



**Valsetz Water Storage Concept
Analysis**

Appendix A

**Water Supply, Demand and Water
Rights Analysis**

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Date:
June 2011

Project Number:
30-23897

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Valsetz Water Storage Concept Analysis

Appendix A

Water Supply, Demand and Water Rights Analysis

1 Introduction

This Valsetz Water Storage Concept Analysis is funded by a Senate Bill 1069 [2008] Water Conservation, Reuse, and Storage Grant Program grant awarded by the Oregon Water Resources Commission on November 20, 2008. The grant provides funding for developing information needed to evaluate development of a water conservation, reuse, or storage project in the South Fork Siletz Basin. The funded planning study includes collection of streamflow and environmental information, completion of hydrologic, streamflow, and water demand analyses, development of baseline environmental impacts assessments and completion of a storage concept and alternative analysis.

The purpose of this study is to conduct an appraisal level assessment of potential environmental effects and potential benefits of the Valsetz water storage project. The assessment focuses on three storage concept alternatives determined by dam height and reservoir storage. This analysis serves as a preliminary, concept-level review of the resources that may be affected if a project were developed. This initial investigation relies on existing information, an extremely limited amount of field data and some preliminary modeling and analysis. This is a first step in understanding potential effects in the area that would be inundated by a project and the Siletz and Luckiamute Rivers. Further investigation and technical studies will be required to definitively evaluate the magnitude and type of impacts and feasibility of project development.

The purpose of this Appendix is to verify existing information on water supply, water demand, potential deficits, and water rights in the region of and near Polk and Lincoln Counties in Oregon.

This document is based on limited data and relies upon many assumptions. The document provides a preliminary assessment of potential project impacts and does not constitute a feasibility analysis for the project. A feasibility analysis would include an assessment of a continuum of data, more in-depth analysis of available data, and would address a broader range of alternatives.

2 Approach

Several reports have been developed in the past decade on these topics. This document is a review and compilation of existing information and research to develop an overview of potential water deficits within the region in the near future. Where new information has been made available, an attempt is also made to update information from previous reports. Reports reviewed include the following:

Regional Water Projection: Polk and Lincoln Counties

WH Pacific (2009). The objective of this analysis was to determine whether the combined future water needs of Lincoln and Polk Counties demonstrate the need for a regional water source. This report highlights recent water needs analyses of Polk and Lincoln Counties and shows how they demonstrate a growing water deficiency in both counties through 2050.

Lincoln County Water Needs Analysis

WH Pacific (2008). This study was funded by the Oregon Water Resources Department under a 2008 Water Supply and Conservation Initiative Grant. The purpose of the report was to quantify currently available water resources in Lincoln County and evaluate whether existing sources can adequately meet future water demand through 2050. This study documents current average day and maximum day water demand; forecasts future water demand based on growth assumptions; and compares currently available water supply to the projected future water demand. The results are combined with similar findings in Polk County to document the combined regional water needs of both areas.

Yamhill County Water Supply Analysis

HDR (2008). Yamhill County commissioned HDR to complete a water supply analysis of Yamhill County. The objective of this study was to identify water supply options that could meet increasing demands through year 2050. Recent planning efforts indicate that several of the communities will need additional source of water within the next ten years. The report also discusses issues related to the development of new water supply sources for the County. The report analyzes the potential costs, environmental impacts, permitting limitations, capacities, reliability, water quality, risks, and location (i.e., proximity to location of need) involved in developing recommended supply alternatives and strategy.

Regional Water Supply Strategy Final Report

HDR and EES (2005). This report was delivered to Polk County Water Providers in January of 2005. The objective of this report was to provide an analysis of future water supply strategies for the citizens of Polk County. The report includes identification of future water needs and the most viable long term drinking water source, development of a production and delivery preliminary plan, estimation of financial impacts, and the discussion of potential options for financing/ operation. In response to the lack of a viable long-term water source, Polk County formed a Technical Advisory Committee (TAC) with representatives from all 13 water providers in Polk County to investigate and evaluate future potential water sources. Several alternatives are identified including the Valsetz Water Storage Project.

Polk County Water Providers Regional Water Needs Assessment Final Report

EES (2004). The objectives of the study were to examine the County's need for water and identify a safe and reliable long-term source of water for Polk County. Polk County Water Providers provide the domestic water supply from both surface and ground water sources. The County formed a Technical Advisory Committee (TAC) with representatives from all the 13 water providers in the area. The TAC identified several potential sources of future water supply including the Valsetz Reservoir/ Storage project, other storage options, and historical unused Adair Village water rights.

In addition to reviewing the above reports, additional data and information were collected for this memorandum through interviews with water providers, state water management staff, and other outside sources. In particular, local water providers were contacted to see if there were any updated reports of use and/or capacity developments. A list of water providers contacted and the data they communicated to the ENVIRON team are reported in Addendum A. In all cases, the data received was found to be consistent with earlier estimates and data reported in the studies above.

3 Results

The results of the update and status review are organized into four subtopics below: Water supply, water demand, potential shortfalls and deficits in the region, and a summary of water rights and alternative strategies.

3.1 Water Supply Review and Update

Available water supply in Polk and Lincoln Counties was reviewed and reported through several different sources. In Polk County, 21.62 MGD was reported to be available in 2000 according to the 2005 Strategic Final Report to the Polk County providers (HDR and EES, 2005). If Adair Village was included in the estimate of water available, then the capacity increases to 77.38 MGD. Adair Village is a small municipality in Benton County that has a substantial and largely unused water right capacity. Adair Village has been included in several studies due to its proximity to the project area. Also, representatives from Adair Village served on the TAC for these reports. The 2005 report indicates that if only permitted diversion rates based on water rights are considered, the total water available to municipalities in the county is 39.7 MGD (Table 1). However, the report points out that the available water is typically a fraction of what is permitted and therefore the available capacity was also evaluated on a provider basis, with the result totaling 21.6 MGD.

Polk County Water Provider	Permitted Diversion Rate	Available Water Capacity
Perrydale Domestic Water Association	3.45	0.50
Monmouth, City of	7.68	3.10
Dallas, City of	9.91	9.91
Buell Red Prairie Water District	0.54	0.54
Independence, City of	4.96	2.70
Falls City	3.4	0.35
Rickreall Community Water Association	2.82	1.98
Grand Ronde Community Water Association	0.48	0.48
Luckiamute Domestic Water Cooperative	3.91	1.00
Rock Creek Water District	0.1	0.06
Willamina, City of	2.46	1.00
Adair Village	55	55.00
Total (with Adair Village)	94.71	76.62
Total (without Adair Village)	39.71	21.62

Source: HDR and EES. 2005. Regional Water Supply Strategy Final Report.

For Lincoln County, a similar analysis has been conducted (WHPacific, 2008). Updated data has been collected for some municipalities in Lincoln County (see Addendum A), but the 2008 report provides a comprehensive analysis evaluating the water use at the municipal level, the

availability of water rights in each municipality, and potential constraining factors, such as infrastructure capacity, low flows, or regulatory requirements. The available capacity from the 2008 study is summarized in (Table 2).

Water rights were identified for municipalities in Lincoln County through the Oregon Water Resources Department Water Rights Information System (WRIS). For the purpose of this report, the WRIS data provided for Lincoln County municipalities was compiled in terms of the total water diversion capacity in MGD if all of the water rights under permit or certification were to be perfected. This analysis does not take into account the feasibility of the capacity, but merely the raw water available through water rights. Rights that are published in acre-feet have been converted to MGD for aggregation purposes. Further details of these water permits and certificates are available in Appendix B.

Provider	Permitted Diversion Rate	Available Capacity
City of Lincoln City	12.59	5.50
City of Newport	15.00	3.88
Seal Rock Water District*	0.26	-
K-GB-LB WD	4.85	1.20
City of Toledo	13.96	1.8
SW Lincoln County WD	4.52	0.94
City of Depoe Bay	1.99	1.29
City of Yachats	4.19	0.36
City of Siletz	1.83	0.5
City of Waldport		1.17
Total for Lincoln County	59.18	16.64
Source: Permitted Diversion Rate from Water User Reporting, Oregon Water Resources Department, http://apps.wrd.state.or.us/apps/wr/wateruse_report , last accessed on February 22, 2011. Available capacity estimates from "Lincoln County Water Needs Analysis," WHPacific, 2008.		

As with Polk County, the actual capacity is much less than the permitted water use reported. Permitted water rights approach 60 MGD although just under 17 MGD are available for use.

Additional consideration of capacity is provided by water supply analysis of neighboring Yamhill County (HDR, 2008). This report concludes that while Yamhill communities, in general, have sufficient water rights through 2050 to provide for maximum daily demands (MDD), the reliable supply sources are anticipated to fall short of MDD in all but two of 10 communities by 2010 and in all communities by 2050. This is because the providers are either production-constrained or in many cases treatment capacity constrained. The county-wide reliable supply totals approximately 26 MGD, and under the low, medium, and high scenarios, the water should be adequate to meet average daily demands (ADD) through 2050. However, even the medium forecast for the maximum daily demand (MDD) is expected to approach 55 MGD, which exceeds the reliable capacity.

In conclusion, the available supply of water for the project area of Polk and Lincoln Counties totals over 38 MGD for municipal supplies. Given that there is the potential for cooperation between Adair Village in Benton County and Polk County providers, the additional 55 MGD available through the Adair Village surface water right to Willamette River water brings the supply potential for the region to 94 MGD. For neighboring Yamhill County, the available current water supply totals just over 26 MGD, which is not anticipated to meet the growing needs of that county in terms of their maximum daily demands. Additional supplies are available and used by non-municipal, or non-public sources. These include individuals and industries that hold water rights that will be used for specific purposes.

3.2 Water Demand Review and Update

Water demand estimates were developed for the Polk and Lincoln County region most recently by WHPacific in 2009. Previous estimates were developed by HDR and EES (2005), and WHPacific (2008). This section reviews previous estimates and incorporates alternative approaches to verify future water demand in the region, considering domestic, commercial, municipal and industrial water use, and agricultural water use.

3.2.1 Present and Future Water Use in the Region

Recent data from the US Geological Society (USGS) on water use provides an overview of current water use in Polk and Lincoln Counties (<http://water.usgs.gov/watuse/data/2005>). These data are collected for federal purposes and often do not capture information that may be available at the local level (such as the local supply-level information available in Tables 1, and 2). In addition to the water used for domestic purposes (which includes water supplied to commercial establishments by public water providers) the USGS data indicate that Polk County uses a significant quantity of water for irrigated agriculture, and that Lincoln County uses water for industrial purposes and for aquaculture with a smaller amount for agriculture. The total fresh water used in 2005 in Lincoln County was over 27 MGD, or over 30 thousand acre-feet per year (AFY). In Polk County, over 48 MGD, or 53 thousand AFY are used, with an emphasis on industrial uses and aquaculture. Together the two counties used nearly 76 MGD or nearly 84 thousand AFY of freshwater in 2005 (Table 3).

For domestic, commercial, and municipal water use, estimates of future demand are typically based on population projections, and per capita water use coefficients. In the 2009 report on regional demand for Polk and Lincoln Counties, historical per capita water use coefficients were applied to population projections from previous reports (such as ESS, 2004; and WHPacific, 2008). The results, which appear to exclude the Polk County region of West Salem, and include the Benton County community of Adair Village, state that by 2050, slightly less than 30 MGD will be required on an average daily demand basis for the region. The peak daily demand (PDD) was estimated at 37.4 MGD assuming PDD was 25 percent higher than the ADD for the period between April and October.

Table 3. USGS Water Use Data, 2005			
	Data in MGD		
	Lincoln	Polk	Total
Domestic	6.71	8.11	14.82
Agricultural Irrigation	0.75	40.03	40.78
Industrial	13.00	0.00	13.00
Aquaculture	6.73	0.00	6.73
Stock Ponds	0.05	0.41	0.46
Total	27.24	48.55	75.79
	Data in AFY		
	Lincoln	Polk	Total
Domestic	7,417	8,965	16,382
Agricultural Irrigation	829	44,250	45,079
Industrial	14,371	-	14,371
Aquaculture	7,440	-	7,440
Stock Ponds	55	453	508
Total	30,112	53,669	83,781
Source: Kenny, J.F., Barber, N.L., Hutson, S.S., Linsey, K.S., Lovelace, J.K., and Maupin, M.A., 2009, Estimated use of water in the United States in 2005: U.S. Geological Survey Circular 1344, 52 p			

The 2005 HDR and ESS report for Polk County developed a water demand forecast for the other incorporated portions of the county. A review of water use reporting for the Oregon Water Resources Department (OWRD) and master plans was conducted to develop reasonable water usage per capita estimates for the Cities of Falls City, Willamina, and Adair Village. Although not in Polk County, Adair Village was included in this study largely due to their sizable water right for water from the Willamette River.

One factor that is handled differently between the demand forecasts of the 2009 Polk and Lincoln County report and the 2005 report for Polk County is in the way that peak daily demand (PDD), and maximum daily demand (MDD) is handled. In the Polk County report, the authors write,

“Also, an estimate of peak day use was estimated either from reported data in master plans or by using a common regional average of about 2 to 3 times average daily use.”
(HDR and EES, 2005, pg. 3-4)

In the 2009 report, the average daily demand was multiplied by a factor of 1.25 to estimate peak daily usage “in the absence of well-documented demand usage” for the period between April 15 and October 15. This difference in approach results in a somewhat different forecast for the two studies. Both approaches are useful as they describe slightly different water use parameters. The Polk County 2005 report (HDR and EES, 2005) suggests that the MDD demand will be 35.6 MGD for just Polk County based on the larger factor used to estimate MDD. The 2009 report arrives at a similar overall demand for both counties by 2050, suggesting that 37.4 MGD will be

required for the peak period daily demand in that year (from April through October). The Lincoln County report follows the same protocol as the 2009 report, using a factor of 1.25 to adjust for PDD.

New information relevant to the estimates of future water demand is now available in terms of both population projections, and water use estimates. Population estimates for municipalities in Polk County were based on the 2004 and 2005 Polk County planning documents from Polk County Water Providers. Current population data was used to evaluate the accuracy of population growth rates that were used in the earlier studies. Similarly, information from water providers was used to develop population and water use forecasts for Lincoln County. The 2008 report for Yamhill County also provides a detailed appendix covering population and water use estimates created for Yamhill County.

3.2.2 Updated Domestic, Commercial, and Municipal and Industrial (DCMI) Water Demand

Given that several studies have already considered population projections and water use estimates from the several municipalities in the study region, the approach taken in this report is to develop an updated estimate using the newer data sources, and compare the results to see whether or not the results are consistent with the earlier work. To do this, the approach is as follows:

- Verify the current population in the project area since 2000.
- Compare the growth rates between Census 2000 and the present with the projections used in the earlier studies.
- Establish updated population growth rates for projections to the year 2050.
- Evaluate water use rates for 2005 on a county basis, using USGS per capita water use rates for 2005.
- Evaluate projected water use in Polk and Lincoln Counties to the year 2050.

Tables 4 and 5 summarize current population estimates for the municipalities in the study area as compared with current population estimates provided by two sources. The first is the Portland State University (PSU) Population Research Center population estimates for July 1, 2010. The second source is the 2010 Census data. Projections for the year 2020 (EES, 2004; WHPacific, 2008) are also provided for Polk and Lincoln Counties to evaluate how closely municipalities may be following the earlier projections. A similar table has been developed for Lincoln County (Table 5).

The 2010 Census results are higher than the PSU estimates for 2010 for both counties. These differences reflect the fact that population estimates are often uncertain. According to PSU, some municipalities have tended to grow more slowly than expected in earlier projections in Lincoln County, and some faster than expected in Polk County.

