Spatial variability and controls of bank instability in a semi-arid drainage basin in southeastern Utah
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The controls and longitudinal variability of bank instability for South Cottonwood Creek, an alluvial channel in San Juan County, southeastern Utah, are analyzed using reach and valley characteristics, channel geometry, bank characteristics, and anthropogenic influences. Maps illustrating the spatial variability of bank stability and a model of the dominant controls of instability are presented. Results suggest that stream banks in each valley segment are mostly unstable and bank retreat processes vary going downstream in the drainage network. The Mountain Segment is characterized by direct trampling and sub-aerial preparation processes, and bank vegetation is the most important control of instability. The Canyon Segment is influenced by fluvial erosion, a process related to unit stream power. The Wash Segment is characterized by both fluvial erosion and bank failure. Bank angle and height and unit stream power are the most important controls of instability. Additionally, anthropogenic influences further instability throughout each valley segment.