



City of Santa Barbara
Public Works Department

Interoffice Memorandum

DATE: October 6, 2010

TO: Board of Water Commissioners

FROM: Bill Ferguson, Water Resources Supervisor *BF*
Alison Jordan, Water Conservation Coordinator

SUBJECT: WATER DEMAND WORK SESSION

Projected water demand is a key input assumption of the water supply update process. Now that we have completed studies related to future water demand, we would like to discuss the issue with the Water Commission in a work session at the October 11, 2010 meeting. Our eventual goal will be to identify the anticipated level of demand that our water supply will need to meet during the 20-year planning period of 2011 to 2030, in addition to an appropriate safety margin. Following is background information about a number of topics that are relevant to this discussion.

Current Situation

The history of water demand from 1986 to present is shown on Attachment 1. Moderate cutbacks in response to a Stage 1 Drought are evident during 1989 and response to the Drought Emergency is reflected in significant reductions for 1990. From 1992 to 1998, a steady post-drought recovery occurred, followed by a period of generally flat demand, but with significant fluctuations from year to year. To analyze this period of fluctuations, staff began tracking demand in relation to rainfall and evapotranspiration (ET_o) data, as shown in Attachment 2. The blue line is the same moving 12-month demand data shown in Attachment 1. The red and green bars represent rainfall and ET_o respectively. Upward bars indicate a 12-month period of above average values, and downward bars indicate periods of below average values. We use this information to help estimate the "normal year" demand (i.e., approximately average rainfall), as the basis for planning water supply and revenue requirements.

Under the current Long Term Water Supply Program (LTWSP) adopted in 1994, the City's water supply was planned to meet a total water system demand (potable plus recycled water) of 18,200 AFY. This number is derived as 17,900 AFY of demand projected as a part of the 1989 update of the City's General Plan, plus a 10% safety margin, for a total of 19,700 AFY, minus an assumed "supply" of 1,500 AFY from new water conservation (some rounding included). Demand without safety margin for the end of the period was projected to be 16,400 AFY, including the assumed effects of water conservation. As we end the current planning period, our normal year demand is approximately 14,000 AFY. As such, we are ending the planning period with a normal year demand that is about 2,400 AFY lower than projected. This can be attributed to a number of factors, including an aggressive water conservation program, less actual development than projected, the cumulative effects of stricter plumbing codes and appliance standards on both new and existing development, and a relatively high cost of water, accentuated by the block rate pricing structure. Demand for the 2010 water year, with rainfall about 12% above average, will be approximately 13,400 AFY.

The Plan SB Process

The current General Plan update process (Plan Santa Barbara) has so far resulted in a recommended "Hybrid Alternative" as analyzed in Volume IV of the final environmental documents released in September 2010. This is similar to the original Plan Santa Barbara project in terms of water supply. The "hybrid" alternative is projected to result in 2,795 new dwelling units (DU) and 1.5 million square feet of non-residential development within the City limits. Water demand for these projections is estimated as follows, based on recently updated demand factors (Attachment 3) for applicable customer classes:

Single Family Residential:	13% of 2,795 DU = 363 DU X .40 AFY/DU =	145 AFY
Multi-Family Residential:	87% of 2,795 DU = 2,432 DU X .16 AFY/DU =	389 AFY
Non-Residential:	1,500,000 ft ² X .13 AFY per 1,000 ft ² =	195 AFY

When 100 AFY of demand from projected added demand outside the City limits is included, the result is a projected new demand of about 830 AFY. (It is worth noting that using current aggregate demand factors to project future demand can be expected to overestimate demand for new development, which will be subject to new codes and standards.) Discussions on Plan Santa Barbara continue and the City Council is expected to consider a recommendation to adopt the new General Plan in October 2010.

