Aquifer Susceptibility Map of Inyan Kara Group, Hermosa NW Quadrangle

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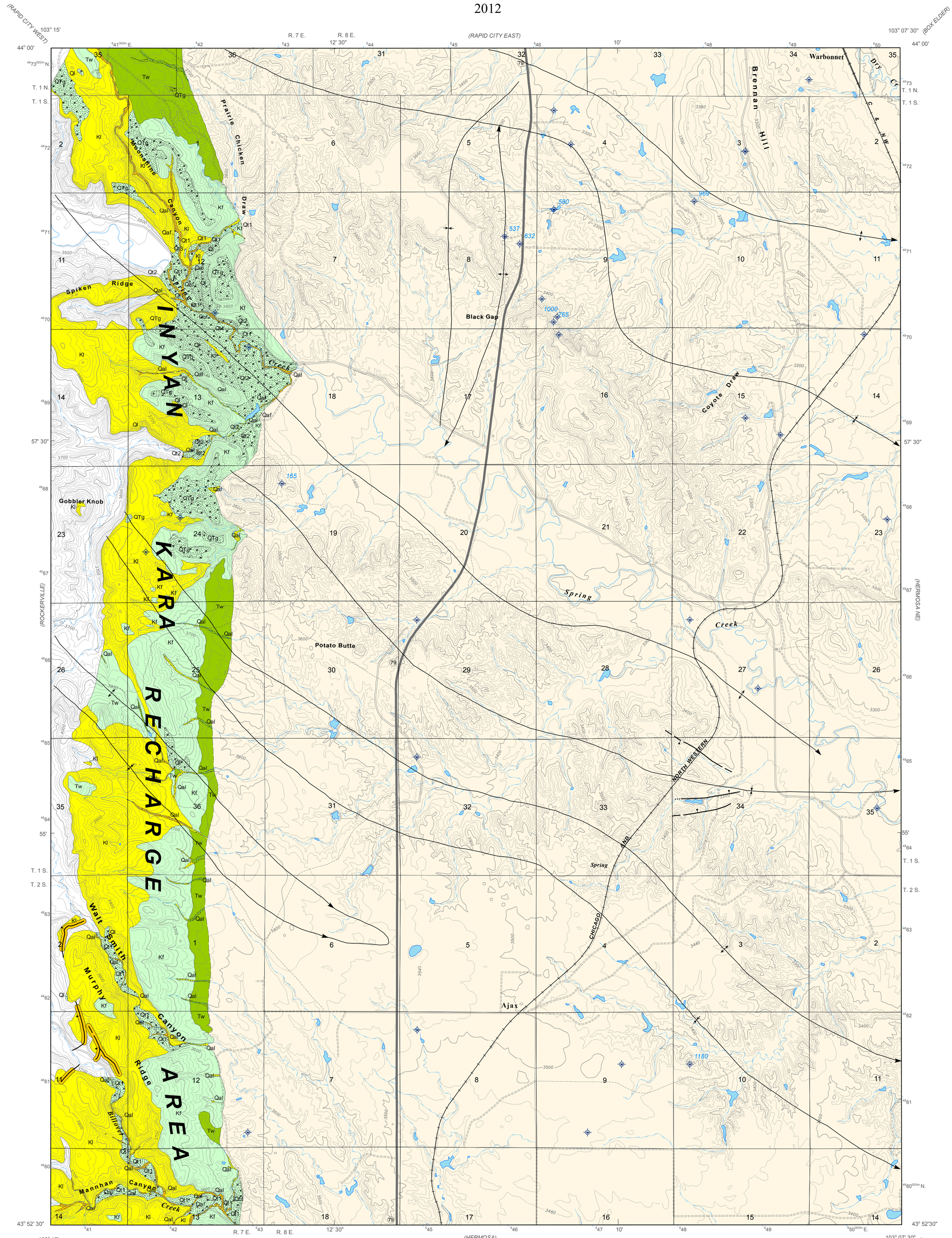
2012



Map base modified from U.S.G.S. 1:24,000-scale Hermosa NW digital line graph.
Water well data collected and digitized from SD Dept. of Environment & Natural Resources "Online Oil/Gas/Injection Well Data" database.
Geology layer from A.L. Lisenbee, C.J. Pellowski, and C.M. Hocking 2005 (Unpublished).
Projection is Universal Transverse Mercator, Zone 13, North American Datum 1983.

