

**Metropolitan Domestic Water Improvement District  
Board of Directors Meeting**

**March 12, 2012**

**Water Resources Update**

**Synopsis**

Metro-Main's 100-Year Designation of Assured Water Supply (DAWS) requires all pumped groundwater from within the service area be replenished within the Tucson basin. The District accomplishes this requirement by recovering CAP water and effluent credits recharged outside of its service area, and directly using remediated water. The District's long-term water resources management goal is to use its CAP water directly within its service area. Metro-Hub and Metro-E&T are currently solely dependent upon groundwater. Staff is developing a DAWS application for Metro-Diablo Village. District water conservation efforts continue to decrease the annual water demand in the four service areas. A meter replacement program is underway in Metro-Hub to minimize water losses.

***Metro-Main***

**Assured Water Supply Status**

Metro-Main received a 100-Year Designation of Assured Water Supply (AWS) in 1996. The Designation of AWS under the State of Arizona Groundwater Management Act requires a municipal water provider to replenish all pumped groundwater used within the service area. A water provider can accomplish this task in many ways. The State's preferred groundwater management option is for the water provider to directly use its CAP allocation and/or other renewable supplies. The last resort is the water provider can join the Central Arizona Groundwater Replenishment District (CAGRDR). Then either CAGRDR purchases excess CAP water supplies and recharges the CAP water to replenish the pumped groundwater within the Tucson basin or the water provider can recharge its own CAP water supply anywhere within the Tucson AMA and recover the CAP recharge credits from recovery wells to zero out its CAGRDR obligation for groundwater replenishment services. Additionally, the water provider can offset groundwater mining by directly using effluent at golf courses/parks. Lastly, the District can clean up groundwater classified by the Arizona Department of Water Resources (ADWR) as poor quality for potable use, such as from the South Shannon Treatment System.

The District has a 13,460 acre-foot CAP allocation for meeting its Assured Water Supply designation. As a backup, the District is also a member service area with the CAGRDR. Table 1 shows Metro-Main met all of its Assured Water Supply requirements for 2011 through CAP water recharge and recovery (92.7%) and remediated water from the South Shannon Treatment System (7.3%) resulting in a 0 acre-foot CAGRDR replenishment obligation. All of Metro-Main's

wells are now permitted as recovery wells and CAGRDR obligations will be zero from 2011 and beyond, unless groundwater levels decline more than 4 feet per year in a wellfield over a five year period.

Table 1. Metro-Main Assured Water Supply Program and CAGRDR Obligation

<b>Assured Water Supply Program</b>	<b>2011 Volume (AF)</b>	<b>Cost</b>
Metro-Main Water Use	7,923.65	-
CAP from Wells and Recovery Tax (\$135.94/AF)	7,366.60	\$1,001,431.16
Effluent Recovery & O&M Fee (\$2/AF)/Value	0.00	\$0.00
Remediated Water from Wells and Tax (\$3/AF)	578.19	\$1,734.57
Mined Groundwater and Tax (\$3/AF)	0.00	\$0.00
<b>AWS Total Costs</b>	<b>7,923.65</b>	<b>\$1,003,165.73</b>
CAGRDR Cost for 7,923.65 AF x 43% @ \$427/AF		\$1,454,861.38
2011 Recharge and Recovery Cost for AWS		\$1,003,165.73
<b>Savings in Cost Avoidance</b>		<b>\$451,695.65</b>

