

474309096122001 Local number E04D-R 149N43W18DDBA Ob. Well 4, NWF 0000654760

Sand and gravel aquifers (glaciated regions)
Glacial Buried Sand and/or Gravel

Polk County, MN

LOCATION.--Lat 47°43'08.44", long 96°12'20.48" referenced to North American Datum of 1983, in NW ¼ SE ¼ SE ¼ sec.18, T.149 N., R.43 W., Polk County, MN, Hydrologic Unit 09020305, 20.0 miles east and 0.8 miles south of Crookston, Minnesota; 3.1 miles west and 0.8 miles south of Mentor, Minnesota.

GROUNDWATER RECORDS

WELL CHARACTERISTICS.--Depth 102 ft. Upper casing diameter 2 in; top of first opening 98 ft, bottom of last opening 102 ft. The hole for well G12 was drilled with a 6.75-inch-diameter power auger to a depth of 121 feet. The well is constructed of a 4-foot-long, 2.04-inch-diameter, schedule-40 PVC, 0.01-inch slotted, flush-threaded screen attached to 10.00 feet of 2.04-inch-diameter, schedule-40 PVC casing. This casing stick-up was 2.13 feet above land surface when measured on Sept. 13, 2001. The open interval of the well is between 98 and 102 feet below land surface and the well is 102 feet deep.

DATUM.--Land-surface datum is 1,152.92 ft above North American Vertical Datum of 1988. Measuring point: Undefined, 2.13 ft above land-surface datum, Sep. 13, 2001, to present. Water levels below land surface are accurate to 0.01 feet. Water levels above North American Vertical Datum of 1988 (sea level) are calculated by subtracting recorded water levels from the land surface elevation, which is accurate only to plus-or-minus 0.1 feet based on a differential GPS survey. Water-level differences are accurate to within 0.001 feet.

PERIOD OF RECORD.--Hourly water levels were recorded hourly during Aug. 06, 2003 at 13:00 CDT to the present, except during the following periods:

Mar. 09, 2004 at 12:00 CDT - Mar. 11, 2004 at 04:00 CDT: due to station failure.
Mar. 25, 2004 at 14:00 CDT - Apr. 11, 2004 at 11:00 CST: due to station failure.
Jan. 15, 2005 at 05:00 CST - Jan. 16, 2004 at 05:00 CST: due to station failure.
Jan. 23, 2005 at 06:00 CST - Jan. 24, 2005 at 11:00 CST: due to station failure.
Dec. 23, 2005 at 18:00 CST - Jan. 10, 2006 at 15:00 CST: due to station failure.
Jan. 16, 2006 at 01:00 CST - Jan. 20, 2006 at 09:00 CST: due to station failure.
Aug. 19, 2009 at 22:00 CDT - Sept. 08, 2009 at 19:00 CDT: due to failing transducer thermistor.
May 24, 2010 at 08:00 CDT - Apr. 13, 2011 at 18:00 CDT: due to failing transducer thermistor.

GAGE.--Water level and water temperature were measured with a Design Analysis H-310 submersible pressure transducer accurate to 0.01 feet and 0.1°C respectively. Data were recorded hourly by a Campbell Scientific, Inc. CR500 data logger located at well G20S-R. The data logger at well G20S-R was upgraded to a Campbell Scientific, Inc. CR206 on Apr. 13, 2011. The data logger is housed in a shelter attached to the well casing on well G20S-R, is solar powered, and data are telemetered by radio and telephone, which is all located at well G20S-R.

COOPERATION.--This site is operated by the U.S. Geological Survey as part of a study to understand hydrologic changes resulting from wetland and prairie restoration and climate change. The station is funded in cooperation with the Red Lake Watershed District, the U.S. Fish and Wildlife Service, and The Nature Conservancy.

REMARKS.--This well is located in same aquifer as a nearby production well and is affected by pumping. After Jul. 01, 2005, the transducer was suspended in the well at 20.47 feet below land surface (1132.44 feet NAVD). Any water levels within a few hundredths of a foot of this level should be considered a minimum depth (maximum elevation) because the transducer was out of the water at that time.

Measured groundwater levels are precise to two decimal places, not the 3 decimal places reported. Differences between subsequent groundwater levels are precise to 3 decimal places, however. Three-decimal place precision is useful at this site for hydrologic analyses such as estimation of groundwater recharge and evapotranspiration.