Area	Previous Report ^a 2000 Estimates	PSU Certified Estimate July 1, 2010 ^b	Census 2010	Previous Report ^a 2020 Estimate
County	60,369	69,145	75,403	72,845
Dallas	12,278	15,555	14,583	19,207
Falls City	990	960	997	1,316
Independence	6,035	8,240	8,590	9,480
Monmouth	8,146	9,675	9,534	12,837
Willamina	602	1,885	2,025	894
SubTotal	28,051	36,315	35,729	43,734
Unincorporated	15,987			18,370
TOTAL	44,854			64,104

Sources: a. Polk County Water Providers Regional Water Needs Assessment Final Report, EES (2004), b. Annual Oregon Population Report, Oregon Population Estimates, 2010 Certified, prepared by the Population Research Center, Portland State University for the State Board of Higher Education, 12/15/2010; c. American Community Survey, 2005- 2009, from factfinder.census.gov.

Area	Previous Report ^a 2010 Estimates	PSU Certified Estimate July 1, 2010 ^b	2010 Census ^c	Previous Report ^a 2020 Estimate
County		44,620	46,034	
Depoe Bay	1,534	1,425	1,398	1,962
K-G-L-W	5,855			7,138
Lincoln City	14,000	7,955	7,930	17,066
Newport	10,992	10,605	9,989	12,446
Seal Rock	5,311			5,949
Siletz	2,347	1,195	1,212	2,854
SW Lincoln Co. W.D.	2,588			3,180
Toledo	3,617	3,655	3,465	3,976
Yachats	897	815	690	1,121
Waldport	3,200	2160	2033	3,500
TOTAL	50,341	27,810	29,479	59,192

Sources: a. Lincoln County Water Needs Analysis, WHPacific, 2008; b. Annual Oregon Population Report, Oregon Population Estimates, 2010 Certified, prepared by the Population Research Center, Portland State University for the State Board of Higher Education, 12/15/2010; c. American Community Survey, 2005- 2009, from factfinder.census.gov.

Population growth rates from the 2004 Oregon Office of Economic Analysis (Table 6) are applied to baseline water use data from the U.S. Geological Society to forecast overall public water use. Growth rates from 2030 to 2040 are repeated between 2040 and 2050 to provide a 40 year forecast. The baseline water use estimates are based on the USGS 2005 water use data tables that were published in 2009. The estimates suggest that 8.71 MGD of water was used for domestic purposes in Polk County in 2005. For Lincoln County, the estimate to be used as the baseline is 6.71 MGD, which is the reported quantity of water used for publicly-supplied water users. This number is smaller than the estimate of water used for all water users, but over time it is expected that increasing proportion of the population will be served by public supply systems and so the public system estimate is used. Applying the growth rates from the population projections, the daily domestic water use forecast for Polk and Lincoln County estimates were developed and are summarized in Table 7. Please note that Polk County estimates do include the area known as West Salem, despite the fact that this portion of the population receives water from the City of Salem.

Area	2010	2020	2030	2040	2050
Oregon Total	1.3%	1.2%	1.1%	1.1%	1.1%
Lincoln County	0.8%	0.7%	0.6%	0.6%	0.6%
Polk County	2.7%	2.3%	1.6%	2.0%	2.0%

Source: Forecasts of Oregon's County Populations by Age and Sex, 2000 – 2040, Office of Economic Analysis Department of Administrative Services, State of Oregon, April, 2004.

Area	2005	2010	2020	2030	2040	2050
Lincoln County	6.71	6.94	7.45	7.94	8.47	9.05
Polk County	8.11	9.0	11.8	14.6	16.8	19.3
Total	14.82	15.94	19.25	22.54	25.27	28.35
PDD	18.53	19.93	24.06	28.18	31.59	35.44
MDD	29.64	31.88	38.50	45.08	50.54	56.70

Source: Kenny, J.F., Barber, N.L., Hutson, S.S., Linsey, K.S., Lovelace, J.K., and Maupin, M.A., 2009, Estimated use of water in the United States in 2005: U.S. Geological Survey Circular 1344, 52 p.

For the purpose of planning for water throughout the region of the proposed facility, a monthly demand has been developed. This monthly demand uses the 28.35 MGD (average daily demand for 2050) and spreads this throughout the year, based on local data sources (see Addendum A). The results suggest that the daily demand during the months of July and August may reach 76 percent above the average daily demand (ADD) for the year. So this brings the ADD during peak months to just under 50 MGD during those months. This is more consistent with the approach used by HDR and ESS, than that from the WHPacific report in 2009.

There is variability around the estimated average daily use of 176% of the yearly ADD during peak use months. Actual use will vary between years, influenced by precipitation patterns, and from day to day. The maximum daily demand days may far exceed the 176% of ADD that is

expected on an average day during July and August. Estimates of potential water demand by month in 2050 for DCMI water use in 2050 are presented (Table 8), using the 28.35 ADD for the year estimate from Table 7 above.

Month	Percent of ADD	MGD
January	80%	22.73
February	71%	20.25
March	76%	21.44
April	89%	25.31
May	89%	25.21
June	95%	26.88
July	163%	46.21
August	173%	49.17
September	93%	26.28
October	96%	27.24
November	84%	23.85
December	86%	24.50
Average Daily Demand (ADD)	100 %	28.35

3.2.3 Agricultural Water Demand

In addition to water use for domestic, commercial, and municipal purposes, it is likely that the Valsetz project may also enhance supplies for agricultural water use. In Polk County, there is a thriving agricultural community with 16,651 irrigated acres of agricultural land reported in the most recent National Agricultural Statistics Service (NASS) census completed in 2005. The NASS census reported another 840 irrigated acres in Lincoln County. WHPacific (2009) reported the total irrigated acreage for Polk and Lincoln Counties at 21,889 based on a 2008 study completed in for Oregon Water Resources Department which analyzed agriculture by county throughout Oregon between 1997 and 2005. Total water needs for irrigated agriculture can be assumed to be 48,970 acre feet per year by the year 2050 (WHPacific 2009). This is supported by the water use data presented in Table 3, which reports current agricultural water use at nearly to 45,000 AFY.

3.2.4 Conservation Measures

Water conservation from water-saving devices in the home, in public water systems, and in agricultural and industrial water delivery mechanisms are expected to lower water use coefficients for specific items such as appliance water use and leakage reduction. However, it is not yet clear whether these gains in efficiency will outweigh per capita use coefficients overall. Historically, some of these technologies have not provided the expected positive results (e.g. low flow showers mean people take longer showers) or have been rendered neutral. Regulations and restrictions on water use have had mixed results in addition to being unpopular in communities, and may unreasonably restrict those who have greater water use needs. As an alternative, demand management strategies that attempt to bring about resource conservation through price mechanisms hold some of the greatest promise for water conservation.

Numerous studies have shown that as prices for urban water rises, demand does respond to a point. This strategy has also been criticized because it is not necessarily equitable in that poorer households will be more affected by price raises in terms of the percent of household income.

Due to uncertainties about the ability of water conservation mechanisms to control water demand in the future, most municipalities do not plan for water conservation. Some do conduct an alternative forecast based on an assumption of water conservation to compare with a standard forecast, but it is unlikely that a municipality will use a conservation assumption as the basis for planning. The net benefits of conservation in terms of recouping the costs of developing safe and secure municipal water supplies are often unclear. This is because the water infrastructure development is repaid over a long period such as 50 years and during that time, the uncertainty of population and economic growth is likely to dominate the effects of marginal improvements in water conservation. For these reasons, the estimates used in this report include a consideration of the potential reductions in water use that may have come about from conservation. The low need estimate in particular might be considered to represent the best case scenario for water use reductions due to conservation measures.

3.2.5 Water Use and Demand Summary

The previous analyses of future water demand relied on a number of uncertain factors primarily centered on the growth and development that will occur in project area counties in the future. In turn, the growth and development depends at least in part upon water supply certainty (for housing and commercial development) and on industrial water availability which affects the location of large industrial facilities. Such industrial facilities can strengthen a local economy, bringing improved incomes and jobs, and therefore attracting increased population growth. An example of commercial activity that brings additional uncertainty to the future economy of Lincoln County is the relocation of the National Oceanographic and Atmospheric Association headquarters to the City of Newport. This will bring new jobs and stimulate economic activity, with unknown associated impacts on future water demand. There are also unused manufacturing facilities in the region that might attract light industrial and potentially heavier industrial water users to the area.

Additional information has historically been available through the Oregon Water Resources Department online Water Availability Reporting System (WARS). However the program is currently hampered by budget shortfalls and reduced staff. The program is underfunded and consequently unable to keep up with the annual water use reporting. It is estimated that only 25 percent of the districts required to report are actively doing so (VanGordon, 2011), which also affects the accuracy of the data available from the Oregon Water Resources Department.

3.3 Potential Water Deficits and Shortfalls

Potential water deficits are anticipated in Polk County and potentially in Lincoln County. Although total water demand for the county may not exceed total water availability, water right holders are not necessarily capable nor willing to transfer water from one place to another. Therefore, water available to some suppliers may not be available to meet shortfalls in other locations. The review of previous work, current conditions, and future plans above suggests that the anticipated regional demand will exceed supply for DCMI water during the planning

horizon, with an estimated 38 MGD currently available, and with a peak to maximum daily demand forecasted at between 35 MGD and 57 MGD by 2050. The demand forecast does not include agricultural or aquaculture needs, while the supply estimate does not include potential development of the Adair Village water right or further development of other water rights currently held by water districts and not developed.

For Polk County, the analysis completed in 2005 suggests that seven of twelve regional providers will not be able to supply their constituents by 2020. The analysis is supported by the updated research contained in this report. For Polk County, the 2005 report likely underestimated future demand since population growth is currently outpacing projections despite the global economic slowdown that began in 2008. The estimates presented in the 2005 report suggest a total deficit of between 12.8 and 15.8 MGD by the year 2040. The deficit is likely to increase by the year 2050. As future water supplies become more uncertain, municipalities may become less willing to transfer water rights to other municipalities.

In Lincoln County, the analysis completed in 2008 suggests that four of ten regional providers will not be able to supply their constituents by 2020 during the peak months. The analysis is supported by the updated research contained in this report. For Lincoln County, the 2008 report likely slightly overestimated future demand since population growth is currently less than some projections had expected. The estimates presented in the 2008 report suggest a total deficit of 10.4 MGD by the year 2050. Although this may overestimate the deficit for Lincoln County, the estimate for Polk County is likely an underestimate. Using the larger expected deficit for Polk County (15.8 MGD), and adding the expected deficit for Lincoln County (10.4 MGD), the total deficit for the two-county region is expected to be 26.2 MGD by 2050.

For the purpose of modeling a range of demand scenarios, the deficits described above for DCMI water use in the year 2050 are assumed to occur during the months of July and August. However, population growth in an area with substantial net in-migration can vary considerably from the expected over the course of 40 years. This coupled with the uncertainty of water rights and capacity, as well as the variability of water use from year to year, and from day to day during the peak months, has led to the development of a range of DCMI water use estimates for the year 2050 that will bracket the estimated 26.2 MGD deficit described above. The bracketed estimates essentially define a plus, or minus 25% range for the expected deficit and timing (see Table 9). The maximum scenario also assumes there will also appear smaller deficits in late June and early September than in July and August. The minimum use scenario assumes a 25% reduction in the anticipated deficit in July and August – from 26.2 MGD to 19.6.

3.1 Summary of Water Rights and Alternative Strategies

The analysis of water demand and strategies to meet the demand in the Polk and Lincoln County region is complicated by uncertainty surrounding water availability and use data, future population growth in the region, the willingness of municipal and private water rights holders to transfer their water rights to public supply sources that need them, and the relative economic costs of storage development, delivery systems and water treatment. In addition to the Valsetz water storage project, alternative strategies to meet the demand include conservation during the peak period and maximum demand months, water right transfers, and delivery and treatment capacity expansion.

Table 9. Estimated Monthly Water DCMI Deficits to be Supplied by the Project.

Month	Average need (MGD)	Min need (MGD)	Max need (MGD)
Jan	0	0	0
Feb	0	0	0
Mar	0	0	0
Apr	0	0	2.5
May	0	0	2.5
Jun 1-15	0	0	8
Jun 16-30	13.1	0	8
Jul 1-15	26.2	19.6	32.75
Jul 16-31	26.2	19.6	32.75
Aug	26.2	19.6	32.75
Sep 1-15	13.1	0	8
Sep 16-30	0	0	8
Oct 1-15	0	0	8
Oct 16-31	0	0	8
Nov	0	0	2.5
Dec	0	0	2.5

4 References

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Final Report

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Addendum A

Water Providers Contracted for this Report and Documents Received

In an attempt to verify and update previous reported water supplies and use, water providers were contacted. Table A-1 summarizes the contacts made. Following the table are copies of the documents received by ENVIRON.

Table A-1. Record of Communications with Water Providers			
Polk County Water Provider	No Response	Response, No Data	Response, Data
City of Dallas			✓
City of Independence		✓	
City of Monmouth			✓
City of Falls City			✓
City of Willamina		✓	
Buell Red Prairie WD		✓	
Rickreall Community WA	No contact info.		
Grand Ronde Community WA	No contact info.		
Luckiamute Domestic Water			✓
Rock Creek WD	No contact info.		
Perrydale Domestic WA		✓	
Tanglewood Water Coop	No contact info.		
City of Adair Village	✓		
Lincoln County Water Provider	No Response	Response, No Data	Response, Data
City of Lincoln City		✓	
City of Newport			✓
Seal Rock WD			✓
K-GB-LB WD			✓
City of Toledo			✓
SW Lincoln County WD		✓	
City of Depoe Bay			✓
City of Yachats		✓	
City of Siletz		✓	

The following additional information was collected:

A.1 Polk County Water Use Data

City of Independence- Spoke to Kenneth Perkins on January 19, 2011 and he said he was going to check in with Austin at Polk County.

City of Monmouth- Spoke to Russ Cooper on January 18, 2011 and he provided the following data:

Avg Daily 2009	Avg Daily 2010	Storage-	Max Demand 2009	Max Demand 2010	Deficit
958,163 gallons	786,859 gallons	2,390,400 gallons	1,950,900 gallons	2,228,223 gallons	None

City of Falls City- Spoke to Don Poe on January 12, 2011 and he provided the following data:

Avg Daily 2009	Avg Daily 2010	Storage-	2009/2010 max	Avg water use-	Deficit
96,301 gallons	106,646 gallons	600,000 gallon reservoir 900,000 gallon total capacity	daily use 310,000 gallons	450 g/ per day	None

Luckiamute Domestic Water- Spoke to customer service on January 12, 2011 and they provided the following data:

2009	Avg. 2010
165,331,514 gallons	159,089,500 gallons

City of Willamina- Spoke to Debbie Bernard on January 18, 2011 and she did not provide any data.

Buell Red Prairie Water District- Email/ Phone communication on January 26, 2011, did not receive any data.

Perrydale Domestic WA- Email/ Phone communication on January 18, 2011, did not receive any data.

City of Adair Village- Email communication on January 11, 2011, did not receive any data.

A.2 Lincoln County Water Use Data

City of Lincoln City- Spoke to Anne Marie on January 20, 2011 and she did not provide any data.

City of Newport- Spoke to Bob Fuller on January 20, 2011 and he provided the following data:

Avg. Daily 2009	Avg. Daily 2010	Storage-	Max Demand 2009	Max Demand 2010	Deficit
1.8 million gal	1.9 million gal	1300 acre feet 2 reservoirs	3.9 million gallons	3.9 million gallons	None

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City of Toledo- Spoke to Adam Denlinger on January 11, 2011 and he provided the following data:

Avg Daily 2009	Avg Daily 2010	Storage Capacity		Max Demand 2009	Max Demand 2010
151,200 est. dick forks- m-24/m	no pumping seal rock (winter)	600,000 g	850,000 g (s)	combined storage capacity from all sources 2.3 million gallons	310 mil gallons(whole year)
daily 36/m peak avg. g/min	w/pumping (winter) 115 g/min (total peak)	900,000 g est. 105 g/min	1 mil g (summer)	151,200 g/ day est.max daily demand 600,000- 1 million gallons	850,000 g

SW Lincoln County WD- Spoke to David the Field Supervisor on January 11, 2011 and he did not provide any data.