State and Federal Requirements

A number of factors at the State and Federal levels will affect water demand in the future:

Urban Council BMP's: The California Urban Water Conservation Council (CUWCC) has developed a list of Best Management Practices for urban water conservation (BMP's) that are effectively becoming mandatory, considering that eligibility for most State grant and loan funding requires that a water purveyor document compliance. Grant funds through the U.S. Bureau of Reclamation have similar requirements and the Cachuma Project contract requires implementation of the BMP's. This process can be expected to continue to push urban water users toward increasing water efficiency, particularly in the City of Santa Barbara where we have long been an active participant in planning and implementing BMP's.

State & Federal Plumbing Code: Currently, Federal plumbing and appliance efficiency standards require 1.6 gpf toilets, 1.0 gpf urinals, and 2.5 gpm showerheads. Effective 2014, all toilets and urinals sold in California will need to meet the new standards of 1.28 gallons per flush for toilets and 0.5 gallons per flush for urinals. This change will affect demand from new development, as well as demand from existing development as older fixtures are gradually replaced with models meeting the new standards. As required by the legislation, compliant models are already on sale in California at major retail and wholesale outlets.

S.B. 407 Fixture Replacement: Recent State legislation requires that new building owners be notified if the property does not have high efficiency fixtures. Implementation requirements are still unclear, but this can be expected to further the pace of conversion to high efficiency plumbing fixtures.

20X 2020: In 2008, the Governor initiated a goal of 20% reduction in per capita urban water use by 2020. In 2009, the legislature adopted this goal into law by passing SB 7. The penalty for non-

compliance is ineligibility for State grants and loans. The focus is on public potable water distribution systems only; as such, the use of recycled water helps toward meeting the requirement. Targets were established by hydrologic regions, with several options for defining the baseline and the eventual 2020 target of per capita water use. The most suitable option for the City is likely to be "Method #3" in the legislation. This results in a baseline of 154 gallons per capita per day (GPCD) and a 2020 target of 117 GPCD. The 2009 potable per capita demand for the City was 122 GPCD.

Demand Forecasts

The chart in Attachment 4 shows demand projections for seven different scenarios that have been developed as a part of our various studies in support of the water supply planning process:

- Without Plumbing Code (Maddaus): Not an actual scenario, since it refers to codes that have already been adopted and are in effect, but a useful reference point to see the effect of plumbing codes on water demand.
- With Plumbing Code (Maddaus): Includes the effects of the upcoming 2014 mandate on high efficiency fixtures, as well as the relatively longstanding requirements for plumbing and appliance standards in the Federal Energy Policy Acts of 1992 and 2005.
- Program A (Maddaus): Plumbing Code, plus quantitative conservation measures that are part of our current program and constitute compliance with the CUWCC BMP's.
- Program B (Maddaus): Plumbing Code, plus Program A and other modeled measures with Benefit-Cost ratio of 0.9 or greater.
- Program C (Maddaus): Plumbing Code, plus all measures modeled.
- Plan SB "Hybrid Alternative": As described above, with base year 2010 demand set equal to base demand in Maddaus study (13,719 AFY); reflects a "snapshot" of demand as of 2010 and therefore does not account for the future effects of plumbing code and ongoing conservation program impacts
- 20 X 2020 Projection: Base year demand of 13,719 AFY interpolated to meet 2020 target potable demand of 12,772 AFY based on a projected 2020 service area population of 97,453.

Planning Issues

A number of additional issues relate to development of an appropriate demand projection:

Conservation Policy: What level of conservation effort is appropriate?

- Is compliance with the 20 X 2020 goal a sufficient level of conservation?
- Should we set the target based on achieving BMP compliance? If so, specific definition of conservation measures will be required, particularly if we opt for the "Flex Track" option for BMP compliance, where we identify the optimal measures for our service area and demonstrate that they are equivalent to the more standard BMP implementation approach.
- Should our target be based on a test of cost effectiveness (i.e. Benefit-Cost ratio) on a measure-by-measure basis?
- To what extent should our goal reflect taking a "leadership" role in the region and/or State?

Climate change:

- Can we expect a significant increase in irrigation demand?
- Will this be an issue within the 20-year planning period?
- Is it reasonably quantifiable, or something to be accounted for as a part of the safety margin?

