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**Hayden Lake Irrigation District
Water Use Resolution**

Resolution 15-01

Whereas: The Hayden Lake Irrigation District (District) encourages efficient use of water and adopts policies, guidelines and recommendations for that purpose; **And**

The District is the water purveyor to its members; **And**

The District supplies water drawn from the Spokane Valley-Rathdrum Prairie Aquifer (Aquifer); **And**

The Aquifer is designated as a "sole source" aquifer; **And**

The District recognizes the need to encourage efficient water use.

Now, Therefore Be It Hereby Resolved, the Hayden Lake Irrigation District Board of Directors establishes this policy to support and encourage efficient water use by its members.

This policy is intended, but not limited to:

Encourage efficient water use by its members through use of current and future technology to improve efficiency of interior and exterior water use within the boundaries of the Hayden Lake Irrigation District.

The District shall establish a water use plan in accordance with Idaho Department of Water Resources Rathdrum Prairie Groundwater Management Plan requirement for a 'Conservation Plan'.

The District shall incorporate efficient water use at and on its facilities.

The District shall provide regular messages promoting efficient water uses through its written and verbal communications with members.

The District shall evaluate the effectiveness of its actions over time, and may make revisions and refinements to its actions as it deems necessary or beneficial to its operations as a water purveyor.

Adopted by the Hayden Lake Irrigation District board of Directors on this 3 day of March, 2015


BiJay Adams, Chairman


ATTEST: Brian Eifler, Secretary/Treasurer

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Hayden Lake Irrigation District Water Use Conservation Plan



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Introduction

The purpose of this document is to establish a formal water conservation plan for the Hayden Lake Irrigation District in accordance with the Rathdrum Prairie Groundwater Management Plan adopted by the Idaho Water Resource Board on September 15, 2005.

System Profile

Hayden Lake Irrigation District was originally formed in 1914; during its history the District evolved into a drinking water supplier. Historic water source was Hayden Lake, however that source has been replaced entirely by groundwater from the Rathdrum Prairie Aquifer (RPA).

The District pumps groundwater under various water rights. These rights are summarized in Appendix A.

Currently the District utilizes four deep wells for its supply. A recently drilled, cased and screened well will add one additional source once completed and equipped. Due to proximity of the local airport the District predominantly uses the aquifer as its storage. The four wells have a pumping capacity of approximately 9000 gallons per minute (gpm) and are controlled using variable frequency drives on three of the four wells.

This supply provides water through a distribution network consisting of one pressure zone with pipe sizes from 24" to 4" and types including concrete lined steel, asbestos cement and PVC. Age of the distribution network ranges from approximately 60 years old to current construction. The distribution system provides water to approximately 2500 connections with approximately 80% of those connections representing residential use. The remainder consists of commercial and seasonal irrigation use. The prior 15 years have resulted in District growth exceeding 100% which added significant connections and distribution network. During the same period the District has been able to reduce production per connection by approximately 40%. This reduction is discussed in more detail in the Resource Conservation section. Growth took place primarily during the recent early 21st century residential boom observed throughout the US. One additional source was added during that time.

All sources are metered as are all connections. Meters are read monthly or more frequently and the District utilizes automated meter reading equipment and software. Reliable consumption meter reading and analysis is limited to a six year period from 2009 to current.

Water Use

Analysis of production trends over the past 15 years yields the following: Average day demand (ADD) ranges from a low of 640 gallons per day per connection (g/d/c) to a high of 1150 g/d/c with an overall average of 650 g/d/c for the past 6 years. Peak day demand (PDD) ranges from a low of 1445 to a high of 3950 g/d/c with an overall average for the past 6 years of 1840 g/d/c. Peak hourly demand ranges from approximately 9000 gpm to 7000 gpm with 2014 exceeding 9000 gpm. Tables depicting these and the following trends are included in Appendix B

Analysis of consumption trends over the past 6 years yields the following: Average minimum daily per meter use ranges from a low of 130 g/d/c to a high of 180 g/d/c. Average maximum daily per meter use ranges from a low of 1330 to a high of 2150 g/d/c with six year averages of 155 and 1640 g/d/c

respectively. Low use typically occurs during the winter months and high use occurring during the summer months. Seasonal use variation is recognized as a multiplier of approximately ten from low to high use. The District has conducted studies of residential use in recently constructed subdivisions which confirm these seasonal variations.

Water loss is demonstrated to be generally within the industry guidelines of 10% or less; annualized unaccounted for water ranges from 7% to 20% over the past 6 years with an average of 10.6%. Unaccounted for water includes; seasonal distribution system flushing (un-metered); construction flushing, and potential distribution system leaks. A leak survey was conducted in 2014 which identified one minor leak (repaired). The District analyzes daily production with increased emphasis during wintertime low flows for consistency, trending and flow rate quantity as one of its methods for analyzing water loss potential.

Resource Conservation

The District has employed several measures to reduce water production and encourage conservation through wise use of water by its customers. These current practices consume approximately ¼ to ½ of a staff FTE. Proposed future conservation measures follow a discussion of current practices.

