abruptly from the depocenter, in the northern part of the basin is a significant fault bounded horst block or mid-basin platform.

The Pre-Tertiary section in the basin is not well imaged by the survey except for a few data segments on the western side.

KIRKLAND, JAMES I.

Brackish-water mollusks from the western margin of the western interior seaway: A tool for sorting out the stacked Cenomanian-Turonian marginal marine strata along the Wasatch Line.

The "middle" Cretaceous along the "Wasatch Line," extending from near Coalville, Utah, in the north to Cedar Canyon and the Pine Valley Mountains in the south, is represented by a thick sequence of marginal marine strata deposited near peak sea-level rise on the western margin of a rapidly subsiding foreland basin. Many brackish-water molluscan taxa were named from these strata during the latter third of the 19th century, but were often described from poorly preserved material at poorly documented sites. Though evolutionarily conservative, brackish-water mollusks generally display a great deal of morphologic variation, resulting in a number of previously described species being lumped together. Therefore, little systematic research on these faunas was undertaken after 1900, except for comparing the Utah taxa to fossils described from similar-age strata to the south in Texas and Arizona. Recently these brackish-water taxa have been found to be useful as a proxy for determining ancient substrate conditions, paleoturbidity, and paleosalinity gradients. Field research in the area of southwestern Utah has revealed that abundant, well-preserved molluscan fossils commonly characterize brackish-water strata in this area. Distinct species can be recognized at different stratigraphic levels, indicating the potential for some of these brackish-water taxa to have local biostratigraphic utility.

To test their utility, collections of brackish-water fossils were made at many stratigraphic levels and from different localities. These sites were tied into the standard ammonite biostratigraphy established for the Cretaceous Western Interior Seaway through intertonguing and onlap/offlap relations between the brackish-water facies and marine, ammonite-bearing strata. The type collections of the original taxa from the previous century were borrowed from the Smithsonian Institution and the type localities were revisited and fossils collected when accessible. Many type specimens were originally collected from the now-closed coal mines near Coalville in the lower Turonian Coalville Member of the Frontier Formation, so the "Wasatch" coal sites are no longer accessible.

Results of these studies indicate that several brackish-water species needlessly had been lumped together, and that a number of undescribed forms historically lumped with these species represent new undescribed species. While the systematic research of these collections continues, the preliminary results are clear: a number of brackish-water molluscan lineages reveal speciation rates much higher than would be considered typical of brackish-water taxa. Gastropods of the *Craginia coalvillensis-C. whitfieldi* and *Admetopsis rhomboides* lineages appear to have the most potential for biostratigraphy, but other gastropods and a number of bivalves also appear to have potential. Using all of these taxa, two "zones" per substage may be discerned. Although it is unlikely that this system will have utility outside the Colorado Plateau region, it appears to work well there. It is often difficult to correlate the lithologically similar stratigraphic succession of marginal marine Cretaceous strata along the "Wasatch Line" due to poor exposures and structural complexity. The brackish-water taxa found in strata along the "Wasatch Line" belt provide a new tool on which to base these correlations.

LOSEKE, T.D., and DILLIARD, K.A.

Significance of Middle Tertiary Sedimentary Rocks of Chino and Verde Valleys, Transition Zone, Arizona.

Oligocene and Miocene sedimentary rocks of Chino and Verde valleys record changes in drainage patterns along the southern edge of the Colorado Plateau. Strata of the Paulden and Beavertail Butte formations represent the first deposits of a southeast-flowing drainage system. Following the development of the Mogollon Rim, a significant deflection in drainage direction occurred, mainly from north- to southeast-directed flow and also a significant change in sediment sources. It is apparent that the Mogollon Rim formed prior to 15 Ma and that the topography of the rim was similar to that of the present day rim. Oligo-Miocene sedimentary deposits represent a period of aggradation that followed an extensive period of erosion that formed the Mogollon Rim.

The Beavertail Butte formation is an informal name given to conglomerates deposited near Sedona, Arizona, approximately 500-1000 meters below the present rim. Capping basalt flows from House Mountain volcano were dated at 13-15 Ma and brackets the upper age of these sedimentary rocks. Deposits of the Beavertail Butte formation consist of basal conglomerate, middle mudstone, and upper cong-lomerate unit. A change of provenance is recorded between the upper (Precambrian terrains to the west) and basal (Paleozoic strata of the Mogollon Rim) conglomerate, probably recording the development and expression of the Mogollon Rim. The upper conglomerate unit represents southeast-direct transport and possibly integration of stream systems.

The Paulden formation is probably older than the upper conglomerate of the Beavertail Butte formation. The Paulden formation outcrops to the northwest of Sedona and probably represents a similar drainage pattern as the Beavertail Butte formation. The Paulden formation is overlain by the 22-26 Ma Sullivan Buttes Latite. Clasts from the overlying Sullivan Buttes Latite are found in the upper conglomerate of the Beavertail Butte formation. This change in drainage direction correlates with the inception of Basin and Range extension in southern Arizona. These two formations help to document evolving drainage patterns of the Transition zone during a period of significant tectonic evolution.

NELSON, S.T. AND HARRIS, R.A.

The role of rheology in the tectonic history of the Colorado Plateau.

Interpretation of the geophysics, petrology, and structure of the Colorado Plateau indicates that it is a rheologically dis-