



WATER SHORTAGE RESPONSE PLAN

2018

TACOMA  **WATER**
TACOMA PUBLIC UTILITIES

Water Shortage Response Plan



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1. Introduction

In the event of weather patterns or water system operating emergencies that challenge Tacoma Water's ability to meet customer demand while maintaining guaranteed minimum stream flows in the Green River, Tacoma Water is prepared to implement this Water Shortage Response Plan (WSRP).

The WSRP:

- Reinforces Tacoma Water's objectives to be environmentally responsible and well prepared to serve our customers when dealing with water shortage and system problems.
- Complements existing water conservation programs and provides guidelines and options to address extended low flows in the Green River or reduced availability of groundwater.
- Provides a menu of possible responses to emergencies such as loss of well capacity or loss of transmission capacity because of major water main or pumping system disruptions.

Underlying the objectives of the WSRP are the need to preserve essential public services while it minimizes adverse effects on public health and safety, community and utility economic activity, environmental resources, and quality of life. Depending on the severity of the water supply shortage, Tacoma Water may implement one or more stages of the WSRP.

Section 12.10.150 of the Municipal Code regarding the "Interruption of Service" authorizes the Director of Tacoma Public Utilities or the Tacoma Water Superintendent "to change, reduce or limit the time for, or temporarily discontinue the use of water." In addition, the ordinance states that "the Public Utility Board is authorized to adopt and/or amend a Water Shortage Response Plan ("Plan") applicable to all classes of customers, which Plan is consistent with the standards in this section."

Customer compliance with the WSRP is a condition of continued water utility service by Tacoma Water.

In order to foster coordination and cooperation during a drought, this WSRP was written to be consistent with Seattle Public Utilities' Water Shortage Contingency Plan.

i. Purpose

This WSRP is a guide for Tacoma Water regarding the best management of Tacoma Water's supplies for the duration of any type of water shortage. The WSRP outlines many of the actions available to reduce customer water demand, with primary focus on non-essential water use and additional actions that Tacoma Water may adopt to reduce supply-side uses of water.

While typical water conservation programming involves ongoing promotion of efficient water use, this WSRP is a short-term tool to organize reductions in water demand in concert with appropriate supply augmentation. The WSRP is designed to complement the Tacoma Water's Integrated Resource Plan, Water System Plan, and agreements such as the Muckleshoot Settlement Agreement (MIT) and Habitat Conservation Plan (HCP).



Depending upon the severity of the water shortage affecting the Green River, drought coordination meetings between Tacoma Water, local, state and federal resource agencies, the Muckleshoot Indian Tribe and U.S. Army Corps of Engineers may be required to “fully explore all alternatives that will allow the maintenance of guaranteed minimum stream flows” and to institute “consensus derived” water-use restrictions. Before reducing river flows at the Auburn gauge below 250 cfs, Tacoma Water is required to institute water-use restrictions consistent with Tacoma Water’s HCP and MIT.

ii. Droughts and System Emergencies

A water shortage, as it applies to Tacoma Water’s supply system, is a temporary and insufficient flow of water in the Green River and/or a lack of groundwater supplies that cannot be offset by supply of water from other portions of Tacoma Water’s well, reservoir and distribution system. The Green River flow is measured at the U.S. Geological Survey stream gauges at Palmer (USGS #12106700) and Auburn (USGS #12113000). Such a shortage may be caused by insufficient snowpack and precipitation within the watershed, an insufficient volume of water available in the supplemental groundwater system, or both.

Water shortages can occur at any time, but Tacoma Water generally categorizes droughts according to their seasonal influence. A spring drought actually occurs during summer but develops during the spring, usually because of low snowpack combined with lower-than-normal spring rains. Because there is minimal precipitation in summer, watershed conditions prior to summer govern streamflow during summer. A fall drought is much more difficult to foresee because it is caused by delayed fall rains. When dry summer conditions extend into fall, streamflow continues to decline, which can be particularly critical because salmon spawning begins in fall. Tacoma Water has experienced more fall droughts than spring droughts.

Water shortages related to system operating emergencies are not as predictable. Shortages may result from failures of major transmission mains; loss or failure of multiple wells, pump stations or water treatment systems; or contamination of the Green River upstream of the intake. Any major loss of a significant source of supply may require Tacoma Water to implement one or more stages of this WSRP. Response to earthquakes, mud slides, lahars, floods, contamination, power or communication failures, civil or employee disturbances, and terrorist attacks are covered in greater detail in the Tacoma Water Emergency Operations Plan.

iii. Water Sources

Tacoma Water gets its water supply from several sources. Most water comes from the Green River, under a 1912 water right claim, known as the First Diversion. An additional water right on the Green River, known as the Second Diversion, is associated with the Second Supply Project. A large wellfield in South Tacoma provides additional water when needed, along with several other minor wellfields in the Tacoma area. Together, the wells can provide as much as 55 mgd for short periods, or smaller amounts for longer periods. Tacoma Water also has a wellfield located alongside the North Fork of the Green River that is used as a substitute for river water. This source does not provide additional capacity and is generally available only during periods of higher-than-average precipitation. Details of each of these sources is provided below:

The FDWR allows Tacoma to divert up to 113cfs from the natural flow of the river, and requires Tacoma to maintain 250 cfs in the Green River at the Auburn Gage. Tacoma Water’s First Diversion is a very reliable source, although it there are times when it may provide less than 73



mgd in the fall in dry years when natural river flows are low. Also, if the natural river flow falls below 73 mgd, Tacoma Water must reduce its diversion.

The Second Diversion Water Right (SDWR) makes 100cfs of water available but is limited by instream flow limits. At the Palmer gage, located just downstream of the Headworks, natural river flows must be at least 200 cfs in summer and 300 cfs in winter before SDWR water can be diverted. At the Auburn gage, there needs to be at least 400 cfs in summer in order for SDWR water to be diverted from the natural, or run-of-the-river. So, access to this water is usually not available in the summer (when flow conditions will not allow it). However, as part of the Additional Water Storage Project, this water right may be stored behind the Howard Hanson Dam in the spring, for use in the summer and fall. SDWR water which has been placed in storage at Hanson Dam can be released and used as needed.

Operations during the spring refill period and the storage season are carefully managed to balance the environmental and human needs on the river. The Corps chairs an ongoing advisory committee (Green River Flow Management Committee – GRFMC) consisting of resource agencies, the Muckleshoot Tribe, Tacoma Water, boaters and other recreational interests, and state and county government agencies. Water management decisions are made on a collaborative basis, within the framework of the Corps' operational requirements.

As mentioned above, Tacoma Water is required to provide adequate water to support instream flows during summer and fall to protect fish habitat, which means that Tacoma Water will either need to reduce its diversion or use water stored in Howard Hanson Reservoir to support streamflow. Tacoma Water has reduced its diversion in two types of situations. The most serious is when the Howard Hanson Reservoir is in danger of being depleted of stored water and the only remaining water is natural flow. Tacoma Water has reduced its diversion to as low as 25 mgd in this situation, which is very rare. A much more common situation is when Tacoma Water has voluntarily curtailed the diversion in the fall to leave additional water in the river for fish. This may reduce the diversion to as low as 36 mgd for a month or more.

Tacoma Water's South Tacoma wells are another important source of water and are typically used for peak water demands during the summer. If they are run for long periods in the summer, peaking capacity is reduced. Typical wellfield use in recent years has been as high as 12,000 AF per year. The wellfield can maintain pumping at about 45 mgd for a sustained period of time. Pumping at high rates requires the use of several wells that are generally not used because of water quality considerations. Using the wells extensively early in the season will reduce their available capacity later in the season because well water levels decline.

iv. Water Supply Planning in Tacoma

The ability to predict how much water will be available from various sources is important for both near term and long range planning. Tacoma Water needs to be able to determine that sufficient supply will be available to meet expected demands, and on a long term basis, forecasting is used to determine available system capacity and how much unused capacity is available to sell, as well as the timing of when additional sources are likely to be needed.

We monitor weather, climate, many different system parameters, and websites that offer very sophisticated and time-tested tools to determine the status of the water supply. The Operations Engineers are constantly in-touch with all aspects of system operation, and are in constant

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communication with the internal and external sources regarding issues that could affect water supply. Powerful sources of information provided by outside agencies are available in the form of publically accessible web sites. Our Engineers scan these sites, and many others, on at least a weekly basis (more often as needed):

- [Palmer Gage](#)
- [Auburn Gage](#)
- [Climate Prediction Center \(CPC\)](#)
- [CPC - Forecasts](#)
- [CPC - 3 Month Outlooks](#)
- [CPC - Palmer Drought Severity](#)
- [CPC - Drought Monitoring](#)
- [NOAA - Historical Palmer Indices](#)
- [Cliff Mass Blog](#)
- [NOAA - River Forecast Center](#)
- [USDA - Snow Update](#)
- [And Others](#)

Tacoma Water's Water Supply section routinely monitors weather, the web sites mentioned above, and actual water supply conditions throughout the year. At different times of the year, different factors become more or less important to a given year's water supply prediction.

In winter, a useful indicator of current and future conditions is the snowpack in the Green River watershed. Tacoma Water uses snowpack information as a means of anticipating streamflows in late spring and early summer. Snowpack keeps the ground saturated in the watershed, much like a saturated sponge. Even after the snowpack is gone, water continues to drain from the soil to provide base river flows well into the summer. The same effect can occur from spring rainfall that keeps the soil saturated until the dry season arrives. For purposes of providing adequate base river flows in summer, either the snowpack or the spring rains can be sufficient. In a year with low snowpack, adequate spring rainfall becomes especially important.

v. Drought Definition and Prediction

All droughts originate from a decrease in the amount of precipitation resulting from some type of weather pattern. If the weather pattern lasts a short time (a few weeks to a couple months), the drought is considered short-term. And if the weather or atmospheric circulation pattern causes decreased precipitation that last for several months (to several years), the drought will be considered to be a long-term drought. During times when a drought is anticipated, there are several different methods of determining our water supply status. Tacoma Water uses information from several sources to arrive at a decision as to whether the Water Shortage Response Plan is to be implemented (or our status is to be changed).

A proven index that is used by many organizations to ascertain the drought status on a broad region-wide basis is the Palmer Index. Of the many quantitative measures of drought that have been developed, the Palmer Index (or derivations thereof) is applicable to many (if not all) regions of the country, and is referred to by many different types users, including many water supply managers. The Palmer Index has actually evolved over time into several different measures that each perform slightly different calculations and provide nuanced different results. The indices of interest to the water industry are: the Drought Severity Index (PDSI), the Palmer Hydrological Drought Index (PHDI), the Palmer Z Index and the Crop Moisture Index (CMI).

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These indices have proven to provide very good and consistent indications of drought for fairly large geographic areas. They are superior to other drought indices in many respects because they account not only for precipitation totals, but also for temperature, evapotranspiration, soil runoff and soil recharge. So these indices have become an important resource for determining the water supply conditions that may be encountered in a given year.

In addition, Tacoma Water has created and implemented an Integrated Resource Plan (IRP), which will assist with supply security decisions. A Water Yield, Supply, and Demand Model (WYSDM) is being developed to use data and projections to estimate available water during the current year. This model will also provide capacity planning, by determining the probability Tacoma Water will be supply constrained in any future year (up to approximately 60 years out). The IRP also includes a groundwater system analysis, a water conservation program assessment and update, participation of a Public Advisory Committee, and a written report with an action plan.

1.1. The Plan

The Water Shortage Response Plan includes four stages of response related to droughts or other supply shortages. These include Preparation (Stage 1), Voluntary (Stage 2), Mandatory (Stage 3), and Emergency (Stage 4). Stages 1 through 3 will be used in response to droughts and water system disruptions, and Stage 4 will be used in response to extreme drought conditions, or critical system failures or disasters.

During a drought, Stages 1 through 3 will be implemented in sequence based on Tacoma Water's evaluation of current and projected conditions. Conditions may include weather, climate forecast, streamflow, rainfall, reservoir storage level and anticipated fish runs. As conditions increase in severity through the three stages, consultation and collaboration with related resource and water management agencies will also increase. Actions of the previous stages will remain in effect in each successive stage. Water supply or use patterns could also be affected enough to impose Stages 2 or 3 without implementation of prior stages by a water system disruption, or by a volcanic eruption that emits ash affecting Tacoma Water's service area.

Tacoma Water's wholesale customers are expected to develop a water conservation and water shortage response plan for their own planning purposes or to follow Tacoma Water's conservation program implementation process and Water Shortage Response Plan. In particular, these agreements include a provision that wholesale customers will assist and support emergency curtailment measures required to manage demand during an emergency or shortage.

Following is an outline of the communications, utility operations and demand management objectives associated with each stage of the WSRP. Potential conservation, media, operational strategies, and impacts and mitigation for all stages are outlined in the following sections. It is expected that the Tacoma Water Superintendent will be in regular communication with the director of utilities, Public Utility Board and City Council as conditions warrant, and will seek concurrence of Board and Council members for various actions, as required.

This Water Shortage Response Plan (WSRP) provides guidelines for Tacoma Water (TW) to manage water supply and demand in the event of a water shortage. The WSRP enables TW to



maintain essential public health and safety and minimize adverse impacts on economic activity, environmental resources and the region's water use preferences. Water shortages could result from forecasted, progressive events such as droughts, as well as immediate crises such as system failures like a major infrastructure break.

This document complements and supplements TW's 2018 Integrated Resource Plan, the 2018 Water System Plan and updates TW's 2006 Water Shortage Response Plan. The WSRP will be reviewed and revised as needed during the next Water System Plan update anticipated in 2027, or may be updated as appropriate.

1.2. WSRP Organization

This WSRP is comprised of the following chapters:

1. Introduction: This chapter provides a general overview of the WSRP, including a description of the water shortage response stages and the WSRP implementation process.

2. Implementation Considerations: This chapter provides context for many of the elements in Chapters 3 and 4 and describes the background, details, and nuances of many aspects of the WSRP. The organization of this chapter largely mirrors that of Chapters 3 and 4.

3. Implementation for a Progressive Event: This chapter describes how the WSRP would be used in a progressive event, such as a drought, and is intended to be operational in nature. It describes what needs to be done in each water shortage response stage and assigns implementation responsibilities. For each stage, the following subjects are covered:

- Triggers
- Objectives
- Stage Activation
- Demand Reduction Goal
- Key Public Messages
- Coordination and Communication Actions
- Water Quality and Supply Management Actions
- Retail Customer Demand Actions
- Wholesale/Partner Actions

4. Implementation for an Immediate Crisis: This chapter is similar to Chapter 3, however it focuses on implementing the WSRP when an event, such as an earthquake, or other major event hinders TW's ability to supply enough water to meet customer demands, and requires immediate action.

1.3. Overview of Water Shortage Response Stages

The WSRP has four water shortage response stages – Preparation (stage 1), Voluntary (stage 2), Mandatory (stage 3), and Emergency (stage 4) – which are typically implemented progressively depending on the magnitude of the water shortage. In the event of an immediate crisis, the WSRP may be activated at one of the more aggressive stages. Each stage contains a variety of strategies for managing aspects such as supply, utility operations, customer actions, and communications. The four stages of the WSRP are described below. The key aspects of each stage are provided in Table 1.

- **Preparation Stage (Stage 1)** – Tacoma Water will implement Stage 1 when potential water supply problems exist and when early indications are that additional steps will be needed if conditions deteriorate.



The WSRP typically begins in the Preparation Stage when TW recognizes there is a potential for a water shortage. At this stage, TW implements supply management actions, as well as formal planning activities including possible use of the ICS framework for improved coordination with other City of Tacoma departments, State agencies, and customers. No customer action is requested at this stage. However, customers and the media may start to inquire about the potential for a water shortage and TW should be ready to answer questions. The authority to enter the Preparation Stage, which in most cases will activate the WSRP, lies with the TW Superintendent.

- **Voluntary Stage (Stage 2)** – Tacoma Water will initiate Stage 2 when available water sources are not expected to be sufficient to support normal demands (based upon Tacoma Water’s current water demand forecast and current usage) and adequate support of instream flows. Actions from Stage 1 will probably remain in effect. The objective of this stage is to encourage Tacoma Water’s customers to further reduce water use.