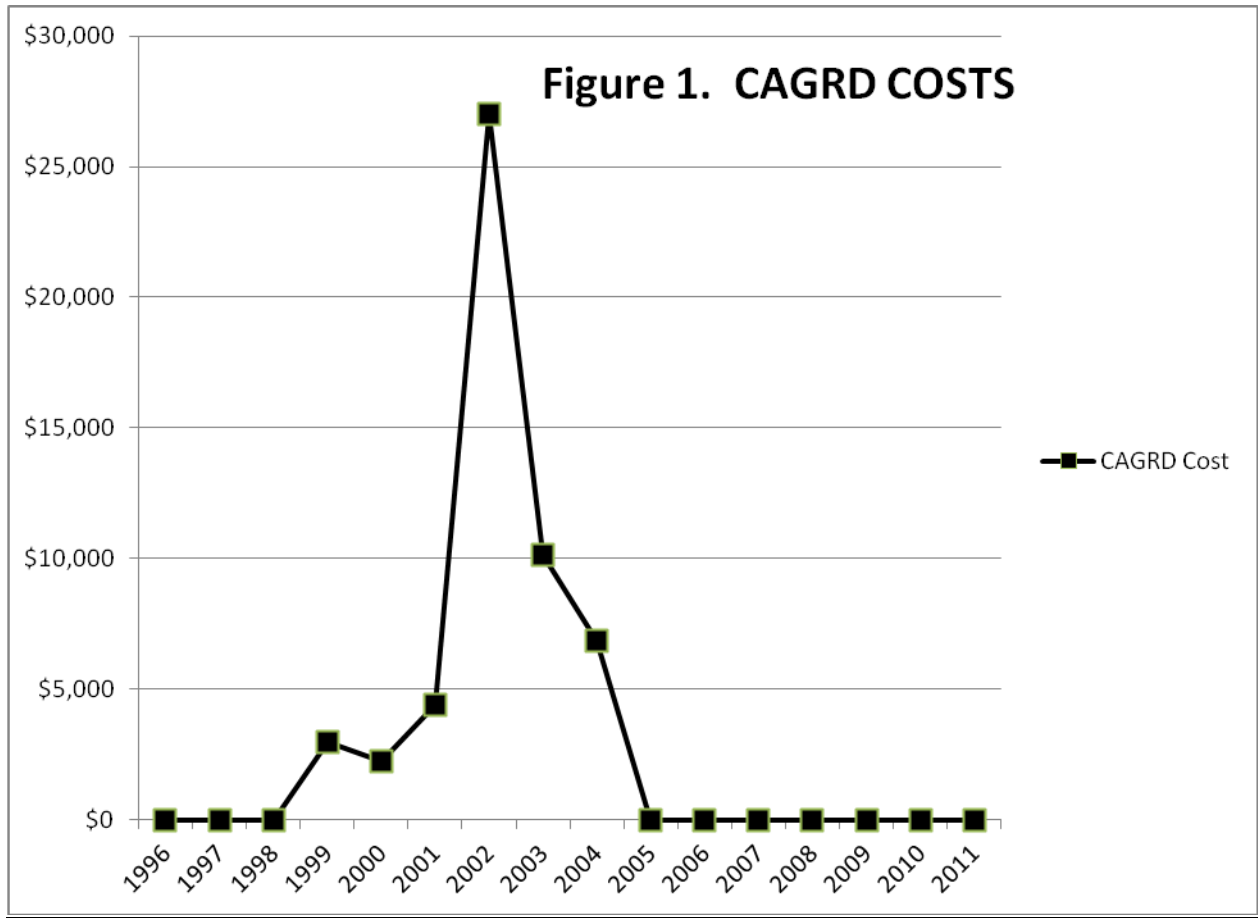
**CAGRDR Status**

Table 1 also illustrates the avoided CAGRDR costs compared to the District completing its own CAP recharge and recovery program. In 2011, \$451,695.65 in CAGRDR expenses was avoided and will be greater in subsequent years (Table 2).

Table 2. Projected Future CAGRDR Costs Avoided by District Recharge & Recovery Program

