Waipapa Taumata Rau University of Auckland

MACQUARIE University

Beyond Management … From the River Styles Framework to more-than-human geomorphologies

Gary Brierley (School of Environment - Te Kura Mātai Taiao)

Formally acknowledge Kirstie Fryirs, co-developer of the River Styles Framework (Macquarie University) and the Let the Rivers Speak team at UoA

10th June 2026

Natural Channel Systems Conference

ACKNOWLEDGEMENT OF COUNTRY: LET THE RIVERS SPEAK

I'd like to begin by acknowledging the Traditional Owners of the land on which we meet today. I pay my respects to Elders past and present

Waiata from Aotearoa

Te aroha	Love
Te whakapono	Faith (hope)
Me te rangimarie	Peace
Tātou tātou e	And respect for all beings (For all of us)

Kia ora koutou …. Concern for collective wellbeing

Thanks

- Organizing Committee, especially Christina & Cailey
- Kirstie Fryirs, co-developer of the River Styles Framework
- Postgraduate students, colleagues and collaborators
- Elli Papangelakis

External perspective … an outsider

Things I don’t understand

- Natural
- Channel
- Site versus watershed

Mindset

- Nature fights back … eventually it wins
- Thinking like an ecosystem

How do we know rivers?

Christopher Pease (2005) New Water Dreaming Australian National Gallery Canberra

Some points of convergence

Bob

- Water is the lifeblood of Mother Earth
- Nihi is a living entity with Spirit, Agency and Rights
- Beyond ‘using’ & ‘managing’ … Relationality, reciprocity, stewardship of land and water

