

**Appendix G**  
**Water Shortage Response Plan**

City of Tumwater

# Water Shortage Response Plan

December 2009 Update

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## BACKGROUND

Water system planning, as required by WAC 248-54-065, provides the framework for making key water supply management decisions. An integral part of this comprehensive plan is the City's course of action in the event of possible water shortages. A water shortage can be described as any situation in which the water supply is insufficient to meet the demand. A shortage may occur for a number of reasons, including weather-related water shortage, natural or human-caused disaster, or other water system operating emergencies such as water contamination, pumping or storage issues. Poor system planning and water waste can contribute significantly to the risk of water shortage as well.

The objective of the Water Shortage Response Plan (WSRP) is to establish both procedures for monitoring factors that may contribute to potential water shortage conditions, and for managing water supply and demands in times of shortage. The WSRP is a resource for identifying appropriate demand reduction actions that are available and defines the potential individual circumstances that may trigger the implementation of these actions.

Events that may lead to a potential water shortage can be unique. While the WSRP is designed to take into account as many scenarios as possible, there may be unforeseen events or circumstances that may not be adequately planned for. The WSRP is intended as a framework of actions that will be tailored to meet the specific needs of a shortage situation. It is the goal of the WSRP to maintain essential public health and safety services, and minimize adverse impacts on the local economy and the environment.

## OVERVIEW

The City of Tumwater's drinking water supply comes entirely from groundwater sources. It is because of this that Tumwater's water supply is not typically influenced by short-term environmental drought conditions. The City's Water Comprehensive Plan, which includes the approved Water Conservation Plan, addresses the management of typical summer demand that may be associated with short-term drought.

This WSRP establishes procedures intended for use during unexpected periods of water shortage. There are several possible scenarios that could result in a shortage and impair the City's ability to meet water demand.

Although moderate short-term drought conditions are not likely to seriously affect Tumwater's capacity to adequately and reliably supply water, severe droughts of an extended period may affect the City's ability to produce and deliver an adequate volume of water.

Potential water shortages may also be the direct result of human activities and/or failure of components of the water system infrastructure. Some examples of this may be contamination of the water system, natural or human caused disaster, pump failure and water line breaks.

Any one of these scenarios, or a combination of scenarios could strain the ability to provide adequate water supply and require implementation of the WSRP. The specific criteria triggering the WSRP implementation is discussed later.

## IDENTIFYING THE LIKELIHOOD OF A WATER SHORTAGE

The City of Tumwater has 12 wells in operation. While groundwater supplies are generally protected from short-term environmental conditions, periods of sustained drought can impact the aquifer's ability to recharge, thus effecting both production capacities and instream flows. Quantifying available supply in comparison with demand is important in determining whether there is a trend toward a water shortage. To evaluate the possibility of a water supply shortage, the utility may look at the following indicators:

- ◆ Static water levels;
- ◆ Pumping water levels, drawdown, and aquifer response;
- ◆ Groundwater elevations;
- ◆ Aquifer characteristics, such as specific capacity and recharge;
- ◆ Well depth, construction, and pump limitations; and
- ◆ Historical well yield information.

These factors may have a direct and measurable impact on water supplies. In addition, less direct indicators such as water quality, weather forecasts, snowpack, and instream flows may also provide insight on water availability.

## WSRP COORDINATION

The Operations Manager and the Water Resources Program Manager have primary responsibility for identifying water system supply and demand conditions that may lead to a water shortage.

Upon identification of an individual trigger, the Operations Manager and Water Resources Program Manager will convene a meeting with a Water Shortage Response Group (WSRG) that will consist of these two individuals as well as the Water Resource Specialist, Water Resources Educator and the Drinking Water Lead Person. This group will evaluate and develop recommendations regarding the implementation of the WSRP. Any recommendations will then immediately be presented to the Director of Public Works, who will make the final determination as to whether the WSRP should be implemented. Once the WSRP implementation has been approved, the WSRG will coordinate as necessary with other departments and staff to implement the plan.

## WATER SHORTAGE RESPONSE PLAN STAGES

The WSRP involves four stages of phased response, to be implemented as conditions warrant. When possible, stages will be implemented progressively to provide City staff, cooperating agencies and the general public with reasonable warning that the next response phase is necessary. Depending on the severity of a water shortage, the City may use any or all of the options outlined in the following table, as well as other options that may not be specifically detailed in this report.

Water conservation is necessary to help the utility continually provide water for public health and safety purposes during drought or emergency conditions. The public shall be notified, as early as April 1 when indicators point to a supply problem, and at each stage thereafter. Initial notification will be by press release in

local papers, local radio and other media outlets and through the water utility bill. Notices will outline the severity of water shortage and actions that will be taken by the City to alleviate the situation.

The notification for critical Stages 3 and 4 will follow the above procedure in addition to a utility mailing independent of the regular utility billing, describing the extent of the shortage and steps individual homeowners and business owners may take to reduce their impact. The public should receive educational materials describing actions that can be taken to reduce consumption and promote future water conservation activities.

User restriction may be necessary during periods of moderate to severe water shortage conditions. Restrictions may include specific requests to curtail or eliminate unnecessary water usage by consumers, for example; restaurants may be asked to not serve water unless specifically asked, or residential customers may be asked not to wash their cars. User restriction will follow the schedule outlined in Table 1 below. The City can assist water conservation efforts by reducing irrigation of public parks and deferring hydrant and main flushing to a more suitable time. Penalization for those who repeatedly disregard conservation measures, including fines and/or disruption of service, should be examined in more detail.

