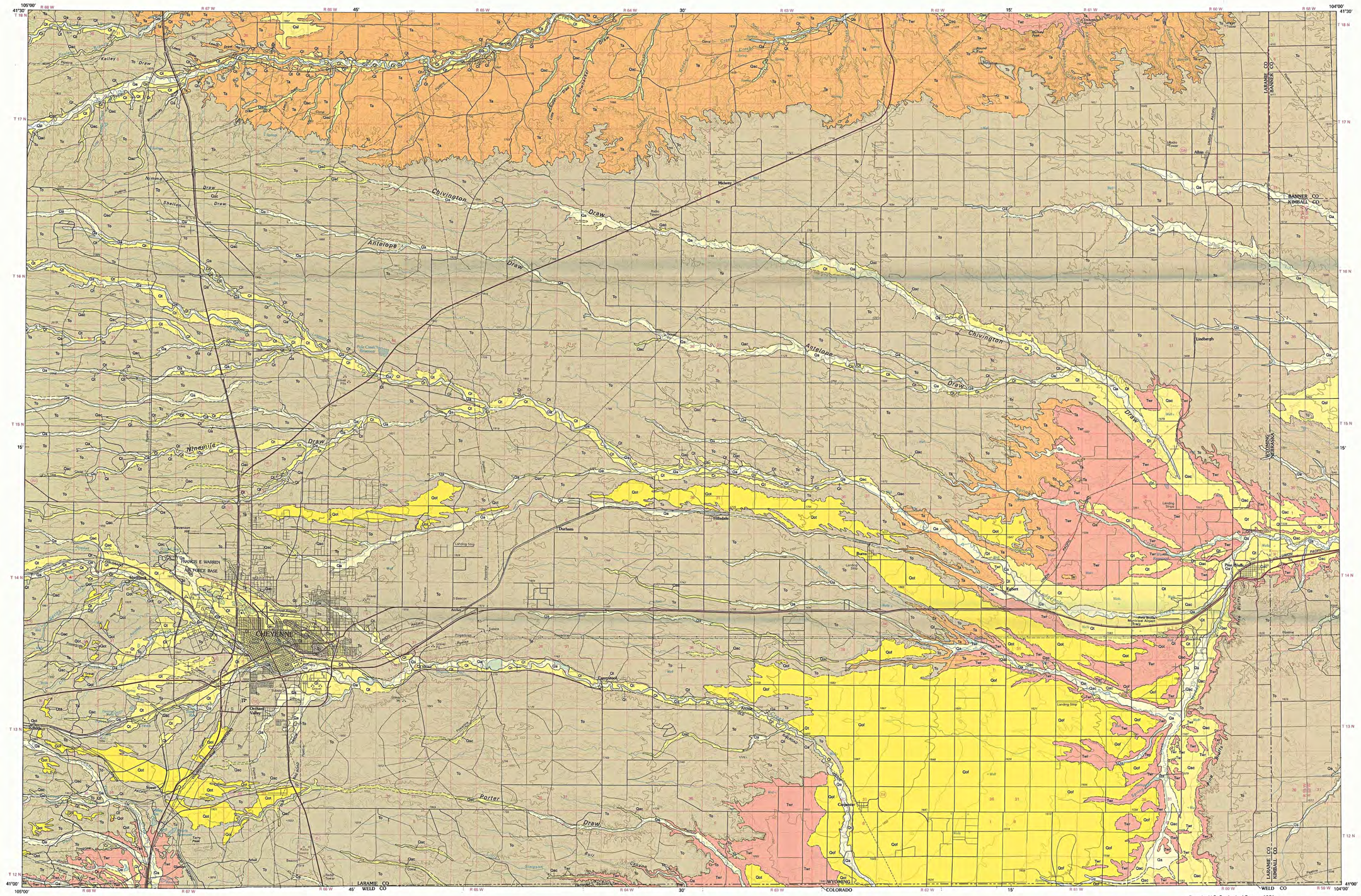
WYOMING STATE GEOLOGICAL SURVEY
Gary B. Glass, State Geologist
Laramie, Wyoming

MAP SERIES 46
Cheyenne 1:100,000-Scale Map



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SCALE 1:100,000
1 CENTIMETER ON THE MAP REPRESENTS 1 KILOMETER ON THE GROUND
CONTOUR INTERVAL 20 METERS

Base by U.S. Geological Survey, 1981.
Compiled mapping was adjusted and modified to fit topography.
Additional mapping in 1994, assisted by Robert W. Gregory.
Cartography by Phyllis A. Ranz.