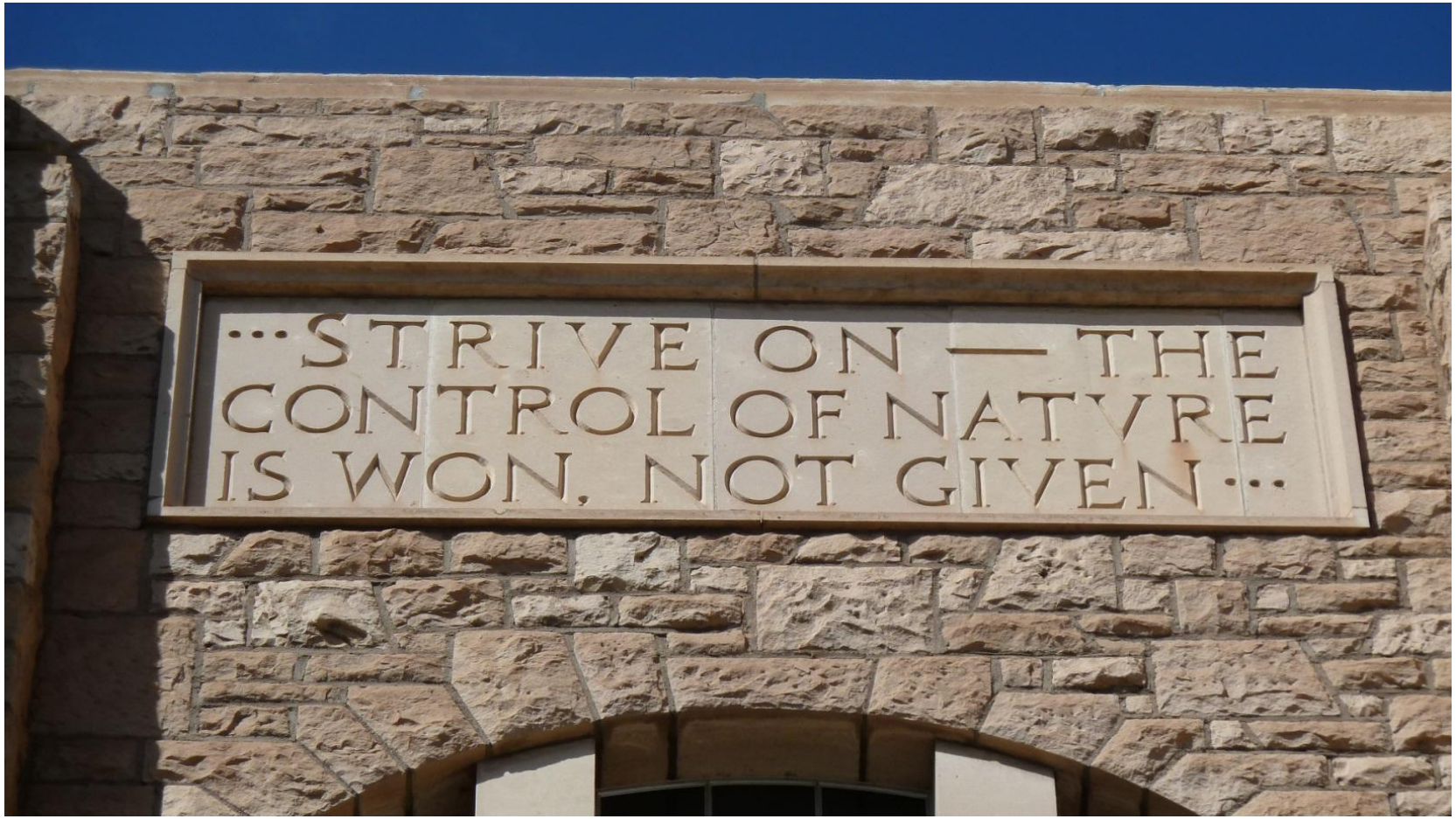
Peter

- We choose the landscapes we live in …
- Semi-alluvial rivers … put aside the text book
- Complex response … evolutionary trajectories
- ‘Re-storying the river’

Mindsets

Faculty of Engineering, University of Wyoming

Strive on – the control of nature is won, not given



Thanks to Stephen Coleman

Perceptions of river health … piping stories

Rivers as living and indivisible entities

Buried alive … Institutional memory – path dependencies

FUTURE: RESTORATION AS AN INCLUSIVE SOCIO-CULTURAL PROCESS?

Blue (2018). What's wrong with healthy rivers? Promise and practice in the search for a guiding ideal for freshwater management. *Progress in Physical Geography: Earth and Environment*, *42*(4), 462-477.
Cairns et al. (2024). River restoration as a sociocultural process: A case study from the Waimatā Catchment, Aotearoa New Zealand. *New Zealand Geographer*, *80*(1), 3-15.

More-than-human relations: Wai Horotiu Queen Street, Tāmaki Makaurau (Auckland)

Buried alive …
ancestral connections
that come alive …

Martuwarra …

https://newsroom.co.nz/2023/12/27/echoes-of-a-river-buried-under-skyscrapers/

Geomorphic expressions of the rights of the river Te Mana o te Wai (Mana, Mauri, Ora)

Brierley et al. (2019)

1. A right to flowing water …
2. A right to convey sediment …
3. A right to be diverse …
4. A right to adjust …
5. A right to evolve …
6. A right to operate at the catchment scale …
7. A right to be healthy …

Transformational times

AI, Digital Twins, Automated analysis

- Dynamic physical habitat mosaic (Form and Process – a Living River)
- Evolutionary trajectory

Mindset (societal relations to rivers)

- Beyond command & control (Truths of the Riverscape; Brierley & Fryirs, 2022)
- Nature-based river management: era of river repair/recovery

Institutional changes (politics, governance, jobs-careers)

Indigenous relations

- Rivers as living and indivisible entities, River rights

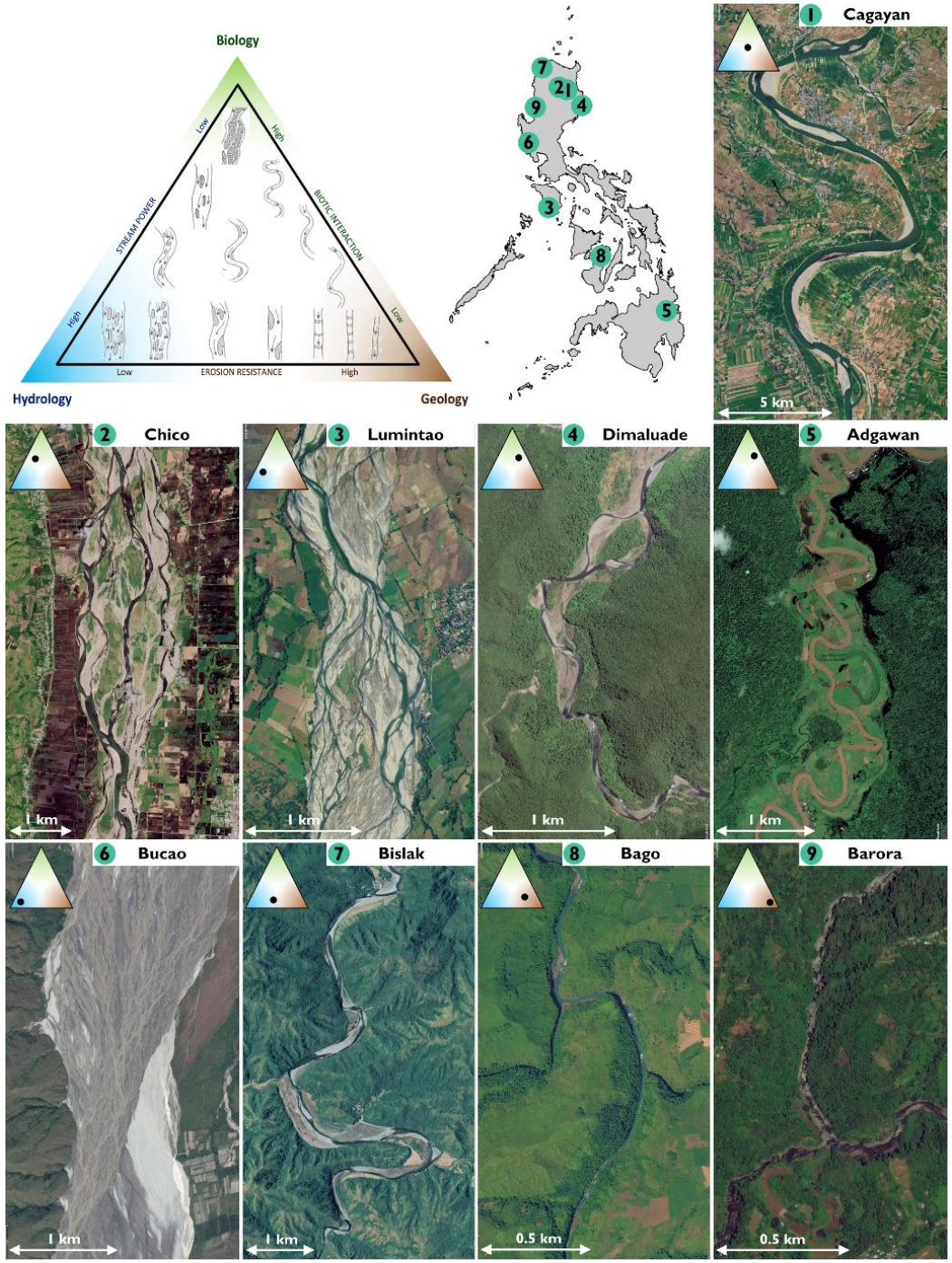
Rivers are screaming … what will it take to listen to and learn from them

