Biography

Kirstie's research focuses on fluvial geomorphology, in particular river evolution, sediment budgets and landscape (dis)connectivity, and human disturbance to rivers. She has also developed frameworks for assessing the physical condition and recovery potential of river systems. She is co-developer of the River Styles Framework and and a portfolio of professional development short courses (see www.riverstyles.com). Her research also focuses on how geomorphology provides a physical template for ecosystem function and how science can be better used in environmental management. She has also undertaken research on heavy metal contamination at Casey and Wilkes stations in Antarctica. She has co-written and/or edited three books titled “Geomorphology and River Management” (Blackwell, 2005), "River Futures" (Island Press, 2008) and "Geomorphic Analysis of River Systems: An Approach to Reading the landscape" (Wiley, 2013). Kirstie is on the Editorial Board of the journal Geomorphology and a winner of the Gordon Warwick medal for excellence in research.

Authored Books

1. Geomorphic analysis of river systems: an approach to reading the landscape

2. The River Styles® short course: workbook and field guide


4. Practical Applications of the River Styles Framework as a Tool for Catchment-wide River Management: A Case Study from Bega Catchment, NSW, Australia

Edited Books

1. River Futures: An Integrative Scientific Approach to River Repair

Journal articles

1. The impact of urbanisation on community structure, gene abundance and transcription rates of microbes in upland swamps of Eastern Australia

2. Single-grain OSL dating of fluvial terraces in the upper Hunter catchment, southeastern Australia

3. Water sources of upland swamps in Eastern Australia: implications for system integrity with aquifer interference and a changing climate

4. Connectivity as an emergent property of geomorphic systems

5. Palaeohydrology of lowland rivers in the Murray-Darling Basin, Australia

6. Simulating the effect of environmental flow duration on seedling emergence from riparian seed banks of the Upper Hunter River, New South Wales
7. What’s in a name? A naming convention for geomorphic river types using the River Styles Framework

8. Tracking geomorphic recovery in process-based river management
Fryirs, K. A., Brierley, G. J., Hancock, F., Cohen, T. J., Brooks, A. P., Reinfields, I., Cook, N. & Raine, A., Sep 2018,
In : Land Degradation and Development. 29, 9, p. 3221-3244 24 p.

9. Dramatic reduction in size of the lowland Macquarie River in response to Late Quaternary climate-driven hydrologic
change
Hesse, P. P., Williams, R., Ralph, T. J., Larkin, Z. T., Fryirs, K. A., Westaway, K. E. & Yonge, D., Sep 2018,

10. The hydrological function of upland swamps in eastern Australia: the role of geomorphic condition in regulating
water storage and discharge

12. Understanding the spatial distribution and physical attributes of upland swamps in the Sydney Basin as a template
for their conservation and management

13. Geomorphic effectiveness: a linear concept in a non-linear world

14. Geomorphic controls on fluvial carbon exports and emissions from upland swamps in eastern Australia

15. A nested hierarchical perspective to enhance interpretations and communication in fluvial geomorphology for use in
water resources management: Lessons from the Okavango Delta, Botswana
Fryirs, K. A., Ralph, T. J., Larkin, Z. T., Tooth, S., Humphries, M., Mccarthy, T., Hesse, P. P. & Mosimanyana, E.,

16. Practicing sociogeomorphology: relationships and dialog in river research and management

17. Different depths, different fauna: habitat influences on the distribution of groundwater invertebrates
157 13 p.

18. Sedimentologically significant tributaries: catchment-scale controls on sediment (dis)connectivity in the Lockyer
Valley, SEQ, Australia

19. Interactive effects of waterlogging and atmospheric CO2 concentration on gas exchange, growth and functional
traits of Australian riparian tree seedlings

20. Prioritising the placement of riparian vegetation to reduce flood risk and end-of-catchment sediment yields:
important considerations in hydrologically-variable regions

21. River sensitivity: a lost foundation concept in fluvial geomorphology

22. ‘Out with the Old?’ Why coarse spatial datasets are still useful for catchment-scale investigations of sediment
(dis)connectivity

23. The Holocene evolution and geomorphology of a chain of ponds, southeast Australia: establishing a physical
template for river management

24. A geomorphic assessment to inform strategic stream restoration planning in the Middle Fork John Day Watershed,
Oregon, USA

25. Identifying key sedimentary indicators of geomorphic structure and function of upland swamps in the Blue
Mountains for use in condition assessment and monitoring

26. Defining the floodplain in hydrologically-variable settings: implications for flood risk management
Croke, J., Fryirs, K. & Thompson, C., 1 Nov 2016, In : Earth Surface Processes and Landforms. 41, 14, p. 2153-
2164 12 p.

