# THE BIG FLOOD:
## WILL IT HAPPEN AGAIN?

## Has Lockyer Creek changed since European settlement?

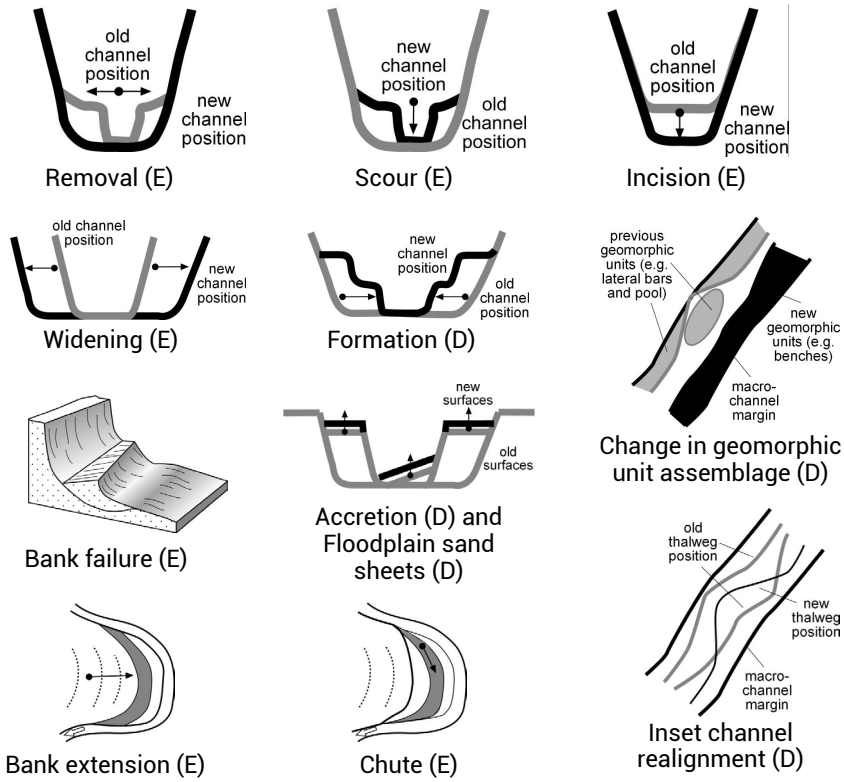
Along Lockyer Creek, 26% of the channel has experienced some change or adjustment since the time of the first parish maps in 1886.

Adjustments are local and dominated by changes to macrochannel width and the type of geomorphic unit (landforms) within the macrochannel. The most significant changes in the Lockyer have occurred upstream of Gatton and mainly after 1974 and in 2011.

Twelve different types of geomorphic adjustment have been identified along Lockyer Creek.

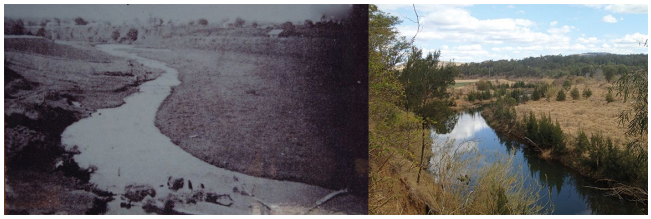
These are categorised as erosional (E), depositional (D) and reorganisational (R).

Lockyer Creek can be described as a resilient system as it has not experienced catastrophic geomorphic adjustment when compared to other rivers in eastern Australia. Fine-grained sediments, terraces, bedrock, vegetation and a large macrochannel have 'held the system together' in the period since European settlement. However, the system may not be so resilient in the future and it is possible more adjustments will occur along the macrochannel.

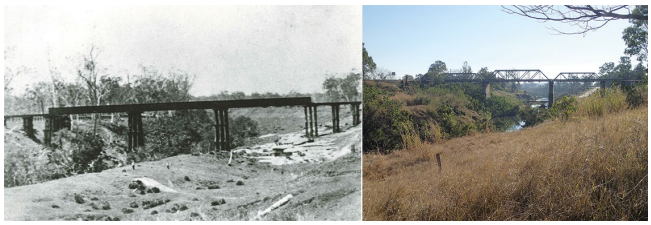



Comparison of historical and contemporary photographs from Lockyer Creek shows little geomorphic change. (photos: Queensland State Library and K. Fryirs)

Helidon (Drover's Crossing), 1890s and 2014



Gatton Railway Bridge, 1866 and 2014



## FURTHER READING

Fryirs, K., Lisenby, P. and Croke, J. 2015. Morphological resilience to catastrophic flooding: the case of Lockyer Creek, SE Queensland, Australia. Geomorphology. 241, 55-71. doi:10.1016/j.geomorph.2015.04.008

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## Morphological and historical resilience to catastrophic flooding: The case of Lockyer Creek, SE Queensland, Australia

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ABSTRACT

This study aimed to determine the extent of geomorphic change resulting from the catastrophic flood of 2011 in the Lockyer Valley in southeast Queensland and to place these impacts within a history of geomorphic adjustment. Aerial photographs dated from 1933 to 2011 and parish maps and historical on-ground photographs dating from 1865 to 1966 were examined for evidence of geomorphic adjustment since European settlement in the first half of the nineteenth century. Eleven forms of geomorphic adjustment were identified in three categories; erosional, depositional, and reorganisational. Only 26% of the Lockyer Creek channel length has been affected by some form of geomorphic adjustment since European settlement. Most of this adjustment was localised and dominated by reorganisation of geomorphic unit assemblages within the macrochannel and sediment deposition on floodplains. No wholesale river change in the form of lateral migration or avulsion has occurred, and the river's morphology has remained relatively characteristic over time (i.e., morphology remains relatively uniform in a reach-averaged sense). Geomorphic responses to extreme flooding have been minor, and the geomorphic effectiveness of floods in this system (including the 2011 flood) has been limited over the last several hundred years. The system is likely still adjusting to past flooding events that 'set' the morphology of the current system (i.e., the macrochannel). A form of event resilience has resulted in this system such that it is less prone to geomorphic adjustment during events than would normally be considered geomorphically effective. As a result, antecedent controls on macrochannel presence and capacity are considered to be first-order controls on contemporary forms and processes in this system. Work is required to test whether the resilience of this system will hold in the future, with more extreme episodes of flooding predicted to occur in this region under future climate change.



**For more information about the project**

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