**Table 1: Outline of Restrictions implemented based on shortage severity.**

Class Use	Stage 1: Advisory	Stage 2: Minor Shortage	Stage 3: Moderate Shortage	Stage 4: Severe Shortage
Essential Uses	Voluntarily Conserved	Voluntarily Conserved	Voluntarily Conserved	Restrictions Implemented
Social & Economic Uses	Voluntarily Conserved	Voluntarily Conserved	Restrictions Implemented	Restrictions Implemented
Non-Essential Uses	Voluntarily Conserved	Restrictions Implemented	Banned	Banned

Class use outlined above is determined by the overall need for water use. Essential use can be classified as those needed to: sustain human and pet life, maintain standards of hygiene and sanitation, maintain patient care in health centers, fire fighting, etc. Examples of social and economic uses are primarily commercial applications such as: commercial car washes, laundromats, restaurants, agricultural irrigation, schools, churches, motels, etc. Non-essential uses include: fountains, watering lawns and golf course fairways, washing sidewalks and buildings, personal car washing, etc.

## THE SHORTAGE

Conservation options should be implemented based on the severity of the water shortage condition. Stages of a water shortage and corresponding conservation measures are summarized below. Potential actions are discussed in more detail later in this report.

- ◆ **Stage 1: Advisory – Every summer.** Internal evaluation of conditions and coordination are initiated to determine the likelihood of shortage and facilitate next steps. The public is reminded that the WSRP is in place and seasonal or other conditions may warrant its implementation. The public is encouraged to use water wisely.

- ◆ **Stage 2: Minor Shortage – Voluntary Reductions.** This is the first step in reducing water consumption during a potential or actual water shortage. Based on previous studies, a 5% - 10% reduction in water consumption can realistically be achieved with a voluntary program.
- ◆ **Stage 3: Moderate Shortage – Mandatory Restrictions.** Under a mandatory program, it is possible to achieve a 10% - 20% reduction in water usage. An appropriate response at this level is to institute mandatory conservation measures, enforceable under the authority of ordinances, and revising the utility rate schedule.
- ◆ **Stage 4: Severe Shortage – Emergency Curtailment.** After implementing emergency curtailment measures, it is suggested that there will be an approximate 30% reduction in water consumption. Appropriate responses might include fixed allotments or percentage cutbacks, but should only be initiated in rare situations. This type of program will allow the City to conserve the maximum amount of water without creating hardship, and would have to be enforced through action by Council.

Table 2: Suggested Conservation Actions based on Severity of Shortage.

Stage	Water Shortage Condition	Consumption Reduction % Goal	Public Information Actions
1	Advisory	1-5	◆ Annual Water Conservation Messages
2	Minor: Voluntary Reductions	5 – 10	<ul style="list-style-type: none"> <li>◆ Prepare and distribute water conservation materials (bill insert, etc.)</li> <li>◆ Prepare and distribute technical conservation information to specific consumer types</li> <li>◆ Prepare conservation retrofit kits</li> <li>◆ Coordinate media outreach program</li> <li>◆ Issue news releases to the media</li> </ul>
3	Moderate: Mandatory Measures	10 – 20	<ul style="list-style-type: none"> <li>◆ Distribute conservation kits</li> <li>◆ Continue public information program</li> </ul>
4	Severe: Rationing Measures	20 - 30	◆ Continue public information program

Stage	Water Shortage Condition	Consumption Reduction % Goal	Utility Actions
1	Advisory	1-5	◆ Utilize wise water use practices
2	Minor: Voluntary Reductions	5 – 10	<ul style="list-style-type: none"> <li>◆ Increase enforcement of hydrant openings</li> <li>◆ Increase meter reading efficiency and meter maintenance</li> <li>◆ Promote intensive leak detection and repair program</li> <li>◆ Adopt ordinances banning water waste. An ordinance could address leaks, washing of paved surfaces; limiting fountains to those with recirculated water, street runoff; peak demand limits; irrigation runoff</li> <li>◆ Adopt ordinance allowing the water utility to declare an emergency requiring: fixed consumption allotments or cutbacks (rationing)</li> </ul>
3	Moderate: Mandatory Measures	10 – 20	<ul style="list-style-type: none"> <li>◆ Reduce water usage for main flushing, street cleaning, public fountains, and park irrigation.</li> <li>◆ Watering of parks, cemeteries, etc. restricted to nights or designated irrigation days</li> </ul>
4	Severe: Rationing Measures	20 - 30	<ul style="list-style-type: none"> <li>◆ All public water uses not required for health or safety prohibited unless using tank truck water supplies or reclaimed water supplies</li> <li>◆ Irrigation of public parks, cemeteries, etc. severely restricted.</li> <li>◆ Main flushing only allowed for emergency purposes</li> <li>◆ Reduce system pressure to permissible levels</li> </ul>

