

RESOLUTION NO. 2008 - 30

A resolution of North Kootenai Water District, Kootenai County, Idaho accepting the 2008 annual review of its Water Conservation Plan; adopting goals and measures for its comprehensive Water Conservation Plan for the 2008/2009 fiscal year; providing for the effective date hereof and providing for other matters properly relating thereto

NORTH KOOTENAI WATER DISTRICT  
Kootenai County, Idaho

BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE NORTH KOOTENAI WATER DISTRICT, Kootenai County, Idaho, as follows:

WHEREAS, the North Kootenai Water District ("District") is a duly and properly formed water district under and by virtue of the constitution and laws of the State of Idaho;

WHEREAS, the District is governed by an elected Board of Directors ("Board");

WHEREAS, the Board of the District is committed to conservation and received and accepted a Water Conservation Plan ("Plan") by Resolution 2007-13, adopted on October 18, 2007;

WHEREAS, the Board, by Resolution No. 08-11, adopted on April 17, 2008 adopted criteria for the ranking of capital improvement projects planned by the District;

WHEREAS, the Board by Resolution No. 2008-15, adopted on May, 2008, adopted conservation measures including mandatory non-irrigation hours;

WHEREAS, the Board, by Resolution No. 2008-23, adopted on July 18, 2008, formed the Conservation Fund into which it deposits eight percent (8%) of the revenue generated by the water rates from Tier 4 of the water rate schedule;

WHEREAS, the Board has directed its Engineer and staff to develop a report evaluating the implementation of the Plan and the effect of the adoption of certain water conservation measures;

WHEREAS, this report has been completed and it also includes recommended goals and measures for fiscal year 2008/2009;

WHEREAS, the Board advertised a workshop to be held on November 6, 2008 and a public hearing on November 20, 2008 (notice attached hereto and incorporated herein by this reference as Exhibit "A");

WHEREAS, the workshop and public hearing were conducted and the Board has considered the input it received;

NOW, THEREFORE, IT IS HEREBY FURTHER RESOLVED as follows:

Section 1: RECEIPT AND ACCEPTANCE OF 2008 ANNUAL REVIEW

The Board hereby acknowledges and accepts the 2008 Annual Review prepared by its Engineers of the District Water Conservation Plan dated October, 2008 and attached hereto as Exhibit "B".

Section 2: ADOPTION OF RECOMMENDED GOALS AND MEASURES FOR FISCAL YEAR 2008/2009.

The Board hereby adopts and affirms the goals and measures contained within the 2008 Annual Review for fiscal year 2008/2009.

Section 3: SEVERABILITY

If any section, paragraph, clause, or provision of this Resolution shall be held to be invalid or unenforceable for any reason, the invalidity or unenforceability of each section, paragraph, clause, or provision shall in no manner affect any remaining provision of this Resolution.

Section 4: RATIFICATION

The Board hereby ratifies all acts taken by members of the Board and/or agents on behalf of the Board or District relative to the implementation of the Mitigation Fees, and the hearing process is hereby ratified and approved.

Section 5: EFFECTIVE DATE OF RESOLUTION

This Resolution shall take effect and be in force and effect from and after its passage and approval.

DATED this 4<sup>th</sup> day of December, 2008

NORTH KOOTENAI WATER DISTRICT



Chairman

ATTEST:



Secretary



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I, the undersigned, Secretary of the North Kootenai Water District, Kootenai County, Idaho hereby certify that the foregoing Resolution is a full, true, and correct copy of a Resolution duly adopted at a regular meeting of the Board of Directors, duly and regularly held at a regular meeting place thereof on December 4, 2008, of which meeting all members of said Board had due notice and at which a majority thereof were present; and that at said meeting said Resolution was adopted by the following vote:

AYES, and in favor thereof, Board members: *Three*

NAYS, Boardmembers: *None*

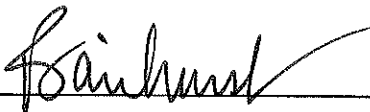
ABSENT, Boardmembers: *Two*

ABSTAIN, Boardmembers: *None*

I further certify that I have carefully compared the same with the original Resolution on file and of record in my office; that said Resolution is a full, true, and correct copy of the original Resolution adopted at said meeting; and that said Resolution has not been amended, modified, or rescinded since the date of its adoption, and is now in full force and effect.

IN WITNESS WHEREOF, I have set my hand and affixed the official seal of the Board on December 4, 2008.

NORTH KOOTENAI WATER DISTRICT

  
Secretary

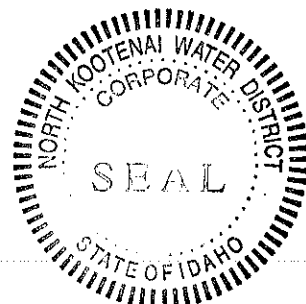


EXHIBIT "A"

NOTICE OF PUBLIC WORKSHOP AND  
PUBLIC HEARING ON CONSERVATION PLAN  
OF THE NORTH KOOTENAI WATER DISTRICT

The Board of Directors ("Board") of North Kootenai Water District ("District") accepted a Water System Conservation Plan ("Plan") in October of 2007. The Board has taken various actions to implement the Plan in 2007 and 2008. The Board is presently considering modifications to the Plan for calendar year 2009. It will also be receiving reports from its staff about the results obtained in 2008 from the conservation steps the District has already implemented.

The Board welcomes your comments and input. There will be both a workshop conducted and a public hearing held which you are invited to attend:

Workshop

Date: Thursday, November 6, 2008  
Time: 12:30 p.m.  
Place: District Office  
North Kootenai Water District  
1841 West Hayden Ave.  
Hayden, ID 83835

Public Hearing

Date: Thursday, November 20, 2008  
Time: 12:30 p.m.  
Place: District Office  
North Kootenai Water District  
1841 West Hayden Ave.  
Hayden, ID 83835

If you are unable to attend either of these sessions, but have input that you would like to provide to the Board and District, please feel free to provide that comment by mail or electronically to:

Board of Directors  
North Kootenai Water District  
P.O. Box 2290  
Hayden, ID 83835  
[mikeg@nkwsd.com](mailto:mikeg@nkwsd.com)

Thank you for your attention to the water conservation measures enacted this year. We appreciate the efforts that many are taking to protect and preserve one of our regions most important resources, our water.

Exhibit "B"

# 2008 ANNUAL REVIEW

NORTH KOOTENAI WATER DISTRICT  
WATER CONSERVATION PLAN

SUBMITTED TO THE:

NORTH KOOTENAI WATER DISTRICT



NOVEMBER, 2008

PREPARED BY:

**WELCH-COMER**   
ENGINEERS | SURVEYORS

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# Executive Summary

In the Fiscal Year 2007/2008<sup>1</sup>, North Kootenai Water District made significant progress in achieving the goals that they established within their 2007 Water System Conservation Plan.

