CHAPTER 4

WATER USE EFFICIENCY PROGRAM AND WATER RIGHTS

4.1 WATER USE EFFICIENCY PROGRAM

4.1.1 Planning Requirements

In 2003, the Washington State Legislature passed the Municipal Water Supply-Efficiency Requirements Act (commonly called the Municipal Water Law) as part of a multi-year effort to reform the state's water laws. The act requires all municipal water suppliers to use water more efficiently in exchange for water right certainty and flexibility to meet future water demands. The Legislature directed the Department of Health to adopt a rule that establishes water use efficiency (WUE) requirements for all municipal suppliers. The Water Use Efficiency (WUE) Rule, which became effective on January 22, 2007, includes the following key items:

- WUE Program - This element of the rule requires the collection of water production and consumption data, forecast of future water demands, evaluation of system leakage, evaluation of water rate structures, and the implementation of WUE measures. This Program is a required element of all Water System Plans prepared after January 22, 2008.

- Distribution Leakage (DSL) Standard - Municipal water suppliers with 1,000 or more connections are required to satisfy a distribution leakage standard equal to 10% or less of total production by July 1, 2010.

- WUE Goal Setting and Performance Reporting - Municipal water suppliers are required to set WUE goals through a public process and report annually on their performance to customers and to DOH. For water systems with 1,000 or more services, the deadline for establishing systems goals is July 1, 2009. The first annual report to DOH is required by July 1, 2008.

The rule requirements and compliance deadlines are summarized in Table 4-1.

TABLE 4-1 WATER USE EFFICIENCY (WUE) RULE REQUIREMENTS

Requirement	Deadlines	
	1,000 or more Connections	Under 1,000 Connections
Begin Production & Consumption Data Collection	January 1, 2007	January 1, 2008
Establish WUE Goals	July 1, 2009	July 1, 2010
Include WUE Program in Planning Documents (Comprehensive Water Plans)	January 22, 2008	January 22, 2008
Submit First Annual Performance Report	July 1, 2008	July 1, 2009
Submit Service Meter Installation Schedule	July 1, 2008	July 1, 2009
Meet DSL Standard	July 1, 2010	July 1, 2011
Complete Installation of all Service Meters	January 22, 2017	January 22, 2017

A WUE Program is one requirement of the WUE Rule. All Water System Plans submitted to the Department of Health after January 22, 2008, are required to include a WUE Program. WAC 246-290-810(4) requires municipal water suppliers to include the following items in their WUE program:

- Description of the current water conservation program including an estimation of water saved through program implementation over the last six years;

- Description of the chosen WUE goals;

- Evaluation and implementation of WUE measures;

- Projected water savings;

- Customer education;
- WUE program effectiveness; and
- DSL evaluation.

4.1.2 Current Water Conservation Program

Current conservation planning for the City of Toppenish began in 1994 and was based upon the DOH Conservation Planning Requirements. Toppenish's current Water Conservation Program, as provided in Chapter 8 of the 2002 Water System Plan update, contained the following mandatory and recommended program elements, including proposed goals:

- Source Metering – The City has source meters on all of its wells and starting in 2001, source meters were planned to be calibrated every three years.
- Service Metering – Service connections in the City have been metered for a number of years and the City planned to continue its meter calibration and replacement program to maintain its low loss and unaccounted for water percentage.
- Data Collection – The City collects water use data from each of its source and service meters. Service area population, total annual source production, peak day, peak month, annual totals, and lost and unaccounted for water volumes were calculated and presented in the Plan. The City planned to begin recording all required conservation information in one annual report and routinely evaluate the data for water use trends to maximize water conservation starting in 2001.
- Water Demand Forecasting – Water demand forecasts were provided in the 2002 Water System Plan. The City planned to create a conservation based demand forecast, which assumed a reduction in water usage by 5 percent.
- Conservation Pricing – Modification of utility rates to encourage water conservation can be an effective means of reducing overall water use. Common conservation rate methods include seasonal surcharges, increasing block rates, and goal billing. The City's current rate structure consisted of a base charge and a volume charge. The base charge was in the amount of 600 cubic feet and the volume charge was a declining block structure, in which customers pay less per gallon at higher consumption rates. At the time, the City felt this rate structure was appropriate for Toppenish.
- Water Reclamation/Reuse - The City does recognize the long-term benefits to water reclamation and water reuse, but currently lacks the infrastructure necessary to put reclaimed water from its wastewater treatment facility to beneficial use with city-wide irrigation City-wide.
- Program Promotion/Public Education – The City maintains conservation literature at City Hall that is available to customers. This information includes Department of Ecology/Department of Health brochures promoting water conservation. The City also informs customers, builders, and contractors on plumbing code regulations requiring efficient plumbing fixtures.
- Technical Assistance – The 1994 Conservation Planning Requirements identified technical assistance recommendations, including purveyor assistance, customer assistance, and bills showing consumption history. Purveyor assistance was not applicable because the city now has wholesale customers, and the city did not have the capability of adding consumption history on bills at the time. The City did, however, provide information and assistance to customers with conservation issues.
- Incentives of Other Measures – Several other measures provided in the Conservation Planning Requirements include: distribution of single-family/multi-family water saving device kits, encouraging application of current technology to water use practices for large agricultural or nursery uses, and promotion of low water demand landscaping. The City did not choose to

pursue these incentives/measures any further, but did discuss how the City currently encourages new construction to comply with providing efficient plumbing fixtures and how most of the City's parks have automatic sprinkler systems that allow for control of water use to minimize water evaporation, reduce peak daytime demands and reduce overall use.

