

# **Kinematic Interactions Between a Major Fault Propagation Fold and Associated Flank Thrusts and Implications for Triangle Zone Development - Example from the Kanarra Fold**

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## **ABSTRACT**

Combined field mapping, 3D-structural analysis, and forward modeling are used to constrain the role of early formed flank thrusts in either the development or abandonment of “triangle-zones” at the leading edge of fold & thrust belts. This process is of considerable interest as triangle-zones represent important traps for hydrocarbon reservoirs, and processes leading to their abandonment are essential for advancement of fold & thrust belts. The west-directed Taylor Creek flank thrust system crops out on the forelimb of the east-verging Kanarra Fold, at the leading edge of the Sevier fold & thrust belt. Field mapping and cross-sections demonstrate the Kanarra Fold is a fault-propagation fold driven by the east-directed Kanarra Thrust. Within this critical area, the forelimb of the Kanarra Fold transitions from upright to overturned. Forelimb duplex structures here are interpreted to be related to faults associated with the Taylor Creek Thrust flank thrust system. Initially, these duplexes were speculated as being part of a nascent triangle-zone. However, I propose the early-formed flank thrusts were also rotated during growth of the Kanarra Fold. This study will examine if flank thrust rotation led to their reactivation as east-directed thrusts to form a ramp for the advancing Kanarra Thrust. Formation of a ramp advances the fold and thrust belt up-section by terminating triangle-zone development. This requires further detailed mapping along strike to the north and south to create a true 3D structural analysis of the area. Forward modeling will be used to test the alternative by exploring criteria that promote flank thrusts developing into roof-thrusts and formation of triangle zones at the leading edge of fold & thrust belts.