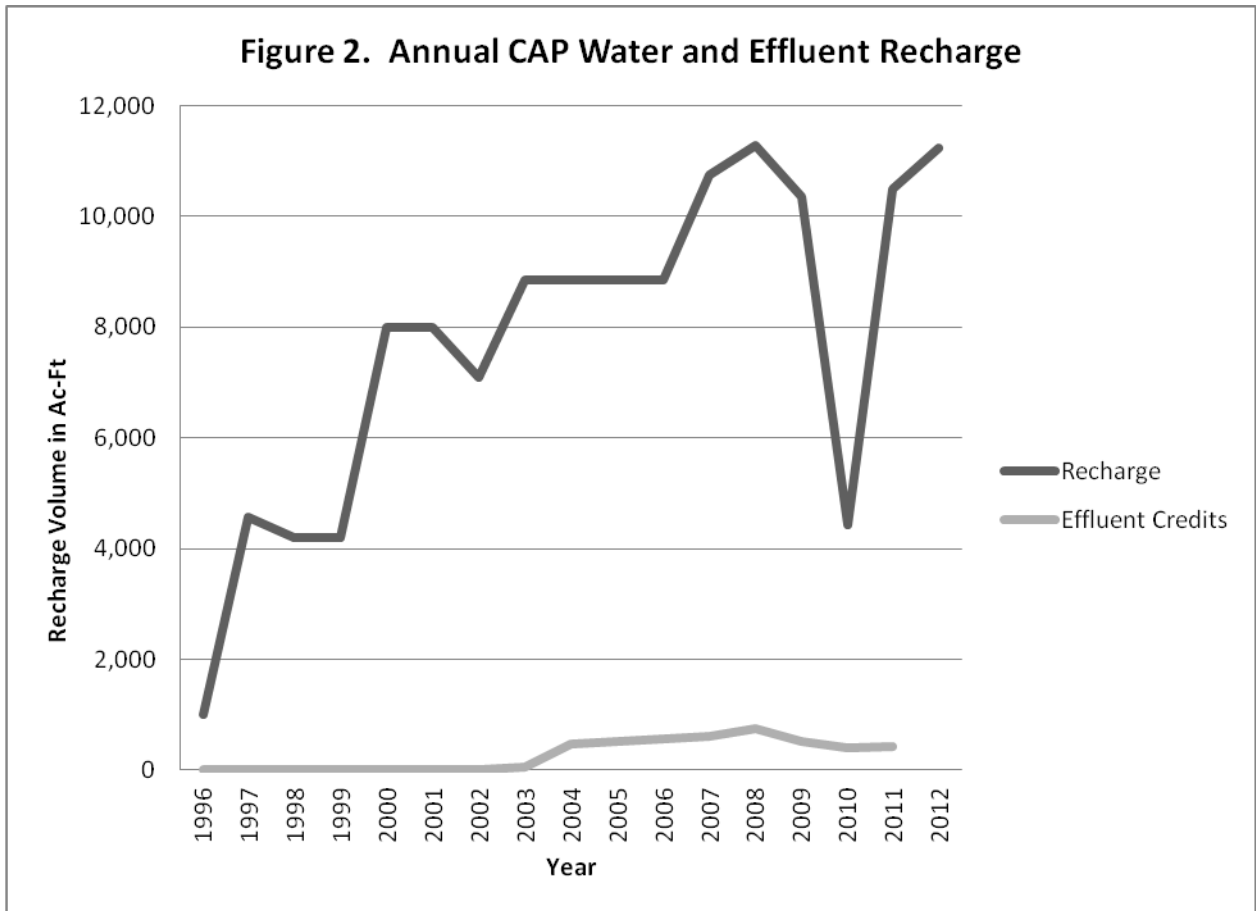
<b>Year</b>	<b>Savings</b>
2011	\$451,696
2012	\$762,198
2013	\$1,019,356
2014	\$1,380,370
2015	\$1,700,422
2016	\$2,147,316

The District’s CAP/effluent recharge and recovery program and remediated water cost was \$1,003,165.73 on 7,923.65 acre-feet or an average cost of \$126.60 per acre-foot compared to using CAGRDR services at an average cost of \$183.61 per acre-foot. Production at South Shannon Treatment System was less than last year but Utility Division is currently testing a way to expand the service area. Figure 1, on the following page, depicts the annual CAGRDR costs paid by the District as a result of the District completing its own recharge and recovery and having an advance replenishment contract with CAGRDR.



### **CAP and Effluent Recharge Program**

The District began its CAP water recharge program in 1996. In 1999, the District began annual recharge and recovery with its own CAP water allocation and as mentioned above has used the CAGR D in a very limited way to offset any mined groundwater not covered from the District's recharge and recovery efforts and thereby minimize CAGR D expenses. Figure 2 below shows how the District has annually increased its CAP recharge to greater than its initial 8,858 acre-foot allocation. From 2007 through 2009, the District was able to purchase Incentive Recharge Water (CAP) at a discounted price. Unfortunately, CAWCD terminated the program for 2010 and beyond. In 2010, the District's CAP water budget was constrained to 4,429 acre-feet of recharge but a total of 10,493.5 acre-feet of recharge was achieved in 2011. However, 1,636 acre-feet of the volume is recharge for the Town of Marana. For 2012, the District will be storing 11,236 acre-feet of CAP water or 83.5% of its CAP allocation.



After the Arizona Department of Water Resources deems the District’s 2011 credits, the credit account volume will be 1.5 times more than annual pumpage (Table 3). The District’s credits have an estimated value of \$1.65 million dollars.

In November 2003, the District was issued by ADWR an effluent recharge facility permit and water storage permit at the Lower Santa Cruz River Managed Recharge Project (LSCRMRP) to earn recharge credits from its effluent supply. The District’s effluent recharge and recovery program has the lowest unit operational and maintenance cost at \$2 per acre-foot, but the District only earns half credit for any store water because ADWR limits the recharge credits to 50 percent for managed recharge projects when the recharge occurs in natural stream channels. The District’s annual effluent supply is about 3,000 acre-feet. Annual effluent recharge credits earned can be found in Figure 2. The District views these credits equivalent to value as CAP credits. Therefore, 2011 effluent credits of 424.9 acre-feet would be valued at \$60,548.25. The 3.8% increase in effluent credits was caused by larger stormflows which improve the effluent infiltration in the Santa Cruz River.