EXTREMES FOR PERIOD OF RECORD.--Highest water level: 1.527 feet below land surface datum (1151.393 feet NAVD88) on Jun. 13, 2005 at 10:00 CDT; lowest water level: 25.251 feet below land surface datum (1127.669 feet NAVD88) on Mar. 21, 2004 at 22:00 CDT.

Highest daily-average water level: 1.573 feet below land surface datum (1151.347 feet NAVD88) on Jun. 12, 2005; lowest daily-average water level: 19.496 feet below land surface datum (1133.424 feet NAVD88) on Jan. 26, 2005.

EXTREMES FOR CURRENT YEAR.--Highest water level: 3.325 feet below land surface datum (1149.595 feet NAVD88) on Apr. 22, 2011 at 09:00 CDT; lowest water level: 11.078 feet below land surface datum (1141.842 feet NAVD88) on Sept. 07, 2011 at 21:00 CDT.

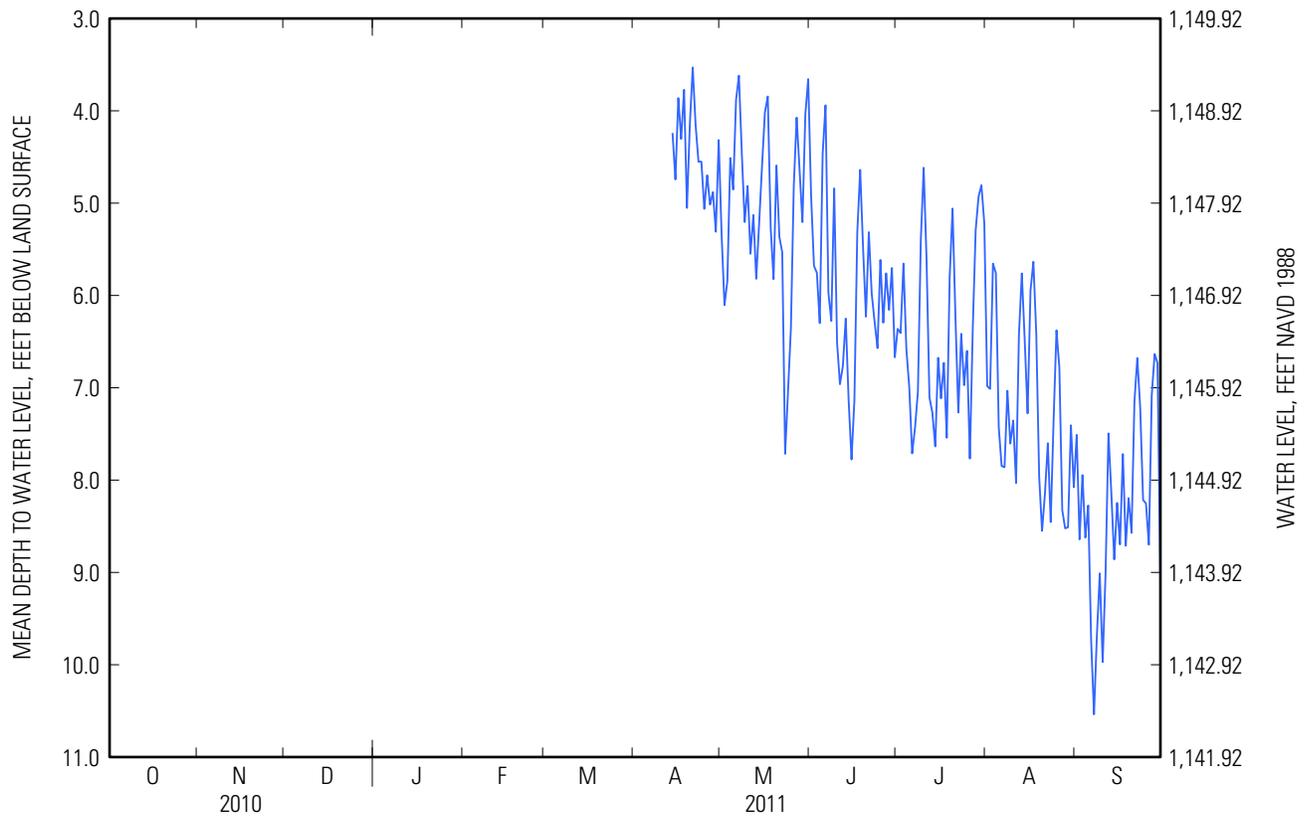
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Highest daily-average water level: 3.530 feet below land surface datum (1149.390 feet NAVD88) on Apr. 21, 2011; lowest daily-average water level: 10.538 feet below land surface datum (1142.382 feet NAVD88) on Sept. 07, 2011.