27. Catchment- and reach-scale controls on the distribution and expectation of geomorphic channel adjustment
28. The Use of Evolutionary Trajectories to Guide ‘Moving Targets’ in the Management of River Futures

29. The Disconnected sediment conveyor belt: patterns of longitudinal and lateral erosion and deposition during a catastropho flood in the Lockyer Valley, South East Queensland, Australia

30. A framework and toolbox for monitoring and assessing the swamp condition and ecosystem health

31. The spatial distribution and physical characteristics of Temperate Highland Peat Swamps on Sandstone (THPSS)

32. An approach for measuring confinement and assessing the influence of valley setting on river forms and processes

33. A channel evolution model for subtropical macrochannel systems

34. Intrinsic and extrinsic controls on the geomorphic condition of upland swamps in Eastern NSW

35. Seed banks as a source of vegetation regeneration to support the recovery of degraded rivers: A comparison of river reaches of varying condition

36. How seed traits predict floating times: A biophysical process model for hydrochorous seed transport behaviour in fluvial systems

37. The Blurred line between form and process: a comparison of stream channel classification frameworks

38. Heterogeneous flows foster heterogeneous assemblages: Relationships between functional diversity and hydrological heterogeneity in riparian plant communities

39. Geomorphic mapping and taxonomy of fluvial landforms

40. Quantifying fluvial (dis)connectivity in an agricultural catchment using a geomorphic approach and sediment source tracing

41. Can the sedimentological and morphological structure of rivers be used to predict characteristics of riparian seed banks?

42. Can the Regeneration of Vegetation from Riparian Seed Banks Support Biogeomorphic Succession and the Geomorphic Recovery of Degraded River Channels?

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

44. Hydrological conditions explain variation in wood density in riparian plants of south-eastern Australia

45. Rehabilitating upland swamps using environmental histories: A case study of the Blue Mountains Peat Swamps, Eastern Australia

46. Metal and petroleum hydrocarbon contamination at Wilkes Station, East Antarctica

47. Managing legacy waste in the presence of cultural heritage at Wilkes Station, East Antarctica

49. Developing and using geomorphic condition assessments for river rehabilitation planning, implementation and monitoring

50. Remediation of metal-contaminated soil in polar environments: Phosphate fixation at Casey Station, East Antarctica

51. Peatlands in eastern Australia? Sedimentology and age structure of Temperate Highland Peat Swamps on Sandstone (THPSS) in the Southern Highlands and Blue Mountains of NSW, Australia

52. Groundwater depth and topography correlate with vegetation structure of an upland peat swamp, Budderoo Plateau, NSW, Australia

53. Geochemical insights to the formation of "sedimentary buffers": Considering the role of tributary-trunk stream interactions on catchment-scale sediment flux and drainage network dynamics

54. The geomorphic character and hydrological function of an upland swamp, Budderoo Plateau, Southern Highlands, NSW, Australia

55. Digging deep for diversity: Riparian seed bank abundance and species richness in relation to burial depth

56. Reading the Landscape in Field-Based Fluvial Geomorphology

57. Highlighting the need and potential for use of interdisciplinary science in adaptive environmental management: The case of Endangered upland swamps in the Blue Mountains, NSW, Australia

58. Reading the landscape: Integrating the theory and practice of geomorphology to develop place-based understandings of river systems

59. The type and spatial distribution of past waste at the abandoned Wilkes Station, East Antarctica

60. Sediment tracing in the upper Hunter catchment using elemental and mineralogical compositions: Implications for catchment-scale suspended sediment (dis)connectivity and management

61. (Dis)Connectivity in catchment sediment cascades: A fresh look at the sediment delivery problem

62. Channel-floodplain connectivity during an extreme flood event: Implications for sediment erosion, deposition, and delivery

63. Progress, problems and prospects in Australian river repair

64. How Does Restoration of Native Canopy Affect Understory Vegetation Composition? Evidence from Riparian Communities of the Hunter Valley Australia