# GEOLOGIC MAP OF THE CHEYENNE 30' x 60' QUADRANGLE, SOUTHEASTERN WYOMING, WESTERN NEBRASKA, AND NORTHERN COLORADO

compiled and mapped by

**Alan J. Ver Ploeg**

**1995**

NORTH
MN
GN
0°20'
6 MILS
15°
231 MILS

UTM grid convergence (GN) and 1981 magnetic declination (MN) at center of map. Diagram is approximate.

## GEOLOGIC SOURCES

Number corresponds to mapped area; unnumbered items are general references.

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1. Bjorklund, L.J., 1957, Geology and ground water resources of the lower Lodgepole Creek drainage basin, Nebraska: U.S. Geological Survey Water-Supply Paper 1410, 76 p., plate 1, scale 1:125,000.
2. Bjorklund, L.J., 1959, Geology and ground water resources of the upper Lodgepole Creek drainage basin, Wyoming: U.S. Geological Survey Water-Supply Paper 1483, 40 p., plate 1, scale 1:126,720.
3. Burchett, R.R., 1986, Geologic bedrock map of Nebraska: Nebraska Geological Survey, 1 plate, scale 1:1,000,000.
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Lowry, M.E., 1966, The White River Formation as an aquifer in southeastern Wyoming and adjacent parts of Nebraska and Colorado: U.S. Geological Survey Professional Paper 550-D, p. D217-D222.

8. Lowry, M.E., and Crist, M.A., 1967, Geology and ground water resources of Laramie County, Wyoming: U.S. Geological Survey Water-Supply Paper 1834, 71 p., plate 1, scale 1:125,000.
9. Moore, F.E., 1959, The geomorphic evolution of the east flank of the Laramie Range [sic], Colorado and Wyoming: Laramie, University of Wyoming, unpublished Ph.D. dissertation, 123 p., plate 4, scale 1:63,360.

Moore, F.E., 1963, Tertiary stratigraphy of the High Plains, *in* Katich, P.J., and Bolyard, D.W., editors, Guidebook to the geology of the northern Denver Basin and adjacent uplifts: Rocky Mountain Association of Geologists, p. 162-166.

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Stevenson, Abe, Lloyd, M.D., and Joseph, Lionell, 1983, Soil survey of Laramie County, eastern part: U.S. Department of Agriculture Soil Conservation Service, Washington, D.C., 117 p.

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## EXPLANATION

### CORRELATION OF MAP UNITS

| | | | | | |
|---|---|---|---|---|---|
| Qa | Qsc | Qsl | Qt | Holocene | QUATERNARY |
| Qof | | | | Pleistocene | |
| Qot | | | | | |
| UNCONFORMITY | | | | | |
| To | | | | Miocene | TERTIARY |
| UNCONFORMITY | | | | | |
| Ta | | | | Oligocene | |
| UNCONFORMITY | | | | | |
| Twr | | | | | |

### DESCRIPTION OF MAP UNITS

#### HOLOCENE AND PLEISTOCENE SURFICIAL DEPOSITS

Qa — **Alluvial deposits** - Unconsolidated and poorly consolidated clay, silt, sand, and gravel mainly in floodplains and lowest terraces. Thickness 0 to 85 feet (Lowry and Crist, 1967).

Qac — **Mixed alluvium and colluvium** - Sand, silt, clay, and gravel deposited mainly along intermittent streams; includes slope wash and smaller alluvial fan deposits that coalesce with alluvium. Thickness 0 to approximately 50 feet.

Qsl — **Windblown sand and loess** - Active and stabilized dunes, composed of loess and very fine-grained sand. Two areas are indicated in the map, one north of Pine Bluffs and the other north of Horse Creek in the northwestern part of the map. These features commonly are located downwind from deflation depressions. Numerous small-scale examples of these types of features occur southeast, east, and northeast of Cheyenne and are mapped with the Ogallala Formation. Thickness 0 to 60 feet.

