

CHAPTER 9. WATER SHORTAGE CONTINGENCY PLAN

CONTINGENCY PLAN

This chapter describes the City's Water Shortage Contingency Plan, including the following:

- Water conservation stages for water supply reductions up to 50 percent.
- Minimum water supply for the next three years based on the driest three-year historic period for the City.
- Actions to be taken during catastrophic interruption of water supplies.
- Mandatory prohibitions and consumption reduction methods.
- Penalties and charges for excessive use.
- Discussion of potential revenue and expenditure impacts.
- Mechanisms for determining actual reductions in water use.

PLAN DEVELOPMENT

The City's Water Shortage Contingency Plan was developed by City staff in 1991 at the request of Governor Pete Wilson, in response to the 1987 to 1992 drought conditions in California. The City's Water Shortage Contingency Plan was adopted by City Council on January 28, 1992 and was included in the City's 1996 and 2000 UWMPs. This Water Shortage Contingency Plan, if implemented, would be enforced within the City's service area.

Preparation of the plan was coordinated with other local water purveyors, such as Arcade Water District (now Sacramento Suburban Water District), that have interties with the City. In addition, a copy of this plan was submitted to the City and County Offices of Emergency Planning.

STAGES OF ACTION

One of the key elements of the Water Shortage Contingency Plan is a staged Water Use Reduction Plan (Reduction Plan). As shown on Table 9-1, the City's Reduction Plan contains four stages, which address water supply shortages of up to 50 percent.



Table 9-1. City of Sacramento Water Use Reduction Plan^(a)

Stage	Shortage Condition	Required Water Use Reduction
1	Up to 20 percent	10 to 20 percent
2	20 to 30 percent	30 percent
3	30 to 40 percent	40 percent
4	40 to 50 percent	50 percent

^(a) Source: 1991 Water Shortage Contingency Plan as documented in the City’s 2000 UWMP.

Each stage of the Reduction Plan is generally triggered by a water shortage condition. The triggers used to determine a stage of action are usually external to the City. Although highly unlikely, conservation triggers may include surface water diversion reductions mandated by the State Water Resources Control Board.

Stage 1 of the Reduction Plan will be triggered when it is anticipated that there will be a 20 percent reduction in the City’s water supply. Under this stage, the City will request customers to reduce water consumption by 10 to 20 percent, and will enact specific water use restrictions (see draft resolution in Appendix I). Subsequent Reduction Plan stages will be implemented if additional water supply reductions occur and will include enactment of additional water use restrictions. Successive stages of the Reduction Plan will be declared only after exhausting efforts to make a prior stage successful. Stage 2 will be triggered by a reduction of water supplies up to 30 percent. Stage 3 will be triggered by a reduction of water supplies up to 40 percent. Stage 4 will be triggered by a reduction of water supplies up to 50 percent.

In some cases, however, it may be necessary for the City to skip stages of the Reduction Plan. This may occur during a natural disaster or when the health and safety of the persons within the City’s water service area are jeopardized. The Reduction Plan is designed to be flexible so that the City can respond to the specific situation occurring at a particular time.

Table 9-2 summarizes the key elements for each stage of the Reduction Plan and the requested customer actions. Appendix I contains a draft resolution which can be used to implement one or more stages of the Water Shortage Contingency Plan. The draft resolution is provided as a model, and the text of any resolution and/or ordinance actually adopted may vary from the draft provisions presented in Appendix I.

It should be noted that the actions included in each stage are cumulative, meaning that if Stage 2 of the Water Shortage Contingency Plan is implemented, all of the measures in Stages 1 and 2 shall be implemented. Likewise, if Stage 3 is implemented, all of the measures in Stages 1, 2 and 3 shall be implemented. If Stage 4 is implemented, all of the measures in Stages 1, 2, 3 and 4 shall be implemented.