Stage	Water Shortage Condition	Consumption Reduction % Goal	User Restrictions
1	Advisory	1-5	◆ None
2	Minor: Voluntary Reductions	5 – 10	◆ Implement voluntary water use reductions
3	Moderate: Mandatory Restrictions	10 – 20	<ul style="list-style-type: none"> <li>◆ Implement ordinances banning water waste</li> <li>◆ Adopt landscaping irrigation restrictions incorporating one or more of the following: Time of Day (7pm – 7am), Weekly Frequency (odd/even days), Sprinkler bans (hand water only)</li> <li>◆ Commercial car washes should intensify voluntary use restrictions</li> <li>◆ Golf course irrigation should be restricted to 7pm-10am on irrigation days</li> </ul>
4	Severe: Emergency Curtailment	20 - 30	<ul style="list-style-type: none"> <li>◆ Implement an ordinance allowing utilities to declare a water emergency, and to require rationing</li> <li>◆ Car washing only permitted during specified watering hours of designated irrigation days</li> <li>◆ Times of day restrictions applied to commercial car washes</li> <li>◆ Golf course watering times and weekly watering limits reduced</li> <li>◆ Manage water consumption to stay within water allotments</li> <li>◆ Permissible watering hours and weekly frequency for landscaping irrigation further reduced</li> </ul>

Stage	Water Shortage Condition	Consumption Reduction % Goal	Penalties
1	Advisory	1-5	◆ None
2	Minor: Voluntary Reductions	5 – 10	◆ None
3	Moderate: Mandatory Restrictions	10 – 20	<ul style="list-style-type: none"> <li>◆ Warning</li> <li>◆ House call</li> <li>◆ Shut off and reconnect fee</li> </ul>
4	Severe: Emergency Curtailment	20 - 30	◆ Fines

## WSRP TRIGGERS

Individual triggers for the implementation of the WSRP can be infrastructure-based or environmental or human conditions. Environmental conditions that may trigger implementation of the WSRP are generally qualitative, and therefore a variety of indicators are used to regularly evaluate the conditions that may lead to water shortage.

Infrastructure-based triggers involve a comparison of water demand to production capabilities. Triggers are activated when current demand reaches varied percentages of production. The WSRG would evaluate whether or not to implement the corresponding phase of the Plan based on infrastructure triggers being reached.

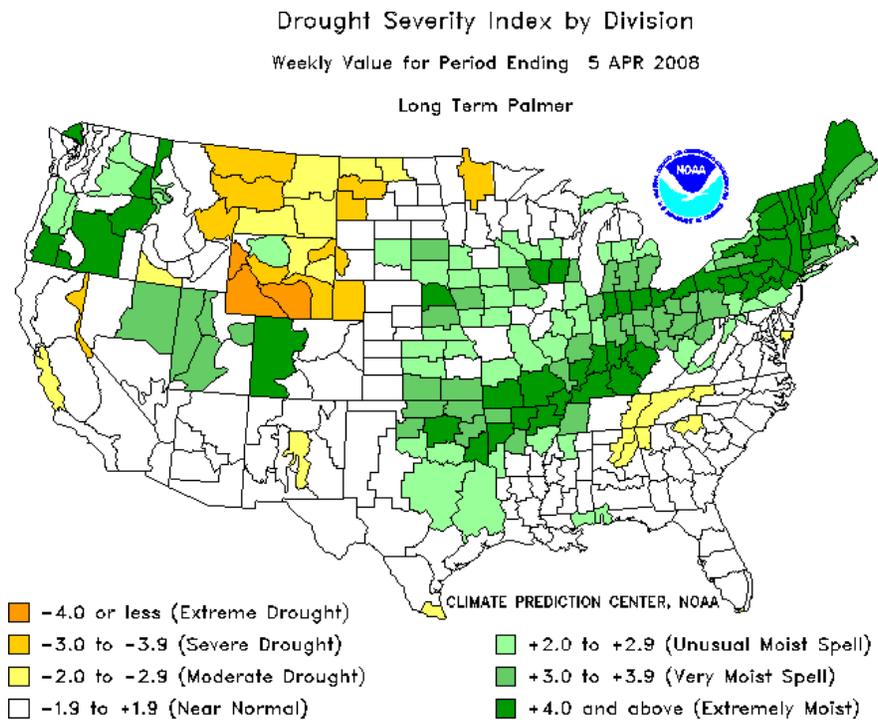
PALMER INDEX

[http://www.cpc.ncep.noaa.gov/products/analysis\\_monitoring/regional\\_monitoring/palmer.gif](http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/palmer.gif)

Developed by Wayne Palmer in the 1960s, the Palmer Index uses temperature and rainfall information in a formula to determine dryness. It has become the semi-official drought index used by the National Oceanic and Atmospheric Association (NOAA). The Palmer Index is most effective in determining long-term drought—a matter of several months. It uses a “0” as normal, and drought is shown in terms of negative numbers; for example, “-2” is moderate drought, “-3” is severe drought, and “-4” is extreme drought. The Palmer Index can also reflect excess rain using a corresponding level reflected by positive numbers; i.e., 0 is normal, “+2” is moderate rainfall, etc.

The advantage of the Palmer Index is that it is standardized to local climate, so it can be applied to any part of the country to demonstrate relative drought or rainfall conditions. Federal data is readily available to evaluate the Palmer index. Figure 1 represents the current Palmer Index readings for the entire United States, but shows Western Washington at near normal conditions, -1.9 to +1.9.