If supply conditions worsen, the WSRP moves to the Voluntary Stage. This stage relies on the voluntary cooperation and support of customers to meet target reduction goals. During the Voluntary Stage, specific voluntary actions are suggested for residential and commercial customers. The suggested customer actions are a combination of standard conservation practices (e.g., avoid watering mid-day) and curtailments that request customers to reduce their water use, which may result in sacrifice (e.g., take a shorter shower). The level of that sacrifice will depend on the severity of the water shortage. The authority to enter the Voluntary Stage lies with the TW Superintendent.

- **Mandatory Stage (Stage 3)** – Tacoma Water will implement Stage 3 when available sources combined with voluntary demand reductions are not expected to be sufficient to support projected demands and provide adequate support of instream flows.

The objective of Stage 3 is to limit or prohibit non-essential water-uses. Restrictions will be determined based on the season of the year, targeted demand levels and other considerations. Because implementation of Stage 3 can create severe economic impacts, the Superintendent will have the authority to waive or exempt customers who comply with and meet exemption criteria. Some actions from Stages 1 and 2 may remain in effect if they assist in meeting the required water-use reduction.

If the Voluntary Stage does not produce needed water use reductions, or if supply conditions worsen, the Mandatory Stage would be implemented. This stage prohibits or limits certain actions, which may be accompanied by an enforcement plan, which could include fines for repeated violation, as well as exemptions. The customer actions in this stage reflect a more aggressive approach that requires deeper levels of customer sacrifice (e.g., restricting outdoor watering). This stage may also include rate surcharges, although careful consideration would be required of the impacts of those charges compared to the balance in TW’s Revenues. The authority to enter the Mandatory Stage lies with the TW Superintendent.

- **Emergency Stage (Stage 4)** - An emergency water supply shortage could arise as a result of a major catastrophic event such as an earthquake of significant magnitude. Critical situations include the loss of the Tacoma Water Headworks or Tacoma Water’s



primary transmission mains. A triage response would be required if a catastrophe were to affect all or significant portions of Tacoma Water's water supply system. Refurbishing damaged facilities and supply lines while maintaining an effective a level of water service is the objective of Stage 4.

Weather-related implementation of Stage 4 could occur as a result of a major or extended drought, especially if it culminates during high-water demand months or is coupled with another critical situation that affects either the available water supply, treatment or distribution system. Maintaining an effective level of water service is the objective of Stage 4 when it is the result of severe or extended drought.

Some actions from the previous stages would remain or go into effect if they assist in meeting the required water-use reduction. Tacoma Water may need to provide water through contracted water supply trucks or by partial operation of the water system. Reduced system pressure can be expected to occur. Intermittent water supply to parts of the city may be available with a "boil water" order if safe water quality cannot be ensured. Commercial and industrial water use may be curtailed except for public health and safety needs.

This stage addresses the most severe need for demand reduction and includes a combination of mandatory actions and rate surcharges. This would be the last stage used to address a progressive situation, such as a drought of increasing severity, or to respond to an immediate crisis, such as a major facility failure. The authority to enter the Emergency Stage lies with the TW Superintendent.

1.4. Overview of Implementation Process

After determining that a potential for a water shortage exists, implementation of the WSRP begins with activation of the plan, which includes three steps. The first step is for the TW Superintendent (or his/her designee) to identify a TW staff member to lead the water shortage response effort.

The second step is to stand-up the ICS team structure, which is a team of TW staff whose role is to evaluate conditions, advise the Superintendent on supply and demand actions, and make assignments to TW staff, as needed, to respond to the shortage. The team should consist of representatives from a broad range of work groups that can provide insight and will be impacted including, but not necessarily limited to, supply, operations, demand management, communications, and finance. Suggested Water Shortage Response Team roles to be filled are provided in Appendix A. The third step is for the Superintendent to communicate the nature and scope of WSRP stage actions and strategies to the Tacoma Public Utility Board (prior to activating the WSRP, if possible) and receive their input. Once the WSRP is activated, the Tacoma Water Public Advisory Committee (TWPAC) may be called to meet. In this context, the TWPAC is a team of key customers and stakeholders whose role is to advise TW on requests or actions made to customers regarding utility water shortage response actions and programs. The TWPAC consists of representatives from a broad range of perspectives that can provide insight as to how proposed actions may impacts customer groups. Membership is provided in Appendix B.

Once the WSRP is activated, a two-prong effort ensues. One prong is focused on implementing the initial stage (typically the Preparation Stage). The other prong is to begin planning for

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possible implementation of a subsequent stage. Typically, a minimum of two weeks is recommended before moving to a new stage, although four weeks may be more realistic to allow for carefully considered decision-making and appropriate planning time. When considering moving from one stage to another, the decision inputs are the same as for initiating the WSRP and include consultation with the Water Shortage Response Team (which is an ICS structure) and evaluation of possible customer response.

A key aspect of implementing the WSRP is determining how and when to ramp down the stages and/or exit the plan. As soon as actual and forecasted supply conditions substantially improve, TW will either inform the public of the return to normal use of water, or inform them that the utility is moving to a lesser stage of this WSRP. This latter process would occur until there was a return to normal operations. Stages could be skipped in this process as conditions and forecasts warrant.

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Table 1: Water Shortage Response Plan – Summary Actions

Component	Stage			
	1	2	3	4
	Preparation	Voluntary	Mandatory	Emergency
Hallmark	<ul style="list-style-type: none"> Formal planning internally Supply management actions No widespread customer outreach 	<ul style="list-style-type: none"> Voluntary customer demand reductions 	<ul style="list-style-type: none"> Mandatory water use restrictions Potential fines and/or rate surcharges 	<ul style="list-style-type: none"> Increased mandatory water use restrictions Potential fines and/or rate surcharges
Trigger	<ul style="list-style-type: none"> Serious potential for water shortage 	<ul style="list-style-type: none"> Supply conditions worsen Future outlook is not predicted to improve, or worsens 	<ul style="list-style-type: none"> Supply conditions worsen Future outlook is not predicted to improve, or worsens 	<ul style="list-style-type: none"> Supply conditions worsen, or system critical failure Future outlook is not predicted to improve, or worsens
Objective	<ul style="list-style-type: none"> Prepare for Voluntary Stretch and optimize supply 	<ul style="list-style-type: none"> Achieve demand reduction Stretch, augment and optimize supply Prepare for Mandatory 	<ul style="list-style-type: none"> Achieve demand reduction Stretch, augment and optimize supply Prepare for Emergency 	<ul style="list-style-type: none"> Achieve demand reduction Stretch, augment and optimize supply
Demand Reduction Goal	<ul style="list-style-type: none"> None (stage is internally focused) 	<ul style="list-style-type: none"> Determined by Water Shortage Response Team 	<ul style="list-style-type: none"> Determined by Water Shortage Response Team 	<ul style="list-style-type: none"> Determined by Water Shortage Response Team
Key Public Messages	<ul style="list-style-type: none"> None (stage is internally focused) 	<ul style="list-style-type: none"> Moving to Voluntary Need customer assistance to meet demand reduction goal Request suggested demand reduction actions 	<ul style="list-style-type: none"> Moving to Mandatory Mandatory water use restrictions & potential rate surcharge Certain exemptions apply 	<ul style="list-style-type: none"> Moving to Emergency Increased water use restrictions & potential rate surcharge Possible water quality concerns
Coordination & Communication	<ul style="list-style-type: none"> Form Water Shortage Response Team Call-up Tacoma Water Public Advisory Committee Develop communication/ 	<ul style="list-style-type: none"> Implement communication/ outreach plan Implement coordination with key stakeholders 	<ul style="list-style-type: none"> Implement communication/ outreach plan Implement coordination with key stakeholders 	<ul style="list-style-type: none"> Implement communication/ outreach plan Implement coordination with key stakeholders

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Component	Stage			
	1	2	3	4
	Preparation	Voluntary	Mandatory	Emergency
	outreach plan			
Water Quality & Supply Management	<ul style="list-style-type: none"> Optimize supply Ready seldom used and emergency supplies 	<ul style="list-style-type: none"> Ready or activate seldom used and emergency supplies; as appropriate Investigate interties 	<ul style="list-style-type: none"> Activate seldom used and emergency sources, as appropriate Activate interties, as appropriate 	<ul style="list-style-type: none"> Activate seldom used and emergency sources Activate interties
Retail Customer Demand Actions	<ul style="list-style-type: none"> None (stage is internally focused) 	<ul style="list-style-type: none"> Request voluntary demand reduction actions Request demand reduction actions from City Dept.'s Restrict new hydrant permits 	<ul style="list-style-type: none"> Provide Mandatory demand reduction actions (& exemptions), including enforcement Require demand reduction actions from City Dept.'s Rescind hydrant permits Potential rate surcharges 	<ul style="list-style-type: none"> Provide mandatory demand reduction actions (& exemptions) Require demand reduction actions from City Dept.'s Potential rate surcharges
Wholesale/ Partner Customer Actions	<ul style="list-style-type: none"> Activate their WSRP's 	<ul style="list-style-type: none"> Move to Voluntary in their WSRP's Outreach to their retail customers Activate alternative sources, if appropriate 	<ul style="list-style-type: none"> Move to Mandatory in their WSRP's Outreach to their retail customers, including enforcement, as appropriate Activate alternative sources, if not already done 	<ul style="list-style-type: none"> Move to Emergency in their WSRP's Outreach to their retail customers, including enforcement, as appropriate Activate alternative sources, if not already done

2. Implementation Considerations

2.1. WSRP Principles

TW has learned a great deal over the years about how best to operate the utility during water shortage events, while minimizing impacts to customers and instream resources.

This knowledge is reflected in this WSRP, and articulated in the following principles:

- **Plan Should Be Flexible:** Each water shortage situation has enough unique characteristics that a plan cannot specifically define all the scenarios and specific supply and demand management actions. The usefulness of a Water Shortage Response Plan lies in planning the range of supply and demand management actions in advance of the situation and in defining the communication mechanisms by which decisions will be made during the event.
- **Solutions considered should consider responsible Supply-side alternatives as well as Demand-side alternatives**
- **Shortage Inconvenience/Disruption Should Be Shared:** A key assumption of this plan is that the level of disruption, cost and risk must be shared among all beneficiaries of the water resource. For example, instream flow levels below normal minimums at locations specified in the Green River would be resorted to only after human water consumption is curtailed. Additionally, all wholesale utilities obtaining water from the TW system should participate in management of the shortage. Similarly, all customer sectors should participate.
- **Conservation Vs. Curtailment:** Given the highly-effective long-term regional Conservation Program operated by TW, it is important to distinguish between the short term curtailment actions necessitated by a water shortage event, and the conservation actions TW regularly promotes to its customers. Conservation focuses on long-term efficiencies which do not adversely affect customers' accustomed use of water, whereas curtailment actions involve short-term water use reductions or restrictions that can create hardships.
- **Voluntary Preferred Over Mandatory:** Customers prefer the opportunity to meet targeted demand reduction levels through voluntary compliance actions. The decision to move to mandatory restrictions is more acceptable if the voluntary approach has been tried first, but has not resulted in sufficient demand reduction.
- **Safeguard Water Quality:** It is essential to closely monitor water quality during water shortages and particularly during a warm weather drought. This applies to water quality in rivers as well as to the drinking water provided to customers. Water quality issues must be considered for drinking water and instream uses when supply management decisions are made. The TW water distribution system is designed to carry a large capacity of water during summer peak months and for potential firefighting. If demand is significantly lowered, coupled with warmer temperatures, water quality can significantly degrade and should be monitored and managed more carefully than typical.

2.2. Types of Drought

Droughts are the most common reason this WSRP would be implemented. Droughts are naturally occurring, unpredictable weather events of varying frequency, duration and severity. The area served by the Tacoma's water supply system has experienced several short-term droughts. Available data indicate a very low probability of a multi-year drought.



To understand the impact of drought, it is important to understand how the raw water mountain storage reservoir in the system is operated. The reservoir operates with an annual refill and drawdown cycle.

Operations during the spring refill period and the storage season are carefully managed to balance the environmental and human needs on the river. The US Army Corps of Engineers (Corps) chairs an ongoing advisory committee consisting of resource agencies, the Muckleshoot Tribe, Tacoma Water, boaters and other recreational interests, and state and county government agencies. Water management decisions are made on a collaborative basis, within the framework of the Corps' operational requirements.

During the winter, the reservoir is kept essentially empty to provide a “flood pocket” to reduce downstream flooding and river scour. In the spring, it is refilled by melting snow and rain. During the summer, the level decreases because water use outstrips replenishment from rain. During the fall, the levels increase as water use decreases and fall rains return. The reservoir is drawn down to essentially be empty in the late fall to be ready for its flood control mission. Drought affects this cycle and can cause water shortages. Every year, this raw water reservoir starts as empty and must fill and drain independent of the previous year. There is no “carry-over” storage in this reservoir.

The types of droughts that affect the Tacoma's water supply system range from poor snowpack accumulation in the winter, to dry hot summers, to delayed onset of rains in the fall. Details on these three types of droughts are provided below. Since the nature of these droughts varies, TW's response will also vary. Examples of past drought events that resulted in TW activating its WSRP are provided in Appendix C.

2.2.1. Winter/Spring Drought (Low Snowpack)

Droughts in the winter and spring are characterized by low snowpack. While low snowpack may not lead to poor water supply conditions if ample spring rains occur, caution is used in managing the water supply in these situations because long range rainfall is inherently difficult to forecast. Low snowpack can occur when mountain temperatures are warm, when precipitation is below average, when intense rainfall events melt low to mid-elevation snow, or through a combination of these factors. TW attempts to manage for these types of droughts in several ways. Tracking El Niño events, which are typified in the Pacific Northwest by warmer and drier than average winter conditions, can alert water managers to the increased potential of a winter/spring drought. The use of Adaptive Management on the Green River, varying the rate at which water is stored and released, based on real-time snowpack measurements and other factors, in these types of droughts helps to ensure that the reservoir is as close to full as possible at the start of the summer drawdown cycle. When winter/spring drought conditions result in low water supply availability, implementation of the WSRP may be necessary because the potential for water use reductions by customers is greater in the spring and summer, there is much uncertainty about impending summer weather which is so influential on demand, and weather forecasts of when the fall rains will begin are not reliable. These conditions generate uncertainty about whether water stored in the spring will be sufficient to meet demands until supplies are replenished in the fall. This can make implementation of the WSRP in the spring and summer necessary, despite the fact that in some of these years no water shortfall actually develops.

2.2.2. Summer/Fall Drought (Hot, Dry Temperatures)

Droughts in the summer and fall are characterized by drier conditions and hotter temperatures. This typically results in both decreased supply and increased demand. Supply is decreased because less rain results in less inflow into the reservoirs. Demand is increased because outdoor water use (mostly irrigation) is higher at this time of year. TW attempts to manage for these types of droughts by carefully monitoring summer demands and water supply. Unfortunately, it is not possible to accurately predict in advance the timing and amount of the fall rains. A key management tool for this type of drought is helping customers to reduce outdoor irrigation use.

2.2.3. Fall/Early Winter Drought (Delayed Fall Rains)

Droughts in the fall and early winter are characterized by the fall rainy season developing later than normal. This can result in the storage reservoir being depleted to fairly low levels. Fall droughts are particularly challenging because that is when water demands for fish habitat needs are especially high and when the ability for people to reduce water use is limited since the irrigation season is ending. TW attempts to manage for these types of droughts using a number of water supply tools, as mentioned in the Water Supply Planning section above (Section iv).

2.3. Trigger Considerations

As mentioned above, TW continuously monitors water supply conditions to meet the operational objectives of providing water for municipal use and instream aquatic habitat (fisheries) management. To deal with hydrologic uncertainty in real-time and in longer term planning horizons, TW uses a number of informational and data gathering sources and forecasting tools. TW contracts with the U.S. Geological Survey (USGS) to provide continuous streamflow monitoring and data collection services. Strategic placement of USGS stream gauging stations provides real-time information for understanding the hydrologic state of the water supply and river systems. Through the National Oceanic and Atmospheric Administration (NOAA), TW regularly monitors daily weather forecasts (National Weather Service Seattle Forecasting Office), mid-range weather forecasts (National Centers for Environmental Prediction), 30-day and 90-day and multi-season climate outlooks (Climate Prediction Center), and daily hydro-meteorological forecasts (Northwest River Forecast Center in Portland, Oregon). The internet provides access to vast amounts of additional useful information to assist TW in forecasting. For example, NOAA's web information on El Niño/La Niña provides a wealth of timely information on current and forecasted El Niño and La Niña conditions with enough lead time for water resource managers to prepare for such events.