Table 9-2. Stages of Action for Water Shortages (DWR Table 23,27)

Stage	Water Conservation Savings Goal	City Actions	Requested Customer Actions
Normal		<p>Current City Code⁽⁶⁾:</p> <ul style="list-style-type: none"> • Water shall not be wasted due to leaky or faulty water fixtures (§13.04.840). • Water shall not be allowed to become water waste runoff and to flow away over the surface of the ground. (§13.04.850). • No person shall use water for the purpose of washing down sidewalks, driveways, or parking areas except to alleviate immediate fire or sanitation hazards. (§13.04.860). • Landscape irrigation shall be prohibited between the hours of 12:00 noon and 6:00 pm from the last Sunday in April to the last Sunday in October. (§13.04.860). • Residential and commercial locations bearing a street address ending in an odd number shall be permitted to irrigate only on Tuesday, Thursday and Saturday and locations bearing a street address in an even number shall be permitted to irrigate only on Wednesday, Friday and Sunday. There shall be no water irrigation on Mondays. (§13.04.860). • No person shall use City water for irrigation or the sprinkling of lawns through an automatic sprinkler for a period exceeding thirty (30) minutes or through a hose for a period exceeding two and one-half (2½) hours during each calendar day. (§13.04.860). 	
1	10 to 20%	<p>Adopt necessary ordinances to:</p> <ul style="list-style-type: none"> • Initiate public information campaign • Ask customers for 10 to 20 percent use reduction • Increase efficiency of system operations: <ul style="list-style-type: none"> – Enforce hydrant use regulations – Intensify leak detection and repair program – Reduce watering of parks, cemeteries to designated days and hours • Increase water waste patrols • Require shut-off valves on all hoses • Enforce 3 day/week outdoor irrigation schedule 	<ul style="list-style-type: none"> • Landscape irrigation restrictions: <ul style="list-style-type: none"> • Odd/even outdoor watering schedule • No outdoor irrigation on Monday • 12:00 noon to 6:00 pm prohibition during daylight savings period
2	20 to 30%	<p>Adopt additional ordinances to:</p> <ul style="list-style-type: none"> • Limit outdoor irrigation to 2 days/week • Allow car washing with bucket only • Further limit park, cemetery, etc. irrigation • Further limit hours for outdoor irrigation • Limit public water uses only to health and safety needs • Main flushing allowed only for emergency purposes • Intensified public education program 	<ul style="list-style-type: none"> • Landscape irrigation restrictions: <ul style="list-style-type: none"> – 2 day/week schedule – Watering time reduced • Cars washed with buckets only • No washing down of paved surfaces
3	30 to 40%	<p>Adopt additional ordinances to:</p> <ul style="list-style-type: none"> • Limit outdoor irrigation to 1 day/week, manual application • Prohibit car washing • Further limit park, cemetery, etc. irrigation • Further limit hours for outdoor irrigation • Continue vigorous public information campaign • Intensify leak detection program 	<ul style="list-style-type: none"> • Landscape irrigation restrictions: <ul style="list-style-type: none"> – 1 day/week schedule with manual application • No car washing
4	40 to 50%	<p>Adopt additional ordinances to:</p> <ul style="list-style-type: none"> • Prohibit outdoor irrigation of turf areas • Further reduce park, cemetery, etc. irrigation • Prohibit irrigation of median strips 	<ul style="list-style-type: none"> • Landscape irrigation restrictions: <ul style="list-style-type: none"> – No residential turf watering – No median strip watering – Reduced irrigation to parks

⁽⁶⁾ City Municipal Code (Title 13 Public Services, Chapter 13.04 Water Service System, Article XI Water Conservation).



ESTIMATED MINIMUM WATER SUPPLY FOR NEXT THREE YEARS

The City has three sources of supply, American River water, Sacramento River water, and groundwater. As described in Chapter 5, the American River supply is subject to limitations applicable to diversions to the FWTP during extremely dry years and Hodge Flow conditions. The estimated minimum water supply for the next three years assumes a multiple dry year condition, as described in Chapter 5, consisting of two normal years with Hodge Flow Criteria governing every month and a third year with extremely dry year conditions, and are representative of actual conditions present in 1933, 1934 and 1977, respectively. Table 9-3 presents the estimated minimum water supply for the next three years.