City of Yachats- Email/ Phone Communication with John McClintock on January 26,2011 and he did not provide any data.

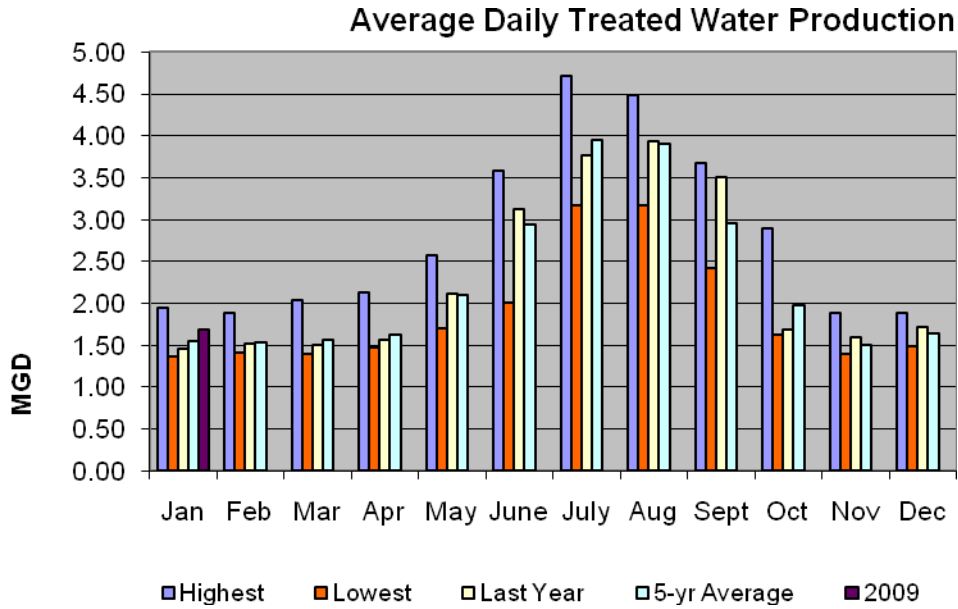
City of Siletz- Email/ Phone Communication with Allen Middaugh on January 11,2011 and he did not provide any data.

CITY OF DALLAS, OREGON
DEPARTMENT OF PUBLIC WORKS
Monthly Report for January 2009

Water Division

	<u>2009</u>	<u>Unit</u>		<u>2008</u>	<u>Unit</u>
Total Discharge to Town	52.34	MG		51.46	MG
Total Water Raw	57.47	MG		59.95	MG
Peak Day	(Jan. 14) 3.25	MG	(Jan. 2)	2.39	MG
Daily Average-Raw	1.85	MGD		1.93	MGD
Daily Average-City	1.69	MGD		1.66	MGD
Backwash Water	3.24	MG		3.08	MG
Filter to Waste	107	MG		0.29	MG
Flushing	0	MG		0.10	MG
Discharge Water	.10	MG		0.10	MG
ASR Injection	5.84	MG		7.35	MG
Average High Temp	47 ° F			42.8 ° F	
Average Low Temp	33 ° F			31.4 ° F	
Total Precipitation	3.56	Inches		8.34	Inches

Mercer Dam and Watershed:



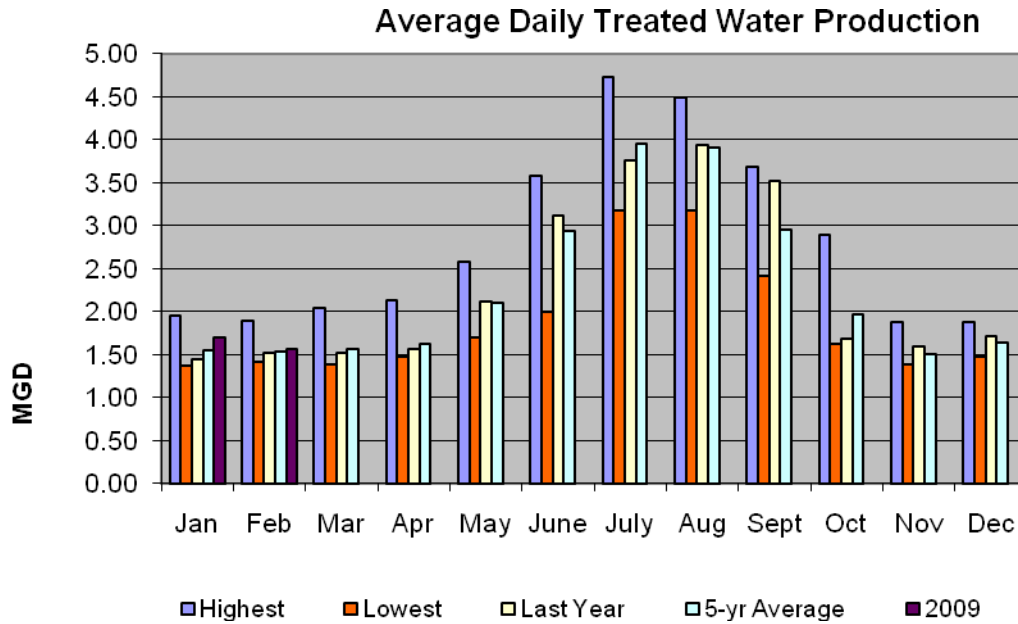
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Monthly Report for February 2009

Water Division

	<u>2009</u>	<u>Unit</u>		<u>2008</u>	<u>Unit</u>	
Total Discharge to Town	43.75	MG		44.63	MG	
Total Water Raw	49.99	MG		53.38	MG	
Peak Day	(2-10)	2.16	MG	02/02/08	2.43	MG
Daily Average-Raw	1.78	MGD		1.93	MGD	
Daily Average-City	1.56	MGD		1.64	MGD	
Backwash Water	2.90	MG		2.42	MG	
Filter to Waste	.69	MG		.67	MG	
Flushing	0	MG		0	MG	
Discharge Water	.10	MG		.10	MG	
ASR Injection	6.58	MG		6.36	MG	
Average High Temp	50	° F		51.2	° F	
Average Low Temp	32	° F		37.4	° F	
Total Precipitation	2.90	Inches		5.33	Inches	

Mercer Dam and Watershed:

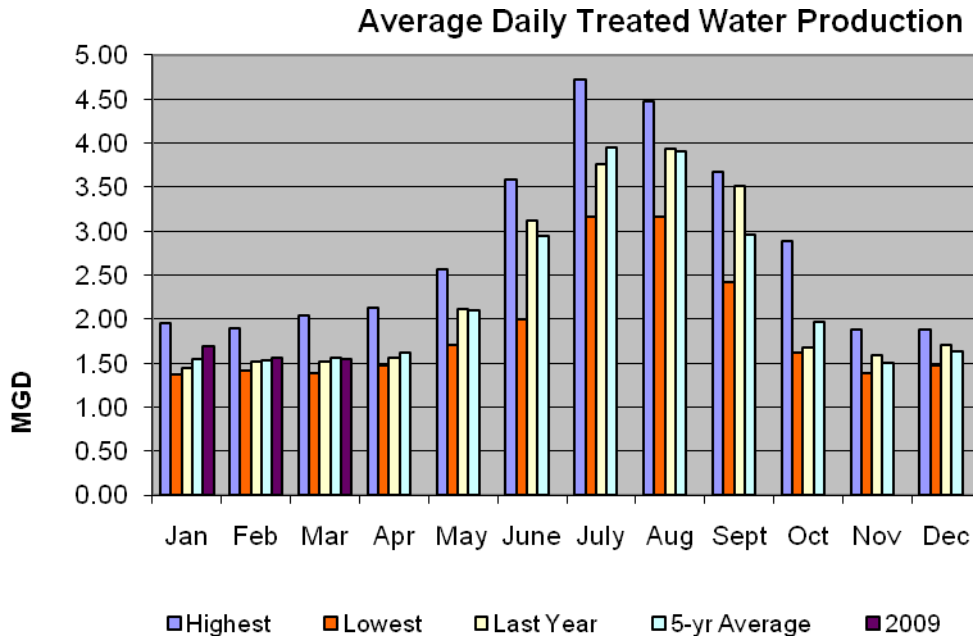


DEPARTMENT OF PUBLIC WORKS

Monthly Report for March 2009

Water Division

	<u>2009</u>	<u>Unit</u>	<u>2008</u>	<u>Unit</u>
Total Discharge to Town	48.1	MG	54.1	MG
Total Water Raw	55.9	MG	59.3	MG
Peak Day	1.90	MG	2.75	MG
Daily Average-Raw	1.81	MGD	1.91	MGD
Daily Average-City	1.55	MGD	1.74	MGD
Backwash Water	4.45	MG	2.48	MG
Filter to Waste	.84	MG	.25	MG
Flushing	N/A	MG	N/A	MG
Discharge Water	.10	MG	.10	
ASR Injection	7.36	MG	7.36	
Average High Temp	60 ^o	F	58.5 ^o	F
Average Low Temp	45 ^o	F	39.4 ^o	F
Total Precipitation	3.03	Inches	2.35	Inches



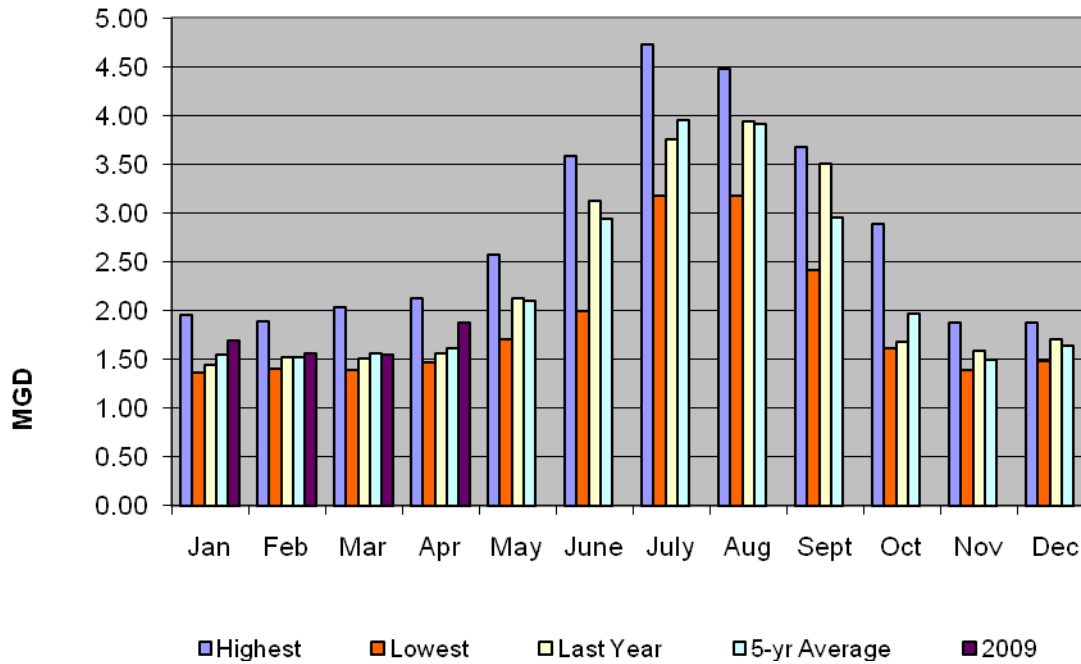
DEPARTMENT OF PUBLIC WORKS

Monthly Report for April 2009

Water Division

	<u>2009</u>	<u>Unit</u>		<u>2008</u>	<u>Unit</u>
Total Discharge to Town	56.42	MG		50.6	MG
Total Water Raw	62.34	MG		56.2	MG
Peak Day	4-21 2.81	MG	4-24	2.37	MG
Daily Average-Raw	2.07	MGD		1.87	MGD
Daily Average-City	1.88	MGD		1.69	MGD
Backwash Water	3.90	MG		2.70	MG
Filter to Waste	.71	MG		.15	MG
Flushing		MG		.42	MG
Discharge Water	.10	MG		.10	MG
ASR Injection	7.13	MG		5.07	MG
Average High Temp	60 ^o	F		56.0 ^o	F
Average Low Temp	38 ^o	F		36.9 ^o	F
Total Precipitation	1.34	Inches		1.97	Inches

Average Daily Treated Water Production

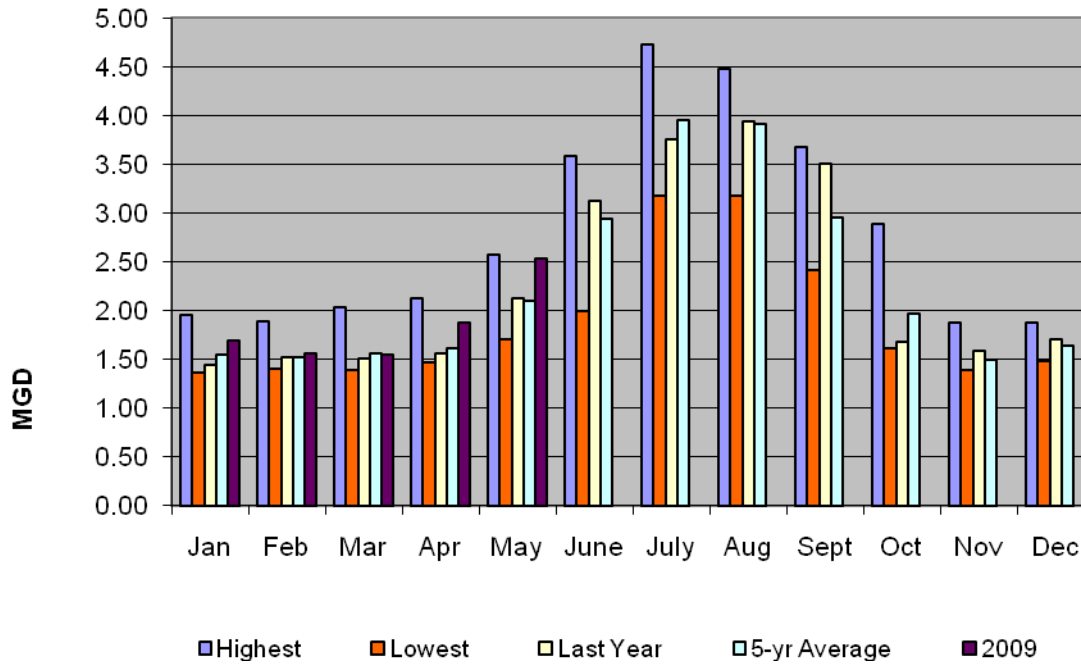


DEPARTMENT OF PUBLIC WORKS Monthly Report for May 2009

Water Division

	<u>2009</u>	<u>Unit</u>		<u>2008</u>	<u>Unit</u>
Total Discharge to Town	78.5	MG		79.81	MG
Total Water Raw	81.5	MG		80.50	MG
Peak Day	5-31 4.01	MG	5-17	2.57	MG
Daily Average-Raw	2.63	MGD		2.60	MGD
Daily Average-City	2.53	MGD		2.57	MGD
Backwash Water	3.56	MG		.236	MG
Filter to Waste	.52	MG		.24	MG
Flushing		MG			MG
Discharge Water	.10	MG		.10	MG
ASR Injection	7.41	MG		7.36	MG
Average High Temp	70 ^o	F		67.0 ^o	F
Average Low Temp	44 ^o	F		47.7 ^o	F
Total Precipitation	3.03	Inches		.43	Inches

