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Biography

Kirstie's work focuses on fluvial geomorphology and river management. She researches the structure and function of rivers, how they adjust and evolve, how they have been impacted by anthropogenic disturbance and how to best use geomorphology in river conservation, recovery and rehabilitation. She also researches how catchment sediment budgets and (dis)connectivity operate and how rivers and catchments may respond to future disturbances, particularly floods and droughts.

She is probably best known as the co-developer of the River Styles Framework and portfolio of professional development short courses (see www.riverstyles.com). The River Styles Framework is a geomorphic approach for the analysis of rivers that includes assessment of river type and behaviour, physical condition and recovery potential. These analyses are used to develop prioritisation and decision support systems in river management practice. Uptake of the River Styles Framework has now occurred in many places on six continents.

Kirstie has strong domestic and international collaborations in both academia and industry. She has worked for many years on various river science and management projects as part of multi-disciplinary, collaborative teams that include ecologists, hydrologists, social scientists, practitioners and citizens.

Kirstie has also been lucky enough to work in Antarctica for two summer seasons, undertaking research on heavy metal contamination at Casey and Wilkes stations.

Kirstie has co-written and co-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). She holds several research, teaching and postgraduate supervision awards including the international Gordon Warwick medal for excellence in research.

Kirstie is also a Certified Environmental Practitioner in geomorphology, CEnvP(geomorphology), www.cenvp.org.

Authorised 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. Evolution of a river management industry in Australia reveals meandering pathway to 2030 UN goals

2. Trends in post-1950 riparian vegetation recovery in coastal catchments of NSW Australia: implications for remote sensing analysis, forecasting and river management

3. A GIS workflow for the identification of corridors of geomorphic river recovery across landscapes

4. Identifying corridors of river recovery in coastal NSW Australia, for use in river management decision support and prioritisation systems
5. Degradation and recovery of alpine meadow catenas in the source zone of the Yellow River, Western China

6. Development of place-based catenal models for grassland ecosystems of the Upper Yellow River, Western China

7. Truths of the Riverscape: moving beyond command-and-control to geomorphologically informed nature-based river management

8. Bacterial communities in peat swamps reflect changes associated with catchment urbanisation

9. The re-greening of east coast Australian rivers: an unprecedented riparian transformation

10. A pedagogy of fluvial geomorphology: incorporating scaffolding and active learning into tertiary education courses

11. Assemblages of geomorphic units: a building block approach to analysis and interpretation of river character, behaviour, condition and recovery

12. How long do seeds float? The potential role of hydrochory in passive revegetation management


14. Using a fluvial archive to place extreme flood sediment (dis)connectivity dynamics in context of a longer-term record

15. Spatial and temporal variation in macrophyte litter decomposition in a rare chain-of-ponds, an intermittent stream and wetland system

16. Geomorphic and vegetative river recovery in a small coastal catchment of New South Wales, Australia: implications for flow hydrology and river management

17. Geomorphic characterization of a seasonal river network in semi-arid western India using the River Styles Framework

18. A dynamic, network scale sediment (dis)connectivity model to reconstruct historical sediment transfer and river reach sediment budgets

19. River Styles and stream power analysis reveal the diversity of fluvial morphology in a Philippine tropical catchment

20. Soil carbon dynamics and aquatic metabolism of a wet-dry tropics wetland system

21. The dark art of interpretation in geomorphology

22. Extent and effect of the 2019-20 Australian bushfires on upland peat swamps in the Blue Mountains, NSW


24. Things we can do now that we could not do before: developing and using a cross-scaler, state-wide database to support geomorphologically-informed river management
25. **Geomorphic controls on the diversity and patterns of fluvial forms along longitudinal profiles**

26. **Modelling sediment (dis)connectivity across a river network to understand locational-transmission-filter sensitivity for identifying hotspots of potential geomorphic adjustment**

27. **Semi-automating the calculation of catchment scale geomorphic controls on river diversity using publically available datasets**

28. **Relationships, social networks and the emergence of recovery-based river management: implications for practice and policy**

29. **Microbial communities of upland peat swamps were no different 1 year after a hazard reduction burn**

30. **Forgotten peatlands of eastern Australia: an unaccounted carbon capture and storage system**

31. **Upland peatlands of eastern Australia as important water storage reservoirs**

32. **An approach for assessing geomorphic river sensitivity across a catchment based on analysis of historical capacity for adjustment**

33. **Application of globally available, coarse resolution digital elevation models for delineating valley bottom segments of varying length across a catchment**

34. **Identifying threshold responses of Australian dryland rivers to future hydroclimatic change**

35. **River sensitivity and sediment connectivity as tools for assessing future geomorphic channel behavior**

36. **Supporting champions in river management**

37. **The importance of relational values in river management: understanding enablers and barriers for effective participation**

38. **Managing sediment (dis)connectivity in fluvial systems**

39. **Simulating the effect of environmental flow duration on seedling emergence from riparian seed banks of the Upper Hunter River, New South Wales**

40. **The hydrological function of a large chain-of-ponds: a wetland system with intermittent surface flows**

41. **The morphology and geomorphic evolution of a large chain-of-ponds river system**

42. **The use of the River Styles Framework as a tool to ‘work with nature’ in managing rivers in Brazil: examples from the Macaé Catchment**

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

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

45. **Engaging with research impact assessment for an environmental science case study**
46. Learning, doing and professional development – the River Styles Framework as a tool to support the development of coherent and strategic approaches for land and water management in Brazil

