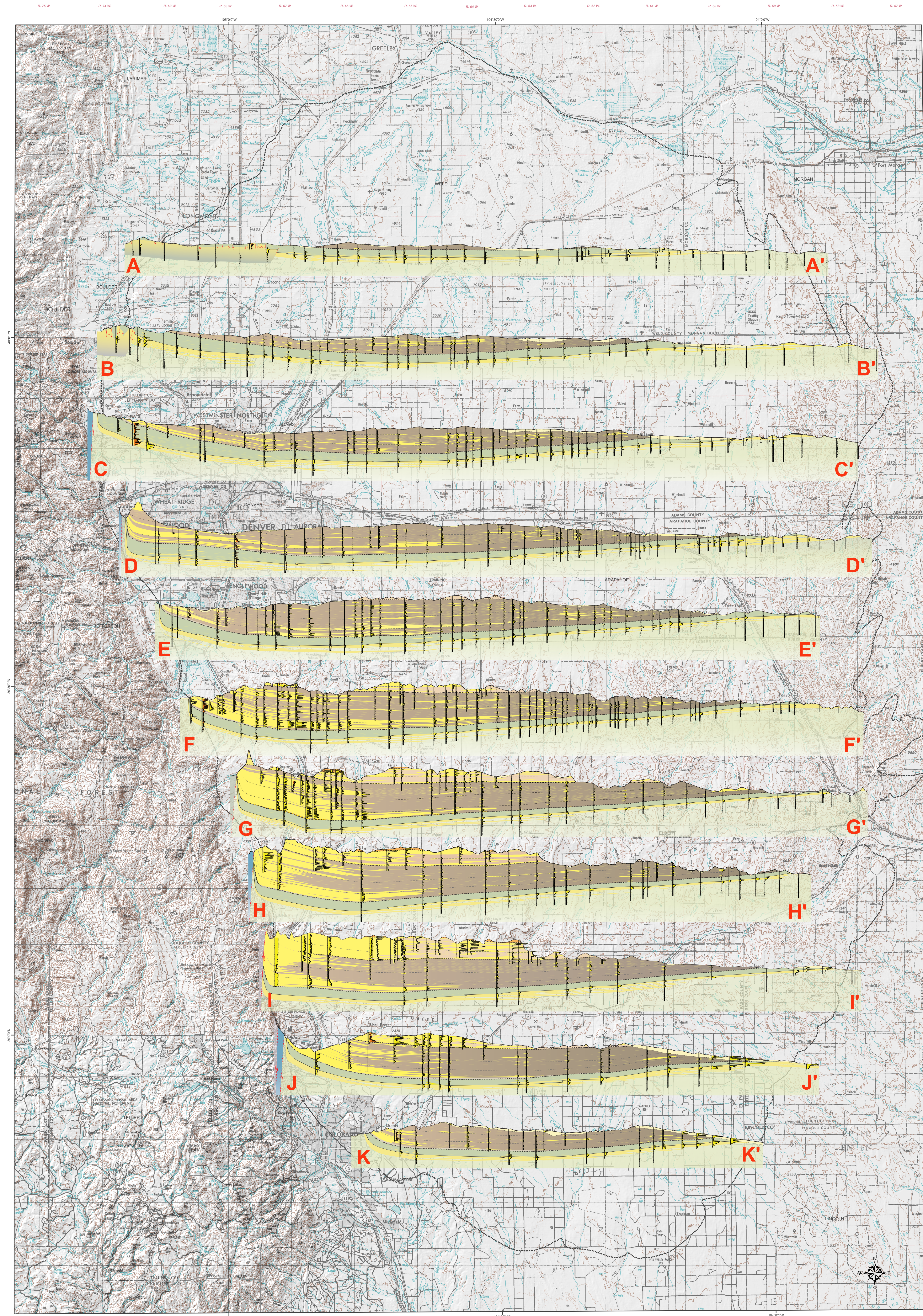
