Drought impacts on the timing and influent water quality to Barr Lake, Colorado

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Abstract. Barr Lake is a 45,000 acre-foot irrigation reservoir located near Brighton, Colorado. Barr Lake is filled from the South Platte River. The diversion to Barr Lake is below the metro area and often includes effluent directly from the Denver Metropolitan Wastewater Reclamation District. Upstream water exchanges have resulted in increasing volumes of wastewater effluent in the South Platte River particularly in the winter months. Water quality at Barr Lake has been monitored since 1997. Water quality data comparisons were made between 3 normal water years (1997-1999) against 3 drought years (2000-2002). The drought not only influenced the volume of water diverted into Barr Lake, but also the timing of the diversions. During the drought years the reservoir was filled during the late winter flows, rather than the spring flows as in "normal" years. The drought had minimal effect on the maximum water quality constituent concentrations that occur, mostly in the winter flows. The difference between normal and drought water quality concentrations was the lack of annual dilutional flows, increasing minimum concentrations. The drought resulted in greater mean concentrations into Barr Lake during the drought years. This observation may need to be considered in drought planning.