65. Use of ergodic reasoning to reconstruct the historical range of variability and evolutionary trajectory of rivers

66. Geomorphology in action: Linking policy with on-the-ground actions through applications of the River Styles framework

67. The Geographic Basis of Geomorphic Enquiry
Preston, N., Brierley, G. & Fryirs, K., Jan 2011, In : Geography Compass. 5, 1, p. 21-34 14 p.
68. Inside the "Black Box" of river restoration: Using catchment history to identify disturbance and response mechanisms to set targets for process-based restoration

69. Climatic and vegetation control on sediment dynamics during the last glacial cycle

70. Has river rehabilitation begun? Social perspectives from the Upper Hunter catchment, New South Wales, Australia

71. Antecedent controls on river character and behaviour in partly confined valley settings: Upper Hunter catchment, NSW, Australia

72. What are we monitoring and why? Using geomorphic principles to frame eco-hydrological assessments of river condition

73. The relationship between geomorphic river adjustment and management actions over the last 50 years in the upper Hunter catchment, NSW, Australia

74. Don't fight the site: Three geomorphic considerations in catchment-scale river rehabilitation planning

75. Post-European settlement response gradients of river sensitivity and recovery across the upper Hunter catchment, Australia

76. Naturalness and place in river rehabilitation

77. Spatial variability in the timing, nature and extent of channel response to typical human disturbance along the Upper Hunter River, New South Wales, Australia

78. Where do floodplains begin? The role of total stream power and longitudinal profile form on floodplain initiation processes

79. Post-rehabilitation environmental hazard of Cu, Zn, As and Pb at the derelict Conrad Mine, eastern Australia

80. Buffers, barriers and blankets: the (dis)connectivity of catchment-scale sediment cascades

81. Catchment-scale (dis)connectivity in sediment flux in the upper Hunter catchment, New South Wales, Australia

82. The relationship between geomorphic river structure and coarse particulate organic matter (CPOM) storage along the Kangaroo River, New South Wales, Australia

83. Knowing your place: An Australasian perspective on catchment-framed approaches to river repair

84. Landscape connectivity: The geographic basis of geomorphic applications

85. Linking geomorphic character, behaviour and condition to fluvial biodiversity: Implications for river management

86. Comparative assessment of three approaches for deriving stream power plots along long profiles in the upper Hunter River catchment, New South Wales, Australia

87. Did humid-temperate rivers in the Old and New Worlds respond differently to clearance of riparian vegetation and removal of woody debris?
88. Guiding principles for assessing geomorphic river condition: Application of a framework in the Bega catchment, South Coast, New South Wales, Australia

89. Die Auswirkungen antezedenter Landschaftsentwicklung auf Aussehen, Eigenschaften und Entwicklung von Fliegewässern am Fuße der Landstufe im Bega Einzugsgebiet, Südseite von New South Wales, Australien

90. Application of the River Styles framework as a basis for river management in New South Wales, Australia

91. Antecedent landscape controls on river character, behaviour and evolution at the base of the escarpment in Bega catchment, South Coast, New South Wales, Australia

92. Variability in sediment delivery and storage along river courses in Bega catchment, NSW, Australia: Implications for geomorphic river recovery

93. A geomorphic framework for river characterisation and habitat assessment

94. A geomorphological framework for river characterization and habitat assessment

95. River styles, a geomorphic approach to catchment characterization: Implications for river rehabilitation in Bega catchment, New South Wales, Australia

96. A geomorphic approach to the identification of river recovery potential

97. River Styles in Bega Catchment, NSW, Australia: Implications for river rehabilitation

98. Habitat assessment using the River Styles™ methodology

99. Habitat mapping using the River Styles Methodology

100. Tributary-trunk stream relations in a cut-and-fill landscape: A case study from Wolumla catchment, New South Wales, Australia

101. Slope-channel decoupling in Wolumla catchment, New South Wales, Australia: the changing nature of sediment sources following European settlement

102. Post-European changes to the fluvial geomorphology of Bega catchment, Australia: Implications for river ecology

103. A fluvial sediment budget for upper Wolumla Creek, south coast, New South Wales, Australia

104. The character and age structure of valley fills in upper Wolumla Creek catchment, south coast, New South Wales, Australia

