2007 Water Management Plan Update

Cayucos Area Water Organization

CAWO Member Utilities

Paso Robles Beach Water Association
Morro Rock Mutual Water Company
County Service Area No. 10A
Cayucos Cemetery District

Boyle Engineering Corporation

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Table of Contents

Tables

Figures

Appendix Tables

Executive Summary

In September 1992, Paso Robles Beach Water Association (PRBWA), Morro Rock Mutual Water Company (MRM), County Service Area 10A (CSA-10A), and the Cayucos Cemetery District adopted a *Water Management Plan for the Cayucos Area Water Organization,* which was prepared by Boyle Engineering Corporation (Boyle). The 1992 Water Management Plan (WMP) included an assessment of community water needs and quantified the amount of additional water available to support new users. In 1992, sufficient water supplies were in place to meet then-current consumer needs, even after adjusting per capita demand rate to account for predicted increases in water use following the drought and after accounting for a 10 percent contingency factor. Further, an estimated 22 acre-foot/year (AFY) was considered available to supply new users.

The 1992 Management Plan was based on eight years of water use data; however, only two of those years reflected fully metered water consumption. Also, the 1992 Management Plan was prepared in the latter part of the drought and included projections for return to "normal" post-drought demand levels. Thus, the 1992 Management Plan was amended in March 1993 in light of additional metered community water use data, and has been updated periodically to incorporate the latest production and usage records.

Future water demands were predicted using up-to-date information regarding the number of vacant lots, their associated zoning, area, and water equivalencies (use factors) for various land uses categories (the CAWO is utilizing the equivalency factors adopted by Morro Bay's Planning Department).

Starting in 2003, the WMP demand forecast includes an allowance for future "Granny Units." Granny units are additional residential units added to existing structures. A granny unit has the equivalency factor of 0.54 EDUs. The total additional demand to support the construction of future granny units is estimated to be 8.4 AFY.

Beginning in 2004, updates to the WMP include forecasted demand from apartments above commercially zoned properties slated for redevelopment or existing as vacant lots. Continuing with the trend of densification, land owners are opting to develop more mixed use properties. These properties are assumed to have apartments on the second story. The second story area expected to be developed for residential use is estimated at ¾ of the commercial ground floor area.

For planning purposes, each residential unit is assumed to be 1,500 s.f. Water use for each property is based on the composition of the commercial uses and added with the residences planned on the upper floor. Apartments have an equivalency factor of 0.54 EDUs.

The estimated total community water demand at build-out has been evaluated using two methods:

(1) The current water demand and additional incremental increases in water demand are based on a 9 percent vacancy rate for all current and future residential development (including granny units and mixed use apartments). Commercial use estimates assume all commercial space will be fully utilized throughout the year. The 9 percent residential vacancy rate assumes Cayucos will experience a vacancy rate similar to the San Luis Obispo County average. Assuming this level of vacancy the total water demand at build-out is estimated to reach 641 AFY (**Appendix Table 8**).

(2) Total water demand at build-out was evaluated through the use of actual consumption records and the estimated incremental increase in demand required to support new growth (including granny units and mixed use apartments). The same 9 percent residential and 0 percent commercial vacancy rates for new growth assumed in Method 1 (above) were applied. Under such a scenario the total water demand at build-out is estimated to reach approximately 615 AFY (**Appendix Table 7**).

Based on 23 years of community water data, 17 of which reflect fully metered data, significant findings are:

Significant findings and summarized below:

1. Since 1990, total community water production has continued to remain below 450 AFY, even in these post-drought years.

2. A 10 percent planning cushion is still reasonable in estimating available water supplies for new users.

3. System losses (treatment plant and distribution system) are conservatively accounted for by assuming total 10 percent total loss factor.

4. It is estimated that 76 AFY is currently available to support new users. This equates to approximately 340 equivalent residential units (Table 6).

5. Without procuring addition water sources, the water deficit at build-out is estimated to be between 15 AFY and 41 AFY (Tables 7 and 8).

1.0 Introduction and Scope

In December 1985, the County of San Luis Obispo placed a building moratorium into effect in Cayucos in response to increasing water demands beyond the amount of available supply. The CAWO members enacted sound management programs and made system improvements, which resulted in significant reductions in water demand. As a result, the County repealed the building moratorium in 1992.

CAWO believes sufficient water supplies continue to be available to justify continued development of the community, i.e., no building moratorium is warranted.

The scope of this 2007 Management Plan Update is to:

1. Obtain monthly production and consumption records from January 2007 through December 2007 from CAWO staff. Obtain the number and type of services which comprise the active water accounts for each of the three member utilities. Obtain occupancy records for the same period.

2. Update Tables 1 and 2 of the WMP to include actual water usage for 2007. We will estimate individual agency water usage based on metered consumption of the three purveyors during this period. Furthermore, we will compare actual recent usage to the "normal" per capita demand as stated in the previous WMP Update (2006). We will compare the actual recent commercial usage for the same period to the "normal" commercial usage as stated in the previous report.

3. Utilizing the above information, compare the water needs of the existing customers to the available supplies. Consider the 600 AFY Whale Rock allocation as the existing source of supply. Render an opinion as to the current available supply for which the new will-serves may be issued. Recommend the number of residential equivalencies that may or may not be issued over the next three years.

4. Prepare a forecast of water needs, by CAWO members, based on the demand projections of the individual purveyors.

5. Provide a discussion of the methodology for the determination of community vacancy rates per purveyor. This methodology will utilize a 10-year average in vacancy rates by purveyor and the Cayucos community as a whole. The updated vacancy rate will be compared to the vacancy rate estimate used for the most recent planning year (2006). Upon completion of the vacancy rate analysis, findings will be reviewed with the representative of the CAWO prior to inclusion in the calculations for projected water demand.

6. Provide a discussion and analysis for the basis of the projected level of increase in water demand. This analysis will include a determination of per capita demand utilizing a 10-year moving average.