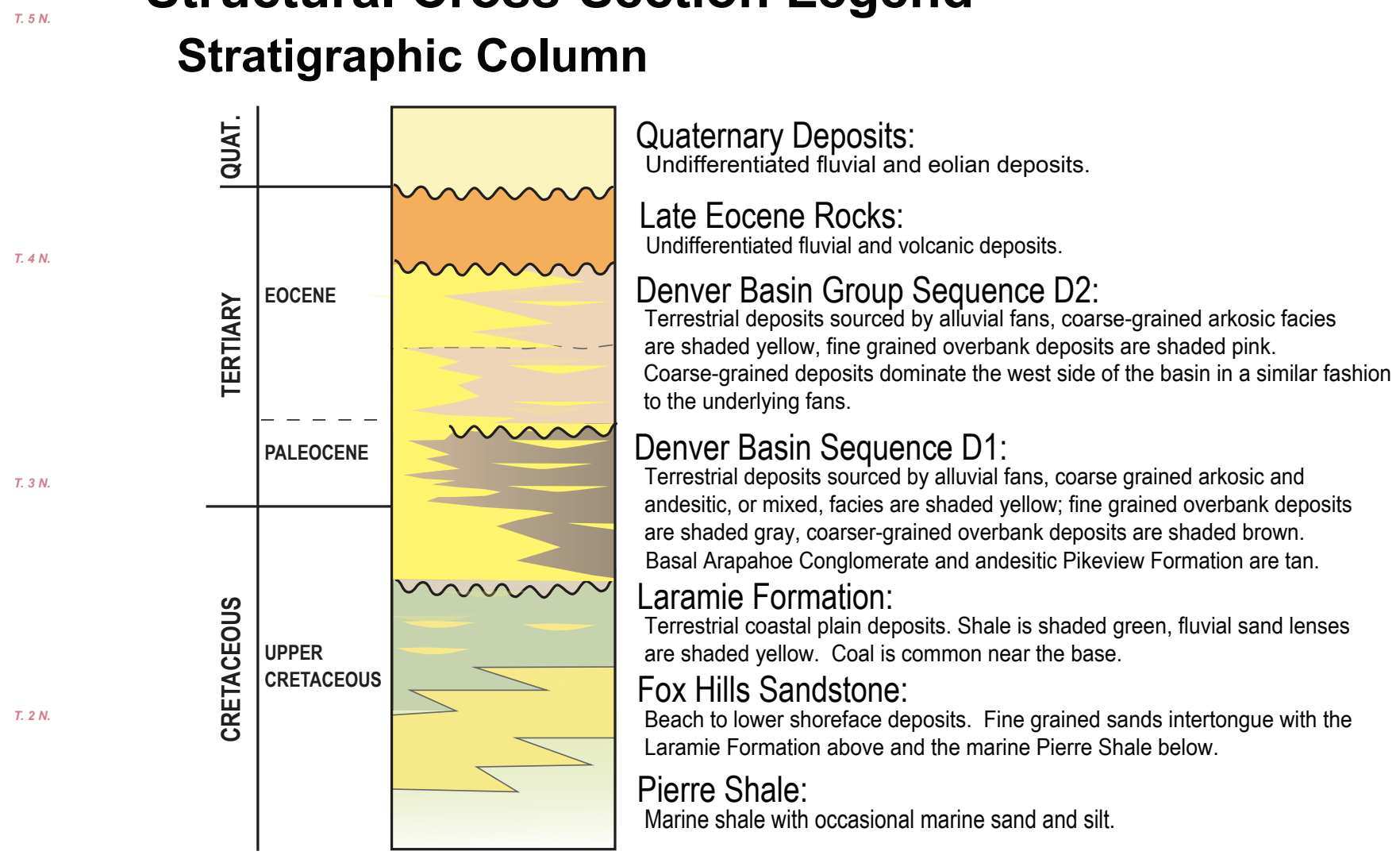