One major goal set for fiscal year 2007/2008 was to revise the District's methods for reading meters in order to more accurately track consumption and production to establish baseline consumption and production for the District. This data would allow for the evaluation of the effectiveness of the conservation measures implemented.

The District provided consumption and production data back to 2000. The data was reviewed and audited with District staff and adjusted where appropriate to account for lube meters, transfer pumps, etc. The data was used to establish baseline consumption for the year 2006, when the conservation program was first initiated, of 1128 gpd per connection. This baseline represents the average daily demand for the peak billing months of July through September.

After review of the historic consumption data, the District chose to set a consumption-side goal to reduce this average daily demand per connection for the peak months of July through September 25% (from the baseline) to 880 gpd per connection by the year 2013. It should be noted that the District achieved a 19% reduction from the baseline between 2006 and 2008 through the implementation of the conservation measures. The District attributes much of this success to an aggressive, conservation based, rate structure established in 2006 with an increase in 2008.

On the production side, the data provided by the District for Fiscal Year 2007/2008 indicated a system loss (District-wide) of 196.38 million gallons or 26% of the total production. This was up from the system loss tracked in Fiscal Year 2006/2007 (108.45 million gallons or 14.7% of the total production). This dramatic increase in loss (88 million gallons in one year) may be due to a major increase in system leakage. However, it is more likely a result of inaccurate data. In either case, the District set a goal to reduce the loss for its largest four systems (Rimrock, Hillside, Twin Lakes and Chilco) to 10% within the next 10 years.

The District is working toward achieving this goal and in October of 2008 completed a leak detection program that identified an estimated 84 gpm or potentially 44 million gallons (6% of the District-wide loss) per year on the Rimrock and Hillside system. The District is working to repair these leaks in the Fall of 2008 and in 2009. The leak

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<sup>1</sup> The District's Fiscal Year starts in October and ends in September of the following year.



detection program will be continued in the Spring of 2009 at the Twin Lakes and Chilco water systems.

## 1. INTRODUCTION

The following is the first annual review of North Kootenai Water District's September 2007, "Water System Conservation Plan," prepared by Welch Comer and Associates and as established by the District Board through three resolutions adopted in April, May, and July of 2008 (Resolution 2008-11, 2008-15, and 2008-23). A copy of each resolution is provided in Appendices A through C, respectively. This annual review satisfies Section 5c of the District's Resolution 2008-15.

The purpose of this annual review is to determine the effectiveness of conservation measures implemented by the District in the preceding year. Additionally, through this annual review and in accordance with Section 5a and 5b of the Resolution 2008-15, a second intent of this review is to establish measurable goals for conservation for the fiscal year 2008/2009.

## 2. FISCAL YEAR 2007/2008 GOALS

The following goals were identified for year 2007/2008 within the Conservation Plan:

- Goal #1: Meter Upgrade and Improvement Program
- Goal #2: Conservation Resolution
- Goal #3: Conservation Funding

The following is the status of each of these goals:

### Goal #1:

On May 1, 2008, NKWD adopted Resolution 2008-15 implementing various provisions of the Conservation Plan. A copy is attached hereto as Appendix B. Section 6, authorizes the staff and District Engineer to collect information for the purpose of developing effective policies to implement the resolution including but not limited to installation and upgrading the metering system per the listed conservation measures.

In addition to revising the District's methods for meter reading to improve data accuracy, the District has also installed new source meters at its Twin Lakes, and Chilco water systems.

### Goal #2:

As with Goal #1, NKWD adopted Resolution 2008-15 which implements the following provisions of this Goal:

Section 1: Mandatory Non-Irrigation Hours beginning June 1, 2008. Irrigation may not occur between 12:00 pm and 6:00 pm daily.

### Goal #3:

In July of 2008, the Board adopted Resolution 2008-23 which creates a "Conservation Fund" and commits the transfer of 8% of the revenue generated by Tier 4, the highest cost tier for consumption greater than 30,000 gallons per month, water rates for the purposes of financing conservation efforts such as:

1. Education
2. Rebates for conservation devices
3. Leak detection and repair
4. Other conservation related items

## 2.1. CURRENT CONSERVATION MEASURES

The following is a summary of the conservation measures adopted through the above referenced Resolutions which support the above goals.

1. Mandatory Non-Irrigation Hours: As described under Goal #2 above.
2. Rebate Program: NKWD provides rebates of up to \$75 per residential customer for installation of one or more of the following devices:
  - a. Rain sensor switch
  - b. Soil moisture sensor
  - c. Hose bib timer
  - d. Dual flush toilets
3. New Subdivision Requirements: All new developments must incorporate moisture and/or rain sensors into their residential irrigation systems.
4. Education: NKWD currently sends out newsletters with every bill and water conservation measures are included in each newsletter. NKWD will continue to communicate and educate its customers on the importance of conservation.

These measures were implemented June 1, 2008. Since implementation, these measures have had the following impact:

1. NKWD has provided rebates to eight customers.
2. One new residential subdivision and two commercial developments have been submitted for review and approval. These subdivisions will add a total of approximately eight connections to the District. Each one will be required to incorporate moisture and rain sensors into their irrigation systems.
3. The District mailed out several conservation related newsletters and brochures in 2008. A copy of each is provided in Appendix D.

In addition to the above, in 2007/2008 the District completed the following conservation related improvements.

### 2.1.1. LEAK DETECTION AND REPAIR

The District completed numerous leak repairs in 2007/2008. The District estimates \$40,000 in material was expended in addition to unquantified District labor costs. The majority of the leak repairs occurred on the District's Hillside water system (service lines) and Rimrock water system (main line).

In October of 2008, the District hired a leak detection specialist to review the Hillside and Rimrock water systems. The following is a brief summary of the findings (also refer to leak detection raw data in Appendix E):

Water System	Leak on Main Line	Leak on Service Line
Hillside	1 <sup>1</sup>	11
Rimrock	3 <sup>2</sup>	2
Total	4	13

1. Leaking hydrant.
2. Includes one leaking hydrant which was repaired.

The associated estimated flow for the leaks identified was 58.5 gpm on the Hillside system (30.75 million gallons per year) and 25.5 gpm (13.4 million gallons per year) on the Rimrock system. Reviewing the total District-wide production for 2007/2008 of 750 million gallons (See Section 2.5) and assuming these leaks have been active a full year, these leaks potentially represent approximately 6% of the total production for the year. The District intends to repair each of the leaks identified in the fall and winter of 2008.