What are they telling us?

Lessons from the Digital Era

Respect diversity – rivers are individual, idiosyncratic entities

Boothroyd et al. (2025). Big data show idiosyncratic patterns and rates of geomorphic river mobility. *Nature Communications*.



Rivers are unhappy

Matt Kondolf, 2016.
Walla-Walla River, Washington

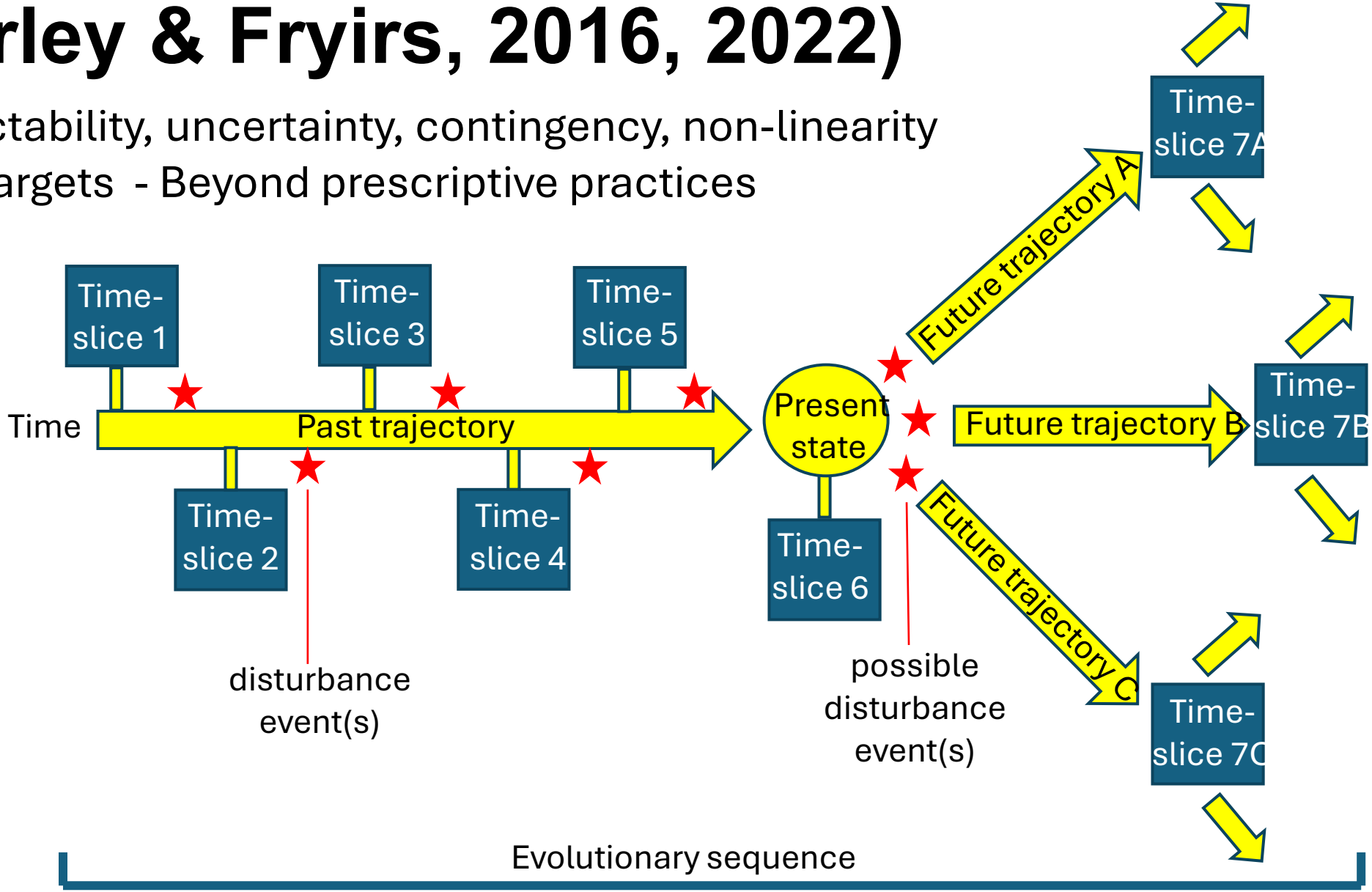
Zuo et al. (2020). Assessment of the happy river index as an integrated index of river health and human well-being: A case study of the Yellow River, China. *Water*, *12*(11), 3064.