7. Obtain and review vacant lot inventories for the community as provided by the Morro Rock Mutual Water Company (MRMWC), Paso Robles Beach Water Association and CSA-10A. This data will be used in forecasting build-out water demand.

8. Obtain and review residential lot inventories from CAWO that are between 6,000 and 12,000 square feet. This date will be used to project water demand for "Granny Units" at build-out.

9. Render an opinion as to the projected population of the community at build-out.

10. Render an opinion as to the projected "gross" 100% occupancy community water demand at build-out utilizing a use-factor method. This will include:

    - Determination of use factor for commercial connections (Acre-feet/yr/ft^2) that will be based on current 2007 data. This use factor will be used to project water demand from vacant commercial lots.
    - Determination of use factor for residential connections (Acre-feet/yr/EDU) that will be based on a 10-year average for each purveyor. This use factor will be used to estimate build-out water demand from vacant residential lots.

11. Render an opinion as to the adjusted community water demand at build-out utilizing the SLO County average vacancy rate of 9%.

12. Compare the projected water demand at build-out with the available water supply for the community and provide a written summary of the comparison.

13. Submit four (4) copies of the Draft 2007 CAWO WMP Update. Meet with CAWO to review Draft.

14. Revise the Draft WMP Update in accordance with the comments received by the CAWO and issue four (4) copies of the Final 2007 WMP Update.

2.0 Water Supply

Domestic supply in the community of Cayucos is provided, primarily, by the CAWO member utilities, MRMWC, PRBWA, and CSA-10A. The Cemetery District is also a CAWO member but provides irrigation water only. Minor domestic uses not supplied by CAWO members included ground water supply to a trailer park on Cayucos Creek. MRM also supplies approximately 3 AFY of irrigation water to the elementary school and park from the non-potable 'D' Street well on Little Cayucos Creek. The 3 AFY provided by the 'D' Street well is not included in the production records as supplied by MRM.

CAWO members receive water from Whale Rock Reservoir per the terms of the March 20, 1958, agreement with the Whale Rock Commission. CAWO receives a maximum annual entitlement of 600 AFY at a quality as stipulated in the 1958 agreement. The terms of the agreement are such that 600 AFY is considered the sustainable yield of this source to Cayucos. Prior to 1997, reservoir releases had been extracted via a well field immediately downstream of the dam. The community water treatment plant came on-line in 1997. CAWO now receives reservoir releases via the water treatment plant (WTP) on Old Creek. The members of CAWO may still receive water from five wells located on Old Creek for emergency use. The wells are configured to direct water from the well field through the water treatment facility prior to introduction to the distribution system.

All production for CAWO is recorded by the County at the wells as and at the WTP, and printed in a monthly production report. Well production is recorded from three meters at the well field, with one meter for each purveyor. The water from the CSA-10A meter goes directly to the WTP.

In 1986, the CAWO members executed an allocation agreement among themselves to establish water allocations. On July 16, 1996, a reallocation was completed as shown in **Table 2.A**.

Table 2.A
Water Entitlement per Whale Rock Agreement

CAWO Members	Allocation (AFY)
PRBWA	222
MRM	170
CSA 10A	190
Cemetery District	18
Total	600 AFY

On April 4, 1996, the CAWO amended the 1958 Whale Rock Agreement allowing delivery. The amendment did not alter the water allocations or total source yield stated above.

In addition to the 190 AFY Whale Rock entitlement, CSA-10A has procured an entitlement of 25 AFY through participation in the Nacimiento Water Supply Project. Although neither PRB or MRM are currently pursuing entitlements from the Nacimiento Water Supply Project, supplemental water for these purveyors and additional supply for CSA-10A may be available in the future.

3.0 Water Needs

3.1 Historic Demand

Historic water production is listed in **Table 1** of the Appendix. Water production from the Whale Rock well field exceeded the 600 AFY entitlement once in the past 20 years. In calendar year 1986, total metered supply to CAWO members amounted to 620 AFY. Shortly thereafter, the well meters were calibrated and water production has not exceeded 600 AFY again. Also, in the mid-1980s, water services within the private purveyor's service area were unmetered (CSA-10A has been metered for more than a decade). Since then, water meters have been installed on all services and overall demand remains well below 600 AFY (**Table 3.A**).

Table 3.A
Overall Demand vs. Entitlement

YEAR	Total Demand / Metered Production (AFY)	Remaining Supply Available (AFY)
1998	412	188
1999	436	164
2000	419	181
2001	415	185
2002	421	179
2003	422	178
2004	428	172
2005	406	194
2006	409	191
2007	432	168

CAWO recognizes per capita demand reduction has resulted from excellent community response to drought conditions, but some increase in community water demand is expected in years following a drought.

3.2 Projected Demand

In assessing available water supply, projected water needs must be considered. This projected level of demand is referred to herein as "normal" water needs of existing consumers.

Occupancy Rates and Population

It is customary to base water need projections on site-specific service area population. In the case of the individual purveyors in Cayucos, however, accurate population figures per household are not available. Accurate counts of the number of water meters, however, are available. Therefore, water meter records were used to derive an estimated service area population and subsequent per capita water demand. **Table 3.B** summarizes the water meter counts per purveyor.

Table 3.B
Water Service Meters per Purveyor

Purveyor	Residential Meter	Commercial[1] Meter	Total[2]
PRBWA	722	57	779
MRM	557	69	626
CSA-10A	750	3	753

1. Commercial accounts based on CAWO account records. Prior to the 2002 WMP Update, meters larger than 5/8-inch were assumed to be commercial.
2. Total does not include meters installed on vacant lots.

In general, accounts which used an average of 1,500 gallons/month or less are considered to be vacant. **Table 2** of the Appendix indicates the estimated percentage of vacant units, or planning percent vacancy, based upon the 1,500 gallons/month criteria. Actual issued will-serve letters and unoccupied lots containing water meters are accounted for in the "Will-Serves" allocation. Overall CAWO vacancy for 2007 is estimated to be approximately 14.3 percent. Therefore, with an estimated occupancy density of 2.08[1] persons per year-round occupied residence, the estimated service area population for CAWO is approximately 3,620 residents as shown in **Table 2** of the Appendix.

