Position statement:

Applying geomorphology in river management using the River Styles Framework

Kirstie Fryirs and Gary Brierley
March, 2023

Our purpose

We see it as our purpose to provide river management practitioners and decision-makers with the knowledge and intellectual resources they need to better manage river systems.

Our vision for best practice river management begins with understanding geomorphology as fundamental to reducing river degradation and promoting recovery.

To achieve our purpose, we choose to invest in producing trusted, peer-reviewed science and professional development for practitioners working in river management.

Contents

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For more information about the River Styles Framework and its applications in river management, please visit riverstyles.com. There you can find case studies, River Styles reports and information about professional training options.

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Foreword

The River Styles Framework arose from a passionate commitment and desire to look after the diversity of rivers. Many rivers around the world have different character and behaviour to the meandering channels documented in traditional textbooks, and the management practices required are also different.

As geomorphologists, it was obvious that a new approach to analysis of riverscapes was required, and that we could contribute something that is process-based, catchment-framed and adaptable to local conditions, thereby respecting the character, behaviour and values of river systems.

Such matters are far more than a scientific concern. They are innately ethical, reflecting concerns for social and environmental justice. These matters are locally-owned and engaged, wherein participatory practices incorporate scientifically-informed management practices that protect and enhance the things that we value through place-based, catchment-specific applications.

This document should be read in the context of a shared aspiration to disrupt the status quo of river management practice, and to generate better ways forward. This agenda is underwritten by our values:

- We are advocates for proactive and visionary practice, informed by the past but realistically framed toward a goal of 'living rivers' that are in the best health that they can be.
- We seek coherent (holistic), efficient and cost-effective practices that make sense in the board room, the office and on-the-ground.
- We encourage adaptation, learning and being ready while embracing and working with uncertainty, recognising that the future will be different from the present in ways that we do not – and cannot – necessarily know.
- We promote generative engagement with new datasets and technologies, alongside citizen science initiatives, in efforts to develop and use the best available science in river management.

We depend on rivers as rivers depend on us. We owe these efforts to our rivers, to ourselves, to communities and the environment as a whole.

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Co-developer of River Styles Framework

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Executive summary

Science-informed river management requires a strong evidence base for decision-making, identifying the river values we want to protect and developing ways of protecting them.

Applied geomorphology can provide a physical-sciences foundation for such an evidence base.

Applied geomorphology provides the physical template for hydrological and ecological processes, works at scales that are meaningful for river management and emphasises processes and evolutionary trajectories.

The River Styles Framework provides a coherent geomorphic information base to support science-informed river management. Its four stages are scaffolded to build a coherent and consistent information base of data and interpretations.

The Framework is generic and open-ended so that it can be applied anywhere, to generate place-based insights. It can be readily integrated with other data and knowledge sources.

The River Styles Framework has four stages:

- **Stage 1** interprets the geomorphic character of rivers and interprets their behaviours in terms of geomorphic process;
- **Stage 2** determines geomorphic condition;
- **Stage 3** evaluates the potential for a river to recover (improve in geomorphic condition);
- **Stage 4** identifies priorities for conservation and rehabilitation at the catchment scale.

Care must be taken when applying the River Styles Framework to ensure that the coherence of the Framework is maintained, insights are grounded in reality and that a consistent and transparent approach is taken to interpretation and decision-making.

The River Styles Framework is a vehicle for using applied geomorphology to inform river management practice and decision-making, consistent with our vision to manage rivers as dynamic, living systems.

The need for science-informed river management

River systems are dynamic and interconnected, both in environmental and social terms. This makes their management a complex task requiring solid information bases, systems for interpreting information in meaningful ways and institutions that are capable of science-based decision-making and learning.

A strong evidence base

Science-informed river management relies on a strong evidence base for decision-making. There is now more data than ever being made available to decision-makers.

However, we must make a distinction between information and evidence. Information that is useful for river management, including data, can be readily collected using a range of field-based and remote sensing methods, and developed into rich datasets describing rivers in catchments and the spatial and temporal relationships that constitute them.

Science-informed decision-making requires that we also have well-developed tools and procedures for interpreting this information and applying it to produce decision support systems and decisions that are appropriate for a particular place. The rigorous interpretation of information produces the evidence required for science-informed river management.

Organising and integrating knowledge

Evidence supporting science-informed river management will necessarily originate from a range of disciplines and knowledge cultures, and these disciplines and cultures may apply different frames and scales when collecting and interpreting information to produce insights.

In order to make these insights actionable forms of evidence, they need to be integrated in a logical way. Unless scientific evidence is structured logically, we cannot practice integrated, science-informed river management.

This document addresses the aforementioned challenges of doing science-informed river management, focusing on application of geomorphology. We demonstrate the value of geomorphology as a source of evidence and a template atop which to integrate other river-based knowledges. We introduce the River Styles Framework as a vehicle for applying geomorphology and draw on our extensive first-hand experiences to outline implications and recommendations that should guide use of the River Styles Framework as a basis for science-informed river management practice.

How applied geomorphology can support effective river management

Geomorphology is the study of earth surface processes. It is both a quantitative and interpretative science, which aims to explain how landforms and landscapes form and change over space and time.