Figure 1: 2008 Palmer Index representing the United States (color)



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## INSTREAM FLOW & SNOWPACK

<http://waterdata.usgs.gov/wa/nwis/uv/?station=12079000>

[ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/wa\\_swepctnormal\\_update.pdf](ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/wa_swepctnormal_update.pdf)

[http://www.wcc.nrcs.usda.gov/cgibin/colusnow.pl?state=columbia\\_river](http://www.wcc.nrcs.usda.gov/cgibin/colusnow.pl?state=columbia_river)

Using charts and data collected by federal and state agencies, the City can determine whether a water shortage may occur in coming months. The USDA NRCS maintains a web site that evaluates stream flow forecasts. Using this information, and setting a determination level, will enable the City to evaluate the need for water shortage planning for summer months as early as February or March of any given year.

It is important to note that the Deschutes River is considered one of the “flashiest” rivers in that it is very responsive to precipitation events, therefore is not a good predictor of overall stream flows in later months. Stream flow records on the Deschutes should be monitored regularly to evaluate any trends.

Snowpack indices are a useful tool for understanding environmental conditions that may impact water supply in the following summer period; however, snow pack is not a major factor in consideration of recharge for Tumwater’s groundwater supply.

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## CLIMATOLOGIC DATA

<http://www.weather.gov/climate/getclimate.php?wfo=sew>

<http://www.wrcc.dri.edu/cgi-bin/cliMONtpre.pl?wa6114>

Records of precipitation and temperature at the Olympia Airport can be accessed readily and used to compare previous years. It is recommended to compare “water years” for consistent analysis. A water year spans from October 1 through September 30. The following is an example of data that can be acquired from the Olympia Airport.

**Table 3: Monthly Climate Summary - Olympia Airport, Washington (456114)**

Period of Record: 6/1/1948 to 10/31/09													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temp (F)	44.4	49.5	53.9	58.8	65.3	70.9	76.5	77.1	71.0	60.5	50.0	44.2	60.2
Average Min. Temp (F)	31.6	32.7	33.6	36.2	41.0	46.4	49.2	49.5	44.7	38.8	35.0	32.1	39.2
Average Total Precip (in.)	8.04	5.68	5.13	3.30	2.03	1.54	0.72	1.17	2.00	4.69	8.23	8.21	50.60
Average Total Snowfall (in.)	6.8	3.2	1.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.4	3.5	16.7

Table 4: Precipitation Data for 2006 – 2009 as compared to average monthly values.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2009	8.58	1.60	5.75	3.13	4.68	0.22	0.29	1.74	2.49	5.30	1.85		33.78
2008	6.69	4.01	4.83	2.33	0.48	1.41	0.42	1.86	0.27	3.36	9.36	5.05	40.07
2007	6.04	5.52	7.00	2.33	1.22	1.30	1.85	0.67	2.24	4.88	4.04	11.71	48.80
2006	15.86	3.44	3.57	1.89	2.36	1.64	0.15	0.13	0.69	1.43	19.68	9.10	59.94
Monthly Average	8.04	5.68	5.13	3.30	2.03	1.54	0.72	1.17	2.00	4.69	8.23	8.21	50.60

As precipitation declines into the summer months, triggers can be implemented upon the severity of the decline.

## GROUNDWATER MONITORING

<http://groundwaterwatch.usgs.gov/AWLSites.asp?S=465033122570202&ncd=>

The US Geologic Survey maintains a real-time groundwater monitoring well south of Tumwater. Screened at approximately 82’ below ground surface, groundwater response in this well can be estimated to react similarly to those of Tumwater’s production wells.

Groundwater levels in the 25-75% range (green) are considered normal, as compared to the monthly median. WSRP implementation should be considered when groundwater levels fall below the 75<sup>th</sup> percentile. Additional strategies would be warranted when groundwater levels reach the 50<sup>th</sup> and 25<sup>th</sup> percentiles.

## INFRASTRUCTURE CONSIDERATIONS

When demand exceeds the City’s ability to produce and/or deliver an adequate supply, such as during extended periods of drought, it may be necessary to implement the WSRP to ensure availability for essential uses, such as fire fighting. The Operations Manager will inform the Water Resources Program Manager that challenges exist and WSRG will be convened to determine which, if any, limitations to recommend to the Public Works Director.

Definitions for the trigger equation variables are as follows:

- ◆ **Useable Source:** A source of potable water supply that can be relied upon to pump water into the system at a moment’s notice. Tanks can be drawn down only a certain amount without affecting area pressures. Pumping time is limited by the amount of drawdown within the tanks, thus all well pumps within the water system do not pump for 24 hours. For the purpose of this plan, a pumping time of 22 hours for each source will be utilized.
- ◆ **Present Possible Production (P3):** The maximum well pumping time of 22 hours per day which is based on the available standby and operational reservoir storage capacity of the water system, expressed in

MGD units. The P3 will be reevaluated by the WSRP Team annually prior to June 1<sup>st</sup>, and the adopted P3 value shall be inserted as an Appendix to this plan.

- ◆ **Current Demand (CD):** The values reported daily on the Weekly Water Log. These values consider water pumped from wells and used from storage the previous day.

Example: To better illustrate how the triggers work, consider the following table. It lists values for current demand that represent triggers for several possible P3 values.