## 2.2. WATER RATES

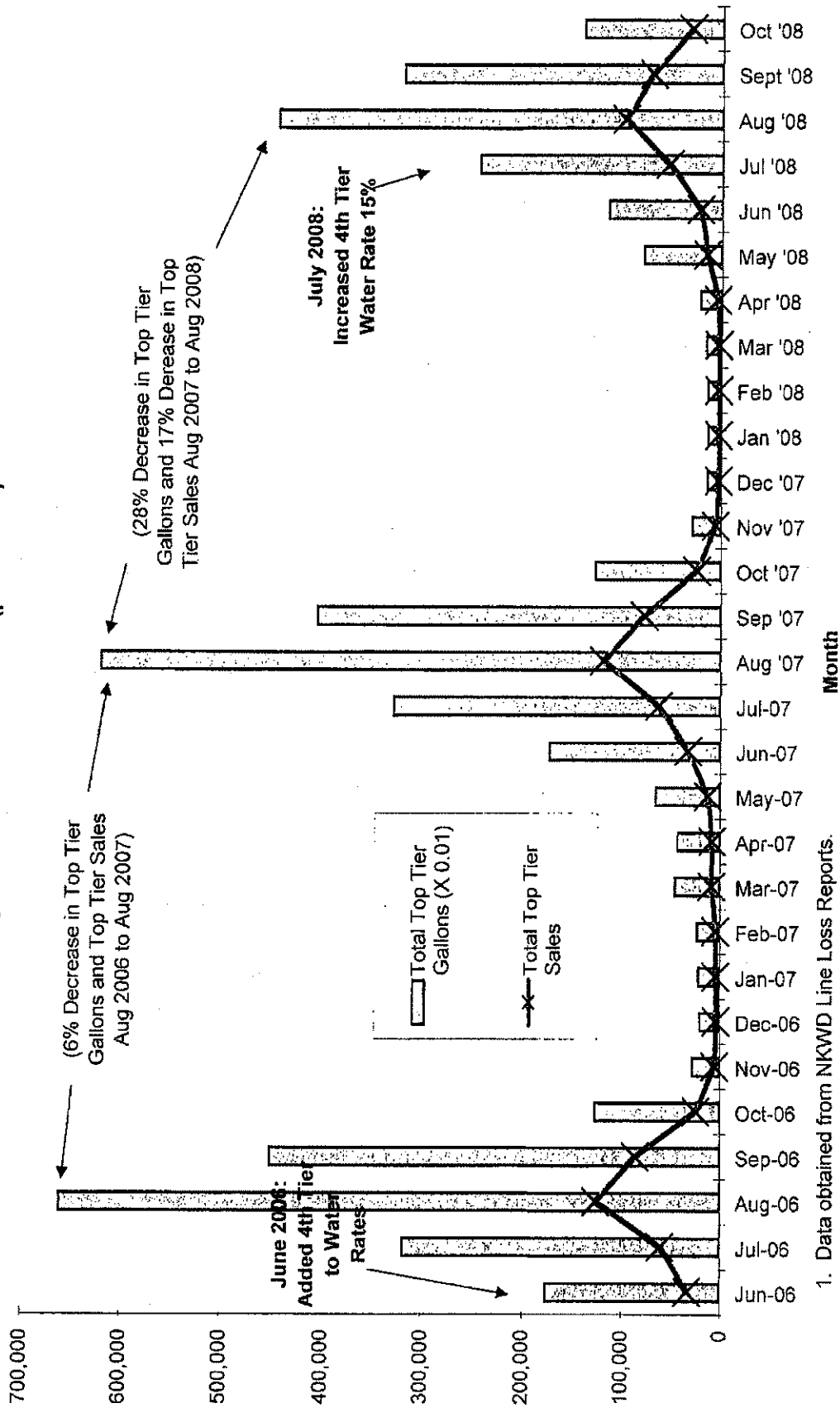
In addition to the above measures, the District instituted another rate increase in June of 2008. The estimated increase in the average rate is 12% from the last rate adjustment in May of 2006.

The District has four water rate tiers for the per gallon consumption charge. With conservation in mind, the District increased the rate for the lower two tiers (0 to 5,000 gallons and 5,001 to 15,000 gallons per month) 10%, while the District increased the rate for the top two tiers<sup>2</sup> (15,000 to 30,000 and 30,000 gallons per month and above) 15%.

Figure 1 (on the following page) compares the top tier gallons consumed and the monthly revenue between 2006 and 2008.

<sup>2</sup> It should be noted that the top tier, Tier 4 (for monthly consumption above 30,000 gallons), was created with the rate adjustment in May of 2006.

**Figure 1:  
Top Tier Gallons and Sales (per Month)<sup>1</sup>**



1. Data obtained from NKWD Line Loss Reports.

As shown in Figure 1, there was a 6% decrease in both the top tier consumption and sales for the peak month (August) between 2006 and 2007. A 28% decrease in the top tier consumption and a 17% decrease in the top tier sales occurred for the peak month (August) between 2007 and 2008. These were significant decreases in consumption for users in the top tier. The following table (Table 1) summarizes the impact of these decreases with respect to the total consumption savings for the District between 2006/2007 and 2007/2008.

Table 1: Top Tier Consumption versus Total System Consumption and Total Annual Savings

	Top Tier (gallons)	Total Consumption (gallons)	Top Tier as % of Total Consumption
October '06 through September '07	190,281,481	630,572,615	30%
October '07 through September '08	144,221,700	553,808,658	26%
Total Savings from '06/'07 (gallons)	46,059,781	76,763,957	60%
% Savings from '06/'07 <sup>1</sup>	-24%	-12%	

1. Note that these numbers reflect total annual savings, not just savings for the month of August as was shown in Figure 1.

As shown in 2006/2007 and 2007/2008, the top tier made up 26% to 30% of the total annual consumption. The table also shows that of the 76.76 million gallon decrease in consumption between these two periods, 60% of the reduction occurred in the top tier. This points to dramatic conservation in the top tier of use and an apparent correlation between the increase in water rates and decrease in consumption.

However, lower temperatures during the summer of 2008 may have contributed to some of these savings. This temperature impact will be discussed later in the report.

### 2.3. CONSUMPTION

The following section provides an analysis of the total water sold in the peak months for each water system.

Figure 2 (on the following page) provides the average daily consumption District-wide per connection for the July, August and September billing months<sup>3</sup> between 2001 and

<sup>3</sup> Meters are read approximately half-way through each month. Therefore, consumption for the August billing month, for example, includes the consumption that occurred during the last half of July and the first half of August.

2008. The figure provides a comparison of the average demand per connection to the average daily temperature and the total precipitation for these three months<sup>4</sup>.

Reviewing Figure 2, there appears to be a strong correlation between the increase in water rates (years 2006 and 2008) and decrease in the average daily consumption for the peak months in the following year. This was previously foreshadowed by the decreasing sales and consumption for the top tier as described in Section 2.2 and as shown in Figure 1 of this report.