Ju et al. (2022). Integrated evaluation of rivers based upon the River Happiness Index (RHI): Happy rivers in China. *Water*, *14*(16), 2568.

Rivers are emergent entities (Brierley & Fryirs, 2016, 2022)

Unpredictability, uncertainty, contingency, non-linearity

Moving targets - Beyond prescriptive practices



Making sense of information overload
The River Styles Framework (Brierley & Fryirs, 2005)

Coherent catchment-framed package of geomorphic information to inform proactive river management that 'works with the river'

Stage 1: River character, behaviour and patterns

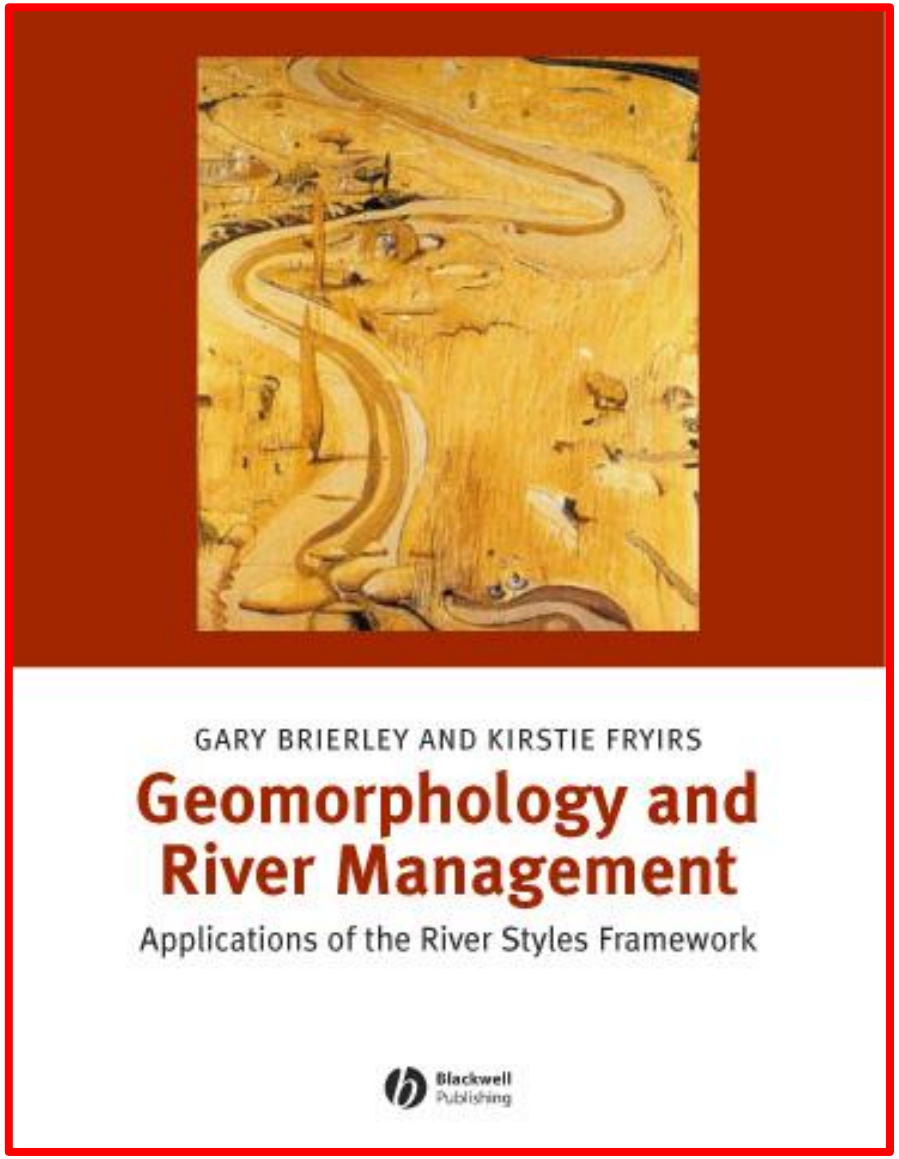
Stage 2: River evolution and geomorphic condition