[1] Source: Average household size obtained for 2000 Census Fact Sheet for Cayucos.

Residential Usage

Meter records from 1997 to the present were examined to estimate historic residential water usage and is calculated based on actual metered data.

Actual residential usage for 2007 was approximately 358 AF. Taking into account the water consumption records from 1998 through 2007, per capita water demand for the CAWO community has averaged 87 gpcd as illustrated in **Table 3** of the Appendix.

Each CAWO member has outstanding water service will-serves on record to which water service has yet to be activated. In addition to outstanding will-serves, vacant lots with installed meters and units under construction are accounted for as water service commitments from CAWO purveyors. Water service commitments for each CAWO member are as summarized in **Table 3.C.** Both PRBWA and MRM converted non single-family residential water service commitments into equivalent residential units.

Table 3.C
Outstanding Water Service Commitments per Agency

CAWO Members	Equivalent Residential Units*
PRBWA	9
MRM	18.27
CSA-10A	54

*Includes outstanding will-serves, vacant lots with installed meters, and units under construction with consumption less than 1,500 gallons per month.

Based upon reported equivalencies, water demand estimates include an additional 16.4-AFY adjustment for the outstanding water service commitments as shown in **Table 3.D.**

Table 3.D
Demand Estimates for Outstanding Water Service Commitments

	Normal[1] Per Capita Consumption Rate (gpcd)	Persons per Occupied Residence[2]	Outstanding Water Service Commitment (SFR Equivalencies)	AFY[3] Usage
PRBWA	87	2.08	9	1.8
MRM	87	2.08	18.27	3.7
CSA-10A	87	2.08	54	10.9
Total Demand				**16.4**

1. Based on the 10-year weighted average consumption for all CAWO purveyors.

2. Persons per dwelling unit based on 2000 census data.

3. Usage presented in Table 3.D is calculated using the normal per capita consumption rate as determined in Table 3 of the Appendix.

Commercial Usage

Historic average commercial usage is shown in **Table 4** of the Appendix. Overall commercial water usage has been trending slightly downward since 1992 for CAWO as a whole. This is due in part to agency improvements in distinguishing residential from non-residential demand and conservation.

Total Short-Term Projected Demand

On April 20, 1992, in a meeting with the County Planning Department, a 10 percent cushion was agreed to be satisfactory for planning purposes. This cushion was first reflected in the 1992 CAWO Management Plan and will again be used for the purposes of planning for the ensuing period.

As of 2003, the WMP Update includes system losses in the total existing and future demand figures. Previously, estimated losses were identified in this document but were not subtracted from the available supply estimates. **Section 3.5** provides additional information regarding unaccounted-for-water.

Total short-term projected demand for existing Cayucos users, including normal residential, commercial, outstanding service commitments, system losses, cemetery irrigation needs, and the 10%

planning cushion are estimated at 478.2 AFY (Appendix **Table 5**). The total short-term demand also includes the 10 percent planning cushion.

3.3 Water Available for New Users

After review of the 2007 water consumption and production records provided by the CAWO members, Boyle has made the following determination regarding the number of residential will-serves that may be issued. The available residential will-serves that may be issued by each CAWO member with respect to their individual Whale Rock entitlement are provided in **Table 3.E**.

Table 3.E
Projected Supply Available vs. Whale Rock Entitlement

	Current Whale Rock Entitlement (AFY)	Projected "Normal" Usage with 10% Cushion and Losses (AFY)	Projected Supply Available (AFY)	Equivalent Residential Units (ERUs)
PRBWA	222	199.1	22.9	102.7
MRM	170	136.6	33.4	149.8
CSA-10A	190	170.5	19.5	87.4
Total	**582**	**506**	**76**	**340**

The number of equivalent units noted in **Table 3.E** will bring the total community demand to a level equaling or exceeding the current Whale Rock entitlement. Therefore, for planning purposes, the actual number of will-serves issued per purveyor should be a fraction of the number of equivalent residential units noted above.

CSA-10A is a participant in the planning stage of the Nacimiento Water Supply Project. CSA-10A has procured a 25 AFY entitlement from the Nacimiento Water Supply Project. If supplemental water is obtained from the Nacimiento Water Supply Project, approximately 44.5 AFY will be available for new CSA-10A users as shown in **Table 6** of the Appendix. The 44.5 AFY will sustain approximately 199 additional equivalent residential units assuming average annual residential demand remains approximately 0.2230 AFY per residence.

At the time of the 2006 Water Management Plan Update both CSA-10A and MRM anticipated participation in the Nacimiento Water Project, with estimated entitlements of 80 AFY and 30 AFY, respectively. Currently, neither MRM or PRB have expressed interest

in participation; CSA-10A has procured an entitlement of 25 AFY. With CSA-10A's participation in the NWP, total community water supplies increase to 625 AFY, as shown in Appendix **Table 6**.

CAWO water production for 2007 was 72 percent of the 600-AFY entitlement. Therefore, making maximum use of the current Whale Rock entitlement in a responsible manner will necessitate measures to ensure that no Cayucos purveyor, individually or collectively, exceeds their allocation. To ensure that no purveyor will make commitments for new water service beyond their allocation, all purveyors must agree to limit the issuance of will-serves to only those available within the limitations of each purveyor's Whale Rock allocation.

If any purveyor should be in a position of having issued will-serves which are projected to cause water demand to exceed their Whale Rock allocation, then that purveyor will cease the issuance of new will-serves until such time as it is able to do so without exceeding the Whale Rock allocation or until new water supplies are secured. Any purveyor exceeding their Whale Rock allocation will pursue reasonable means at their disposal to remedy the situation, either by demand management or procuring supplemental water.