Recycled Water Expansion:

- Investigation is underway to identify needed changes in secondary and tertiary systems.
- First increment of expanded use: ~300-400 AFY of capacity currently available with existing system; to be used to displace potable use at existing user sites and for customers adjacent to the existing distribution system.
- Next increment: Increased storage requirement or modified filter operation.
- Extensions of distribution system may be cost effective.
- Is participation by other local water purveyors appropriate? On what terms?
- Potential need for future expenditure for reduction of mineral content.

Avoided Cost of Water Supply: Utility savings that result from implementing water conservation:

- The conservation measure modeling done by Maddaus was based on an avoided cost of \$600/AF. This is the average of the variable costs for State Water Project deliveries of Table A water, groundwater treatment at Ortega Groundwater Treatment Plant, and purchase and delivery of non-project water through State Water Project facilities.
- Should this value be updated to reflect a more accurate mix of "avoided" supplies based on lower projected demand numbers?
- Should avoided cost of desalination be included? If so, how?

Rates:

- What will be the effect of reduced demand on revenue?
- How should an updated demand projection be incorporated into the planned rate study?

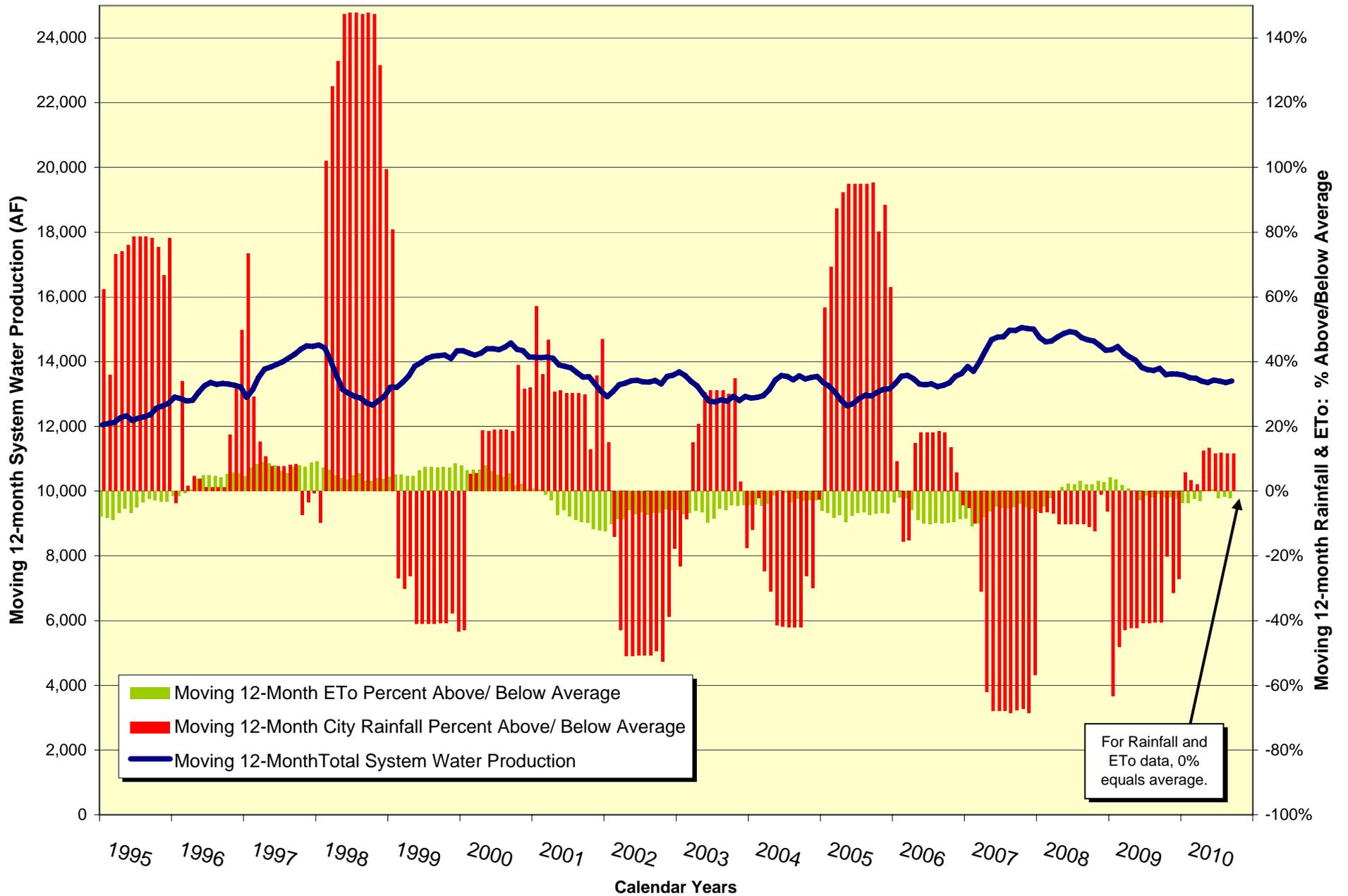
In summary, an accurate and informed projection of demand throughout the 20-year planning period is a crucial component of an effective water supply plan. We look forward to an in-depth discussion of this issue at our meeting of October 11, 2010.