TW also uses an in-house computer model known as the Water Yield – Supply and Demand Model (WYSDM). The WYSDM model is regularly updated with meteorological and hydrological data, and can simulate the current state of the watershed and water supply system. The model is used to analyze and assess various future reservoir operating scenarios, both in real time and in near- and long-term operational planning, based on probabilistic analysis of nearly 104 years of historic weather. TW intensifies ongoing monitoring of water supply conditions during potential water shortage. This information is part of what is used to help determine when to activate the WSRP and when to move between stages. The following factors may be considered in these decisions:

- Hydrologic conditions including snowpack, precipitation and the Palmer Index
- Total supply availability, including groundwater, interties, and instream flow levels
- Amount of storage in the raw water reservoir compared with typical amounts for a given date

- Short- and long-term weather and hydrologic forecasts
- Computer modeling of streamflow and reservoir storage, for different weather and demand assumptions
- Trends and forecasts of the system's daily water demands
- Demand reduction goals
- Estimated margin of safety provided by the demand reduction, compared with the level of risk assumed if no action is taken
- Increased operating costs of potential actions and the value of lost water sales revenue, compared with the increased margin of reliability

2.4. Demand Reduction Considerations

2.4.1. Demand Reduction Actions

A key strategy to managing a water shortage event is having customers reduce their water use. The WSRP does not pre-identify specific demand reduction actions for each stage. Rather a comprehensive list of potential actions customers can take to reduce water use is provided in Appendix E. The actual actions requested or required for each stage will depend on the severity, likely duration, and timing of the shortage, as well as the demand reduction needed. There are several criteria for deciding which demand reduction actions are appropriate during a water shortage:

- **Magnitude of Savings:** Will the action result in enough savings to make a meaningful difference?
- **Timing:** Can the action produce results in the necessary timeframe?
- **Duration of Event:** What is the anticipated duration of the event (e.g., customers may tolerate certain mandatory curtailments if the event is expected to last a few weeks rather than months)?
- **Season:** Is the action relevant to the time of year (e.g., banning lawn watering during summer irrigation season vs. during non-irrigation season)?
- **Costs:** How severe are the cost implications of the action to the customer relative to the need for action?
- **Enforcement:** For mandatory curtailment actions, is it desirable and practical to enforce the action?
- **Equity:** Do the suite of actions cover all customer sectors and types of uses?

2.4.2. Exemptions

Appendix G provides background and a framework for developing and implementing exemptions to customer water use restrictions that are part of the Mandatory and Emergency stages of the WSRP.

2.5. Demand Reduction Goal Setting

Providing a demand reduction goal signals to the public the severity of the situation and provides a metric for which to measure success. The demand reduction goal should be set so that it can reasonably be achieved with the demand reductions actions requested or required. Because the level of demand reductions and actions will vary for each event, the WSRP does not prescribe a metric or reduction level. Metrics and goals used in past water shortage events can be considered for future events. Factors to consider in selecting a metric and goal are:



- **Measurable:** Data need to be readily available to report out in a timely fashion on achievement towards the goal.
- **Understandable:** The metric and goal should be easy to explain to customers and the media, and performance should be easy to communicate via simple graphics. Customers should be able to understand how their actions will help achieve the goal.
- **Meaningful:** The goal should be set at a level matching the severity of the event, especially to demonstrate significant customer participation prior to any lowering of instream flows to below normal minimum.
- **Reasonableness:** The goal should reflect the reduction potential associated with the demand reduction actions and time of year. If there are key uncertainties, consider using a range instead of an absolute number.
- **Scalable:** If conditions worsen to the next stage, then the goal should be changed to reflect the need for greater demand reductions, given the time of year.
- **Consistency:** As appropriate, use a metric and goals that are consistent with neighboring utilities.

2.6. Coordination and Communication Considerations

2.6.1. Relationship to Wholesale Customers' WSRPs

There are more than 500 thousand people living in the areas served by TW, our Partners, and our wholesale water customers. TW provides water to in many areas of Pierce County and a small part of south King County. TW has contracts with 15 wholesale customers, and 3 Second Supply Project (SSP) Partners. Water shortages affect TW's retail customers as well as TW's Partners and wholesale customers and their respective retail customers.

TW's water wholesale contracts include a provision that wholesale customers will assist and support actions required to manage demand during a shortage or an emergency. When TW activates its WSRP; it will request that each wholesale customer also activate their WSRP. This plan has been developed by TW, in consultation with its wholesale customers and other participants, based on the premise that an effective demand management strategy must be regionally consistent. This is based on several considerations:

- **Shortage Should Be Shared:** Shortage and risk must be shared among all beneficiaries of the water resource, including all water utilities obtaining water from the Tacoma water supply system.
- **Unified Message:** A unified/regional message and approach is easier to understand and distribute through the media, which is key in communicating information to the public.
- **Consistency Aids Forecasting:** Consistency makes it easier for TW to forecast demand reductions, which is essential to effectively manage the system during a water shortage.

2.6.2. Coordination with Key Resource Management Agencies

The Washington State Department of Ecology has authority regarding statewide drought declaration. Early and consistent communication with Ecology, which advises the Governor's Office, is important to ensure that the actions and public messages take into account conditions of the Tacoma water supply system. TW should participate in the meetings of the State's Water Supply Advisory Committee to better understand statewide drought conditions, coordinate on messages, and provide input on the status of the Tacoma's water supply system.



TW's staff also work closely with members of other city, local, state, federal and tribal resource agencies, including Tacoma Power, Pierce County, Washington State Department of Fish and Wildlife, Washington State Department of Ecology, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, National Marine Fisheries Services, Muckleshoot Indian Tribe, and Puyallup Tribes. This coordination typically occurs at the Green River Flow Management Committee.

2.6.3. Coordination with Neighboring Jurisdictions

TW will communicate and coordinate with neighboring jurisdictions – especially Seattle and Everett – to ensure, to the extent practical, that the timing of plan activation and requests to customers are linked when appropriate and provide opportunities for regional messaging.

2.7. Water Quality and Supply Management Considerations

2.7.1. Managing Instream Flows

The management of stream flows downstream of TW's water storage and diversion facilities is a critical consideration in managing water resources during water shortages. In addition to meeting the needs of TW's retail and wholesale customers, the Green River is managed to protect instream resources.

TW has ongoing formal and informal agreements with state, federal and local resource agencies, Indian Tribes and the U.S. Army Corps of Engineers that help guide how it manages stream flows. Streamflow management in the Green River is governed by the Habitat Conservation Plan (HCP), and other agreements. As previously described (see section iii above), these agreements provide guaranteed flow regimes, as well as adaptive features to ensure that water is released from TW's storage reservoirs in a manner that provides beneficial conditions for salmon and other species downstream of the reservoirs. The protective provisions of the governing agreements are particularly important during droughts and associated periods of low stream flow.

2.7.2. Reservoir Management

The operational flexibility allowed by TW's stored water is key, with plans for how and when to use the water changing as conditions and forecasts change. Water is stored behind Howard Hanson Dam in the spring, and as the water is being stored at a rate not to exceed the Second Diversion water right rate of 100 cfs, it may be withdrawn at a later date, at any rate. Therefore, when needed in the peak season, water from the Green River source may be used at a rate that is limited only by pipe/plant capacity. At times when there is little snowpack, or minimal spring precipitation and low soil moisture, the water stored in the reservoir becomes even more important.

2.7.3. Alternative Water Supplies

Depending on the nature and timing of a water shortage, alternative or emergency water supplies may be useful to supplement existing supplies. TW has several options available:

- **Eagle Lake:** Pumping of up to 4000 acre-feet of water into Eagle Gorge Reservoir
- **Starting and Running of seldom used wells:** Several wells in the TW inventory are not normally run due to a variety of factors, these may be started and used
- **Use of Partner Storage:** Purchase of Partner water stored in Eagle Gorge Reservoir



- **Interties:** Since water supply problems may not affect all water suppliers in the region to the same extent, it is sometimes feasible for TW to obtain water from other providers (Partners or Wholesale connections) through interties. An intertie was recently installed in 2018 to allow Lakehaven Water & Sewer District to Supply a portion of the water we serve to our NE Tacoma area.
- **Reclaimed Water:** In the future, in order to reduce demand for potable water and lessen the impact of shortages on the community, reclaimed water (which is highly-treated effluent) may be used in certain situations/locales instead of potable water for irrigation, street washing, construction purposes, etc.,. This will need to be explored.

2.8. Financial Considerations

Reducing water demand as needed to address a water shortage event can reduce revenues at a time when there is an increased need for these funds to cover costs associated with implementing the WSRP. Accordingly, the following issues should be considered.

- **Reprioritize Current Revenue:** This consists of reducing revenue contributions to the capital program and lowering the year end operating cash target. These are the most flexible resources to offset revenue and expenditure problems.
- **Reprioritize Expenses:** Reducing planned operations and maintenance expenditures can ease the demand on revenues or free up money to meet unexpected needs.
- **Rate Surcharge:** In the mandatory and emergency stage, rate surcharges can be used to send a strong signal to customers to reduce water use. Rate surcharges can also help to make-up revenues lost due to decreased demand.
- **State Drought Relief Funds:** In a Washington State emergency drought declaration, funds in the form of grants or loans may be available to TW to mitigate the impacts of a water shortage.

3. Implementation for a Progressive Event

For each stage, the following information is provided. Note that if a particular stage is not entered into progressively, actions listed in the previous stage(s) may be appropriate as well.

1. **Triggers** – Describes the general, qualitative conditions that would trigger the stage. Note there are no pre-determined, quantitative conditions that trigger stages.
2. **Objectives** – Describes the overall objective of the stage.
3. **Stage Activation** – Describes who has the authority to enter the stage (TW Superintendent).
4. **Demand Reduction Goal** – Discusses the general, qualitative nature of the goal for the stage. Note there are no pre-determined, quantitative demand reduction goals for each stage.
5. **Key Public Messages** – Describes the key public messages for the stage. The messaging work is led by the Communications Lead.
6. **Coordination and Communication Actions** – Describes a variety of work necessary to coordinate and communicate with key stakeholders and interested parties such as TWPAC, Partners, wholesale customers, Department of Ecology, Department of Health, natural resource agencies, tribes, City employees, the general public, etc. The overall work is led by the Water Shortage Response Team Lead, who makes assignments as appropriate.
7. **Water Quality and Supply Management Actions** – Describes work necessary to safeguard water quality and to maximize supply. This work is led by the Supply Management Lead.
8. **Retail Customer Demand Actions** – Describes work necessary to reduce customer demand. This work is led by the Demand Management Lead.
9. **Wholesale/Partner/Large Industrial Actions** - Describes actions required by each wholesale customer. Communication and monitoring of these actions is done by the Wholesale Customers Lead.

3.1. Preparation Stage

3.1.1. Triggers

- Supply conditions and supply forecasts raise significant concerns about the utility's ability to meet demand later in the year.

3.1.2. Objectives

- Prepare the Department, City, and relevant agencies for a potential water shortage thereby allowing all parties adequate planning and coordination time in the event there is a need to move to the Voluntary Stage.
- Stretch available supply through supply management actions.

3.1.3. Stage Activation

- The authority to enter the Preparation Stage, which in most cases is effectively activating the WSRP, lies with the Director of Public Utilities or TW Superintendent.

3.1.4. Demand Reduction Goal

- None, as described earlier, the Preparation Stage is an internally focused stage that does not include outreach to customers.

3.1.5. Key Public Messages

Although the Preparation Stage is not intended to be a public stage, TW should be prepared to answer inquiries from the public and media as follows:

- **Planning:** Due to the potential for a water shortage, TW has entered the planning phase of the WSRP to coordinate actions in the event we need to move to the Voluntary Stage.



- **Supply Conditions:** Report on supply conditions and forecasts.
- **No Customer Action:** At this time, customers are not being asked to take special action. (If pressed: TW has an ongoing conservation program and always encourages customers to use water wisely. See Tacoma Water's web site for ways to use water wisely, indoors as well as outdoors during the summer irrigation season.)
- **Future Customer Action May Be Needed:** Customers may be asked to reduce their water use if conditions worsen and we move to the next stage (Voluntary Stage).

3.1.6. Coordination and Communication Actions

- **Water Shortage Response Lead & Team:** Identify the lead and team members for the Water Shortage Response Team. See Appendix A
- **Wholesale/Partner Customers:** Inform wholesale customers and Partners about current water supply conditions, that the Preparation Stage has been triggered, and that planning is underway in the event that elevation to the Voluntary Stage is needed. Request their cooperation, as identified under the Wholesale/Partner Actions section.
- **TWPAC:** Call-up the Tacoma Water Public Advisory Committee (TWPAC), as described earlier. Early meetings will focus on explaining the short-term role of TWPAC and educating the TWPAC about the water system, particularly the relationship of weather patterns to supply and demand, and the customer base. For this stage, the role of the TWPAC is to provide input on TWPAC membership, potential customer demand reduction strategies, and on outreach strategy and materials.
- **Ecology:** Participate on Ecology's Water Supply Advisory Committee to keep informed about the State drought response and to provide Ecology with updates on forecasts for the Tacoma's water supply system.
- **DOH:** Update the DOH on the shortage response and the likelihood of moving to the Voluntary Stage.
- **Public Agencies:** Coordinate with other City departments and public agencies (e.g., county, state and federal resource agencies, tribes, and other regional water suppliers, including Cascade Water Alliance and the Cities of Everett and Seattle) about water supply conditions, projections, and potential actions.
- **Outreach:** Develop the initial communication and outreach plan, focusing primarily on the Voluntary Stage. As described in the Communication and Outreach Framework in Appendix D, the plan should include the overall purpose, goals, audiences, and tools (e.g., FAQs, press releases, tips flyers).

3.1.7. Water Quality and Supply Management Actions

- **Data Collection:** Increase data collection actions (e.g., stream flows, snowpack conditions, etc.) and monitoring weather forecasts.
- **Modeling:** Increase TW's computer modeling runs of projected supply, storage, demand and revenue scenarios.
- **Water Quality:** Assess water quality in the reservoir and in the distribution system to identify areas that may experience degradation with reduced consumption. Increase monitoring if appropriate. Additionally, assess current water main flushing and reservoir cleaning activities to determine whether they should be accelerated to be completed prior to the peak season or reduced to conserve supply.
- **Instream Flows:** In coordination with state and federal resource agencies and tribes, review supply and fisheries conditions to determine appropriate instream flow levels, including whether to provide supplemental flows or reduce to flows below normal minimum. (See HCP and MIT settlement agreements.)

- **Optimize Supplies:** Identify and implement supply side management techniques to optimize existing sources (e.g., seldom-used wells, pumping of Eagle Lake, etc.).
- **Emergency Supplies:** Ready emergency supplies, such as the seldom used wellfields and Eagle Lake, for use and activate if appropriate.

3.1.8. Retail Customer Demand Actions

- **General Customer Actions:**
 - No demand reduction actions will be requested of general customers for the Preparation Stage. Some proactive outreach to customers may occur reminding them to use water wisely.
 - Determine the list of customer demand reduction actions that would be requested if the WSRP advances to the Voluntary Stage. A list of potential actions customers can take to reduce water use is provided in Appendix E. The actual actions selected for use in the Voluntary Stage will depend on the severity, likely duration, and timing of the shortage, as well as the demand reduction needed.
- **City Departments:** Request that the Metro Parks, and others activate their Water Shortage Response Plans, as appropriate.

3.1.9. Wholesale/Partner Actions

- **Activate Plans:** Activate their own WSRPs, in a manner consistent with TW.
- **Plan for Voluntary:** Work with TW to plan for the potential to move to the Voluntary Stage. Additionally, plan for their internal process needed to enter the Voluntary Stage.
- **Alternative Sources:** Determine feasibility of activating independent or emergency supply sources, as appropriate (usually not required at this stage).
- **Flushing:** Assess current water main flushing and reservoir cleaning activities to determine whether they should be accelerated to be completed prior to the peak season or reduced to conserve supply.

3.2. Voluntary Stage

3.2.1. Triggers

- The Voluntary Stage will be implemented when: 1) supply conditions have not improved or have worsened, and/or 2) demand levels need to be reduced.

3.2.2. Objectives

- Achieve the demand reduction goals by voluntary customer action, as well as by utility actions.
- Stretch available supply through supply management actions.
- Prepare for potentially moving to the Mandatory Stage.

