Santa Barbara County
Regional Water Shortage/Drought Management Plan

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Table of Contents

Executive Summary

Historical rainfall records demonstrate that Santa Barbara County is subject to multi-year dry periods. Accordingly, local water purveyors have relied on historic records to develop sufficient supplies to meet demand during droughts such as experienced in 1945-51 and 1986-91. However, it is important that water purveyors regularly update their water supply plans, including their strategies to meet anticipated droughts, due to changes in their service areas such population growth, regulatory constraints, as well as improving water efficiency technology.

Although the Santa Barbara County Water Agency (Water Agency) has no direct customers, this *Regional Water Shortage/Drought Management Plan* (County Plan) in necessary to complement and augment the drought plans of local water purveyors. It is both based on the experience gained during the 1986-1991 drought and Water Agency/U.S. Bureau of Reclamation development of a "model" Regional Water Shortage/Drought Plan. The "model plan" is intended to expedite small and medium size purveyor response to droughts that may occur in the immediate future by addressing changes in water demand due to population increases, newly developed water supplies, and on-going conservation efforts.

To assure that the County Plan complements the purveyors' plans, the Water Agency created a Water Shortage/Drought Preparedness Planning Technical Advisory Committee comprising staff from the Water Agency and local water purveyors. This group helped shape the regional plan, particularly those actions to be implemented by the Water Agency in conjunction with the individual efforts of the water purveyors.

The Regional Plan describes these specific actions to be undertaken by the Water Agency:

- Development of a coordinated advertising campaign and public information materials;
- Acceleration of low-flow fixture rebate programs;
- Complete an inventory of potential surplus water available for exchange/sale to districts that may wish to augment their existing supplies;
- Work with medium and small local water purveyors to complete water shortage plans using the USBR Water Shortage/Drought Planning Handbook developed by the Water Agency in 2003;
- Hold a public workshop to allow local purveyors and the public a forum for discussing issues that water users may face during a drought; and
- Incorporate other actions into the plan as appropriate in response to future conditions.

It is important to remember that local water purveyors will be affected differently by the drought depending on their particular supply sources. Therefore, individual purveyors may ask their customers to respond to a prolonged drought in different ways. But a drought is a regional phenomenon so some responses are appropriate at a regional level. Specifically, a regional approach will help ensure that water users countywide will receive clear and consistent information about the drought. Thus to maximize effectiveness, coordination with local water purveyors is an essential element of the Water Agency Plan.

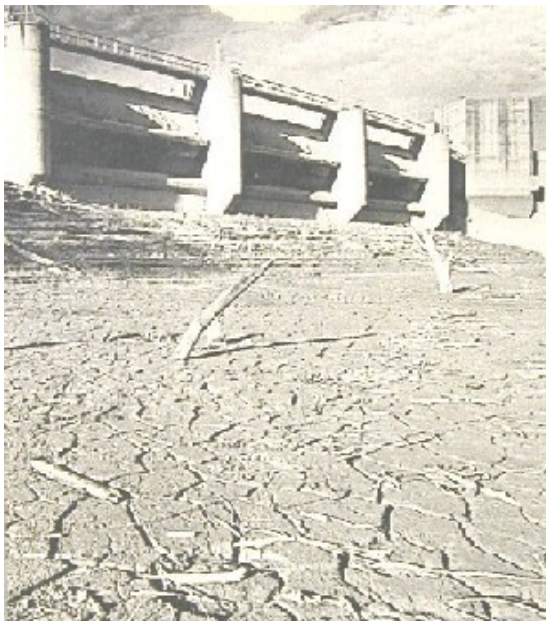
The Concept of Drought*

Drought is a normal, recurrent feature of climate, although many erroneously consider it a rare and random event. It occurs in virtually all climatic zones, but its characteristics vary significantly from one region to another. Drought is a temporary aberration; it differs from aridity, which is restricted to low rainfall regions and is a permanent feature of climate.

Drought is an insidious hazard of nature. Although it has scores of definitions, it originates from a deficiency of precipitation over an extended period of time, usually a season or more. This deficiency results in a water shortage for some activity, group, or environmental sector. Drought should be considered relative to some long-term average condition of balance between precipitation and evapotranspiration (i.e., evaporation + transpiration) in a particular area, a condition often perceived as "normal". It is also related to the timing (i.e., principal season of occurrence, delays in the start of the rainy season, occurrence of rains in relation to principal crop growth stages) and the effectiveness (i.e., rainfall intensity, number of rainfall events) of the rains. Other climatic factors such as high temperature, high wind, and low relative humidity are often associated with it in many regions of the world and can significantly aggravate its severity.

Drought should not be viewed as merely a physical phenomenon or natural event. Its impacts on society result from the interplay between a natural event (less precipitation than expected resulting from natural climatic variability) and the demand people place on water supply. Recent droughts in both developing and developed countries and the resulting economic and environmental impacts and personal hardships have underscored the vulnerability of all societies to this "natural" hazard.

***Excerpted from** the National Drought Mitigation Center, University of Nebraska, Lincoln.*



Gibraltar Reservoir 1990

Introduction

Dry periods and drought are a way of life for Southern California residents and are an expected piece of the local water supply puzzle for Santa Barbara County. Local water purveyors understand the need to prevent problems associated with drought, thus most purveyors have a variety of supply sources to rely on when shortages occur.

Purpose

The purpose of this plan is to discuss the steps that the Water Agency in partnership with the county's water purveyors will undertake to address future shortages associated with drought conditions and to describe the current water conditions in Santa Barbara County that trigger the actions outlined in the plan. This plan will be reviewed and updated as needed. To be most effective, the update should include a review of the water purveyors' plans as well.

County Water Agency

The Santa Barbara County Water Agency (Water Agency) is part of the Water Resources Division of the Public Works Department. The Water Agency was established by the state legislature in 1945 to control and conserve storm, flood and other surface waters for beneficial use and to enter into contracts for water supply. The Water Agency was originally empowered under the State Water Code to cooperate and contract with the United States and State of California on behalf of municipalities and districts within the Agency's boundaries.

Major water projects involving the County include the State Water Project (Flood Control District), the Cachuma Project (Water Agency) and the Twitchell Project (also Water Agency). Although the Santa Barbara County Water Agency does not have direct responsibility for treating or purveying water to end users, the Agency is required to provide a regional water efficiency program on behalf of the purveyors. Therefore, the Agency established the Regional Water Efficiency Program in 1990 to promote the efficient use of urban and agricultural water supplies in Santa Barbara County, and to provide information and assistance to local water purveyors. The Program provides coordination for cooperative efforts among purveyors, acts as a clearinghouse for information on water efficiency technology, and monitors local, state and national legislation concerning efficient water use.

Due to the relationship between long-term water efficiency programs, regional water shortage contingency planning, and the contractual relationships the County has in various water supplies, it is appropriate that the Water Agency also provide regional coordination of water shortage/drought activities within the County. Therefore, the Water Agency has developed this Regional Water Shortage/Drought Plan to be implemented by the Water Agency in conjunction with the individual efforts of the water purveyors during local water shortages.