Reviewing the decrease in the average daily consumption for the peak months between 2006 and 2007 of 5% with an additional decrease of 15% between 2007 to 2008 (overall a 19% decrease has occurred since 2006), it appears that the District's more aggressive approach to conservation over the last two years<sup>5</sup> has been a success.

The highest average daily consumption for the 8 year period occurred in the year with the highest average daily temperature (2003). Noting the trend of higher average demands during years with higher temperatures, the relationship between temperature and average daily demand was evaluated and is shown in Figure 3. The purpose of evaluating the temperature-demand relationship was to be able to estimate the impact of temperature on demand so that the conservation measure impact on demand could be exclusively evaluated.

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<sup>4</sup> There are two reasons for focusing on the average daily consumption for the peak months (July through September) as listed below:

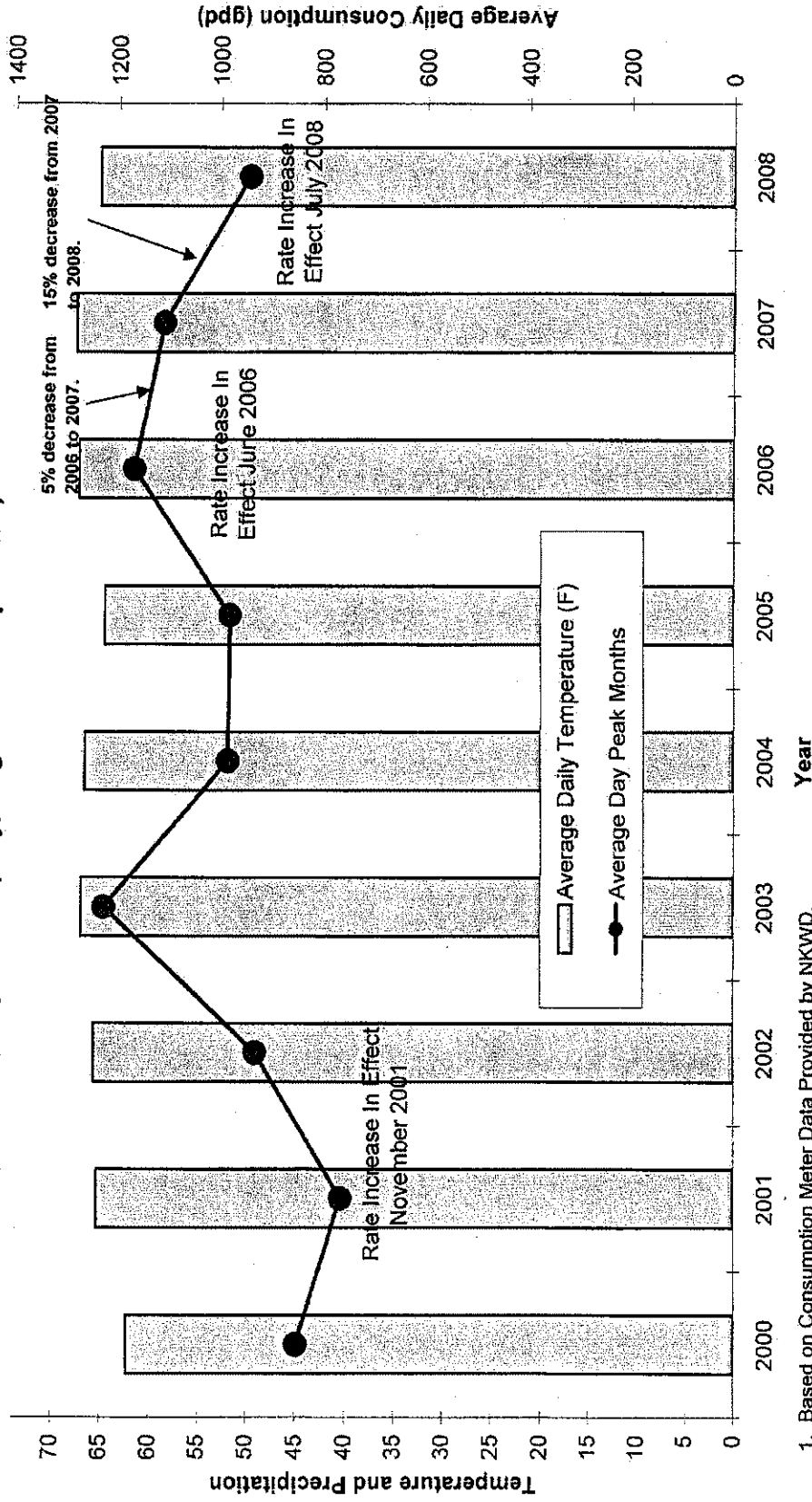
1. Meters are not read through the winter months. Meter reading typically starts in March or April and in these months adjustments are made to the estimated winter billings. Therefore, the most accurate consumption data is gathered between May and October.
2. Historically, for NKWD, July through September is typically the warmest period during the year and shows the highest consumption due to outdoor water use. Furthermore, outdoor water use is typically the highest percentage of a customer's consumption. Thus, in order to make the largest impact in conservation, it makes sense to target savings in outdoor water consumption.

Therefore, the goals pertaining to consumption will be set based upon the average daily consumption for these peak months.

<sup>5</sup> Since 2001, the District has recognized and promoted conservation as is evidenced by the rate increase established in 2001 and has promoted conservation in their semiannual newsletters. However, in 2006, the District took two major steps forward in promoting conservation including the establishment of the 4<sup>th</sup> water rate tier for consumption over 30,000 gallons per month as well as the first draft of a water conservation plan. The water conservation plan developed in 2006 was refined in 2007 to meet the requirements of the Rathdrum Prairie Aquifer Groundwater Management Plan.