DEPTH TO WATER LEVEL, FEET BELOW LAND SURFACE
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011
DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	---	---	---	---	---	---	---	5.339	4.920	6.362	6.981	7.510
2	---	---	---	---	---	---	---	6.105	5.679	6.408	7.012	8.643
3	---	---	---	---	---	---	---	5.841	5.755	5.655	5.655	7.946
4	---	---	---	---	---	---	---	4.511	6.300	6.578	5.756	8.623
5	---	---	---	---	---	---	---	4.853	4.468	6.993	7.427	8.275
6	---	---	---	---	---	---	---	3.883	3.940	7.711	7.848	9.731
7	---	---	---	---	---	---	---	3.619	5.972	7.433	7.861	10.538
8	---	---	---	---	---	---	---	4.461	6.276	7.043	7.032	9.679
9	---	---	---	---	---	---	---	5.205	4.840	5.408	7.605	9.010
10	---	---	---	---	---	---	---	4.815	6.513	4.616	7.354	9.971
11	---	---	---	---	---	---	---	5.549	6.962	5.619	8.031	9.015
12	---	---	---	---	---	---	---	5.129	6.764	7.104	6.421	7.494
13	---	---	---	---	---	---	---	5.820	6.250	7.269	5.761	8.138
14	---	---	---	---	---	---	---	4.240	5.220	7.133	7.635	8.859
15	---	---	---	---	---	---	---	4.744	4.599	7.777	6.675	8.247
16	---	---	---	---	---	---	---	3.862	4.015	7.137	7.114	8.697
17	---	---	---	---	---	---	---	4.305	3.845	5.316	6.730	5.635
18	---	---	---	---	---	---	---	3.772	5.269	4.640	7.542	6.414
19	---	---	---	---	---	---	---	5.052	5.823	5.482	5.803	7.961
20	---	---	---	---	---	---	---	4.149	4.592	6.230	5.058	8.550
21	---	---	---	---	---	---	---	3.530	5.364	5.314	6.235	8.149
22	---	---	---	---	---	---	---	4.156	5.533	5.981	7.269	7.600
23	---	---	---	---	---	---	---	4.552	7.716	6.285	6.415	8.455
24	---	---	---	---	---	---	---	4.551	7.045	6.571	6.972	7.352
25	---	---	---	---	---	---	---	5.062	6.357	5.615	6.600	6.378
26	---	---	---	---	---	---	---	4.698	4.812	6.295	7.767	6.783
27	---	---	---	---	---	---	---	5.016	4.073	5.760	6.358	8.325
28	---	---	---	---	---	---	---	4.881	4.638	6.156	5.295	8.523
29	---	---	---	---	---	---	---	5.310	5.206	5.702	4.931	8.511
30	---	---	---	---	---	---	---	4.317	4.039	6.670	4.806	7.406
31	---	---	---	---	---	---	---	3.656	---	5.218	8.077	---
Mean	---	---	---	---	---	---	---	5.062	5.957	6.407	7.244	8.312
Max	---	---	---	---	---	---	---	7.716	7.777	7.767	8.550	10.538
Min	---	---	---	---	---	---	---	3.619	3.940	4.616	5.635	6.634

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WATER-QUALITY RECORDS

PERIOD OF RECORD.--Hourly water temperatures were recorded hourly during Aug. 06, 2003 at 13:00 CDT to the present, except during the following periods:

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May 24, 2010 at 08:00 CDT - Apr. 13, 2011 at 18:00 CDT: due to failing transducer thermistor.

INSTRUMENTATION.--Water temperature is measured with a Design Analysis H-310 submersible pressure transducer accurate to 0.1°C. Record is currently uncalibrated while sufficient calibration data is being collected.