Table 5: Example of Infrastructure Trigger Implementation

Stage	If P3 = 9 mgd	If P3 = 10 mgd
1	Every Summer	Every Summer
2	8.1 mgd or greater for 3 days, or 8.55 mgd or greater for 1 day	9 mgd or greater for 3 days, or 9.5 mgd or greater for 1 day
3	8.55 mgd or greater for 3 days, or 8.73 mgd or greater for 1 day	9.5 mgd or greater for 3 days, or 9.7 mgd or greater for 1 day
4	9 mgd for 1 day	10 mgd for 1 day

## IMPLEMENTATION SCHEDULE

To determine whether a water shortage is likely for the summer months, investigations should begin early in the year, preferably February or March. Using the environmental indicators described above, a good estimate of conditions in summer months can be inferred. Public notification should commence in May or June to give sufficient time for consumers to adapt to the idea of a water shortage and review any educational materials offered by the City. Ideally, two months advance notice should be given. Public notices should contain information on when water conservation measures become effective, the severity of the condition and the possibility of reduced service. Refer to the chart below for an implementation schedule.

Under this schedule, implementation begins in early March unless conditions at that time do not suggest a risk of water shortage. Continual monitoring of water supply and consumption should take place without regard to a summer shortage on a monthly basis.

## WATER DEMAND AND ENVIRONMENTAL CONSIDERATIONS

Demand patterns are addressed in more detail in the Comprehensive Water System Plan. This information is provided as part of the water shortage analysis. The City of Tumwater currently has 6,567 service connections, of which 201 are used primarily for irrigation. The highest use of water is for residential service, consisting of 76% of the connections and consuming 45% of the water in 2008. The next highest consumer of water in Tumwater is the commercial sector, using approximately 29.3% of the total water production in 2008, but only making up 8.4% of service connections. Independent irrigation service accounts for 10.4 % of 2008 consumption but only 3 % of the connections. The remaining 15.3% of consumption consists of institutional uses such as Parks and Schools, as well as mobile home parks.

The Average Daily Demand (ADD), defined as the total volume of water consumed in one year divided by the number of days in a year, and will be used for comparison purposes. In 2008, the ADD, including “non-revenue” water, was approximately 2.90 million gallons.

Seasonal variations in water demands are primarily driven by weather conditions. The Peak Day Demand (PDD) generally occurs on or near the warmest day of the year, or within a prolonged period of warm, dry weather in July or August. The PDD is equal to the largest 24-hour demand that occurs in a calendar year. For forecasting purposes, a PDD can be estimated by multiplying ADD by 2.4, the peaking factor as described in Chapter 2 of the 2010 Water System Plan update. In Tumwater, the PDD for water consumption in 2008 was approximately 6.96 million gallons, or 4,833 gallons per minute.

## EARLY RESPONSE

Once a water supply shortage has been predicted based on the above analysis, the utility should take steps as soon as possible to reduce negative impacts on the water system, its customers and the environment. When indicators, such as snowpack and rainfall data from the previous year, point to a possible shortage, the utility should take steps to regularly monitor groundwater levels to determine the severity of the deficit. By late winter or early spring, the utility can compare data from federal agencies, such as the National Oceanic Atmospheric Association (NOAA) or USGS, to evaluate the appropriate water shortage response. Once the determination has been made, monitoring can begin.

## PRODUCTION MONITORING

The City, with the assistance of Thurston County’s Environmental Health program, monitors groundwater levels to determine the depth of the water table, defined as the elevation of water below ground surface. In addition, the USGS utilizes groundwater monitoring wells located south of Tumwater to observe current groundwater levels. This information is available at <http://groundwaterwatch.usgs.gov>. Between March and October of each year, this information is valuable in determining the rate at which groundwater levels are declining and the likely severity of a shortage.

Monitoring should also be conducted on the supply reservoirs within the City. Monitoring water elevation drawdown in select wells and reservoirs over a 24-hour period will give managers a good understanding of the production capacity of the wells and the ability of the reservoirs to recover after a significant drawdown during prolonged periods of high demand. Data collected from selected wells can be used to determine the specific capacity of the aquifer. This index is the rate of discharge of a well during pumping divided by the resulting drawdown of the water table due to pumping. Efficient wells in a good aquifer will yield a high result. As efficiency of either the well or the aquifer decreases, a possible supply shortage can be determined. Specific capacity data, collected over a long period, can also reveal possible mechanical deficiencies with the well.

## CONSUMPTION MONITORING

Once indication has been determined that a drought is imminent, hydrologic monitoring of groundwater supplies should commence immediately. As stated earlier, drought effects on groundwater supplies will be

evident in water table elevations and the ability to recharge storage tanks. As a final check, well data should be collected daily to determine the severity of a water shortage.

Once a deficiency has been noted, more frequent monitoring of production meters and use trends of larger customers, such as Pepsi Co., the City of Tumwater and Tumwater School District, should begin to determine the total amount of daily consumption for comparison. This data will provide not only the estimated daily consumption, but also reveal any losses within the system that can be augmented by corrections. If the situation is severe, limiting consumer use may be necessary. Water conservation measures should be implemented through spring and summer using a utility mailer, bill box messages and projects should be coordinated to assist consumers to control individual water usage.

Should the severity of a water shortage reach Stage 3, a mechanism for monitoring consumption will become a key element, should the City need to implement emergency curtailment measures through Stage 4. The utility should reinforce water conservation methods to a consumer that fails to follow guidelines set forth. In this situation, the utility would notify the customer that their usage is impacting the water supply and offer assistance to rectify the situation. Future failure of the consumer to follow shortage guidelines will result in action to be determined at that time, but can result in further usage limitations or a higher user fee during drought conditions.

#### ONGOING MONITORING

During shortages, it is important that the city continue its monitoring efforts to determine whether the situation is getting better or worse. Factors associated with water shortages can be used to reassess the need to further conservation actions.