3.4 Projected Population and Demand at Build-Out

The 2002 WMP Update marked a change in the way build-out demand was estimated for the community of Cayucos, which continues in this current Update. The information provided in the Crawford Multari & Clark report is no longer used to project future water demand in the WMP Update. Rather, a revised build-out demand was estimated using recently compiled information regarding vacant lots, their assigned zoning, commercial square footage, and the associated water equivalencies (use factors) for the various land uses categories. The CAWO made the decision to use the equivalency factors adopted by Morro Bay's Planning Department, as it is believed a fair representation of water use in Cayucos.

In order to support the eventual build-out water demand of Cayucos, approximately 15 to 41 AFY of additional supply will be required, as shown in Appendix **Tables 7 and 8**, respectively. It is assumed, in this update, all future commercial square footage will be fully utilized year round. **Tables 3.F and 3.G** provide a summary of build-out water requirements for both commercial and residential usage. **Table 3.H** provides a summary of the total additional water supplies that will be required at build-out by purveyor.

Table 3.H
Additional Water Required for Build-out

Purveyor	Entitlement (AFY)	Build-Out Requirement (AFY)	Supply Available at Build-Out (AFY)
PRBWA	222	217.8	4.2
MRM	170	173.4	-3.4
CSA-10A	190	231.6	-41.6
Cemetery	18	18.0	0.0
Total	**600**	**640.8**	**-40.8**

* Tabular values shown to nearest whole number
* Demand estimates include planning cushions and losses - assumes EDU demand stays constant at 0.2230 AFY/EDU, see Table 8 of Appendix

Cayucos is likely to experience water shortages as the population grows. In order to provide consistent and reliable water service in the future, additional sources of water sufficient to account for the projected deficiencies should be explored by CAWO members.

Boyle Engineering has evaluated the current water demand and additional incremental increases in demand to support future growth based on a 9 percent vacancy rate. The 9 percent vacancy rate is applied to all current and future residential development. Commercial use estimates assume all commercial space will be fully utilized throughout the year. The 9 percent residential vacancy rate assumes, at build-out, Cayucos will experience a vacancy rate similar to the San Luis Obispo County average. Assuming this level of vacancy the total water demand at build-out is estimated to reach 641 AFY, as shown in **Table 3.H** above and **Table 8** of the Appendix.

3.5 Unaccounted-for-Water

One water management strategy CAWO members may consider is to reduce unaccounted-for-water. This can be accomplished by meter calibration, replacing broken or damaged service meters, leak repairs, and making sure temporary meters are used each time for construction, and maintenance (including water line flushing).

Unaccounted-for-water in distribution systems of this size typically range from 8 to 10 percent. This is considered normal and generally does not indicate the need for a leak detection or other loss reduction

program. For years when consumption exceeds production, there is probably some meter error or a mismatch between the water sales and production time periods. For planning purposes, a 10 percent loss factor is assumed.

CAWO's unaccounted-for-water, for 2007, is summarized in **Table 3.I** as determined by the difference between metered water consumption and metered water production.

Table 3.I
Water System Loss per Purveyor (AFY)

	2007 Production	2007 Metered Consumption	Gain or Loss
PRBWA	164.74	162.60	Loss 1.3%
MRM	121.49	121.40	Loss 0.1%
CSA-10A	141.86	132.30	Loss 6.7%
Plant Losses	428.09	416.30	Loss 2.8%

Purveyor loss values:
Production = Plant Metered Deliveries
Metered Consumption = Purveyor Metered Consumption
Plant loss values:
Production = Plant Metered Influent
Metered Consumption = Plant Metered Deliveries

Based on the data provided by CAWO, CAWO members have unaccounted-for-water below the typical range, with the exception of CSA-10A. As water use approaches each purveyor's individual Whale Rock entitlement, and where losses exceed the typical range (as appears to be the case with CSA-10A) it may be prudent to embark on a loss production program.

4.0 Identification of Maximum Use Goal

In 1992, the CAWO adopted maximum use goals that trigger specific actions on a quarterly basis in response to total community water demand. The CAWO has been closely following water consumption and has maintained detailed records of monthly water use. Boyle recommends the CAWO continue to utilize the "Maximum Use Goal" for each quarter to determine whether management actions are needed throughout the year. This consumption pattern is based on historic monthly use trends and represents 90 percent use of the available 600 AFY Whale Rock Reservoir supply. In other words, the agreed upon 10 percent cushion has been factored in. The recommended quarterly Maximum Use Goals are as noted in **Table 4.A.**

Table 4.A
Quarterly Maximum Water Use Goals

	Goal	Quarterly Increment
1st quarter	106 AF	106 AF
2nd quarter	242 AF	136 AF
3rd quarter	410 AF	168 AF
4th quarter	542 AF	132 AF

If year-to-year demands are observed to be increasing steadily, CAWO will consider instituting the low-flow fixture rebate program and will re-evaluate the issuance of will-serve letters. The CAWO may also implement the retrofit program as a condition of issuing additional will-serve letters if annual demands are observed to be increasing.[2]

[2] Note that PRBWA enacted a retrofit program in 1995, MRM enacted a retrofit program in 1997 and the Board of Supervisors approved CSA-10A's retrofit program on January 13, 1998.

5.0 Deficiency Level Thresholds

The following discussion of levels of deficiency and the means by which they are to be repealed is verbatim from that published in the 1992 Water Management Plan (WMP). The sections in italics below restate the 1992 WMP discussion for each level to emphasize the importance of relating community building permit issuance to sound water resource management.

5.1 Current Level

Level I Resource Capacity Problem

1992 WMP: *In San Luis Obispo County, a Level I Resource Capacity Problem is defined in the Local Coastal Plan Framework for Planning as the condition in which the capacity of a particular water source will be reached within seven years or other time frame deemed critical for obtaining supplemental water.*

Discussion: **Figure 5.1** below represents the current and projected water demands for CAWO in relation to the total water available as determined by the Whale Rock Agreement (600AFY). The bold black line depicts the projected water demand increase required to trigger a Level I Resource Capacity Problem as defined above. This would require a demand increase of 24 AFY over the next seven years. As of the completion of the 2007 Water Management Plan Update, no Level I water deficiency exists as long as future water demand increases remain below the critical threshold.

