Depth to Top of the Inyan Kara Group
Butte, Meade, and Lawrence Counties, South Dakota

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RESPEC CONSULTING & SERVICES

BELLE FOURCHE RIVER WATERSHED PARTNERSHIP

INTRODUCTION

This map is a product of the Belle Fourche River Watershed Groundwater Study performed by RESPEC, and is part of a series of 1:180,000-scale structure contour and depth-to maps for the study. The study area consists of Butte, Meade, and Lawrence counties located in the Black Hills of South Dakota. The study focused on four major aquifers including the Inyan Kara, Minnelusa, Madison, and Deadwood. The purpose of this map is to show the depth to top of the Inyan Kara Group within the study area.

DATA

The outcrops and structural features shown on the map are from Martin and others (2004), with modifications to the structural features from Lisenbee (1985). The data points used to generate this map were compiled from the interpretations of drillers' logs of numerous monitoring, water, and oil and gas test holes. The primary drill-hole data sources used in this study are digital databases generated by state government programs: (1) the well completion report database created by the Water Rights Program, South Dakota Department of Environment and Natural Resources, (2) the lithologic logs database created by the South Dakota Geological Survey Program, and (3) the oil and gas database created by the Minerals and Mining Program, South Dakota Department of Environment and Natural Resources (see REFERENCES). The locations of wells and drill holes are typically recorded based on legal location, thus the plotted latitude and longitude of these points is only approximate. The ground-surface elevation was also determined in ArcGIS from 30 m DEMs.

Depth to formation maps were generated using Spatial Analyst in ArcGIS. Structure contour maps generated as part of this project were interpolated into grids using the "topo to raster" tool to generate elevation surfaces for each formation. Then depth was calculated by subtracting the elevation of the formation from the surface elevation.

Depth approximations are more accurate near the outcrop and well control data. Depths are approximate and could vary by 100 feet or more.

The gradient color interval on this 1:180,000-scale map is 250 feet. A consistent color gradient is used on all maps in this series. Both the database and the depth grid are available digitally.

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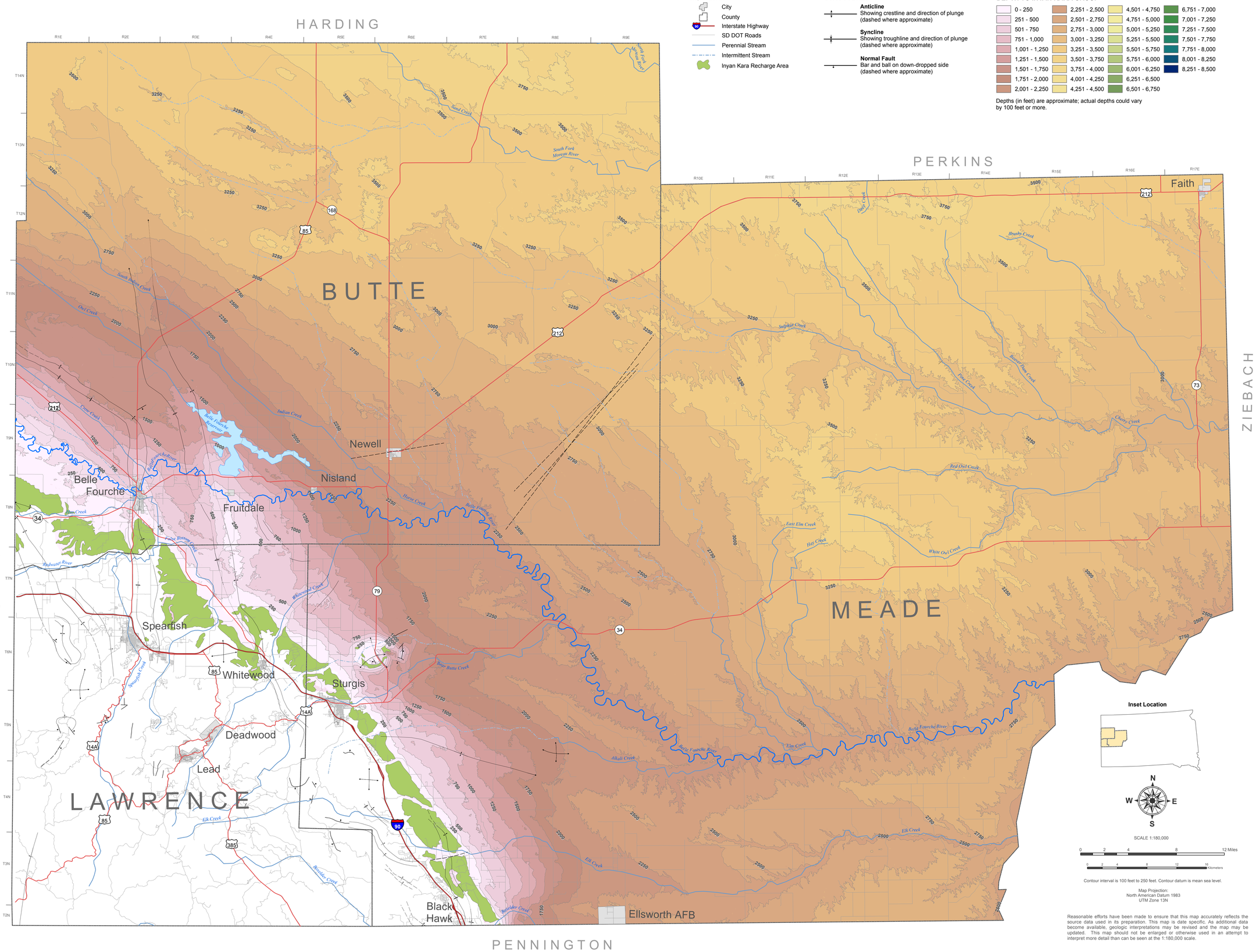

BASE DATA

- City
- County
- Interstate Highway
- SD DOT Roads
- Perennial Stream
- Intermittent Stream
- Inyan Kara Recharge Area

STRUCTURES

Anticline
Showing crestline and direction of plunge (dashed where approximate)

Syncline
Showing troughline and direction of plunge (dashed where approximate)

Normal Fault
Bar and ball on down-dropped side (dashed where approximate)

DEPTH TO INYAN KARA GROUP

0 - 250	2,251 - 2,500	4,501 - 4,750	6,751 - 7,000
251 - 500	2,501 - 2,750	4,751 - 5,000	7,001 - 7,250
501 - 750	2,751 - 3,000	5,001 - 5,250	7,251 - 7,500
751 - 1,000	3,001 - 3,250	5,251 - 5,500	7,501 - 7,750
1,001 - 1,250	3,251 - 3,500	5,501 - 5,750	7,751 - 8,000
1,251 - 1,500	3,501 - 3,750	5,751 - 6,000	8,001 - 8,250
1,501 - 1,750	3,751 - 4,000	6,001 - 6,250	8,251 - 8,500
1,751 - 2,000	4,001 - 4,250	6,251 - 6,500	
2,001 - 2,250	4,251 - 4,500	6,501 - 6,750	

Depths (in feet) are approximate; actual depths could vary by 100 feet or more.

Contour interval is 100 feet to 250 feet. Contour datum is mean sea level.

Map Projection:
North American Datum 1983
UTM Zone 13N

Reasonable efforts have been made to ensure that this map accurately reflects the source data used in its preparation. This map is date specific. As additional data become available, geologic interpretations may be revised and the map may be updated. This map should not be enlarged or otherwise used in an attempt to interpret more detail than can be seen at the 1:180,000 scale.