Since 2002, the City has continued to maintain service meter records. Below in Table 4-2 is a summary of City population, water services, and water consumption data that was provided in Chapter 2 for the period 2003 through 2009. Further information regarding historical water use data is provided in Chapter 2 of the Plan.

TABLE 4-2 WATER PRODUCTION & CONSUMPTION INFORMATION 2003 - 2009

Year	Population*	Total Water Services	Annual Water Consumption (million gallons)	Residential (Inside City) Annual Consumption (million gallons)	Residential (Inside City) Water Services	Residential (Inside City) Consumption per Service (gal/service/day)
2003	8,940	2,221	550.640	342.291	1,766	531
2004	9,000	2,223	512.401	318.089	1,770	491
2005	9,000	2,219	503.828	315.293	1,766	489
2006	9,015	2,217	513.005	305.043	1,766	473
2007	9,105	2,223	523.893	311.856	1,767	484
2008	9,140	2,218	507.127	309.828	1,778	476
2009	9,090	2,229	506.925	302.550	1,774	467

* From June 29, 2009 Office of Financial Management (OFM) population estimates.

It can be seen from Table 4-2 that there has been approximately an 8% reduction in the total annual demand and a 12% reduction in residential demand since 2003, which exceeds the City's 2002 conservation goal of a 5% reduction. There has also been a decline in the average residential consumption per service per day from a high of 531 in 2003 to the current value of 467. However, DSL has increased slightly from the average value of 8.4% calculated for the 2002 Water System Plan. A summary of historical production data from 2003 through 2009 and the average DSL is provided in Section 4.1.8.

No other conservation measures from the 2002 Conservation Program have been implemented other than discussed above. The City's WUE Program will replace the 2002 Conservation Program, and it will continue the primary goals and objectives of the previous program by continuing to provide more efficient use of water.

4.1.3 Water Use Efficiency Goals

Water use efficiency goals are an integral component of the updated WUE Program, setting the ground work for more efficient use of water. In 2009, Toppenish began the process of adopting the following WUE goals:

- Account for 90% or the water it distributes by December 31, 2015.
- Reduce single-family and multi-family residential water consumption by 25 gallons per day per connection by December 31, 2015.

The WUE goals were presented to the public for review prior to the public forum which was held on November 24, 2009 and there were no public comments on the proposed goals. The WUE goals were adopted by the City council on November 8, 2010. A copy of the public notice, public forum meeting notes, and WUE goal adoption resolution are provided in Chapter 10 of this Plan.

Adoption of the above WUE goals is expected to improve system performance and consequently reduce water production volumes in spite of projected growth within the City. It is anticipated that the proposed reduction in residential use of 25 gallons per day per connection could save approximately 17 million gallons per year, if realized by December 31, 2015.

4.1.4 Evaluation and Implementation of Water Use Efficiency Measures

Water use efficiency (WUE) measures are necessary actions taken to attain a water system's established efficiency goals. Measures are intended to support the WUE Program and should address both supply and demand efficiencies. For this reason, the WUE measures that have been evaluated and/or implemented are separated into two primary categories, supply side measures and demand side measures. All of the selected WUE measures pertaining to the Toppenish's WUE goals were presented to the public during the goal setting process.

Supply Side Measures

Supply side measures are essential to control DSL and improve supply efficiency and overall system performance. The following are discussions of the supply side WUE measures that have already, or will be implemented within the next six years to achieve the established WUE goals. The estimated cost of these measures and anticipated water savings are also provided.

Service Meter Replacement Program – To ensure the accuracy of water consumption information, Toppenish embarked upon a program of replacing all existing service meters within the City with radio-read meters. This meter replacement program began in 2007 and is planned to be completed in 2010. Upgrading the existing service meters to radio-read style meters will reduce inaccuracies from old worn or malfunctioning meters and give the City the ability to identify excessive usage and possible service leaks so that the customer may be notified for repairs to be made. In the future, Toppenish will calibrate and/or replace faulty meters on an as-needed basis when a reading from an individual meter is in question.

WUE Measure Cost Estimate: The City has spent approximately $400,000 to date on existing service meter replacements and upgrades. There are approximately 200 meters left to upgrade, for a total estimated project cost of approximately $500,000.

Estimated Water Savings: Unknown.

WUE Measure Action Status: Implemented in 2007.

Source Meter Calibration – The City of Toppenish proposed providing routine calibration of its source meters in their 2002 Water Conservation Program. Source meter calibration will ensure the accuracy of production data and potentially reduce the current DSL percentage for the City. Toppenish plans to begin calibration of its source meters approximately every three to five years, beginning 2011. It is unknown how much water may be saved by implementing this measure, but if accuracy is improved by even 0.5%, the resulting water savings would be considerable given that approximately 600 million gallons of water are pumped into the system each year.

WUE Measure Cost Estimate: Approximately $2,000 for a spare meter and $1,500 for calibration of the City's 5 source meters.

Estimated Water Savings: Unknown.

WUE Measure Action Status: To be implemented in 2011.

Leak Detection Program – The City of Toppenish plans to implement and maintain an ongoing leak detection program, beginning in 2011. The leak detection program will provide thorough inspections of the distribution system by a trained expert. If leaks are found within the distribution system, they will be evaluated and the City will make any necessary cost-effective repairs. The amount of water saved is unknown and depends largely on the amount of leaks found, but detection and repair of any leaks found will reduce DSL.