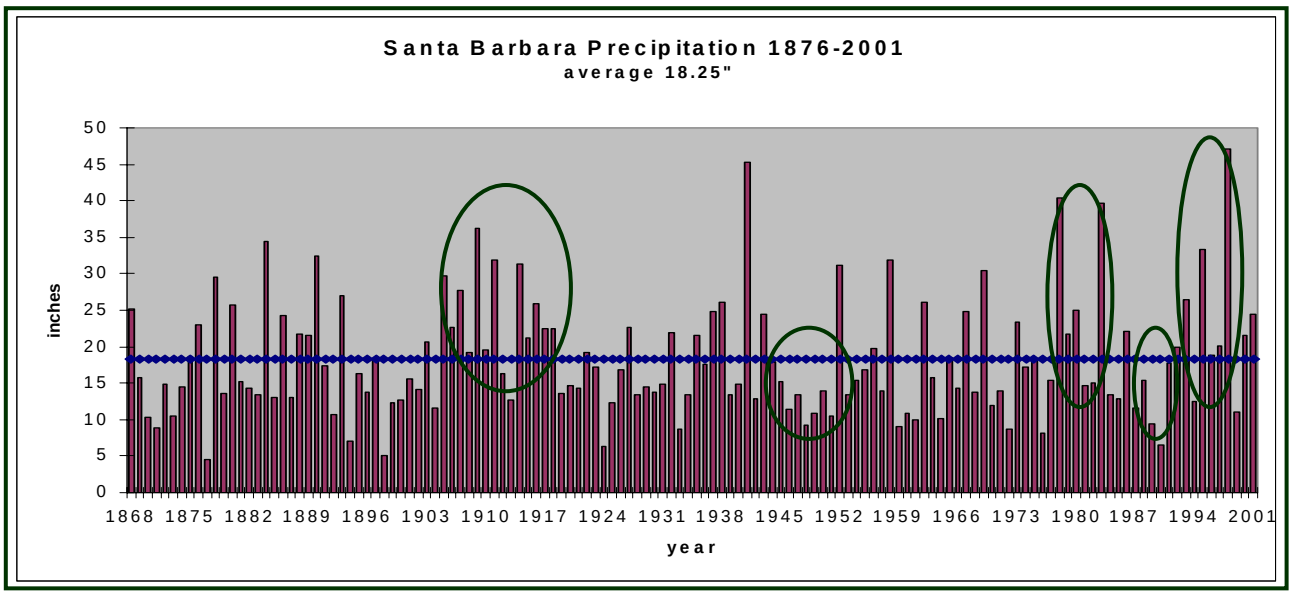
Background

This section contains information about rainfall, past droughts, current water demand and supplies and changes that have occurred since the last prolonged drought.

Rainfall

Average annual precipitation in Santa Barbara County varies from 7" - 9" near Cuyama to a maximum of about 36" at the uppermost elevations of the San Rafael Mountains. See Figure 1 for historic precipitation levels. Figure 2 presents selected rainfall statistics.

Figure 1



Annual Rainfall in Santa Barbara, California with example wet and dry cycles shown.

Figure 2

Santa Barbara County Rainfall Statistics

Most rainfall in a year:
1997-1998: 46.75” in Santa Barbara
1941-1942: 30.76” in Santa Maria

Wettest Month:
February 1998: 21.36” in Santa Barbara

Biggest Storm Event:
January 1969: Highest flow in Santa Ynez River in 2,900 years — 89,000 cfs (cubic feet per second - about 40 million gallons per minute) flowed into Lake Cachuma.

Santa Barbara County is subject to some of the highest short-duration rainfall intensities in California:

- In 1995, 1.6” of rain fell in a 30 minute period near San Marcos Pass
- In 1993, 1.25" of rain fell during a 15 minute period at the Buellton Fire Station
- In 1969, 16" of rain fell in a 24 hour period at Juncal Dam

Driest year:
1877: 4.49 inches in Santa Barbara

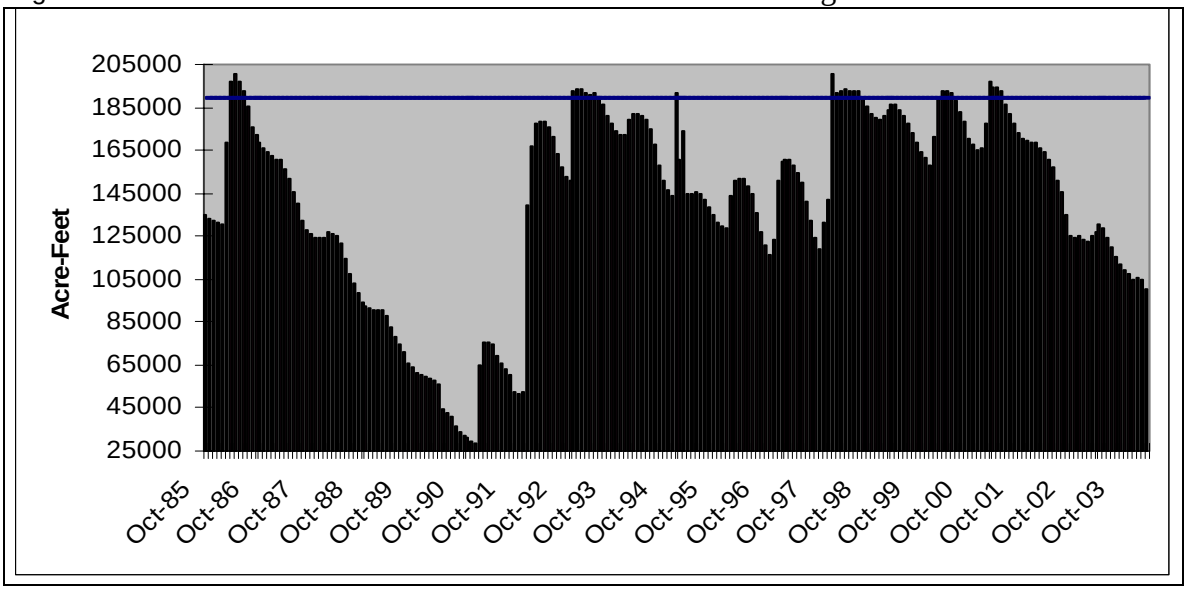
Figure 3 **2003-04 Rainfall Totals**

Location	Water Year Total (in.)	% of Normal
Buellton	9.25	54
Cachuma	10.39	52
Carpinteria	8.96	45
Cuyama	3.70	48
Figueroa Mtn.	10.66	49
Gibraltar Dam	14.74	56
Goleta	10.98	60
Lompoc	8.58	57
Los Alamos	9.35	61
San Marcos Pass	18.83	57
Santa Barbara	10.67	59
Santa Maria	9.14	66
Santa Ynez	10.23	66
Sisquoc	10.76	72

Importance of Rainfall to Water Supplies

Local surface and groundwater supplies are dependent on above average rainfall for recharge. An indicator of local hydrologic conditions is the level of storage in Lake Cachuma. When reservoir storage is high, it generally means we are experiencing or have recently experienced a wet period or even just one wet year. When reservoir storage is low it generally means the opposite. Figure 3 shows recent below average rainfall totals. Examination of Figure 4 reveals that reservoir storage was high in the mid to late 1990s due to above average rainfall during the period 1992-1998, but is dropping at a substantial rate and if no significant rainfall occurs in the near future, storage could be as low as it was in the drought of 1986-1991 by spring of 2007.

Figure 4 Cachuma Reservoir Storage 1985-2004



Note: In 1995 storage was kept at a lower than normal operating level due to seismic strengthening work that was being done on the Dam. The "spikes" from 1995 were caused by exceptionally large January 10 and March 10 storms that delivered a great deal of water to the facility. Storage was immediately and intentionally lowered right after the storms to continue with the seismic strengthening work. The "spike" in 1998 was from the February 23rd storm; the Lake was intentionally surcharged to hold back floodwaters and protect downstream interests.

Past Droughts

Historical records show that local drought periods of several years or more are cyclical, recurring about every forty years. Tree ring studies covering time periods of several centuries reveal apparent droughts lasting as long as 16 years or more. Current records show droughts in Santa Barbara County have lasted an average of five years.