When applied to river management, geomorphology is concerned with the spatial organisation of river systems, the processes that determine patterns of stream flow and the evolutionary trajectories of river forms and their associated processes.

Below are three key reasons why applied geomorphology is important for river management.

Geomorphology provides the fundamental ‘physical template’ for ecological and hydrological processes

The geomorphic landscape fundamentally controls the physical character of a river, or the spatial arrangement of landforms. The spatial arrangement of landforms, combined with flow and vegetation dynamics, makes up the habitat required for flora and fauna. For example, fish species may prefer pools (slow-moving, deep water) over riffles (faster-moving, shallower water) or require either condition at different times to complete their life cycle. Geomorphology sets the ‘physical template’ within which hydrological and ecological processes operate for ecosystem function.

Geomorphology works at spatial and temporal scales that are meaningful for river management as a basis for integration

River systems are spatially bounded by their catchments, which impose certain conditions on those rivers. Rivers within a catchment can be subdivided into ‘reaches’ (or sections) with consistent character and behaviour. The landform, reach and catchment scales define spatial units that are meaningful for river management. Insights from ecological and hydrological knowledge sources can be integrated at these scales for the purposes of river management planning as well as environmental monitoring, evaluation and reporting.

Geomorphology emphasises processes and evolutionary trajectories for understanding dynamic environmental systems

River systems dynamically adjust, to various degrees, over the short, medium and long term. This makes static or unduly prescriptive approaches to river management ineffective. Geomorphology aims to understand the processes by which rivers adjust over time and to situate contemporary river character within an evolutionary trajectory, defining the range of potential variability. This range of potential variability places limits on what is achievable in river management and the possible future trajectories which must factor into an adaptive management approach. Unless river management plans account for geomorphic processes and evolutionary trajectories, they cannot adequately manage for the future in a proactive way.

River Styles: A coherent framework to inform river management with geomorphology

The River Styles Framework is a coherent, structured set of procedures for describing and understanding rivers in geomorphic terms, for use in science-based river management.

The Framework is based on field-derived and remote sensing data, and focuses on rivers as they are now, rather than how they might have been in the past. As such, rivers are characterised according to their present range of variability; condition is assessed in terms of what is actually possible for a particular river given its potential range of adjustment and recovery potential is determined according to what is realistically achievable in the future, given the character, behaviour and condition.

The River Styles Framework has four stages

Stage 1 interprets river diversity in terms of rivers' geomorphic character and interprets river processes and behaviour (functioning). Understanding river diversity allows us to:

- Identify geodiversity values (the things we want to protect)
- Determine how to look after the things we want to protect
- Appropriately transfer understanding from one place to another.

Stage 2 determines the geomorphic condition (integrity) of a river as we see it today. Understanding geomorphic condition allows us to:

- Identify what needs to be treated (and what should be left alone)
- Select management interventions that address causes (not symptoms) of river degradation
- Proactively adopt and prioritise measures to look after rivers.

Stage 3 evaluates the potential for a river to recover (improve in geomorphic condition). Understanding river recovery allows us to:

- Address issues before they become a problem
- Identify where small efforts can make a big difference
- Determine what can realistically be achieved in river rehabilitation.

Stage 4 identifies priorities for conservation and rehabilitation at the catchment scale. Prioritising river conservation and rehabilitation:

- Supports monitoring, evaluation and reporting (MER) activities
- Supports management of cost-effectiveness
- Situates local conservation goals in broader context (e.g. regional, state, national)
- Helps to target investment in the right places, reducing waste.

More detailed information about the four stages of the River Styles Framework and their value for river management is available in the fact sheets beginning on Page 8.

Implications and recommendations for using the River Styles Framework

The River Styles Framework provides a vehicle for effective use of geomorphology in river management. However, it can only do so if it is applied appropriately. We recommend that users consider the following points in order to develop coherent and reliable information bases for use in river management.

The River Styles Framework is designed to be a learning and thinking tool that can be used to develop a coherent information base to inform river management

The Framework is open-ended and generic so can be applied in any given setting. To achieve the best benefit from datasets generated using the River Styles Framework, the scaffolding of the Framework must remain intact to ensure that insights are coherent and consistent. All stages of the Framework must be in place.

Generating grounded knowledge takes time and effort

Efficiencies can be made; for example, with use of outputs from emerging spatial technologies and modelling applications, but these outputs need to be verified and cannot replace the value of fieldwork and interpretation. Insights need to be grounded in reality and appropriate confidence limits must be stated in order for others to interpret and act on insights.

Data does not equal knowledge; information bases must include interpretation of data

In the River Styles Framework, interpretation of river behaviour must accompany analysis of river character; river condition and recovery potential must be contextualised with interpretation of river evolution; and reach-scale information must be situated in the catchment context. Without interpretation, geomorphic information cannot be used to develop visions or prioritise conservation and rehabilitation actions, thereby meaningfully informing river management practice.