WUE Measure Cost Estimate: $2,000 per year for the leak detection services.

Estimated Water Savings: Unknown.

WUE Measure Action Status: To be implemented in 2011.

The above costs and estimated water savings of the identified supply side measures have been summarized in Table 4-3.

TABLE 4-3 SUMMARY OF SUPPLY SIDE WUE MEASURES

Measure Description	Implementation Cost	Year of Implementation	Projected Water Savings
Service Meter Replacement Program	$500,000	2007	Unknown
Source Meter Calibration	$3,500	2011	Unknown
Leak Detection Program	$2,000/annually	2011	Unknown

Demand Side Measures

Municipal water systems are required to evaluate or implement a specified number of demand side water use efficiency (WUE) measures based upon the size of the water system. Table 4-4 shows the minimum number of measures required to be evaluated or implemented by the City of Toppenish.

TABLE 4-4 WATER USE EFFICIENCY MEASURES

Number of Service Connections	Number of Water Use Efficiency Measures to be Evaluated
Less than 500	1
500 - 999	4
1,000 – 2,499	5 (Toppenish's current requirement)
2,500 – 9,999	6
10,000 – 49,999	9
Greater than 50,000	12

A discussion of the demand side measures that the City of Toppenish has evaluated to achieve its specified efficiency goal is provided below, along with the estimated costs to implement the measure and the projected water savings. Evaluation of the following measures for cost-effectiveness is primarily based upon the costs of either acquiring additional water rights/increasing the current permitted water withdrawal capacity, construction of additional sources of supply, or construction of additional storage capacity, since these are the major system components of the water system affected by system demand. Currently, storage capacity is the limiting factor in the City of Toppenish water system, as discussed in Chapter 2 of this Plan. Therefore, the cost-effectiveness of the following measures is based upon the cost to construct a new water storage reservoir.

It should be noted that water savings attributable to public information activities are difficult to quantify because they are not directly linked to physically saving water. Although these measures cannot be specifically quantified, they are an integral part of the WUE Program, raising awareness of the importance of water conservation and increasing community participation in other conservation activities.

Public School Outreach Program – The City will start an outreach program to local public schools. City representatives will deliver interactive presentations to elementary school students, distribute age appropriate educational material and engage students in fun activities that encourage water conservation. The City will present to a yet-to-be determined grade at every public elementary school annually starting in 2010, thereby ensuring that public school students know and understand

the importance of conserving water. The City hopes that by engaging the children in fun educational activities, the presentation will have both an immediate and long term impact on their water-use practices.

WUE Measure Cost Estimate: $3,000 for preparation of presentation materials.

Estimated Water Savings: Unknown; the hope is, a school outreach program will contribute to the overall goal of reducing residential consumption by 25 gallons per service per day by December 31, 2015.

WUE Measure Action Status: Scheduled for implementation in 2010.

Water Bill Leaflets – Beginning in 2011, the City will include a leaflet addressing consumer leak detection with water bills once a year. The purpose of the leaflet is to increase awareness of at-home leak detection and to educate water customers by providing leak-detection techniques as well as some solutions and resources for fixing leaks. The City hopes that the annual mailing will encourage water customers to take the time to survey their home for leaks at least once a year.

WUE Measure Cost Estimate: $2,000 for preparation of insert materials plus $1,000/year for reproduction of bill inserts.

Estimated Water Savings: Unknown; the hope is, bill inserts will contribute to the overall goal of reducing residential consumption by 25 gallons per service per day by December 31, 2015.

WUE Measure Action Status: Scheduled for implementation in 2011.

Livestock Fair Booth and Literature – Beginning in 2012, the City will set up a booth at the annual Livestock Fair and hand out appropriate literature on conservation. City representatives will also answer questions and give away vouchers for free conservational items. Water customers will be able to redeem the vouchers at the Public Works office during normal office hours after the Fair. By setting up a booth at the Livestock Fair, the City hopes to reach an audience that typically uses water for different needs, such as livestock and agriculture. The literature handed out at the Fair will address conserving water for those specific uses.

WUE Measure Cost Estimate: $5,000 for preparation of the booth and literature.

Estimated Water Savings: Unknown; the hope is, the Fair booth and literature will contribute to the overall goal of reducing residential consumption by 25 gallons per service per day by December 31, 2015.

WUE Measure Action Status: Scheduled for implementation in 2012.

Low-Flow Showerheads – Beginning in 2013, Toppenish will have low-flow showerheads available at the Public Works office for residential water customers. Switching to a low-flow showerhead is a convenient and relatively inexpensive way to conserve water. Low-flow showerheads are a proven method for saving water and can save 2 to 3 gallons every minute when compared to a regular showerhead. If each member of a family of four takes one 15 minute shower a day, switching to a low-flow showerhead could save approximately 120 gallons per day. Being conservative and considering that only about 50% of the current 1,770 single-family residential services use the new showerheads, this measure would result in a maximum day demand (MDD) reduction of about 106,000 gallons. The initial cost of purchasing and distributing the showerheads is approximately $20,000, which is based upon two showerheads per home, $12 per replacement showerhead, and has a 50% success rate.

WUE Measure Cost Estimate: $20,000 for purchase and distribution of the low-flow showerheads.

Estimated Water Savings: 106,000 GPD reduction in MDD.

WUE Measure Action Status: Scheduled for implementation in 2013.

Newspaper Articles – Beginning in 2014, the City will publish two newspaper articles annually on water conservation information and tips. The spring article will focus on outdoor conservation tips, and the fall article will focus on indoor water conservation. The City feels that by providing water customers with season-appropriate water conservation tips, they will be more likely to use them and change their water usage habits.