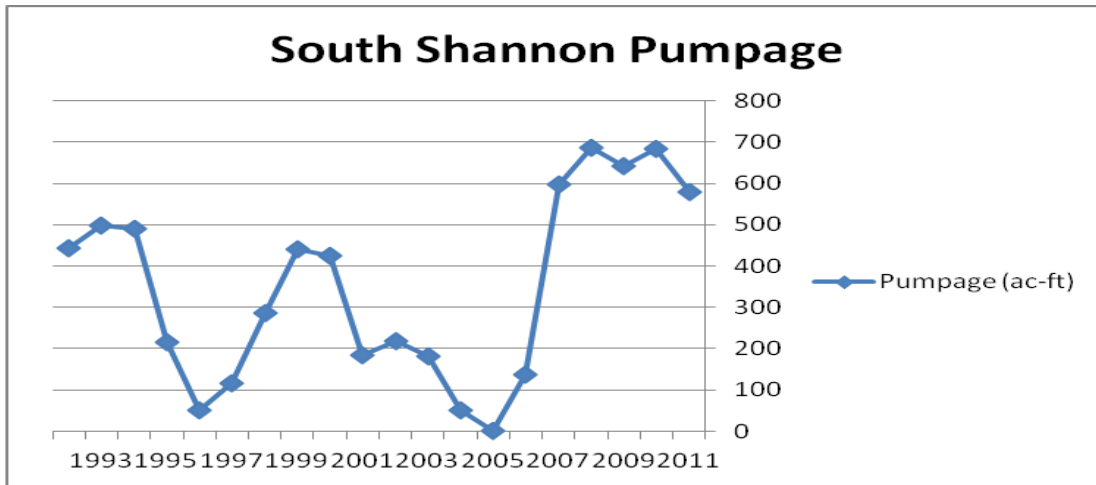
Table 3. CAP and Effluent Recharge Program

<b>Long Term Recharge Credit Account</b>	<b>Volume (AF) as of 12/31/10</b>	
Recharge Credits Balance	9,460.17	
2010 Recharge Account Value @ \$142.50/AF	\$1,348,074.22	
<b>2011 Recharge and Recovery</b>		
	Cost	
CAP Cost from GSFs by Annual Recovery in 2011 of 4,800 AF @ \$125/AF	\$600,000.00	
CAP Cost from USF by Annual Recovery in 2011 of 2,566.60 AF + 1% loss (25.93 AF) @ \$152/AF	\$394,064.56	
Metro-Main CAP Recovery Fee (\$1/AF) on 7,366.6 AF	\$7,366.60	
Total Cost for 2011 CAP Recovery	\$1,001,431.16	
	Volume (AF)	Cost
Anticipated 2011 Effluent Recharge Credits (\$2/AF)	424.90	\$849.80
Projected CAP Credits from Excess 2011 Storage/Cost 3,472.47 AF @ \$152/AF – 5% Cut and 1% ET (208.35 AF)	3,264.12	\$527,815.44
<b>PROJECTED TOTAL CREDITS</b>	<b>13,149.19 AF</b>	
Contract Credits for Transfer to Marana	-1,537.84 AF	
<b>Projected Recharge Credits Balance in AF by 9/29/12)</b>	<b>11,611.35 AF</b>	
Recharge Account Value @ \$142.50/AF	\$1,654,617.38	