Information infrastructure required for building and maintaining a River Styles information base should be considered from the outset

Issues to consider include: consistency of data format (e.g. following the River Styles naming convention); consistency in scale of analysis; documentation of data sources, methods used to collect data and decisions concerning treatment of data; and the accessibility of information for future use (e.g. for updating data, querying at different scales and integrating with other data sources as in development of decision support tools). It pays to invest time in planning and maintenance from the outset.

River Styles Framework fact sheets

The River Styles Framework provides an effective structure for application of geomorphology in river management. It allows generation of a coherent information base to inform decision-making through appropriate application of its four stages.

Using the River Styles Framework, applied geomorphology can help to identify the river values that we need to protect and develop ways of protecting those values that are cost-effective, science-informed and work with rivers as dynamic, living systems.

Each stage of the River Styles Framework contains a number of procedures and is scaffolded so that it builds on the previous stage. The fact sheets on the following pages provide an overview of all four stages of the River Styles Framework and are intended to demonstrate how all stages, together, contribute to effective, science-informed river management.

The fact sheets include examples of outputs that are generated in each stage. They also outline what it means to manage for river diversity, geomorphic river condition and river recovery, and how these management principles can underpin strategic, catchment-scale prioritisation in river management.

Stage 1: Respecting river diversity

Understanding river diversity allows us to:

- ► Identify geodiversity values (the things we want to protect)
- ► Determine how to look after the things we want to protect
- ► Appropriately transfer understanding from one place to another

What do we mean by 'river diversity'?

River diversity refers to the wide range of different 'types' of rivers that exist in the environment. Stage 1 of the River Styles Framework identifies and interprets rivers based on their geomorphology; their **character** (the physical landforms) and **behaviour** (geomorphic processes that create and shape landforms at different flow stages).

Stage 1 of the Framework gives managers the tools to recognise diversity of river character and behaviour, and to develop management strategies that work with the expected character and behaviour of each river type. The Framework does not classify rivers, it characterises them. This avoids 'pigeon-holing' and ensures that rivers are managed to meet individual need.

River character

River character is comprised of five key components: **valley setting**, degree of **lateral confinement**, river **planform**, **geomorphic units** (landforms) and **bed material texture**. The procedures used to identify a River Style are also used to assign a name using a consistent convention (Figure 1).

Geomorphic analysis of river character can help to identify distributions of various types of physical habitat and to interpret processes driving river adjustment over time.

River behaviour

River behaviour is interpreted at three flow stages: **low flow**, **bankfull** and **overbank**, recognising that different channel-bed, within-channel and floodplain-formation and -reworking processes occur at these flow stages.

Interpretation of form-process associations of geomorphic units, and assemblages of these features, is used to interpret river behaviour, the range of erosion and deposition processes in a given reach.

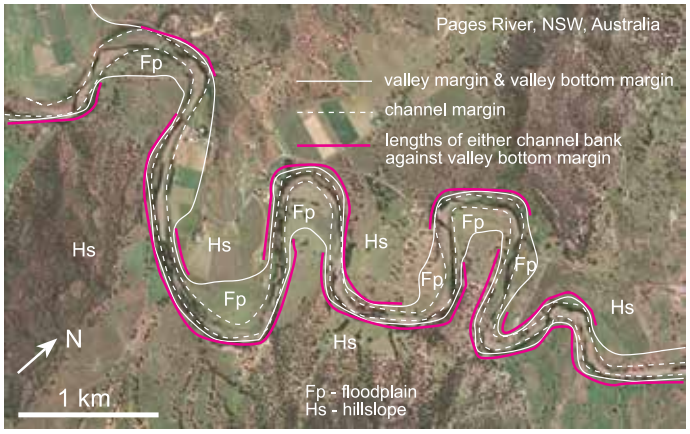
Managing for river diversity

Understanding geomorphic river diversity is fundamental for developing river management systems and strategies as it is vital to:

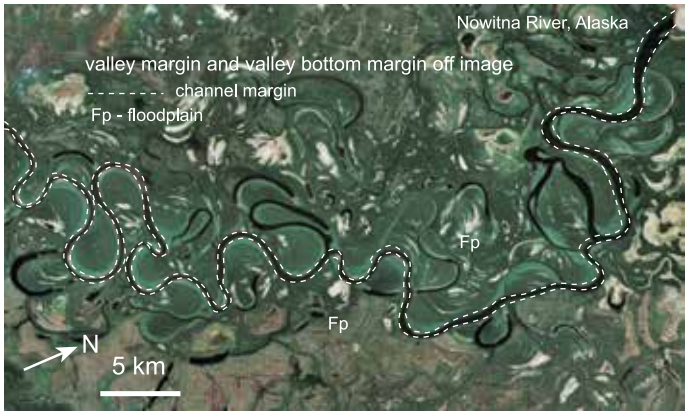
- ☑ Know what kind of river you are working with
- ☑ Understand rivers on their own terms, characterising rather than classifying
- ☑ Use place-based approaches to manage rivers, avoiding 'one-size-fits-all' approaches
- ☑ Place each reach in its catchment context, analyzing patterns of river types and their connectivity.