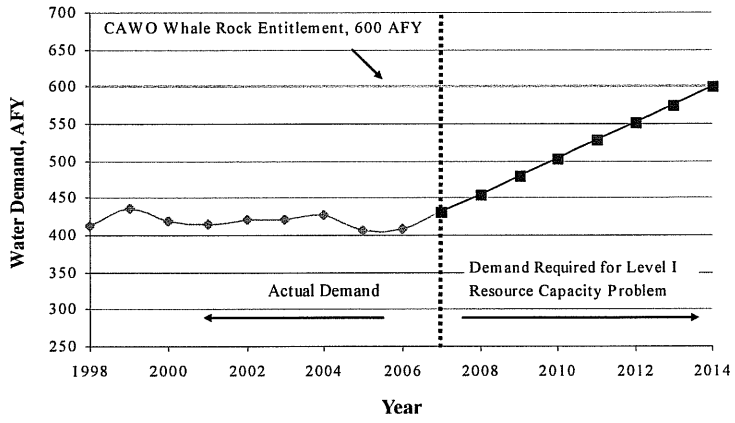

Figure 5-1: CAWO Level I Resource Capacity Problem

Level II Diminishing Resource Capacity

A Level II Diminishing Resource Capacity is defined as the condition in which the capacity of a water source will be reached within 5 years or other critical time line.

Discussion: **Figure 5.2** below provides a graphical description of the current and projected water demands for CAWO in relation to the total water available as determined by the Whale Rock Agreement (600AFY). The bold black line depicts the projected water demand increase required to trigger a Level II Diminishing Resource Capacity situation as defined above. This would require a demand increase of 34 AFY over the next five years. As of the completion of the 2007 Water Management Plan Update, no Level II water deficiency exists as long as future demand increases remain below the critical threshold.

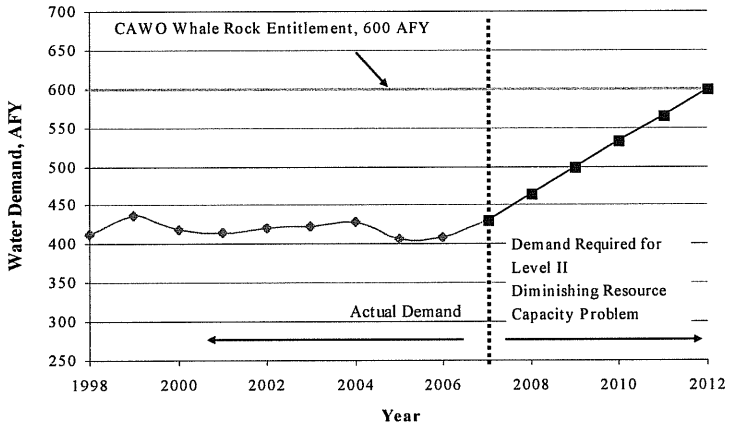

Figure 5-2: CAWO Level II Resource Capacity Problem

Level III Resource Met or Exceeded Capacity

A Level III Resource Capacity Met or Exceeded occurs when the water source capacity has been met or exceeded and creates a deficiency of sufficient magnitude that drastic actions must be taken to protect public health and safety.

5.2 Criteria for Change of Level Status

It is the intention of the CAWO to manage available resources in such a manner as to avoid reaching any deficiency level. Proposed criteria for triggering a change to the resource status level and the basis on which such criteria is founded are:

1. *There is currently no water deficiency in Cayucos.*
2. *Current sustained yield of all CAWO water sources is 600 AFY. This will increase to approximately 625 AFY at the time that Nacimiento water is delivered.*
3. *The CAWO plans to document actual water consumption and project future water needs based on the planning parameters included herein. Projected demands for existing users and those associated with outstanding will-serve letters will be summarized annually and compared to the approximation of sustained yield.*
4. *If projected demand is found to equal sustained yield within 7 years, then a Level I Resource Capacity Problem may be warranted.*
5. *Once a Level I deficiency is declared, the CAWO will reevaluate the issuance of will-serve letters. Also, the level of severity can be reclassified to a Level II if projected demand approaches sustained yield within a 5-year period.*
6. *Once a Level II deficiency is declared, the CAWO should reevaluate the issuance of will-serve letters and should concentrate on securing new water sources. Reclassification to a Level III deficiency level should only be declared after 3 continuous years of water production in excess of the sustained yield of all water sources. This would avoid overreacting to a one-year event and would provide for some reaction time on the part of the residents. Further, water use in excess of the 600 AFY contractual limit with the Whale Rock Commission should be handled among the parties to the agreement and should not become the concern of an outside agency.*
7. *The CAWO is encouraged to negotiate some carryover storage in the Whale Rock Reservoir as part of the anticipated exchange agreement as additional insurance against sporadic excess water usage.*

6.0 Conclusion

It is estimated that a total of 76 AFY (or 340 equivalent residential dwelling unit) of water is available for new users. This includes existing customers, outstanding will serves, system losses and a 10% planning cushion. Furthermore, it is estimated that roughly 41 AFY (including system losses, and 10% planning cushion) of water will be required to support new growth.

The vacancy rate is expected to decline, approaching the County average of 9 percent, as the community moves towards build-out. An increase in occupancy will result in an increase in annual water demand. Without procuring addition water sources, the water deficit at build-out is estimated to be between 15 AFY and 41 AFY.