WUE Measure Cost Estimate: $2,000 for preparation of insert materials plus $2,000/year for reproduction of bill inserts.

Estimated Water Savings: Unknown; the hope is that providing water customers with season-appropriate water conservation tips will contribute to the overall goal of reducing residential consumption by 25 gallons per service per day by December 31, 2015.

WUE Measure Action Status: Scheduled for implementation in 2014.

Conservation Material to Non-Billed Services – There are certain homes that use City water but do not receive individual-use water bills, such as apartments and retirement homes. The City of Toppenish will provide these residents with all of the conservation material to be included in the water bills, including conservation tips and leak detection leaflets. It is important that all residential water consumers receive this conservation information, regardless of whether or not they pay the City for their water usage. See Water Bill Leaflet measure above for further information.

A summary of the estimated costs to implement the selected measures, their estimated water savings, and overall cost-effectiveness are provided in Table 4-5.

TABLE 4-5 SUMMARY OF DEMAND SIDE WUE MEASURES

Measure Description	Implementation Cost	Year of Implementation	Projected Water Savings
Public School Outreach Program	$3,000	2010	Unknown
Water Bill Leaflets	$3,000	2011	Unknown
Livestock Fair Booth and Literature	$5,000	2012	Unknown
Low-Flow Showerheads	$20,000	2013	106,000 GPD
Newspaper Articles	$2,000	2014	Unknown

Five of the above measures are scheduled for implementation within the next six-year period. The measures planned to be implemented are summarized in Table 4-6 of section 4.1.5. The City will re-evaluate the effectiveness of the above measures during each program update.

4.1.5 WUE Measure Implementation

A summary of the WUE program measures that are planned for implementation is provided in Table 4-6, including measure description, implementation cost, annual cost after implementation (if applicable), and year of implementation. All of the implemented measures support the system's WUE goals to reduce distribution system leakage and single-family residential consumption.

TABLE 4-6 SUMMARY AND PROJECTED SAVINGS OF WATER USE EFFICIENCY MEASURES			
Measure Description	Implementation Cost	Year of Implementation	Projected Water Savings
Service Meter Replacement Program	$500,000	2007	Unknown
Source Meter Calibration	$3,500	2011	Unknown
Leak Detection Program	$2,000/annually	2011	Unknown
Public School Outreach Program	$3,000	2010	Unknown
Water Bill Leaflets	$3,000	2011	Unknown
Livestock Fair Booth and Literature	$5,000	2012	Unknown
Low-Flow Showerheads	$20,000	2013	106,000 GPD
Newspaper Articles	$2,000	2014	Unknown

The City plans to budget funds each year for the next six-year period to fund the WUE measures listed above in Table 4-6. These budget amounts are reflected in the proposed City of Toppenish financial plan in Chapter 9 of this Plan.

4.1.6 Customer Education

Customer education is intended to inform citizens about the need for, and the methods to achieve water conservation. Customer education involves publicizing and promoting the need for water conservation to all classes of customers. The City of Toppenish currently educates its customers through their annual Water Quality Report/Consumer Confidence Report (CCR), a copy of which is provided in Chapter 10 of this Plan. The annual report discusses the importance of using water more wisely and the City's plans for more efficient use of water, providing a source of information for customers and promoting water conservation ideas.

Beyond educating customers through the annual Water Quality Report, the City of Toppenish has evaluated and plans to implement several other educational programs that include a public school outreach program, providing water bill leaflets, preparing an educational booth and literature for the annual livestock fair and issuing of newspaper articles. Each of these additional education programs is discussed in more detail, including their cost for implementation, in Section 4.1.4 above.

4.1.7 Water Use Efficiency Program Effectiveness

The Water Use Efficiency Rule requires the completion of annual performance reporting to system customers and to the Department of Health (DOH). The City will use preparation of the Annual WUE Performance Report as an opportunity to review the effectiveness of the WUE measures, and determine if established goals require revision. The annual effectiveness evaluation and the Annual WUE Performance Report will include the following elements:

- Calculation of distribution system leakage in terms of volume and percent of total water production;
- Identification of WUE goals;
- Evaluation of established WUE goals, including estimating water savings achieved through implemented measures and progress towards satisfying goals.

Toppenish submitted its first Annual WUE Performance Report in 2009, and will submit future Annual WUE Performance Reports to DOH by July 1 of each year. Information contained in the Annual WUE Performance Report will also be included in the City's CCR distributed to all water system customers annually. WUE Program effectiveness will also be evaluated every six years when the Water System Plan is updated. A copy of the City's 2009 Annual WUE Performance Report is provided in Chapter 10 of this Plan.

4.1.8 Distribution System Leakage (DSL) Evaluation

The distribution leakage standard is a significant element of the Water Use Efficiency requirements. This standard requires all water systems monitor total water consumption by all services. The difference between water consumption and water production is considered distribution system leakage (DSL). DSL includes meter inaccuracies, water theft, leaking water mains, and reservoir overflows. DSL may also include un-metered uses such as hydrant use for fire fighting, and water used for distribution system flushing (if these uses are un-metered or un-estimated). The WUE Rule requires water distribution leakage to be 10% or less of total production based on a three year rolling average beginning in 2010 for systems with more than 1,000 connections.

All of Toppenish's water sources are metered, and these source meters are read daily. All services in Toppenish's distribution system are metered and read monthly. Table 4-7 presents Toppenish's water production and water consumption values (including estimated unmetered authorized consumption) for the last three-year period (2007 through 2009).