Find out more: www.riverstyles.com

River Style name = valley setting + degree of lateral confinement + river planform + geomorphic units + bed material texture



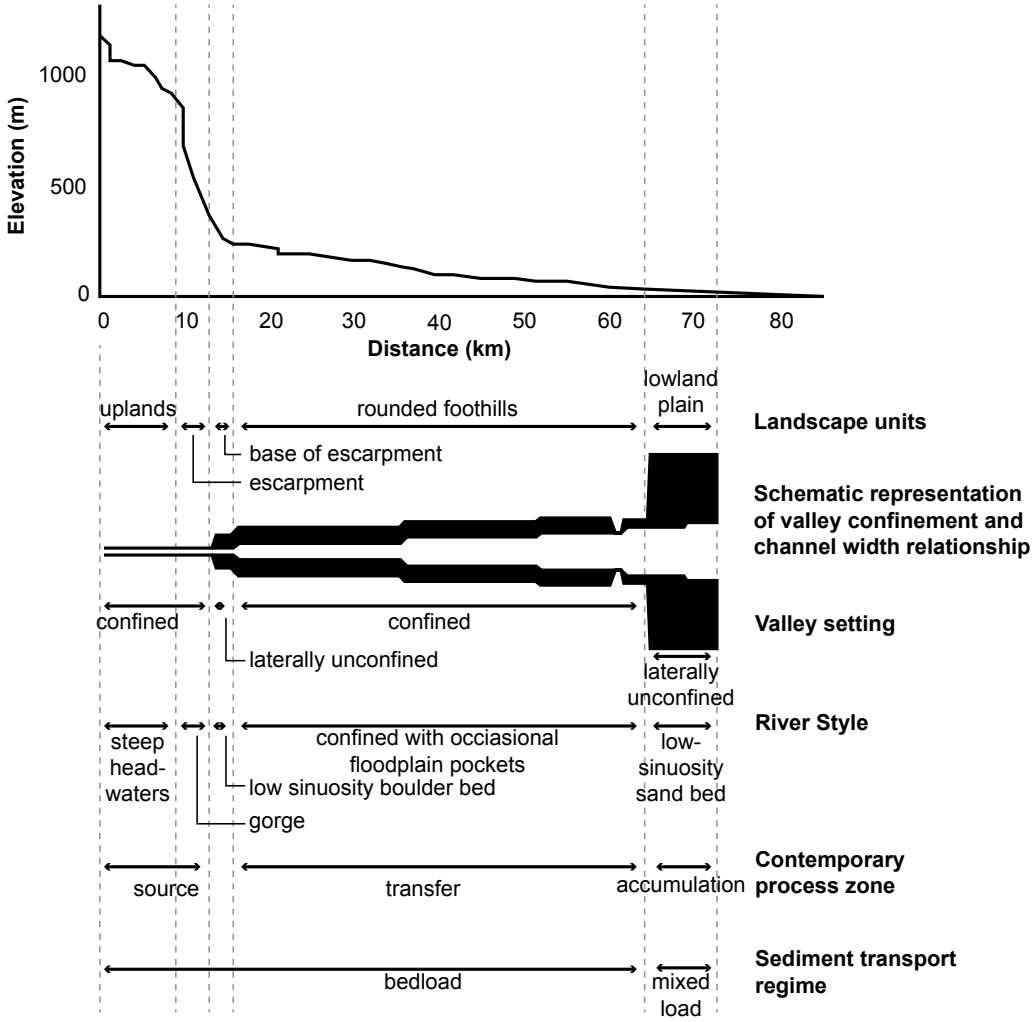
Partly confined, bedrock margin controlled, discontinuous floodplain, gravel bed River Style



Laterally unconfined, continuous channel, meandering, sand bed River Style

Figure 1: Application of the River Styles naming convention, which helps to develop consistent and geomorphically meaningful names for the full diversity of rivers. Modified from Fryirs et al. (2018).

Figure 2: Longitudinal profile and controls on river character and behaviour. This key River Styles output delineates River Styles and explains controls on river character and behaviour in context of the catchment-scale setting.



Further reading:

Fryirs, K. A. & Brierley, G. J. 2018. What's in a name? A naming convention for geomorphic river types using the River Styles Framework. PLOS ONE, 13 (9):e0201909. https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0201909.

Fryirs, K. & Brierley, G. J. 2009. Naturalness and place in river rehabilitation. Ecology & Society, 14 (1):1-10. https://www.ecologyandsociety.org/vol14/iss1/art20/.

Stage 2: Assessing geomorphic river condition

Understanding river condition allows us to:

- ► Identify what needs to be treated (and what should be left alone)
- ► Select management interventions that address causes (not symptoms) of river degradation
- ► Proactively adopt and prioritise measures to look after rivers

Measuring condition – against what?

Geomorphic river condition is a measure of the capacity of a river to perform functions that are expected for that type of river, given its setting. The characteristics we expect to see, and the processes that shape this, differ between river types.

Determing benchmarks to assess river condition is difficult. Sometimes people refer to 'historical reference conditions' of a pre-disturbance ideal state, yet very few pristine examples exist for many river types. Instead, we can benchmark condition assessment against what can be expected for the given river type, given the contemporary catchment conditions. This relies on interpretation of a river's geomorphic character, behaviour and evolutionary history in order to identify useful measures and attributes.