Digital Cartography: E. M. Francisco and H. W. Tiruneh, 2012
Department of Geology and Geological Engineering,
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REFERENCE SCALE 1:24,000

1 0.5 0 1 Miles

1,000 0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 Feet

1 0.5 0 1 Kilometers

TOPOGRAPHIC CONTOUR INTERVAL 20 FEET

NORTH

1° 10' 21 MILS

13° 231 MILS

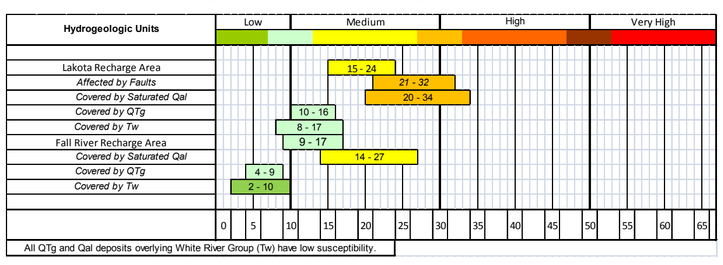
UTM GRID AND 1971 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

The preparation of this map was funded by the West Dakota Water Development District in association with the Department of Geology and Geological Engineering South Dakota School of Mines and Technology.

Definition of Susceptibility

Aquifer susceptibility is the inherent ability of a formation to accept and transmit liquids (potentially including contaminants).

Susceptibility Ranges for Hydrogeologic Units



Summary of ratings associated with the Inyan Kara aquifer. Numbers indicate the qualitative rating for aquifer susceptibility (adapted from Francisco, 2008).

Susceptibility Ratings Explanation:
The susceptibility range is the sum of ratings for susceptibility parameters of the aquifer. The parameters used for the Minnelusa aquifer are rock type, overlying material, joints, breccia and minor faults affecting the hydrogeologic units of the Minnelusa Fm.
The ratings for these parameters are: Rock Type; 5-8 for combined sandstone and mudstone; Overlying Material; Plus 5-10 for alluvium and minus 5-10 for gravel, sand, clay and White River Group mixture; Joints; 5-7; Stacking of Channels; 1-8; Breccia; 5-7 and; Minor Faults; 4-6. All minor faults within aquifer recharge area are buffered 100 ft in all directions.

EXPLANATION

765 Water Wells penetrating Inyan Kara Group.
Number indicates depth to top of Inyan Kara Group, in feet.

- Unimproved Road
- Trail
- Paved Road
- Highway
- Railroad
- Lake
- Intermittent Stream
- Perennial Stream

Contact
Solid where location certain; dashed where approximately located.

Fault
Solid where location certain. Bar and ball on downthrown side.

Anticline
Showing crestline and direction of plunge. Solid where location.

Syncline
Showing troughline and direction of plunge. Solid where location certain.

Geologic Units

Quaternary

Lakota Formation covered by Saturated Alluvium - MEDIUM TO HIGH SUSCEPTIBILITY
Susceptibility rating ranges between 20 to 34.

Fall River Formation covered by Saturated Alluvium - MEDIUM SUSCEPTIBILITY
Susceptibility rating ranges between 14 to 27.

Lakota Formation covered by Gravel Deposits - MEDIUM SUSCEPTIBILITY
Susceptibility rating ranges between 10 to 16 where landslide, alluvial fan and terrece deposits overlies the Lakota Formation.

Fall River Formation covered by Gravel Deposits - LOW SUSCEPTIBILITY
Susceptibility rating ranges between 4 to 9 where landslide, alluvial fan and terrece deposits overlies the Fall River Formation.

White River Group covered by Alluvimum or Gravel - LOW SUSCEPTIBILITY

Oligocene Eocene

Lakota Formation covered by White River Group - LOW TO MEDIUM SUSCEPTIBILITY
Susceptibility rating ranges between 8 to 17.

Oligocene Eocene

Fall River Formation covered by White River Group - LOW SUSCEPTIBILITY
Susceptibility rating ranges between 2 to 10.

Lower Cretaceous Inyan Kara Aquifer

Kf — **Fall River Formation - LOW TO MEDIUM SUSCEPTIBILITY**
Susceptibility rating ranges between 9 to 17.

Kl — **Lakota Formation - MEDIUM TO HIGH SUSCEPTIBILITY**
Susceptibility rating ranges between 15 to 24 where Lakota Formation is exposed to surface, and 21 to 32 where Lakota Formation is affeceted by faulting.

Inyan Kara Group Absent

Inyan Kara Group Present in Subsurface