47. To plug-in or not to plug-in? Geomorphic analysis of rivers using the River Styles Framework in an era of big data acquisition and automation

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

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

50. Mapping valley bottom confinement at the network scale

51. Connectivity as an emergent property of geomorphic systems

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

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

54. A nested hierarchical perspective to enhance interpretations and communication in fluvial geomorphology for use in water resources management: lessons from the Okavango Delta, Botswana

55. Tracking geomorphic recovery in process-based river management

56. What’s in a name? A naming convention for geomorphic river types using the River Styles Framework

57. Dramatic reduction in size of the lowland Macquarie River in response to Late Quaternary climate-driven hydrologic change

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

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

60. Contextualising the trajectory of geomorphic river recovery with environmental history to support river management

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

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

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

64. Different depths, different fauna: habitat influences on the distribution of groundwater invertebrates

65. Interactive effects of waterlogging and atmospheric CO₂ concentration on gas exchange, growth and functional traits of Australian riparian tree seedlings
66. 'Out with the Old?' Why coarse spatial datasets are still useful for catchment-scale investigations of sediment (dis)connectivity

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

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

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

70. The Use of Evolutionary Trajectories to Guide ‘Moving Targets’ in the Management of River Futures

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

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

73. Defining the floodplain in hydrologically-variable settings: implications for flood risk management

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

75. Assessing the geomorphic recovery potential of rivers: forecasting future trajectories of adjustment for use in management

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

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

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

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

80. Catchment- and reach-scale controls on the distribution and expectation of geomorphic channel adjustment

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

82. A channel evolution model for subtropical macrochannel systems

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

84. Prospects for, and Challenges of, Research Design and Training in Cross-Disciplinary Environmental Management Research

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

86. Rehabilitating upland swamps using environmental histories: A case study of the Blue Mountains Peat Swamps, Eastern Australia
87. Developing and using geomorphic condition assessments for river rehabilitation planning, implementation and monitoring

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

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

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

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

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

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

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

95. Geomorphic mapping and taxonomy of fluvial landforms

96. Reading the Landscape in Field-Based Fluvial Geomorphology

97. 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

98. 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

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

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

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

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

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

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

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

106. Progress, problems and prospects in Australian river repair
Sediment tracing in the upper Hunter catchment using elemental and mineralogical compositions: Implications for catchment-scale suspended sediment (dis)connectivity and management

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

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

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

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

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

The Geographic Basis of Geomorphic Enquiry
Preston, N., Brierley, G. & Fryirs, K., Jan 2011, In: Geography Compass. 5, 1, p. 21-34 14 p.

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

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

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

Inside the "Black Box" of river restoration: Using catchment history to identify disturbance and response mechanisms to set targets for process-based restoration

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

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

Naturalness and place in river rehabilitation

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

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

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

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

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

Catchment-scale (dis)connectivity in sediment flux in the upper Hunter catchment, New South Wales, Australia
127. Post-rehabilitation environmental hazard of Cu, Zn, As and Pb at the derelict Conrad Mine, eastern Australia

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

129. Landscape connectivity: The geographic basis of geomorphic applications

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

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

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

133. Did humid-temperate rivers in the Old and New Worlds respond differently to clearance of riparian vegetation and removal of woody debris?

134. Guiding principles for assessing geomorphic river condition: Application of a framework in the Bega catchment, South Coast, New South Wales, Australia

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

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

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

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

139. A geomorphological framework for river characterization and habitat assessment

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

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

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

143. Habitat assessment using the River Styles™ methodology

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

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

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

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

148. 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. Identifying corridors of river recovery in coastal NSW for use in decision support and prioritisation systems

2. The certified environmental practitioner scheme geomorphology specialisation

3. Reviewing fire as a vegetation management technique in highly modified riparian ecosystems

4. Do we still need a human? Geomorphic analysis and interpretation of river systems in an age of emerging technology and big data

5. Delineating multiple flow paths in anastomosing river systems with wetlands using DEMs

6. Exploring the relationship between channel bed control structures and stream power in low-gradient floodplain wetlands

7. A quarter-century of evolution in Australian stream management: trends and prospects

8. The recovery of riparian vegetation along rivers of coastal NSW since the 1980s: implications for working with river recovery in management

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

10. It's a good news story! Tracking geomorphic recovery of rivers in eastern New South Wales as part of process-based river management

11. Towards defining geomorphic rarity and vulnerability; use of River Styles in High Ecological Value Aquatic Ecosystems (HEVAE)

12. Reviewing fire as a vegetation management technique in highly modified riparian ecosystems
13. **Sociogeomorphic river recovery: integrating human and physical processes in rehabilitation**

14. **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**

15. **The use and usefulness of geomorphology in river management**

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

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

18. **Management and conservation of a unique and diverse Australian river type: chain-of-ponds**

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

20. **The Importance of 'moving targets' in assessing what is physically achievable and what we seek to achieve in river restoration practice**


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

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

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

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

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

27. **Using geomorphology in river management: linking policy with on-the-ground actions through applications of the River Styles framework in NSW**
28. Space, place and a healthy dose of realism: Grounding the process of river repair

29. The importance of reach sensitivity and catchment connectivity in river rehabilitation planning

30. Challenges faced in the integration of science in river management in Australia

31. An interdisciplinary perspective of riverwork projects in the upper Hunter catchment: Has river rehabilitation begun?

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

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

34. Landscape perspectives on river rehabilitation practice

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

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

37. 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

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

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

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