## WSRP STAGE ACTIONS

### STAGE 1: ADVISORY

#### TRIGGER

- ◆ Every summer.
- ◆ Stream flow forecasts and Instream flows are 20% - 30% below normal as of March 1.
- ◆ Precipitation for October – March is 25% - 30% below normal by March 1.

#### OBJECTIVES

- ◆ Evaluate supply & demand conditions to determine if further implementation of the Plan is warranted.
- ◆ Initiate internal coordination to evaluate conditions and facilitate further implementation.
- ◆ Prepare City staff for a potential water shortage, thereby allowing adequate time for planning and coordination.
- ◆ Remind the public to use water wisely.

#### PUBLIC MESSAGE

This stage is non-critical and annually repetitive. Public message serves as a reminder to “use water wisely”.

#### ACTIONS

- ◆ The Water System Operator will compile data on a Weekly Water Production Report and route the report to members of the group to keep them informed of current demand and supply conditions.
- ◆ If a trigger has been met, the Water System Operator will assemble a meeting of the Work Group to develop a recommendation on whether to implement the WSRP.
- ◆ The Water Resources Specialist will work with the Water Resources Educator to develop and distribute a press release reminding the public that summer weather leads to increases in water demands and encouraging water conservation. The message should include a reminder that the City has adopted a WSRP that can be implemented if necessary.
- ◆ The Water Resources Specialist will develop a fact sheet outlining the WSRP and provide it to City customer service staff and the public, as requested, to allow for uniform, consistent dissemination of information to the public.
- ◆ Public notification should begin, explaining the possibility of summer drought conditions.
- ◆ Water utility will begin examination of system for deficiencies.
- ◆ Stage 2 Water Shortage measures should be prepared.

## STAGE 2: VOLUNTARY REDUCTIONS

### TRIGGERS

- ◆ Total indices continue to decline.
- ◆ Demand projections are determined to be at or near supply projections.
- ◆ Routine well water level monitoring suggests a lowered water table.
- ◆ System storage capacities are projected to be deficient.
- ◆ 90% of P3 for 3 consecutive days; or
- ◆ 95% of P3 for 1 day

### OBJECTIVES

- ◆ Inform City water customers of a water shortage and the need to reduce water use and eliminate water waste.
- ◆ Reduce water use to accommodate supply limitations through voluntary customer actions.
- ◆ Minimize or delay the need for more stringent demand or supply management actions.

### PUBLIC MESSAGE

“The City’s water supply situation warrants concern. Supply is lower than normal or alternatively, demand is higher than normal. Customers are asked to voluntarily reduce demand to avoid the need for more stringent actions in the future. We are relying on the support and cooperation of all water customers to reduce consumption by about 10% to stretch our available supply. Here is the watering prescription we ask that you follow...”

### ACTIONS

- ◆ Establish regular meetings for the WSRG and regular communications with the Public Works Director.
- ◆ WSRG will maintain regular communications with all City departments and staff to keep them up to date on conditions, goals, and City actions so they can provide accurate information to the public.
- ◆ WSRG will consider current and projected supply conditions and seasonal demand and set demand reduction goals that may be revised as necessary.
- ◆ Water utility should begin analysis of large consumers.
- ◆ Irrigation uses on City property and larger commercial outfits need to be assessed.

### PUBLIC OUTREACH

- ◆ Develop and implement a comprehensive public awareness and education campaign to keep customers informed about supply and demand conditions.

- ◆ Recommend customer actions to reduce demand, reinforce desired customer actions and remind customers that if goals are not achieved, mandatory restrictions may be necessary.
- ◆ Ask commercial customers to follow a watering schedule that reduces their water use by at least 10%.
- ◆ Make commercial customers aware of the potential upcoming need to reduce water use by 25%.
- ◆ Discourage businesses from allowing charity car washes on their property until water shortage conditions have subsided.

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#### INTERNAL OPERATIONAL ACTIONS

- ◆ Reduce all operating system water uses (flushing, truck washing, etc.) to essential levels.
- ◆ Reduce irrigation at City-owned and managed landscapes. Reduce or eliminate seasonal plantings.
- ◆ Reduce washing of all City fleet vehicles.
- ◆ Implement reasonable adjustments to pressure zones to maximize supply.
- ◆ Stage 3 Water Shortage measures should be prepared.

## STAGE 3: MANDATORY RESTRICTIONS

### TRIGGERS

- ◆ 95% of P3 for 3 consecutive days; or
- ◆ 97% of P3 for 1 day
- ◆ Total storage drops below level required to meet demand.
- ◆ System inflows continue to be low.
- ◆ Weather forecasts predict a trend of a continuing warm, dry period.

### OBJECTIVES

- ◆ Achieve targeted demand reduction goals by restricting defined water uses.
- ◆ Ensure that adequate water supply will be available during the duration of the water shortage to protect public health and safety.
- ◆ Minimize the disruption to customers while meeting target demand reduction goals.

### PUBLIC MESSAGE

“In order to ensure that an adequate supply of water remains available to maintain public health and safety, it is necessary to impose mandatory water use restrictions. We continue to rely on the support and cooperation of the public to reduce water demand by 25% through compliance with these restrictions.”