**Remediated Water from South Shannon Treatment System**

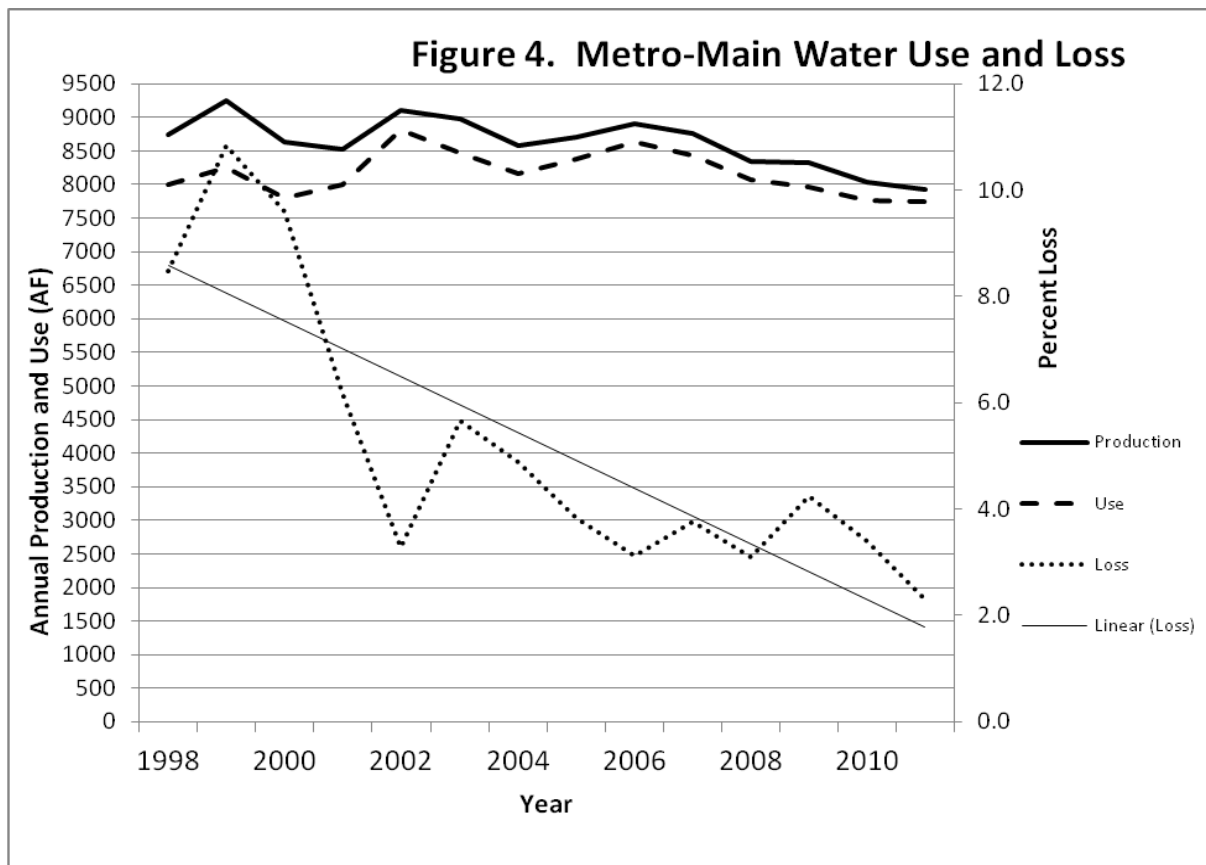
The District was issued an exemption by ADWR in 2006 for using up to 1,048 acre-feet of treated South Shannon water as remediated water instead of being classified as groundwater. ADWR records remediated water as renewable surface water not as mined groundwater. Therefore, the 578.19 acre-feet of remediated water exemption saved the District \$106,161 at present CAGR prices for 2011.

Figure 3 shows the annual amount of remediated water from the South Shannon Treatment System reached its highest in 2008 and supplied 8 percent of Metro-Main’s total water demand. PCE levels have declined in half from the highest levels of 25 ppb in 2005, but beginning in mid 2009 levels in groundwater rose above the drinking water standard of 10 ppb. The increased pumpage has helped prevent the plume from migrating towards Deconcini Well. Total operation and maintenance expenses at South Shannon Treatment System from 2000 to 2011 were \$688,496.92 or \$134.58 per acre-foot of water treated or \$0.41 per 1,000 gallons. All of these costs were reimbursed by the Arizona Department of Environmental Quality including \$107,957 for 2011. In 2011, 30.15 pounds of volatile organic carbons were absorbed by the activated carbon. 188.4 million gallons of water was treated by the system.