In a general sense, the impacts of drought result from the interplay between a natural event (less precipitation than expected resulting from natural climatic variability) and the demand people place on water supply. The impacts of drought are intensified in areas that are entirely dependent on one water supply, particularly if that supply is surface water. Additional sources of supply allow water purveyors to coordinate the management of the different supplies to increase the total overall yield of an individual supply. For example, wet year water held in a surface reservoir can be stored by injection or surface recharge in the groundwater basin to increase dry year supplies.

Drought of 1986-91

The most recent drought occurred from 1986 until 1991 and included some of the driest years on record. The drought had serious impacts on water users and the environment. Statewide, farmers lost or could not plant crops, forests were damaged and many trees died, urban water users were forced to conserve unprecedented amounts of water, and fisheries suffered from greatly reduced flows in rivers and lowered reservoir levels. The Central Coast region of California (Monterey, San Luis Obispo and Santa Barbara counties) was particularly hard hit by the drought.

The impact of the drought on the Central Coast was intensified by the fact that water purveyors in San Luis Obispo and Santa Barbara counties were entirely dependent on local water supplies at the time the drought occurred. Hardest hit were areas relying on local surface reservoirs, as some groundwater users were able to make up the supply deficit by increased pumping. By late 1989, the City of Santa Barbara's Gibraltar Reservoir was completely empty. Lake Cachuma, the primary regional water supply reservoir which serves several communities in the Santa Barbara area, was drawn down to only 14% of capacity by February 1991, its lowest level since the lake first filled in 1957.

In response to this critical water supply situation, several water purveyors on the South Coast of Santa Barbara County (Goleta Water District, City of Santa Barbara, Montecito Water District) adopted drought emergency measures, and water use restrictions were implemented. Together, these three entities served approximately 180,000 people and some agricultural users. Each of these purveyors developed distinct and yet similarly effective water conservation programs. They also cooperated on innovative public education programs to reduce water demand.

As the drought progressed, rationing, penalty rates, and prohibition of certain water uses caused water demand to drop dramatically. Local residents faced and met the challenge of saving water with impressive results; water demand in both the Goleta and Santa Barbara service areas was approximately 40% below normal in 1990 and 1991.

In addition to efficiency, some communities sought relief with expensive, and in some cases short-term, water supplies. The City of Santa Barbara, in a joint effort with several other local purveyors, commissioned construction of a temporary desalination facility, which has since been converted to a permanent part of the City's water supply. A number of water purveyors on the South Coast also cooperated in constructing an emergency water supply pipeline to "wheel" water from the State Water Project (SWP) into southern Santa Barbara County, via Los Angeles and Ventura Counties. This project utilized local entitlements to water from the SWP, which had not been exercised up to that point in the absence of a delivery system.

Demand reduction, however, was the most significant local response to the drought. Per capita water demand fell in some months to 55% below normal. The amount of water conserved by customers was more than double the amount provided by alternative water supplies. This dramatic reduction also had a downside: a substantial reduction in anticipated revenue to the water purveyors. One challenge facing water purveyors after the drought was how to determine the long-term effects of the drought on demand (demand hardening), and to adopt appropriate water rate structures, which would balance water demands with operational costs. Water rates after the drought included the cost of new water supplies developed to provide a buffer against future droughts, such as the State Water Project and desalination. As a result of the difficulties experienced in the 1986-91 drought, local water purveyors teamed with the County to evaluate which responses worked, and which didn't. Appendix A summarizes the lessons learned in that extended drought.

Changes in Demand and Supply since the Last Drought

A number of changes have occurred in the County with respect to water supply and demand since the drought of 1986 – 1991. In addition, all local water purveyors have developed water management plans that, among other things, provide long-term options for augmenting water supplies in order to lessen the impacts of droughts.

Demand

State and federal legislation have been enacted to improve long term efficiency of water use and local water purveyors have implemented a variety of long term efficiency programs. In general, water demand per capita has remained below the levels prior to the last drought. Table 1 contains 2003 water demand and population figures for local water purveyors. Per capita demand figures are shown for 1980 (per-drought), 1990 (during the drought) and 2003 (dry year).

Table 1
Water Demand

Water Purveyor	Population Served 2003	M&I Water Demand (Acre-Feet Per Year)	Per-Capita Water Demand (Gallons per person per day) Pre Drought 1980	(Gals per person per day) During Drought 1990	(Gals per person per day) Post Drought Wet Year 1998	(Gals per person per day) Post Drought Dry Year 2003
City of Buellton	4,000	1,136	299	262	206	253
Cal-Cities Water	38,252	8,109	216	247	205	220
Carpinteria Valley Water District	18,200	2,322	137	109	120	114
Casmalia CSD	200	22	65	72	NR	97
Cuyama CSD	820	178	417	255	180	194
Goleta Water District	85,000	9,501	164	86	103	100
City of Guadalupe	6,100	651	184	113	79	95
La Cumbre Mutual Water Company	4,900	1,642	312	260	229	299
City of Lompoc	41,671	4,788	128	123	97	103
Los Alamos CSD	1,300	290	280	252	NR	199
Mission Hills CSD	3,300	613	189	181	151	166
Montecito Water District	18,028	4,878	271	293	261	242
City of Santa Barbara	94,304	12,831	158	94	111	121
City of Santa Maria	82,148	12,568	196	179	129	137
Santa Ynez River ID #1	8,298	2,539	227	200	267	273
City of Solvang	5,383	1,383	379	369	217	229
Vandenberg Village CSD	5,802	1,310	233	189	160	217

Supply

Groundwater and surface water are the most widely used supplies in Santa Barbara County. Several water purveyors participate in the State Water Project while a few recycle wastewater for irrigation, and the City of Santa Barbara operates a desalination facility. Since the 1986-1991 drought, water purveyors in Santa Barbara County have developed additional supplies, as mandated by the voters, to increase system reliability. In addition, the yields of other supplies have changed from various factors.

For more detailed information regarding water supplies, please refer to the Water Resources Report and Ground Water Report cited in the references section of this report.

Surface Water Supplies

In Santa Barbara County, there are two river systems that contribute significantly to water supplies for local communities; the Santa Ynez and Santa Maria Rivers.

Santa Ynez River

Within the Santa Ynez River Watershed, three reservoirs have been constructed to provide surface water to the South Coast area. Bradbury Dam created Lake Cachuma the largest reservoir on the Santa Ynez River. Currently five water purveyors: Montecito Water District, the City of Santa Barbara, Carpinteria Valley Water District, Goleta Water District, and Santa Ynez RWCD Irrigation District #1 (ID #1), take water from Lake Cachuma.

The average annual Lake Cachuma yield is assumed to remain constant at approximately 25,400 AFY for the next 40 years. This forecast was based on the Santa Ynez River Model last updated by the Water Agency and the Cachuma Member Units in 2001. The model run used assumed a modest cloud seeding program and includes Tecolote Tunnel infiltration water in the operational yield value.

Farther upstream on the Santa Ynez River are the Gibraltar Dam and Reservoir and the Juncal Dam, which created Jameson Reservoir. Siltation has significantly reduced the storage capacity of Gibraltar Reservoir and will also impact Jameson yields in the future. The average yield for Gibraltar Reservoir and Mission Tunnel is expected to drop from about 5,400 AFY in 2000 to 5,100 AFY in 2040. During the same period, the average Jameson Reservoir-Doulton Tunnel yield is expected to drop from about 2,320 AFY to about 2,280 AFY.

Santa Maria River

The Twitchell Reservoir on the Santa Maria River provides flood control protection as well as about 18,000 AFY of groundwater recharge to the Santa Maria Groundwater Basin. It should be noted that water from the Twitchell Reservoir is a part of adjudication of the groundwater basin.

