Surficial Geology of the Obert 7.5 Minute Quadrangle, Nebraska

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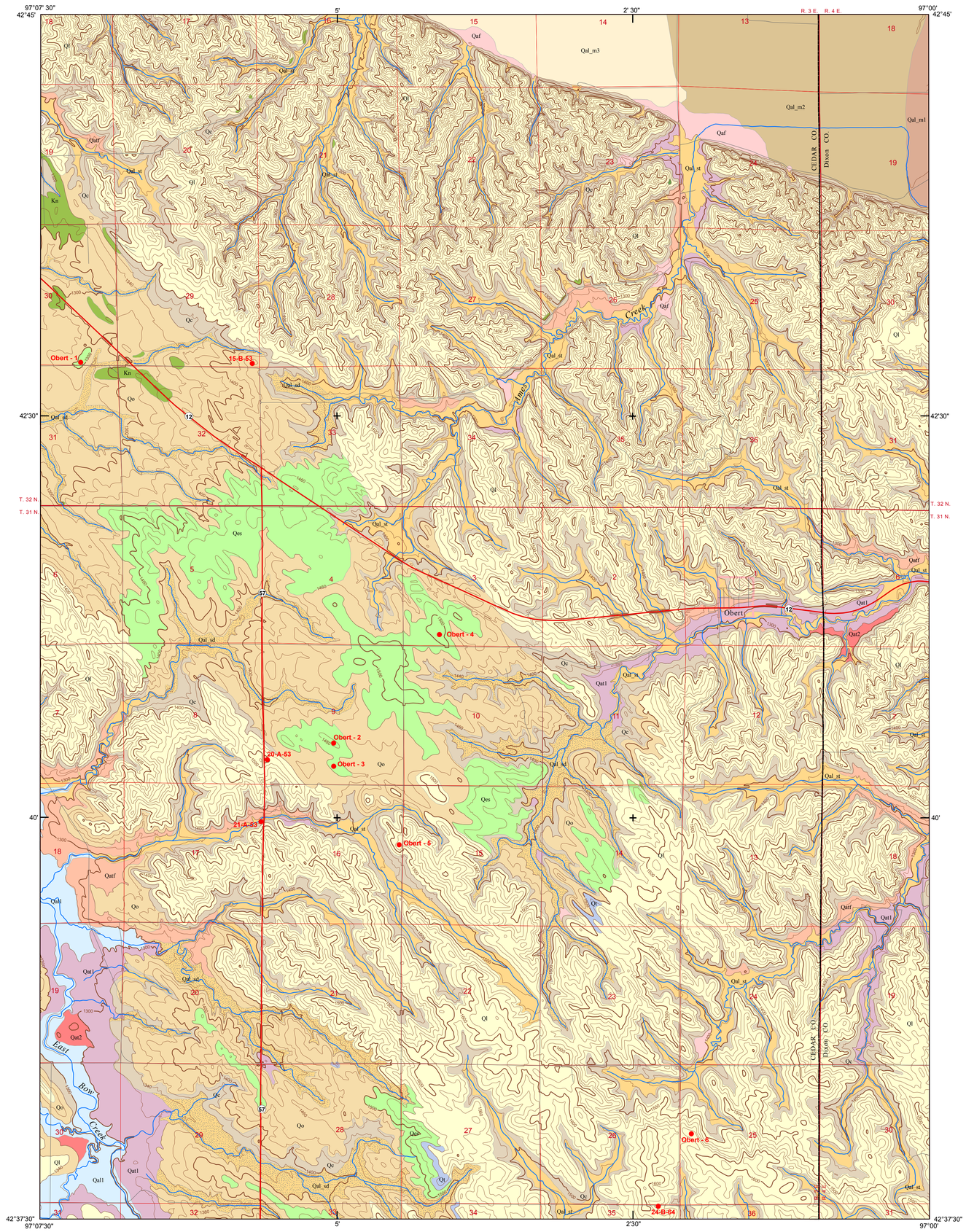

SCALE 1:24,000

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

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

Magnetic North Declination Approximately 4°1', 2009

Projection: UTM zone 14 North, NAD83

Contours from the Nebraska Department of Natural Resources, compiled from USGS 7.5 minute topographic quadrangles

Additional base data derived from 2005 second edition TIGER/line files

QUADRANGLE LOCATION

SAINT HELENA	MECKLING	VERMILLION
WYNOT	OBERT	MASKELL
COLERIDGE	COLERIDGE SE	MARTINSBURG SW

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Description of Mapping Units:

Qaf **Alluvial fan (Holocene)**

Silt, fine sandy silt, and sand

Alluvial fans along the valley margins. They are composed of massive to thin bedded silt, fine sand, and fine gravel beds, often with buried soils.

Qal **Quaternary alluvium of small tributary valleys (Holocene through Modern)**

Thin deposits of silty clay, Silt, very fine sandy silt, and/or sand and fine gravel.

These sediments occur in small tributary valleys draining the uplands adjacent to Bow Creek. The fluvial sediments in the larger valley bottoms include small alluvial fans which cannot be delineated at this contour interval and scale. Deposits may be massive or thin bedded.

- **Qal_st** Silty alluvium sourced primarily from Peoria Loess
- **Qal_sd** Sandy alluvium sourced primarily from glacial outwash and/or eolian sand

Qal1 **Quaternary alluvium of East Bow Creek valley bottom (Late Holocene to Modern)**

Silty clay, silt, sand, sand and gravel

Qal represents the modern channel and flood plain of East Bow Creek. The mapping unit is adjacent to the incised, modern channel of East Bow Creek. Fine to coarse sand occurs as point bars, channel bars, and bed load along many reaches of the modern channel.