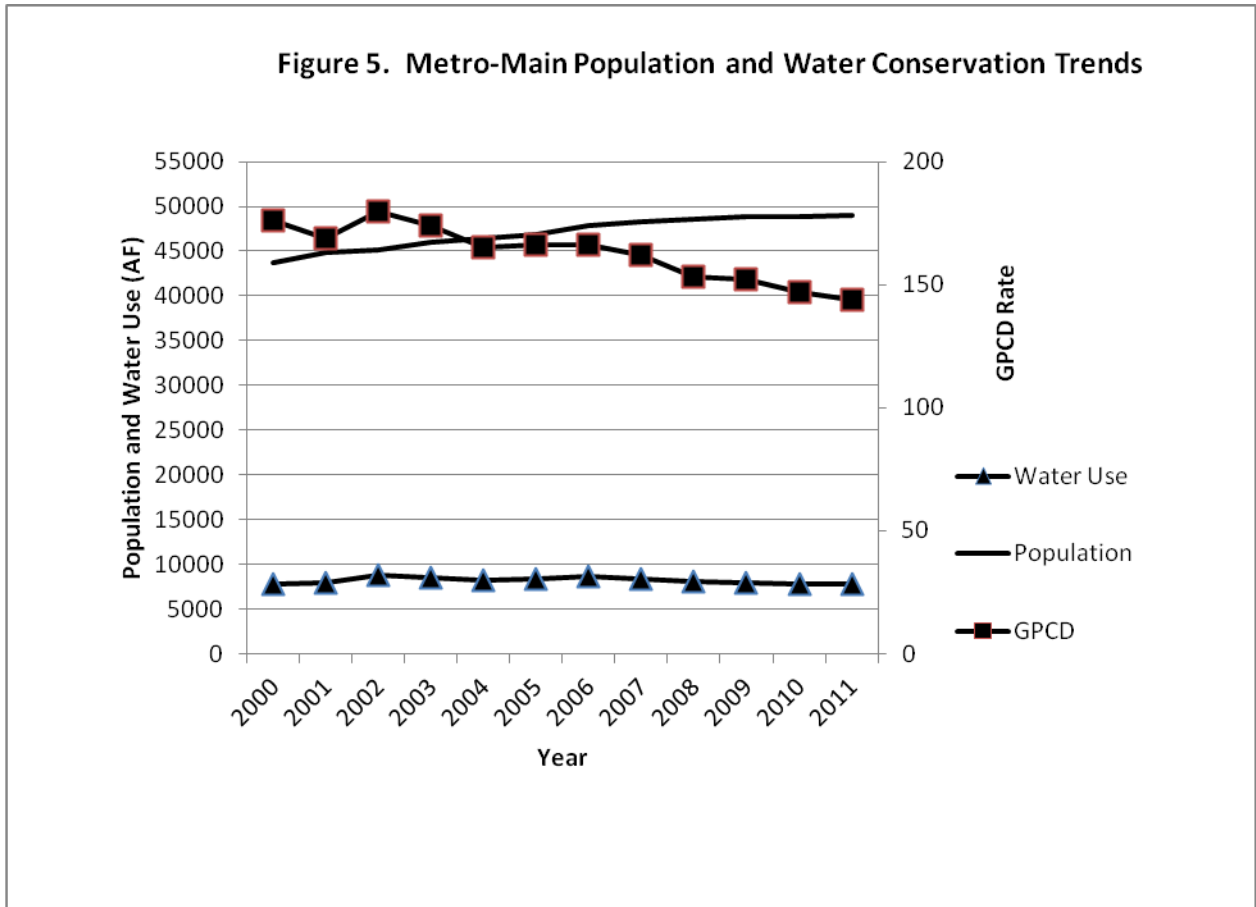
**Water Loss**

Figure 4 shows the overall annual water use trend in Metro-Main as slightly decreasing while annual well production decreased. Water loss for 2011 was 2.3 percent. The District’s annual water meter replacement program, water conservation efforts and home vacancies/foreclosures may be the cause of this significant long-term reduction in annual water loss.



### Water Conservation

Figure 5 depicts as the service area population in Metro-Main has increased the overall water usage remain essentially constant, while the gallons per person per day used by each customer has declined to 144 gallons per person per day.