TABLE 4-7 WATER PRODUCTION & CONSUMPTION INFORMATION 2007 – 2009
(values are in million gallons)

Year	Water Production	Water Consumption	Estimated Water Consumption	Distribution Leakage
2007	631.753	523.893	0.061	17.06%
2008	606.876	507.127	2.639	16.00%
2009	616.340	506.925	5.114	16.92%
3-Year Average	618.323	512.648	7.814	16.67%

The City of Toppenish currently does not meet the 10% DSL standard. As discussed previously in Section 4.1.2, DSL for the City of Toppenish has risen from the 2002 average of 8.4%. This rise may be due to an increase in system leaks or recent service meter upgrades and changes. The City is working towards satisfying the 10% DSL standard through implementation of supply-side efficiency measures, including calibration of source meters, performing annual leak detection surveys, metering of hydrant usage, and completion of distribution system improvements. Repair and/or replacement of known or suspected leaking distribution system components is key to reducing the percentage of DSL.

4.2 WATER RIGHT STATUS SUMMARY

The City of Toppenish lies entirely within the jurisdictional boundaries of the Yakama Nation reservation, and therefore, applies for and maintains 10-year renewable existing use permits with the Yakama Nation Water Code Administration for each of its wells. The Yakama Nation is the sole entity for enforcing, administering, and adjudicating water resources within the external boundaries of the Reservation. Most recently in 2005, the City of Toppenish applied for and received 10-year renewable existing use Permits for Well No. 3, Well No. 5, Well No. 6, Well No. 7, and Well No. 8. Provided below in Table 4-8 is a summary of the permitted flow rates for each well.

TABLE 4-8 SUMMARY OF YAKAMA NATION 10-YEAR RENEWABLE EXISTING USE PERMITS

Source	Permit Number	Permit Expiration Date	Instantaneous Quantity
Well No. 3	2005-27	January 25, 2015	495 gpm
Well No. 5	2005-27-A	January 25, 2015	950 gpm
Well No. 6	2005-27-B	January 25, 2015	195 gpm
Well No. 7	2005-27-C	January 25, 2015	2,200 gpm
Well No. 8	2005-27-D	January 25, 2015	375 gpm
		TOTAL	4,215 gpm

Most of the permitted flow rates match the current well capacities with the exception of Well No. 5, which was granted a higher instantaneous quantity. Each of these permits expires in 2015, as shown in Table 4-8, requiring the City to renew the permits with the Yakama Nation at that time. Permits for proposed future wells will also have to be obtained from the Yakama Nation.

The City also maintains a Washington Stated Department of Ecology (DOE) Certificate of Ground Water Right (3681-A) for Well No. 6, which has a priority date of November 25, 1958 and authorizes a maximum instantaneous withdrawal of 2,000 GPM and annual volume of 3,200 acre feet. Well No. 6 is the only well with a water right certificate, issued by DOE.

Three groundwater applications have been filed by the City with DOE. Application G3-20191 was for Well Nos. 2, 3, 4, 5 and 6, with a priority of May 12, 1972, and a combined total annual volume of 3,800 acre-feet from all five wells. The application provides individual instantaneous flow rates for each well equal to 440, 800, 225, 950, and 1,500 gpm from Well Nos. 2, 3, 4, 5, and 6, respectively. Application G3-20192, for Well No. 7, was submitted on the same date as application G3-20191 and therefore, has the same priority date. This application was for a maximum annual volume of 2,400 acre-feet and maximum instantaneous flow rate of 3,000 gpm. Application G4-31201 was for Well No. 8, with a priority date of March 20, 1992. The maximum withdrawal rate under this Application is equal to 1,200 gpm, but there was no annual volume provided. Processing of these applications has stopped, and to this date, none of the applications have been converted to a permit and/or certificated right.

Copies of all the City of Toppenish 10-year renewable existing use permits issued by the Yakama Nation, and DOE water right certificates and applications are provided in Chapter 10 of this Plan.

The status of Toppenish's DOE issued water rights, as compared to their current and future water system demand, is shown in Table 4-9, Table 4-10, and Table 4-11. The excess and/or deficiencies in the City's current and projected future water demands compared to their existing and applied for water rights are also shown in these tables. As shown, the current water right status for the City is adequate to meet projected 20-year demand.

TABLE 4-9 EXISTING WATER RIGHT(S) STATUS

Permit Certificate or Claim #	Name of Rightholder or Claimant	Priority Date	Source Name/No.	Primary or Supplemental	Existing Water Rights		Existing Water Use From Sources (Year 2009)		Existing Water Right Status Excess (Deficiency)	
					Maximum Instantaneous Flow Rate (Qi) (gpm)	Maximum Annual Volume (Qa) (acre-feet)	Maximum Instantaneous Flow Rate (Qi) (gpm)	Maximum Annual Volume (Qa) (acre-feet)	Maximum Instantaneous Flow Rate (Qi) (gpm)	Maximum Annual Volume (Qa) (acre-feet)
Permits/Certificates										
1. 3681-A	City of Toppenish	11/25/58	Well No. 6, S06	Primary	2,000	3,200	195	281.9	1,805	2,918.1
2.										
				TOTAL	2,000	3,200	195[a]	281.9[b]	1,805	2,918.1
Claims										
1.										
				TOTAL						