Reference conditions

Good | **Moderate** | **Poor**

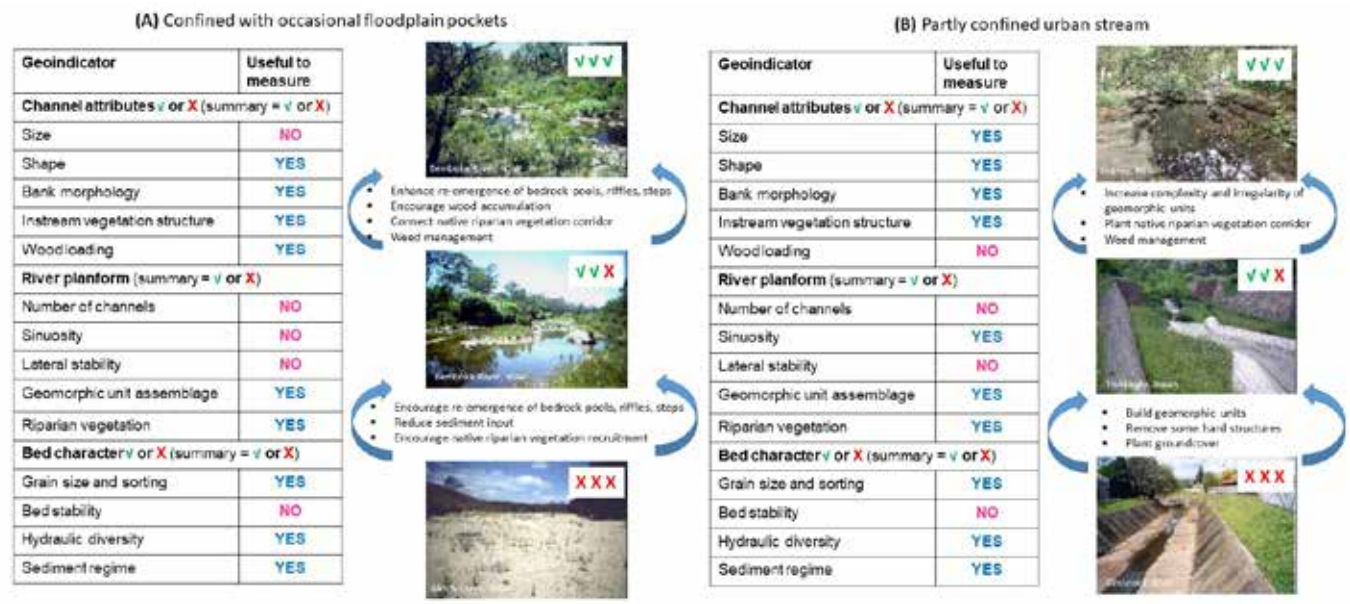
Figure 1: Which of these examples is in good, moderate and poor condition? Partly confined, planform controlled, meandering, discontinuous floodplain pocket, sand bed River Style, Wollombi Brook, NSW, Australia.

What to measure?

Stage 2 of the River Styles Framework is used to assess the geomorphic condition of rivers. It involves measuring a range of geoindicators for each river type that provide a signal of good, moderate or poor condition. Selected geoindicators are tailored by River Style to measure the right things in the right place at the right time.

A good signal – or 'geoindicator' – of geomorphic river condition is one that gives an early warning sign and direct insight into how a particular river adjusts (or is adjusting) to disturbance (see Figure 2). If the geoindicator is operating as expected, it receives a 'tick' (✓). If it is not, it receives a 'cross' (x).

Geoindicators, 'ticks' and 'crosses'



Geoindicator	Useful to measure
Channel attributes √ or X (summary = √ or X)	
Size	NO
Shape	YES
Bank morphology	YES
Instream vegetation structure	YES
Woodloading	YES
River planform (summary = √ or X)	
Number of channels	NO
Sinuosity	NO
Lateral stability	NO
Geomorphic unit assemblage	YES
Riparian vegetation	YES
Bed character √ or X (summary = √ or X)	
Grain size and sorting	YES
Bed stability	NO
Hydraulic diversity	YES
Sediment regime	YES

Geoindicator	Useful to measure
Channel attributes √ or X (summary = √ or X)	
Size	YES
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Instream vegetation structure	YES
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Number of channels	NO
Sinuosity	YES
Lateral stability	NO
Geomorphic unit assemblage	YES
Riparian vegetation	YES
Bed character √ or X (summary = √ or X)	
Grain size and sorting	YES
Bed stability	NO
Hydraulic diversity	YES
Sediment regime	YES

Figure 2: Different measures are used to assess geomorphic condition for different River Styles.

Managing for geomorphic river condition

Compare like with like
An understanding of each River Style's character and behaviour (Stage 1) is fundamental to condition assessment. This allows meaningful comparisons to be made between river reaches.

Place reaches within their evolutionary context
Present-day geomorphic condition must be placed within an evolutionary context, understanding the history of river dynamics in order to identify drivers (causes) of change (rather than symptoms).