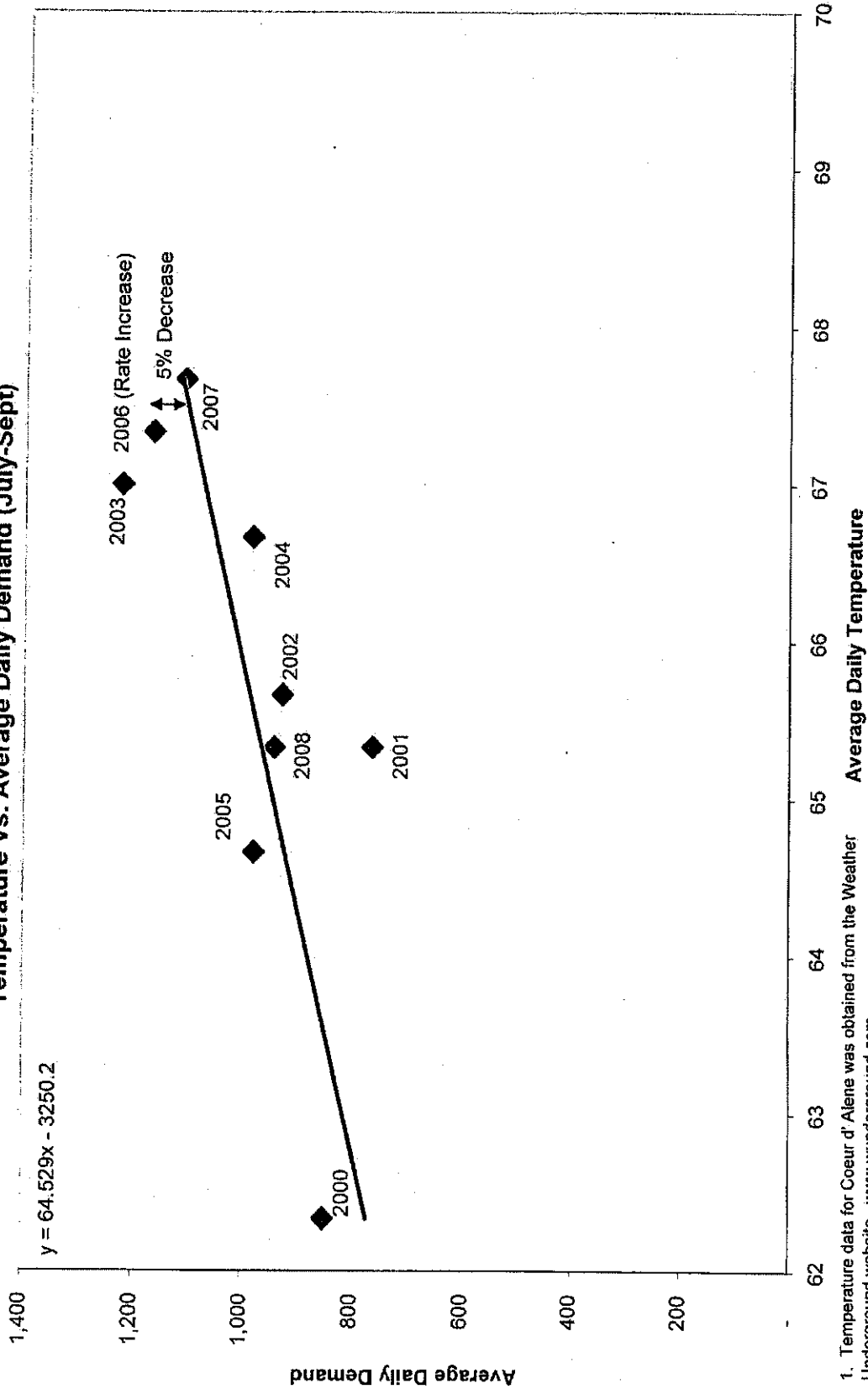


**Figure 2:**  
**Average Daily Consumption per Connection (July, August and September) vs Average Daily Temperature (July, August and September)<sup>1</sup>**



1. Based on Consumption Meter Data Provided by NKWD.
2. Average daily consumption for the billing months of July through September. Billing/metering periods are mid month to mid month. Therefore, for example, July represents June 15 through July 15.
3. Temperature data for Coeur d'Alene was obtained from the Weather Underground website. [www.wunderground.com](http://www.wunderground.com).

Figure 3:  
Temperature Vs. Average Daily Demand (July-Sept)



1. Temperature data for Coeur d' Alene was obtained from the Weather Underground website. [www.wunderground.com](http://www.wunderground.com).

Figure 3 demonstrates the function of demand based on temperature using the data provided between 2000 and 2008. The function of demand to temperature based on the available data is described as:

$$Y = 64.53 X - 3250.2$$

Thus, using the data provided, it is predicted that in a year where the average daily temperature is 66 degrees F, the estimated average daily demand would be 1009 gpd/connection. This function will be reviewed and adjusted annually as more data becomes available.

Another important observation in Figure 3 is the apparent impact of the rate increase. It is seen that between 2006 and 2007, the temperature increased just slightly, however the average daily demand decreased. The decrease was 5%. It is believed that this decrease can be fully attributed to conservation measures and the water rate increase that was implemented in 2006. In later years, we would expect that when the average daily demand for a certain year falls below the trend line, this would be an indication of conservation related savings.

Figure 4 provides the average daily consumption per connection for the peak month for each year from 2001 through 2008 for each water system.

This graphic compares the average daily consumption per connection for each system to the District-wide average (1,237 gallons per day in 2008) as well as to the conservation guideline (domestic use and irrigation) that was established in part by Kootenai Environmental Alliance for a typical 0.5 acre lot (1,250 gallons per day).