Table 9-3. Estimated Minimum Water Supply for the Next Three Years (DWR Table 24)

Supply Source	Projected Minimum Water Supply, acre-feet		
	2006	2007	2008
American River ^(a)	127,700	132,200	132,213
Sacramento River ^(b)	81,800	81,800	81,800
Groundwater ^(c)	0	0	0
Total Supply	209,500	214,000	214,013
Projected Water Demand (Retail and Wholesale)^(d)			
Assuming No Conservation	147,700	156,400	165,100
Assuming 7.5% Conservation	146,600	154,200	161,800
Assuming 25.6% Conservation	144,100	149,200	154,300
Projected Supply Shortfall	No Shortfall Projected		

- (a) American River projected minimum water supply based on Fairbairn Water Treatment Plant diversion limitations due to extremely dry year and Hodge Flow conditions.
- (b) Sacramento River projected minimum water supply based on City’s Sacramento River permit.
- (c) Table 9-3 demonstrates that the City has sufficient surface water supplies to accommodate demands, although the availability of groundwater enhances the City’s overall water supply reliability and the City may use groundwater to satisfy demands.
- (d) See Chapter 6.

Also shown in Table 9-3 are the projected demands (for both the City’s retail and wholesale customers) for the next three years (see Chapter 6). As shown, even if no water conservation is assumed for the next three years, the estimated minimum water supply is sufficient to meet the projected water demands and no supply shortfall is projected.



DROUGHT/EMERGENCY PLANNING ACTIONS

In addition to responding to drought conditions, the City's Water Shortage Contingency Plan can be used to respond to emergency conditions that interrupt water supplies to the City. Water supplies may be interrupted in the future due to water supply contamination, treatment plant shutdown, major transmission pipeline break, regional power outage, or a natural disaster such as an earthquake or flood. Actions that the City would take if these emergencies occurred today are outlined below.

No Water Available from the American River

In the event that the American River supply becomes contaminated (i.e. due to a chemical spill or other environmental incident) or the FWTP is shutdown (i.e. due to a treatment process or mechanical failure), it may be possible that no water would be available from the American River for a period of time. In such a case, the City would need to rely on the Sacramento River supply source (using the SRWTP) and the groundwater supply to meet demands.

Figure 9-1, shows various water supply outage scenarios. As shown, if the FWTP is out of service, the treatment capacity at the SRWTP is 160 mgd and the groundwater pumping capacity available is assumed to be 30 mgd. This would provide the City with up to 190 mgd of supply, which would be adequate to meet existing (2005) average day demands, but would be inadequate to meet existing (2005) maximum day demands. If such an event were to occur in the summer months, when demands were high, it may be necessary for the City to implement one or more stages of the Water Shortage Contingency Plan to notify customers of the need to reduce water use until the American River water supply (treated at the FWTP) could be restored.

The use of one water treatment plant to meet the City's demands is a common practice during the winter months when maintenance is required at either of the water treatment plants. When water demands are lowest in the winter, one plant is taken out of service for four to six weeks during November through February, with the remaining plant providing 100 percent of the treated surface water deliveries for the City's customers. When maintenance and repairs are completed, the plant is returned to service and the other plant is taken out of service for routine maintenance.

If additional Sacramento River diversion and treatment capacity is constructed in the future, additional system redundancy and treatment capacity from the Sacramento River would be available to assist in meeting water demands until the American River water supply could be restored.

No Water Available from the Sacramento River

Similar to the case where the American River supply is not available, it may be possible for the Sacramento River supply to become unavailable due to contamination, treatment plant failure at the SRWTP or major transmission pipeline break. Under such a case, the American River supply, using the FWTP, and the groundwater supply would need to be relied upon to meet the City's demands.



With the recent expansion of the FWTP, the treatment capacity is 200 mgd; however, diversions at the FWTP presently are subject to the Hodge Flow Conditions which would limit FWTP diversions to 100 mgd during certain drought conditions. As shown on Figure 9-1, if the SRWTP was out of service, the American River supply (treated at the FWTP), together with the groundwater supply of 30 mgd, would provide the City with 130 to 230 mgd of supply, which would be adequate to meet existing (2005) average day demands, but may not be adequate to meet existing (2005) maximum day demands. If such an event were to occur in the summer months, when demands were high, it may be necessary for the City to implement one or more stages of the Water Shortage Contingency Plan to notify customers of the need to reduce water use until the Sacramento River water supply could be restored.