Appendix

TABLE 1
HISTORIC WATER DELIVERIES
(AFY)

PURVEYOR	ANNUAL DELIVERIES (1) 1984	1985	1986 (2)	1987	1988	1989	1990 (3)	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	10 YEAR AVG	CURRENT ANNUAL ALLOCATION (4)
PRBWA	195.50	201.73	204.63	221.95	248.28	239.76	197.30	167.30	157.29	172.04	164.79	164.79	177.08	167.83	155.03	158.92	167.69	159.01	161.48	164.76	168.54	155.54	155.50	162.60	160.9	222
MRM	152.26	216.84	244.35	153.03	166.71	154.21	141.95	123.96	114.03	95.81	108.49	108.49	112.24	113.43	115.86	104.90	105.83	111.45	119.09	113.51	116.27	112.04	114.04	121.40	113.4	170
CSA-10A (6)	120.24	153.85	153.26	155.47	141.58	132.89	131.71	122.37	117.30	133.16	134.94	135.21	128.35	123.78	118.21	126.06	123.97	121.52	126.06	127.80	128.43	125.35	124.14	132.30	125.4	190
CEMETERY	12.78	16.83	18.09	16.63	18.70	15.42	16.60	13.91	6.97 (5)	5.30 (5)	11.43	8.15	16.89	17.34	12.26	15.77	14.25	14.62	14.86	15.91	14.93	13.14	15.20	15.32	14.6	18
TOTALS	480.78	589.25	620.33	547.08	575.27	542.28	487.56	427.54	395.59	406.31	419.65	416.64	434.56	422.38	401.36	405.65	411.74	406.60	421.49	421.98	428.17	406.07	408.88	431.62	415	600

(1) Source: Memorandum from Alex Hinds, Director - Department of Planning and Building, and Clint Milne, County Engineer, to the San Luis Obispo County Board of Supervisors, dated May 7, 1991. Supplemented with well production records from the water purveyors for 1991. All records indicated metered well production. 1992-2004 data from SLO County, MRM, and PRBWA Engineering Department Monthly Reports (customer usage). Furthermore, the CSA-10 Treatment Plant came on line in 1997.

(2) Well meters were calibrated after 1986 and found to be erroneous. Production figures prior to 1987 are suspect.

(3) Total CAWO service area meters in place by early 1990. Usage after 1990 represents water usage to metered services.

(4) Per the Allocation of Whale Rock Water Agreement, as amended in 1995.

(5) Meter reading errors were reported, usage for planning to be based on 18 AFY allotment.

(6) County staff has thoroughly reviewed and revised CSA-10 consumption records for the period between 1996-2003.

(7) Deliveries from 2004 on represent water sold. Losses are summarized in subsequent tables.

(8) 10-year total average delivery rounded up.

TABLE 2

ESTIMATED SERVICE AREA POPULATION

BASED ON 10 YEAR MOVING AVERAGE FOR VACANCY

PURVEYOR	10 YEAR AVG. (AFY)	CURRENT ANNUAL ALLOTMENT (AFY) (2)	FULLY INSTALLED METERS (3)		METERS ON VACANT LOTS / NEW CONSTRUCTION (3)	PLANNING % VACANCY (4) (5) 10-Yr Avg	NUMBER OF OCCUPIED RESIDENCES	ESTIMATED POPULATION @ 2.08 PER OCCUPIED RES. (6) (7)
			TOTAL	RESID.				
PRBWA	160.9	222	779	722	8	14.05	621	1,291
MRM	113.4	170	626	557	9	15.11	473	984
CSA-10A	125.4	190	753	750	39	13.84	646	1,345
CEMETERY	14.6	18	n/a	n/a	n/a	n/a	n/a	n/a
TOTAL	415	600	2,158	2,029	56	Overall Vacancy 14.3%	1,740	3,620

(1) 10-year total average usage rounded up.
(2) Per the Allocation of Whale Rock Water Agreement, as amended in July 16, 1996.
(3) Number of meters are as provided by CAWO records.
(4) Accounts of less than 1,500 gallons/month are presumed vacant units.
(5) Planning % Vacancy is determined by using a 10-year moving average.
(6) The average household size of 2.08 persons/residence is based on the 2000 Census Data for the Community of Cayucos.
(7) Meters on vacant lots or lots under construction are not included.

TABLE 3

PROJECTED "NORMAL" RESIDENTIAL USAGE FOR EXISTING SERVICES
10 Year Average

PURVEYOR	ESTIMATED POPULATION (1)	WATER DELIVERIES (AFY)															ESTIMATED RESIDENTIAL USAGE (AFY) (2)															ESTIMATED PER CAPITA USAGE (gallons per capita - day)															10-YEAR AVE (gpcd)	"NORMAL" RESIDENTIAL DEMAND (AFY)
		1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007		
PRBWA	1291	172.04	164.79	164.79	177.08	167.83	155.03	158.92	167.69	159.01	161.48	164.76	168.54	155.54	155.50	162.6	138.8	134.8	143.8	152.1	135.8	124.0	155.0	154.3	139.0	136.7	140.1	139.0	127.5	126.70	132.3	100	98	94	107	100	91	103	119	95	95	97	96	88	87	92	96	139.0
MRM	984	95.81	108.49	108.49	112.24	113.43	115.86	104.90	105.83	111.45	119.09	113.51	116.27	112.04	114.04	121.4	77.3	85.9	83.5	89.2	88.4	80.0	88.0	83.6	90.0	95.8	91.3	92.7	88.2	90.34	94.9	78	87	83	90	92	60	81	58	83	86	82	83	79	81	86	78	86.0
CSA-10A	1345	133.16	134.94	135.21	128.35	123.78	118.21	126.06	123.97	121.52	126.06	127.80	128.43	125.35	124.14	132.3	131.2	131.9	133.2	123.4	120.8	115.2	123.1	121.4	116.3	124.2	126.4	127.1	123.8	122.67	131.1	98	98	98	90	87	83	83	81	81	87	89	88	85	85	87	85	127.8
CEMETERY	N/A	5.30 (3)	11.43	8.15	16.89	17.34	12.26	15.77	14.25	14.62	14.86	15.91	14.93	13.14	15.20	15.32	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
TOTAL	3,620	406	420	417	435	422	401	406	412	407	421	422	428	406	409	432	347	353	360	365	345	319	366	359	345	357	358	359	340	340	358																Weighted Average 87	353

(1) Refer to Table 2. Estimated population for years 1996-2007 are as follows: 1996 pop. = 3359, 1997 pop. = 3407, 1998 pop. = 3448, 1999 pop. = 3630, 2000 pop. = 3609, 2001 pop. = 3552, 2002 pop. = 3558, 2003 pop. = 3560, 2004 pop. = 3584, 2005 pop. = 3586, 2006 pop. = 3595, 2007 pop. = 3620.
(2) 2002 - 2007 figures are based on CAWO Records for "Residential" accounts. Figures before 2002 are based on total consumption less meter records for commercial usage based on meter size.
(3) Meter reading errors were reported, usage for planning to be based on 18 AFY allotment.
(4) Total normal residential demand rounded up.