Select appropriate reference conditions
Reference conditions must be an appropriate comparison in terms of River Style and setting within the catchment (compare like with like). Reference conditions may be defined for a range of condition states, from 'intact' or 'good' condition variants through to those reaches that have experienced direct human disturbance with irreversible change ('poor' condition).

Measure appropriate geoindicators for each River Style
As different River Styles have varying capacity to adjust, certain parameters provide a reliable and relevant signal about the condition of a reach, whereas others give irrelevant or poor signals. Hence, the range of parameters measured should be River Style-specific.

Define irreversible change
In some cases, a river reach may be able to return to a condition similar to the pre-disturbance state; however, in other cases the change may be irreversible. If change is irreversible, condition must be assessed according to the contemporary River Style. There is no point in defining an unachievable goal.

Treat the crosses, not the ticks
In management practice, leave the 'ticks' alone – they do not require treatment. Geoindicators that have 'crosses' are not functioning as expected, signaling that treatment may be needed.

Further reading:
Fryirs, K. A. 2015. Developing and using geomorphic condition assessments for river rehabilitation planning, implementation and monitoring. Wiley Interdisciplinary Reviews: Water, 2(6):649-667. https://doi.org/10.1002/wat2.1100.

Stage 3: Working with recovery processes in river rehabilitation

Understanding river recovery allows us to:

- ► Address issues before they become a problem
- ► Identify where small efforts can make a big difference
- ► Determine what can realistically be achieved in river rehabilitation

What are recovery processes?

Recovery processes are forms of adjustment by which a river responds to disturbance and improves its geomorphic condition. Recovery processes are specific to the type of river and the nature of the disturbance. Recovery may not mean a return to a previous state; if a change is irreversible, then recovery may be on a new trajectory toward an improved – but different – condition.

Recognising the signs of geomorphic recovery requires a sound understanding of the river's character and behaviour, its geomorphic condition and its evolutionary history (including causes of disturbance). These insights can be generated through application of Stages 1 and 2 of the River Styles Framework. Stage 3 of the River Styles Framework considers geomorphic recovery potential for prioritisation of river conservation and rehabilitation.

Dimensions of river recovery

Figure 1: An over-widened channel impacted by a sand slug (A) and in recovery (B). Channel contraction has occurred through bench building and vegetation recovery, redefining the low-flow channel. Modified from Fryirs et al. (2018).

Find out more: www.riverstyles.com

Will my river recover?

A river's recovery potential depends on its geomorphic condition, the operation of recovery processes or threatening processes and the contemporary (and projected) catchment conditions that may promote or limit recovery.

Recovery potential is best understood within the context of an evolutionary history and a catchment context, considering pressures and limiting factors operating in a system and the (dis)connection of that system. Multiple future trajectories are possible, along either recovery or degradation pathways (Figure 2). From this, potential future pathways can be mapped, prioritising actions to enhance the likelihood of recovery.