Qt — **Terrace deposits** - Beds of coarse sand and gravel with some boulders and lenses of silt and clay. Includes fragments of weathered granite and other igneous rocks. These terraces occur along present drainages, a few feet to over 100 feet above modern floodplains. Thickness 0 to 65 feet along Horse Creek (Lowry and Crist, 1967).

Qof — **Older alluvial fan deposits (Pleistocene)** - Poorly sorted clay, silt, sand, and gravel; crudely bedded to nonbedded. Located in the southeastern part of the map above present drainages; currently inactive. Thickness 0 to approximately 150 feet (Rapp and others, 1953).

Qot — **Older terrace deposits (Pleistocene)** - Beds of coarse sand and gravel with some boulders and thin lenses of silt and clay. A large portion of the sand and gravel is made up of weathered granite fragments transported from the Laramie Mountains or eroded from the underlying Ogallala and Arikaree Formations. These are upper level terraces which were deposited in channels cut into the Ogallala and Arikaree Formations. May represent segments of a dissected older alluvial fan complex in some areas. Thickness 0 to 150 feet (Rapp and others, 1953).

To — **OGALLALA FORMATION (UPPER AND MIDDLE MIOCENE)** - Tan to brown, unconsolidated to well-cemented sandstone, siltstone, volcanic ash, and conglomerate (gravel- to boulder-sized), interbedded with claystone and thin beds of limestone toward the east. The conglomerate clasts are primarily Precambrian igneous material, with limestone clasts predominating in some conglomerates near the base of the formation. The deposits are mostly coarse grained near the Laramie Mountains and become finer to the east. Thin, tightly carbonate-cemented lenses of gravel, sand, and silt, locally referred to as "mortar beds", occur in the lower part of the formation in the central and eastern portions of the map area. Reddish brown gravels of possible Pliocene age are mapped with the Ogallala Formation in areas north, east, and southeast of Cheyenne (Cooley, 1991). Thickness 0 to 330 feet (Lowry and Crist, 1967).

Ta — **ARIKAREE FORMATION (LOWER MIOCENE AND UPPER OLIGOCENE)** - Friable, gray, tuffaceous, calcareous, fine-grained, crossbedded sandstone, interbedded with lenses of siltstone and volcanic ash. Elongate, cylindrical, calcareous concretions, 2 to 3 feet thick and up to 10 feet long, occur locally in the sandstones. These concretions have a predominant northwest-southeast alignment (Rapp and others, 1953). Coarse conglomerate occurs locally near the base of the formation. The Arikaree Formation pinches out toward the south on the map. Thickness 0 to 500 feet (Lowry and Crist, 1967).

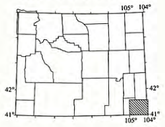
Twr — **WHITE RIVER FORMATION (OLIGOCENE)** - The upper White River Formation is characterized by light pink to buff, massive, argillaceous, calcareous siltstone interbedded with minor sandstone, conglomerate, and volcanic ash beds. This unit commonly weathers into cubic blocks and slabs. The silt is imbedded in a matrix of carbonate flakes, volcanic ash, and montmorillonitic clay. The lower White River Formation consists of interbedded red and green bentonitic claystone, sandstone, siltstone, and conglomerate. This lower unit does not crop out in the map area. In adjacent areas, the White River is subdivided into an upper Brule Formation and a lower Chadron Formation corresponding to the upper and lower White River Formation described above. Thickness 0 to 500 feet (Lowry and Crist, 1957).

### SYMBOLS

**CONTACT** - Dashed where approximately located.

**ANTICLINE** - Trace of axis and direction of plunge. Shorter arrow indicates limb of fold with steeper dip. Dashed where approximately located. Plotted axes are based on structure contours on the White River Formation from a map by Lowry and Crist (1967). Axis in Cheyenne area portrays a near-surface fold in the White River Formation.

### LOCATION DIAGRAM

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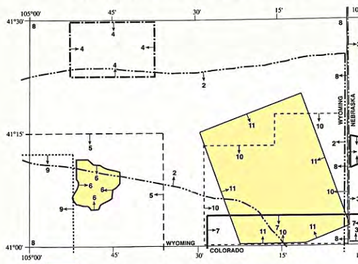


Area covered by source maps of scales 1:62,500 or larger.

Area covered by source maps of scales smaller than 1:62,500.