3.2.3. Stage Activation

- The authority to enter the Voluntary Stage lies with the Director of Public Utilities or TW Superintendent. This is the case whether entering the Voluntary Stage is done as the initial activation of the WSRP or as a progressive step if the WSRP is activated at a lower stage.

3.2.4. Demand Reduction Goal

- Set demand reduction goal based on supply conditions and demand reduction potential and, if appropriate, consistent with neighboring utilities. The metric for the goal will be determined by the Water Shortage Response Team.

3.2.5. Key Public Messages

- **Moving to Voluntary:** We are moving to the second stage of our WSRP, the Voluntary Stage, because 1) supply conditions have not improved or have worsened, and/or 2) demand levels need to be reduced.



- **Meet Demand Reduction Goal:** We are asking customers to voluntarily reduce their water use to meet the demand reduction goal.
- **Customers Choose Methods:** How customers achieve that reduction is up to them. A full list of options is available on the website.
- **Top Suggestions:** Top suggestions include the following:
Let lawns go golden – if your lawn isn't already dormant, let it go dormant until the fall rains return. Just water deeply once each month to keep roots alive.
Minimize vehicle washing – Reduce the frequency of, or eliminate washing vehicles.
Take shorter showers - hold showers to 5 minutes or less.
- **Cooperation Lessens Possibility of Mandatory Restrictions:** If everyone cooperates, we may avoid moving to the Mandatory Stage where specific water use restrictions are mandated.

3.2.6. Coordination and Communication Actions

- **Wholesale/Partner Customers:** Update wholesale customers and Partners about current water supply conditions and that the Voluntary Stage has been formally triggered. Note that in the Preparation Stage, wholesale/Partner customers may have been involved in planning for the potential of moving to the Voluntary Stage. TW will give attempt to give wholesale and Partner customers advanced notice of the intent to formally move to the Voluntary Stage, so they can do final preparations (e.g., get their website ready). The advanced notice will likely be short in order to reduce the risk of unintended leaks to the press, which would complicate the process. Request continued cooperation, as identified under the Wholesale/Partner Actions section.
- **TWPAC:** TW will provide updates on the water supply status and customer demand. For this stage, the role of the TWPAC is to provide input on implementation of customer demand reduction aspects of the Voluntary Stage, as well as input on planning for the customer demand reduction aspects of the Mandatory Stage.
- **Ecology:** Continue participation on Ecology's Water Supply Advisory Committee to keep informed about the State drought response and to provide Ecology with updates on forecasts for the Tacoma's water supply system. Petition the State to include the Tacoma's water supply system service area in a State declaration of drought, if not already included.
- **DOH:** Update the DOH on the shortage response and the likelihood of moving to the Mandatory Stage.
- **Public Agencies:** Continue and intensify coordination with other City departments and public agencies (e.g., state and federal resource agencies, tribes, and other regional water suppliers, including Cascade Water Alliance and the Cities of Everett and Seattle) about water supply conditions, projections, and potential actions.
- **Outreach:** Implement the communication and outreach plan elements developed for the Voluntary Stage. Also, develop the elements (including any potential exemptions and enforcements) for the Mandatory Stage. See the Communication and Outreach Framework in Appendix D.
- **TW Employees:** Establish a regular communication mechanism to keep TW employees up to date on goals, conditions, and actions.
- **Customer Inquiries:** Establish a systematic way to respond to and track customer inquiries in a timely way. Note that customer inquiries could show up in various ways, including social media, which may require a different strategic communication approach.
- **Revenue:** Assess revenue implications and potential remedies, including reprioritizing expenses.

3.2.7. Water Quality and Supply Management Actions

- **Data Collection:** Continue increased data collection actions (e.g., stream flows, snowpack conditions) and monitoring weather forecasts.
- **Modeling:** Continue increased TW's computer modeling runs of projected supply, storage, demand and revenue scenarios.
- **Instream Flows:** Continue coordination with state and federal resource agencies and tribes, to review supply and fisheries conditions to determine appropriate instream flow levels, including whether to provide supplemental flows or flows below normal minimum. (See HCP and MIT settlement agreements.)
- **Flushing:** If necessary, implement flushing to maintain water quality. Include flushing information in public communication and outreach so the public understands it is essential for drinking water quality. Conversely, it may be determined that flushing be suspended or reduced if additional conservation is called for.
- **Emergency Supplies:** Ready emergency supplies, such as Eagle Lake Pump Plant, and requesting of available Partner storage supplies, for use and activate if appropriate.
- **Interties:** Investigate using existing interties to increase supply availability and activate if appropriate.

3.2.8. Retail Customer Demand Actions

• General Customer Actions:

- Implement the Voluntary Stage customer demand reduction actions (that were determined in the Preparation Stage).
- Determine the list of customer demand reduction actions that would be requested if the WSRP advances to the Mandatory Stage. A list of potential actions customers can take to reduce water use is provided in Appendix E. The actual actions selected for the Mandatory Stage will depend on the severity, likely duration, and timing of the shortage, as well as the demand reduction needed. Additionally, establish appropriate possible exemptions for the Mandatory Stage. Appendix G includes possible exemptions to water use restrictions for TW to consider in creating actual exemptions at the time of the event. Finally, determine appropriate enforcement strategies.

• **City Departments:** Request that City departments reduce their water use. The specific actions requested for this stage will be determined during implementation of the WSRP, however likely actions include the following:

• All Departments:

- Let lawns go dormant and limit plant watering to twice a week. Avoid mid-day watering. Post explanatory signage if these recommendations cannot be implemented. (Certain exemptions will apply.)
- Wash fleet vehicles only if using facilities that recycle the water
- Do not wash plazas, foyers, sidewalks, etc. with a hose. Use a broom instead. (Certain exemptions will apply where necessary for health and safety.)
- Any applicable actions requested of general retail customers
- Turn off decorative fountains
- Post signage throughout buildings to encourage City employees (and the public where applicable) to reduce their water use.

• Tacoma Water:

- Suspend meter testing
- Accelerate schedule to fix distribution/transmission system leaks

- **Parks:** Move to the Voluntary Stage of their WSRP (if appropriate) and implement the associated demand reduction actions.
- **Public Works:** Suspend street washing
- **Fire Department:** Limit training exercises that use water
- **Hydrant Permits:** Restrict new hydrant permits for temporary water service to essential purposes.

3.2.9. Wholesale/Partner Actions

- **Move to Next Stage:** Implement the Voluntary Stage of their WSRPs, in a manner consistent with TW.
- **Plan for Mandatory:** Work with TW to plan for the potential to move to the Mandatory Stage. Additionally, plan for their internal process needed to enter the Mandatory Stage.
- **Outreach to Retail Customers:** Outreach to their retail customers, as documented in Appendix F.
- **Flushing:** Assess current water main flushing and reservoir cleaning activities to determine whether they should be accelerated to be completed prior to the peak season or reduced to conserve supply.
- **Alternative Sources:** Activate alternative supply sources, if appropriate.

3.3. Mandatory Stage

3.3.1. Triggers

- The Mandatory Stage will be implemented when: 1) supply conditions have not improved, or have worsened, and/or 2) demand levels need to be further reduced.

3.3.2. Objectives

- Achieve the demand reduction goals by restricting specific water uses.
- Further stretch available supply through additional supply management actions.
- Prepare for potentially moving to the Emergency Stage.

3.3.3. Stage Activation

- The authority to enter the Mandatory Stage lies with the Director of Public Utilities or the TW Superintendent. This is the case whether entering the Mandatory Stage is done at the initial activation of the WSRP or as a progressive step if the WSRP is activated at a lower stage.

3.3.4. Demand Reduction Goal

- Set demand reduction goal based on supply conditions and demand reduction potential consistent with water use restrictions and, if appropriate, adjust with neighboring utilities. The metric for the goal will be determined by the Water Shortage Response Team.

3.3.5. Key Public Messages

- **Moving to Mandatory:** We are moving to the third stage of our WSRP, the Mandatory Stage, because our supply situation has worsened and/or the voluntary approach in the previous stage has not resulted in the necessary demand reduction.
- **Mandatory Water Restrictions:** It is necessary to impose mandatory restrictions on certain water uses. Those restrictions are as follows: *(to be determined in the previous stage)*. There are exemptions for the following: *(to be determined in the previous stage)*.
- **Rate Surcharge:** If applicable, the rate surcharge is as follows: *(to be determined in the previous stage)*.

3.3.6. Coordination and Communication Actions

- **Wholesale/Partner Customers:** Update wholesale customers about current water supply conditions and that the Mandatory Stage has been formally triggered. Note that in the Voluntary Stage, wholesale/Partner customers may have been involved in planning for the potential of

moving to the Mandatory Stage. TW will give wholesale/Partner customers advanced notice of the intent to formally move to the Mandatory Stage, so wholesale customers can do final preparations (e.g., get their website ready). The advanced notice will likely be short in order to reduce the risk of unintended leaks to the press, which would complicate the process. Request continued cooperation, as identified under the Wholesale/Partner Actions section.

- **TWPAC:** TW will provide updates on the water supply status and customer demand. For this stage, the role of the TWPAC is to provide input on implementation of customer demand reduction aspects of the Mandatory Stage, as well as provide input on planning for the customer demand reduction aspects for the Emergency Stage, if likely needed.
- **Outreach:** Implement the communication and outreach plan elements developed for the Mandatory Stage. Also, develop the elements for the Emergency Stage, if likely needed. See the Communication and Outreach Framework in Appendix D.
- **Ecology:** Continue participation on Ecology's Water Supply Advisory Committee to keep informed about the State drought response and to provide Ecology with updates on forecasts for the Tacoma's water supply system.
- **DOH:** Update the DOH on the shortage response and the likelihood of moving to the Emergency Stage.
- **Public Agencies:** Continue and intensify coordination with other City departments and public agencies (e.g., state and federal resource agencies, tribes, and other regional water suppliers, including Cascade Water Alliance and the Cities of Everett and Seattle) about water supply conditions, projections, and potential actions.
- **TW Employees:** Continue regular communication with Department employees to keep them up to date on goals, conditions, and actions.
- **Customer Inquiries:** Continue responding to customer inquiries, using the strategy established in the Voluntary Stage. Note that customer inquiries could show up in various ways, including social media, which may require a different strategic communication approach.
- **Revenue:** Continue assessing revenue implications and potential remedies, including reprioritizing expenses.

3.3.7. Water Quality and Supply Management Actions

- **Data Collection:** Continue increased data collection actions (e.g., stream flows, snowpack conditions) and monitoring weather forecasts.
- **Modeling:** Continue increased TW's computer modeling runs of projected supply, storage, demand and revenue scenarios.
- **Instream Flows:** Continue coordination with state and federal resource agencies and tribes, to review supply and fisheries conditions to determine appropriate instream flow levels. (See HCP and MIT settlement agreements.)
- **Emergency Supplies:** Activate emergency supplies, such as the emergency wellfields and Eagle Lake Pump Plant, as appropriate.
- **Interties:** Activate interties, if appropriate, if not already implemented.
- **Reclaimed Water:** Promote reclaimed water availability to tanker trucks for street cleaning, construction projects, landscape irrigation, dust control, where appropriate (Tehaleh may be able to offer Class A water for these purposes, etc.)

3.3.8. Retail Customer Demand Actions

- **General Customer Actions:**
 - Implement the Mandatory Stage customer demand reduction actions (that were determined in the Voluntary Stage).
 - Determine the list of customer demand reduction actions that would be requested if the WSRP advances to the Emergency Stage. A list of potential actions customers can take



to reduce water use is provided in Appendix E. The actual actions selected for the Emergency Stage will depend on the severity, likely duration, and timing of the shortage, as well as the demand reduction needed.

• **City Departments:** Require that City departments reduce their water use. The specific actions requested for this stage will be determined during implementation of the WSRP, however likely actions include the following (if not already implemented under the Voluntary Stage):

- **All Departments:**

- Let lawns go dormant and limit plant watering to twice a week. Avoid mid-day watering. Post explanatory signage if these recommendations cannot be implemented. (Certain exemptions may apply.)

- Wash fleet vehicles only if using facilities that recycle the water.

- Do not wash plazas, foyers, sidewalks, etc. with a hose. Use a broom instead. (Certain exemptions will apply where necessary for health and safety.)

- Any applicable actions required of general retail customers

- Turn off decorative fountains

- Post signage throughout buildings to encourage City employees (and the public where applicable) to reduce their water use.

- o **Tacoma Water:**

- Suspend meter testing

- Accelerate schedule to fix distribution system leaks

- o **Parks:** Move to the Mandatory Stage of their WSRP and implement the associated demand reduction actions

- o **Public Works:** Suspend street washing

- o **Fire Department:** Limit training exercises that use water

- **Hydrant Permits:** Rescind hydrant permits for temporary water service, unless necessary for public health.

- **Exemptions from Water Use Restrictions:** Implement the exemptions for the Mandatory Stage water use restrictions. Determine appropriate exemptions for the Emergency Stage water use restrictions. Appendix G includes possible exemptions to water use restrictions for TW to consider in creating actual exemptions at the time of the event.

- **Rate Surcharges:** Consider implementing rate surcharges to accelerate customer compliance with the restrictions and/or recover lost revenue.

3.3.9. Wholesale/Partner Actions

- **Move to Next Stage:** Implement the Mandatory Stage of their WSRPs, in a manner consistent with TW.

- **Plan for Emergency:** Work with TW to plan for the potential to move to the Emergency Stage. Additionally, plan for their internal process needed to enter the Emergency Stage.

- **Outreach to Retail Customers:** Outreach to their retail customers, as documented in Appendix F.

- **Enforcement:** Enforce water use restrictions within their own service areas.

- **Flushing:** Assess current water main flushing and reservoir cleaning activities to determine whether they should be accelerated to be completed prior to the peak season or reduced to conserve supply.

- **Alternative Sources:** Activate alternative supply sources, if appropriate.

3.4. Emergency Stage (as continued from a progressive implementation of the WSRP – see Section 4 for Emergency Stage due to a critical system failure)



At this stage, TW recognizes that a critical water situation exists and that, without additional significant curtailment actions, a shortage of water for public health and safety is imminent. This type of situation has never occurred in the TW water system's history. This stage is characterized by two basic approaches. First, increasingly stringent water use restrictions are established. Secondly, significant rate surcharges may be used to increase customer compliance.

3.4.1. Triggers

- The Emergency Stage will be implemented when: 1) supply conditions have worsened, 2) demand levels need to be further reduced, and/or 3) the prospects of a water shortage are imminent if immediate action is not taken 4) A system emergency such as an earthquake or major failure of a critical supply component has caused a probable reduced supply capacity.

3.4.2. Objectives

- Achieve the demand reduction goals by additional restrictions on water use, recognizing that for this stage, customers' lives and businesses may be significantly impacted.
- Stretch available supply through supply management actions.

3.4.3. Stage Activation

- The authority to enter the Emergency Stage lies with the Director of Public Utilities or TW Superintendent.

3.4.4. Demand Reduction Goal

- Set demand reduction goal based on supply conditions and demand reduction potential consistent with water use restrictions and, if appropriate, adjust with neighboring utilities (if appropriate). The metric for the goal will be determined by the Water Shortage Response Team.

3.4.5. Key Public Messages

- **Moving to Emergency:** We are moving to the fourth (and final) stage of our WSRP, the Emergency Stage, because our supply situation has worsened and/or the approach in the previous stage has not resulted in the necessary demand reduction. Or a critical system failure has occurred.
- **Additional Water Restrictions:** There are additional water restrictions as follows: *(to be determined in the previous stage)*. There are exemptions for the following: *(to be determined in the previous stage)*.
- **Rate Surcharge:** If applicable, the rate surcharge may be applied *(to be determined in the previous stage)*.
- **Taste & Odor:** If applicable, taste and odor water quality problems may occur with system-wide reduced water consumption.
- **Pressure Reduction:** If applicable, pressure reduction problems may occur with system-wide reduced water consumption.

3.4.6. Coordination and Communication Actions

- **Formal Declaration of Emergency:** The Director of Public Utilities or the TW Superintendent declares a water supply emergency.
- **Wholesale/Partner Customers:** Update wholesale customers about current water supply conditions and that the Emergency Stage has been formally triggered. Note that in the Mandatory Stage, wholesale customers may have been involved in planning for the potential of moving to the Emergency Stage. If possible, TW will give wholesale and Partner customers advanced notice of the intent to formally move to the Emergency Stage, so wholesale customers can do final preparations (e.g., get their website ready). The advanced notice will likely be short in order to reduce the risk of unintended leaks to the press, which would complicate the process. Request continued cooperation, as identified under the Wholesale/Partner Actions section.