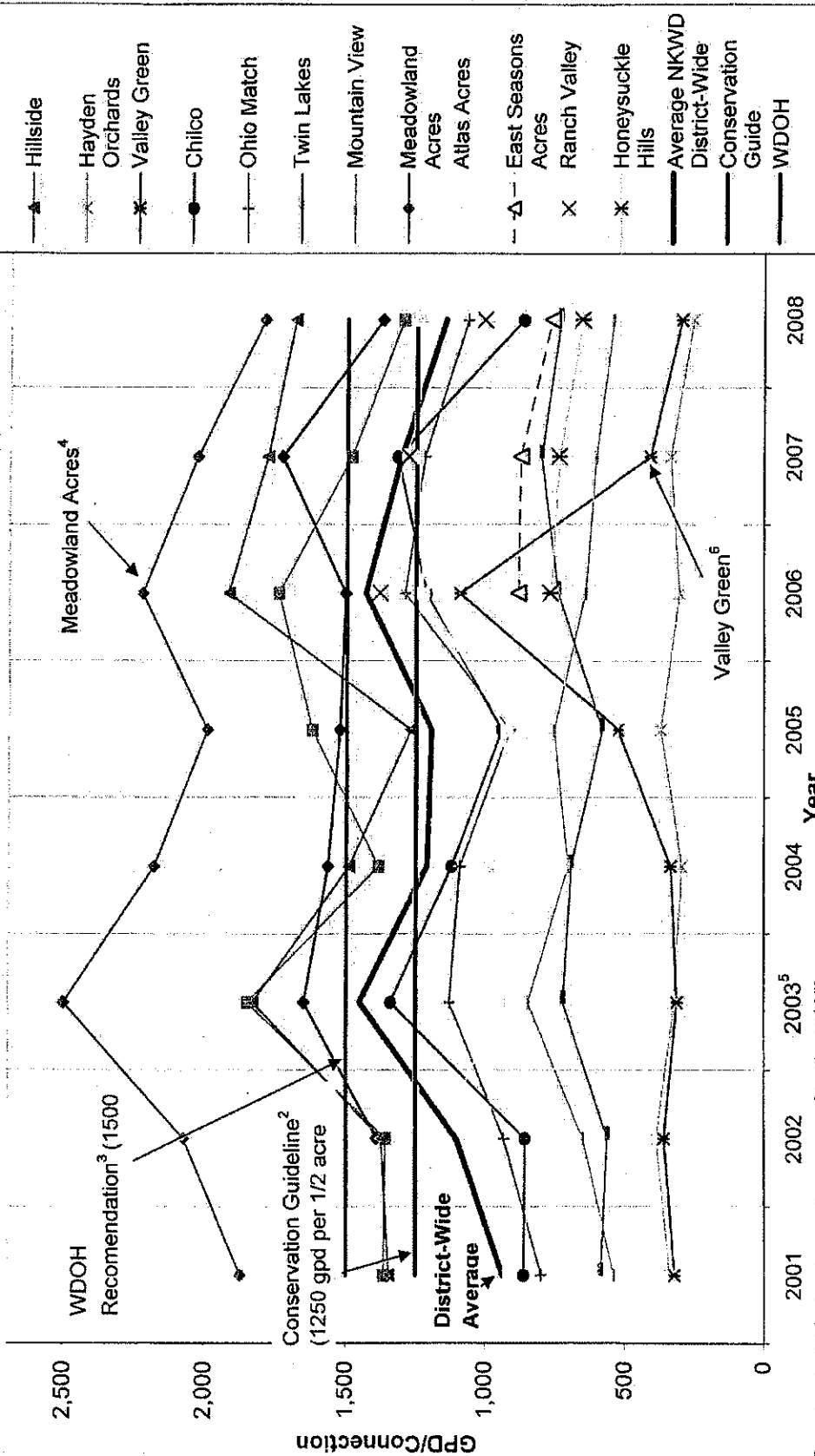
As shown, the District-wide average has closely followed the conservation guideline over the last 8 years. It should be noted that the water systems that are routinely above this average, including Rimrock (1,381 gallons per day in 2008) and Meadowland Acres (1,793 gallons per day in 2008), have much larger lots than the average. Each lot in Meadowland Acres is approximately 5 acres in size.

The Hayden Pines water system (1,372 gallons per day in 2008) has a larger number of commercial users than any of the other water systems, including several restaurants, a large strip mall, car wash and several banks and office buildings, which most likely explains the higher usage.

The Hillside water system (2,018 gallons per day in 2008) has several large homes with extensively landscaped yards.

It can be concluded for all of the District's systems, as shown in Figure 3, that the average daily water consumption for the peak month has declined since 2006.

**Figure 4:**  
**North Kootenai Water District**  
**Average Day Demand (Peak Month) per Connection<sup>1</sup>**



1. Based on individual meter readings as provided by NKWD.  
 2. Conservation guideline for average day use during irrigation season with 1/2 acre lots as discussed with Kootenai Environmental Alliance Representatives. Assumes 250 gpd for domestic use and 1,000 gpd for irrigation (approx. 1 inch per week per 1/4 acre lawn.)  
 3. 1999 Washington State Department of Health Water System Design Manual references historic guideline of 1500 gpd for MDD in western Washington.  
 4. Meadowland Acres experiences high demand due to its large lot size (average lot size 3.4 acres). Rimrock average lot size is 2.8 acres. Hillside average lot size is 0.9 acres.  
 5. The year 2003 had a high summer month average temperature (see Exhibit 2.5 B for comparison of summer temperature and precipitation).  
 6. Valley Green customers are served domestic water by NKWD and irrigation water by Hayden Irrigation District. In the past 2 years many property owners have started to use NKWD for irrigation and domestic.  
 \\nas-01\Projects\K1111233\WaterUsageRateHistoricalWorking.xls  
 WELCH~COMER  
 09/04/2007

## 2.4. PRODUCTION AND SYSTEM LOSS

The #1 goal for fiscal year 2007/2008 as stated within the 2007 Conservation Plan was to "establish a metering program to accurately track consumption and production." This goal was described as "necessary to establish the baseline consumption and production data needed to properly evaluate the effectiveness of the subsequent conservation efforts."

In the fiscal year 2007/2008, the District continued reading production meters on a weekly basis, but modified the date of the readings to coincide with that of the monthly consumption meter reads.

Additionally, at the end of the fiscal year 2007/2008, the District and Welch Comer completed a detailed audit of how the meter data was being recorded within the monthly line loss reports. Extraneous data was eliminated and the meter readings for the District's line shaft turbine lube meters and system master meters were checked to ensure they were tied to the correct source and correctly accounted for with respect to each system's ultimate production. Additionally, the master meter data was reviewed with respect to the corresponding pump's known output to determine if the meters were registering accurately.

The following table (Table 2) provides a comparison of the total water produced from the October billing month of 2006 through the September billing month of 2007 as well as for the Fiscal Year 2007/2008. In 2006/2007 the District produced 739.02 million gallons and recorded a loss of approximately 14.7% (108.45 million gallons). The production increased in 2007/2008 by 11 million gallons to 750.19 million gallons. The system loss for 2007/2008 also increased significantly by 88 million gallons or 26% of the total production. This is a huge and unanticipated jump in the system loss, which likely points to inaccurate data, and is further explained below.

Reviewing the detailed data for the District (per water system) the line losses appear to be consistent. However, for a few systems, the data still appears to be inaccurate. In 2007/2008 data, two systems indicated negative line loss, which is impossible and also inconsistent with the previous year. These included the Chilco water system (-2%) and the East Seasons Acres water system (-12%). Additionally, some systems indicate extremely high system loss in 2007/2008 inconsistent with the 2006/2007 data for these same systems. These systems included the Rimrock system (41%) and Atlas Acres (54%).

Based on the above, the District still has some meter inaccuracies that need to be resolved. However, the current, audited, data indicates a significant improvement from the data available at the time of development of the 2007 Conservation Plan.