TABLE 4

PROJECTED "NORMAL" COMMERCIAL USAGE

PURVEYOR	1993 (1)	1994 (1)	1995 (1)	1996 (1)	1997 (1)	1998 (1)	1999 (1)	2000 (1)	2001 (1) (2)	2002 (2)	2003 (2)	2004 (2)	2005 (2)	2006 (2)	2007 (2)	"NORMAL" COMMERCIAL USAGE (AFY) (3)
PRBWA	33.0	30.0	21.0	25.0	32.0	30.0	9.0	13.39	19.56	24.75	24.62	29.52	28.00	28.80	30.26	23.8
MRM	19.0	23.0	25.0	23.0	25.0	24.0	21.0	22.24	21.80	23.34	22.21	23.57	23.80	23.70	26.47	23.2
CSA-10A	2.0	3.0	2.0	5.0	3.0	3.0	3.0	2.62	5.21	1.85	1.40	1.32	1.60	1.47	1.24	2.3
CEMETERY	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
TOTAL	54	56	48	53	60	57	33	38	47	50	48	54	53	54	58	50

(1) Estimated usage based on CAWO records for meters larger than 5/8" before 2002.
(2) Estimated usage based on actual meter records for "commercial / business" accounts as provided by CSA-10A, MRM, and PRBWA.
(3) "Normal" commercial usage based on 10-year average, total rounded up.

TABLE 5

TOTAL "NORMAL" USAGE FOR EXISTING SERVICES

PURVEYOR	"NORMAL" RESIDENTIAL USAGE (1) (AFY)	NO. OF OUTSTANDING WATER SERVICE COMMITMENTS (EDUs) (2)	ADJUSTMENT FOR OUTSTANDING WATER SERVICE COMMITMENTS (AFY) (3)	"NORMAL" COMMERCIAL AND CEMETERY USAGE (4) (5) (AFY)	TOTAL "NORMAL" USAGE (AFY)	PLUS 10% "CUSHION" (5)	ESTIMATED SYSTEM LOSSES (10%) (AFY) (6)	WHALE ROCK ENTITLEMENT (AFY)	SUPPLY AVAILABLE (AFY)
PRBWA	139.0	9.00	1.8	23.8	164.6	181.0	18.1	222	22.9
MRM	86.0	18.27	3.7	23.2	112.9	124.2	12.4	170	33.4
CSA-10A	127.8	54.00	10.9	2.3	140.9	155.0	15.5	190	19.5
CEMETERY	n/a	n/a	n/a	18.0	18.0	18.0	n/a	18	n/a
TOTAL	353	81	16.4	68.0	436.4	478.2	46.0	600	75.8

(1) Refer to Table 3.
(2) "Water Service Commitments" includes outstanding will-serves, vacant lots with installed meters, and units under construction with consumption less than 1,500 gallons per month.
(3) Estimation of projected yearly demand for issued "Water Service Commitments" which are outstanding. Refer to Note 2 for description of "Outstanding Water Service Commitments"
(2.08 persons per occupied Residence)*(87 gpcd)*(365 days/yr) / [(7.48 gal/cf)(43560 cf/acre)] = 0.2230 AFY per will-serve.
(4) Refer to Table 4. Cemetery usage is based upon allocation.
(5) 10% cushion not added to Cemetery usage.
(6) CAWO treatment plant losses typically range from 1% to 4%, distribution losses typically range from 3% to 6%. For planning purposes, total distribution losses are estimated at 10% of "Normal" usage.

TABLE 6

WATER AVAILABLE FOR ADDITIONAL USERS

PURVEYOR	CURRENT WHALE ROCK ENTITLEMENT (AFY)	REQUESTED NACIMIENTO ENTITLEMENT (3) (AFY)	TOTAL PROJECTED SUPPLIES (AFY)	PROJECTED "NORMAL" USAGE (Number includes 10% Cushion & Losses (1) (AFY)	WITH NACIMIENTO WATER		WITHOUT NACIMIENTO WATER	
					PROJECTED SUPPLY AVAILABLE (AFY)	ADDITIONAL EQUIVALENT RESIDENTIAL UNITS (2)	PROJECTED SUPPLY AVAILABLE (AFY)	ADDITIONAL EQUIVALENT RESIDENTIAL UNITS (2)
PRBWA	222	0	222	199.1	22.9	102.7	22.9	102.7
MRM	170	0	170	136.6	33.4	149.8	33.4	149.8
CSA-10A	190	25	215	170.5	44.5	199.6	19.5	87.4
CEMETERY	18	0	18	18.0	n/a	n/a	n/a	n/a
Totals	600	25	625	525.0	100.8	452 Units	76	340 Units

(1) See Table 5. The 10% cushion is included for domestic suppliers, no cushion included for cemetery usage. Losses (10% of "Normal" Use) include both treatment plant and distribution system losses.

(2) Based on "Normal" residential usage of 87 gpcd at 2.08 persons per residence + 10% planning cushion = 199.06 gal/EDU/day = 0.2230 AFY/EDU.

(3) Adjustments in requested entitlements are anticipated.