Average Daily Treated Water Production



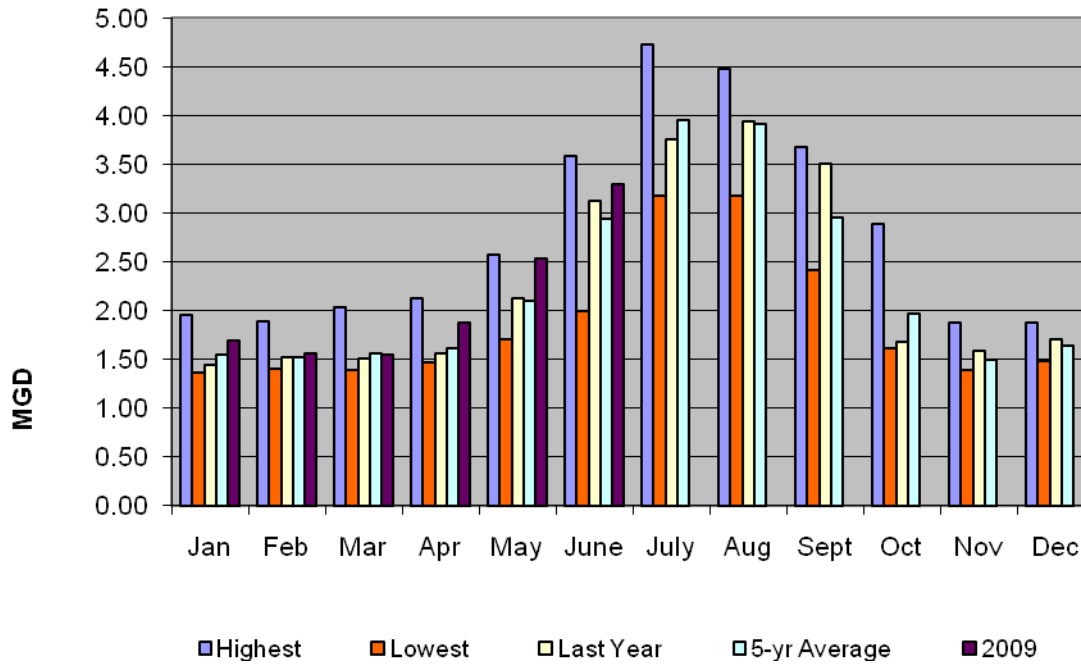
DEPARTMENT OF PUBLIC WORKS

Monthly Report for June 2009

Water Division

	<u>2009</u>	<u>Unit</u>		<u>2008</u>	<u>Unit</u>	
Total Discharge to Town	99.1	MG		105.56	MG	
Total Water Raw	99.3	MG		103.80	MG	
Peak Day	6-30	4.46	MG	6-29	4.96	MG
Daily Average-Raw		3.30	MGD		3.46	MGD
Daily Average-City		3.30	MGD		3.52	MGD
Backwash Water		2.91	MG		1.97	MG
Filter to Waste		.48	MG		.10	MG
Flushing			MG			MG
Discharge Water		.10	MG		.10	MG
ASR Injection		7.19	MG		7.17	MG
Average High Temp		74 o	F		74.4 o	F
Average Low Temp		53 o	F		47.3 o	F
Total Precipitation		1.12	Inches		.03	Inches

Average Daily Treated Water Production

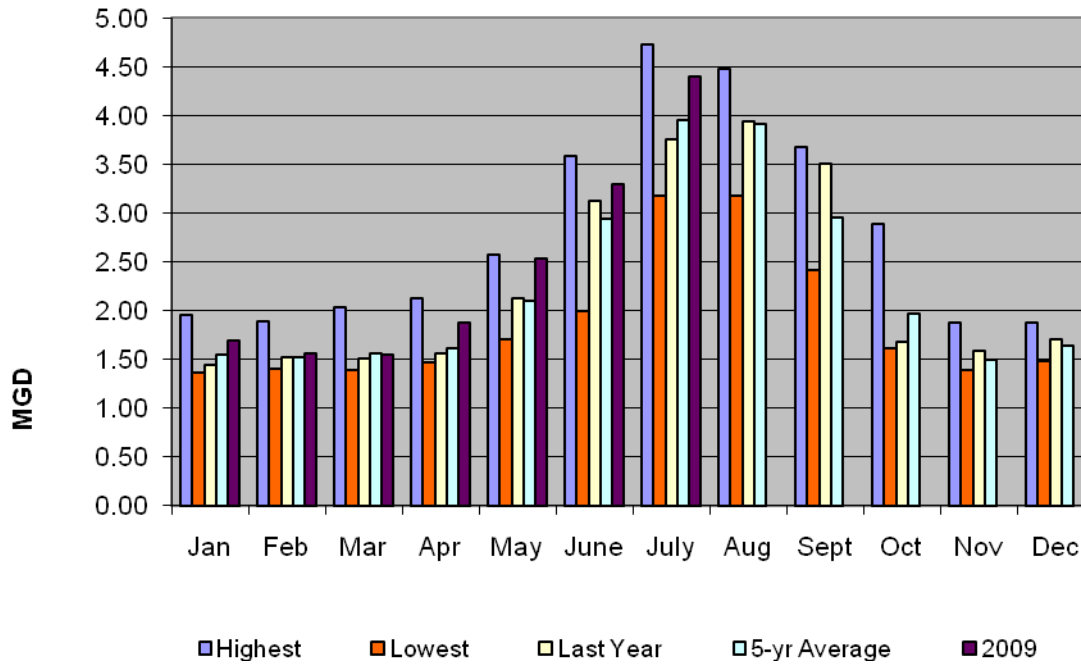


DEPARTMENT OF PUBLIC WORKS Monthly Report for July 2009

Water Division

	<u>2009</u>	<u>Unit</u>		<u>2008</u>	<u>Unit</u>	
Total Discharge to Town	13.7	MG		146.31	MG	
Total Water Raw	12.9	MG		128.86	MG	
Peak Day	7-30	5.8	MG	7-1	4.74	MG
Daily Average-Raw		4.2	MGD		4.16	MGD
Daily Average-City		4.4	MGD		4.72	MGD
Backwash Water		5.35	MG		2.41	MG
Filter to Waste		1.87	MG		.28	MG
Flushing			MG			MG
Discharge Water		.10	MG		.10	MG
ASR Injection	7-1 to 7-10	2.2	MG		.55	MG
Average High Temp		86.0	F		83.0	F
Average Low Temp		86.0	F		53.0	F
Total Precipitation		.68	Inches		0.00	Inches

Average Daily Treated Water Production

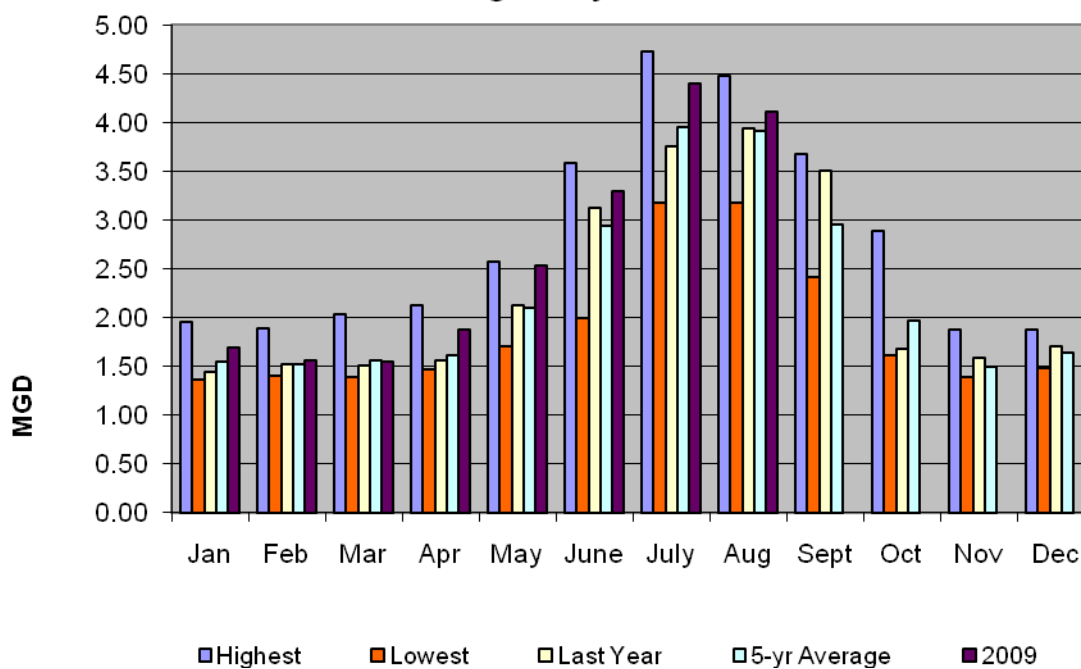


DEPARTMENT OF PUBLIC WORKS Monthly Report for August 2009

Water Division

	<u>2009</u>	<u>Unit</u>		<u>2008</u>	<u>Unit</u>
Total Discharge to Town	12.74	MG		128.25	MG
Total Water Raw	11.55	MG		116.01	MG
Peak Day	8-4 4.63	MG	8-6	4.98	MG
Daily Average-Raw	3.73	MGD		3.74	MGD
Daily Average-City	4.11	MGD		4.14	MGD
Backwash Water	5.28	MG		2.95	MG
Filter to Waste	1.34	MG		.35	MG
Flushing		MG		.50	MG
Discharge Water	.10	MG		.10	MG
ASR Injection		MG		4.96	MG
Average High Temp	82°	F		80°	F
Average Low Temp	55°	F		55°	F
Total Precipitation	.18	Inches		1.28	Inches

Average Daily Treated Water Production



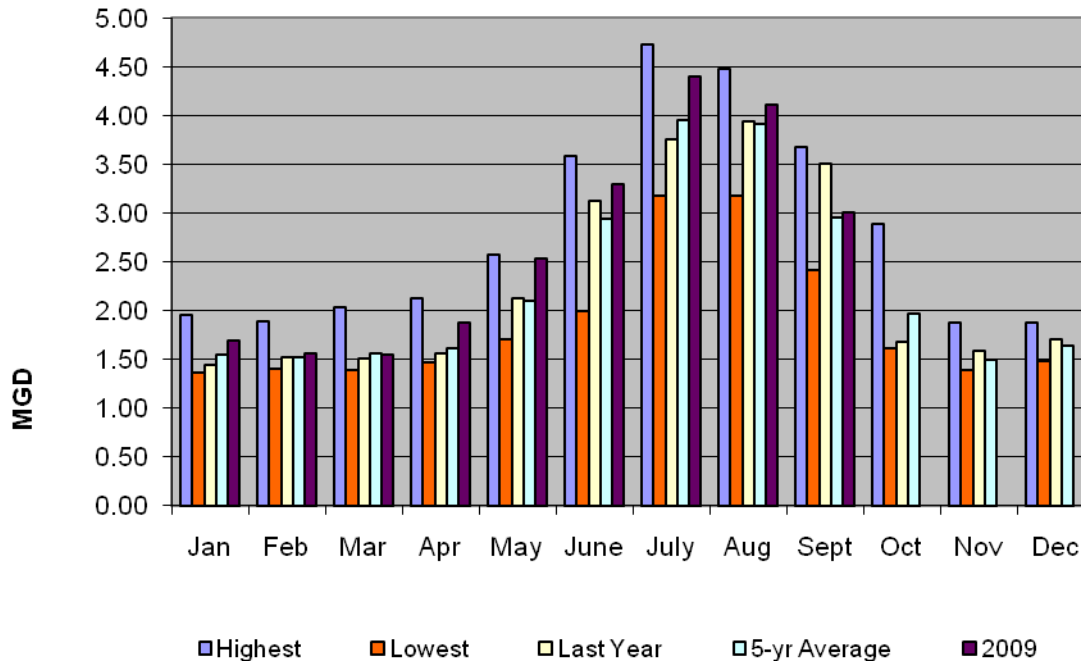
DEPARTMENT OF PUBLIC WORKS

Monthly Report for September 2009

Water Division

	<u>2009</u>	<u>Unit</u>		<u>2008</u>	<u>Unit</u>	
Total Discharge to Town	96.1	MG		110.57	MG	
Total Water Raw	89.8	MG		103.58	MG	
Peak Day	9-24	3.8	MG	9-12	4.49	MG
Daily Average-Raw		3.2	MGD		3.45	MGD
Daily Average-City		3.0	MGD		3.68	MGD
Backwash Water		4.3	MG		2.83	MG
Filter to Waste		.40	MG		.47	MG
Flushing			MG			MG
Discharge Water		.10	MG		.25	MG
ASR Injection			MG			
Average High Temp		78 ^o	F		72 ^o	F
Average Low Temp		51 ^o	F		47 ^o	F
Total Precipitation		1.2	Inches		.74	Inches

Average Daily Treated Water Production



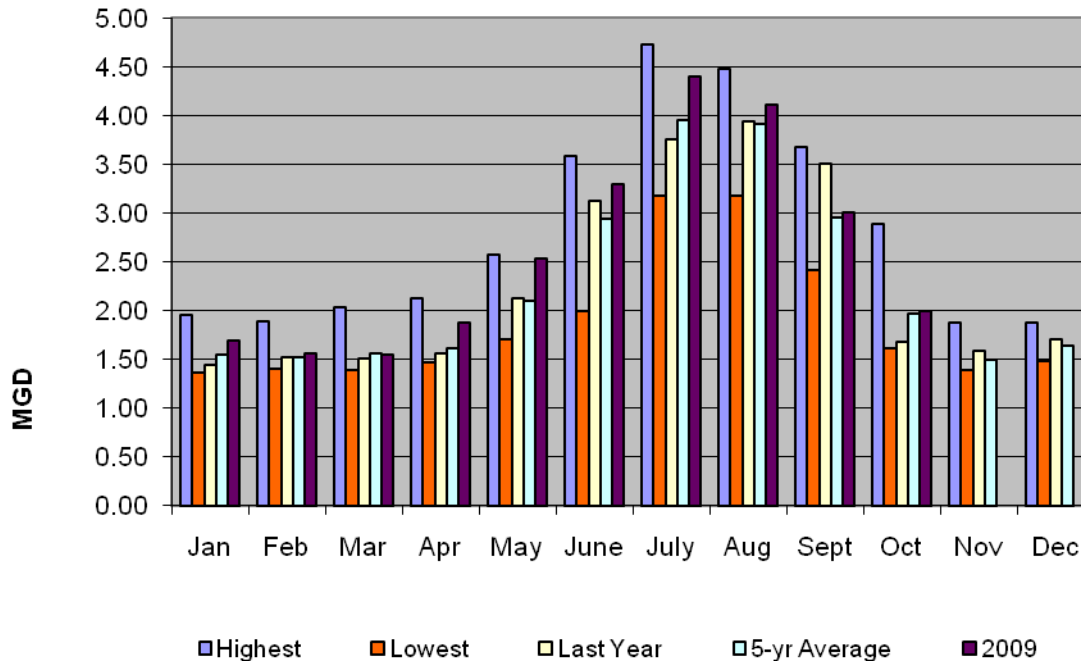
DEPARTMENT OF PUBLIC WORKS

Monthly Report for October 2009

Water Division

	2009	Unit		2008	Unit
Total Discharge to Town	53.01	MG		61.9	MG
Total Water Raw	57.57	MG		57.5	MG
Peak Day	(Oct. 1) 2.5	MG	(Oct. 1)	2.89	MG
Daily Average-Raw	1.9	MGD		1.86	MGD
Daily Average-City	1.7	MGD		2.00	MGD
Backwash Water	2.8	MG		2.09	MG
Filter to Waste	1.7	MG		.19	MG
Flushing		MG		.15	MG
Discharge Water	.10	MG			.10
ASR Injection		MG			
Average High Temp	63 ^o	F		63 ^o	F
Average Low Temp	54 ^o	F		41 ^o	F
Total Precipitation	2.61	Inches		.96	Inches