Stage 3: River recovery potential

Stage 4: Management applications

- Catchment-scale vision
- Target conditions (Defining rehabilitation goals)
- Prioritisation
- Monitoring

www.riverstyles.com

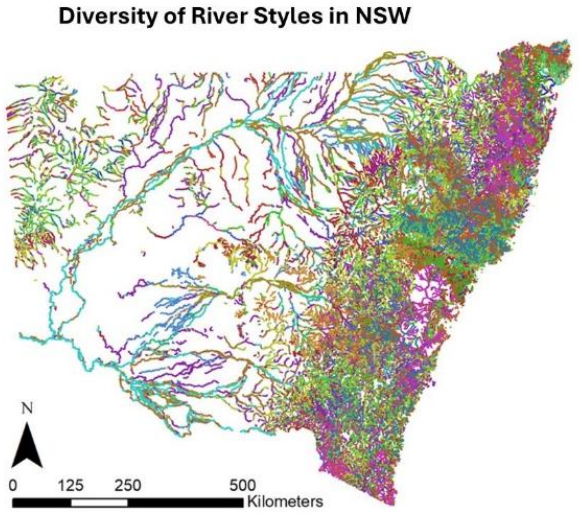


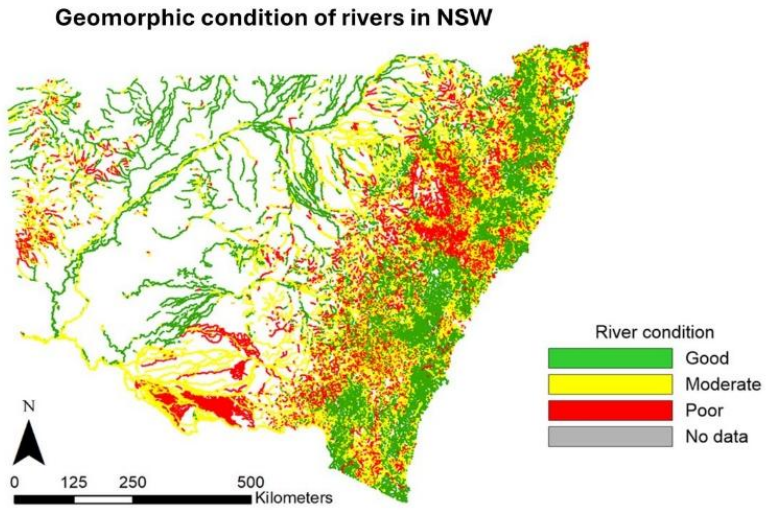
Changing practices

Coherent, proactive, cost-effective, prioritization (conservation focus, work with recovery), passive restoration (leave the river alone, allow it to sort itself out)

Fryirs et al. (2021). Things we can do now that we could not do before: Developing and using a cross-scalar, state-wide database to support geomorphologically-informed river management. *PloS One*, *16*(1), e0244719.

NSW River Styles database



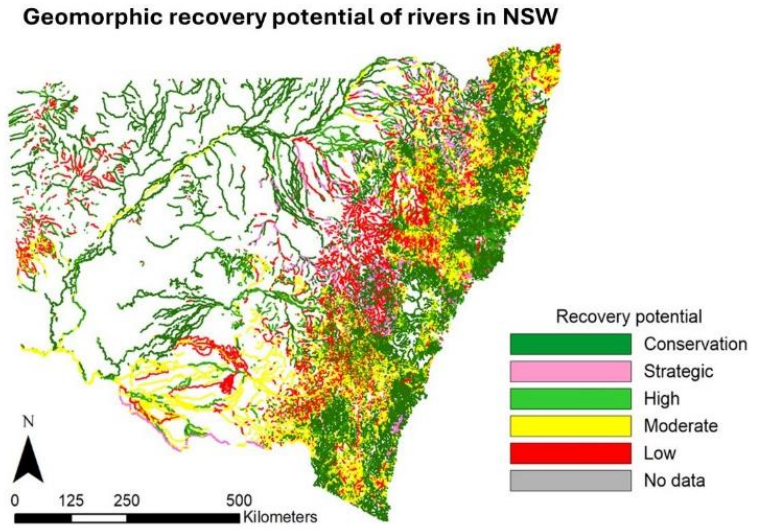


225,000+ km — total stream length mapped using River Styles Framework

47 — different River Styles in NSW, some rare and previously unidentified

39% — stream length is in good geomorphic condition

43% — stream length has moderate to high recovery potential



Positionality & Situatedness

Brierley, G. (2025). Which realities are we trying to understand? In: Castree et al. (Eds). *Making Geography Matter: The Past and Present of a Changing Discipline*. Routledge