A more detailed discussion of the safe yields, water models and assumptions for Santa Barbara County's surface water sources can be found in the following documents;

- Santa Barbara County Water Supply and Demand Update (2003); Santa Barbara County Water Agency and Boyle Engineering Corp.

- Water Resources of Santa Barbara County (2000); Rodriguez, L. and Lang, R.

State Water Project

In 1991, after six years of extremely dry conditions, voters in several service areas in Santa Barbara County voted to import State Water Project (SWP) water. In addition to providing local communities with an additional source of water to augment local supplies, delivery of SWP water has also improved water quality for some communities (such as Santa Maria) and added more flexibility in water delivery capability for purveyors through the pipeline facilities constructed to deliver state water. These pipeline facilities provide the opportunity for water purveyors to purchase, exchange or sell water supplies both locally and from outside sources.

Table 2 presents the "Table A" amount of SWP water available to each project participant. Table A of the SWP contract is the basis for water delivery requests and allocation of certain project costs. Most project participants also have additional (drought buffer) supplies available as well. Existing Table A amounts range from 50 AFY (Raytheon) to as high as 16,200 AFY (City of Santa Maria), though actual water deliveries may be less than the Table A amounts in any given year depending on a number of factors, ranging from lower customer requests to droughts in northern California. Factors other than drought that could also cause short-term delivery reductions of SWP water include equipment failure and natural disasters such as floods and earthquakes.

Table 2
State Water Entitlements in Santa Barbara County

Project Participant	SWP Table A amount (AFY)	Long-Term Average SWP Deliveries* (AFY)
California Cities Water Co (Southern California Water Company).	500	375
Carpinteria Valley Water District	2,000	1,500
City of Buellton	578	434
City of Guadalupe	550	413
City of Santa Barbara	3,000	2,250
City of Santa Maria	16,200	12,150
City of Solvang	1,500	1,125
Goleta Water District**	4,500	4,500**
La Cumbre Mutual Water Co.	1,000	750
Montecito Water District	3,000	2,250
Morehart Land Company	200	150
Raytheon Infrared Operations	50	38
Santa Ynez River Water Conservation District ID#1	500	375
Vandenberg Air Force Base	5,500	4,125
Total:	**39,078**	**30,434**

* *Assumed to be 75 percent of entitlement due to the 2002 reliability percentages provided by the Department of Water Resources.*

** *Goleta Water District has an additional drought buffer that allows their long-term average to equal their Table A amount.*

Groundwater Supplies

Groundwater supplies fluctuate according to seasonal rainfall and pumping levels. The nature of the fluctuation also depends on the size of the basin. Declining groundwater levels can lead to increased energy costs for pumping, and over the long term can also lead to diminished water quality. This section addresses current trends in groundwater supplies and the impacts of the last drought on local groundwater basins. The following information is excerpted from the 2003 Santa Barbara County Groundwater Report, published by the County Water Agency.

The drought of 1986 to 1991 led to significant declines in groundwater. Following 1991 seven out of nine years produced above average rainfall, and as a result of this wet period groundwater levels in 1999-2002 throughout Santa Barbara County were generally the highest since the mid 1940s, and in some areas highest since the 1920s. The historic winter of 1998, which produced some of the highest rainfall totals recorded, caused shallow wells to rise sharply during that year, and deeper wells to rise for up to 3-4 years afterwards. **Now, after the moderate winters of 1999 through 2001, the extremely dry year of 2002 and the moderate year of 2003, the deep wells in the large basins have hit their peak, most in *2001*, and are now declining while the wells developed in the shallower and/or smaller basins continue to exhibit a pronounced annual variation in response to winter rains.**

Groundwater levels were last measured in the Spring of 2004. The Cuyama Basin continues to show a slight decline at a greatly lowered working level. The Santa Maria Basin shows significant declines in the Eastern and Central part of the basin, but only minor declines in the far Western part of the Basin and in the Sisquoc-Foxen Canyon areas. The San Antonio Basin exhibited a moderate drop from Spring 2003 to Spring 2004. There was a moderate decline in the Lompoc Basin (main zone), only a slight declines in the Lompoc Uplands, Santa Rita and Santa Ynez areas. Gaviota-Ellwood area measurements showed declines in alluvial wells but fairly stable levels in deeper Vaqueros Formation wells. The Water Agency does not make measurements in the South Coast urban areas. Fall measurements (only the western part of the Lompoc and Santa Maria Basins) are usually made during the last two weeks of August.

Discussion of Trends in Groundwater Basins

It is important to note that localized influences such as variations in pumping can obscure general groundwater level trends. Thus every effort is made to use well data collected during periods of no local pumping. Factors affecting trends displayed by well hydrographs include length of record, proximity to sources of recharge and active wells, and short-term climatic variations. As a result of these factors, in the Santa Barbara County region **single year or short term groundwater trends are of limited value in assessing overall basin conditions due to annual rainfall fluctuations.**

Observations of well measurements indicate that in the Cuyama Valley the downward groundwater level trend continues, in the Eastern Santa Maria Basin levels have dropped off dramatically, while in the Western Santa Maria Basin near Guadalupe levels are still high from water moving through the system after the extremely wet 1990's. In the San Antonio Valley most well levels are declining. In the Santa Ynez and Lompoc Basins water levels have remained stable or only declined slightly.

Historic trends and hydrologic balance studies using available data indicate slight to moderate overdrafts of groundwater basins in Santa Maria Valley, San Antonio Valley, Santa Ynez Uplands and Lompoc Uplands. *Significant* overdraft is evident only in the Cuyama Valley at this time. Effects of importation of State Water in the Santa Maria area and Santa Ynez Uplands are being evaluated and may help eliminate part or all of the overdraft in those Basins in the future. While the Santa Maria Groundwater Basin is in adjudication, the outcome is not anticipated in this plan for the following reasons: no final action is expected within the next few years; there is no need for major reallocation of supplies expected in the Basin since it is in near hydrologic balance; and since there was no "rush to the pump use" and most users are efficient, there is no basis for wholesale reallocation.

Recycled Wastewater Supplies

Water recycling is becoming an important resource as local water purveyors seek ways to stretch their existing water supplies. Because recycled water can be safely and legally substituted for potable water in agricultural and landscape irrigation, flushing toilets, as well as dust control and compaction on construction sites, it replaces potable water and makes it available for other uses. This effectively creates a new water source.

Three wastewater treatment plants in the county: the City of Santa Barbara's El Estero Wastewater Treatment Plant, the Goleta Sanitary District Wastewater Treatment Plant, and the Lompoc Regional Wastewater Reclamation Plant, produce water that is directly reused in the community. **The total amount of recycled wastewater reused in 2003 Countywide was 1,694 acre-feet.** These communities expect to increase the amounts of recycled water used in the future. In addition, Laguna Sanitation District is currently designing wastewater treatment and recycled water distribution facilities that will be used to serve a golf course and several other irrigation water customers within the City of Santa Maria. The other local treatment facilities produce water that is discharged directly or indirectly to the ocean or percolates into the groundwater from ponds and/or pasture irrigation.

Desalinated Water Supply

The City of Santa Barbara owns and operates the Charles Meyer Desalination Facility. Water produced from the facility is incorporated into the City's long-term supply plan as a way of reducing shortages due to depleted surface supplies during droughts. The facility is designed to produce up to 5,000 acre-feet per year of desalinated water. The facility is currently in long-term storage, which is more economical than standby maintenance mode, but can be made operable within 6 to 12 months if the need arises.