### ACTIONS

- ◆ The WSRG will recommend to the Public Works Director the move to the Mandatory stage, and adopt mandatory restrictions. The WSRG will recommend the nature, scope and timing of restrictions.
- ◆ Implement water use restrictions, as developed by the WSRG. The following list serves as the baseline for water use restrictions. The exact restrictions used will depend on the situation and may change as the severity of the situation changes:
  - Prohibit all watering during the warmest hours of the day, between 9am and 7pm.
  - Prohibit use of outdoor ornamental fountains using potable water.
  - Prohibit car washing except at commercial car wash facilities that recycle water.
  - Prohibit washing of sidewalks, streets, decks or driveways.
  - Limit pressure washing of buildings to situations that require it as part of a scheduled building rehabilitation project (e.g. painting).
  - Prohibit water waste, including untended hoses without shutoff nozzles, obvious leaks, and poor irrigation design.

- Implement the process for receiving, recording and responding to reported violations of restrictions. Enforcement procedures will be implemented to assess fines where mandatory restrictions are not followed.
  - Increase enforcement actions in accordance with the applicable ordinance approved by City Council.
  - Provide training for staff for the purpose of increasing enforcement patrols.
  - Notify the Police Department regarding enforcement of curtailment actions and coordinate with them regarding the need for additional enforcement assistance.
  - Evaluate resources and plans for moving into the Emergency Curtailment stage.
- ◆ Public notification of the possibility of Stage 4 measures.

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## PUBLIC OUTREACH

- ◆ Through direct mail and media campaign communicate:
  - Scope and nature of mandatory restrictions
  - Reasons for imposing restrictions
  - Demand reduction goals and ways to achieve those goals
  - Pending additional restrictions if goals are not met
  - Enforcement mechanisms and fines
  - Projections for how long restrictions will be in place
  - Provide area landscape management and property management companies with water use restriction information.
  - Contact irrigation customers using potable water and inform them that the City may shut off their irrigation meters in the event of an extreme water shortage situation.
  - Post updated status reports on the City web site.
  - Establish a “Customer Hotline” for residents to report violations of restrictions.

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## INTERNAL OPERATIONS ACTIONS

- ◆ City-owned property irrigation will be restricted and will meet or exceed irrigation reduction goals being asked of the public.
- ◆ Enhance aquifer and water quality monitoring actions as necessary.
- ◆ Continue Stage 3 measures. Prepare for Stage 4 implementation.

## STAGE 4: EMERGENCY CURTAILMENT

### TRIGGERS

**At this stage, triggers indicate that a critical water situation exists and that without additional significant curtailment actions, a shortage of water for public health and safety will be imminent.**

- ◆ 100% OF P3 FOR 1 DAY
- ◆ Conditions described for Stage3 continue.

### OBJECTIVES

- ◆ Ensure that throughout the water shortage, and adequate water supply exists to protect public health and safety.
- ◆ Sharply reduce water demand.
- ◆ Restrict certain defined water uses in order to meet demand reduction goals.
- ◆ Ensure water quality remains at the highest level possible.

### PUBLIC MESSAGE

“A water supply emergency exists. Severe restrictions on water use are necessary to maintain adequate water supplies essential for basic health and safety. Restrictions will be strictly enforced. Your continued cooperation is requested. We need to reduce water use by 50%.”

### ACTIONS

- ◆ The WSRG will define the water shortage as an emergency and through the Public Works Director, implement procedures for the Council to formally declare a Water Shortage Emergency.
- ◆ The WSRG will recommend to City Council through the Public Works Director a list of water use restrictions, prohibitions and exemptions for consideration. Restrictions and prohibitions may include any of the following:
  - Residential customers are allowed to water only 1 day per week.
  - Commercial/large irrigators are allowed to water only one day per week or must submit and implement a plan that would reduce irrigation water use by at least 50%.
  - Prohibit use of any ornamental fountains using potable water for operation.
  - Prohibit car washing except at commercial car wash facilities that recycle water
  - Prohibit use of potable water for pressure washing.
  - Prohibit filling or adding potable water to swimming pools at public and private facilities.

- Prohibit the use of water in training exercises and flushing activities by the Fire Department.
- Prohibit all lawn/turf irrigation
- Prohibit all irrigation of gardens and ornamental landscapes
- Prohibit irrigation of new landscapes as well

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## PUBLIC OUTREACH

- ◆ Through a media and direct mail campaign communicate to City customers the:
  - Scope and nature of rationing and curtailments
  - Reasons for imposing curtailments
  - Water use reduction goals
  - Enforcement mechanism and fines, and
  - Projections for how long curtailments will be in place
- ◆ Clearly identify and communicate exemptions from water use curtailment, such as for medical facilities and other public health situations.
- ◆ Inform customers about possible pressure reductions and problems this may cause.
- ◆ Provide area landscape firms with water use curtailment information to facilitate their compliance and ability to explain the need for compliance to their customers.
- ◆ Post updated status reports on the City website.

## WSRP RECOMMENDATIONS

To enhance the City's ability to respond effectively to an emergency water shortage condition, the following recommendations are made:

- ◆ Review penalty options for waste of water and/or disregard of WSRP implementation actions.
- ◆ Draft and adopt ordinances prohibiting water waste
- ◆ Draft and adopt ordinances authorizing the water utility to declare an emergency requiring fixed consumption allotments and percentage cutbacks (rationing).
- ◆ Develop a program to routinely monitor the specific capacity of the aquifer and production wells.