Teaching, learning & enjoyment

- Postgraduate students (first publications)
- Management applications, professional short courses

Science & Social science

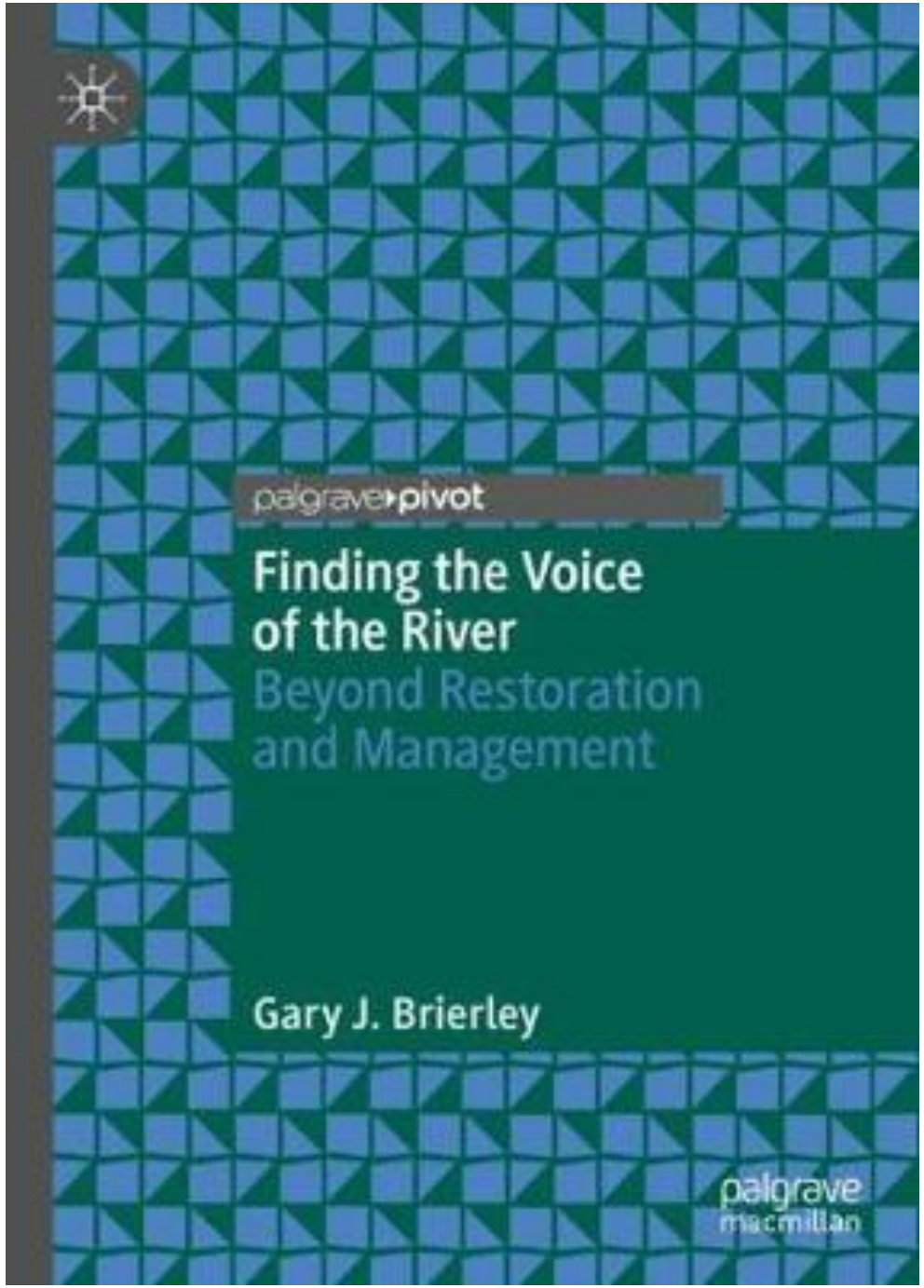
- Let the River Speak – Finding the Voice of the River
- China, Ecological Civilization
- Pedagogies of Hope

Where did I arrive at?

Dean of Science at UoA sought commercialization … GB focused on Internationalization

Brierley et al. (2019). A geomorphic perspective on the rights of the river in Aotearoa New Zealand. *River Research and Applications*, *35*(10), 1640-1651.

Hikuroa et al. (2025). Listening to rivers: Sharing river stories from Aotearoa New Zealand in a European context. *Shima*, *19*(1).



Mike Church (2010, p. 265) Trajectory of Geomorphology

Geomorphology is simultaneously developing in diverse directions: on one hand, it is becoming a more ***rigorous geophysical science*** *– a significant part of a larger earth science discipline; on another, it is becoming more concerned with* ***human social and economic values****, with environmental change, conservation ethics, with the human impact on environment, and with issues of social justice and equity.*

How did the River Styles Framework come about?