Conjunctive Use To Enhance Water Supplies

Water purveyors that have access to more than one water source typically use the water sources conjunctively to increase the overall reliability (long-term or average annual yield) of their district water supplies. For instance, some purveyors use SWP water whenever it is available and rely on groundwater supplies to supplement the State Water during periods of high demand or drought years. Water purveyors can also increase their water supply reliability by purchasing "drought buffers" of additional SWP water, signing drought year water supply agreements or banking water in a groundwater basin. Similarly some purveyors may manage, possibly in accordance with an AB 3030 Groundwater Management Plan, the groundwater pumped and stored in groundwater basins in order to optimize the basin's overall long-term working yield.

Conjunctive use plans incorporate all the water sources available to a water purveyor including surface and groundwater, SWP water, recycled water, and desalinated water. Since this report focuses on regional water supplies, average annual water supply yield estimates have been used throughout the report and tables. The actual water available from each water source may vary considerably from year-to-year; however, the water supply yield estimates provide a reasonable long-term assessment. Each water purveyor will assess individual supplies on a year-to-year basis as part of their own drought response. This detailed assessment is beyond the scope of the County Drought Plan.

County Water Agency Drought Plan Implementation

The County does not produce or deliver water supplies. This plan concentrates on issues that individual water purveyors or other organizations (COMB or CCWA) cannot do as well on their own. This plan focuses on demand management and public information and regional coordination. The scope of this plan was developed in coordination with a regional drought task force created in early 2004.

The following section provides details on the actions that will be undertaken by the County Water Agency during a drought. Also included is information regarding potential actions that local water purveyors may implement.

Demand Management – Before and During a Water Shortage

It is necessary to point out the subtle, but important differences between short-term drought contingency efforts and ongoing water efficiency efforts. The goal of most water efficiency programs is to achieve lasting improvements in water use efficiency that do not negatively affect the quality of life of water users. On the other hand, the desired outcome of drought contingency efforts is to dramatically reduce water demands during a short-term crisis (usually caused by prolonged droughts or some other emergency) that may require drastic changes in habits for a short time.

Pre-drought demand reduction measures include implementation of the fourteen Best Management Practices (BMPs) identified in the statewide Memorandum of Understanding (MOU) for Urban Water Conservation in California by the California Urban Water Conservation Council (CUWCC). These measures are long-term, cost-effective programs that are appropriate for implementation by all urban water purveyors at all times. Implementation of these measures results in more efficient water use in urban communities.

Water shortage/drought period demand reduction measures are implemented in addition to the BMPs when a water shortage hits. There are many ways that water purveyors can request and encourage additional water efficiency from their customers. Options available to water purveyors include rebates and incentives for fixture replacements or landscaping changes, prohibiting certain water uses along with enforcement of these prohibitions, water pricing strategies, prohibitions on new connections or the incorporation of new areas, and water rationing.

Long-term Water Efficiency Measures

The Water Agency's Regional Water Efficiency Program was established in December 1990 to promote the efficient use of urban and agricultural water supplies in Santa Barbara County, and to provide information and assistance to the eighteen local water purveyors within the county. The Program provides coordination for cooperative efforts among purveyors, acts as a clearinghouse for information on water efficiency technology, monitors local, state and national legislation concerning efficient water use, and implements regional programs for fixture retrofits.

A number of the Regional Water Conservation Program's activities fulfill - on a regional level - the obligations for BMPs in the statewide CUWCC Memorandum of Understanding and/or the Bureau of Reclamation's water conservation criteria. The Water Agency is a signatory to the MOU and has

prepared a plan to meet the Bureau's water conservation criteria. Many of the regional activities also assist individual water purveyors to satisfy their own conservation goals under the MOU and Bureau Criteria.

The Water Agency provides the following programs, brochures and presentations as part of their long-term program, which is implemented regardless of a water shortage emergency to result in efficient water use in local communities, while enhancing the quality of life for local residents.

Programs:
Santa Barbara County Commercial, Industrial, and Institutional Water Efficient Fixture Rebate Program
Santa Barbara County ET Controller Distribution and Installation Program
Green Gardener Certification Program
H20 On the Go – Traveling Library Display for Junior High
Water Puzzle Classroom Presentations
Large Landscape/Agricultural Water Audits
Be Water Wise Ad Campaign – for landscape watering efficiency – supported by watering calculator and CIMIS station information on our website
Green Awards – Green Business Awards for companies working to save water and other resources
Green Team Waterless Urinal Retrofit for County facilities

Brochures:
Teacher's Guide to Free Resources
Water of Santa Barbara County
Water Resources Brochure
Sustainable Landscape Brochure
How to Water Your Garden Brochure
Landscape Irrigation Guide for Landscape Professionals
Lodging Industry In-room Brochures for Water and Energy Efficiency
Water Connection (Quarterly Newsletter)
www.sbwater.org website

Events:
Water Awareness High School Video Contest
Water Awareness Month
Earth Day Fair
Girl Scouts Water Drop Patch Event
Sustainable Landscape Fairs

During a water shortage or drought emergency, the Water Agency would maintain the majority of these programs. However, the Sustainable Landscape Fairs would be cancelled until the water shortage emergency was lifted. In addition, the Be Water Wise Ad campaign would be replaced by a campaign that would be developed specifically to alert the public about the water shortage issues as outlined in the next section.

Water Shortage/Drought Contingency Measures

In contrast to long-term water efficiency measures, water shortage or drought contingency measures represent those programs or actions that are designed to be used only as needed to mitigate the effects of a drought or short-term water shortage condition. These water shortage contingency actions can include steps to reduce demand or increase supply.

County Water Agency Actions

The Water Agency will implement the following additional water shortage/drought contingency measures in coordination with the efforts of each of the local water purveyors during a defined water shortage/drought emergency (see Triggers for Implementing County Drought Contingency Measures) to provide regional drought coordination.

1. Coordination of Regional Water Shortage/Drought Planning TAC

The Water Agency will convene a Regional Water Shortage/Drought Planning Technical Advisory Committee to coordinate local efforts prior to the onset of a true drought. The TAC will begin regional drought preparation and will participate in the activities set forth in the Water Agency's water shortage plan. The TAC will be comprised of staff from the Water Agency, the water purveyors in Santa Barbara County, the Association of Water Purveyors in Santa Barbara County, Cachuma Operations and Maintenance Board, and the Central Coast Water Authority. The TAC will be used as a forum for coordination of drought response programs among purveyors in the region for consistency, equity and to minimize confusion among water users regarding which programs are in effect in their area. TAC participants will be responsible for keeping each other apprised of individual efforts to prepare for a drought such as adoption of drought management plans, ordinances, or development of outreach materials.

2. Coordination of the Public Information Message

The Water Agency and the TAC will work together to establish a coordinated message to the community about the drought. The TAC will develop (or update) a list of Frequently Asked Questions (FAQs) and develop responses to those questions that will be used to help educate customers and the media. The Water Agency will strive to ensure that TAC members work together as much as possible on outreach and advertising, to assure a consistent message about dry or drought conditions and voluntary efficiency measures that water users could adopt. The Water Agency and the TAC will collaborate on the development of a public information campaign that can be used when a drought occurs.

The TAC will help maintain credibility in the community by conducting an honest, open and intensive public information campaign throughout the duration of the drought that keeps customers informed about water situation, the impact of their efficiency efforts and the ongoing need to conserve. The campaign would utilize a variety of mediums to keep public informed such as bill inserts, radio/television advertising, newspaper articles and advertising, presentations to local service clubs and organizations, neighborhood workshops, newsletters and the internet. The Water Agency will develop additional web pages for drought related information that will be posted on www.sbwater.org.

A key objective of the coordinated public information plan is each water user knowing how the drought affects their supplies, and what they should do to conserve water.