Average Daily Treated Water Production

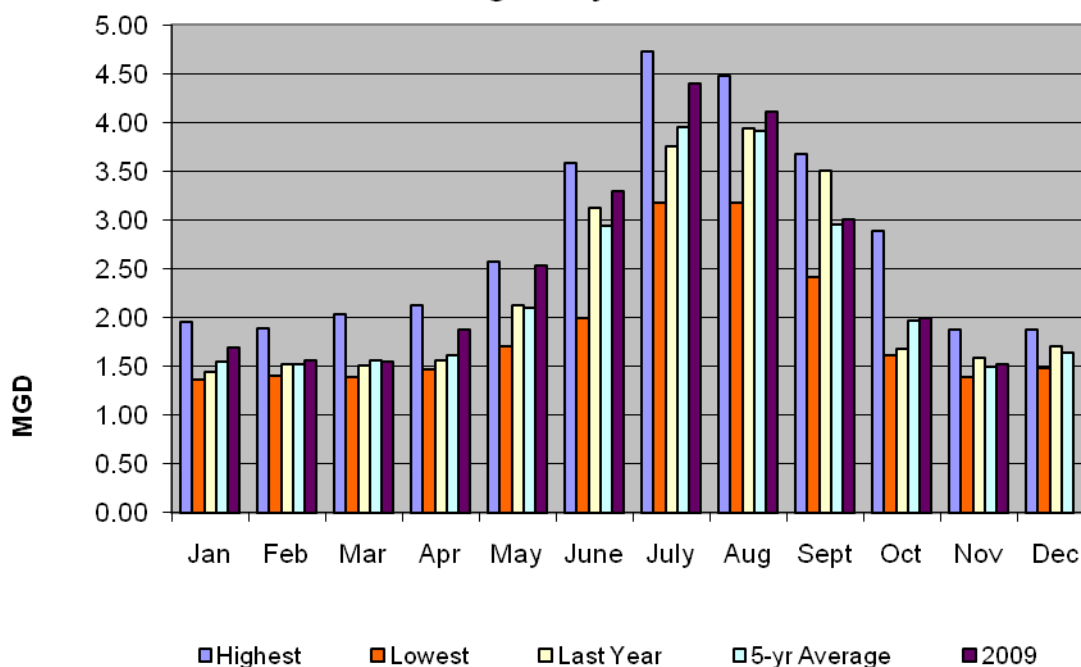


DEPARTMENT OF PUBLIC WORKS Monthly Report for November 2009

Water Division

	2009	Unit		2008	Unit
Total Discharge to Town	45.67	MG		51.75	MG
Total Water Raw	48.73	MG		51.99	MG
Peak Day	(Nov. 12) 2.08	MG	(Nov. 26)	2.06	MG
Daily Average-Raw	1.62	MGD		1.73	MGD
Daily Average-City	1.52	MGD		1.73	MGD
Backwash Water	2.7	MG		4.11	MG
Filter to Waste	.17	MG		1.25	MG
Flushing	0	MG		0	MG
Discharge Water	.10	MG		.10	MG
ASR Injection	0	MG		0	MG
Average High Temp	54 ^o	F		54 ^o	F
Average Low Temp	39 ^o	F		41 ^o	F
Total Precipitation	8.02	Inches		3.62	Inches

Average Daily Treated Water Production

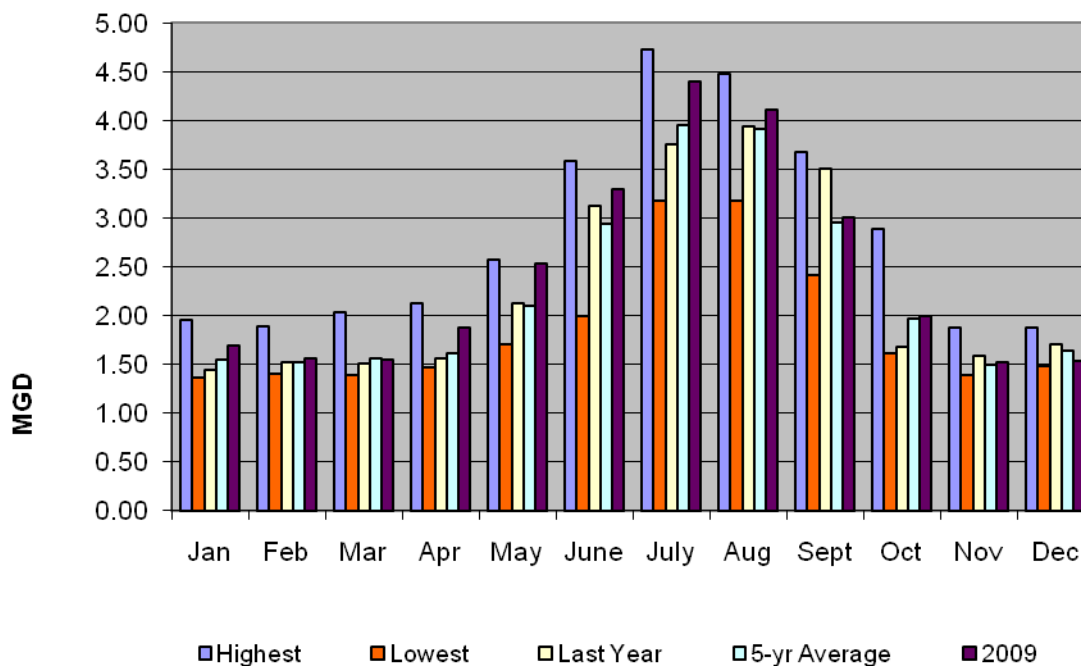


DEPARTMENT OF PUBLIC WORKS Monthly Report for December 2009

Water Division

	<u>2009</u>	<u>Unit</u>		<u>2008</u>	<u>Unit</u>
Total Discharge to Town	47.74	MG		56.1	MG
Total Water Raw	55.95	MG		54.9	MG
Peak Day	(Dec. 14) 2.46	MG	(Dec. 24)	2.54	MG
Daily Average-Raw	1.80	MGD		1.8	MGD
Daily Average-City	1.54	MGD		1.8	MGD
Backwash Water	3.13	MG		3.6	MG
Filter to Waste	0.31	MG		.80	MG
Flushing	-	MG		-	MG
Discharge Water	0.01	MG		.10	MG
ASR Injection	4.76	MG		0	MG
Average High Temp	44 ^o	F		44 ^o	F
Average Low Temp	30 ^o	F		30 ^o	F
Total Precipitation	6.14	Inches		6.02	Inches

Average Daily Treated Water Production



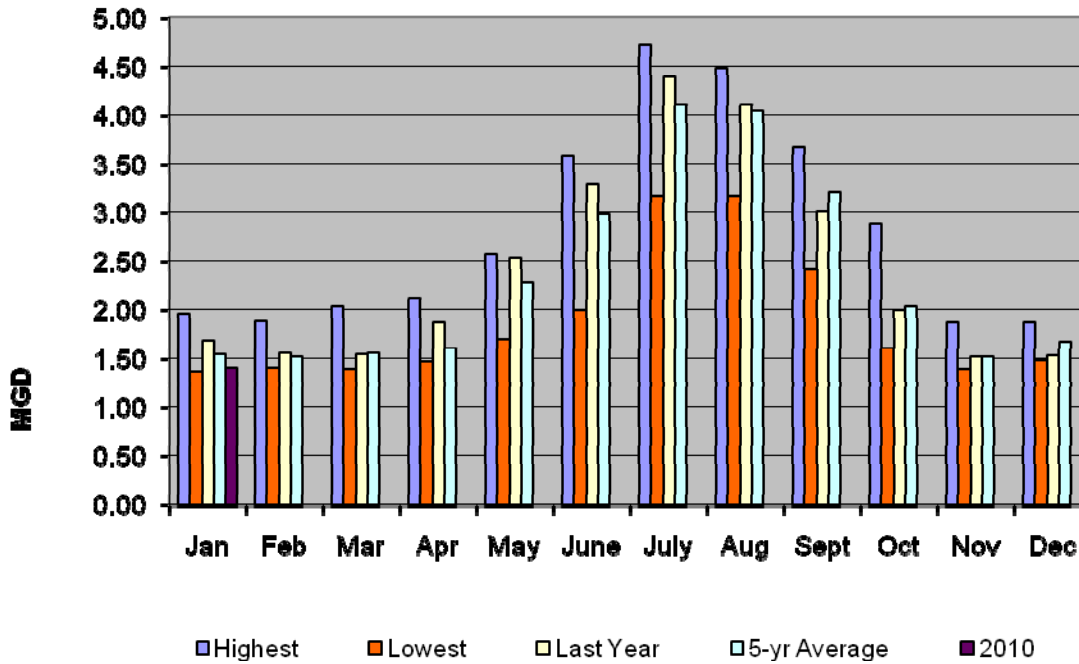
DEPARTMENT OF PUBLIC WORKS

Monthly Report for January 2010

Water Division

	<u>2010</u>	<u>Unit</u>		<u>2009</u>	<u>Unit</u>
Total Discharge to Town	43.71	MG		52.34	MG
Total Water Raw	56.13	MG		57.47	MG
Peak Day	(Jan. 20) 1.99	MG	(Jan. 14)	3.25	MG
Daily Average-Raw	1.81	MGD		1.85	MGD
Daily Average-City	1.41	MGD		1.69	MGD
Backwash Water	4.22	MG		3.24	MG
Filter to Waste	0.84	MG		107	MG
Flushing	0.00	MG		0.00	MG
Discharge Water	0.00	MG		.10	MG
ASR Injection	7.36	MG		5.84	MG
Average High Temp	52 ^o	F		47 ^o	F
Average Low Temp	41 ^o	F		33 ^o	F
Total Precipitation	5.85	Inches		3.56	Inches

Average Daily Treated Water Production



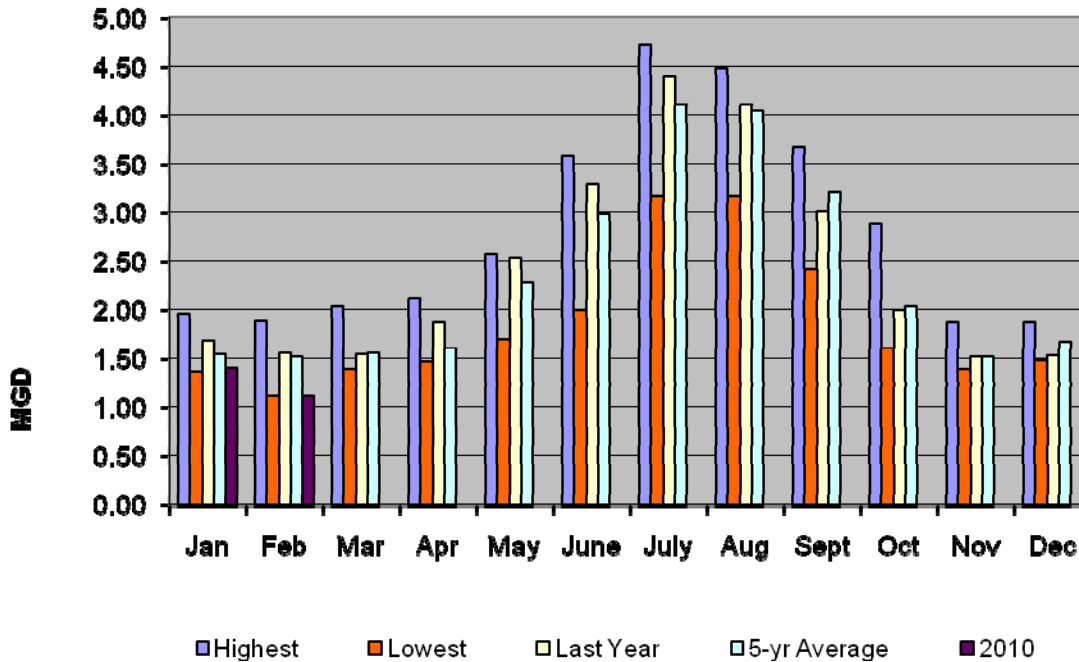
DEPARTMENT OF PUBLIC WORKS

Monthly Report for February 2010

Water Division

	<u>2010</u>	<u>Unit</u>		<u>2009</u>	<u>Unit</u>
Total Discharge to Town	34.62	MG		43.75	MG
Total Water Raw	49.10	MG		49.99	MG
Peak Day	(2-17) 2.07	MG	(2-10)	2.16	MG
Daily Average-Raw	1.58	MGD		1.78	MGD
Daily Average-City	1.12	MGD		1.56	MGD
Backwash Water	2.62	MG		2.90	MG
Filter to Waste	0.44	MG		.69	MG
Flushing	0.00	MG		0	MG
Discharge Water	0.00	MG		.10	MG
ASR Injection	6.66	MG		6.58	MG
Average High Temp	52 ^o	F		50 ^o	F
Average Low Temp	42 ^o	F		32 ^o	F
Total Precipitation	.14	Inches		2.90	Inches

Average Daily Treated Water Production



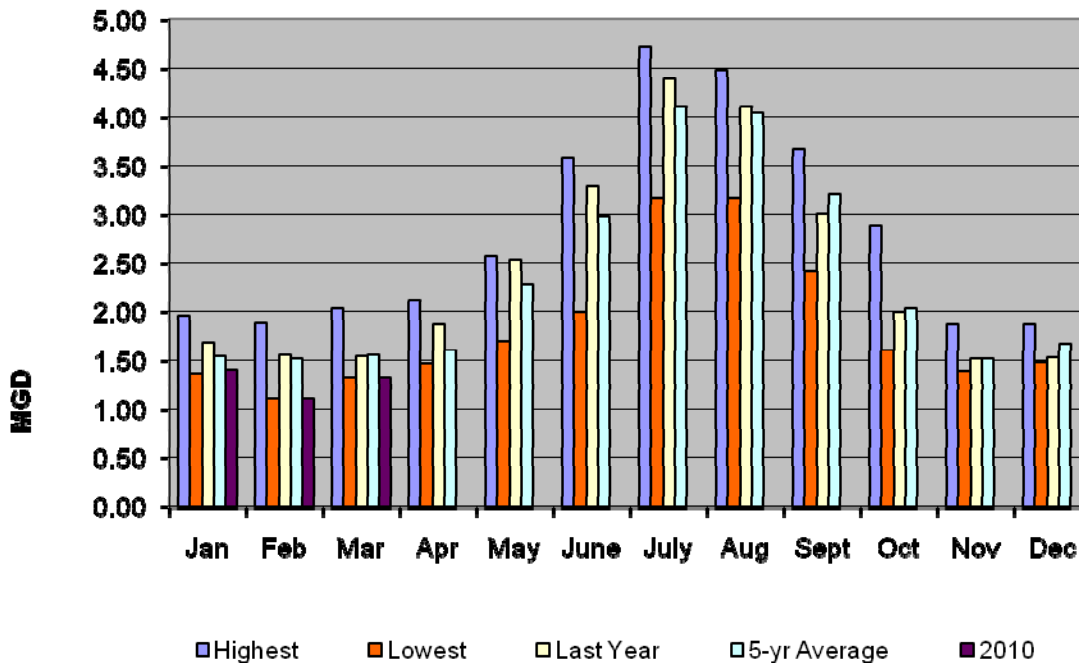
DEPARTMENT OF PUBLIC WORKS

Monthly Report for March 2010

Water Division

	<u>2010</u>	<u>Unit</u>	<u>2009</u>	<u>Unit</u>
Total Discharge to Town	41.06	MG	48.1	MG
Total Water Raw	54.04	MG	55.9	MG
Peak Day (3-6)	2.00	MG	1.90	MG
Daily Average-Raw	1.74	MGD	1.81	MGD
Daily Average-City	1.32	MGD	1.55	MGD
Backwash Water	4.78	MG	4.45	MG
Filter to Waste	0.81	MG	.84	MG
Flushing	0.00	MG	N/A	MG
Discharge Water	0.10	MG	.10	MG
ASR Injection	7.38	MG	7.36	MG
Average High Temp	46 ^o	F	60 ^o	F
Average Low Temp	38 ^o	F	45 ^o	F
Total Precipitation	5.14	Inches	3.03	Inches