Intertie Name – Identifier	Name of Purveyor Providing Water	Existing Limits on Intertie Water Use		Existing Consumption Through Intertie		Existing Intertie Supply Status Excess (Deficiency)	
		Maximum Instantaneous Flow Rate (Qi) (gpm)	Maximum Annual Volume (Qa) (acre-feet)	Maximum Instantaneous Flow Rate (Qi) (gpm)	Maximum Annual Volume (Qa) (acre-feet)	Maximum Instantaneous Flow Rate (Qi) (gpm)	Maximum Annual Volume (Qa) (acre-feet)
1.							
	TOTAL						

Pending Water Right Application	Name on Permit	Date Submitted	Primary or Supplemental	Pending Water Rights	
				Maximum Instantaneous Flow Rate (Qi) REQUESTED	Maximum Annual Volume (Qa) REQUESTED
1. G3-20191	City of Toppenish	May 12, 1972	Primary	Well No. 2: 440 gpm Well No. 3: 800 gpm Well No. 4: 225 gpm Well No. 5: 950 gpm Well No. 6: 1,500 gpm	3,800 acre-feet
2. G3-20192	City of Toppenish	May 12, 1972	Primary	Well No. 7: 3,000 gpm	2,400 acre-feet
3. G4-31201	City of Toppenish	March 20, 1992	Primary	Well No. 8: 1,200 gpm	NA

[a] Refer to Table 4-8 for total Yakama Nation permitted quantities for Well No. 6 and other City wells.
[b] Refer to Chapter 2 for annual volumes pumped from all other source wells.

TABLE 4-10 SIX YEAR WATER RIGHT(S) STATUS

Permit Certificate or Claim #	Name of Rightholder or Claimant	Priority Date	Source Name/No.	Primary or Supplemental	Existing Water Rights		Projected Year 2015 Water Use From Sources		Year 2015 Water Right Status Excess (Deficiency)	
					Maximum Instantaneous Flow Rate (Qi) (gpm)	Maximum Annual Volume (Qa) (acre-feet)	Maximum Instantaneous Flow Rate (Qi) (gpm)	Maximum Annual Volume (Qa) (acre-feet)	Maximum Instantaneous Flow Rate (Qi) (gpm)	Maximum Annual Volume (Qa) (acre-feet)
Permits/Certificates										
1. 3681-A	City of Toppenish	11/25/58	Well No. 6, S06	Primary	2,000	3,200	195	314.6[a]	1,805	2,885.4
2.										
				TOTAL	2,000	3,200	195[b]	314.6[c]	1,805	2,885.4
Claims										
1.										
				TOTAL						

Intertie Name – Identifier	Name of Purveyor Providing Water	Existing Limits on Intertie Water Use		Existing Consumption Through Intertie		Existing Intertie Supply Status Excess (Deficiency)	
		Maximum Instantaneous Flow Rate (Qi) (gpm)	Maximum Annual Volume (Qa) (acre-feet)	Maximum Instantaneous Flow Rate (Qi) (gpm)	Maximum Annual Volume (Qa) (acre-feet)	Maximum Instantaneous Flow Rate (Qi) (gpm)	Maximum Annual Volume (Qa) (acre-feet)
1.							
	TOTAL						

Pending Water Right Application	Name on Permit	Date Submitted	Primary or Supplemental	Pending Water Rights	
				Maximum Instantaneous Flow Rate (Qi) REQUESTED	Maximum Annual Volume (Qa) REQUESTED
1. G3-20191	City of Toppenish	May 12, 1972	Primary	Well No. 2: 440 gpm Well No. 3: 800 gpm Well No. 4: 225 gpm Well No. 5: 950 gpm Well No. 6: 1,500 gpm	3,800 acre-feet
2. G3-20192	City of Toppenish	May 12, 1972	Primary	Well No. 7: 3,000 gpm	2,400 acre-feet
3. G4-31201	City of Toppenish	March 20, 1992	Primary	Well No. 8: 1,200 gpm	NA

[a] Represents the maximum annual volume from Well No. 6 based upon the current maximum pump capacity.
[b] Refer to Table 4-8 for total Yakama Nation permitted quantities for Well No. 6 and other City wells.
[c] Refer to Chapter 2 for projected annual volumes from all other source wells combined

TABLE 4-11 TWENTY YEAR WATER RIGHT(S) STATUS

Permit Certificate or Claim #	Name of Rightholder or Claimant	Priority Date	Source Name/No.	Primary or Supplemental	Existing Water Rights		Projected Year 2029 Water Use From Sources		Year 2029 Water Right Status Excess (Deficiency)	
					Maximum Instantaneous Flow Rate (Qi) (gpm)	Maximum Annual Volume (Qa) (acre-feet)	Maximum Instantaneous Flow Rate (Qi) (gpm)	Maximum Annual Volume (Qa) (acre-feet)	Maximum Instantaneous Flow Rate (Qi) (gpm)	Maximum Annual Volume (Qa) (acre-feet)
Permits/Certificates										
1. 3681-A	City of Toppenish	11/25/58	Well No. 6, S06	Primary	2,000	3,200	195	314.6[a]	1,805	2,885.4
2.										
				TOTAL	2,000	3,200	195[b]	314.6[c]	1,805	2,885.4
Claims										
1.										
				TOTAL						

Intertie Name – Identifier	Name of Purveyor Providing Water	Existing Limits on Intertie Water Use		Existing Consumption Through Intertie		Existing Intertie Supply Status Excess (Deficiency)	
		Maximum Instantaneous Flow Rate (Qi) (gpm)	Maximum Annual Volume (Qa) (acre-feet)	Maximum Instantaneous Flow Rate (Qi) (gpm)	Maximum Annual Volume (Qa) (acre-feet)	Maximum Instantaneous Flow Rate (Qi) (gpm)	Maximum Annual Volume (Qa) (acre-feet)
1.							
	TOTAL						