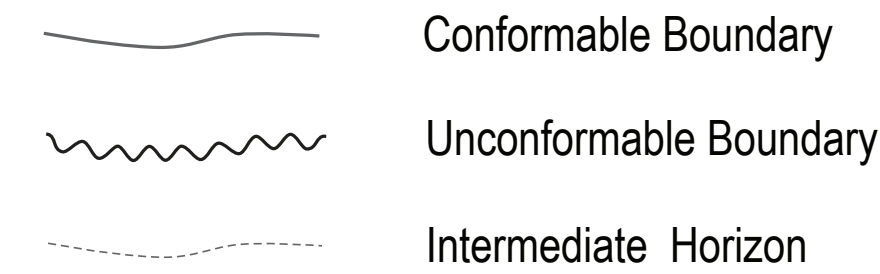
WEST-TO-EAST COMPILATION



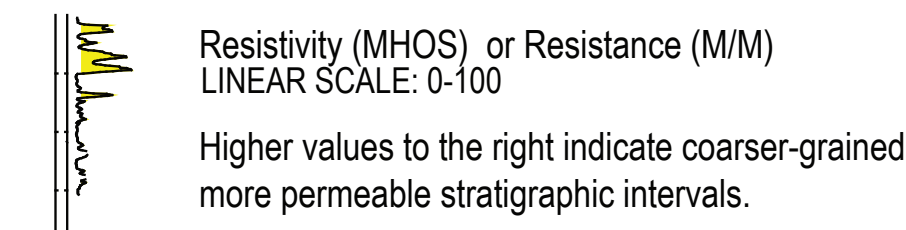
Structural Cross-Section Legend  
Stratigraphic Column



Geologic Boundaries



Geophysical Log Traces



INTRODUCTION

Fresh groundwater in the Upper Cretaceous through Paleogene strata of the Denver Basin is held in the pore spaces between the grains of sedimentary rocks that were deposited in ever-changing environments. Based on the geography at the time of deposition, the characteristics of these sedimentary rocks vary considerably, both laterally and with depth. Accordingly, the ability of the rocks to store and transmit water also varies laterally and with depth. New data and refined interpretations continue to reveal the diverse characteristics and spatial heterogeneity of these sedimentary rocks. This spatial heterogeneity directly affects how the aquifers respond to exploitation. Management of the groundwater resource within these strata requires a systematic understanding of the characteristics and heterogeneity using the most current data and technology available.

The fifteen cross-sections in this publication depict stratigraphic and structural relationships of the Upper Cretaceous through Paleogene strata within the Denver Basin. They integrate subsurface data from 737 boreholes with surface geologic mapping to provide a regional three-dimensional view of the water-bearing strata. Computer-based technologies provide robust tools for cross-section preparation and interpretation drawing information from a broad array of sources.

Alignments of the cross-sections in this publication follow those of cross-sections prepared by the Colorado Division of Water Resources (DWR) in the 1980s while developing the Denver Basin Rules (DWR, 1987). Eleven cross-sections extend from the west side of the basin at the base of the Front Range uplift east across the basin. Four cross-sections parallel the Front Range uplift from north-to-south. Plates 1 and 2 are compilations of the cross-sections at a horizontal scale of 1:250,000 to allow regional comparisons of stratigraphic relations across the basin. Plate 3 is a geologic base map showing cross-section alignments and all boreholes used in cross-section preparation. Plate 4 includes type logs with brief descriptions of criteria used for geophysical log picks. Individual cross-sections are included as Plates 5 through 19 at a detailed horizontal scale of 1:78,000 and a vertical exaggeration of 16.4.

This work builds upon and complements the geologic map compilation of the southwestern part of the Denver Basin by Thorson (2011). The compilation map integrates results of surface geologic mapping by the CGS under STATEMAP component of the National Geologic Cooperative Mapping Program. This work also complements the Denver Basin geologic map series by Dechesne et al. (2011). The map series includes a bedrock geologic map, structure maps, and isopach maps of the Upper Cretaceous to Paleogene strata deposited during the Laramide mountain-building event. Both publications serve as detailed references for the strata depicted in these cross-sections.