Average Daily Treated Water Production



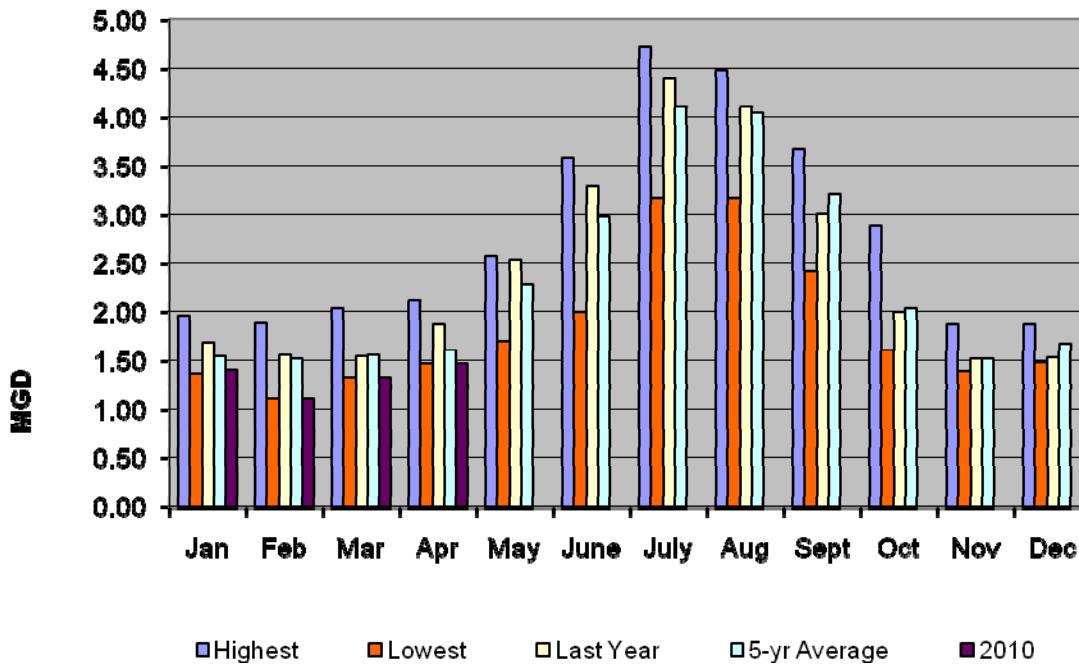
DEPARTMENT OF PUBLIC WORKS

Monthly Report for April 2010

Water Division

	<u>2010</u>	<u>Unit</u>		<u>2009</u>	<u>Unit</u>
Total Discharge to Town	45.48	MG		56.42	MG
Total Water Raw	55.59	MG		62.34	MG
Peak Day	(4-9) 2.19	MG	(4-21)	2.81	MG
Daily Average-Raw	1.79	MGD		2.07	MGD
Daily Average-City	1.47	MGD		1.88	MGD
Backwash Water	2.54	MG		3.90	MG
Filter to Waste	0.33	MG		.71	MG
Discharge Water	0.00	MG		.10	MG
ASR Injection	7.24	MG		7.13	MG
Average High Temp	59 °	F		60 °	F
Average Low Temp	40 °	F		38 °	F
Total Precipitation	4.35	Inches		1.34	Inches

Average Daily Treated Water Production



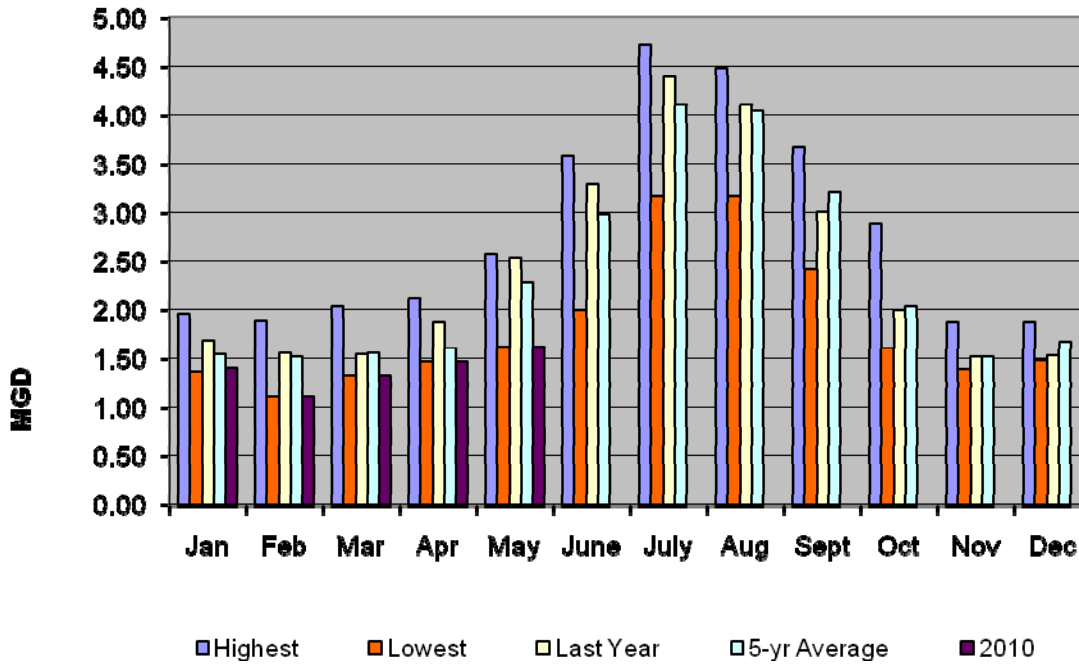
DEPARTMENT OF PUBLIC WORKS

Monthly Report for May 2010

Water Division

	<u>2010</u>	<u>Unit</u>		<u>2009</u>	<u>Unit</u>
Total Discharge to Town	50.44	MG		78.5	MG
Total Water Raw	61.36	MG		81.5	MG
Peak Day	(5-12) 2.68	MG	(5-31)	4.01	MG
Daily Average-Raw	1.98	MGD		2.63	MGD
Daily Average-City	1.63	MGD		2.53	MGD
Backwash Water	1.56	MG		3.56	MG
Filter to Waste	0.28	MG		.52	MG
Discharge Water	0.00	MG		.10	MG
ASR Injection	9.08	MG		7.41	MG
Average High Temp	64 °	F		70 °	F
Average Low Temp	45 °	F		44 °	F
Total Precipitation	3.47	Inches		3.03	Inches

Average Daily Treated Water Production



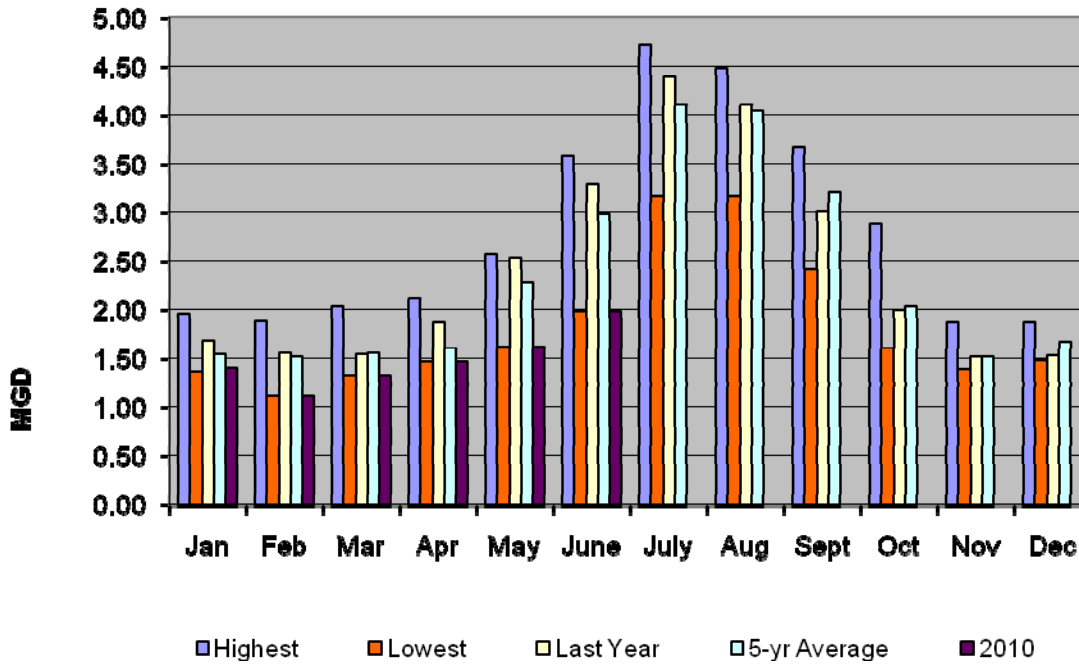
DEPARTMENT OF PUBLIC WORKS

Monthly Report for June 2010

Water Division

	<u>2010</u>	<u>Unit</u>		<u>2009</u>	<u>Unit</u>
Total Discharge to Town	61.44	MG		99.1	MG
Total Water Raw	72.59	MG		99.3	MG
Peak Day	(6-29) 3.77	MG	(6-30)	4.46	MG
Daily Average-Raw	2.34	MGD		3.30	MGD
Daily Average-City	1.98	MGD		3.30	MGD
Backwash Water	2.14	MG		2.91	MG
Filter to Waste	0.37	MG		.48	MG
Discharge Water	0.00	MG		.10	MG
Flushing	.10	MG		0.00	MG
ASR Injection	8.64	MG		7.19	MG
Average High Temp	70°	F		74°	F
Average Low Temp	50°	F		53°	F
Total Precipitation	2.64	Inches		1.12	Inches

Average Daily Treated Water Production



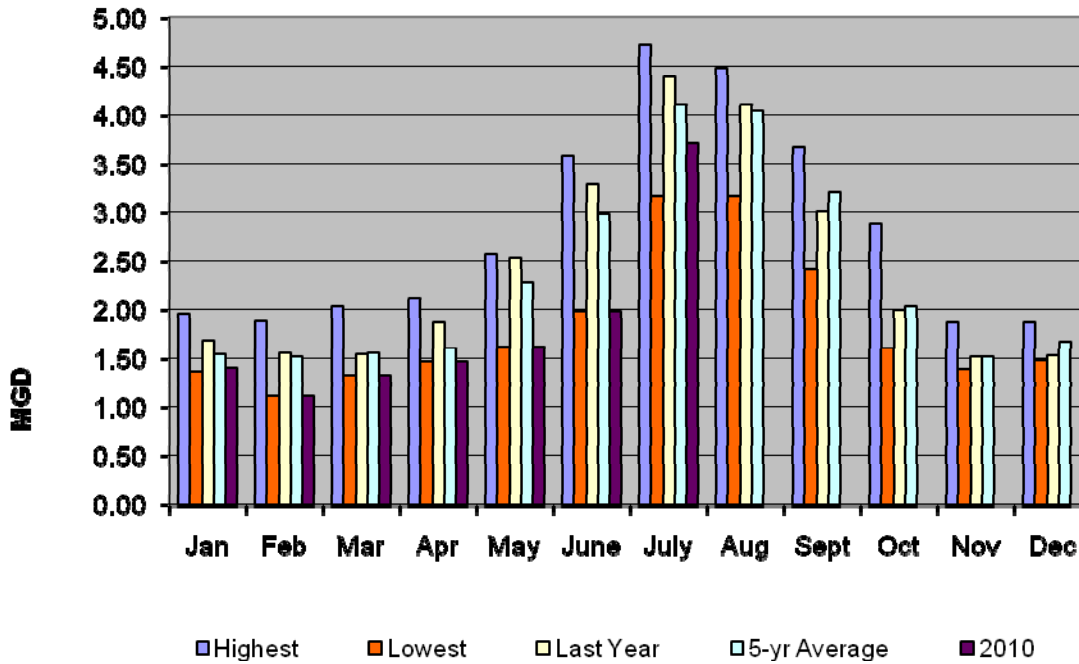
DEPARTMENT OF PUBLIC WORKS

Monthly Report for July 2010

Water Division

	<u>2010</u>	<u>Unit</u>		<u>2009</u>	<u>Unit</u>
Total Discharge to Town	114.88	MG		13.7	MG
Total Water Raw	117.74	MG		12.9	MG
Peak Day	7-9 4.67	MG	7-30	5.8	MG
Daily Average-Raw	3.80	MGD		4.2	MGD
Daily Average-City	3.71	MGD		4.4	MGD
Backwash Water	2.32	MG		5.35	MG
Filter to Waste	0.53	MG		1.87	MG
Flushing	0.00	MG		0	MG
Discharge	.10	MG		.10	MG
ASR Injection	7.46	MG	7-1 to 7-10	7.19	MG
Average High Temp	82 ^o	F		86 ^o	F
Average Low Temp	53 ^o	F		56 ^o	F
Total Precipitation	.04	Inches		.68	Inches

Average Daily Treated Water Production



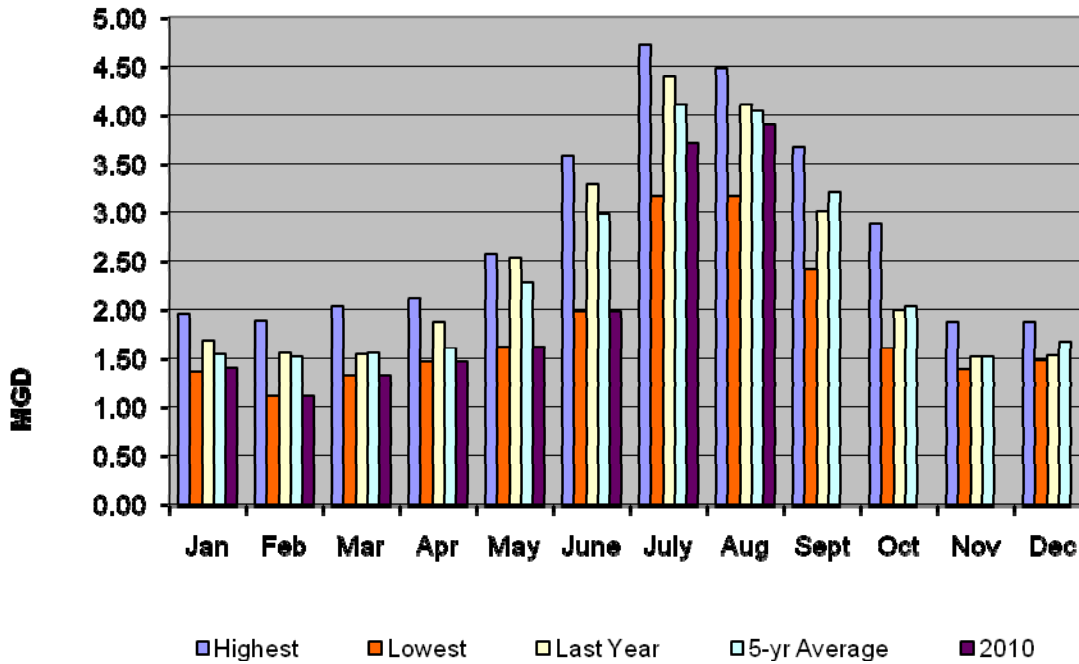
DEPARTMENT OF PUBLIC WORKS

Monthly Report for August 2010

Water Division

	<u>2010</u>	<u>Unit</u>		<u>2009</u>	<u>Unit</u>	
Total Discharge to Town	120.99	MG		127.4	MG	
Total Water Raw	116.40	MG		115.5	MG	
Peak Day	8-14	4.78	MG	8-4	4.63	MG
Daily Average-Raw	3.75	MGD		3.73	MGD	
Daily Average-City	3.90	MGD		4.11	MGD	
Backwash Water	3.33	MG		5.28	MG	
Filter to Waste	0.81	MG		1.34	MG	
Flushing	0.00	MG		0	MG	
Discharge	0.10	MG		.10	MG	
ASR Discharged	8.83	MG			MG	
Average High Temp	82 °	F		82 °	F	
Average Low Temp	54 °	F		55 °	F	
Total Precipitation	.18	Inches		.18	Inches	

Average Daily Treated Water Production



Water Treatment

Kenn Carter, Supervisor

	<u>OCT</u>	<u>NOV</u>	<u>DEC</u>
Total Discharge to Town	52.76 MG	43.27 MG	43.79 MG
Total Water Raw	56.64 MG	46.79 MG	52.35 MG
Peak Day	2.23 MG	1.99 MG	2.19 MG
Daily Average-Raw	1.83 MGD	1.56 MGD	1.69 MGD
Daily Average-City	1.70 MGD	1.44 MGD	1.41 MGD
Backwash Water	3.52 MG	3.19 MG	4.17 MG
Filter to Waste	.36 MG	.33 MG	.63 MG
Flushing	0 MG	0 MG	.10 MG
Discharge	0 MG	0 MG	0 MG
ASR Injected	0 MG	0 MG	3.75 MG
Average High Temp	65 ° F	52 ° F	49 ° F
Average Low Temp	44 ° F	39 ° F	39 ° F
Total Precipitation	5.22 Inches	6.44 Inches	9.95 Inches

Patti KC 10/4
For your monthly report.