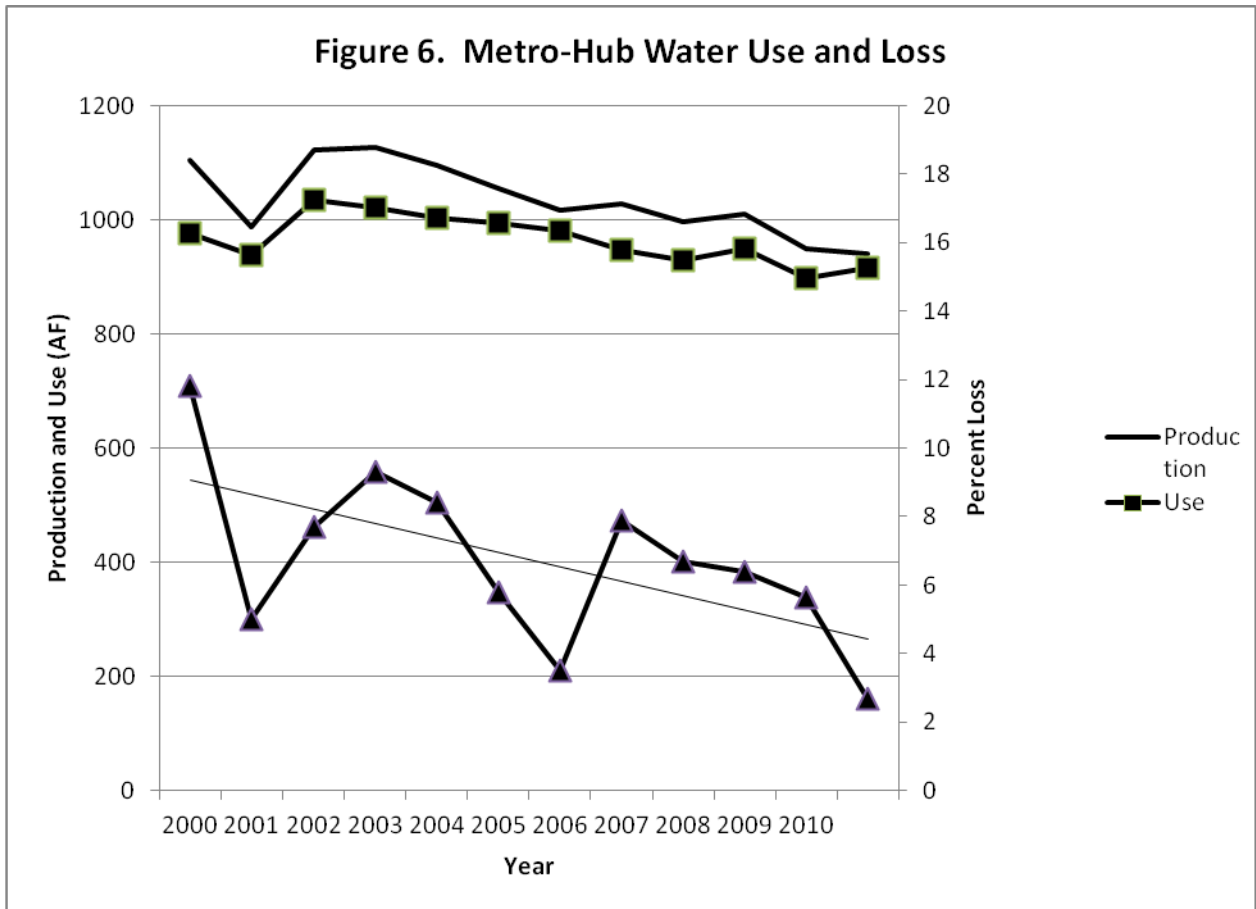
### Well Production Capacity

Average well production capacity in 2004 was 12,386 gpm. For 2011, the average well production capacity was 10,799 gpm or a decline of 1.8 percent per year. Metro-Main well production has declined with time and will likely continue to decline because of retirement of poor performing wells and falling water tables in wells with shallow depths or wells that have reached the end of their economic and physical useful life.

*Metro-Hub*

**Water Use and Population**

Metro-Hub is currently solely dependent upon groundwater from wells to meet customer demands. Annual well production in the Hub service area has decreased with time as population has increased (Figures 6 and 7).



**Water Loss**

Figure 6 shows water loss for 2011 dropped to 2.6 percent and corresponds to the overall historical trend of less water loss each year. The District has begun a water meter replacement program for the Metro-Hub service area. Such a program could be a means to further reductions in annual water loss by more accurate metering.