Qal_m **Late Holocene (?) to recent alluvium of the Missouri River valley bottom**

Silt, silty caly, and sandy silt

This unit occurs in the modern Missouri River valley bottom in the northern and northeastern portions of the quadrangle. These mapping units are segregated based upon cross-cutting relationships observable on the topographic map and on areal photography.

- **Qal_m1** Alluvium with prominent channel scars, adjacent to the modern Missouri River Channel
- **Qal_m2** Alluvium with prominent channel scars which cut the Qal_m1 fill
- **Qal_m3** Alluvium with few, faint channel scars, cut by Qal_m2 in this mapping area.

Qat1 **Low Terraces (Late Holocene and Recent)**

Silty clay, silt, and silty sand grading downward to bedded sand and gravel

This mapping unit includes remnant terrace surfaces throughout the small upland tributaries and paired terraces along the East Bow Creek valley bottom. Many small remnants are present in the tributary valleys but cannot be mapped at this contour interval and scale. The low terrace fill includes one of two stratigraphic units: The Honey Creek Member or the Roberts Creek Member of the DeForest Formation. The Honey Creek Member is composed of gray to grayish brown, cross bedded silt loam grading downward to bedded sand and gravel. The Roberts Creek member is composed of massive or horizontally bedded gray to dark gray silt loam and sandy loam. Although conspicuous in the field, the two fills cannot be separately mapped at this scale. Both deposits include more sand than in other localities in eastern Nebraska due to the predominantly sandy source materials for the sediments. This unit is capped with 0.5 to 1 meter of horizontally stratified, Historic-age alluvium which buries the soil formed in the upper portions of the underlying terrace fill.

Qat2 **Low Terraces (Early to Middle Holocene and Recent)**

Silty clay, silt, and silty sand grading downward to bedded sand and gravel

This mapping unit includes small, unpaired, remnant terrace surfaces throughout the small upland tributaries and along the East Bow Creek valley bottom. Terrace fills are composed of the Gunder Member of the DeForest Formation. This unit is composed of brown to yellowish brown silt loam and sandy loam. The lower portions of exposures include bedded sand and gravel. The Qat2 surfaces stand approximately 1 to 2 meters above the Qat1 surfaces where both are present. This unit is commonly capped by a thin (approximately 0.5meter) mantle of horizontally stratified, Historic-age alluvium which buries the soil formed in the upper portions of the underlying terrace fill.

Qatf **Quaternary terrace / alluvial fan complex (Holocene)**

Bedded to massive silt, fine sandy silt, sand, and sand and gravel

This mapping forms an extensive "apron" of remnant terrace surfaces, alluvial fans, and colluvial deposits along much of East Bow Creek and the larger tributary valley margins. Individual fans merge with, and thus cannot be meaningfully segregated from the narrow terrace fills and colluvial aprons due to contour interval and map scale. This unit is composed of silt and silty sand where the source material is Peoria Loess, and sand to sand and gravel where the source area is eolian sand and glacial outwash.

Qc **Qc Slopewash (Holocene to modern)**

Thin deposits of silt, very fine sandy silt, and/or sand and gravel.

Slopewash occurs as thin mantles of sediment along valley margins, and is composed of sediments derived from adjacent slopes.

Qes **Qes Sand (Late Pleistocene and Holocene)**

Fine and very fine sand

Eolian, fluvial, and locally-reworked colluvial sand occurs as discontinuous deposits throughout the mapping area. They are derived from outwash and/or local alluvium. The Missouri River valley bottom may also be a source of eolian sand. The sand occurs in a variety of positions on the landscape and mantles a variety of mapping units.

Ql **Peoria Loess (Late Pleistocene)**

Eolian silt to very fine sandy silt

The Peoria Loess is typically massive to laminated, very fine sandy silt, presumably due to its proximity to the primary source area: the Missouri River valley. The Peoria Loess is typically greater than 50 feet thick, although thin (1 to > 3 meter), discontinuous deposits mantle a variety of older mapping units and geomorphic surfaces. The upper portions are oxidized brown to light gray. A thick soil has developed in the upper portions of the deposit. The lower portions are reduced, or "deoxidized" with common gray, pale yellow and brown mottles. Thin lamination was observed in the few road cuts in the area.

Qo **Glacial outwash (Lower or Middle Pleistocene)**

Poorly-sorted sand and cobbly gravel

Clast sizes range from sand to cobbles, with few boulders. Scattered boulders commonly occur on the surface, presumably remnants due to removal of the finer sediments due to erosion. Gravel and larger clasts include a variety of igneous and metamorphic lithologies, including quartzite, granite, granodiorite, and distinctive Sioux Quartzite. Few locally-derived sedimentary rocks are also present.

Qt **Glacial till and adjacent colluvial sediments derived from till (Lower or Middle Pleistocene)**

Clay through boulder diamict

Gray to dark gray matrix-supported diamict. Weathers to orange-yellow, with secondary carbonate coatings along fractures. Small exposures are scattered throughout the quadrangle.

Kn **Niobrara Formation (late Cretaceous)**

Limestone, chalky to argillaceous

The Niobrara Formation is light gray to medium gray and weathers to yellowish or yellowing orange. It is thin bedded, weathering to 10-30 cm thick plates. Gypsum crystals and blades are present along bedding planes and inclined fractures.

Kc **Carlile Shale (late Cretaceous)**

Silty shale,

The Carlile Shale is gray to dark gray, calcareous, silty shale to siltstone. Very limited outcrops occur along the Missouri River bluffs.

W **Water**

Test hole location

This geologic map was funded in part by the USGS National Cooperative Geologic Mapping Program. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government.