhead.

N. Residential Ultra-lowflush Toilet Replacement Programs

The City purchases the toilets (two styles) and contracts with an outside contractor, Central Coast Energy Services, to install them. Toilets marked 1.6 gallons per flush are not eligible for free replacement. This program has no income restrictions.

Since 1992, the City has offered a rebate of $100 per high flow toilet for replacement with a high efficiency toilet. This program is available to both residential and commercial customers. The City promotes this program regularly through newspaper advertising and mailing a brochure with the City utility bill, included in **Appendix E**. Over 3300 low-flow toilets have been installed through this program.

Table 6.N - Toilet Replacement Program					
	2006	**2007**	**2008**	**2009**	**2010**
Number of Residential Toilets	223	170	114	122	204
Costs ($100 per toilet)	$22,300	$17,000	$11,400	$12,200	$20,400
Projected Water Savings AF/Y *(0.04 AF/Unit)*	8.92	6.8	4.56	4.88	8.16

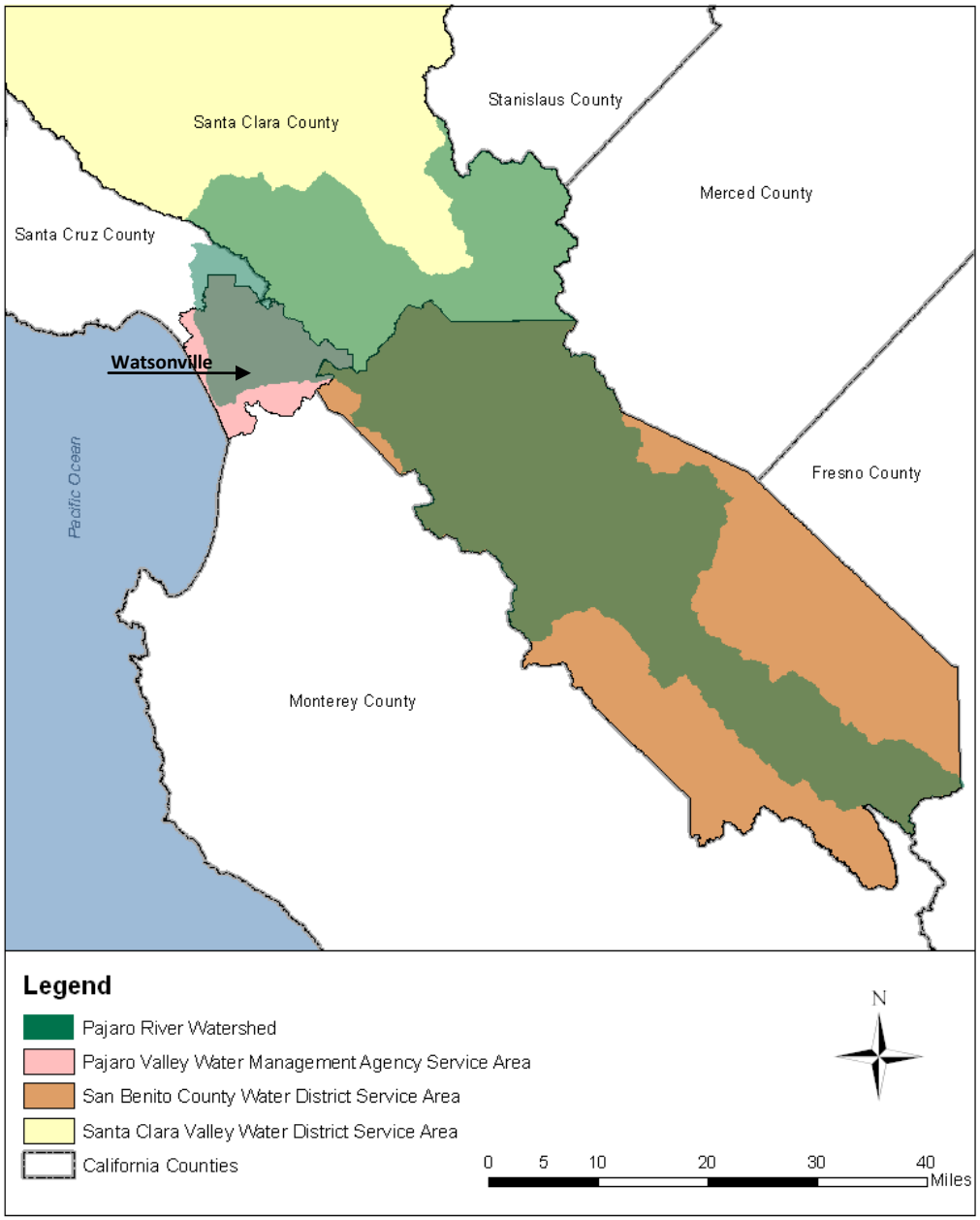
The annual budget is $30,000.

