

6. Raw Water Master Plan Summary

Background Information

The city gets its water from the Boulder Creek Basin and from the western slope through the Colorado-Big Thompson (CBT) Project and Windy Gap Project. Flows in the watershed basins supplying each source are highly variable from year to year. Because of this, the amount of water derived from each of Boulder's water sources and delivered into the municipal system also varies.

1. Boulder Creek Basin Water Rights

The city's water rights in the Boulder Creek Basin include direct use and storage rights on both Middle and North Boulder Creek and exchange rights. The city's exchange rights allows the city to release water into lower Boulder Creek near 75th Street from Boulder and Baseline Reservoirs in exchange for increased diversion at the city's direct use and storage points on Middle and North Boulder Creeks. Most of the city's water rights are absolute. The city also has several conditional rights that are being developed for future use.

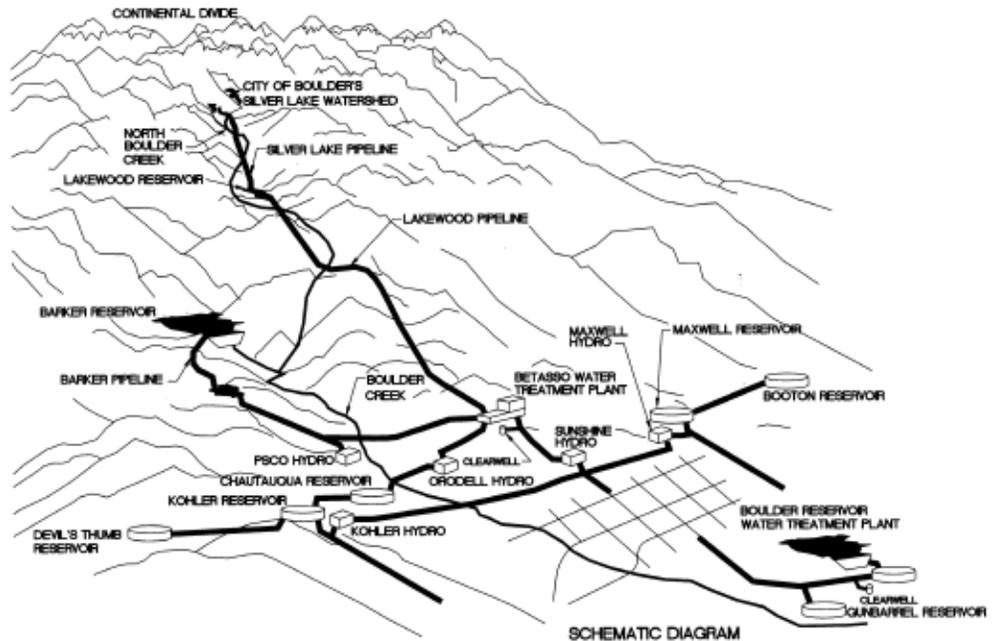
2. The Colorado-Big Thompson (CBT) Project

Boulder receives western slope water at Boulder Reservoir from the CBT Project facilities. The city utilities own 21,015 CBT units out of a total of 310,000 units in the project. At present, CBT deliveries to Boulder can only be made from April through October of each year due to winter operating limitations on canals. Boulder uses CBT water for direct treatment at the Boulder Reservoir Water Treatment Plant, either diverted directly from the Boulder Feeder Canal or pumped out of Boulder Reservoir, and as a source of exchange water to increase water deliveries to the Betasso Water Treatment Plant.

3. The Windy Gap Project

The Windy Gap Project delivers western slope water to municipal and industrial water users on the east slope through CBT facilities. The city has an allotment contract for 37 units out of a total of 480 units in the project. These units, when used in conjunction with storage space in Boulder and Barker Reservoirs and "borrowing" of CBT water, can deliver up to 3700 acre-feet per year. Unlike much of the rest of Boulder's water, the Windy Gap water is fully consumable, meaning that the return flows (wastewater effluent and lawn watering runoff) from this source can be reused either for exchange back into Boulder's water system or by leasing to other downstream users.

Boulder's water supply system includes many storage, conveyance, hydroelectric and treatment facilities. The city owns approximately 7,200 acre-feet of reservoir storage space in the North Boulder Creek watershed, 11,686 acre-feet of storage in Barker Reservoir on Middle Boulder Creek, and 8,500 AF in Boulder Reservoirs. Boulder's two water treatment facilities are the Betasso plant, with approximately 45 million gallons per day (MGD) of treatment capacity and the



Boulder Reservoir plant at about 16 MGD. The city operates eight hydroelectric plants located within the municipal water supply system. Four of these hydro plants are located on raw water pipelines, and four are on treated water transmission pipelines. Electricity generated at these plants is sold to Xcel Energy.

Water provided by the city serves a variety of purposes ranging from those uses that require an assured supply such as drinking water and firefighting, to those uses that can tolerate occasional restrictions, such as lawn irrigation and car washing. It is recognized that no municipal water supply can ever be 100 percent reliable against all risk factors and that the economic and environmental opportunity costs of reducing the risks of occasional water shortages are significant. The reliability standards for the city's municipal water supply that were adopted by City Council in 1989 are:

1. For those water uses deemed essential to the maintenance of basic public health, safety and welfare such as indoor domestic, commercial, industrial uses and firefighting uses, the city will make every effort to ensure reliability of supply against droughts with occurrence intervals of up to 1,000 years.
2. For the increment of water use needed to provide

continued viability of outdoor lawns and gardens, the city will make every effort to ensure reliability of supply against droughts with occurrence intervals of up to 100 years.