If additional Sacramento River diversion and treatment capacity is constructed in the future, increased system redundancy from the Sacramento River would be available to assist in meeting water demands if the loss of the Sacramento River supply was due to a malfunction at the SRWTP, break in a major transmission main serving the SRWTP, or contamination downstream of the new Sacramento River facility. If the loss of the supply were due to contamination of the Sacramento River supply source, the City would need to rely on the American River supply and groundwater until the Sacramento River supply could be restored.

Area-Wide Electrical Power Failure

If an area-wide electrical power failure were to occur within the City's water service area, the City is well prepared to meet water demands through the use of electrical generators located at both of the water treatment plants and at each of the booster pump stations. None of the City's groundwater wells currently have backup power; however, the City is considering a Capital Improvement Project which would provide for emergency power facilities at up to half of the City's 32 municipal wells.

Earthquake

Water system infrastructure, including treatment plants, pump stations, storage tanks, and pipelines, can be damaged during a strong earthquake. The City's facilities have been constructed in accordance with the applicable building codes to minimize potential damage during an earthquake. However, some facilities could be damaged as the result of a strong earthquake. The City has planned for this potential outage scenario by constructing system redundancy into its water system. The City has two existing and one proposed water treatment plants, multiple storage facilities and looped distribution pipelines, to allow potentially damaged portions of the City's system to be quickly isolated and repaired.

Flood

The City of Sacramento is potentially at risk of flooding as a result of severe storms, large quantities of runoff from the Sierra Nevada, and/or failure of levees which protect the City from major flooding events. The Sacramento Area Flood Control Agency (SAFCA) was created in 1989 to address the Sacramento's area vulnerability to catastrophic flooding. Members of SAFCA include the City of Sacramento, the County of Sacramento, the County of Sutter, the American River Flood Control District and Reclamation District 1000. SAFCA's mission is to



provide the Sacramento region with increased flood protection along the American and Sacramento Rivers, with at least a 100-year level of flood protection as quickly as possible, while seeking a 200-year or greater level of protection over time. SAFCA's activities are funded from development fees and annual assessments imposed on benefiting properties in three separate districts in Sacramento and Sutter Counties. A number of flood protection projects have already been completed, including construction of new levees, repairs to existing levees, and bank protection and stabilization.

Even though the City's water system is vulnerable to the risk of flooding, the redundancy it has with two separate water treatment plants and two different surface water supply sources (the Sacramento and American Rivers) helps alleviate some of this risk. This redundancy will be further enhanced in the future if a third water treatment plant (the proposed Natomas Water Treatment Plant) is constructed. Currently, if the SRWTP is out of service due to flooding, the FWTP may be available to meet City demands, and vice versa. It is possible that a single flooding event could impact both of the City's water treatment plants and other water system facilities; however, in such an instance, the City will respond as quickly as possible to restore water service for the City's residents.

MANDATORY PROHIBITIONS AND RESTRICTIONS

The Sacramento City Code contains a section on water conservation (Title 13 Public Services, Chapter 13.04 Water Service System, Article XI Water Conservation), which outlines the mandatory prohibitions and restrictions that are in place under normal water supply conditions in the City. These measures include the following:

- Water shall not be wasted due to leaky or faulty water fixtures. (§13.04.840).
- Water shall not be allowed to become water waste runoff and to flow away over the surface of the ground. (§13.04.850).
- No person shall use water for the purpose of washing down sidewalks, driveways, or parking areas except to alleviate immediate fire or sanitation hazards. (§13.04.860).
- Landscape irrigation shall be prohibited between the hours of 12:00 noon and 6:00 pm from the last Sunday in April to the last Sunday in October. (§13.04.860).
- Residential and commercial locations bearing a street address ending in an odd number shall be permitted to irrigate only on Tuesday, Thursday and Saturday and locations bearing a street address in an even number shall be permitted to irrigate only on Wednesday, Friday and Sunday. There shall be no water irrigation on Mondays. (§13.04.860).
- No person shall use City water for irrigation or the sprinkling of lawns through an automatic sprinkler for a period exceeding thirty (30) minutes or through a hose for a period exceeding two and one-half (2½) hours during each calendar day. (§13.04.860).



