Chapter 6
Water Supply Reliability

This chapter of the Guidebook will provide guidance for describing an urban water supplier's water reliability. Actions to address a water shortage will be discussed in the next chapter, Chapter 7, Water Shortage Contingency Planning.

DISCUSSION POINT – Suggested factors to consider for inclusion in the introduction?

The following subsections are included in this chapter:

6.1 Supplementing Inconsistent Sources

6.2 Water Quality

6.3 Reliability by Water Year Type

6.4 Supply and Demand Comparison

6.5 Climate Change (Optional)

6.6 Regional Supply Reliability

6.1 Supplementing Inconsistent Sources

CWC Requirement
For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable (10631(c)(2)).

Identify and describe inconsistent water sources and agency's plans to supplement the inconsistent source. Complete Table 6-1 and provide a narrative description.

1. Identify the water sources and potential factors that may result in a reduction of water supply using Table 6-1.
2. Provide a narrative description of inconsistencies in water supplies noted in Table 6-1. For sources that are inconsistent, provide a description of plans to supplement or replace these sources with alternative sources or water demand management measures, to the extent practicable.
   If there is another section within the UWMP that describes a constraint on a particular water source and/or plans to supplement this source, there is no need to repeat this information in this section. Simply refer the reader to the other sections within the UWMP that provide these details.

Table 6-1 Factors resulting in inconsistency of supply						
Water supply sources		**Constraint**				
Source type (Drop down menu)	Name of Source (optional)	Legal	Environmental	Water quality	Climatic	None

6.2 Water Quality

CWC Requirement
The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability (10634).

Identify and describe any water quality issues related to the agency's water sources. Complete Table 6-2 and provide a narrative description.

1. Table 6-2. Identify water quality issues (if any) for each water supply.
2. For any water sources that have a water quality issue, include a description of the issue, water management strategies to address the issue, (such as blending with a higher quality water, or treatment) and how the issue may affect supply reliability.
   If a water quality issue is anticipated, such as a plume in the groundwater moving toward the agency's wells, or saltwater intrusion, discuss water management strategies that are anticipated and any expected impacts to supply reliability.

Table 6-2 Water Quality					
Water supply sources		Water Quality Issue	Condition	Affects Water Management Strategies	Affects Supply Reliability
Source Type	Name of Source (optional)				
Drop Down			Drop Down Menu	y/n	y/n
			No known water quality issues		
			Treatment addresses known issues		
			Treatment planned to address known issues		
			Issue will be addressed in the future		

Recommended
Maps are recommended when they can provide a visual illustration of a water quality issue.

Include a narrative summary of the Water Quality section from the Climate Change Vulnerability Assessment.

6.3 Reliability by Water Year Type

CWC Requirement
Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following: (A) an average water year, (B) a single dry water year, (C) multiple dry water years (10631(c)(1)).

Describe the reliability of the water supply and any vulnerability to seasonal or climatic shortage, to the extent practicable. This description will be reported in two formats:

1. Table 6-3 – identify the calendar years that represent each water year type and specify the percentage and/or volume of water supply expected if there were to be a repeat of the hydrology from the year type.
2. Provide a narrative description of the method used to determine which calendar years represent each water year type.

Table 6-3. Using the guidelines below, identify average, single-dry, and multiple-dry water years and list them in Table 6-3. For each of the dry years, calculate percentage or volume, or both, as described below.

- **Percentage.** The percentage of an average year water supply that would be available if the dry year hydrology were repeated.
- **Volume**. The volume of water that would be available if the dry year hydrology were repeated.

Water year types will be based on the hydrology for a particular water source, this may be the annual run off in that watershed or annual precipitation. Water agencies are encouraged to use as long a time period as data is accurate and available.

If the agency has more than one source of water, each with a unique hydrology, the agency will balance their water supply portfolio by relying more heavily on one source if another is in short supply. Such an agency will report their water supply reliability in Table 6-3 as the aggregation of all their water supplies. The agency may also assess the reliability for each water source individually.

DISCUSSION POINT: What guidance should be provided to water suppliers with sources from different watersheds?

> *Average Year* — a year, or an averaged range of years, that most closely represents the median water supply availability to the agency. The UWMP Act uses the term "normal." conditions. Within this guidebook the terms "normal" and "average" are used interchangeably.
>
> *Single-dry year* —the year with the lowest water supply availability to the agency.
>
> *Multiple-dry year period* —the lowest average water supply availability to the agency for a consecutive multiple year period (three years or more).

Table 6-3 Bases of water year data

Water Year Type	Base Year	Available supplies if water year type repeats	
		Volume available	Percent of Average Supply
Average Water Year			100%
Single-Dry Water Year			
Multiple-Dry Water Years 1st Year			
Multiple-Dry Water Years 2nd Year			
Multiple-Dry Water Years 3rd Year			

6.4 Supply and Demand Assessment

CWC Requirement
Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional or local agency population projections within the service area of the urban water supplier (10635(a)).

Assess the water agency's supply reliability for normal (average), single-dry year, and multiple-dry years for 2015, 2020, 2025, 2030 and 2035. Reporting for the year 2040 is optional. Provide this assessment in two formats:

1. Provide a narrative that summarizes the information found in the Tables. When discussing water supply reliability, consider including a discussion of management actions to be taken if a supply shortage is shown on any of the tables.
2. Quantify supply and demand for the various water years using Tables 6-4, 6-5, and 6-6

Tables 6-4 Values will be entered automatically from Table 5-1 (Water Supplies Current and Projected) and Table 3-5 (Total Water Use).