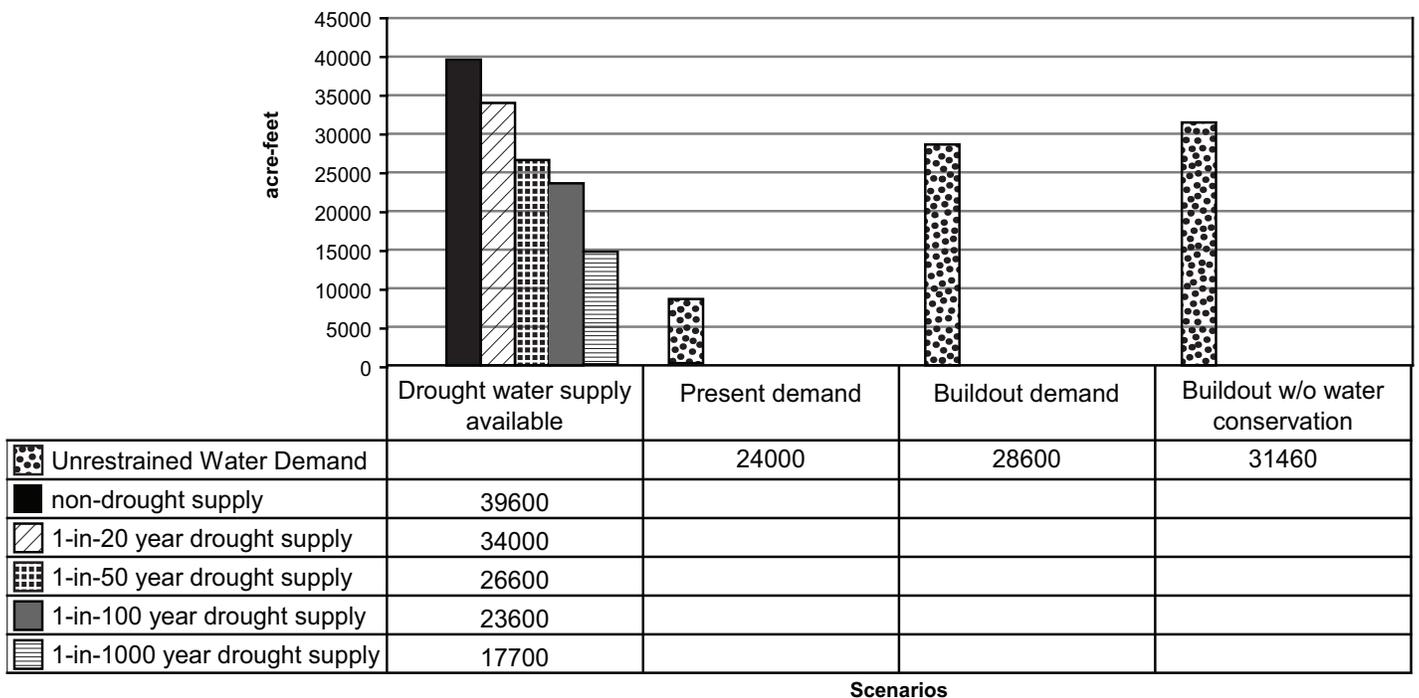
3. For the increment of water needed to fully satisfy all municipal water needs, the city will make every effort to ensure reliability of supply against droughts with occurrence intervals of up to 20 years.

The Raw Water Master Plan anticipates that the city will maintain a diversity of water supply sources (both east and west slope sources) in order to hedge against droughts and increase water supply reliability. In addition, the master plan identifies multiple-purpose uses for the city's municipal raw water supplies. In addition to residential and commercial consumptive uses, the city's raw water supply has been used for maintaining streamflow and enhancing stream habitat in Boulder Creek and its tributaries and for leasing to downstream agricultural and recreational users.

Future Service Projections and Programs

Based on extensive modeling of the city's municipal water system and its water supply basins, it is believed that the city has sufficient raw water supply holdings to meet the ultimate municipal water needs of expect-

Water Supply vs. Demand



ed development levels within the city's water service boundaries based on the current BVCP planning area. Future water needs were evaluated in the Raw Water Master Plan in 1989. Water demand forecasts have been updated several times since then based on demographic and land use forecasts provided by the city Planning Department and expectations of results from conservation practices.

Boulder's future water demands were most recently evaluated as part of the Drought Plan process in 2003 and are shown below. Current modeling shows that the city's present water rights portfolio would provide sufficient water to meet all demands at full buildout of the BVCP area during 275 years out of a period of 285 years. Voluntary use reductions or moderate use restrictions would be necessary in about nine years

due to reduced supplies during drought. Severe use restrictions would be required in only one year out of 285 years when drought conditions would reduce water yields significantly. At no time during the modeled scenario did water yields drop below the level of meeting essential indoor needs. This model outcome meets the adopted reliability criteria for the city's water supply system.

The 1989 Raw Water Master Plan recommended improved management of the city's water holdings and some capital projects, many of which have been implemented and can be found in the plan.

More information on Boulder's water resources as well as a Boulder Watershed Map can be found on the Web at: <http://www.BoulderWater.net>