As discussed above, Table 9-2 lists the additional conservation measures associated with each conservation stage which would further restrict the allowable water uses and landscape irrigation practices.

WATER RATES AND PENALTIES FOR EXCESSIVE USE

Because most of the City's residential customers are unmetered and are billed for water use based on a monthly flat-rate, excessive use of water by an individual residential customer presently cannot be identified or billed. However, under AB 2572, this will change as the City implements its meter retrofit program and commences metered billing for metered residential connections on January 1, 2010. Excessive use by non-residential customers can be identified because approximately three-quarters of the City's non-residential connections are billed on a metered basis, and this percentage will increase under the City's ongoing commercial meter retrofit program. In addition, in the event any person violates any provisions of the City's mandatory water conservation measures (as outlined in the City's Code), the following applies:

- For the first violation, the person who committed the violation shall be issued a written notice stating the type of violation.
- For the second violation, the person who committed the violation shall be issued another written notice stating the type of violation, and the property owner, if different than the person who committed the violation, shall be issued a written notice.
- For the third violation, the person who committed the violation and the property owner, if different than the person who committed the violation, shall be issued a written notice, and the subject property water rates shall be increased to five times the normal monthly rates for the duration of the summer period from the time of third violation to September 15th and then said water rates shall return to their regular schedule.
- For the fourth violation, the person who committed the violation shall be issued a written notice stating the type of violation, and the property owner, if different than the person who committed the violation, shall be issued a written notice, and the regular water rates shall be permanently billed at five times the normal monthly rates, as long as the same property owner is recorded on the tax rolls. In the event of a new property ownership or occupancy, the subject water rates may revert to the regular rate schedule upon review and approval by the water waste appeals board.

REVENUE AND EXPENDITURE ANALYSIS

Potential Revenue Impacts

Because about 95 percent of the City's customers presently are unmetered and are billed based on a monthly flat rate (based on the number of rooms for residential customers), until the City begins the transition to metered billing per AB 2572, potential revenue losses during a period aimed at achieving large water conservation savings are minimal. The flat rate structure,



although not as great an incentive to water conservation as metered billing, contributes to a stable revenue stream.

Once the City's customers become metered and are billed based on actual water use, there may be a revenue impact during a shortage condition as customers are requested to utilize less water. Under this case, in the future, the City would need to develop reserves to compensate for decreased revenue or consider rate increases during the water shortage.

Potential Expenditure Impacts

As discussed in Chapter 8, the City budgeted approximately \$1.3 million for water conservation programs in FY 2004/2005. Although there may be more intensive efforts made for water conservation during a drought period (i.e., more staff time for water waste patrols or increased media advertising for the need for conservation), expenditures are not expected to increase significantly during a drought period.

MECHANISMS FOR DETERMINING ACTUAL WATER USE REDUCTIONS

The City's aggregate water supply and system demands are accurately monitored and tracked at the City's two water treatment plants.

Metered customers (approximately 400 multi-family residential and 6,900 commercial customers) are billed based on actual water use and records are available on individual use. Also, although all residential customers are currently billed based on a monthly flat rate, approximately 11,700 single-family residential customers have a meter installed that is used to monitor actual water use. Residential metered billing will begin in 2010 as discussed above.

DRAFT WATER SHORTAGE CONTINGENCY RESOLUTION

A copy of a draft water shortage contingency resolution is provided in Appendix I. As previously noted, the draft resolution provides model language for enacting one or more stages of the City's Water Shortage Contingency Plan. Implementation of the resolution also may require amendments to the Sacramento City Code.

Figure 9-1. Water Supply Outage Scenarios