Pending Water Right Application	Name on Permit	Date Submitted	Primary or Supplemental	Pending Water Rights	
				Maximum Instantaneous Flow Rate (Qi) REQUESTED	Maximum Annual Volume (Qa) REQUESTED
1. G3-20191	City of Toppenish	May 12, 1972	Primary	Well No. 2: 440 gpm Well No. 3: 800 gpm Well No. 4: 225 gpm Well No. 5: 950 gpm Well No. 6: 1,500 gpm	3,800 acre-feet
2. G3-20192	City of Toppenish	May 12, 1972	Primary	Well No. 7: 3,000 gpm	2,400 acre-feet
3. G4-31201	City of Toppenish	March 20, 1992	Primary	Well No. 8: 1,200 gpm	NA

[a] Represents the maximum annual volume from Well No. 6 based upon the current maximum pump capacity.
[b] Refer to Table 4-8 for total Yakama Nation permitted quantities for Well No. 6 and other City wells.
[c] Refer to Chapter 2 for projected annual volumes from all other source wells combined

4.3 WATER SUPPLY RELIABILITY ANALYSIS

4.3.1 Source Reliability

The single most important aspect of a water utility is its domestic water supply source. The City of Toppenish's water supply is dependent on ground water sources. As previously discussed in this Plan, the City utilizes five source wells. The locations of these wells within the water system are shown on Figure 3-1 and Map A enclosed in the back of this Plan.

All five City wells are located on property owned by the City. Currently, there are no known protective covenants filed for any of the wells establishing a 100-foot sanitary radius around each well. Copies of the property deeds for each well are provided in Chapter 10 of this Plan.

As discussed in Chapter 3 of this Plan, there has been little change in source well water quality from any of Toppenish's wells as demonstrated by inorganic chemical and volatile organic chemical monitoring over time. Toppenish has taken steps to protect its aquifers through completion and implementation of a Wellhead Protection Program. Completed in 1997, the program is intended to protect Toppenish's aquifers through a combination of regulatory measures, best management practices, and public education and awareness. Details of Toppenish's Wellhead Protection Program are provided in Chapter 5 of this Plan.

Based upon their recorded depths and available well log information, it is likely that all of Toppenish's wells withdraw water from either the Ellensburg Formation of the Overburden Unit or the Saddle Mountain formation. Although no well log is available for Well No. 3, it probably draws water from the Ellensburg Formation, because of its relatively shallow depth. The Overburden and Saddle Mountain hydrogeologic units are part of the Columbia River Basalt Group that underlies much of south-central Washington. This geologic formation consists of four distinct hydrogeologic units. Starting with the oldest, these four units are known as the Grande Ronde, Wanapum, Saddle Mountain (made up primarily of basalts of the same name, but also include sedimentary interbeds), and the Overburden Unit.

The Grande Ronde, Wanapum, and Saddle Mountain Units vary in thickness in South-Central Washington. Each unit is composed of numerous to several hundred individual basalt flows, which can range in thickness from a few inches to more than 300 feet, with sedimentary interbeds. Distinct, thick sedimentary interbeds separate the Grande Ronde, Wanapum, and Saddle Mountain Units. Further information on the geologic formations in the area can be found in the 1990 United States Geological Survey (USGS) study of the geologic framework of the Columbia Plateau Aquifer System. Excerpts from this study are provided in Chapter 10 for reference.

Locally, other municipalities and individuals utilize water primarily from the Ellensburg Formation of the Overburden Unit, and the other units, for domestic and irrigation supply. Consequently, many Yakima area communities have experienced diminishing capacities and/or lowering drawdown levels in their source wells over the past 5 to 10 years. However, Toppenish has not experienced significantly diminished capacity due to lowering drawdown levels in its wells.

Provided below in Table 4-12 is a brief description of each of the five Toppenish wells. Copies of the well logs are included in Chapter 10 of this Plan.

TABLE 4-12 TOPPENISH SOURCE WELL INFORMATION SUMMARY					
	Well No. 3	Well No. 5	Well No. 6	Well No. 7	Well No. 8
Source No.	S03	S05	S06	S07	S08
Date Drilled	1937	1952/1954	1959	1973	1994
Well Depth	188 feet	291 feet	863 feet	1,024 feet	250 feet
Casing Depth	187 feet	240 feet	863 feet	1,022 feet	239 feet
Static Water Level (1994)	14'-2"	14'-4"	Artesian	Artesian	15'-2"
Current Capacity	495 GPM	810 GPM	195 GPM	2,200 GPM	375 GPM

4.3.2 Water Right Adequacy

Toppenish's existing certified water rights of 2,000 GPM and 3,200 acre-feet per year and current Yakama Nation permitted quantities of 4,215 GPM are adequate to satisfy current demand. The projected future twenty-year demand will be satisfied through renewal and expansion of existing permitted quantities, as discussed previously in this Plan. Toppenish will pursue water conservation measures, continue its annual review of water production and consumption data, and evaluate the possibility of alternative and/or additional sources of supply.