COOPERATION.--This site is operated by the U.S. Geological Survey as part of a study to understand hydrologic changes resulting from wetland and prairie restoration and climate change. The station is funded in cooperation with the Red Lake Watershed District, the U.S. Fish and Wildlife Service, and The Nature Conservancy.

EXTREMES FOR PERIOD OF RECORD.--

WATER TEMPERATURE: maximum hourly: 8.1°C on Sept. 30, 2011 at 00:00 CDT; minimum hourly: 4.2°C on Apr. 30, 2007 at 09:00 CDT.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: maximum daily-average: 8.1°C on Sept. 30, 2011; minimum daily-average: 5.2°C on many days during May & Jun., 2009.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum hourly, 8.1°C on Sept. 30, 2011 at 00:00 CDT; minimum hourly, 5.9°C on May 23, 2011 at 05:00 CDT.

Maximum daily-average, 8.1°C on Sept. 30, 2011; minimum daily-average, 6.0°C on May 23, 2011.

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TEMPERATURE, WATER, DEGREES CELSIUS
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011
DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	---	---	---	---	---	---	---	6.2	6.6	7.1	6.7	7.3
2	---	---	---	---	---	---	---	6.2	6.6	7.2	6.7	7.4
3	---	---	---	---	---	---	---	6.2	6.5	7.3	6.7	7.4
4	---	---	---	---	---	---	---	6.2	6.5	7.1	6.8	7.5
5	---	---	---	---	---	---	---	6.2	6.6	6.9	6.9	7.5
6	---	---	---	---	---	---	---	6.2	6.7	6.9	7.0	7.5
7	---	---	---	---	---	---	---	6.2	6.6	7.1	7.1	7.6
8	---	---	---	---	---	---	---	6.2	6.6	7.0	7.1	7.6
9	---	---	---	---	---	---	---	6.1	6.7	6.8	7.2	7.6
10	---	---	---	---	---	---	---	6.2	6.5	6.7	7.2	7.6
11	---	---	---	---	---	---	---	6.1	6.5	6.6	7.2	7.6
12	---	---	---	---	---	---	---	6.1	6.5	6.6	7.2	7.6
13	---	---	---	---	---	---	---	6.1	6.8	6.5	7.1	7.7
14	---	---	---	---	---	---	6.5	6.1	6.7	6.5	7.2	7.7
15	---	---	---	---	---	---	6.5	6.1	6.8	6.5	7.2	7.7
16	---	---	---	---	---	---	6.5	6.2	7.0	6.5	7.1	7.7
17	---	---	---	---	---	---	6.5	6.2	6.8	6.5	7.1	7.7
18	---	---	---	---	---	---	6.5	6.1	6.7	6.5	7.2	7.8
19	---	---	---	---	---	---	6.4	6.1	6.6	6.5	7.3	7.8
20	---	---	---	---	---	---	6.4	6.2	6.6	6.5	7.2	7.8
21	---	---	---	---	---	---	6.5	6.2	6.7	6.5	7.2	7.8
22	---	---	---	---	---	---	6.4	6.2	6.7	6.5	7.2	7.7
23	---	---	---	---	---	---	6.4	6.0	6.7	6.5	7.2	7.8
24	---	---	---	---	---	---	6.3	6.1	6.8	6.5	7.2	7.9
25	---	---	---	---	---	---	6.4	6.1	7.1	6.5	7.1	7.9
26	---	---	---	---	---	---	6.3	6.3	7.1	6.6	7.2	7.9
27	---	---	---	---	---	---	6.3	6.4	7.4	6.6	7.3	7.9
28	---	---	---	---	---	---	6.3	6.4	7.3	6.6	7.3	7.9
29	---	---	---	---	---	---	6.2	6.3	7.1	6.6	7.3	7.9
30	---	---	---	---	---	---	6.3	6.5	7.1	6.6	7.3	8.1
31	---	---	---	---	---	---	---	6.5	---	6.6	7.4	---
Mean	---	---	---	---	---	---	---	6.2	6.8	6.7	7.1	7.7
Max	---	---	---	---	---	---	---	6.5	7.4	7.3	7.4	8.1
Min	---	---	---	---	---	---	---	6.0	6.5	6.5	6.7	7.3

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