NKWD Conservation Annual Review

Table 2: Fiscal Year Line Loss Summary for 2006/2007 and 2007/2008

2006/2007 Fiscal Year Summary					
System	Production (gallons)	Consumption (gallons)	Line Loss (gallons)	Percent Loss	Average Connections
Rimrock	232,936,000	212,853,697	20,082,303	8.6%	975
Hillside/Honeysuckle Hills	256,739,800	167,884,900	88,854,700	34.6%	1,004
Twin Lakes	72,722,200	80,456,000	-7,733,800	-10.6%	653
Chilco	40,139,700	29,037,600	11,102,100	27.7%	115
Ohio Match	6,624,600	6,118,000	506,600	7.6%	38
GTE/Hayden Pines	86,265,600	93,807,300	-7,541,700	-8.7%	390
Hayden Orchards	4,762,036	3,830,000	932,036	19.6%	50
Valley Green	5,755,500	5,204,600	550,900	9.6%	58
Mountain View	18,904,982	17,256,718	1,648,264	8.7%	165
Meadowland Acres	5,904,700	5,853,600	51,100	0.9%	21
Atlas Acres	2,575,400	2,228,500	346,900	13.5%	15
East Seasons Acres	2,242,700	2,611,900	-369,200	-16.5%	21
Ranch Valley	3,450,300	3,429,800	20,500	0.6%	17
<b>District-wide Total</b>	<b>739,023,318</b>	<b>630,572,615</b>	<b>108,450,703</b>	<b>14.7%</b>	<b>3,522</b>

2007/2008 Fiscal Year Summary					
System	Production (gallons)	Consumption (gallons)	Line Loss (gallons)	Percent Loss	Average Connections
Rimrock	300,445,004	176,916,695	123,528,309	41.1%	993
Hillside/Honeysuckle Hills	211,307,500	168,512,983	42,794,517	20.3%	1,009
Twin Lakes	79,539,900	66,084,120	13,455,780	16.9%	687
Chilco	18,304,500	18,643,099	-338,599	-1.8%	119
Ohio Match	6,177,100	5,675,300	501,800	8.1%	39
GTE/Hayden Pines	92,747,700	83,610,219	9,137,481	9.9%	397
Hayden Orchards	4,342,410	3,267,720	1,074,690	24.7%	50
Valley Green	4,695,800	4,237,440	458,360	9.8%	58
Mountain View	16,052,700	13,659,239	2,393,461	14.9%	173
Meadowland Acres	4,562,200	4,527,920	34,280	0.8%	23
Atlas Acres	6,630,900	3,083,423	3,547,477	53.5%	18
East Seasons Acres	1,936,700	2,160,700	-224,000	-11.6%	22
Ranch Valley	3,450,300	3,429,800	20,500	0.6%	17
<b>District-wide Total</b>	<b>750,192,714</b>	<b>553,808,658</b>	<b>196,384,056</b>	<b>26.2%</b>	<b>3,605</b>

Fiscal Year	Total Gallons Sold	Average Billed Connections
2006/2007	630,572,615	3,522
2007/2008	553,808,658	3,605
Percent Reduction	12.2%	-2.4%
<b>Percent Water Savings:</b>		<b>12.2%</b>
<b>Gallons Saved:</b>		<b>76,763,957</b>

## 2.5. CONCLUSIONS

### Consumption

Based on the data provided by the District with respect to consumption and production for 2007 and 2008, it appears that the conservation measures that the District began to implement (even if informally) in 2006 and 2007 are taking affect. However, 2008 was a wetter, cooler year than the average, and we do predict that some of this reduction is attributable to the climate.

In any case, the savings between 2007 and 2008 for just the billing months of July, August and September can be quantified as follows. The total water sold in 2007 for these three months was approximately 348.63 million gallons. The total water sold for these months in 2008 was approximately 304.61 million gallons. The total water consumed, therefore, decreased by 12.6%. The average billed connections increased by 0.9% from July through September of 2007 to July through September of 2008. Based on these figures, a water savings of 13.6%, or approximately 47.41 million gallons, was realized for these three months.

For the fiscal year, the District sold an estimated 630.57 million gallons from October 2006 through September 2007 and an estimated 553.81 million gallons from October 2007 through September 2008. The average connections billed in the 2006/2007 fiscal year was 3,522 and 3,605 in the 2007/2008 fiscal year. Thus the estimated annual savings between the two periods was 14.5% or 91.62 million gallons. Per customer, the savings between the two periods was 16.7%.

With respect to consumption, the District has already demonstrated a substantial conservation savings of 16.7% per connection for the year. Considering the impact of temperature and precipitation and considering that it may be another 2 years before the water rates are adjusted again, it is not likely that the District can maintain an annual savings of 16.7% per year for the next five years.

After reviewing the average daily demand per connection for the peak months in 2006 (when the conservation program officially began), the District is proposing to set a goal to decrease this average a total of 25% by 2013. In order to do this, the District would need to achieve a 5.5% per year reduction from the average for the previous 3 years. (The purpose of figuring this three year average is to reduce the impacts of temperature, which as shown by Figure 3 is predicted to be a major influence on consumption.)

The three year average for the peak months of 2006 through 2008 is 1,070. Therefore, in 2009, the average daily demand (District-wide) for the peak months (July through September) would need to be 1011 gpd to meet the proposed goal. If the proposed goal is met every year for the next 5 years, the estimated average daily demand for the peak months would be reduced to 880 gpd per connection by 2013.



### Production and System Loss

It was identified in Section 2.4 that meter inaccuracies between the production and consumption readings. These inaccuracies can be attributed to:

1. Adjustments for meter read months
2. Meter errors (broken meters)
3. Recording errors

The most obvious inaccuracies were seen for the fiscal year 2007/2008 on the Rimrock, Chilco, Atlas Acres and East Seasons Acres. Thus we recommend that the District focus on correcting these inaccuracies for these systems in 2008/2009.

It should be noted here that based on the Table 1 information, although consumption decreased 14.5% (16.7% per connection) between 2006/2007 and 2007/2008, production increased 1.5% in the same time frame (from 739.02 million to 750.19 million). Considering the additional connections added during this time frame, the production did decrease approximately 1% per connection.

This discrepancy in the annual consumption (16.7%) versus production (1%) conservation savings may be another indication of the inaccuracy of the meter data. Additionally, it may point to increased system leakage.

Reviewing table 1 with respect to system loss, the estimated District-wide line loss for 2007/2008 was 26% or 196 million gallons. Based on the leak detection survey conducted in Fall of 2008 (summarized in Section 2.1.1) and the identification of an estimated 84.5 gpm of leakage (44 million gallons over a year) on just two of the District's water systems, it can be expected that a large portion of the system loss may be attributed to leakage.

Whether the estimated line loss is relative to meter/data inaccuracies or system leakage, based on the data presented above, the District must address conservation on the production side (reduction of system loss). Therefore, it is recommended that the District consider setting a goal of achieving a maximum 10% line loss in the largest four water systems (Rimrock, Hillside, Twin Lakes, and Chilco) within the next 10 years based on a three year rolling average. These four systems are targeted as they have the largest distribution networks, highest number of leak repairs and highest production when compared to the system loss. The 10% system loss is established based on "industry standards."

Industry standards for loss are well established. The accepted industry standard for system loss is 10 to 20%. The American Water Works Association's Year 2000, "Water Distribution Systems Handbook," indicates, "A commonly accepted rule of thumb for acceptable levels of unaccounted-for water is 15 percent, although this value is highly

site specific." Additionally, we note here that WSDOH has set forth through the new Water Use Efficiency requirements a distribution system leakage (DSL) standard which will eventually require systems to come into compliance with a maximum 10% DSL based upon a 3 year rolling average. Systems with fewer than 500 connections will be allowed up to 20% DSL.