Section 7 - Climate Change

Introduction

The City of Watsonville is located within the Pajaro River Watershed Integrated Regional Water Management Plan (Pajaro IRWMP) boundaries as depicted in **Figure 7.1**. The Pajaro IRWMP Regional Water Management Group was awarded a one million dollar grant to update the IRWMP, conduct studies to fill data gaps, and enhance stakeholder outreach.

Figure 7.1. Pajaro River Watershed IRWMP Boundaries



The IRWMP update must address both adaptation to the effects of climate change and mitigation of Green House Gas (GHG) emissions for the region. The IRWMP must include the following items:

- A discussion of the potential effects of climate change on the IRWM region, including an evaluation of the IRWM region's vulnerabilities to the effects of climate change and potential adaptation responses to those vulnerabilities; and
- A process that discloses and considers GHG emissions when choosing between project alternatives.

The updated Pajaro IRWMP is scheduled to be completed in 2013 at which time the climate change analysis for the region can be incorporated into the City of Watsonville UWMP. However, there are opportunities for the City to develop a flexible water resources planning strategy in advance of the IRWMP regional climate change strategy. This section describes the City of Watsonville planning approach for a "no-regrets" strategy.

Background

Regional water supplies are expected to decline due to climate change. The City residents depend on an already overdrafted groundwater basin and could be vulnerable to changes that exacerbate those overdraft conditions. While the actual conditions of future climate change on the City are uncertain and vary based on the global climate models used, it is generally accepted that impacts have already occurred in the region and that these impacts are very likely to intensify in the future.

Most models predict drier conditions, on average, along the Central Coast of California. Future climate change evaluations for the region will include an assessment of the following environmental conditions:

- Temperature
- Precipitation
- Sea Level
- Vegetation
- Wildfires
- Storm Events

Each of these factors can affect the City's water supply conditions. Most critically, increased temperatures can lead to increased water use for both agricultural and urban water users, decreased precipitation can reduce groundwater infiltration, and increased sea levels can exacerbate seawater intrusion.

Exactly predicting these future conditions is not necessary for implementing responsible water management strategies that reduce vulnerabilities for the residents of the City. Planning for more frequent and/or severe drought is considered a "no-regrets" strategy. The region is already at risk from extended drought, seawater intrusion into coastal wells, and over pumping of groundwater. More frequent or severe drought conditions and potential increased water use would exacerbate these

conditions. Therefore, a “no-regrets” water resources planning strategy, regardless of climate change or uncertain climate change projections, would reduce vulnerabilities for the City residents.

The purpose of this strategy is to develop approaches for the City to reduce the potential impacts to the community resulting from climate change. As described in the 2010 UWMP Guidebook, approaches for responding to climate change generally take two forms: mitigation and adaptation. Mitigation is taking steps to reduce the contribution to the causes of climate change by reducing GHG emissions. Adaptation is the process of responding to the effects of climate change by modifying systems and behaviors to function in a warmer environment. Adaptation is considered a short term strategy because it does nothing to minimize the cause of climate change. However, an approach that implements both adaptation and mitigation can most significantly reduce the affects of climate change on the residents of the City of Watsonville. For example, the City is developing a surface water treatment project that maximizes the yield from the existing Corralitos Filter Plant (adaptation) and utilizes renewable solar energy to operate the facility (mitigation).

Additionally, the City can integrate these climate change strategies with other City objectives. For example, improving the efficiency of the Corralitos Filter Plant allows the City to preserve flow in the creek when most needed for the endangered fisheries and the renewable energy source reduces facility operation costs, which translate to reduced rates for City residents.

By implementing both mitigation and adaptation responses, the City of Watsonville can reduce the vulnerability of the city residents to droughts, but also contribute to the groundwater sustainability and agricultural preservation for the region.

This next section provides a summary of the mitigation and adaptation strategies that are or can be implemented by the City of Watsonville to reduce vulnerabilities to its residents. These strategies are a critical first step in what will need to be an ongoing process as the region progresses in its understanding of climate change, its impact on the region, and opportunities for responding to these changes and impacts.

Mitigation Measures

Increasing the amount of non-polluting, renewable energy is the primary opportunity for the City to implement a climate change mitigation measure. Renewable energy reduces GHG emissions and is important for mitigating climate change and reducing its long-term severity.

Utilizing Federal New Clean Renewable Energy Bond funds (NCREB), the City is installing solar panel arrays on four city buildings, **Table 7.1**. Bond payments will be paid through the Water Enterprise Fund. Installation is expected to begin in 2011.

Table 7.1 - Solar Projects		
	KWH generated	**DC KWH**
City Hall	148,848	106.425
Municipal Services Center	177,372	128.945
Materials Recovery Facility	49,539	36.08
Water Resources Center	170,130	122.59
total	**545,889**	**394.04**
Projected annual savings in kg of CO_2	**610,667**	

The City is incorporating the use of renewable solar electricity into its Corralitos water supply project designs. This new Corralitos Creek Water Supply and Fisheries Enhancement Project will host solar panels providing approximately 65% of the electricity needed to operate, estimated at 620,000 kilowatt-hours (kWh). The solar electricity will be used entirely on-site. The new facility, by design, offsets groundwater pumping with use of a surface water membrane filtration plant, reducing power needs by 40%. This efficiency improvement is an important design step for solar electricity. First, the project reduces total energy use and then replaces a portion of the future energy usage with renewable energy.