- **TWPAC:** TW will provide updates on the water supply status and customer demand. For this stage, the role of the TWPAC is to provide input on the implementation of the Emergency Stage.
- **Outreach:** Implement the communication and outreach plan elements developed for the Emergency Stage.
- **Ecology:** Continue participation on Ecology's Water Supply Advisory Committee to keep informed about State drought response and to provide Ecology with updates on forecasts for the Tacoma's water supply system.
- **DOH:** Update DOH on the shortage response and the need to be in the Emergency Stage.
- **Public Agencies:** Continue and intensify coordination with other City departments and public agencies (e.g., state and federal resource agencies, tribes, and other regional water suppliers, including Cascade Water Alliance and the Cities of Everett and Seattle) about water supply conditions, projections, and potential actions.
- **TW Employees:** Continue regular communication with Department employees to keep them up to date on goals, conditions, and actions.
- **Customer Inquiries:** Continue responding to customer inquiries, using the strategy established in the Voluntary Stage. Note that customer inquiries could show up in various ways, including social media, which may require a different strategic communication approach.
- **Revenue:** Continue assessing revenue implications and potential remedies, including reprioritizing expenses.

3.4.7. Water Quality and Supply Management Actions

- **Data Collection:** Continue increased data collection actions (e.g., stream flows, snowpack conditions) and monitoring weather forecasts.
- **Modeling:** Continue increased TW's computer modeling runs of projected supply, storage, demand and revenue scenarios.
- **Instream Flows:** Continue coordination with state and federal resource agencies and tribes, to review supply and fisheries conditions to determine appropriate instream flow levels. (See HCP and MIT settlement agreements.)
- **Emergency Supplies:** Activate emergency supplies, such as the seldom-used wells, purchases of Partner water, and pumping of Eagle Lake, as appropriate.
- **Interties:** Activate interties, if not already implemented.
- **Reclaimed Water:** Continue to promote reclaimed water availability to tanker trucks for street cleaning, construction projects, landscape irrigation, dust control, where appropriate (Tehaleh may be able to offer Class A water for these purposes, etc.)

3.4.8. Retail Customer Demand Actions

- **General Customer Actions:**
 - Implement the Emergency Stage customer demand reduction actions (that were determined in the Mandatory Stage).
- **City Departments:** Require that City departments reduce their water use including, but not limited to:
 - **All Departments:**
 - Continue to let lawns go dormant and limiting plant watering. Continue avoiding mid-day watering. Post explanatory signage if these recommendations cannot be implemented. (Certain exemptions will apply.)
 - Suspend all washing of fleet vehicles.
 - Continue not washing plazas, foyers, sidewalks, etc. with a hose. Use a broom instead. (Certain exemptions will apply where necessary for health and safety.)
 - Any applicable actions required of general retail customers
 - Continue keeping decorative fountains off.



- Continue to use signage throughout buildings to encourage City employees (and the public, where applicable) to reduce their water use.
 - **Tacoma Water:**
 - Continue to suspend meter testing.
 - Continue to accelerate schedule to fix distribution system leaks.
 - **Parks:** Move to the Emergency Stage of their WSRP and implement the associated demand reduction actions.
 - **Public Works:** Continue suspension of street washing.
 - **Fire Department:** Suspend training exercises that use water.
 - **Exemptions from Water Use Restrictions:** Implement the exemptions for the Emergency Stage water use restrictions.
 - **Rate Surcharges:** Consider implementing rate surcharges to accelerate customer compliance with the restrictions and/or recover lost revenue.
- ### 3.4.9. Wholesale/Partner Actions
- **Move to Next Stage:** Implement the Emergency Stage of their WSRPs, in a manner consistent with TW.
 - **Outreach to Retail Customers:** Outreach to their retail customers, as documented in Appendix F.
 - **Enforcement:** Continue to enforce water use restrictions within their own service areas.
 - **Flushing:** Assess current water main flushing and reservoir cleaning activities to determine whether they should be accelerated to be completed prior to the peak season or reduced to conserve supply.
 - **Alternative Sources:** Activate alternative supply sources, if appropriate.

4. Implementation for an Immediate Crisis

4.1. Background

This chapter focuses on implementing the WSRP when an event, such as a system failure, hinders TW's ability to supply enough water to meet customer demands, and requires immediate action. Implementing the WSRP under these circumstances has both differences and similarities from implementation for a progressive event such as a drought.

Implementation of the WSRP for an immediate crisis is different in the following ways:

- **Lack of Preparation Time:** In a typical progressive event, TW has weeks or months to prepare for action. In an immediate crisis, there is typically little to no preparation time and TW takes actions within days, hours and/or minutes.
- **Initial Stage:** In a typical progressive event, the WSRP is activated at the Preparation Stage and progresses sequentially through stages as necessary. In an immediate crisis, the WSRP is activated at one of the more aggressive stages, likely either the mandatory or emergency stage.
- **Larger Volume:** The volume of the water shortage for an immediate crisis could be more significant, thereby requiring larger-scale demand reductions.
- **Localized:** The immediate crisis could be localized, thereby requiring demand reduction for only limited geographic areas.
- **Heightened Public Health & Safety:** The need to protect water quality and availability to support public health and safety are heightened, including issues such as minimizing any outages and having sufficient water and pressure for fire-fighting.
- **TW/City Emergency Response Plans:** Implementation of the WSRP would likely dovetail with implementation of other higher-level and/or more specific TW /City of Tacoma /Pierce County emergency response plans. Both TW and the City have broader, all-hazards plans, such as TW's Emergency Operations Plan, TPU's Continuity of Operations Plan (COOP) and the City's Comprehensive Emergency Management Plan (CEMP), that describe how their emergency management system is organized and managed in order to prepare for, prevent, mitigate, respond to, and recover from emergencies. TW has numerous hazard-specific (e.g., earthquake) and site-specific (pipelines) emergency response plans that might be applicable.
- **Incident Command System:** The response would be implemented under an Incident Command System (ICS), which is a nationally-sanctioned, standardized approach to the command, control, and coordination of emergency response. ICS is integral to the TW, TPU and City emergency response plans mentioned above. Implementation of the WSRP for an immediate crisis is similar to that of a progressive event in many of the considerations and principles discussed in Chapter 2 such as the need for flexibility, sharing the burden of the shortage, and the importance of addressing financial implications.

There are numerous crisis situations that could necessitate implementing the WSRP. Several examples are described below. Note that the WSRP does not necessarily need to be implemented if positively mitigating circumstances are present. The need to activate the WSRP would depend on the amount of the supply impacted, the amount of time needed to restore the system to normal functions, how easily water could be re-routed to customers in the affected area, and the amount of water being used by customers given the season.

- **Major Transmission Pipeline Break:** A major transmission pipeline break from the Green River supply could require activation of the WSRP in an immediate crisis mode. A pipeline failure may have only minor impacts on customers due to system redundancy.
- **Temporary Treatment Plant Shut Down:** A temporary unplanned shut down of Green River Filtration Facility could require activation of the WSRP in an immediate crisis mode.



- **Earthquake:** A seismic event that damaged critical water infrastructure (treatment facilities, storage tanks, pipelines) could require activation of the WSRP in an immediate crisis mode.
- **Wildland Fire:** A wildland fire that contaminates source water through ash or firefighting strategy could require activation of the WSRP in and immediate crisis mode.

4.2. Components

The following nine components are discussed below. (The definitions are repeated here so this chapter functions as a stand-alone chapter, which may be important in a crisis.) These are the same components as Chapter 3 (a progressive event) and the content is a hybrid of content from all four stages in Chapter 3. Therefore, when implementing the WSRP for an immediate crisis, this stage may look slightly different than under a progressive event.

1. **Triggers** – Describes the general qualitative conditions that would trigger the stage. Note there are no pre-determined, quantitative conditions that trigger stages.
2. **Objectives** – Describes the overall objective of the stage.
3. **Stage Activation** – Describes who has the authority to enter the stage (either the TW Superintendent, or Director of Public Utilities).
4. **Demand Reduction Goal** – Discusses the general, qualitative nature of the goal for the stage. Note there are no pre-determined, quantitative demand reduction goals for each stage.
5. **Key Public Messages** – Describes the key public messages for the stage. The messaging work is led by the Communications Lead.
6. **Coordination and Communication Actions** – Describes a variety of work necessary to coordinate and communicate with key stakeholders such as , wholesale customers, Ecology, Department of Health, natural resource agencies, tribes, City employees, the general public, etc. The overall work is led by the ICS Incident Commander, who makes assignments as appropriate.
7. **Water Quality and Supply Management Actions** – Describes work necessary to safeguard water quality and to maximize supply. This work is led by the Supply Management Lead.
8. **Retail Customer Demand Actions** – Describes work necessary to reduce customer demand. This work is led by the Demand Management Lead.
9. **Wholesale/Partner Actions** - Describes actions required by each wholesale customer. Communication and monitoring of these actions is done by the Wholesale Customers Lead.

4.2.1. Triggers

- The appropriate stage (Voluntary, Mandatory, or Emergency) will be implemented when an event occurs that would prevent TW from supplying enough water to meet customer demands and requires immediate action. (The selection of the appropriate stage will be based on the severity of the shortage.)

4.2.2. Objectives

- Maximize the amount of water delivered to customers and restore full supply capabilities as soon as possible.
- Achieve the demand reduction goals by voluntary or mandatory customer action. If activated at the Emergency Stage, restrictions may significantly impact customers' lives and businesses.
- Prepare for potentially moving to the next aggressive stage, if not already in the Emergency Stage.

4.2.3. Stage Activation

- The authority to declare a water supply emergency and activate the WSRP for an immediate crisis lies with the Director of Public Utilities or TW Superintendent. However, the underlying event may warrant an emergency proclamation, which would be declared by the City Council upon the request of the City Manager.

4.2.4. Demand Reduction Goal



- Set demand reduction goal based on supply conditions and demand reduction potential consistent with any water use restrictions.

4.2.5. Key Public Messages

- **Activated WSRP:** We have activated the WSRP due to an immediate crisis. The details of the crisis are as follows (*to be developed at the time of the crisis*).
- **Meet Demand Reduction Goal:** We are asking customers to reduce their water use to meet the demand reduction goal.
- **Mandatory Water Restrictions (If Activating at the Mandatory or Emergency Stage):** It is necessary to impose mandatory restrictions on certain water uses. Those restrictions are as follows: (*to be determined at the time of the crisis*). There are exemptions for the following: (*to be determined at the time of the crisis*).
- **Rate Surcharge:** If applicable, the rate surcharge is as follows may apply (*to be determined at the time of the crisis*).
- **Water Quality, Pressure Reduction or Loss of Pressure:** Several different water quality conditions could occur depending on what caused TW to be in stage 4 of the WSRP. Messaging to customers could range from an informational notice of possible aesthetic concerns, to a possible “Boil Water” notice, or could escalate all the way to a “Do not drink / Do not use” message, depending on the nature of the incident and possible localized conditions. Water Quality staff will determine appropriate messaging, in consultation with appropriate regulators.

4.2.6. Coordination and Communication Actions

- **Formal Declaration of Water Supply Emergency and/or Civil Emergency:** Depending on the event, the Superintendent, Director of Public Utilities and/or City Council upon the request of the City Manager make formal declarations of emergencies and activation of the WSRP.
- **Incident Commander & Team:** Identify the Incident Commander and the team members. An Incident Command System organizational chart is provided in Appendix A. Note that the functions of the Water Shortage Response Team used during a progressive application of the WSRP are incorporated into the Incident Command System.
- **Wholesale/Partner Customers:** Inform wholesale customers and Partners about the crisis and that the WSRP has been activated. Request their cooperation, as identified under the Wholesale/Partner Actions section.
- **TWPAC:** Call-up of the TWPAC is not appropriate unless the event is anticipated to be of long duration. If formed, the role of the TWPAC is to provide feedback on implementation of customer demand reduction actions. Early meetings will focus on explaining the crisis, the role of the TWPAC, and educating the TWPAC about the water system and the customer base.
- **DOH:** Inform the DOH about the crisis and the activation of the WSRP.
- **Public Agencies:** Coordinate with other City departments and public agencies (e.g., county, state and federal resource agencies, tribes, and other regional water suppliers, including Cascade Water Alliance and the Cities of Everett and Seattle) as appropriate.
- **Outreach:** Develop and implement the initial communication and outreach plan. As described in the Communication and Outreach Framework in Appendix D, the plan should include the overall purpose, goals, audiences, and tools (e.g., FAQs, press releases, tips flyers). Additional outreach tools such as highway message boards, social media, or dial out phone systems might be used in an immediate crisis.
- **TW Employees:** Establish a regular communication mechanism to keep Department employees up to date on goals, conditions, and actions.
- **Customer Inquiries:** Establish one point of contact for responding to customer inquiries.

- **Revenue:** Assess revenue implications and potential remedies, including reprioritizing expenses.
- **Police & Fire Enforcement:** It may be possible to coordinate with police and fire departments requesting their assistance in promoting and enforcing any water restrictions, if entering the Emergency Stage.

4.2.7. Water Quality and Supply Management Actions

- **Maximize Supplies:** Make system operational changes as needed to maximize the amount of water delivered to customers and restore system to normal operations.
- **Wells:** Begin to ready all wellfields (including seldom used wells) for use and activate, if appropriate.
- **Eagle Lake Pump Plant:** Ready the pumping plant on Eagle Lake and commence pumping when gravity flow is no longer sufficient, if appropriate.
- **Partner Stored Water:** Purchase and use Partner stored water, if appropriate.
- **Interties:** Investigate using existing interties to increase supply availability and activate if appropriate.
- **Other:**
 - **Reclaimed Water:** promote reclaimed water availability to tanker trucks for street cleaning, construction projects, landscape irrigation, dust control, where appropriate (Tehaleh may be able to offer Class A water for these purposes, etc.)
 - **Water Quality:** Assess water quality in reservoirs and in the distribution system to identify areas that may experience degradation or changes to system operations. Increase monitoring if appropriate.
 - **Instream Flows:** If reductions in instream flows would mitigate the impact of the event or are necessary, coordinate with state and federal resource agencies and tribes, to review supply and fisheries conditions and determine appropriate instream flow levels, including whether to provide supplemental flows or reduce to below normal minimum flows. (See HCP and MIT settlement agreements.)

4.2.8. Retail Customer Demand Actions

- **General Customer Actions:**
 - o Determine and implement the list of customer demand reduction actions requested/required. A list of potential actions customers can take to reduce water use is provided in Appendix E. The actual actions selected will depend on the severity, likely duration, and timing of the shortage, as well as the demand reduction needed. Additionally, establish and implement appropriate exemptions. Appendix G includes possible exemptions to water use restrictions for TW to consider. Finally, determine appropriate enforcement strategies, if appropriate.
- **City Departments:** Request that City departments reduce their water use in affected areas. The specific actions requested will be determined during implementation of the WSRP, however likely actions include the following:
 - o **All Departments:**
 - Let lawns go dormant and limit plant watering. Avoid mid-day watering. Post explanatory signage if these recommendations cannot be implemented. (Certain exemptions may apply.)
 - Either wash fleet vehicles only if using facilities that recycle the water or suspend all washing of fleet vehicles, depending on the severity of the crisis.
 - Do not wash plazas, foyers, sidewalks, etc. with a hose. Use a broom instead. (Certain exemptions will apply where necessary for health and safety.)

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- Any applicable actions requested of general retail customers
- Turn off decorative fountains
- Post signage throughout buildings to encourage City employees (and the public where applicable) to reduce their water use.
- o **Tacoma Water:**
 - Suspend water main flushing and reservoir cleaning unless needed to support restoration to normal operations
 - Suspend meter testing
 - Accelerate schedule to fix distribution system leaks
- o **Parks:** Request that the Parks and Recreation Department activate their Water Shortage Response Plan, if appropriate.
- o **Public Works:** Suspend street washing
- o **Fire Department:** Either limit or suspend training exercises that use water, depending on the severity of the crisis.
- **Hydrant Permits:** New hydrant permits for temporary water service will be either restricted to essential services or rescinded (unless necessary for public health), depending on the severity of the crisis.
- **Rate Surcharges:** Consider implementing rate surcharges to accelerate customer compliance with the restrictions and/or recover lost revenue.