Book Chapters
1. Abordagens de Restauração Fluvial na Australásia

2. Impacts of land clearing

3. River types and contemporary sediment storage
4. Assessment of riparian seed bank resources for river rehabilitation: Wollombi Brook, Lower Hunter Valley, NSW

5. Underfit streams in the upper Hunter catchment NSW: Antecedent controls on partly-confined river behaviour

6. Suspended sediment connectivity of the Lower Macquarie River system, central west NSW, Australia.

7. Moves towards an era of river repair

8. River futures

9. Working with change: the importance of evolutionary perspectives in framing the trajectory of river adjustment

10. Principles of river condition assessment

11. The Australian river management experience

12. Social and biophysical connectivity of river systems

13. Sediment organisation along the upper Hunter River, Australia: A multivariate statistical approach

14. 16 sediment organisation along the upper Hunter River, Australia: a multivariate statistical approach

15. Sedimentary cascades in Australian river systems: Using examples from the Bega and Hunter catchments to demonstrate (dis)connectivity of sediment movement and its implications for river recovery

16. The distribution of organic matter along the Kangaroo River, NSW

17. Bega River: Sediment Source, Transfer and Accumulation Zones

18. Bega River: Impacts of European settlement on sediment transfer relationships

Peer-reviewed Conference Papers

1. Ecosystem productivity of a wet-dry tropics wetland system: establishing a baseline understanding for conservation

2. A toolbox of sedimentary indicators for assessing the geomorphic structure, function and condition of endangered Temperate Highland Peat Swamps on Sandstone (THPSS), Blue Mountains, NSW
3. The use and usefulness of geomorphology in river management

4. Sedimentologically significant tributaries: characterizing sediment connectivity in the Lockyer Valley, SEQ

5. Relating with rivers: geomorphic foundations for ethical cross-cultural dialogue in river management


7. On-site teaching with XRF and XRD: training the next generation of analytical X-ray professionals

8. Adaptive management of Temperate Highland Peat Swamps on Sandstone in the Blue Mountains: is it occurring?

9. The Importance of ‘moving targets’ in assessing what is physically achievable and what we seek to achieve in river restoration practice

10. Developing a model of upland swamp structure, function and evolution for biodiversity conservation and rehabilitation: the case of threatened Temperate Highland Peat Swamps on Sandstone (THPSS)

11. Is passive revegetation through utilisation of soil seed banks a viable rehabilitation option in riparian ecosystems?

12. The Formation and geomorphic condition of upland swamps in the Blue Mountains: rehabilitation potential of these endangered ecosystems

13. Tracing sediment supply to a colmation layer in the upper Hunter River using X-ray diffractometry: implications for catchment-scale sediment management

14. Depth, stratification and viability of seed banks in riparian systems: Watagan Creek, NSW

15. Using geomorphology in river management: linking policy with on-the-ground actions through applications of the River Styles framework in NSW

16. Space, place and a healthy dose of realism: Grounding the process of river repair

17. The Importance of reach sensitivity and catchment connectivity in river rehabilitation planning

18. Challenges faced in the integration of science in river management in Australia
19. **An interdisciplinary perspective of riverwork projects in the upper Hunter catchment: Has river rehabilitation begun?**

20. **Geomorphic controls on Coarse Particulate Organic Matter (CPOM) distribution: implications for river rehabilitation**

21. **Making Integrative, Cross-disciplinary Research Happen: Initial Lessons from the Upper Hunter River Rehabilitation Initiative**

22. **A catchment scale perspective on biophysical fluxes in the upper Hunter: Constraints and limiting factors on a large river rehabilitation experiment at Muswellbrook, NSW**

23. **Landscape perspectives on river rehabilitation practice**

24. **Linking landscape processes and river systems: Assessing implications of catchment-scale (dis)connectivity of sediment movement on river sensitivity, recovery and river management**

25. **Sedimentary Cascades in Australian River Systems: Using Examples from the Bega and Murrumbidgee Catchments to Demonstrate the Connectivity of Sediment Movement and Its Implications for Geomorphic River Recovery**

26. **Creating a catchment-framed biophysical vision for river rehabilitation programs**

27. **Application of the river styles framework to river management programs in New South Wales**

28. **The recovery potential of river styles in Bega catchment, NSW: a catchment based framework for prioritisation of river rehabilitation strategies**