The City will procure solar electricity by entering into a Power Purchase Agreement (PPA). A PPA with a third-party provider is preferable to direct purchase and ownership of the solar photovoltaic (PV) system because it does not require a large capital outlay. A PPA does, however, give the City the option of ownership through buyout at the end of the contract period. A PPA further mitigates ownership risk to the City by eliminating performance degradation risks, design and construction contingencies, and ongoing maintenance.

Overview of Power Purchase Agreement

The selected PPA contractor will provide all capital (photovoltaic equipment, installation) and O&M related activities (power monitoring and equipment maintenance), while the City will provide the necessary land and roof access at the treatment plant site. The parties will negotiate a price at which the City would purchase the power back from the solar operator. The City plans to cover the existing filter/sedimentation basin and the new membrane building with a solar photovoltaic system. The combined 37,700 square feet will provide enough space to support a photovoltaic system of approximately 322 kW producing approximately 400,000 kWhs, as described below. Future expansion of the photovoltaic system is planned as the plant increases in capacity.

A typical PPA lasts for 10 to 20 years. The City can either renew the PPA or “buy out” the remaining value of the system, thereby taking ownership of the equipment and ending the contract arrangement with the provider. The PPA provider will install the PV system with no capital cost to the City. The provider will coordinate financing for the project and will design, construct, operate and maintain the system for the duration of the agreement. The energy from the project will be sold to the City at a fixed

price. The annual rates may be escalated, depending on contract negotiations; however, the escalation must be lower than current utility escalation rates to maximize savings.

The PPA provider will be assigned all rebates and potential tax incentives associated with the system. Under the California Solar Initiative incentive program, the PPA provider would retain ownership of any Renewable Energy Credits (RECs). The combination of these financial incentives results in a favorable price of solar electricity in the PPA.

Expected Environmental Benefits

By producing 400,000 kWh per year, the PV system will offset approximately 116 metric tons of carbon dioxide per year, equivalent to taking 22 cars off the road for one year. This emissions reduction means that for every megawatt-hour the PV system generates, approximately 641 pounds of CO2 are not generated from electricity produced and delivered into the utility grid. This factor is the average emissions across PG&E's service territory; while PG&E does purchase renewable energy, this factor incorporates emissions from all of PG&E's owned and purchased resources. The system will also avoid 3.2 pounds of nitrous oxide emissions annually.

In addition to accounting for GHG emissions reduced by the PV system, the City may inventory GHG emissions sources, reductions achieved, and future opportunities throughout the project. The City will use The Climate Registry to track emissions and performance over time.

The City will continue to pursue opportunities to incorporate the use of renewable energy into its water resource projects and other City facilities.

In addition to the development of renewable energy, the City can support the reduction of GHG emissions by offering opportunities for alternative transportation. The City has developed bike and pedestrian trails and the *Wetlands Trails Master Plan* calls for a system of paved pedestrian footpaths that will incorporate bicycle use and access for disabled users. The trail system will provide a wide range of recreational opportunities as well as promote alternative modes of transportation in residential and commercial areas.

Adaptation Measures

Adaptation is the process of responding to the effects of climate change by modifying systems and behaviors to function in a warmer environment. The most significant adaptive measure the City has implemented is the development of the Watsonville Water Recycling Treatment Facility. The recycling facility can generate 4,000 acre feet per year of a sustainable, drought tolerant, irrigation supply. The supply is delivered to agricultural users and will offset an equivalent amount of groundwater extractions. Although not used for potable use, the reduction in groundwater extractions directly benefits the City residents who rely upon this overdrafted basin for over 90% of their water use.

The recycling facility was developed in partnership with the Pajaro Valley Water Management Agency (PVWMA), the agency responsible for management of the Pajaro Valley groundwater basin. The City will continue to work collaboratively with PVWMA to address water supply resources and develop water supply opportunities in the region. Potential joint strategies could include the development of projects,

programs and policies to preserve watersheds and implementation of groundwater management ordinances to assure a long-term, sustainable groundwater supply.

Summary

Climate change may introduce additional water supply challenges for the City of Watsonville and the Pajaro Valley. However, the City is already implementing adaptation and mitigation measures and intends to continue this "no-regrets" strategy as more climate change information and strategies are developed for the region. The City is committed to working with other agencies and organizations to:

- Better understand the impacts of climate change;
- Develop a coordinated strategy for mitigating and adapting to climate change;
- Reduce the vulnerabilities to the City residents; and
- Work to protect the vital resources and agricultural economy of the Pajaro Valley.