River recovery diagram

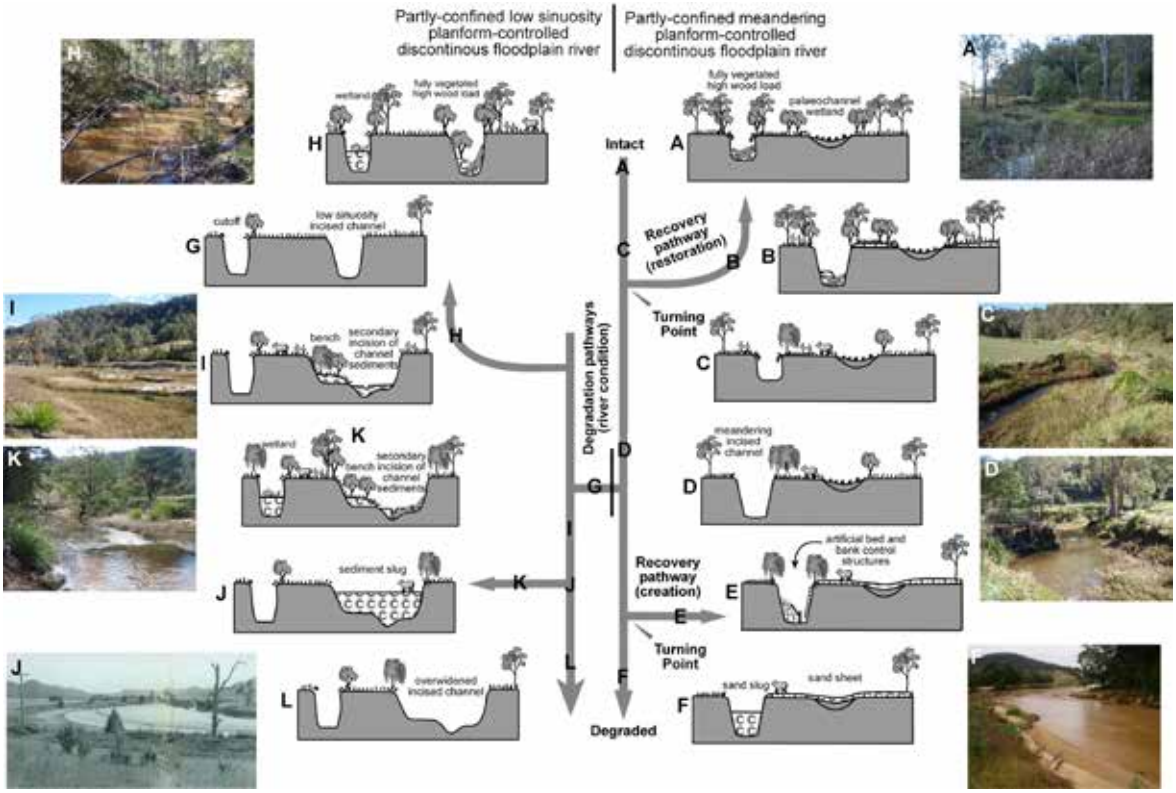


Figure 2: River recovery diagram for Wollombi Brook, NSW. Reaches are placed on a continuum from 'intact' to 'degraded' with recovery trajectories (actual or potential) mapped as side-branches. Modified from Fryirs et al. (2012).

Managing for river recovery

Where geomorphic river recovery is occurring, we can implement recovery-enhancement techniques to support recovery processes. These are preferable to more interventionist techniques because they work with river behaviour rather than fighting it, making success more likely. They are also often less expensive to implement and maintain.

For reaches in intact condition or in good condition with high recovery potential, the best strategy may be to do nothing at all, or to only act to reduce the likelihood of future disturbance. Knowing when to opt out because the river is 'self healing' is critical to a practitioner's decision-making toolkit.

Further reading:

Brierley, G. J. & Fryirs, K. 2015. The use of evolutionary trajectories to guide 'moving targets' in the management of river futures. River Research and Applications. https://doi.org/10.1002/rra.2930.

Fryirs, K., Brierley, G. J. & Erskine, W. D. 2012. Use of ergodic reasoning to reconstruct the historical range of variability and evolutionary trajectory of rivers. Earth Surface Processes and Landforms, 37 (7):763-773. https://doi.org/10.1002/esp.3210.

Fryirs, K. A. & Brierley, G. J. 2016. Assessing the geomorphic recovery potential of rivers: forecasting future trajectories of adjustment for use in management. Wiley Interdisciplinary Reviews: Water, 3(5):727-748. https://doi.org/10.1002/wat2.1158.

Fryirs, K. A., Brierley, G. J., Hancock, F., Cohen, T. J., Brooks, A. P., Reinfelds, I., Cook, N. & Raine, A. 2018. Tracking geomorphic recovery in process-based river management. Land Degradation and Development, 29:3221-3244. https://doi.org/10.1002/ldr.2984.

Stage 4: Prioritising river conservation and rehabilitation

Prioritising river conservation and rehabilitation:

- ▸ Supports monitoring, evaluation and reporting activities
- ▸ Supports management of cost-effectiveness
- ▸ Situates local conservation goals in broader context (e.g. regional, state)

Visioning and strategic prioritisation

River managers must make decisions about where to focus conservation and rehabilitation efforts based on availability of resources and the likelihood that efforts will generate a positive outcome, given what is realistically achievable in biophysical terms.

Stage 4 of the River Styles Framework uses key information from Stages 1, 2 and 3 to develop a catchment vision and prioritise conservation and rehabilitation activities, appraising each reach in its catchment context.

Triaging rivers at the catchment scale

Effective approaches to prioritisation adopt a 'conservation-first, recovery-enhancement' ethos, where the less we intervene, the better. In this approach, first priority is given to reaches which require no direct intervention (Figure 1). These 'conservation' reaches are in good geomorphic condition and should be protected from potential future threats. Reaches that contain threatening processes are assigned a 'strategic' priority. The next priority is those reaches which are in good or moderate condition and have a high recovery potential. These reaches can be rehabilitated with little intervention and a high chance of success.

Poor condition reaches with low-to-moderate recovery potential should only be addressed when reaches in good or moderate condition and with high or moderate recovery potential have been treated. These reaches are likely to require expensive, interventionist works and have a lower likelihood of success. Whilst it can be tempted to jump in and tackle the big problems first, a conservation-first approach will achieve much better outcomes for a similar investment.

'Save the strongest swimmers first!'

