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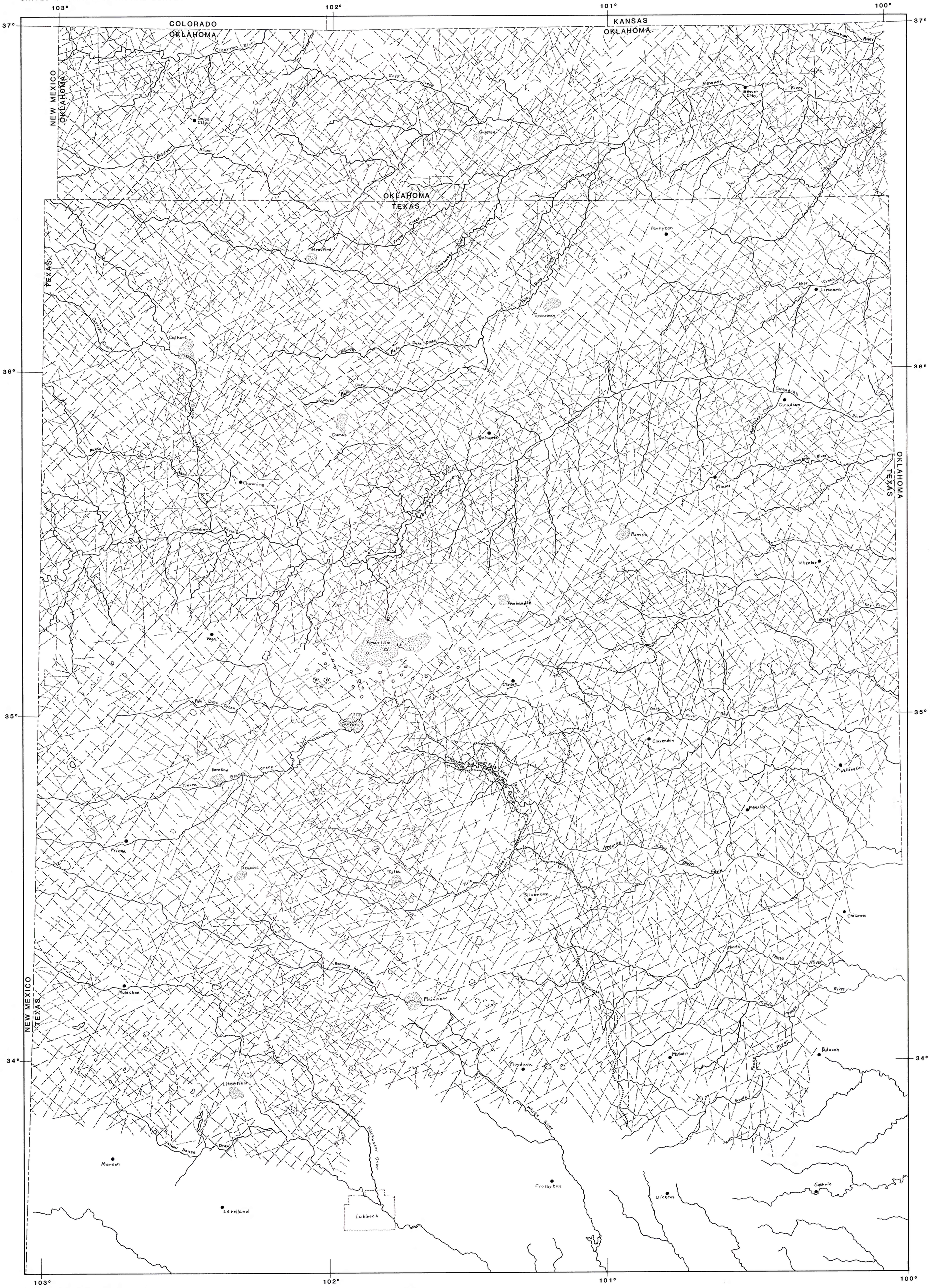

LINEAR FEATURES DETERMINED FROM LANDSAT IMAGERY IN THE TEXAS AND OKLAHOMA PANHANDLES

By

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IDENTIFICATION AND PLOTTING OF LINEAR FEATURES

This map is one of two linear-features maps compiled for the U.S. Geological Survey's High Plains Regional Aquifer System Analysis (Weeks, 1978). The other map covers western Kansas (Cooley, 1984).