3. Accelerate Regional Rebate Programs

The Water Agency will also seek additional funding to accelerate rebate programs (for purchase of water efficient fixtures) within the county including searching for additional grant funding, requesting additional funding from Board of Directors of the Water Agency, and seeking opportunities to partner with CUWCC and USBR. The Water Agency will also investigate rebate program options for cost effectiveness, ease of initiation, the relationship to current rebate programs, and the appropriate target audience. The Water Agency will target the BMPs that local agencies are having difficulty completing on their own.

4. Assist small and medium water purveyors in the completion of the Water Shortage/Drought Planning Handbook

The Water Agency will work with local small and medium water purveyors to assist them in the completion of a water shortage/drought plan. The Water Agency will use the USBR Water Shortage/Drought Planning Handbook as a template for these plans.

5. Create and distribute a water supply inventory

The Water Agency and the TAC will create (or update) and distribute a water supply inventory to help identify opportunities for conjunctive use or interagency agreements during periods of water shortages. The Water Agency shall develop a template for the information and distribute it to the local water purveyors for completion.

6. Hold Public Workshops

The County Water Agency will hold public workshops to obtain feedback from customers and to keep the community informed about the purveyor's decisions, particularly regarding transitions between stages of action related to minimizing water shortages.

Potential Actions for Water Purveyors

During a drought individual water purveyors will also be implementing programs to augment supplies and reduce demand. Table 3 identifies potential actions that water purveyors can implement and indicates those actions that the Water Agency implements through the Regional Water Efficiency Program. The actions listed are from the USBR Water Shortage Contingency/Drought Planning Handbook (2003) and contain measures not appropriate for all purveyors in Santa Barbara County. In addition, many of the programs listed are the direct responsibility of the water purveyor and cannot be undertaken by the County Water Agency (rate setting, rationing programs, etc.)

Table 3
Drought Actions

ACTIONS FOR A DROUGHT STRATEGY	SBCWA Regional Drought Plan Actions	Potential Individual Purveyor Actions (1)
Methods to Increase Existing Supplies		
Increase use of recycled wastewater	N/A	X
Increase use of nonpotable water for nonpotable uses	N/A	X
Construct emergency dams	N/A	X
Re-activate abandoned dams	N/A	X
Drawing From Reserve Supplies		
Use reservoir dead storage	N/A	X
Add wells	N/A	X
Deepen wells	N/A	X
Re-activate abandoned wells	N/A	X
Rehabilitate operating wells	N/A	X
Renegotiate contractually controlled supplies	N/A	X
Methods to Increase Efficiency		
Reduce dam leakage	N/A	X
Minimize reservoir spills	N/A	X
Reduce distribution system pressure	N/A	X
Conduct distribution system water audit	N/A	X
Conduct distribution system leak detection and repair	N/A	X
Surge and clean wells	N/A	X
Modifications to Operations		
Re-circulate wash water	N/A	X
Blend primary supply with water of lesser quality	N/A	X
Transfer surplus water to areas of deficit	N/A	X
Change pattern of water storage and release operations	N/A	X
Cooperative Efforts with Other Agencies		
Exchanges	N/A	X
Transfers or interconnections	N/A	X
Mutual aid agreements	N/A	X
Demand Reduction Actions		
Residential Plumbing Retrofit	N/A	X
System Water Audits, Leak Detection And Repair	N/A	X
Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections	N/A	X
Large Landscape Conservation Programs And Incentives (applies only to non-residential accounts with large landscaped areas)	Turf Audits – Cachuma RCD; USBR ET Controller Program	X

ACTIONS FOR A DROUGHT STRATEGY	SBCWA Regional Drought Plan Actions	Potential Individual Purveyor Actions (1)
Limit Main Flushing	N/A	X
High-Efficiency Washing Machine Rebate Programs	N/A	X
Public Information Programs	Numerous Brochures Ad Campaigns	X
School Education Programs	Classroom Presentations; High School Video Contest; H20 on the Go	X
Conservation Programs For Commercial, Industrial, And Institutional (CII) Accounts	CII Rebate Program; Green Award Program; Rinse and Save Program	X
Wholesale Agency Assistance Programs	N/A	N/A
Conservation Pricing	N/A	X
Conservation Coordinator	Conservation Coordinators on Staff	X
Water Waste Prohibition	N/A	X
Residential Ultra Low Flow Toilet Replacement Programs	N/A	X
Implement all applicable pre-stage 1 measures	N/A	X
Provide technical assistance to customers	Conservation Coordinators on Staff	X
Begin public information campaign– drought message	Drought Advertising; Drought Brochures; Newsletter Templates; SB Water Website	X
Ask customers for voluntary reductions in use	N/A	X
Provide incentives to customers to reduce water consumption (rebates, free devices)	USBR ET Controller Program	X
Prohibit wasteful use of water	N/A	X
Limit number of building permits issued	N/A	X
Implement water shortage rate structure (Change the water rate structure from a uniform rate to an inclining block rate)	N/A	X
Plumbing fixture replacement	N/A	X
Request increased reduction by customers	N/A	X
Require that eating establishments serve water only when specifically requested by customers	N/A	X

ACTIONS FOR A DROUGHT STRATEGY	SBCWA Regional Drought Plan Actions	Potential Individual Purveyor Actions (1)
Prohibit use of running water for cleaning hard surfaces such as sidewalks, driveways, and parking	N/A	X
Require lodging hotels/motels to post notice of drought condition with tips in each guest room	N/A	X
Provide weekly updates on supply conditions to media and public	Drought Advertising Campaign, Drought Brochures; Newsletter Templates; SB Water Website	X
Prohibit some uses of water – i.e., lawn watering using sprinklers	N/A	X
Institute rationing programs through fixed allotments or percentage cutbacks	N/A	X
Reduce pressure in water lines	N/A	X
Prohibit use of ornamental fountains and ponds, except when water is re-circulated (include a sign adjacent to the fountain stating that the water in the fountain is being re-circulated)	N/A	X
Prohibit filling swimming pools and spas unless the pool or spa is equipped with a pool cover	N/A	X
Prohibit the use of potable water for cleaning, irrigation and construction purposes, including but not limited to dust control, settling of backfill, flushing of plumbing lines, and washing of equipment, buildings and vehicles	N/A	X
Vehicles and boats can only be washed at a car wash that recycles water or uses 10 gallons or less of water per cycle or with a bucket and hose equipped with a automatic shut-off nozzle	N/A	X
Intensify implementation of all measures in previous stages	N/A	X
Implement mandatory water rationing including per-capita water use allocations for residential customers	N/A	X
Restrict water use only to priority uses (no lawn watering, car washing)	N/A	X

(1) Not all Actions are appropriate for all purveyors

Triggers for Implementing County Drought Contingency Measures

The County Water Agency will begin implementing its drought contingency measures when the local weather patterns result in three years of average or below average rainfall, or when asked to by local water purveyors, whichever occurs first. Due to the nature of our local water supplies substantial recharge to surface reservoirs and groundwater basins occurs only in above average rainfall years. Since 2001, 2002 and 2003 were average or below average, the County Water Agency has created this plan. Future revisions and implementation of the actions defined by this plan will occur under similar conditions.

As a dry cycle or drought deepens, County Water Agency activities beyond the scope of this plan will be recommended to the County by the members of the Drought Technical Advisory Committee developed as part of this plan.

Future Actions
This plan will be evaluated and updated as appropriate to reflect rainfall and water supply conditions. Any evaluation and update should be done in coordination with the various purveyors within the County.

Glossary

A

ABANDONED WATER RIGHT - A water right which was not put to beneficial use for a number of years, generally five to seven years.

ABANDONED WELL - A well, which is no longer used. In many places, abandoned wells must be filled with cement or concrete grout to prevent pollution of ground water bodies.

ACRE-FOOT - The quantity of water required to cover one acre to a depth of one foot; equal to 43,560 cubic feet, or approximately 325,851 gallons.

