Part II – Shrinking Supply and Infinite Demand

Matt Lindon, P.E. - The Water Guy – Assistant State Water Engineer

We live at the divided headwaters of the Weber River. Everything south of Thaynes Canyon drains east down Poison Creek, prosaically renamed Silver Creek, towards Keetley/Quinns and Silver Creek Junctions thru Wanship, where it joins the main stem of the Weber River flowing from the High Uintas via Smith Morehouse Canyon. Then it all flows toward Echo Reservoir, past the towns of Henefer and Morgan. North of Thaynes Canyon, McLeod Creek drains everything through Kimball Junction north towards East Canyon Creek, dam and reservoir, to Morgan where it joins the main stem of the Weber River in Morgan and heads towards Ogden and the Great Salt Lake. Silver Creek at Silver Creek Junction drains barely 17 square miles and discharges an average of 5 cubic feet per second (cfs), 2250 gallons per minute (gpm) or 3,625 acre-feet (ac-ft) per year, with a peak flow during this dry decade of 80 cfs. East Canyon Creek drains 57 square miles and discharges an average of 26 cfs or 18,780 ac-ft with a peak flow this decade of 163 cfs. Only 10-15% of the area in these drainage basins is actually developed and much less of it is actually paved, so our effect on the large, historical infiltration and evapo-transporation rate is not tremendous. Peak flows typically come from snowmelt runoff in the spring, while base flows are reduced to almost zero in the late summer and are seldom strongly affected by summer thunder storms, as is typical of dense urban development or the slick-rock desert drainages.

Surface flows in our local streams have steadily decreased with use for the past 100 years and are now estimated to carry only 10-20% of total precipitation for Silver Creek and 20-30% for East Canyon Creek. With local precipitation ranging between 20 and 40 inches of water or 200 – 500 inches of snow per year,

depending on elevation and the particular year, the average total water supply for the basin from the sky is approximately 200,000 acre feet per year. Evapo-transpiration from the natural vegetation and sublimation from the snow account for as much as 80 percent of the loss of water from our system. Of the 20 percent left that is diverted for our use, 80 percent of that is used on our lawns and gardens, golf courses and parks. The remaining 20 percent is diverted to our homes of which 80 percent flows back into the system down our drains. The remaining one percent of the total water budget is actually used or consumed by us or depleted from the system. The remaining water in the natural system, if there is any, can recharge the local streams and ground water regime. Excess groundwater, in good years, actually discharges back to the streams, making up as much as 40 percent of the surface water flow.

Water use in the Park City area was historically focused on surface water, which was used for agriculture and mining processing: ground water was a nuisance to mining and was pumped and drained to the surface for disposal. With the modern change to municipal uses, the demand has shifted from surface water treatment to the capture of clean groundwater. The Snyderville Basin geology is bounded by folded and faulted sedimentary rocks, mostly sandstone, quartzite, shale and limestone to the west and south, and by the Keetley volcanics, tuffs and breccias to the east. The basin is filled with unconsolidated alluvial (stream) and colluvial (glacial) deposits, as thick as 275 feet deep. These deposits are typically course grained at the mountain interface, which is great for recharge, but are unfortunately fine grained in the basin and therefore do not yield water as easily as many of the other unconsolidated fill basins in Utah.
Municipal wells in the Park City area therefore withdraw water from consolidated rocks, such as the fractured and faulted limestone and sandstone. These rock formations are locally broken into separate block formations that can inhibit or isolate water flow and withdrawal, which can make finding reliable water difficult. Water that recharges in the bedrock outcrops in the mountains typically takes 15 to 40 years to move through the system, although much older water can still be

found stored in the underlying bedrock and aquifers. Because of the low capacity for bedrock ground water storage, the hydrological system is very dependent on the amount of annual precipitation and is therefore sensitive to prolonged drought and climate change. Less than normal precipitation or overuse can result in substantial groundwater level decline, both in the bedrock (affecting municipal wells), and in the basin fill (affecting stream flow). The under-drain affect of the system of mine tunnels below our town also influences surface waters and subsequent ground water flows, inhibiting recharge and draining some water out of the basin toward Jordanelle and Salt Lake. Mining related sinkholes, currently and historically open along Silver Creek and elsewhere, can capture the entire stream and direct it underground towards our aquifers or towards other drainages. Because of our increased use of surface waters and springs, the local stream flows have diminished and recharge to the aquifer has suffered.
Summit County consolidated several fledging water companies several years ago to form Mountain Regional Water District and take advantage of redundant, efficient, economy of scale water delivery. They now have multiple sources that they can alternate and recover in the off season. Mountain Regional has also developed a new project to pull as much as 5000 acre feet of 'new' water out of the Weber River near Rockport Reservoir and pump it over the Promontory Divide to a treatment plant for distribution in the Snyderville Basin. With new piping and plumbing recently finished, Mountain Regional is currently sharing the new water with Park City. Ideas are being considered for a dual treated/untreated water system, an aquifer recharge program that pumps surface water into the aquifer, and possibly a storage reservoir in Round Valley to better distribute the new water that is being imported to our basin. Summit Water Company is the third major private purveyor of water in the basin. They have developed a treatment plant near Jeremy Ranch and plan to run a pipeline from East Canyon Reservoir to bring water back into the upper basin for future municipal use. While Deer Valley and Park City Municipal Corporation import new water to the basin from Jordanelle, much of their water still comes from local mine tunnel sources.

The mine tunnel sources, however, have water quality issues with the presence of mercury and antimony as well as heavy metals such as arsenic and lead. These constituents must be removed or diluted before the water is suitable for culinary use. This treatment is expensive and the allowable EPA standards are becoming more stringent.

Our population in the Snyderville Basin is expected to double again in the next 20 years and triple by 2050, bringing with it challenges and choices between conservation and consumption, balance and blind ignorance, sustainability and selfishness. Water demands are expected to outstrip supply by 50 to 100 percent over those periods. Importing new water into the basin is necessary and critical as we outgrow the supply that we have. We can over-pump our wells and import new water to the basin until the cows go home, but eventually we will have to balance supply and demand. Despite years of consternation and conflict that wasted time, money and water, there must be a cooperative effort to coordinate and consolidate the retail water companies in the basin for efficiency, redundancy and reliability of our shared resources.

Silver Springs Resident:
Matt Lindon - Assistant State Engineer/Technical Services
801-538-7481 mattlindon@utah.gov