The District has reduced its annual production per connection by approximately 40% over the past 15 years. These reductions appear to be the result of two technological advancements; the first included installing variable frequency drives on two of its pumps (a third drive was added later when the fourth well was constructed) and installation of a control system (SCADA system). These changes resulted in significant reductions of tank overflow and once the control systems were understood and able to be fully utilized they resulted in increased overall system operational efficiency reducing production by approximately 20% total. The second advancement included replacing all consumption meters with automated meters and associated reading equipment and software.

The second improvement has enabled the District to read meters accurately, reliably and on an increased frequency and more importantly to analyze and subsequently use the information gained to notify customers of leaks and high use. The District notifies customers of these parameters on a monthly basis. Results of this effort illustrate a sharp 20% decrease in production with continued, less significant, reduction trends since.

The District constructed a demonstration garden in 2010 to illustrate a landscape alternative to lawn grasses. The District can use this garden to demonstrate the per square foot reduction in water use.

The District routinely provides information encouraging conservation to its customers in the form of meter readings and reminders on the billing statement, newsletters included with the quarterly water bill, annual consumer confidence report, District website information and personal communication with customers by office and field staff. A leak credit program is utilized to encourage quick repair of leaks.

Water rates are annually reviewed and generally increased each year by a small amount. The District finds its water pricing to be midpoint on a comparison of local providers.

Each of these measures provides a consistent message of the importance of water, its management as a resource and everyone's responsibility in preserving the resource.

Future measures may include

- Continuation of the existing educational and field programs with improvements and enhancements as they become available, and are implementable.
- Conversion to a consumption based water rate rather than an allocation based rate as currently employed. Consumption based rates have a demonstrated effect of reducing consumption.
- Odd/Even watering schedules for seasonal irrigation.
- Encouragement of soil amendments to increase water holding capacity which is shown to reduce rapid dewatering of the top soil as well as reduce surface evaporation retaining more water near the root zone.
- Encouraged use of technological advancements both indoors and for outside irrigation.
- Support of technology to use rain and soil moisture sensors, AgriMet stations and other methods to increase efficiency of irrigation of larger plots with potential for use on residential lots.

The Districts future goals for water use will be based on a per connection basis; with desired results to reduce the seasonal peaks and develop stable, consistent water use patterns. The District has significant involvement in a regional organization which is discussing conservation on a region wide basis. It is anticipated that organization will establish goals for water use and conservation which the District will then tailor its conservation programs to meet.

Conclusion

It must be noted, and understood, the Districts primary responsibility is to provide safe drinking water of high quality. Efforts spent on conservation, while embraced by the District as an important component of resource management, must be manageable, implementable and affordable to both the District staff and its members. As evidenced by its significant current efforts the District is committed to realistic conservation, however it also recognizes future conservation measures are unlikely to yield returns as high as previously observed.

The District participates significantly in the larger regional (bi-state) resource management discussions towards regional solutions to current and future resource challenges. Conservation is recognized as a significant, and logical part of that discussion. It is also recognized that the region will not 'conserve' its way out of these challenges; and conservation in many ways simply paves the road towards additional growth.

To provide greater context of the Districts current water use patterns; recent studies completed by the Idaho Water Resources Research Institute (IWRRI) and the USGS demonstrate the District's per capita use as it compares to local and national trends. The IWRRI study concluded the District as having the 2nd lowest per capita water use (87 g/d) of the regional (Idaho) purveyors supplying information. A recent USGS national study (completed every 5 years) showed a national average of 88 g/d/person and illustrated Idaho as the highest per capita water user in the nation at 168 g/d (District use shown at 87 g/d/p). These comparisons demonstrate the effectiveness of the Districts current work.

The District believes the results discussed in this report, and a comparison to regional and national trends illustrate District water use trends significantly influenced by its conservation efforts, its customer's willingness to use water wisely and the Districts commitment to manage the resource appropriately.

Hayden Lake Irrigation District

Conservation Plan

Appendix A

Rights Held by District

Right #	Priority Date	Cfs Annual	Cfs 3-15 11-15	AF Annual	AF Irr Season
95-7800 ¹	11/16/77	3.8	3.8	2751.1	
95-8581 ¹	4/25/88	10.92	12.92	4237	300
95-9212	8/7/02	1.34	1.34	968.3	
95-16962 ²	12/23/14	5.00	5.00	-	-
Total		21.06 ³	23.06 ³	7288.1 ³	8256.4 ³

Irrigation season is March 15 to November 15

Notes

1. Rights 95-7800 & 95-8581 have an instantaneous withdraw limitation of 16.72 CFS and a combined annual limit of 7288.1 Ac. Ft. CFS Annual allocation is for Municipal use.
1. Prohibition of application to lands that have surface water rights, whether for irrigation or domestic lawn watering.
2. Right 95-16962 has a conditional instantaneous withdraw limitation of 30.88¹ CFS. This total includes combined rights 95-7800, 95-8581, 95-9212, 95-16962, 95-8269, 95-8279², 95-9242.
 - ¹. The total capacity listed as part of the conditions of right 95-16962 is assumed to be in error- Actual total capacity should be 29.00 CFS rather than 30.88 taking the combined limit of 3.12 for rights 95-8273 and 95-8279
 - ². Right 95-8279 is linked to 95-8273 this condition is assumed to include both.