4.2.9. Wholesale/Partner Actions

- **Activate Plans:** Activate their own WSRPs, in a manner consistent with TW, if in affected area.
- **Alternative Sources:** Activate alternative supply sources, if appropriate and necessary.
- **Flushing:** Assess current water main flushing and reservoir cleaning activities to determine whether they should be suspended.
- **Outreach to Retail Customers:** Outreach to their retail customers, as documented in Appendix F.
- **Enforcement:** Enforce any water use restrictions within their own service areas.



APPENDIX A



Appendix A – Water Shortage Response Team Membership and Roles

Water Shortage Response Team

The Water Shortage Response Team is Tacoma Water's internal team whose role is to evaluate conditions, advise Tacoma Water's Superintendent on supply and demand actions, coordinate with other parties, communicate with stakeholders and the public, and make assignments to Tacoma Water staff as needed to respond to the shortage. The Response Team Lead is appointed by the Tacoma Water Superintendent (or may be the Superintendent), and the Response Team Lead then forms the Water Shortage Response Team using available staff. A proposed organizational chart and the typical role descriptions are provided below.

Superintendent and Management Team – Provides overall direction on the response.

Weighs in on Team recommendations for moving through the stages, demand management actions and key messages.

Response Team Lead – Lead the overall water shortage response effort including issue coordination, information gathering and dissemination, key support staff assignments, role clarification, and communication with a broad array of stakeholders and interested parties.

Communications Lead – Messaging, employee communication, media relations, press releases, marketing, advertising, social media, key contact for interagency Public Information Officers (PIOs), and coordination on messaging with Cascade Water Alliance and Cities of Everett and Seattle.

Finance Lead – Expected lost revenue estimates, budgets and charge number set-up for shortage-related activities, and process necessary to apply surcharges.

Demand Management Lead – Customer water use reduction actions management and messaging, estimates of water use savings, implementation cost estimates, and communication with landscapers nurseries and other large outdoor water users.

Supply Management Lead – Overall guidance on supply management, drinking water quality and operations, status of non-revenue use in operations, and issues related to potential alternative supplies and interties. Provides water supply condition reports, forecasts, production reports, operational needs, and modeling oversight. Provides guidance regarding instream flows/fisheries, and coordinates with the Green River Flow Management Committee (GRFMC) for potential lowering of instream flows.

Government / Tribal Affairs Liaison – Coordinate briefings with, and feedback from, Public Utility Board, City Council, and Tribal stakeholders. Assist with legislation and code revisions, as needed.

Tacoma Water Public Advisory Committee (TWPAC) Liaison – Purpose and membership of the TWPAC is described in Appendix B. The TWPAC Liaison facilitates meetings and communications with the TWPAC.

Retail Customer Liaison – Communicate with and assist with message development for the call center and public communications. Assist with FAQ development and maintenance.

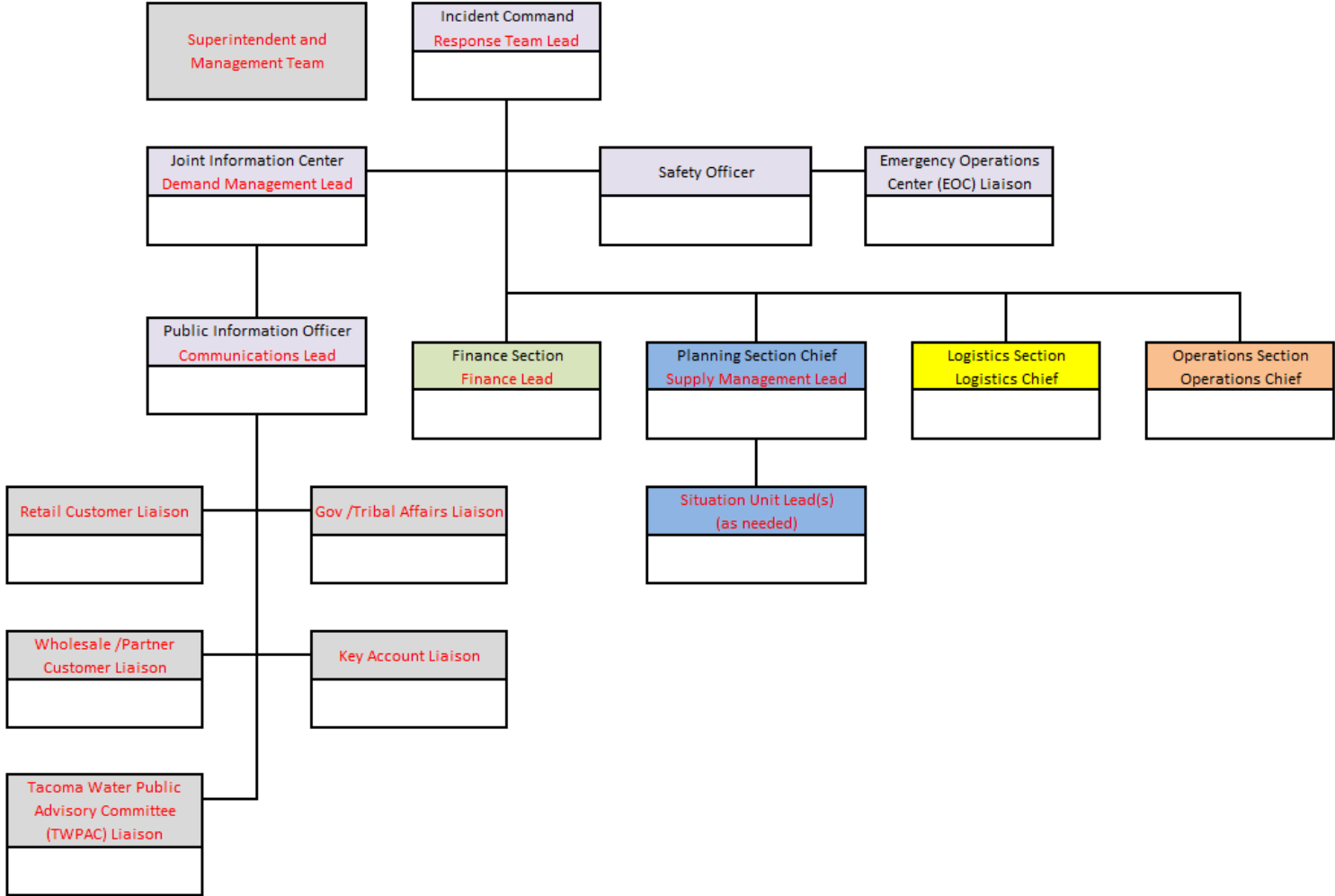
Wholesale / Partner Customer Liaison – Provide communication with Wholesale and Partner customers. Work with customers to ensure adequate levels of information is reaching them to help ensure adequate participation.

Key Customer Liaison – Provide communication with Key customers. Work with customers to ensure adequate levels of information is reaching them to help ensure adequate participation.

Situation Unit Lead – In charge of various water shortage related projects to either increase sources of supply (e.g. pumping of Eagle Lake, . . .), or to assist with demand reduction (e.g. placing of signs, administration of special contracts, . . .).



Appendix A - Water Shortage Response Team ICS Organization Chart





APPENDIX B



Appendix B – Tacoma Water Public Advisory Committee Membership

The Tacoma Water Public Advisory Committee (TWPAC) is a committee that may meet during times of water shortage. The committee’s function is meant to provide transparency of Tacoma Water’s plans and actions, and to gage community interest and attitudes regarding water shortage related events. The committee membership is meant to encompass a broad and diverse population of potential stakeholders that represent a wide range of perspectives.

Upon Activation of the WSRP, these interests will be invited to participate in meetings and conference calls. These key customers and stakeholders will advise the Water Shortage Response Team on requests or actions made to customers regarding water shortage response actions and programs.

Interest areas of the members of the TWPAC are shown in the following table:

Interest Represented	Organization / Entity
Large Contract Customer	<ul style="list-style-type: none"> • WestRock • Metro Parks
Commercial Customer	<ul style="list-style-type: none"> • Atlantic Power •
Broad Interest	<ul style="list-style-type: none"> • Save Tacoma Water • Pierce County Planning & Public Works • Sustainable Tacoma Commission
Partner	<ul style="list-style-type: none"> • Covington Water District • Lakehaven Water & Sewer District • City of Kent
Regulators	<ul style="list-style-type: none"> • Tacoma-Pierce County Department of Health • Washington Department of Health
Wholesale Customers	<ul style="list-style-type: none"> • City of Fife • Firgrove Mutual
Residential Customers	<ul style="list-style-type: none"> • Neighborhood Council Representatives from the Community Council • University Place City Hall
Business Community	<ul style="list-style-type: none"> • Tacoma - Pierce County Chamber of Commerce
TW/City Staff	<ul style="list-style-type: none"> • Facilitator • Staff

Water Shortage Response Plan



Interest Represented	Organization / Entity
Environmental	<ul style="list-style-type: none"> • Friends of the Green • Green River Flow Management Committee
Tribal	<ul style="list-style-type: none"> • Muckleshoot Indian Tribe
Regional Water Suppliers	<ul style="list-style-type: none"> • Seattle Public Utilities • City of Everett • Cascade Water Alliance
Landscape and Nursery Industry	<ul style="list-style-type: none"> • Washington Association of Landscape Professionals (WALP) • Washington State Nursery and Landscape Association (WSNLA)
Regulators	<ul style="list-style-type: none"> • Department of Ecology • Washington Department of Fish and Wildlife • National Marine Fisheries • US Army Corps of Engineers
TW/City Staff	<ul style="list-style-type: none"> • Water Shortage Response Team (see Appendix A) • Social Justice Coordinator



APPENDIX C



Appendix C – Previous WSRP Implementations

Tacoma Water has implemented the WSRP 3 times in the past. Each implementation was due to drought; however each of the implementations was different due to the unique characteristics of each drought. Tacoma Water has modified both the WSRP and our system operations during drought based on lessons learned from these previous implementations. The Table below highlights a few keys aspects of each implementation, more detailed summaries are provided below:

Year	Furthest Stage	Type of Drought	Duration	Statewide Drought?
2015	Voluntary	Winter/Spring (low snowpack) and Summer (hot/dry)	Late July to Late October	Yes
1992	Mandatory	Winter/Spring (low snowpack)	Mid May to Mid August	No
1987	Mandatory	Summer/Fall (hot/dry) and Fall/Winter (late fall rains)	Early August to January	N/A

2015 Drought

Very low snowpack levels caused statewide concerns about drought. To account for the lack of snow, the Eagle Gorge Reservoir was operated to fill more quickly than typical during the late winter and early spring (and yet our refill goal was still not achieved). By mid-May, the Governor had declared a statewide drought emergency, but noted that the large municipal water suppliers in the Puget Sound region, such as Tacoma, Seattle and Everett, had adequate reservoir storage to meet their customers’ needs and did not anticipate water shortages. Subsequently, the region experienced historical hot and dry conditions causing rapid drawdown of storage in the region’s reservoirs. TW, in close coordination with Everett and Seattle, activated the Preparation Stage of their Water Shortage Response Plan in late July. In August, the three utilities entered the Voluntary Stage of their plans and requested customers to reduce their water use by 10 percent, which was achieved. In late October significant rains occurred.

During the drought TW was able to maintain stream flows above the normal guaranteed levels at all times. In November, the three utilities moved back into the Preparation Stage of their water shortage Response plans, and then deactivated their plans, when regional water supply conditions returned to normal.

2005 Event

There have been other periods of potential water shortage, such as a potential event occurred in 2005, but the potential was short-lived and did not impact customers. The WSRP was not activated in this year.

1992 Drought

In 1992, Tacoma Water experienced a different type of drought. A dry, mild winter and spring raised concerns about the ability of the Green River supply to meet municipal and instream needs in late summer and early fall. In June 1992, the Tacoma Public Utility Board implemented a two-step approach to Stage 2 of the Water Shortage Response Plan. At this time, water demand had surpassed 100 million gallons per day (mgd) and stream flows were near record lows. The stages were implemented as follows:

Water Shortage Response Plan



Stage 1: Tacoma Water established a water demand goal of 81 mgd or 20 percent reduction by June 17, 1992. All customers, including industrial, commercial, and institutional customers, were asked to reduce water use by 20 percent. In addition, Simpson was asked to implement all possible voluntary reductions. A mandatory restriction to limit lawn and turf watering to once per week was implemented for all customer classes. Some exceptions were allowed for new landscape installations.

Stage 2: A mandatory ban on lawn and turf watering for all customer classes was authorized if the 20 percent reduction goal was not met by July 1, 1992. The goal was not met, so lawn watering was prohibited as of July 6, 1992. Exceptions were allowed for new lawns, and gardens. The Tacoma City Council also amended the Simpson contract to include a “temporary reduction incentive” that reduced the contract demand charge, providing greater financial incentives for water conservation.

Mandatory restrictions were lifted in August 1992 as supply levels returned to normal with the onset of rainy weather.

1987 Drought

On September 1, 1987, Tacoma Water agreed to limit diversions from the Green River to slow depletion of the supply in the Howard Hanson Reservoir. This action was taken due to an extremely low streamflow and the risk of losing the ability to supplement future flows from the reservoir because of a low pool of water. On October 14, 1987, the Tacoma Public Utility Board approved a Water Conservation and Curtailment Plan that outlined a four-stage response plan. On October 15, 1987, Tacoma Water implemented Stage 3, mandatory water use restrictions, prohibiting outdoor water use and curtailing a portion of the supply of water to the Simpson Tacoma Kraft paper mill (Simpson). In December 1987, the water supply situation had improved to the point that mandatory water use restrictions were lifted.



APPENDIX D

Appendix D – Communication and Outreach Framework

This document is intended to provide a framework for communication and outreach efforts during implementation of the Water Shortage Response Plan. The actual communication and outreach plan will be developed during each implementation of the WSRP. The initial plan will be developed in the Preparation Stage, during which TW plans for the potential of moving into the Voluntary Stage. The communication and outreach plan will be modified as implementation of the WSRP continues, especially if TW moves into the Mandatory and/or Emergency Stage.

The communication and outreach plan should include the following elements: overall purpose, goals, audience, and tools. More information on each of these elements is provided further below. Selected examples of tools used during the 2015 WSCP implementation are also included.

The following steps should be used to develop the communication and outreach plan:

1. Confirm/modify the overall purpose
2. Confirm/modify the goals
3. Identify which audiences to target and/or to prioritize
4. Identify which tools to develop
5. Match the audiences and the tools
6. Identify staff responsible for developing the tools
7. Identify staff responsible for implementing the communication/outreach
8. Track the implementation
9. Modify as necessary

Overall Purpose

The overall purpose of the communication and outreach effort is to make sure everyone is aware of the "drought/shortage message", which consists of the following components:

1. We are experiencing a drought/shortage
2. We are asking everyone to help by.....(*to be determined for appropriate WSRP stage*)
3. We have suggestions/requirements on how to reduce water use
4. Also see the "key public messages" under each WSRP stage

Goals

There are three goals of the communication and outreach effort, as follows:

1. Build awareness
2. Create a community presence
3. Targeted messaging

Audiences

There are a variety of audiences for the communication and outreach efforts. Some audiences are broad in nature, while others are very specific. The seven main audiences, including locations/organizations/other subcategories, are as follows:

1. General Public
 - City of Tacoma community centers
 - City of Tacoma libraries
 - City of Tacoma neighborhood service centers
 - Tacoma Water Public Advisory Committee

Water Shortage Response Plan



- Community events
- Farmers markets
- Multifamily property management associations
- Churches
- 2. Irrigation Community
 - Area parks and recreation departments
 - Schools
 - Prominent nurseries
 - Professional landscape/nursery organizations
 - Garden Hotline
- 3. Large Users (other than irrigation community)
 - TPU key account representatives
- 4. Business Community
 - Chambers of commerce
 - Business improvement districts
 - Commercial building operator associations
 - Hotel and restaurant association(s)
 - City of Tacoma Office of Economic Development
- 5. Environmental Community
 - Green River Flow Management Committee
 - Save Tacoma Water
- 6. City of Tacoma Employees

Tools

There are a variety of tools that can be used for the communication and outreach efforts. Tools used, or considered, for previous WSRP implementations are show below. The list includes both paid and “earned” media. Note that tools may change over time, especially as changes occur in technology and customers’ preferences.