Linear features occur on the Earth's surface as straight or slightly curved lines. These features usually are referred to as linear trends or lineaments, some of which extend across the area investigated. The linear features shown on this map are not identified as to type or origin, although most probably reflect fractures or fracture zones, including joints and faults. Fracture zones affect the movement of water or other fluids through the rocks.

The linear features were determined from visual inspection of false-color composites of Landsat imagery at a scale of 1:500,000. The imagery used was from the Geological Survey's EROS Data Center at Sioux Falls, South Dakota. The images are free of cloud cover, and, except for one image, have been enhanced to remove scan lines that tend to mask some of the features, including linear features.

The High Plains, distributed throughout most of the Texas and Oklahoma Panhandles, are nearly flat and contain many shallow internally drained depressions. In this area, sedimentary rocks forming the High Plains are comprised chiefly of the Ogallala Formation of Tertiary age. In the northern part of the area, the Cimarron, Canadian, and Red Rivers have carved deep valleys or shallow canyons below the level of the High Plains and in places are now flowing on pre-Tertiary rocks. The eastern edge of the High Plains in Texas forms an imposing escarpment especially near Canyon Palo Duro (Red River drainage system).

Physiographic features used to identify linear features include straight segments of low escarpments or bluffs, ridges, and valleys and dissected slopes including some badlands. Vegetation growing on flood plains accentuates the configuration of shallow valleys. Tonal contrasts in color patterns indicating differences in vegetation, soils, or outcropping rocks helped in the recognition or extension of some of the linear features. In parts of the area, the linear features may be masked by widespread farming. The rectangular patterns of cultivated fields and roads along section lines make it difficult to recognize linear features that trend generally eastward or northward (east-northeast to east-southeast and north-northwest to north-northeast). The general eastward orientation of the main highways and railroads also makes it difficult to recognize the generally eastward trending linear features. Therefore, there are fewer north-trending linear features and especially fewer east-trending linear features plotted on the map than linear features trending in other directions.

Small, tightly curved linear features occur throughout the area, but they are more numerous to the south of Amarillo, Texas. They outline parts of shallow depressions generally less than 3 miles in diameter. Large, slightly curved, linear features, generally between 5 and 25 miles long, are recognized throughout the panhandles.

The linear features were plotted as dashed lines on transparent overlays on the Landsat images only in locations where they were observed. Dashed lines were used because most of the linear features were observed as discontinous lines. The most conspicuous linear features were plotted first and usually were the longest linear features.

The major and subordinate linear features were classified according to their length into the two groups shown on the map. Determination of the linear features was aided by plotting the linear features from a mosaic of Landsat imagery of the United States (scale 1:5,000,000) compiled by the U.S. Soil Conservation Service (1974).

REFERENCES

Cooley, M. E., 1984, Linear features determined from Landsat imagery in western Kansas: U.S. Geological Survey Open-File Report 84-241, map, scale 1:500,000.

U.S. Soil Conservation Service, 1974, Mosaic of imagery from Earth Resources Technology Satellite-1 of the conterminous United States: U.S. Geological Survey map, scale 1:5,000,000.

Weeks, J.B., 1978, Plan of study for the High Plains Regional Aquifer-System Analysis in parts of Colorado, Kansas, Nebraska, New Mexico, Oklahoma, South Dakota, Texas, and Wyoming: U.S. Geological Survey Water-Resources Investigations Report 78-70, 28 p.

EXPLANATION

- APPROXIMATE POSITION OF EASTERN HIGH PLAINS ESCARPMENT DETERMINED FROM LANDSAT IMAGERY
- SLIGHTLY CURVED LINEAR FEATURE
- TIGHTLY CURVED LINEAR FEATURE--Diameter of depression generally is less than 3 miles

LENGTH OF LINEAR FEATURES

- Less than 30 miles
- More than 30 miles
- EPHEMERAL LAKE
- URBAN AREA DETERMINED FROM LANDSAT IMAGERY

CONVERSION FACTOR

Multiply	By	To obtain
mile	1.609	kilometer

LOCATION MAP