Month: SEPTEMBER 2010

Total Discharge to Town	65.96	G	80,425,600 MG
Total Water Raw	73.07	G	73,073,736 MG
Peak Day Date: <u>9-5-2010</u>	3.38	G	3,381,417 MG
Daily Average Raw	2.36	G	2,435,791 MG
Daily Average - City	2.13	G	2,680,853 MG
Backwash Water	3.45	G	3,449,595 MG
Filter to Waste	.48	G	481,594 MG
Flushing	-0-	G	MG
Discharge Water	-0-	G	MG
ASR (Circle one) <u>Discharged</u> / Injected	3.19 MONTH OF SEPT.	G	3,186,882 MG

SHUT DOWN ASR
9-16-2010

TOTAL RECHARGE 51,397,556
SEPTEMBER 31,891,566

TOTAL RECOVERY 19,505,990

Aug 35,078,448
SEPT 31,891,566

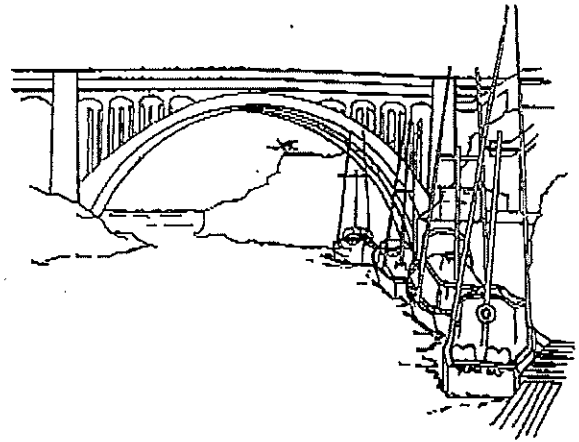
TOTAL FOR SEPT. 3,186,882

CITY of DEPOE BAY

Post Office Box 8 -:- Depoe Bay, Oregon 97341

Phone (541) 765-2361

Fax (541) 765-2129

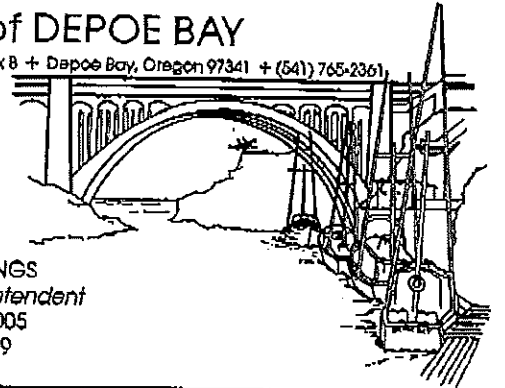


FAX TRANSMISSION SHEET

DATE 2-14-11

CITY of DEPOE BAY

Post Office Box 8 + Depoe Bay, Oregon 97341 + (541) 765-2361



TO: Erwincoy

TERRY OWINGS
City Superintendent
(541) 765-3005
Fax 765-2129

ATTN: Maitri Durrveyer

FAX PHONE NUMBER: 503-353-1653

FAXED
2-14-11

Number of pages included in this transmission: 4 including cover sheet.

Please contact the sender if you do not receive the full transmission.

COMMENTS: From Terry Owings

City of Depoe Bay Water Use Data

Available Source Capacity

2.8 million gallon raw water storage

4.0 CFS / Rocky Creek

2.5 CFS/ South Depoe Bay Creek

2.0 CFS/ North Depoe Bay Creek

Average Daily Demand

2009 Average 160,000 gallons per day (daily demand)

2010 Average 156,000 gallons per day (daily demand)

Maximum Daily Demand

2009- 428,000 gallons per day

2010- 418,000 gallons per day

Water Audit

See fax

To: **City of Depoe Bay**

Mayor: Carol Connors

Councilors: Pete Cameron, Barbara Leff, Dan Zimmerman, Dorinda Goddard

Cc: Terry Owings, Pery Murray, Brady Weidner

From: Bob Pailthorp

Date: January 12, 2011

Subject: **Water Audit for November-December 2010**

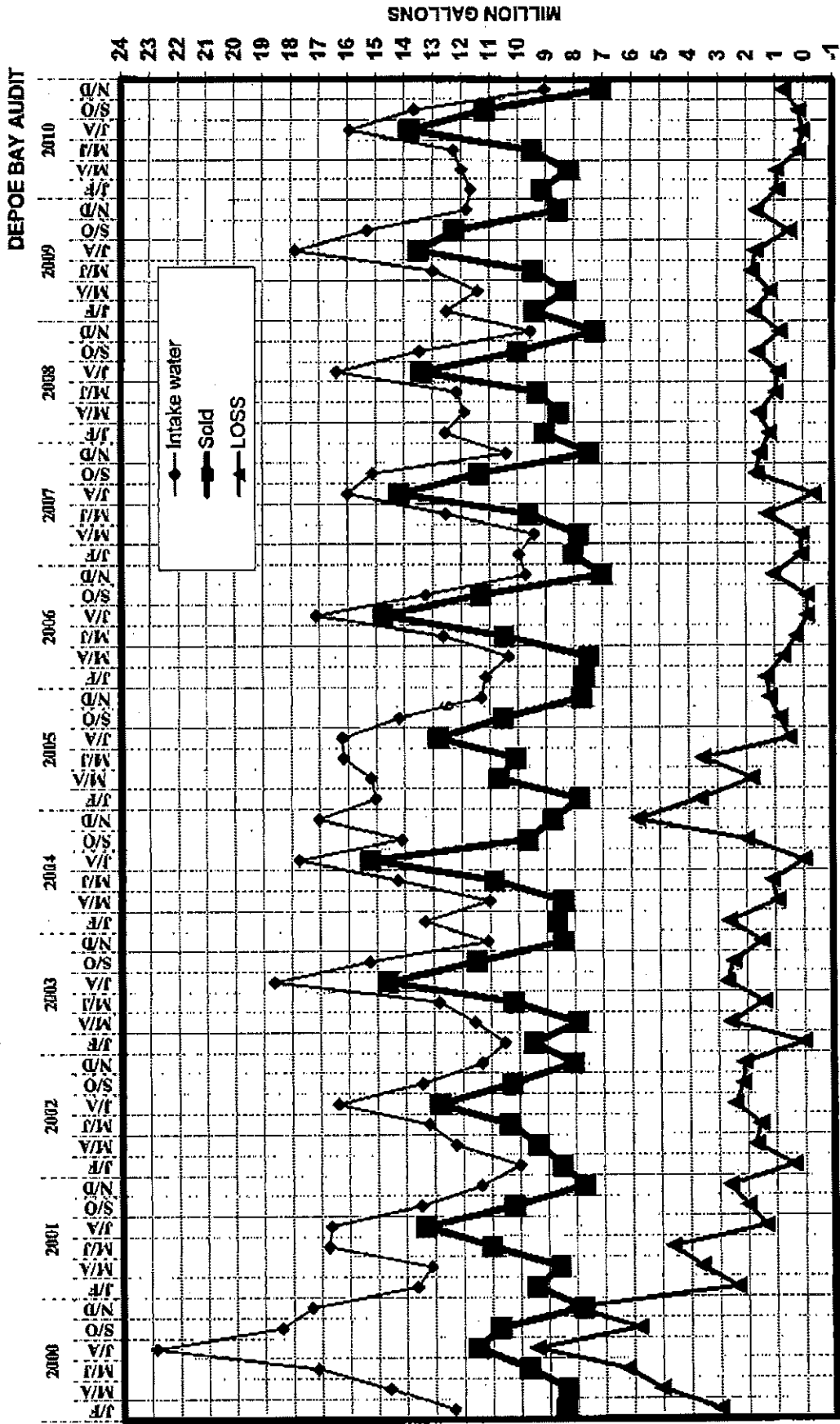
WATER AUDIT	N/D 09	J/F 10	M/A 10	M/J 10	J/A10	S/O 10	N/D 10
WATER LOSS							
water loss, gallons	1,664,503	904,401	953,499	173,770	54,657	178,159	711,720
% of treated water	15	8	9	2	0.4	1.4	8.6
average gpm	19	10	11	2	0.6	2.0	8.1
WATER SOLD							
water sold, gallons	8,569,482	9,044,240	8,183,440	9,509,997	13,823,276	11,188,607	7,067,313
same months last year	7,264,002	9,429,201	8,271,170	9,467,752	13,506,369	12,249,914	8,569,482
WATER DISTRIBUTED							
distributed, gallons	10,935,759	10,749,273	9,891,711	11,311,733	14,692,783	12,547,196	8,265,898
same months last year	8,639,959	10,255,535	11,863,521	10,680,451	16,378,504	14,016,223	10,935,759
IN-PLANT WATER USE							
gallons	708,123	726,763	1,414,268	800,005	1,045,118	927,030	613,658
% of water treated	6	7	14	7	7	7	7
IN-SYSTEM WATER USE							
gallons	273,300	243,000	345,600	673,245	212,400	621,000	0
METER UNDER-REGISTRATION, assumed as 5%							
gallons	428,474	457,232	409,172	475,500	691,164	559,430	353,366

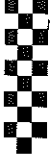
Water loss was good at less than 10%. Some of this loss resulted from an undetected overflow at the south reservoir.

Water sales were 1.5 million gallons less than in the same months of 2009.

In-system water use was zero. However, the overflow loss was not estimated.

Chart attached.





FAX COVER SHEET

TO Maitri

FROM Kernville-Gleneden Beach-Lincoln Beach Water District
Gleneden Sanitary District
PO Box 96, Gleneden Beach, Oregon 97388
Phone: (541) 764-2475
Fax: (541) 764-2459

DATE 0-12-11

TIME 2:15

Number of Pages including this cover sheet: 4

COMMENTS _____

2009

Oregon Water Resources Department
October through September
Water Use Recording and Reporting Form

2010

Consult the water right (permit, certificate, order) to determine applicable reporting conditions; the measurement, recording, and reporting conditions identified in a permit or certified water right typically follow the place of use description. Use the columns below to document measurements for each authorized point of diversion/appropriation or reservoir. We ask that zeros be reported for any given month when water is not being used. Keep a copy of all measurement reports for your records. We encourage you to submit your water use data via our online utility when available, and to use the Monthly Water Use Forms for record keeping purposes. To lookup water rights, access the water use reporting webpage/online utility, or to obtain additional forms visit our web site: <http://www.wrd.state.or.us>

Kernville Clevedon Beach - Lincoln Beach
Water Right Holder's Name

Kernville - Gleneden Beach - Lincoln Beach
Water Right Holder's Business Name or Entity Name

1429
USER ID#

kab@kabbwater.com
Water Right Holder's Email

P.O. Box 96 Clevedon Beach, OR 97388
Water Right Holder's Complete Mailing Address

541-764-2475
Phone Number

Facility Report ID	DRIFT CREEK 12,764 Application: Permit: Other: CERTIFICATE 85971	LIN - NAMED TRIBUTARY 62699 Application: Permit: Other: CERTIFICATE 89573	Application: Permit: Other:	Application: Permit: Other:
October - 2009	23,845,200	0		
November - 2009	13,510,600	0		
December - 2009	16,494,600	7,375,300		
January - 2010	12,975,500	7,445,300		
February - 2010	10,619,700	6,531,400		
March - 2010	12,417,500	11,159,500		
April - 2010	4,469,300	26,329,300		
May - 2010	24,305,700	0		
June - 2010	14,834,400	0		
July - 2010	27,530,794	0		
August - 2010	26,902,298	0		
September - 2010	16,549,044	0		
TOTAL *	204,454,636	58,840,800		
Unit of Measurement	<input checked="" type="checkbox"/> MG <input type="checkbox"/> KG <input type="checkbox"/> MCF	<input checked="" type="checkbox"/> MG <input type="checkbox"/> KG <input type="checkbox"/> MCF	<input type="checkbox"/> G <input type="checkbox"/> MCF	<input type="checkbox"/> G <input type="checkbox"/> MCF
	<input type="checkbox"/> AF <input type="checkbox"/> CF	<input type="checkbox"/> AF <input type="checkbox"/> CF	<input type="checkbox"/> AF <input type="checkbox"/> CF	<input type="checkbox"/> AF <input type="checkbox"/> CF

Describe the method of measurement used: METER FOR RAW WATER If used for irrigation, total number of acres irrigated: 0
I certify this information is true and accurate to the best of my knowledge.

12-27-10 Mark Savage Sup MARK SAVAGE Sup
Date Signature Name and Title (print)
Kernville - Gleneden Beach - Lincoln Beach water Dist. 541-764-2475
Company Phone Number

Please complete and mail to: Oregon Water Resources Department, Water Use Reporting Program, 725 Summer Street NE, Suite A, Salem, OR 97301.

straightforward interpretation of the condition, although the condition does not specifically refer to the District's right by permit number.

In conclusion, it does not appear that there are any rights senior to the District's that would limit the full appropriation by the District of its two water rights totaling 7.0 csf.

Drift Creek Flow Availability

The WRD does not currently monitor streamflows in Drift Creek. Past streamflow records were summarized in the District's October 1969 Water Study report prepared by CH2M HILL. The lowest recorded flow, according to this study, was 13.8 csf on August 24, 1966. This was apparently at a location about one-half mile to one mile downstream of the District's intake. The 1965 State Water Resources Board report for the Mid-Coast Basin reported that the computed minimum flow was 22 csf.

Long-Term Water Supply Needs

As described in Chapter 4, the District's current MDD is approximately 0.82 mgd. However, the highest treatment and pumping rate from the plant has exceeded this value for short periods. The peak production rate recorded to date is 1.036 mgd (1.60 csf), which occurred on August 17, 1997. This value was the basis for the claim of beneficial use submitted for Permit No. 29267.

Future water supply needs can be projected by applying a 2 percent growth rate to the value of 1.60 csf. The 2 percent growth rate is based on recent demand growth, as presented in Chapter 4, Water Requirements. The peak projections based on the peak August 17, 1997, production and a 2 percent growth are higher than the MDD projected in Chapter 4. MDDs are based on an even pumping rate over a 24-hour period, whereas the peak values account for higher rates of pumping during some periods of the day.