1. Utility website
2. Tips/restrictions flyer
3. Regular utility publication (bills, bill inserts, newsletters, etc)
4. Press release
5. FAQ
6. Print ad
7. Television ad
8. Radio ad
9. Web ad
10. Social media posting (Facebook, Twitter, Nextdoor, blogs, etc)
11. Signage (building, vehicle, park, etc)
12. Email
13. Letter/postcard
14. Phone call
15. Presentation at meeting
16. Industry newsletter
17. Drought message in email signature line
18. Recording for on-hold callers to utility customer service phone number



APPENDIX E



Appendix E - Potential Customer Demand Reduction Actions

Potential Customer Demand Reduction Actions ¹ (see footnotes)									
	End Use ²	Behavior or Hardware ³	Implementation Stage ⁴	Indoor or Outdoor ⁵	Season ⁶	Sector ⁷	Action ⁸	Potential to enforce ⁹	Potential Exemption ¹⁰
1	Clothes Washing	Behavior	N/A - Conservation	Indoor	Year Round	NR	Towels On Request: Provide new towels only on request.	N	
2	Clothes Washing	Hardware	N/A - Conservation	Indoor	Year Round	SF & MF	Efficient Clotheswashers: If buying a new clotheswasher, select a waterefficient model. Clotheswashers are the second largest water users in homes.	N	
3	Clothes Washing & Dish Washing	Behavior	N/A - Conservation	Indoor	Year Round	All	Wash Full Loads: Wash only full loads of laundry and dishes.	N	
4	Cooling Towers	Behavior	N/A - Conservation	Indoor	Year Round	NR	Check Cooling Towers: Check cooling towers for overflow and excessive blowdown.	N	
5	Dish Washing	Behavior	N/A - Conservation	Indoor	Year Round	SF & MF	Don't Pre-Rinse Dishes: Don't pre-rinse dishes unless heavily soiled. Most new dishwashers don't require pre-rinsing	N	
6	Faucets	Behavior	N/A - Conservation	Indoor	Year Round	SF & MF	Turn Off Tap: Turn off the tap while brushing your teeth or shaving.	N	
7	Faucets	Behavior	N/A - Conservation	Indoor	Year Round	All	Minimize Garbage Disposal: Put food waste in your compost bin, rather than using your garbage disposal.	N	
8	Faucets	Behavior	N/A - Conservation	Indoor	Year Round	NR	Thaw in Fridge: Thaw frozen food in the refrigerator, rather than under running water.	N	

Potential Customer Demand Reduction Actions ¹
(see footnotes)

	End Use ²	Behavior or Hardware ³	Implementation Stage ⁴	Indoor or Outdoor ⁵	Season ⁶	Sector ⁷	Action ⁸	Potential to enforce ⁹	Potential Exemption ¹⁰
9	Faucets	Hardware	N/A - Conservation	Indoor	Year Round	SF & MF	Efficient Faucets: Replace older bathroom faucet aerators with WaterSense models, which use far less water. (Note: There are different flow rates for residential vs non-residential. This is the residential version.)	N	
10	Faucets	Hardware	N/A - Conservation	Indoor	Year Round	NR	Efficient Faucets: Replace older bathroom faucet aerators with newer, more-efficient models that use 0.5/1.0 gallons per minute or less. (Note: There are different flow rates for residential vs non-residential. This is the nonresidential version.)	N	
11	Hose	Behavior	N/A - Conservation	Outdoor	Year Round	All	Use a Broom Not Hose: Use a broom, rather than a hose, to clean sidewalks, driveways, and patios.	N	
12	Hose	Behavior	N/A - Conservation	Outdoor	Year Round	All	Hose Shut-Offs: Never leave a hose running; always use a shut-off nozzle.	N	
13	Irrigation - Frequency	Behavior	N/A - Conservation	Outdoor	Summer	All	Water Deeply, But Infrequently: It's better to have one or two deep waterings, rather than several shallow waterings.	N	
14	Irrigation - Method	Behavior	N/A - Conservation	Outdoor	Summer	All	Tune Up Automatic Systems: Do an efficiency tune up of your automatic irrigation system such as fixing overspray onto sidewalks and ensuring sprinkler heads reach adjacent sprinkler heads.	N	

Potential Customer Demand Reduction Actions ¹ (see footnotes)									
	End Use ²	Behavior or Hardware ³	Implementation Stage ⁴	Indoor or Outdoor ⁵	Season ⁶	Sector ⁷	Action ⁸	Potential to enforce ⁹	Potential Exemption ¹⁰
15	Irrigation - Method	Behavior	N/A - Conservation	Outdoor	Summer	All	Get Water to the Roots: Use soaker hoses, drip irrigation, or watering wands to deliver water where it's needed.	N	
16	Irrigation - Method	Behavior	N/A - Conservation	Outdoor	Summer	All	Water Young Trees Efficiently: Water young trees efficiently using a water bag. Trees planted 5 or fewer years ago need 15-20 gallons of water twice a week to thrive.	N	
17	Irrigation - Method	Hardware	N/A - Conservation	Outdoor	Summer	All	Upgrade Automatic Systems: Consider efficiency upgrades to your automatic irrigation system such as weather-based or soil-based controllers.	N	
18	Irrigation - Other	Hardware	N/A - Conservation	Outdoor	Summer	All	2 Inches of Mulch: Put 2 inches of mulch on planting beds and around trees, which reduces evaporation. Keep the mulch a hands-width away from the trunk.	N	
19	Irrigation - Plant Material	Behavior	N/A - Conservation	Outdoor	Summer	All	Mow High: Set your lawn mower blade to cut grass 2 inches high, which reduces evaporation	N	
20	Irrigation - Timing	Behavior	N/A - Conservation	Outdoor	Summer	All	Water Early or Late: Water before 8am or after 7pm, which reduces evaporation.	N	
21	Kitchen	Hardware	N/A - Conservation	Indoor	Year Round	NR	Commercial Kitchen Equipment: If buying new food steamers, dishwashers, or ice machines, select water-efficient models.	N	

Potential Customer Demand Reduction Actions ¹ (see footnotes)									
	End Use ²	Behavior or Hardware ³	Implementation Stage ⁴	Indoor or Outdoor ⁵	Season ⁶	Sector ⁷	Action ⁸	Potential to enforce ⁹	Potential Exemption ¹⁰
22	Leaks	Behavior	N/A - Conservation	Outdoor	Summer	All	Fix Leaks: Check for and fix outdoor leaks, such as at hose bibs, spray heads, valves, and broken pipes.	N	
23	Leaks	Behavior	N/A - Conservation	Indoor	Year Round	SF & MF	Fix Leaks: Check for and fix indoor leaks, such as at faucets. Also, check your toilets for silent leaks. Put several drops of food coloring in your toilet tank. After 10 minutes, if you have color in the toilet bowl, you have a flapper leak. (Note: For the non-residential sector, specify for “tank” toilets for the toilet check.)	N	
24	Other	Behavior	N/A - Conservation	Indoor	Year Round	NR	Equipment Not in Use: Turn off water using equipment when not in use, including dishwashers, garbage disposals, and food troughs.	N	
25	Other	Behavior	N/A - Conservation	Both	Year Round	NR	Employee Awareness: Increase employee awareness about using water wisely and encourage their suggestions.	N	
26	Other	Hardware	N/A - Conservation	Indoor	Year Round	NR	Other Water-Using Equipment: Consider upgrading any other water using equipment to models that are more efficient.	N	
27	Pools & Hot Tubs	Behavior	N/A - Conservation	Outdoor	Year Round	All	Pool & Hot Tub Covers: Use covers on swimming pools and hot tubs when not in use to reduce evaporation.	N	

Potential Customer Demand Reduction Actions ¹ (see footnotes)									
	End Use ²	Behavior or Hardware ³	Implementation Stage ⁴	Indoor or Outdoor ⁵	Season ⁶	Sector ⁷	Action ⁸	Potential to enforce ⁹	Potential Exemption ¹⁰
28	Showers	Hardware	N/A - Conservation	Indoor	Year Round	All	Efficient Showerheads: Replace older showerheads with WaterSense models, which use far less water.	N	
29	Toilets	Hardware	N/A - Conservation	Indoor	Year Round	All	Efficient Toilets: If buying a new toilet, look for a WaterSense or Premium WaterSense model, which use far less water than older models. Toilets are the largest water users in homes. (Note: For the non-residential sector, add urinals.)	N	
30	Vehicle Washing	Behavior	N/A - Conservation	Outdoor	Year Round	All	Wash Vehicles Wisely: Wash your vehicle(s) at locations that recycle water.	N	
31	Faucets	Behavior	Voluntary	Indoor	Year Round	NR	Water On Request: Serve water only on request, and then ask before refilling.	N	
32	Irrigation - Frequency	Behavior	Voluntary	Outdoor	Summer	All	Eliminate One Watering Day: Cut one day from your typical weekly watering schedule (except for young plants as noted elsewhere). (Note: The similar "Water X Times A Week Maximum" series might be preferred wording, but this is included as an option.)	N	

Potential Customer Demand Reduction Actions ¹ (see footnotes)									
	End Use ²	Behavior or Hardware ³	Implementation Stage ⁴	Indoor or Outdoor ⁵	Season ⁶	Sector ⁷	Action ⁸	Potential to enforce ⁹	Potential Exemption ¹⁰
33	Irrigation - Frequency	Behavior	Voluntary	Outdoor	Summer	All	Eliminate Two Watering Days: Cut two days from your typical weekly watering schedule (except for young plants as noted elsewhere). (Note: The similar "Water X Times A Week Maximum" series might be preferred wording, but this is included as an option.)	N	
34	Irrigation - Frequency	Behavior	Voluntary	Outdoor	Summer	All	Eliminate Three Watering Days: Cut three days from your typical weekly watering schedule (except for young plants as noted elsewhere). (Note: The similar "Water X Times A Week Maximum" series might be preferred wording, but this is included as an option.)	N	
35	Irrigation - Frequency	Behavior	Voluntary	Outdoor	Summer	All	Water Twice A Week Maximum: Limit plant watering to twice a week.	N	
36	Irrigation - Frequency	Behavior	Voluntary	Outdoor	Summer	All	Water Once A Week Maximum: Limit plant watering to once a week (except for young plants as noted elsewhere).	N	

Potential Customer Demand Reduction Actions ¹ (see footnotes)									
	End Use ²	Behavior or Hardware ³	Implementation Stage ⁴	Indoor or Outdoor ⁵	Season ⁶	Sector ⁷	Action ⁸	Potential to enforce ⁹	Potential Exemption ¹⁰
37	Irrigation - Method	Behavior	Voluntary	Outdoor	Summer	All	Water Young Trees Efficiently: Water young trees efficiently using a water bag. Trees planted 5 or fewer years ago need 15-20 gallons of water once a week to survive. (Note: This is only appropriate if the maximum temperatures are in the low 70s w/ occasional showers and not peak daylight hours.)	N	
38	Irrigation - Plant Material	Behavior	Voluntary	Outdoor	Summer	SF & MF	Let Lawn Go Golden: If your lawn isn't already dormant (brown), let it go dormant until the fall rains return. Just water deeply once each month to keep roots alive.	N	
39	Irrigation - Plant Material	Hardware	Voluntary	Outdoor	Summer	All	Plant in Fall: Consider delaying new plantings. Fall is the best time for planting new trees, shrubs and perennials, since rain provides natural irrigation.	N	
40	Pools & Hot Tubs	Behavior	Voluntary	Outdoor	Year Round	All	Minimize Filling Pools & Hot Tubs: Minimize refilling swimming pools and hot tubs.	N	
41	Pressure Washing	Behavior	Voluntary	Outdoor	Year Round	All	Minimize Pressure Washing: Do only essential pressure washing.	N	
42	Showers	Behavior	Voluntary	Indoor	Year Round	SF & MF	Shorter Showers (a): Reduce your showering time. (Note: This was the "shorter showers" action that was promoted during the 2015 WSCP implementation.)	N	

Potential Customer Demand Reduction Actions ¹									
(see footnotes)									
	End Use ²	Behavior or Hardware ³	Implementation Stage ⁴	Indoor or Outdoor ⁵	Season ⁶	Sector ⁷	Action ⁸	Potential to enforce ⁹	Potential Exemption ¹⁰
43	Showers	Behavior	Voluntary	Indoor	Year Round	SF & MF	Shorter Showers (b): Reduce your showering time by one minute.	N	
44	Showers	Behavior	Voluntary	Indoor	Year Round	SF & MF	Shorter Showers (c): Reduce your showering time, by two minutes.	N	
45	Showers	Behavior	Voluntary	Indoor	Year Round	SF & MF	Shorter Showers (d): Limit showers to five minutes or less.	N	
46	Vehicle Washing	Behavior	Voluntary	Outdoor	Year Round	All	Minimize Vehicle Washing: Reduce the frequency of, or eliminate, washing vehicles.	N	
47	Water Feature	Behavior	Voluntary	Outdoor	Year Round	All	Turn Off Water Features (a): Turn off non-recirculating water features such as fountains	N	Y
48	Water Feature	Behavior	Voluntary	Outdoor	Year Round	All	Turn Off Water Features (a): Turn off non-recirculating water features such as fountains	N	Y
49	Fire Lines	Behavior	Voluntary	Both	Year Round	NR	Minimize use of water in fire fighter training exercises.	N	Y
50	Fire Lines	Behavior	Mandatory	Indoor	Year Round	NR	No Fire Line Testing: Fire line testing within buildings is prohibited. (Note: Confirm w/ Fire Department this is reasonable.)	N	Y
51	Hose	Behavior	Mandatory	Outdoor	Year Round	All	No Hose Washing: Using a hose to clean sidewalks, driveways, and patios is prohibited. Use a broom instead.	Y	Y

Potential Customer Demand Reduction Actions ¹ (see footnotes)									
	End Use ²	Behavior or Hardware ³	Implementation Stage ⁴	Indoor or Outdoor ⁵	Season ⁶	Sector ⁷	Action ⁸	Potential to enforce ⁹	Potential Exemption ¹⁰
52	Irrigation - Frequency	Behavior	Mandatory	Outdoor	Summer	All	Water Twice A Week Maximum: Plant watering is only allowed twice a week, in accordance with the published schedule by address.	Y	
53	Irrigation - Frequency	Behavior	Mandatory	Outdoor	Summer	All	Water Once A Week Maximum: Plant watering is only allowed once a week, in accordance with the published schedule by address.	Y	
54	Irrigation - Method	Behavior	Mandatory	Outdoor	Summer	All	No Automatic Irrigation: Use of automatic irrigation systems is prohibited. Watering by hand, soaker hose, and/or drip irrigation is allowed.	Y	Y
55	Irrigation - Other	Behavior	Mandatory	Outdoor	Summer	All	No Irrigation: Irrigation is prohibited.	Y	Y
56	Irrigation - Plant Material	Behavior	Mandatory	Outdoor	Summer	All	No Lawn Watering: Watering of lawns is prohibited.	Y	Y
57	Irrigation - Timing	Behavior	Mandatory	Outdoor	Summer	All	Water Early or Late: Watering between 8am and 7pm is prohibited, due to high evaporation.	Y	
58	Pools & Hot Tubs	Behavior	Mandatory	Outdoor	Year Round	All	No Pools & Hot Tubs: Filling swimming pools and hot tubs is prohibited. (Note: Add a statement about safety around empty pools/tubs.)	Y	Y
59	Pressure Washing	Behavior	Mandatory	Outdoor	Year Round	All	No Pressure Washing: Pressure washing is prohibited.	Y	Y

Potential Customer Demand Reduction Actions ¹ (see footnotes)									
	End Use ²	Behavior or Hardware ³	Implementation Stage ⁴	Indoor or Outdoor ⁵	Season ⁶	Sector ⁷	Action ⁸	Potential to enforce ⁹	Potential Exemption ¹⁰
60	Toilets	Behavior	Mandatory	Indoor	Year Round	SF & MF	Less Toilet Flushing: Flush your toilet less often. As the saying goes, "If it's yellow, let it mellow." Toilet flushing is the largest water use inside the home.	N	
61	Vehicle Washing	Behavior	Mandatory	Outdoor	Year Round	All	No Vehicle Washing: Washing of vehicles is prohibited, unless at a location that recycles the water.	Y	
62	Water Feature	Behavior	Mandatory	Outdoor	Year Round	All	No Water Features (a): Use of nonrecirculating decorative water features such as fountains is prohibited.	Y	
63	Water Feature	Behavior	Mandatory	Outdoor	Year Round	All	No Water Features (b): Use of decorative water features such as fountains is prohibited.	Y	

1. This is a list of potential actions that customers can take to reduce their water use. The actual actions requested/required for each stage will depend on the severity, likely duration, and timing of the shortage, as well as the demand reduction needed. The list is in Excel, to allow for sorting and filtering, which should help develop the actual list of actions to be implemented.