ADJUDICATION - A court proceeding to determine all rights to the use of water on a particular stream system or ground water basin.

ALLUVIAL - Sediment deposited by flowing water, such as in a riverbed.

APPLIED WATER DEMAND - The quantity of water that would be delivered for urban or agricultural applications if no efficiency measures were in place.

AQUIFER - An underground layer of rock, sediment or soil that is filled or saturated with water.

ARTIFICIAL RECHARGE - The addition of water to a ground water reservoir by human activity, such as irrigation or induced infiltration form streams, wells, or recharge basins. See also GROUNDWATER RECHARGE, RECHARGE BASIN.

B

BRACKISH WATER - Water containing dissolved minerals in amounts that exceed normally acceptable standards for municipal, domestic, and irrigation uses. Considerably less saline than sea water.

C

COMMERCIAL ACCOUNT - Any water user that provides or distributes a product or service, such as hotels, restaurants, office buildings, commercial businesses or other places of commerce. These do not include multi-family residences, agricultural users, or customers that fall in the industrial or institutional classification.

CONJUNCTIVE USE – The coordinated management of surface water and groundwater supplies to increase the total overall yield. Wet year water can be stored by injection or surface recharge to increase dry year supplies.

CONSERVATION - As used in this report, urban water conservation includes reductions realized from voluntary, more efficient, water use practices promoted through public education and from state-mandated requirements to install water-conserving fixtures in newly constructed and renovated buildings. Agricultural water conservation, as used in this report, means reducing the amount of water applied in irrigation through measures that increase irrigation efficiency. See NET WATER CONSERVATION.

CRITICAL DRY PERIOD - A series of water-deficient years, usually an historical period, in which a full reservoir storage system at the beginning is drawn down (without any spill) to minimum storage at the end.

CRITICAL DRY YEAR - A dry year in which the full commitments for a dependable water supply cannot be met and deficiencies are imposed on water deliveries.

CUBIC FEET PER SECOND - A unit of measurement describing the flow of water. A cubic foot is the amount of water needed to fill a cube that is one foot on all sides, about 7.5 gallons.

D

DESALINATION the process of salt removal from sea or brackish water.

DWR - California Department of Water Resources (or successor agency).

E

EFFECTIVE PRECIPITATION - The part of precipitation which produces runoff; a weighted average of current and antecedent precipitation "effective" in correlating with runoff. It is also that part of the precipitation falling on an irrigated area which is effective in meeting the requirements of consumptive use.

F

FIRM YIELD - The maximum annual supply of a given water development that is expected to be available on demand, with the understanding that lower yields will occur in accordance with a predetermined schedule or probability.

G

GRAYWATER - Wastewater from clothes washing machines, showers, bathtubs, hand washing, lavatories and sinks that are not used for disposal of chemical or chemical-biological ingredients.

GROUNDWATER - Water that occurs beneath the land surface and completely fills all pore spaces of the alluvium or rock formation in which it is located. *As a source category for the drought plan tables* - All water withdrawn by the district through district owned/operated wells.

GROUNDWATER BASIN - A groundwater reservoir, together with all the overlying land surface and underlying aquifers that contribute water to the reservoir.

GROUNDWATER MINING - The withdrawal of water from an aquifer greatly in excess of replenishment; if continued, the underground supply will eventually be exhausted or the water table will drop below economically feasible pumping lifts.

GROUNDWATER OVERDRAFT - The condition of a groundwater basin in which the amount of water withdrawn by pumping exceeds the amount of water that replenishes the basin over a period of years.

GROUNDWATER RECHARGE - Increases in groundwater by natural conditions or by human activity. See also ARTIFICIAL RECHARGE.

GROUNDWATER STORAGE CAPACITY - The space contained in a given volume of deposits. Under optimum use conditions, the usable groundwater storage capacity is the volume of water that can, within specified economic limitations, be alternately extracted and replaced in the reservoir.

GROUNDWATER TABLE - The upper surface of the zone of saturation (all pores of subsoil filled with water), except where the surface is formed by an impermeable body.

I

INDUSTRIAL ACCOUNT - Any water users that are primarily manufacturers or processors of materials as defined by the Standard Industrial Classifications (SIC) Code Numbers 2000 through 3999.

INSTITUTIONAL ACCOUNT - Any water using establishment dedicated to public service. This includes schools, courts, churches, hospitals, and government facilities.

M

MULTI-FAMILY SERVICE CONNECTION – More than one dwelling unit per meter.

M&I - Municipal and Industrial (water use); generally urban uses for human activities.

mg/L - Abbreviation for "milligrams per Liter," the mass (milligrams) of any substance dissolved in a standard volume (liter) of water. Nearly the same as parts per million (ppm).

N

NET WATER CONSERVATION - The difference between the amount of applied water conserved and the amount by which this conservation reduces usable return flows.

NET WATER DEMAND - The applied water demand less water saved through conservation efforts (= net applied water = actual water used).

NONPOINT SOURCE - A contributing factor to water pollution that cannot be traced to a specific spot.

O

OVERDRAFT - Withdrawal of groundwater in excess of a basin's perennial yield. See also PROLONGED OVERDRAFT.

P

PERCOLATION - The downward movement of water through the soil or alluvium to the groundwater table.

PERENNIAL YIELD - "The rate at which water can be withdrawn perennially under specified operating conditions without producing an undesired result" (Todd, 1980). An undesired result is an adverse situation such as: (1) a reduction of the yield of a water source; (2) development of uneconomic pumping lifts; (3) degradation of water quality; (4) interference with prior water rights; or (5) subsidence. Perennial yield is an estimate of the long-term average annual amount of water that can be withdrawn without inducing a long-term progressive drop in water level. The term "safe yield" is sometimes used in place of perennial yield, although the concepts behind the terms are not identical: the older concept of "safe yield" generally implies a fixed quantity equivalent to a basin's average annual natural recharge, while the "perennial yield" of a basin or system can vary over time with different operational factors and management goals.

PROLONGED OVERDRAFT - Net extractions in excess of a basin's perennial yield, averaged over a period of ten or more years.

ppm - Abbreviation for "parts per million," a measure of a substance's concentration in a solution or other mixture. Nearly the same as milligrams per liter (mg/L).

R

RECHARGE BASIN - A surface facility, often a large pond, used to increase the infiltration of water into a groundwater basin.

RECREATIONAL SERVICE CONNECTION – Services to public golf courses, parks, sports centers/grounds.

RECYCLED WASTEWATER - Urban wastewater that becomes suitable for a specific beneficial use as a result of treatment. *As a source category for the drought plan tables* - The total capacity of wastewater that is treated to an appropriate level for beneficial use by the district.

RETURN FLOW - The portion of withdrawn water that is not consumed by evapotranspiration and returns instead to its source or to another body of water.

REUSE - The additional use of once-used water.

RWQCB - California Regional Water Quality Control Board (or successor agency).

S

SAFE YIELD (GROUNDWATER) - The maximum quantity of water that can be withdrawn from a groundwater basin over a long period of time without developing a condition of overdraft. Sometimes referred to as sustained yield.

SALINITY - Generally, the concentration of mineral salts dissolved in water. Salinity may be measured by weight (total dissolved solids), electrical conductivity, or osmotic pressure. Where seawater is the major source of salt, salinity is often used to refer to the concentration of chlorides in the water. See also TDS.

SERIOUS OVERDRAFT - Prolonged overdraft that results, or would result, within ten years, in measurable, unmitigated adverse environmental or economic impacts, either long-term or permanent. Such impacts include but are not limited to seawater intrusion, other substantial quality degradation, land surface subsidence, substantial effects on riparian or other environmentally sensitive habitats, or unreasonable interference with the beneficial use of a basin's resources. (Also see Policy 3.5 et seq. in main text.)