### 3. RECOMMENDED GOALS AND MEASURES FOR FISCAL YEAR 2008/2009

The following goals are recommended for implementation in the Fiscal year 2008/2009:

**Goal #1:** The District initiated its conservation program in 2006. The District's goal for this program is to accomplish a 25% reduction in the average daily demand (per connection) for the peak months (July through September) by the end of 2013. This represents an average reduction in the target value of approximately 4% per year. The District will continue to evaluate the effectiveness of its program annually, and shall report results on a per capita basis using a 3-year rolling average designed to minimize the influence of temperature variation.

Supporting Measures:

The District will continue with the currently implemented conservation measures. Additionally, the District will be adding the following conservation measures in the Fiscal Year 2008/2009:

1. Public Information and Education: North Kootenai Water District is working with Trout Unlimited to sponsor 3 signs promoting healthy trout habitat. These signs will be located at public access points to the Spokane River in Idaho. The estimated funding for this measure is \$3,000.

**Goal #2:** Reduce or eliminate meter inaccuracies identified for the following water systems in the year 2007/2008:

1. Rimrock
2. Chilco
3. Atlas Acres
4. East Seasons Acres

**Goal #3:** Reduce the average production per connection by achieving an average annual line loss of 10% (based on a three year rolling average)<sup>6</sup> within 10 years (by the end of 2018) on the following systems:

1. Hillside
2. Rimrock
3. Twin Lakes
4. Chilco

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<sup>6</sup> This goal will be met when the average line loss for three consecutive years is equivalent to 10% of the total water produced.

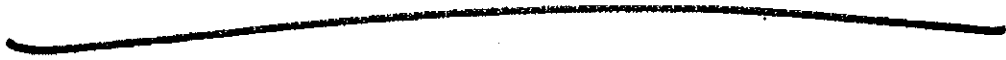
These systems have been selected because they have the largest lineal footage of pipe, largest number of leak repairs annually, and highest production with respect to system loss.

#### Supporting Measures

In order to achieve Goal #3, the District is implementing the following measures:

1. The District completed leak detection on the Hillside and Rimrock water systems in the October of 2008. The District will complete repairs to the leaks detected in the Fall of 2008. The District also plans to complete leak detection on the Twin Lakes and Chilco water systems in the Spring of 2009.
2. The District will continue toward the completion of their Fire Hydrant Lock Program. The District estimates that about 40% of the hydrants within the District still need to be locked. Until that time, the hydrants will continue to be a source of "loss" when used without permission for construction or other purposes.
3. The District has included significant waterline replacement projects for each of the four systems listed above within their 10 year CIP.

# Appendix A



**RESOLUTION NO. 08- 11**

**A RESOLUTION OF NORTH KOOTENAI WATER DISTRICT, OF KOOTENAI COUNTY, IDAHO, ADOPTING CRITERIA FOR THE RANKING OF CAPITAL IMPROVEMENT PROJECTS PLANNED BY THE DISTRICT; AND PROVIDING FOR OTHER MATTERS PROPERLY RELATING THERETO**

**NORTH KOOTENAI WATER DISTRICT  
Kootenai County, Idaho**

BE IT RESOLVED BY THE Board of Directors of North Kootenai Water District, of Kootenai County, Idaho (the "District") as follows:

WHEREAS, North Kootenai Water District, of Kootenai County, Idaho (the "District") is a duly and properly formed water district under and by virtue of the constitution and laws of the State of Idaho; and

WHEREAS, the District is governed by an elected Board of Directors (the "Board"); and

WHEREAS, the Board of Directors is responsible for the management of all District resources which include the funds of the District and other valuable environmental resources; and the District supports the management of its water resources through appropriate conservation measures; and

WHEREAS, the District supports the evaluation of necessity and need for all capital improvement projects on a uniform and consistent basis and has developed a method for ranking capital improvement projects that assigns a scale of importance to such capital projects;

NOW, THEREFORE, BE IT FURTHER RESOLVED by the Board of Directors of the District as follows:

**Section 1: ESTABLISHMENT OF CRITERIA FOR THE RANKING OF PROJECTS IN THE CAPITAL IMPROVEMENT PLAN**

All capital improvements proposed for inclusion in the District's Capital Improvement Plan shall be ranked according to the following numerical scale of importance:

1. Health and Safety

2. System Reliability
3. System Performance
4. Water Conservation
5. Opportunity Cost
6. Public Right of Way Required Relocations

In preparing the schedule for construction of the projects included in the Capital Improvement Plan, the District shall take the assigned ranking of each project into consideration. Project rankings may be amended from time to time or as deemed appropriate by the Board.

Section 2: SEVERABILITY

If any section, paragraph, clause, or provision of this Resolution shall be held to be invalid or unenforceable for any reason, the invalidity or unenforceability of each section, paragraph, clause, or provision shall in no manner affect any remaining provision of this Resolution.

Section 3: RATIFICATION

The Board hereby ratifies all acts taken by members of the Board and/or agents on behalf of the Board or District relative to this potential annexation and the hearing process is hereby ratified and approved.

Section 4: EFFECTIVE DATE


This Resolution shall become and is effective as of the date of its adoption.

DATED this 17<sup>th</sup> day of April, 2008.

NORTH KOOTENAI WATER DISTRICT,  
Kootenai County, Idaho

  
\_\_\_\_\_  
Chairman, Board of Directors

ATTEST:

  
\_\_\_\_\_  
District Secretary

(SEAL)

\*\*\*\*\*

I, the undersigned, Secretary of the Board of Directors of North Kootenai Water District, of Kootenai County, Idaho, hereby certify that the foregoing Resolution is a full, true, and correct copy of a Resolution duly adopted at a regular meeting of the District, duly and regularly held at the regular meeting place thereof on April 17, 2008, of which meeting all members of the Board had due notice and at which a majority thereof were present; and that at said meeting said Resolution was adopted by the following vote:

AYES, and in favor thereof, Directors: *Four*

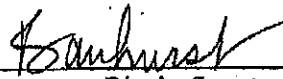
NAYS, Directors: *None*

ABSENT, Directors: *One*

ABSTAIN, Directors: *None*

I further certify that I have carefully compared the same with the original Resolution on file and of record in my office; that said Resolution is a full, true, and correct copy of the original Resolution adopted at said meeting; and that said Resolution has not been amended, modified, or rescinded since the date of its adoption, and is now in full force and effect.

IN WITNESS WHEREOF, I have set my hand and affixed the official seal of the District on April 17, 2008.



\_\_\_\_\_  
District Secretary

(SEAL)



# Appendix B

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