

Effects of D-Shaped Fault Deformation on South Louisiana Landscape

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Distinctive D-shaped depressions are common landform fault signatures on down-dropped blocks of east-west striking regional growth faults extending across south Louisiana. On Pleistocene terrace upland surfaces, swamps or small lakes form in the depressions and drainage is redirected into funnel-shaped tributary patterns that converge at the lower depression rims. In coastal wetlands, lakes and bays form as a result of fault depressions and they are a primary cause of Twentieth Century land loss.

Depressions occur along broad, arc-shaped fault scarps that are 5 to 8 km. in length. They are amphitheater-shaped with maximum displacement at the center of the fault segment and decreasing in a radiating pattern from that point, with radii of 6 km or more. Antithetic faults are sometimes found along the outer rims. Depths range from 0.5 to 8 m. and total areas are 6000 hc or more.

In the deltaic plain some depressions captured active Mississippi River distributaries and became depocenters in-filled by small lacustrine deltas. Fault movement and resulting depressions change landforms and hydrology and drive ecological successions.

Modern fault movement resulting in depressions has been dated from historic maps, aerial images and eye-witness accounts. Large depressions have formed within a year or less. Geoarchaeology and radiometric dating has been used to date prehistoric formation. Some depressions exhibit evidence of multiple episodes of fault movement.

Characteristics of Colyell, Boudreaux, Empire, Bastian Bay, Bayou L'Ours and Bayou Jasmine depressions are compared.