Table 6-4 Supply and demand comparison — normal year

	2015	2020	2025	2030	2035	2040 -Opt
Supply totals (autofill)						
Demand totals (autofill)						
Difference	(auto-calculate)	(auto-calculate)	(auto-calculate)	(auto-calculate)	(auto-calculate)	(auto-calculate)

Table 6-5 and 6-6.
Enter the estimated supplies and demands for the 20 year planning horizon. Show a negative value for years where demands are higher than supplies.

Supply
Generally, supply projections for a single dry year are the normal/average expected supply (from Table 6-4) multiplied by the percentage for a single dry or multiple dry year(s) (from Table 6-3). If another method is used to assess projected supply, include a description of the method.

Demand

Include a narrative description of the methodology used to assess the projected demand totals. Some factors to consider include, potential for increased irrigation demand because of low rainfall, and expected conservation savings due to increased demand management measures, savings from codes, and drought messaging.

Table 6-5 Supply and demand comparison — single dry year						
	2015	**2020**	**2025**	**2030**	**2035**	**2040 -Opt**
Supply totals						
Demand totals						
Difference	(auto-calculate)	(auto-calculate)	(auto-calculate)	(auto-calculate)	(auto-calculate)	(auto-calculate)

Table 6-6 Supply and demand comparison — multiple dry-years							
		Beginning 2015	**Beginning 2020**	**Beginning 2025**	**Beginning 2030**	**Beginning 2035**	**Beginning 2040 Opt**
First year	**Supply totals**						
	Demand totals						
	Difference	(auto-calculate)	(auto-calculate)	(auto-calculate)	(auto-calculate)	(auto-calculate)	(auto-calculate)
Second year	**Supply totals**						
	Demand totals						
	Difference	(auto-calculate)	(auto-calculate)	(auto-calculate)	(auto-calculate)	(auto-calculate)	(auto-calculate)
Third year	**Supply totals**						
	Demand totals						
	Difference	(auto-calculate)	(auto-calculate)	(auto-calculate)	(auto-calculate)	(auto-calculate)	(auto-calculate)

6.5 Climate Change (Optional)

Recommended:

Include a narrative summary of relevant information from “Section II Water Supply” of the Climate Change Vulnerability Assessment, Appendix XX.

Discuss any planned actions to address noted vulnerabilities from the Assessment.

6.6 Regional Supply Reliability

CWC Requirement

An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions (10620(f)).

Briefly summarize how the water management actions described in this UWMP update will lead to greater regional water supply reliability and decrease the reliance on water imported from other regions.

Provide a narrative description of the water management tools and options that are being implemented, or are planned for implementation, that maximize resources and minimize the need to import water from other regions. For example, this description may include actions such as increased implementation of demand management measures, increased use of recycled water, or improvements in regional water management and coordination, among other actions.

Recommended

Water suppliers may quantify increased regional water supply reliability by completing Table 6-7. Regions with increasing regional supply reliability will show an increase, over time, of the percentage of local supply and a decrease of the percentage of imported supply.

Conservation as Water Supply

For the purposes of this table, conservation is included as a water supply. Other tables in the UWMP may not include conservation as a supply.

To calculate conservation savings as a water supply volume, DWR recommends determining the Gallons per Capita per Day (GPCD - see Chapter 4) savings for each year in the table, multiplying the per Capita savings by the agency's population, and then converting the agency's savings from gallons/day to Acre Feet per Year.

1. Calculate the 2010 Conservation Savings in GPCD

   (Baseline Water Use $_{GPCD)}$ – (2010 Water Use $_{GPCD}$) = 2010 Conservation Savings $_{GPCD}$

2. Convert Per Capita per Day Savings to Agency per Day Savings

   (2010 Conservation Savings $_{GPCD}$) X (2010 Population $_{Agency}$) = 2010 Conservation Savings $_{Gallons/Agency/Day}$

3. Convert Agency Savings from Gallons per Day to Acre Feet per Year

   $$\frac{(\text{2010 Conservation Savings}_{\text{Gallons/Agency/Day}}) \text{ X } (365_{\text{days/year}})}{325{,}850_{\text{ gallons/acrefoot}}} = \text{2010 Conservation Savings}_{\text{AF/Year}}$$

Calculating Conservation Savings *(will be as appendix, not a numbered data table)*			
Year	GPCD	Agency Population	Conservation Savings (AF/Year)
2000	200		
2005	190	26000	291
2010	180	27000	302
2015	170	28000	314
2020	160	29000	325
2025	150	30000	336
2030	140	31000	347
2035	130	32000	358

Table 6-7 Increasing reliance on local water supplies (Optional)

	2000 (Actual)		2005 (Actual)		2010 (Actual)		2015 (Actual)		2020 (Projected)		2025 (Projected)		2030 (Projected)		2035 (Projected)	
Water Supply Sources (Drop Down Menu)	Volume	% of Supply	Volume	% of Supply	Volume	% of Supply	Volume	% of Supply	Volume	% of Supply	Volume	% of Supply	Volume	% of Supply	Volume	% of Supply
Local Sources																
Local Groundwater																
Local Surface Water																
Recycled Water																
Desalination																
Storm Water Capture																
Conservation [1]																
Other																
Total Local Water Sources																
Imported Sources																
Imported Water (By Source)																
Transfers into Service Area																
Total Imported Water Sources																
Total Water Supplies																

[1] Conservation is included as a source of water for this table only. It may not be considered a source for use in the tables found in Chapter 5. Conservation may be calculated by comparing current GPCD to baseline GPCD. Future conservation is calculated as future water use target minus baseline.