Northern Hemisphere training in an Australian context

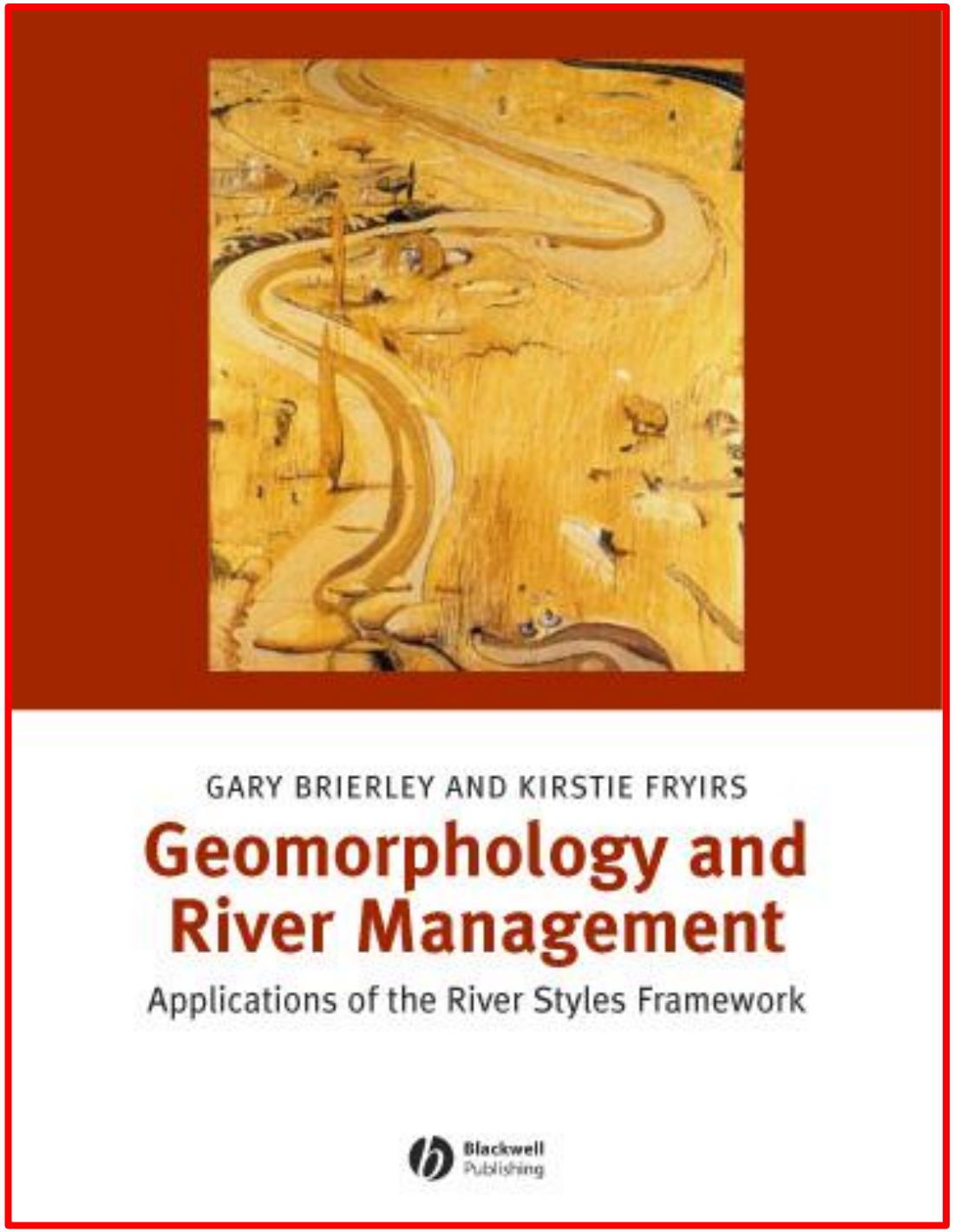
Core research by postgraduate students

- Human impacts on rivers
- Geo-eco-hydrology – riparian vegetation and wood

Work with managers (Land & Water Australia)

Complementary skills (Kirstie & Gary) – same focus and passion, field-based (grounded)

Fryirs et al. (2019). Engaging with research impact assessment for an environmental science case study. *Nature Communications*, *10*(1), 4542.



How does the River Syles Framework differ from other approaches?

