SAND-DISTRIBUTION MODEL

By
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INTRODUCTION

The glacial sediments and glacially modified bedrock of the Redwood County area (Fig. 1) are associated with two major till sequences, the Good Thunder Formation (Knaeble, 2013) and the New Ulm Formation. These formations are composed of a variety of glacial sediments, including sand and gravel, silt, clay, and till, which were deposited during the Pleistocene Epoch. The glacial sediments are the primary source of water-well supply in the county, and their distribution is critical for understanding the potential for groundwater development. The mapping of these sediments is an ongoing process, and GIS (geographic information system) software has been used to create three-dimensional models that show the distribution and history of multiple glacial events that makes mapping of these potential aquifer-bearing units possible (Knaeble, 2013).

As much of the glacial sediment in Redwood County was deposited during the last glaciation, the Quaternary sand and gravel deposits of Minnesota are products of a long and complex history (Plate 3). The Quaternary period is characterized by the presence of multiple glaciers, each of which left a distinct imprint on the landscape. The mapping of these sediments is important for understanding the potential for groundwater development, as the distribution of the glacial sediments is closely tied to the history of glacial advance and retreat (Knaeble, 2013).

Note that the cross section is shown with 50x vertical exaggeration, and that glacial sediments and bedrock are highly contoured features compared to the antecedent bedrock surface. This results in a low feature on the bedrock surface overlain by thick glacial till. Features may have been eroded, mostly in the southwestern part of the county. This valley crosses the northern third of the county. There is also a valley along the Minnesota River, but occurs about 6 miles (10 kilometers) southwest of it. Of these data sources, the outcrops are regarded as the most reliable, drill records are the least reliable, and the Quaternary deposits are intermediate. All the data are considered to be in error at some places, with the exception of those that have been corroborated by field observations. The errors are due to the uncertainty of the data sources and the resolution of the mapping procedures, which are limited to the extent of the field observations.

Note that the map display as the bedrock surface beneath the Cretaceous strata, including Cretaceous bedrock, and Precambrian bedrock surface (Fig. 1). Note that the cross section is shown with 50x vertical exaggeration, and that glacial sediments and bedrock are highly contoured features compared to the antecedent bedrock surface. This results in a low feature on the bedrock surface overlain by thick glacial till. Features may have been eroded, mostly in the southwestern part of the county. This valley crosses the northern third of the county. There is also a valley along the Minnesota River, but occurs about 6 miles (10 kilometers) southwest of it. Of these data sources, the outcrops are regarded as the most reliable, drill records are the least reliable, and the Quaternary deposits are intermediate. All the data are considered to be in error at some places, with the exception of those that have been corroborated by field observations. The errors are due to the uncertainty of the data sources and the resolution of the mapping procedures, which are limited to the extent of the field observations.

The topography of the bedrock surface beneath the Cretaceous strata, including Cretaceous bedrock, and Precambrian bedrock surface (Fig. 1). Note that the cross section is shown with 50x vertical exaggeration, and that glacial sediments and bedrock are highly contoured features compared to the antecedent bedrock surface. This results in a low feature on the bedrock surface overlain by thick glacial till. Features may have been eroded, mostly in the southwestern part of the county. This valley crosses the northern third of the county. There is also a valley along the Minnesota River, but occurs about 6 miles (10 kilometers) southwest of it. Of these data sources, the outcrops are regarded as the most reliable, drill records are the least reliable, and the Quaternary deposits are intermediate. All the data are considered to be in error at some places, with the exception of those that have been corroborated by field observations. The errors are due to the uncertainty of the data sources and the resolution of the mapping procedures, which are limited to the extent of the field observations.

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