4.3.3 Facility Reliability

The City of Toppenish's major water system components have been well operated and maintained. Most of the City's source well pumps have been in service 15 years or more and, with the exception of Well No. 8, have had no major problems or performance issues. Well No. 8 currently has some sand production issues, which has resulted in diminished capacity. Rehabilitation of Well No. 8 will be completed as a recommended system improvement, as discussed in Chapter 3. Currently the total capacity of Toppenish's source wells exceeds the maximum day demand of the system. However, in the future additional source capacity will be necessary to serve peak demand and improve system reliability.

Power outages in Toppenish are rare, and when they occur their duration is generally brief. To provide an additional measure of reliability, four out of five of Toppenish's source wells, including the City's largest source well, Well No. 7 (2,200 GPM), are currently outfitted with permanent engine generators that provide adequate power to run the well pumps and treatment equipment if there is a failure in the normal power supply.

4.3.4 Water Shortage Response Planning

The City currently has restrictive water usage as part of the City Water Code. Code Chapter 13.08.110 limits or forbids the use of water for irrigation, sprinkling, or sluicing upon such times, limits or conditions as the City council may determine following the publishing of a public notice in the legal newspaper of the City. During short-term water shortages, the City will also implement the following additional conservation measures:

- City restrictions on irrigation of parks;
- City curtailment of pool use;
- City restrictions on water main and hydrant flushing; and
- Requesting curtailment on non-essential commercial water use.

4.4 SOURCE OF SUPPLY ANALYSIS

If 20-year water use projections forecast that demand will exceed existing water rights, the purveyor is required to conduct a source of supply analysis. The purpose of the source of supply analysis is to evaluate opportunities to obtain or optimize the use of existing sources already developed and to evaluate other innovative methods to meet water needs. Toppenish's 20-year water demand projections will not exceed their existing, certified and permitted use quantities, but the following source of supply analysis may be valuable as projected growth occurs. This source of supply analysis includes an evaluation and discussion of the following items:

- Water Rights Changes;
- Interties;
- Artificial Recharge; and
- Evaluation of Water Reclamation/Water Reuse Opportunities.

4.4.1 Water Rights Changes

This measure involves examining opportunities to utilize existing water rights via change(s) in water right parameters (change in place of use, change in purpose of use, change in point of diversion or additional points of diversion or withdrawal). As Toppenish continues to grow and serve areas within their future service area, they will pursue the acquisition of water rights/permitted uses associated with each newly annexed property. In some cases, the City may need to apply for a change in type of use, or change in point of use of the particular water right. These acquisitions may include:

- Permitted domestic or industrial ground or surface water rights associated with the annexed property;
- Permitted irrigation ground or surface water rights associated with the annexed property (these may include those portions supplied by an irrigation district or company); and
- Ground water rights associated with individual residential property (the domestic exemption water rights).

Neighboring community water systems or permitted wells near the City of Toppenish were discussed in Chapter 1 and other sections of the Plan. To date, no discussions have taken place between the City of Toppenish and any of these neighboring and/or adjacent water purveyors, regarding acquisition their system or water right.

4.4.2 Interties

Currently, Toppenish has no interties with any neighboring water systems. The most likely future intertie between the City of Toppenish and other water systems would be between AB Foods or the Yakama Nation, as discussed previously in this Plan. AB Foods is currently an industrial service customer of the City. Some preliminary discussions have occurred between the City and AB foods; however, development of an intertie agreement has not begun. Given the unreliable demand history from AB Foods, it may be advantageous for both systems to develop an agreement in the future.

If a future intertie is proposed, it will require a detailed study of the proposed usage, physical capacity, source water quality and costs to determine its feasibility. The City will need to evaluate any proposed interties and develop an agreement with the other purveyor, obtain approval of the intertie from the Department of Health and the Department of Ecology, modify appropriate water rights to reflect the intertie, and incorporate the intertie into the Water System Plan. The intertie agreement would likely include the following elements:

- A discussion on the place of use as authorized in appropriate water rights documents;
- Identification of the specific time period(s) in which water will be provided;
- Quantification of the amount of water available for use;
- A discussion on seasonal or other restrictions on water availability; and
- A discussion of how water conservation programs, data collection, and other operational matters will be conducted and coordinated.

4.4.3 Artificial Recharge

Artificial recharge is the injection or infiltration of available surface water (usually from high winter flows) or other available water into an aquifer and its subsequent withdrawal. However, Toppenish has no surface water right to use for artificial recharge. Toppenish may acquire a surface water right through some future annexation, but the City would most likely put such a right to direct use rather than using it for artificial recharge.

4.4.4 Evaluation of Water Reclamation / Reuse Opportunities

This measure involves exploring opportunities for reclaimed water, reuse, non-potable water and greywater as an approach to providing additional water supply. Toppenish's sole source of reclaimed or reused water is the City's wastewater treatment facility. Reclaim and reuse of wastewater from Toppenish's wastewater treatment plant would involve identification of nearby facilities that could utilize the reclaimed water such as:

- Areas suitable for irrigation (cropland, parks, golf courses, freeway landscapes, school yards, and cemeteries);
- Wetland enhancement; and
- Groundwater recharge areas.

The most logical and practical reuse of reclaimed water from the Toppenish wastewater treatment facility would be to develop the infrastructure necessary to pump the reclaimed water back to the City for use in irrigating parks. This would require upgrading Toppenish's wastewater treatment facility to Class A reclaimed water standards and constructing a separate reclaimed water distribution system (pumps and pipeline) to deliver the reclaimed water to the various parks throughout the City. Irrigation of parks, although seasonal, would reduce annual water demand and lower demand during the critical summer period. However, at this time the costs associated with these improvements would be prohibitive compared to the benefit of using the reclaimed water.