## PLAN PREPARATION INFORMATION

Tim Wilson, *Water Resources Specialist*, updated this Water Shortage Response Plan on November 17, 2009. Reviewers include: Jay Eaton, *Public Works Director*, Dan Smith, *Water Resources Program Manager*, and Steve Craig, *Superintendent of Public Works*.

## IMPORTANT NUMBERS

### CITY OF TUMWATER

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#### PUBLIC WORKS OPERATIONS:

Steve Craig, Superintendent of Public Works

W (360) 754-4150 x151

H (360) 705-0166

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#### PUBLIC WORKS ENGINEERING:

Dan Smith, Water Resources Program Manager

W (360) 754-4140 x149

C (360) 870-6938

Nhan Vo, Engineer III

(360) 754-4140 x146

Tim Wilson, Water Resources Specialist

(360) 754-4140 x345

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#### LARGE CONSUMERS:

Tumwater School District

Butch Sweet, Operations Manager: (360) 709-7727

City of Tumwater Parks

Chuck Denney, Parks Director: (360) 754-4160 x.165

City of Tumwater Facilities

Jeff Vrabel, Facilities Operations & Maintenance Manager: (360) 754-4211 x.218

Pepsi Co, Inc.

Mark Plowman: (360) 357-5303 x. 129

## MANDATORY RESTRICTIONS ENFORCEMENT PROCEDURAL CHECKLIST

- ◆ Determine number of warnings before a penalty is applied;
- ◆ Self-duplicating “Notice of Violation” forms printed; one copy to leave at the property, one to record violation with billing;
- ◆ Staff with customer service and communication experience assigned to “Water Watch”;
- ◆ Establish procedure for “Water Watchers” to record warnings and penalties on customer accounts;
- ◆ Establish “hotline” for customers to report violations; to help avoid frivolous reports, recorded message should note that only complaints with the name and address can be responded to;
- ◆ Vehicles for “Water Watch” made available; vehicles that are signed as “Water Watchers” will increase visibility and effectiveness of enforcement;
- ◆ High priority routes established, e.g., areas with large lawns;
- ◆ All field and customer service staff provided with “fact sheets”, question and answer sheets, briefed on restrictions, enforcement procedures, field staff trained on tagging obvious violations.

## ASSESSMENT OF PENALTIES

Penalties will be assessed to help the City water utility manage demands only where an emergency has been declared and reasonable efforts to seek demand reduction by communicating with customers have not resulted in the needed demand reductions. Penalties are intended to provide an additional incentive for customers to reduce demand and an important public relations message that the cooperation of all customers is needed to meet the emergency.

**Penalty Procedure** – Emergency penalties will be established to provide an additional incentive for water customers to reduce individual consumption in the event of an emergency declaration. Customers and actions exempt from this rule are outlined below under commercial or residential customer headings.

Initial contact will be made by Public Works Water Resources staff after visual confirmation of the violation has been made by staff and/or receipt of complaint has been made and confirmed by staff. Initial contact will be in person or by a phone call, to explain the restrictions in effect and the observed use of water in contravention of the restrictions; to ask the customer the reason for the

excessive use of water, and to ask them to refrain from the activities causing the violation, such as irrigation or vehicle washing. The staff person making the initial contact will inform the violator of the procedure that will be followed by the City for future complaints or violations.

After initial contact has been made, and if no resolution has been agreed to with the customer, the violation will be logged on file with the Water Resources staff as a **First Violation**. If there are any future violations at the same customer site, the owner/operator of the site will be subject to the terms of the violations outlined below. Multiple violations occurring on the same day will be treated as one violation. Each separate daily violation, and each day any violation is committed or permitted to continue, will be considered a separate offense as follows:

- **Second Violation:** Whenever a violation of any use restriction is a second offense, the violator will be issued a written warning notice describing the violation, requiring immediate cessation of the violation, and advising that future violations will result in penalties. This Notice of Violation will be delivered in a fashion so that there is a record of delivery, such as registered mail or hand delivered with date and initials of recipient noted. All notices of violations will be processed by the city's Public Works department. There will be no monetary penalty for the second violation.
- **Third, Fourth & Fifth Violation:** When a violation of any use restriction is a third, fourth or fifth offense, the violator shall be issued a Notice of Violation, which will describe the violation, state which offense (3<sup>rd</sup>, 4<sup>th</sup>, or 5<sup>th</sup>), require immediate cessation of the violation, and set forth the amount of the penalty to be imposed. In the case of 3<sup>rd</sup>, 4<sup>th</sup>, and 5<sup>th</sup> offenses, a penalty will be imposed as follows:

<u>Violation</u>	<u>Penalty</u>
3 <sup>rd</sup> Offense	\$50.00
4 <sup>th</sup> Offense	\$150.00
5 <sup>th</sup> Offense	\$350.00

- **Sixth and Subsequent Violations:** Any violation of any use restriction that is a 6<sup>th</sup> or subsequent violation, a penalty of \$400.00 per violation will be imposed.

If any monetary penalty is imposed under the structure above is not paid within 30 days from the issuance of the Notice of Violation, the penalty will be added to the water utility bill for the site, and collected in the same manner as delinquent accounts.

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## ENFORCEMENT

The Director, or his/her designee, is authorized to enforce the provisions of this section and any adopted use restrictions; the Director shall have the authority to authorize other city employees and departments to enforce such provisions and restrictions as deemed necessary, in consultation with the City Administrator.