Rights Held in Deed by District

Right #	Priority Date	CFS Annual	Cfs 3-15 11-15	AF Annual	AF Irr Season
95-8279 ¹	4/1/83		3		553
95-8273 ¹	3/16/83		2		374.5
95-9242 ²	3/9/66		1.26		371
95-8269 ³	3/11/83		1.56		273
			5.94 ⁴		1571.5

Notes:

1. Sunshine Meadows and Strawberry Fields development water rights deeded to District September 2004 instruments 1929155 & 1929156
1. Rights 95-8279 & 8273 have a combined limit of 3.12 CFS
2. Broadmoore Estates development water right
3. Carrington Meadows water right. Section 16 T51 R4
4. Represents total CFS where rights 8279 & 8273 have a combined total of 3.12.

Hayden Lake Irrigation District **Conservation Plan** **Appendix B**

Water Production 2009 to 2014

Source: Rathdrum Prairie Aquifer
Source wells 1 through 4 Quantity in gallons

	Year					
	2009	2010	2011	2012	2013	2014
January	20,939,000	18,283,900	18,692,000	16,836,600	17,233,000	16,265,100
February	17,493,000	16,523,000	16,315,000	15,769,100	15,088,000	14,907,800
March	19,342,000	18,745,000	17,426,000	16,491,000	16,962,300	16,746,000
April	22,340,900	21,868,000	17,801,600	19,657,100	20,202,200	20,130,100
May	66,111,100	47,361,400	25,633,400	53,419,400	64,335,600	52,075,100
June	118,205,700	51,482,300	46,146,300	53,462,300	101,967,200	86,757,900
July	159,272,500	126,110,800	106,825,500	106,365,200	155,398,400	140,461,200
August	131,389,200	142,174,100	135,640,300	140,108,500	128,065,100	129,746,900
September	98,456,600	73,579,700	125,910,400	111,912,500	68,260,400	97,459,300
October	28,802,500	32,058,900	44,800,900	34,580,700	24,059,100	40,068,100
November	17,065,400	18,592,000	17,223,400	16,620,000	16,525,300	19,241,100
<u>December</u>	<u>17,776,000</u>	<u>18,480,000</u>	<u>17,143,300</u>	<u>17,122,400</u>	<u>17,948,500</u>	<u>17,866,900</u>
Total	717,193,900	585,259,100	589,558,100	602,344,800	646,045,100	651,725,500

Water Use 2009 to 2014

Consumption from monthly meter readings (in gallons)

	2009	2010	2011	2012	2013	2014
January		13,196,000	15,641,000	13,712,000	14,120,000	13,976,000
February	33,978,000	12,360,000	18,828,000	12,288,000	12,722,000	11,853,000
March	13,587,000	13,734,000	11,499,000	9,961,000	12,278,000	12,301,000
April	18,960,000	18,096,000	13,490,000	14,913,000	14,414,000	18,468,000
May	39,432,000	37,565,000	29,379,000	40,299,000	56,566,000	40,821,000
June	71,709,000	40,459,000	40,706,000	37,660,000	61,048,000	66,032,000
July	114,596,000	85,785,000	107,925,000	72,859,000	117,718,000	109,998,000
Irrigation		45,461,000	26,519,000	18,721,000	44,694,000	36,247,000
August	74,682,000	99,234,000	118,167,000	109,406,000	96,615,000	92,681,000
September	157,511,000	81,871,000	100,533,000	140,584,000	94,662,000	122,807,000
October	22,538,000	61,024,000	35,349,000	48,779,000	18,702,000	32,343,000
November	13,940,000	13,793,000	15,551,000	13,925,000	18,326,000	12,300,000
December	12,137,000	21,750,000	11,729,000	23,607,000	12,267,000	15,260,000
	573,070,000	544,328,000	545,316,000	556,714,000	574,132,000	585,087,000

Unaccounted for Water

Unaccounted for water (in gallons)						
	2009	2010	2011	2012	2013	2014
Production	717,193,900	585,259,100	589,558,100	602,344,800	646,045,100	651,725,500
Use	573,070,000	544,328,000	545,316,000	556,714,000	574,132,000	585,087,000
Unaccounted	144,123,900	40,931,100	44,242,100	45,630,800	71,913,100	66,638,500
Percentage	20.10%	6.99%	7.50%	7.58%	11.13%	10.22%

Note: Significant unmetered construction project flushing in 2013 and 2014 (independent projects) may have contributed to the higher unaccounted for water.

Growth in Connections

	2009	2010	2011	2012	2013	2014
beginning	2363	2445	2483	2511	2551	2597
ending	2443	2490	2521	2549	2597	2659
change	80	45	38	38	46	62
total	309					
%						
change	3.39%	1.84%	1.53%	1.51%	1.80%	2.39%
Total %	12.46%					