

## **Downtown Boise – East Boise Area**

The Downtown Boise-East Boise area is about five miles long in the northwest-southeast direction, with a maximum width of about a mile. Most of the wells occur in the northwest half of the area. There are 24 low temperature geothermal wells in the Downtown Boise-East Boise area, with 18 having water temperatures greater than 125° F, and 13 of these having water temperatures greater than 150° F.

The Downtown Boise-East Boise area contains four district heating systems that service several hundred commercial and public buildings, and homes. All four district heating systems monitor their wells for withdrawal and temperature. Two of the systems also monitor for water levels. Four unused wells are used for monitoring (see the Downtown Boise-East Boise Map under Hydrographs and Maps on the BF GWMA website).

New developments in Downtown Boise during the mid-1980's more than doubled the diversion volume from pre-1983 levels. Three district heating systems were birthed during this time. Two of the systems (State of Idaho and Veterans Administration) have injected their spent water back into the geothermal aquifer since the beginning of their operations. However, the City of Boise discharged their spent water into the Boise River for over a decade. Water levels declined 30 feet from 1983 to 1987 in Monitoring Well #1. Also, water temperatures began to decline in the State of Idaho production well.

The geothermal resources in East Boise, which is located about two miles southeast of Downtown Boise and is also known as the Warm Springs Avenue area, have been used for residential heating since the 1890's. The Boise Warm Springs Water District is the oldest geothermal district heating system in the nation. Monitoring Wells #2 through #4 are located in the East Boise area. Water levels in Monitoring Wells #2 and #3 increased 25 to 30 feet from the late 1990's to 2014. Water levels in Monitoring Well #4 also increased but only about 15 feet. The hydrograph for MW #4 looks very different from the other three monitoring wells which suggests that although there is good hydraulic communication throughout much of the area, MW#4 and the nearby well have significant delayed responses to the withdrawals from the four district heating systems to the northwest.

Beginning in 1999, a sequence of events occurred in the Downtown Boise area which resulted in water level increases and increased withdrawals by the City of Boise:

1. In 1999, the City of Boise completed an injection well for returning their system's spent geothermal back to the aquifer. Water levels in Monitoring Well #1 rose about 14 feet from 1998 to 2001.
2. In 2001, the City of Boise requested an increase in withdrawals from 200 million gallons per year (mgy) to 330 mgy. The request was protested by local geothermal water users and a hearing was convened. A stipulated agreement signed in 2002 between the geothermal water users and IDWR allowed the City of Boise to increase its production to 230 mgy. The City was allowed to increase withdrawal despite the moratorium because of an existing, undeveloped permit from IDWR, and because they provided computer

modeling results which predicted that additional withdrawal would not negatively affect water levels if the spent water was injected.

3. Water levels in Monitoring Well #1 continued to rise from 2001 to 2010 because of the City's injection well.
4. During the time from 1999 to 2010, the net withdrawal for the four district heating systems decreased about 100 million gallons (mg) (see the Gross and New Withdrawals graph under Hydrographs and Maps).
5. In 2010, the City of Boise requested a second increase that would be implemented in annual stages from 230 mgy to 330 mgy. In 2011, IDWR accepted a second stipulated agreement between the City and the other low temperature geothermal water users. Since then, the City's withdrawal has increased from 218 mg in Water Year 2011 to 276 mg in Water Year 2014.
6. Water levels in Monitoring Well #1 remained fairly stable from 2010 to 2014. The maximum water level increased about two feet, while the minimum water level decreased about four feet. From 2010 to 2013, the net withdrawal for the system increased 25 mg.