Figure 6-1 shows the resulting projection for peak use. The curve indicates that the District may use the full 3.0 csf limit of Permit No. 29267 by 2030. It shows the full use of both permits (7.0 csf) by 2074. Figure 6-1 also includes a curve projecting the MDD. The District should be able to limit the peak production rate to the MDD, although additional finished water storage or other facilities may be necessary to allow this to occur. As shown in Figure 6-1, if production is limited to MDD rates, the present water right total of 7.0 csf will provide the District's needs through 2085.

A large degree of uncertainty exists in projecting future water needs. This is true for a 20-year master planning period. The uncertainty associated with projections that extend 50 years or more is very high. The projections presented in Figure 6-1 suggest that the District's supply is adequate beyond 2050. The District should periodically review actual peak use compared to these projections to confirm the status of its supply. Since developing new supplies can require 10-20 years, it is important to anticipate supply deficiencies long in advance of their arrival.

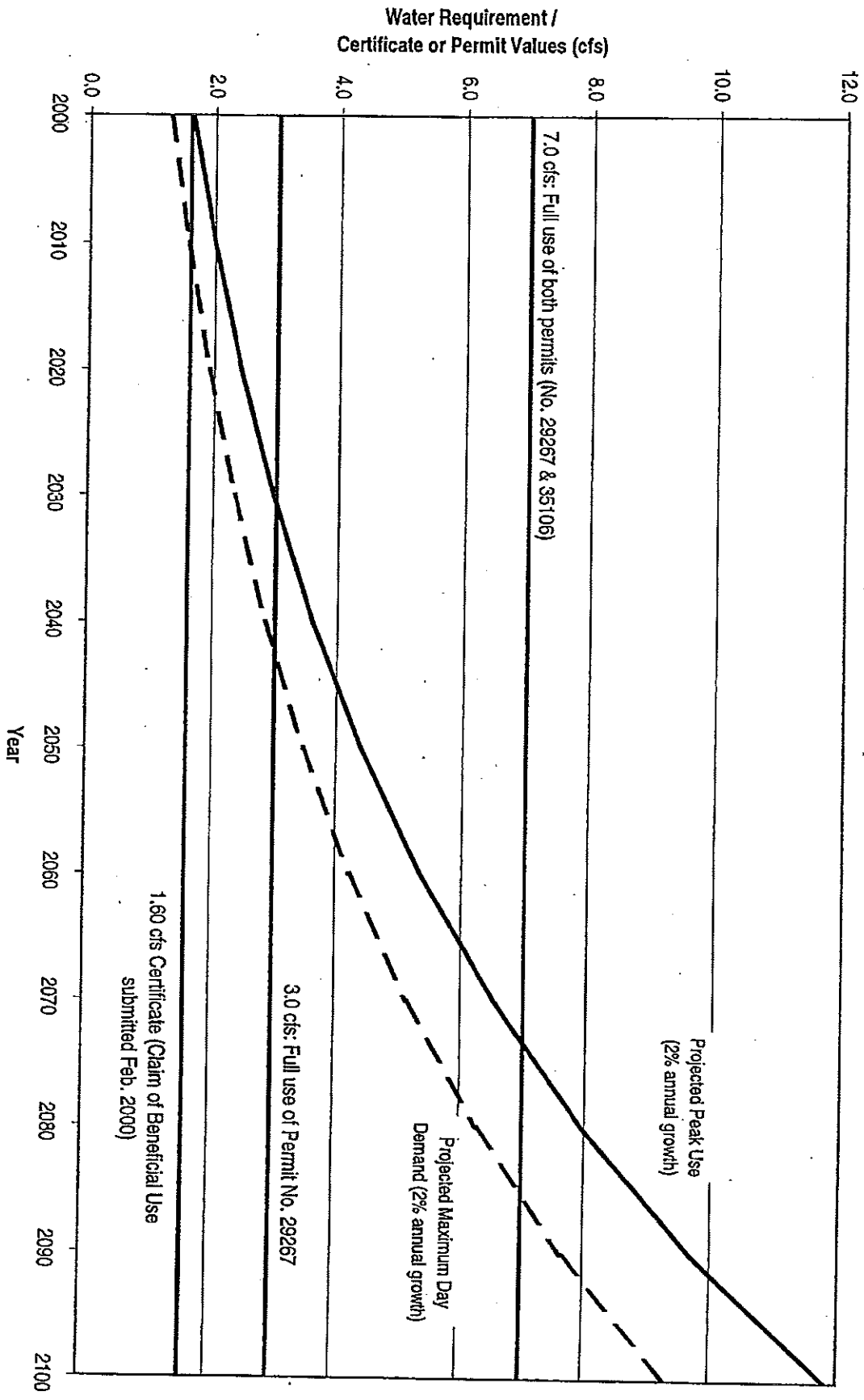
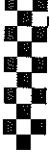


Figure 6-1
Projected Water Requirements

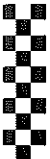
Post-it [®] Fax Note	7671	Date	# of pages ▶
To	ma:lr: Director	From	SCOTT Dixon
Co./Dept.		Co.	Seal Rock water
Phone #	503-353-1734	Phone #	541-563-4447
Fax #	503-353-1653	Fax #	

GALLONAGE COMPARISON

MONTH	GALLONS PURCHASED		GALLONS SOLD		WATER LOSS %	
	PRIOR YEAR 2009-10	CURR YEAR 2010-11	PRIOR YEAR 2009-10	CURR YEAR 2010-11	PRIOR YR 2009-10	CURR YR 2010-11
JUL	12,273,400	11,642,100	9,225,950	8,492,430	24.83%	27.05%
AUG	12,940,000	12,612,100	10,437,200	9,464,340	19.34%	24.96%
SEPT	11,186,200	9,815,000	10,968,850	10,928,000	1.94%	-11.34%
OCT	9,874,500	9,186,200	6,680,770	5,836,030	32.34%	36.47%
NOV	7,545,900	8,270,200	6,845,830	7,605,230	9.28%	8.04%
DEC	10,826,400	8,830,100	6,787,720	5,728,160	37.30%	35.13%
JAN	7,701,500	0	5,407,900	0	29.78%	#DIV/0!
FEB	7,514,800	0	4,976,850	0	33.77%	#DIV/0!
MAR	7,314,900	0	7,037,100	0	3.80%	#DIV/0!
APR	9,056,000	0	6,182,524	0	31.73%	#DIV/0!
MAY	8,228,800	0	5,754,992	0	30.06%	#DIV/0!
JUN	7,618,000	0	7,565,850	0	0.68%	#DIV/0!
TOTAL	112,080,400	60,355,700	87,871,536	48,054,190	21.60%	20.38%

COST COMPARISON

MONTH	TOLEDO CHARGES		SRWD SALES		RATIO: SALES/COST	
	PRIOR YEAR 2009-10	CURR YEAR 2010-11	PRIOR YEAR 2009-10	CURR YEAR 2010-11	PRIOR YR 2009-10	CURR YR 2010-11
JUL	\$26,142.35	\$28,523.15	\$119,035.62	\$120,706.83	4.55	4.23
AUG	\$27,562.20	\$30,899.65	\$129,152.54	\$128,860.50	4.69	4.17
SEPT	\$23,826.61	\$24,046.75	\$132,736.33	\$140,625.65	5.57	5.85
OCT	\$21,032.69	\$22,506.20	\$99,992.74	\$100,845.34	4.75	4.48
NOV	\$16,072.77	\$20,262.00	\$101,856.34	\$115,088.36	6.34	5.68
DEC	\$23,060.23	\$21,633.75	\$106,465.28	\$101,804.97	4.62	4.71
JAN	\$16,404.20	\$0.00	\$91,668.96	\$0.00	5.59	#DIV/0!
FEB	\$16,006.52	\$0.00	\$90,846.56	\$0.00	5.68	#DIV/0!
MAR	\$15,580.74	\$0.00	\$103,173.95	\$0.00	6.62	#DIV/0!
APR	\$19,289.28	\$0.00	\$99,603.00	\$0.00	5.16	#DIV/0!
MAY	\$17,527.34	\$0.00	\$94,793.21	\$0.00	5.41	#DIV/0!
JUN	\$18,664.10	\$0.00	\$106,636.03	\$0.00	5.71	#DIV/0!
TOTAL	\$241,169.03	\$147,871.50	\$1,275,960.56	\$707,931.65	5.29	4.79



0



City of Yachats

441 Hwy 101 N.
P O Box 345
Yachats, OR 97498

Fax Cover Sheet

To: Maitri Dirmeyer From: John McClintock
 Fax: 503-353-1653 Date: 3-17-11
 Phone: _____ Pages: 3
 Re: Water Request Phone: 541-547-3851
541-547-3243

Sorry about the delay. I just received these numbers from our WTPD. If you require any further information please call WTPD Rick McClung @ 541-547-3851

John McClintock

②

John McClintock

From: Maitri Dirmeyer [mdirmeyer@Environcorp.com]
Sent: Wednesday, January 26, 2011 3:37 PM
To: John McClintock
Subject: RE: City of Yachats Water Use Data

Dear Mr. McClintock,

Our firm is working on a water use/demand project for Polk and Lincoln County. We are looking for water use data for water years 2009 and 2010. The most recent water use data we have is for 2008. Also, if you have any updated water demand forecasting data as well that would be helpful.

We need the following water use data for 2009 and 2010:

- 1) Available Source Capacity
- 2) Average Daily Demand
- 3) Max Daily Demand
- 4) Deficit

Let me know if you have any questions. I look forward to hearing from you.

Thanks,

Maitri

Maitri Dirmeyer

ENVIRON International Corp.
| 14000 SE Johnson Road, Suite 200 | Milwaukie, OR 97267
| (o) 503.353.1734 | (f) 503.353.1653 |
mdirmeyer@environcorp.com | www.environcorp.com

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	2009	2010
Summer 1	310gpm	335gpm
Winter	800+gpm	800+gpm
2	110,000gpd	103,000gpd
3	357,000gpd	396,000gpd
	80% of available capacity	61% of available capacity
4		

Addendum B

Water Rights Permits and Certificates for Lincoln County

Final Report

Water Provider	Date	Permit/ Certificate #	Use	Location/ Source	Amount	MGD
Lincoln City	10/14/1947	S 18293	Municipal	Schooner Creek	3.5 cubic feet	2.26
Lincoln City	1/29/1973	S 37605	Municipal	Schooner Creek	3.5 cubic feet	2.26
Lincoln City	6/8/1982	G 9827	Municipal	Schooner Creek	6 cubic feet	3.88
Lincoln City	11/28/1956	21779	Municipal	Rock Creek	.75 cfs	0.48
Lincoln City	9/8/1965	37438	Municipal	Rock Creek	.73 cfs	0.47
Lincoln City	3/28/1933	Inchoate S11506	Municipal	Rock Creek	5 cfs	3.23
						0.00
City of Newport	9/24/1963	S 29213	Municipal	Siletz River	6 cubic feet	3.88
City of Newport	7/19/1974	S 38220	Municipal	Big Creek Reservoir	4 cubic feet	2.59
City of Newport	6/27/1974	R 6171	Municipal	Big Creek Reservoir	345 acre ft. to 970 acre ft.	0.59
City of Newport	4/17/1937	28003	Municipal	Little Creek	.25 cfs	0.16
City of Newport	5/10/1909	1012	Municipal	Blattners Creek	.54 cfs	0.35
City of Newport	8/31/1951	21357	Municipal	Big Creek Reservoir	200 acre feet	0.18
City of Newport	10/5/1979	48628	Municipal	Big Creek Reservoir #2	345 acre feet	0.31
City of Newport	10/27/1926	9127	Municipal	Big Creek + tributaries	10 cfs	6.46
City of Newport	10/5/1979	48627	Municipal	Big Creek	345 acre feet	0.31
City of Newport	8/1/1951	21358	Municipal	Big Creek	200 acre feet	0.18
						0.00
Seal Rock WD	10/1/1959	32199	Municipal	Hill Creek	.40 cfs	0.26
						0.00
KGLB WD	4/30/1970	85971	Municipal	Drift Creek	2.5 cfs	1.62
KGLB WD	12/10/1963	85972	Municipal	Drift Creek	3 cfs	1.94
KGLB WD	4/21/200	85973	Municipal	Unnamed Stream near Drift Creek	2 cfs	1.29
						0.00
City of Toledo	3/23/1979	S 44083	Municipal	Siletz River	4 cubic feet	2.59
City of Toledo	10/24/1929	S 9370	Municipal	Siletz River	4 cubic feet	2.59
City of Toledo	11/9/1959	42193	Municipal	Mill Creek	250 acre feet	0.22
City of Toledo	2/12/1937	14396	Municipal	Siletz River	1.75 cfs	1.13
City of Toledo	12/22/1924	9047	Municipal	Unnamed Stream near Mill Creek	.75 cfs	0.48
City of Toledo	12/22/1924	9048	Municipal	Mill Creek	.75 cfs	0.48
City of Toledo	5/15/1919	9040	Municipal	Mill Creek	10 cfs	6.46
						0.00

Final Report

Water Provider	Date	Permit/ Certificate #	Use	Location/ Source	Amount	MGD
SW Lincoln County WD	9/6/1966	S 31979	Domestic	Vingie Creek	.30 cubic feet	0.19
SW Lincoln County WD	1/13/1989	S 52498	Municipal	Vingie Creek	.6 cubic feet (7/1-7/31) & 1 cubic feet (8/1- 6/30)	
SW Lincoln County WD	10/22/1997	S 53693	Municipal	Big Creek	.3 cubic feet	0.19
SW Lincoln County WD	6/7/1971	80664	Municipal	Dicks Fork Big Creek	.4 cfs	0.26
SW Lincoln County WD	6/8/1945	Inchoacte S 19165	Municipal	Big Creek	3 cfs	1.94
SW Lincoln County WD	6/8/1945	Inchoacte S 16464	Municipal	Starr Creek	3 cfs	1.94
						0.00
City of Depoe Bay	1/5/1989	S 50604	Municipal	S Depoe Bay Creek	2 cubic feet	1.29
City of Depoe Bay	8/19/1965	41345	Municipal	Unnamed Stream near N Depoe Bay Cr.	8.66 acre feet	0.01
City of Depoe Bay	8/19/1965	41346	Municipal	N. Depoe Bay Creek	.56 cfs	0.36
City of Depoe Bay	10/31/1974	64894	Municipal	S. Depoe Bay Creek	.5 cfs	0.32
						0.00
City of Yachats	Unknown	S 29018	Municipal	Salmon Creek	2 cubic feet	1.29
City of Yachats	3/20/1989	S 53471	Municipal	Yachats River	2 cubic feet	1.29
City of Yachats	7/9/1945	22933	Municipal	Reedy Creek	2 cfs	1.29
City of Yachats	7/21/1934	14104	Municipal	Cape Creek	.49 cfs	0.32
						0.00
City of Siletz	12/20/1985	S 49649	Municipal	Siletz River	1 cubic foot	0.65
City of Siletz	11/12/1964	41548	Municipal	Tangerman Creek	.44 cfs	0.28
City of Siletz	1/27/1965	41547	Municipal	Tangerman Creek	2 acre feet	0.00
City of Siletz	8/6/1953	27681	Municipal	Siletz River	.25 cfs	0.16
City of Siletz	10/11/1945	15803	Municipal	Unnamed Stream near Siletz R.	.30 cfs	0.19
City of Siletz	3/23/1944	22447	Municipal	Unnamed Stream near Siletz R.	.5 cfs	0.32
City of Siletz	9/9/1957	S 25114	Municipal	Siletz River	.34 cfs	0.22
GRAND TOTAL						59.18

Key to Application Characters
S - Surfacewater
G - Groundwater
R - Reservoir
IS - Instream
MF - Minimum Flow
SY - Scenic Waterway
RN - Reservation
TY - Indian Treaty
OS - Oregon Statute
SI - Decree (Snap ID)
SR - Surface Water Registration
Source: Oregon Water Resources Department (OWRD). Water Use Reporting. Website- Accessed February 22, 2011. Link- http://apps.wrd.state.or.us/apps/wr/wateruse_report/