2. The end use is how the water is being used and is typically a type of water-using fixture/equipment (e.g., showers).

3. The requested/required list of actions should include both hardware and behavior actions in order to: 1) increase the demand reduction potential, 2) ensure every customer type has actions they can do, and 3) minimize the cost to participate. For example, since some customers do not have control over their water-using hardware, it is important to make sure they have behavior actions. Similarly, since behavior actions are typically free, it is important to include many of them.

4. The stage designation is a suggestion, but may be appropriate to change due to circumstances of a particular shortage. Note the following about the stage designations:

- N/A - Conservation: None of the actions are designated in Preparation since that stage is internally focused and is not intended to include outreach to customers. However, some actions are identified as Conservation for two reasons. First, if the public/press becomes aware that TW has activated the WSRP (at the Preparation Stage level), TW may be asked to provide suggested customer actions. In that case, the Conservation actions (things



Potential Customer Demand Reduction Actions ¹									
(see footnotes)									
	End Use ²	Behavior or Hardware ³	Implementation Stage ⁴	Indoor or Outdoor ⁵	Season ⁶	Sector ⁷	Action ⁸	Potential to enforce ⁹	Potential Exemption ¹⁰

TW recommends continually and do not involve customer sacrifice) would be appropriate. Second, many of the Conservation actions can be promoted in the higher stages since some customers may choose not to follow these recommendations and, thus, while technically conservation actions, can be used as curtailment actions.

- Voluntary/Mandatory: The Voluntary and Mandatory actions are true curtailment.
 - Emergency: No Emergency actions are identified; however they would likely be the Mandatory actions, without most exemptions.
5. The requested/required list of actions should include both indoor and outdoor actions in order to: 1) increase the demand reduction potential, and 2) ensure every customer type has actions they can do. For example, since apartment dwellers won't be able to implement most outdoor actions, it is important to make sure there are a sufficient number of indoor actions for them.
6. The seasonality of the action is important to consider in regards to the timing of the shortage. For example, if the shortage does not occur during the summer, it is unlikely that the Summer actions (mostly irrigation-related) would be useful.
7. SF = single family; MF = multifamily; NR = non-residential (commercial, industrial, institutional). The requested/required list of actions should include options for all sectors in order to: 1) increase the demand reduction potential, and 2) ensure every customer type has actions they can do.
8. The specific language for each measure has been crafted based on previous implementations of the WSRP. However, the language is still just a suggestion and can be edited for many reasons including length. Note that some end uses have several, similar sounding actions. In some cases, it is to provide options for the team to consider (e.g., the number of days to restrict irrigation to). In other cases, it is to provide actions for several stages (e.g., minimize vehicle washing for voluntary and prohibit vehicle washing in mandatory.)
9. The column indicates whether TW would likely enforce the action. Enforcement is only applicable to the Mandatory (and the eventual Emergency) actions. Outdoor actions are typically stronger candidates for enforcement, compared to indoor actions, since TW staff can more readily see outdoor water uses (e.g., irrigation, hose use, car washing, etc.).
10. Some Mandatory (and the eventual Emergency) actions will have exemptions associated with them, such as for irrigation restrictions. This column indicates a potential exemption. See a separate appendix for more details regarding exemptions.



APPENDIX F



Appendix F – Wholesale and Partner Customer Outreach Suggestions

This list is intended to assist our wholesale and Partner utilities with suggested responses when Tacoma Water has implemented the Water Shortage Response Plan.

What Tacoma Water will do:

Statewide Actions and Messaging: Coordinate with Ecology, Health, and Governor's Office.

Tri-County Actions and Messaging: Coordinate with Seattle and Everett, as needed.

Tacoma Water Supply System Actions and Messaging: Lead coordination of the Drought Response Team and call-up the Tacoma Water Public Advisory Committee.

Press Release: Issue regional press releases to major media outlets (& conduct subsequent media interviews). This is usually done in close coordination with Seattle and Everett to minimize regional confusion.

Traditional Media: Purchase regional traditional media ads such as tv, radio, print, as appropriate.

Drought Website: Host a website to serve as the main drought website.

Tips Flyer, FAQ - Create: Create a flyer that helps customers: 1) understand there is a shortage situation and 2) understand ways to reduce their water use.

Irrigation Community: Outreach to large irrigators contacts including parks/recreation departments and schools. For contacts that are in wholesale customers' service areas, TW will coordinate the outreach with the appropriate wholesale customer.

Wholesale and Partner Communication: Outreach to our wholesale customers and Partners. Provide access to FAQ's and other communications materials, as appropriate.

Suggestions for each utility:

Utility Websites: Post drought information prominently on the utility's homepage and link to the regional drought website.

Tips Flyer, FAQ - Utilize: Make the tips flyer and FAQ readily available (e.g., on utility website, in utility lobby, distribute in public areas such as community centers, libraries, etc.).

Utility Bill / Insert / Newsletter: Include drought messages in existing utility "publications" such as bills, bill inserts, newsletters, etc.

Social Media: Include drought messages in any social media vehicles used by the utility such as Facebook, twitter, Next Door, etc.

Signage: Post signage in appropriate locations (e.g., at utility buildings, on utility vehicles, in key locations in service area).

Brief Staff: Brief utility staff, using the TW-produced FAQ as one tool.

Events: Highlight the drought message at community events the utility is participating in.

Key Customers: Contact key customers directly (e.g., large water users, significant irrigators, highest billing tier, etc.).

Local Press Release: Issue press releases to local media outlets (& conduct subsequent media interviews).

On-Hold Message: Add drought alerts to messaging that customers calling in hear while on hold.

Email Signature Line: Add a drought message in the email signature for utility staff.



APPENDIX G



Appendix G – Potential Exemptions for Water Use Restrictions

This document provides a framework for developing and implementing exemptions to customer water use restrictions that are part of the Mandatory and Emergency stages of the WSRP.

- **Background**

- Water use restrictions are key components of the Mandatory and Emergency Stages of the WSRP. For some water use restrictions, exemptions for continued water use may be appropriate. Exemptions can be useful in balancing the need to reduce overall water demand with minimizing hardships imposed on customers and certain industries, as well as protecting health and safety. For example, in the Mandatory stage, Tacoma Water may prohibit irrigation for established plants, while allowing irrigation for newly planted landscapes because of their need for water to survive their establishment period.
- The importance of exemptions, and effective implementation of them, was learned from previous implementations of the WSRP by TPU and other local utilities at various stages. In one example, lawn watering was banned and initially there were no clear exemptions. Prohibiting lawn watering is a sensitive issue, and doing so without clear exemptions made the situation even more difficult.
- As described previously, the WSRP does not pre-identify specific demand reduction actions for each stage. Rather a comprehensive list of potential actions customers can take to reduce water use is provided in Appendix E. The actual actions requested or required for each stage will depend on the severity, likely duration, and timing of the shortage, as well as the demand reduction needed.
- Similarly, the exact exemptions for the water use restrictions eventually selected for implementation in the Mandatory and Emergency Stages are not pre-identified. Rather this document provides a framework to be used during each implementation of the WSRP for how to develop and implement the restrictions.

- **Potential Exemptions**

- Potential exemptions that should be considered include, but are not limited to, the following:
- Irrigation
 - Newly planted landscapes (Will need to define “new” which could be within 12 months, within the calendar year, or something else. For lawns, likely clarify that “new” does not include overseeding. Need to be clear that plantings done after restrictions are announced are not eligible unless done as part of a capital project and necessary for a functional purpose such as slope stabilization, rather than for aesthetics).
 - Sports fields (because they contribute to physical and psychological benefits of children and adults, and can be dangerous if not kept watered).
 - Golf course tees and greens (restrictions would apply to the fairways).
 - High traffic turf in parks.
 - Trees (because they cannot be quickly or inexpensively replaced).
 - Plant nurseries and garden centers watering plant inventory.

- Food crops.
- Disabled gardeners who cannot hand water (applicable to prohibition of automatic systems; likely do not publicize).
- Vehicle Washing
 - Vehicle washing at a commercial car washing facility. (The default potential restriction for vehicle washing is “washing of vehicles is prohibited, unless at a location that recycles the water”.) This potential exemption is essentially changing that restriction to be “washing of vehicles is prohibited, unless at a commercial facility” and is a recognition that the former might have a significant negative financial impact on car washes that do not recycle the water.
- Pressure Washing
 - Pressure washing necessary to protect public health and safety (not for aesthetic purposes), such as washing downtown parks/sidewalks to clear trash, food, and human waste.
 - Pressure washing that is part of scheduled building rehabilitation, such as preparing a surface for painting.
- Hose Washing
 - Hose washing necessary to protect public health and safety (not for aesthetic purposes), such as washing downtown parks/sidewalks to clear trash, food, and human waste.
- Swimming Pools and Hot Tubs
- Health care facilities such as hospital physical therapy pools.
 - Commercial businesses where swimming pools or hot tubs are central to their business and shutting them down would have a significant negative financial impact.
 - Public swimming and wading pools, since they serve a large number of people and can offset the use of private, personal pools that serve a small number of people.
- Fire Line Testing
 - Testing necessary to protect public health and safety.
- Private Wells / Reclaimed Water
 - Any use of water that is not from the public water system but is from private wells or reclaimed water. TW does not have the authority to restrict use of these sources. TW could encourage users to post signs to indicate that alternative sources of water are being used.
- **Development Process**
- The recommended process to develop and implement the exemptions is as follows:
- Once the water use restrictions have been determined, develop any associated exemptions. The development of the exemptions should include input from the impacted parties. This can be done through the Tacoma Water Public Advisory Committee and/or



outreach to specific industries such as landscaping, car washing, and building management.

- Decide whether each exemption will require pre-approval by TW.
- Develop the process and systems necessary for processing exemption requests.
 - Customer contacts TW
 - Need to determine TW contact
 - Need to determine submission method (e.g., email, phone, website)
 - Need to determine submission contents (e.g., name, address of water use, water account number, description of how they fit the exemption, any required proof)
 - Enter request into tracking system
 - Need to develop tracking system (e.g., Excel spreadsheet)
 - Determine whether request qualifies or not
 - Need to set criteria to be considered for qualifying exemptions, with some discretion on behalf of TW (e.g., undue financial hardship, public health and safety, etc.).
 - Need to determine who can authorize exemptions (the primary contact or higher level?)
 - Notify customer of result
 - Need to determine notification method (e.g., email, phone, website)
 - Need to determine whether customer will be required to post notice of exemption from TW.
- Publicize the exemptions and the process to request an exemption when the restrictions are announced, including noting that exemptions may be revoked if the water supply situation worsens.



APPENDIX H



Appendix H - Supply and Storage Actions

Project	Type	Project Description	Potential Yield	Implementation Speed	Estimated Cost	Notes
Tacoma Well Fields	Groundwater	Use Tacoma well fields up to maximum aquifer yield	Large	Fast	Low	This is currently done in all potential drought years. Used in 2015.
Tacoma Well Fields	Groundwater	Use Tacoma well fields beyond sustainable yield (mine aquifers)	Large	Fast	Low	Cannot be done in adjacent years. Additional pump capacity must be installed to achieve adequate rate.
Purchase stored water from other AWSP Partners	Storage	TW purchases water that is still in storage above HHD	Medium to Large	Fast	Low	Used in 2015.
Eagle Lake	Surface water	Pump Eagle Lake	Medium (2kAF to 4kAF)	Fast	Low	Used in 2015.
Wholesale Purchases from Lakehaven Utility District	Intertie	TW purchases water through a combination of interties from Lakehaven Utility District	Medium (hydraulically limited)	Fast	Low	Used in 2015.
Tacoma Well Fields	Groundwater	Start Inefficient wells	Small	Fast	Low	Used in 2015.
Tacoma Well Fields	Groundwater	Start seldom-used wells (usually wells with aesthetic issues)	Small	Fast	Low	Used in 2015.
Tacoma Well Fields	Groundwater	Start wells with corrosion control issues	Small	Fast	Low	Used in 2015.
Borrow Howard Hanson water from Corps,	Storage	Borrow stored water from Corp, backed with fall groundwater pumping	Small	Fast	None	Needs conceptual development and negotiated with Corps.
Howard Hanson Fish Passage	Storage	Complete Tacoma's "Additional Water Storage Project," securing 10,000 ac-ft of storage	Large	Slow to construct, Fast after implementation	Low	Part of AWSP, still owe 1.64% of Fish Passage Facility cost.
Partnership with Lakehaven Utility District's OASIS Project	Groundwater	Partnership for use of the Optimization of Aquifer Storage for Increased Supply (OASIS) Project	Large	Slow to construct and negotiate, Fast after implementation	Low to Medium	Written expression of interest to further discuss partnership made in December 1995.

Water Shortage Response Plan



Project	Type	Project Description	Potential Yield	Implementation Speed	Estimated Cost	Notes
Existing Wells	Groundwater	Rehabilitate/replace wells to maximize production capacity and improve reliability.	Medium	Slow to construct, Fast after implementation	Medium	Can be done using existing water rights.
Optimize Howard Hanson/ Green River System Start Date	Storage	Change of start of storage date to be earlier than is currently implemented	Medium	Slow to negotiate, Fast after implementation	None	Requires extensive interaction & decision-making by USACOE.
Optimize Howard Hanson/ Green River System Operations	Storage	More efficient and effective use of system storage (including change of start of storage date).	Medium	Slow to negotiate, Fast after implementation	None	Requires extensive interaction & decision-making by USACOE.
Reclaimed water use	Reclaimed Water	Use of reclaimed water for landscaping and industrial purposes	Low to Medium	Very Slow to negotiate and construct, Fast after implementation	Very High	Coordinate with City of Tacoma Environmental Services, Wastewater Management.
Seattle-Tacoma Intertie	Intertie	Construct a pipeline between SPU's Lake Youngs (~10 miles) and Tacoma's system	Large, TBD	Very Slow to construct and negotiate, Fast after implementation	Very High	Linked to Forum Resiliency Study outcomes. Requires joint action with Seattle. Negotiated previously as part of SSPP, but not implemented.
Indirect reuse via groundwater infiltration	Reclaimed Water	Infiltrate reclaimed water to be used to provide water rights mitigation credits for additional groundwater use	Low	Very Slow to construct and negotiate, Fast after implementation	High	Requires study & permit from Ecology. Some regulatory challenges, but can be overcome.
Chambers Creek Properties Landscape Irrigation	Reclaimed Water	Use of reclaimed water from the Chambers Creek Wastewater Treatment Plant for irrigation for nearby properties and Chambers Bay Golf Course	Low	Very Slow to construct and negotiate, Fast after implementation	High	Identified as a Pierce County Wastewater Utility project but would offset water use from TW in these areas.

Water Shortage Response Plan



Project	Type	Project Description	Potential Yield	Implementation Speed	Estimated Cost	Notes
Wholesale purchases of water from Cascade's Lake Tapps	Surface water	Purchase water from Cascade Water Alliance (CWA) from their water rights associated with the development of Lake Tapps as a source. Develop treatment works and conveyance pipeline(s).	Large	Very Slow to negotiate, Fast after implementation	Very High	Requires construction of treatment and conveyance works. Cascade actions to construct treatment are currently deferred.
Additional Howard Hanson Storage	Storage	Add 12,000 ac-ft of storage, or which 9,600 ac-ft goes to environmental. A net of 2,400 is made available for municipal use	Medium	Very Slow to construct and negotiate, Fast after implementation	Unknown	Requires Study and permits from regulators.
Other Aquifer Storage and Recovery (ASR)	Groundwater	Develop ASR facilities to store water from times of surplus supply	Unknown	Unknown	Unknown	Written expression of interest to further discuss partnership made in December 1995.
Desalination	Groundwater	Convert sea water from Puget Sound into fresh water for potable supply.	Large, 50 mgd	Very Slow	Very High (\$727M)	Advances in technology are needed to reduce costs.