TABLE 7
Total Projected Water Requirements at Build-Out By Purveyor

Purveyor	Total 2007 "Normal" Usage - Includes 10% Planning Cushion AFY (1)	Estimated Additional Demand to Support Build-Out - Includes 10% Cushion AFY (2) (3)	Treatment Plant and Distribution System Losses (10%) (4)	Total (AFY)	Whale Rock Entitlement (AFY) (5)	Supply Available at Build-Out
PRBWA	181.0	8.0	18.9	207.9	222	14.1
MRM	124.2	26.8	15.1	166.0	170	4.0
CSA-10A	155.0	47.8	20.3	223.1	190	-33.1
Cemetery	n/a	n/a	n/a	18.0	18	0.0
TOTAL	460.2	82.5	54.3	615.0	600	-15

(1) The 2007 normal usage is calculated using a 14.3% vacancy rate.
(2) The estimated incremental increase in demand assumes every vacant residential lot zoned single family will contain an EDU and assumes 9% vacancy rate for new growth only.
(3) See Tables 8A and 8B. Values include build-out demand of existing vacant lots and anticipated additional granny units.
(4) CAWO treatment plant losses typically range from 1% to 4%, distribution losses typically range from 3% to 6%. For planning purposes total distribution losses are estimated at 10%.
(5) The current Whale Rock Reservoir water allocation as described in the amended allocation agreement dated July 16th, 1996.

TABLE 8

Total Projected Water Requirements at Build-out By Purveyor

(Numbers Reflect a 9 % Vacancy Rate for all Current and Future Residential Development and 100% Commercial Occupancy)

Purveyor	Adjusted 2007 "Normal" Usage Includes 10% Cushion (AFY) (1) (2)	Estimated Additional Demand to Support New Growth to Build-Out, Includes 10% Cushion (AFY) (1) (2) (3)	Treatment Plant and Distribution System Losses (10%) (4)	Total (AFY)	Whale Rock Entitlement (AFY)	Supply Available at Build-Out
PRBWA	190.0	8.0	19.8	217.8	222	4.2
MRM	130.9	26.8	15.8	173.4	170	-3.4
CSA-10A	162.8	47.8	21.1	231.6	190	-41.6
Cemetery	n/a	n/a	n/a	18.0	18	0.0
TOTAL	484	83	57	640.8	600	-40.8

(1) Quantity accounts for a 9% residential vacancy rate. This quantity of water is the estimated increase in current demand to support build-out. The 9% vacancy rate is based on San Luis Obispo County Planning Department's estimate for a build-out vacancy rate for the community of Cayucos. San Luis Obispo County assumes that build-out vacancy for Cayucos will approach the SLO County average.

(2) The Adjusted 2007 Normal Usage (includes the 10% planning cushion) is computed using the 2007 use data, but assumes a 9% vacancy rate rather than the actual 2007 average rate of 14.3%.

(3) See Tables 8A and 8B. Number includes build-out demand of existing vacant lots and anticipated additional granny units.

(4) CAWO treatment plant losses typically range from 1% to 4%, distribution losses typically range from 3% to 6%. For planning purposes total distribution losses are estimated at 10%.

TABLE 8A
Projected Additional Water Demand to Support Build-Out
(Anticipated Build-Out Demand of Vacant Lots)

Purveyor	Commercial Services Square Footage	Office Square Footage	Com Retail Square Footage	Office and Commercial Sub Total (AFY)	Total Lots Multi Family[2]	Total Lots Single Family	Residential Sub Total (AFY)	Estimated Quantity Required (AFY)	Estimated Quantity Required (AFY)
SF Residential Equivalency Factor[3]	0.00009	0.00015	0.00015		2.34	1.0		Assuming 0%	Assuming 9%
Unit	Ft^2	Ft^2	Ft^2		Unit	Unit		Vacancy Rate	Residential Vacancy Rate
PRBWA	21,750	8,000	6,250	0.9	2.0	14	4.2	5.08	4.8
MRMWC	42,750	46,000	30,000	3.4	16.0	68	23.5	26.9	25.5
CSA10	1,779	0	2,102	0.1	0.0	215	47.9	48.0	43.7
TOTAL	66,279	54,000	38,352	4.4	18.0	297	76	80	74

(1) Equivalency factors are referenced from Morro Bay Community Development Department, Water Equivalency Table (Oct 1990)
(2) The 2007 Weighted Average "Normal" per capita demand plus a 10% planning cushion is used to calculate an EDU: EDU = 87 gal/cap-day *10% Cushion * 2.08 persons / unit * 365 day/yr = 0.2230 AFY/EDU. (Uses 2007 "Normal" per capita demand of 87 gpcd).
(3) Non-residential zoned property assumes mixed use two story construction. It is assumed the 2nd story area developed for residential use is 3/4 of the ground floor area (commercial). For planning purposes, each residential unit is assumed to be 1,500 s.f. Water use for each residence is based on the composition of the commercial uses and added with the residences planned on the upper floor. Each residence is assumed as an apartment with a duty factor of 0.54 EDU.
(4) Assumes 3 units per multi-family lot - each unit has a residential equivalency of 0.78 units
(5) Assumes every vacant single family residential lot will contain a single EDU
(6) Additional build-out demand estimates are based on vacant lot inventories and zoning information provided by CAWO members

TABLE 8B
Projected Water Demand to Support Granny Units At Build-Out

Purveyor	Total Lots w/ Potential GU [2]	Estimated Quantity Required (AFY)	Estimated Quantity Required (AFY)
SF Residential Equivalency Factor [1]	0.54	Assuming 0%	Assuming 9%
Unit	Unit	Vacancy Rate	Residential Vacancy Rate
PRBWA	29	3.5	3.2
MRMWC	11	1.3	1.2
CSA10	37	4.5	4.1
TOTAL	**77.0**	**9.3**	**8.4**

(1) Equivalency factors are referenced from Morro Bay Community Development Department, Water Equivalency Table (Oct 1990)
(2) Thirty percent (30%) of lots between 6,000 and 12,000 SQ. FT are considered to have "Granny Unit" potential.