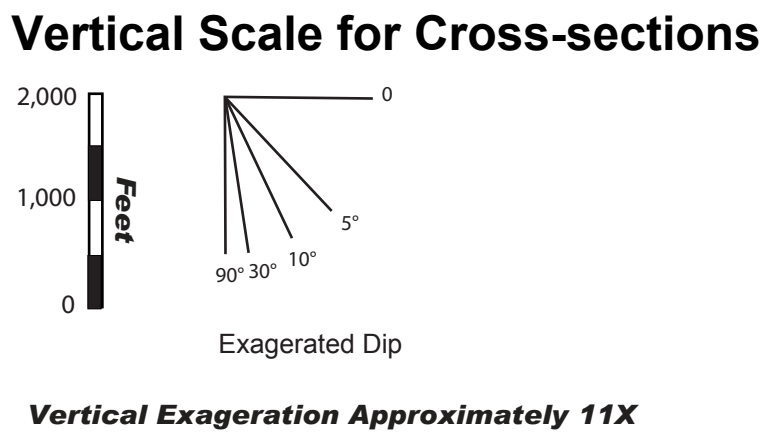
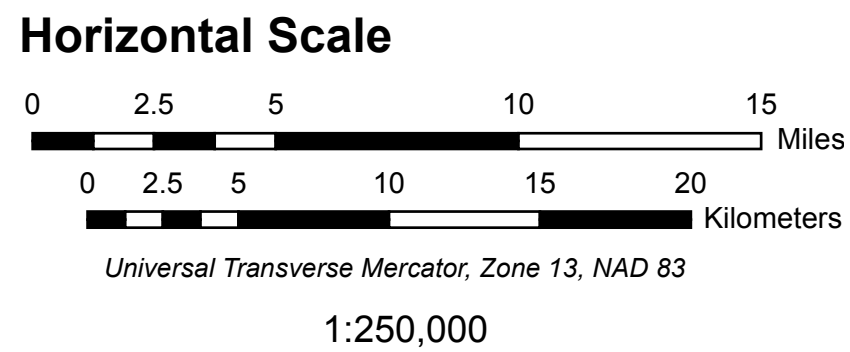
GRAPHIC REPRESENTATION

Relationships shown in the cross-sections illustrate variability in stratigraphic architecture at different depths and geographic locations across the basin. Coarser-grained clastic facies, as interpreted from higher resistivity values on the well logs, have been given solid yellow shading. Finer-grained facies, as interpreted from lower resistivity values have been given darker shading. In places where coarser-grained facies are laterally correlative, the solid yellow shading connects between neighboring wells to indicate lateral continuity. These can be individual clastic beds and lenses, or intervals of amalgamated, coarse-grained facies. In cases where lateral correlation could not be made with confidence between adjoining wells, individual sand bodies are depicted as solid yellow lens-shaped polygons. Horizontal dimension is not implied by the polygon size. Areas between wells filled with subtle lens-shaped polygons indicate that lenses of clastic material of variable thicknesses and lateral extent may be present at any depth.

Graphic presentations on the cross-sections include the following features:

- Formation boundaries
  - Conformable contacts
  - Unconformable boundaries
  - Intermediate boundaries used for correlations
- Major stratigraphic intervals
  - Coarse-grained facies, shown in shades of yellow
    - Continuous deposits
    - Lenticular sandstone bodies
    - Alluvial fan systems
  - Fine grained facies, shown as a background color

Geologic formations mapped at the surface are identified on the detailed cross-sections in Plates 5 through 19. Exposures on the west and south side of the basin are based on recent mapping by CGS under the STATEMAP component of the National Cooperative Geologic Mapping Program. Results of this detailed 1:24,000 scale quadrangle mapping have been compiled at a scale of 1:50,000 by Thorson (2011). Elsewhere, exposures are based on mapping at a scale of 1:100,000 by Colton (1978), Trimble and Machette (1979a; 1979b) or mapping at a scale of 1:250,000 by Braddock and Cole (1978), Bryant et al. (1981), Scott et al. (1978), Sharps, J.A. (1976, 1980).



CROSS-SECTIONS OF THE  
FRESH-WATER BEARING STRATA  
OF THE DENVER BASIN BETWEEN GREELEY AND COLORADO SPRINGS, COLORADO

By Peter E. Barkmann, Marieke Dechesne, Mary Ellen Wickham, Jill Carlson, and Scott Formolo  
2011