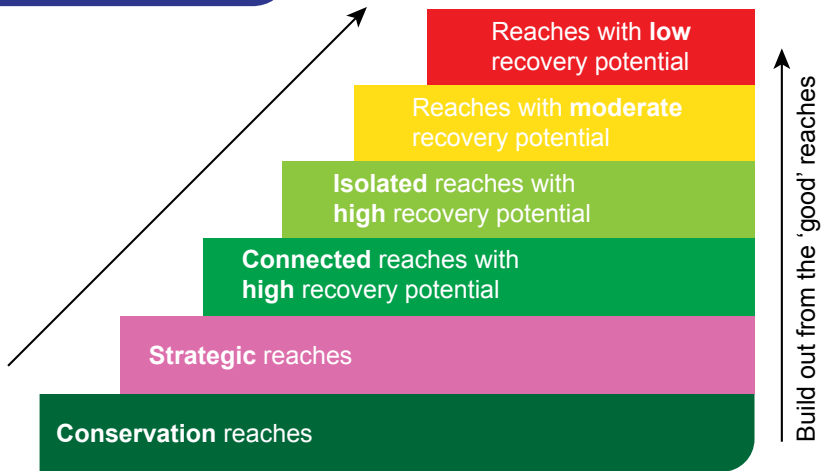
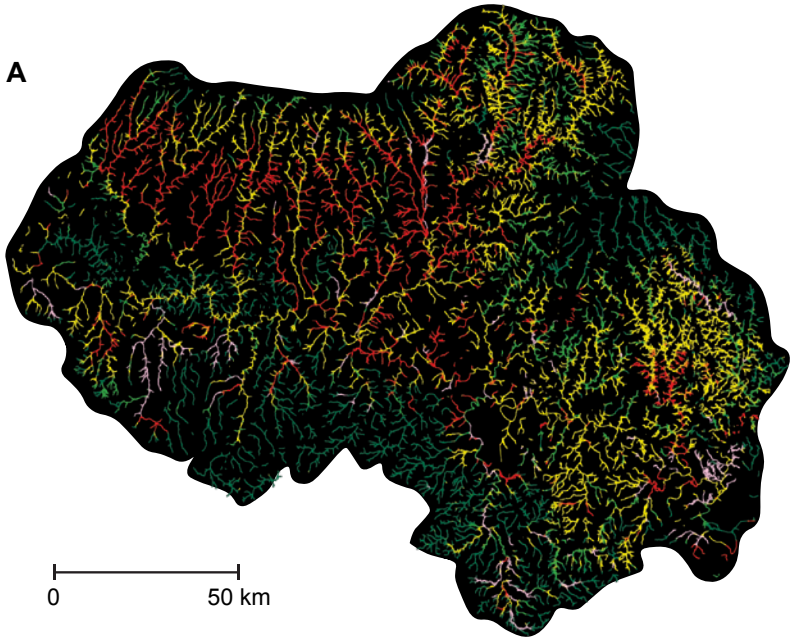


Figure 1: A hierarchy of reaches for prioritisation, based on geomorphic condition and recovery potential. Reaches in the best condition, which require the least intervention, should be treated first, unless they are impacted by a threatening process in a strategic reach.

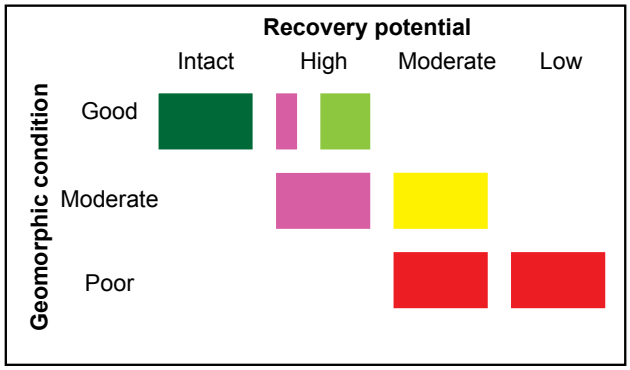
Find out more: www.riverstyles.com

Managing using strategic prioritisation



Conservation
Strategic
High recovery potential
Moderate recovery potential
Low recovery potential

◄ Prioritisation map of Hunter River catchment, New South Wales using geomorphic condition and recovery potential data. Data source: NSW River Styles Database.



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Priorities	1. Conservation	2. Strategic	3. High recovery potential	4. Moderate recovery potential	5. Low recovery potential
	Reach is already in good geomorphic condition or intact.	Reaches that contain threatening processes and threaten the integrity of conservation reaches.	Normally in good condition and showing signs of geomorphic recovery.	Moderate or poor condition with potential to recover if existing pressures are removed. May be showing some signs of geomorphic recovery.	Poor condition with little or no signs of geomorphic recovery. Often degradation is still occurring.
Actions	Conserve and protect from threats and maintain current condition. (may require treating strategic reaches).	Control the threatening processes.	Limit further disturbance and continue to allow recovery. Minimal intervention (e.g. exclusion fencing and vegetation management) then 'opt out' and leave alone to recover.	Limit further disturbance and continue to allow recovery. More intensive interventions will be required to treat these reaches.	Work elsewhere until reach shows signs of recovery. If intervention is needed, it is likely to be interventionist, expensive and with significant chance that it will fail.

Figure 1: Prioritisation procedure from Stage 4 of the River Styles Framework. Information on geomorphic river condition and recovery potential can be represented on a catchment map (A). Priorities are assigned based on relationships between geomorphic condition and recovery potential, as expressed in the decision matrix (B). Suggested actions (or non-actions where no intervention is required) are outlined at (C), beginning with those reaches that require only protection from threats and ending with the most impacted and challenging reaches.

Further reading:

Brierley, G. J., Fryirs, K., Outhet, D. & Massey, C. 2002. Application of the River Styles Framework as a basis for river management in New South Wales. Applied Geography, 22:91-122. https://doi.org/10.1016/S0143-6228(01)00016-9.

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