BF/nrs

Attachments

Demand Analysis: System Water Production, Rainfall, and Evapotranspiration

Based on Long-Term Average Annual ETo of 44.61" for Santa Barbara, Station #107, per CIMIS Web Site



■ Moving 12-Month ETo Percent Above/ Below Average
■ Moving 12-Month City Rainfall Percent Above/ Below Average
— Moving 12-Month Total System Water Production

For Rainfall and ETo data, 0% equals average.



2009 City of Santa Barbara Water Demand Factor Table

Excerpted from Water Demand Factor Update Report
October 2009

Table 1. Water Demand Factors 1989 and 2009

(All values include indoor and outdoor usage)

Land Use Category (2009 Study)	1989 Study Values	2009 Study Values	Monthly Units	1989 Study Values	2009 Study Values	Annual Units
Single Family Residential (Aggregate)	18.00	14.40	HCF/month/ dwelling unit	0.50	0.40	AFY/ year/ dwelling unit
Single Family - Small Lot size < 7000 ft ²	11.43	9.49	HCF/month/ dwelling unit	0.32	0.26	AFY/ year/ dwelling unit
Single Family - Medium Lot size 7000 ft ² to 1 acre	18.24 – 30.42	15.09	HCF/month/ dwelling unit	0.51 – 0.85	0.42	AFY/ year/ dwelling unit
Single Family - Large Lot size > 1 acre	51.57	34.45	HCF/month/ dwelling unit	1.44	0.95	AFY/ year/ dwelling unit
Multi-Family Residential (Aggregate)	7.33	5.72	HCF/month/ dwelling unit	0.20	0.16	AFY/ year/ dwelling unit
Service Commercial	N/A	6.18	HCF/month/ 1000 ft ²	N/A	0.17	AFY/ year/1000 ft ²
Retail Large: > 20,000 ft ² Small: < 20,000 ft ²	2.43 3.93	(Retain 1989 values)	HCF/month/ 1000 ft ²	0.068 0.11	(Retain 1989 values)	AFY/ year/1000 ft ²
Office	3.57	2.06	HCF/month/ 1000 ft ²	0.10	0.06	AFY/ year/1000 ft ²
Industrial	2.49 – 5.37	2.84	HCF/month/ 1000 ft ²	0.07 – 0.15	0.08	AFY/ year/1000 ft ²
Institutional	N/A	6.11	HCF/month/ 1000 ft ²	N/A	0.17	AFY/ year/1000 ft ²
Hotel/Motel	4.65	4.81	HCF/month/ room	0.13	0.13	AFY/ year/room
Hotel/Motel with Restaurant	5.37	7.17	HCF/month/ room	0.15	0.20	AFY/ year/room

System Demand Projections (AFY)

Plan SB Hybrid, 20 X 2020, and Five Scenarios from Maddaus Analysis