SINGLE FAMILY SERVICE CONNECTION – One dwelling unit per meter.

SURFACE WATER – Water above the surface of the land, including lakes, rivers, streams, ponds, floodwater and runoff.

SWP - State Water Project.

SWRCB - California State Water Resources Control Board (or successor agency).

T

TDS - Total Dissolved Solids, a quantitative measure of the residual minerals dissolved in water that remains after evaporation of a solution. Usually expressed in milligrams per liter (mg/l) or in parts per million (ppm). See also Salinity.

TURBIDITY - A measure of cloudiness and suspended sediments in water. Water high in turbidity appears murky and contains sediments in suspension. Turbid water may also result in higher concentrations of contaminants and pathogens, that bond to the particles in the water.

U

ULF – Ultra-Low Flush; A term used to describe water efficient toilets now required by state law in new construction. ULF is defined as 1.6 gallons per flush or less.

W

WATER QUALITY - A term used to describe the chemical, physical, and biologic characteristics of water with respect to its suitability for a particular use.

WATER RIGHT - A legally protected right, granted by law, to take possession of water occurring in a water supply and to divert the water and put it to beneficial uses.

WATERSHED - The area or region drained by a reservoir, river, stream, etc.; drainage basin.

WATER TABLE - The surface of underground, gravity-controlled water.

References

Santa Barbara County Water Supply and Demand Update (2003); Santa Barbara County Water Agency and Boyle Engineering Corp.

Water Resources of Santa Barbara County (2000); Rodriguez, L.A. and R. Lang.

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2003 Groundwater Report, Santa Barbara County Water Agency

SANTA BARBARA COUNTY – SOUTH COAST, REVIEW OF 1986-91 DROUGHT
Prepared by Santa Barbara County Water Agency with Assistance from City of Santa Barbara, Montecito Water District and Goleta Water District, 1992)

USBR Water Shortage Contingency/Drought Planning Handbook, April 2003

APPENDIX A

Lessons Learned in Drought of 1987-91
(*Excerpted From:* SANTA BARBARA COUNTY – SOUTH COAST, REVIEW OF 1986-91 DROUGHT
*Prepared by Santa Barbara County Water Agency with Assistance from City of Santa Barbara, Montecito Water District and Goleta Water District, 1992.*Visit www.sbwater.org to see the entire report.*)*

Suggestions For Implementing Drought Conservation Programs

When implementing a water efficiency/demand management program in response to a water supply emergency, many elements are developed by trial and error. The following are ideas and suggestions to consider when developing and implementing a water demand management program during a period of water supply shortage. Some of these ideas will also apply to establishing a long-term efficiency program.

Program Equity:

Public input is useful in creating equitable programs. It is impossible to create a program that is acceptable to everyone, but customers often have good suggestions for dealing with questions of "fairness". This is most applicable in water rationing or allocation type programs where customer accounts have different allotment sizes.

While not always popular, banning certain practices, such as lawn watering, which are considered non-essential, may be equitable efficiency measures. Such restrictions affect lower and upper income accounts equally, i.e. the ability to engage in a certain type of water use is not dependent on the ability to pay a higher water bill.

When creating a rationing program, property size should be taken into account, regardless of whether allocations or tiered water pricing systems are used. Larger properties have a higher need for irrigation, even during a drought, in order to protect trees or established shrubs. This could be taken into account by creating a different account classification for larger properties, with appropriate price-block sizes.

Public Information Development:

When developing public information materials, it is useful to have them proof-read by someone not associated with your agency. Ideas that seem simple and unambiguous to staff may not be as clear to members of the public.

Be sure to include clear definitions of terms used in explaining efficiency programs. Information that may seem very basic, such as the units of water used on a customer's bill, may be an unfamiliar term to the customer.

Staff Management:

It is important for information to flow smoothly among staff during a water supply emergency. Conservation employees and others who deal with the public should be updated regularly so that information going out to customers is consistent and accurate.

Regular staff meetings can facilitate the flow of information and provide moral support for employees who may have to deal regularly with members of the public who are angry or frustrated.

Staff on the "front lines" implementing water efficiency programs may have valuable input on decisions faced by the Board of Directors. A line of communication between Board members and staff can help to efficiently gather staff input before making decisions that affect ongoing programs or staff work load.

Better staff communication can result in more consistent and equitable policies, as well as less frustration on the part of the staff and the public.

Water Pricing Strategies:

Rate increases should include all user categories, i.e. not excluding a certain rate category or tier. This helps relay the message that all water users will share equally in the cost of the water supply emergency.

Because water sales fluctuate each month, revenue during a water supply emergency may not be predictable. If additional funding is needed for supplemental water supplies, the use of increased service charges may be more reliable as a revenue generator.

Monitoring the Effectiveness of Programs:

The best way to track water use by each account in order to monitor the effectiveness of efficiency programs is through computerized billing systems. Databases can often be altered to include information on accounts such as participation in water audit, toilet rebate, or low-flow showerhead programs.

If computerized records are not possible, consider instituting other tracking methods at the beginning of the program. This can mean simply keeping "hard copy" files of information, for instance on customers who install low-flow showerheads, ULF toilets, or receive water audits. After the program is well underway it may be more difficult to extract information that can reveal program effectiveness or weaknesses.

A customer survey may be used to determine which efficiency programs/techniques are most often used or preferred by customers. Such a survey could give insight into difficult-to-quantify programs such as public information or school education programs. Rigorous survey design is important in order to avoid inappropriate conclusions.

Sewer flow records provide a means of separating the reduction in indoor water use from reductions in outdoor use. This may be useful in programs that include strong reduction incentives in both use categories.

Summary of Recommendations

Based on the experiences of the water districts on the South Coast of Santa Barbara County during the prolonged drought of 1986-91, the following recommendations are made for addressing future droughts. These recommendations are based on what worked, what didn't work and lessons learned by local water districts during this

- Prepare a comprehensive drought contingency plan including water supply and demand scenarios during multiple dry years so that you fully understand the district supplies and what steps will be taken to increase supplies or reduce demand when shortages occur.
- Plan ahead by setting aside water supplies (drought buffer) and funding reserves to offset temporary revenue shortfalls during periods with lower water sales.

- Implement water conservation pricing structure at all times; implement drought pricing structure in early stages of drought to encourage maximum efficiency and minimize wasteful use.
- Coordinate drought response programs among purveyors in the region for consistency, equity and to minimize confusion among water users regarding which programs are in effect in their area.
- Establish programs that are equitable (do not favor customers in higher income brackets) and do not penalize customers that been conserving all along (i.e., by creating an allocation program that reduces customer's allotment to a percentage of past use).
- Maintain credibility with customers by conducting an honest, open and intensive public information campaign throughout the drought. Keep customers informed about water situation, the impact of their conservation efforts and the ongoing need to conserve. Use many mediums to keep public informed such as bill inserts, radio/TV advertising, newspaper articles and advertising, presentations to local service clubs and organizations, neighborhood workshops, newsletters and other means typically used by local purveyors to educate customers.
- Offer options for customers regarding how they save water during early stages of drought. For example, provide an allocation and let them choose how they will use the water. One customer may want to keep their landscape thriving (with efficient irrigation practices, of course) and choose not wash their vehicles, while another customer may want to let their lawn die and still wash their vehicles. Save the severe restrictions (i.e. no lawn watering) for later stages when higher levels of conservation are necessary.
- Create a citizens' committee to obtain feedback from customers and to keep the community informed about the purveyor's decisions, particularly regarding transitions between stages of action.
- Establish a reasonable rationing program and enforce it equitably. Customers will notice if districts do not enforce the restrictions or prohibitions consistently.