**Water Conservation**

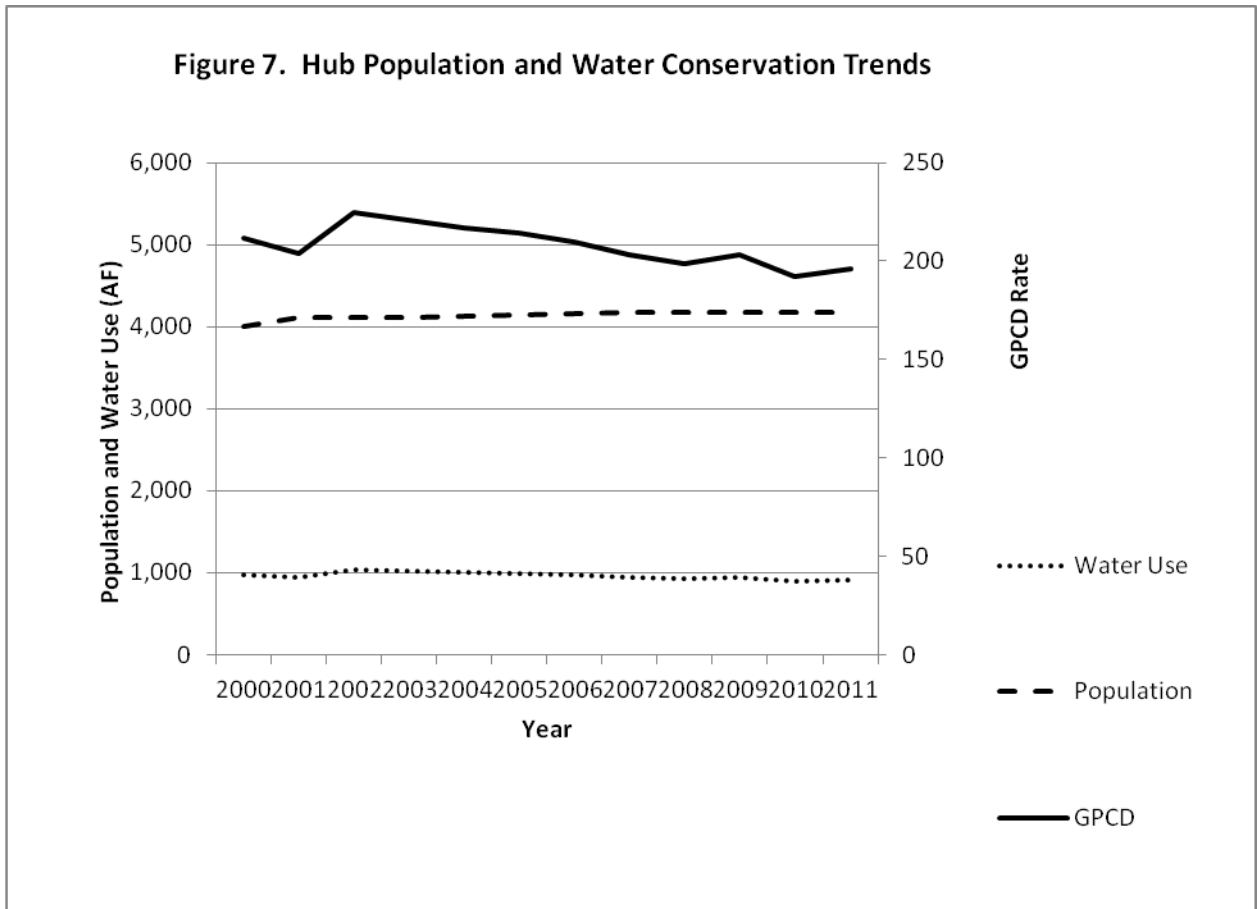
Figure 7 depicts as service area population in Metro-Hub has increased overall water use has remained constant and the gallons per person per day used by each customer has decreased.



Water conservation efforts are assumed to be the cause of this reduction in water use. In 2011, the gallon per capita per day (gpcd) rate in Metro-Hub was estimated as 196 gpcd. This rate is much higher than for the same period in Metro-Main of 144 gpcd.

**Well Production Capacity**

Metro-Hub is served by five production wells with pump capacities in 2011 ranging from 112 to 499 gallons per minute that have a total production capacity of 1,282 gpm. In 2004, the production capacity was 1,612 gpm. These decreases are related to operational changes. The arsenic treatment system causes a 80 gpm lower flow rate at Hub Well No. 1. Flow at Hub Well No. 4 is reduced by 200 gpm, so not to cause pressure problems in the distribution system. There is a 60 gpm flow decrease at Hub Well No. 5A, so the pumping water level does not go below the pump setting.



*Metro-Southwest*

**Water Use**

Metro-Southwest has two separate service areas. Customer water use at Diablo Village for 2011 was 233.51 acre-feet. A total of 253.86 acre-feet of groundwater was delivered from DV-1 and DV-2 Wells and about 1.2 acre-feet was supplied through an interconnect with Tucson Water.

A total of 113.984 acre-feet of groundwater was pumped from two wells in the E&T service area. Of that amount, 98.84 acre-feet was used by E&T customers.

**Water Loss**

Water loss in Diablo Village was 8.0 percent, while lost was 13.2 percent in the E&T service area.

**Water Conservation**

Water loss above 10 percent is a compliance trigger by ADWR for increased water conservation efforts or water use metering. The District will be completing the installation of automated water meters this year for the Metro-Diablo service area. Such a program could be a means to further reductions in annual water loss by more accurate metering.

**Summary**

The Board of Directors is requested to discuss with staff any aspect of this update. Overall, the District has done well in managing costs for Metro-Main's assured water supply program as well as effectively managing its water resources (groundwater, CAP water, effluent and remediated water). Water conservation efforts at Metro-Hub and Metro-Diablo Village continue to show improvement. Further improvements may result in these two service areas from the water meter replacement program. No motion is required for this agenda item.

Respectfully submitted,

I concur with staff's report.

Respectfully submitted,

Warren Tenney  
Assisted General Manager

Mark R. Stratton, P.E.  
General Manager