- Kasprak, A., Hough-Snee, N., Beechie, T., Bouwes, N., Brierley, G., Camp, R., Fryirs, K., Imaki, H., Jensen, M., O'Brien, G., Rosgen, D., & Wheaton, J. (2016). The blurred line between form and process: a comparison of stream channel classification frameworks. *PloS One*, *11*(3), e0150293.
- Coherence in space and time
- Open-ended, non-prescriptive – a flexible learning tool … allows rivers to speak for themselves … there is no magic number of river types
- Process-based – channel and floodplain geomorphic units
  - Get your head out of the channel
  - Channels and floodplains tell different stories
  - Not every river has a channel

Stage 1. Respect Diversity – River patterns and connectivity at the catchment scale

Distinguishing characteristics at the reach scale (River Reach Analysis; Kellerhals et al., 1976)

Character and behaviour; Geomorphic units (Fryirs & Brierley, 2022)

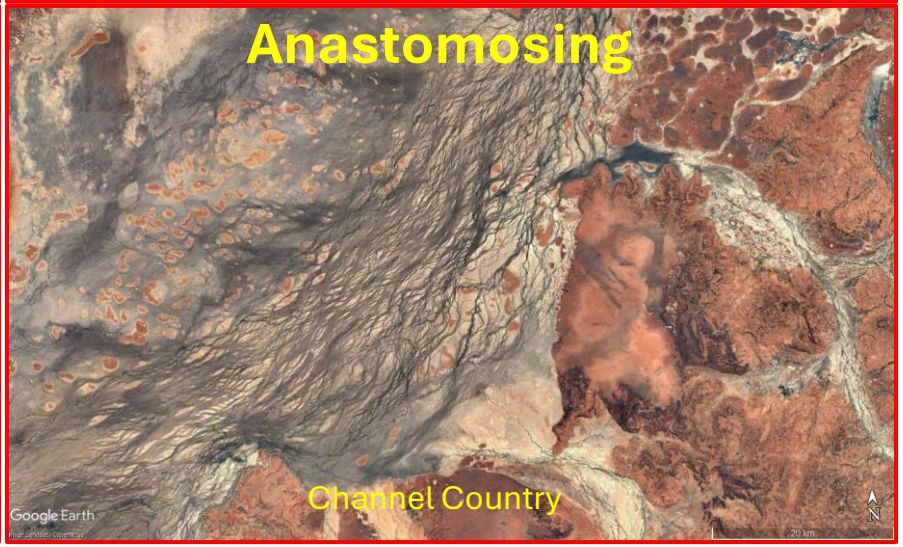
Forms, rate, capacity for adjustment (sensitivity/resilience)

Bed material, channel geometry, channel planform, geomorphic units (mosaics, assemblages)

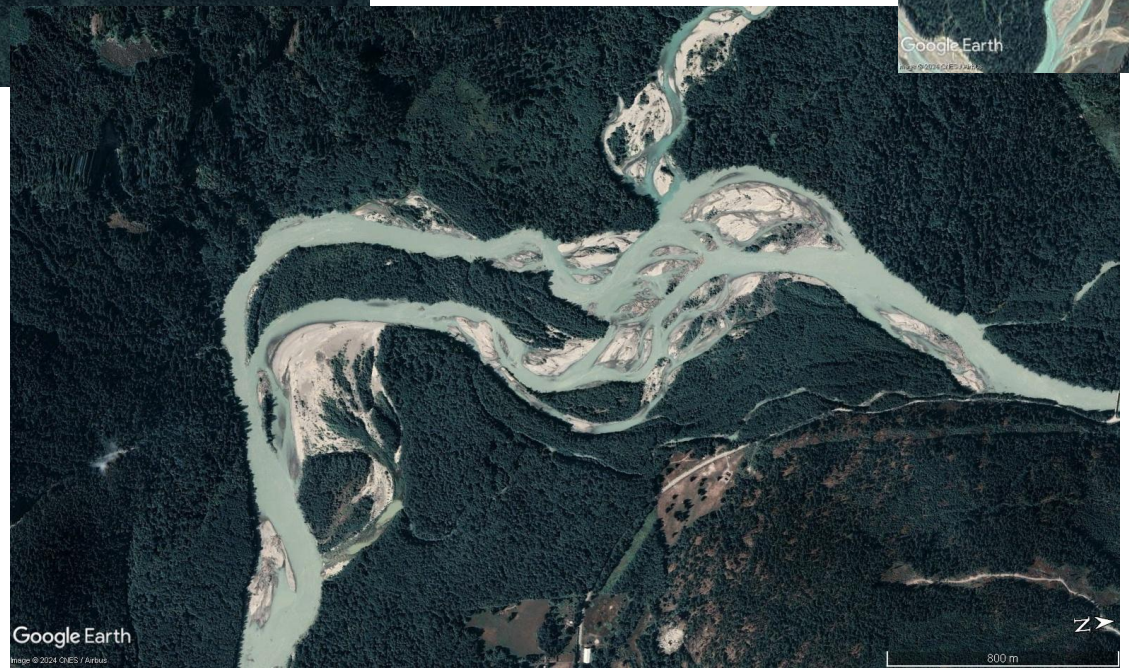
Range of variability – low flow, bankfull, overbank stage

Naming convention (Fryirs & Brierley, 2018)

Distinctive rivers in Australia



River diversity in the Pacific NW



Eastern Canada river images
Slaymaker et al. (2020, Fig 3.1)

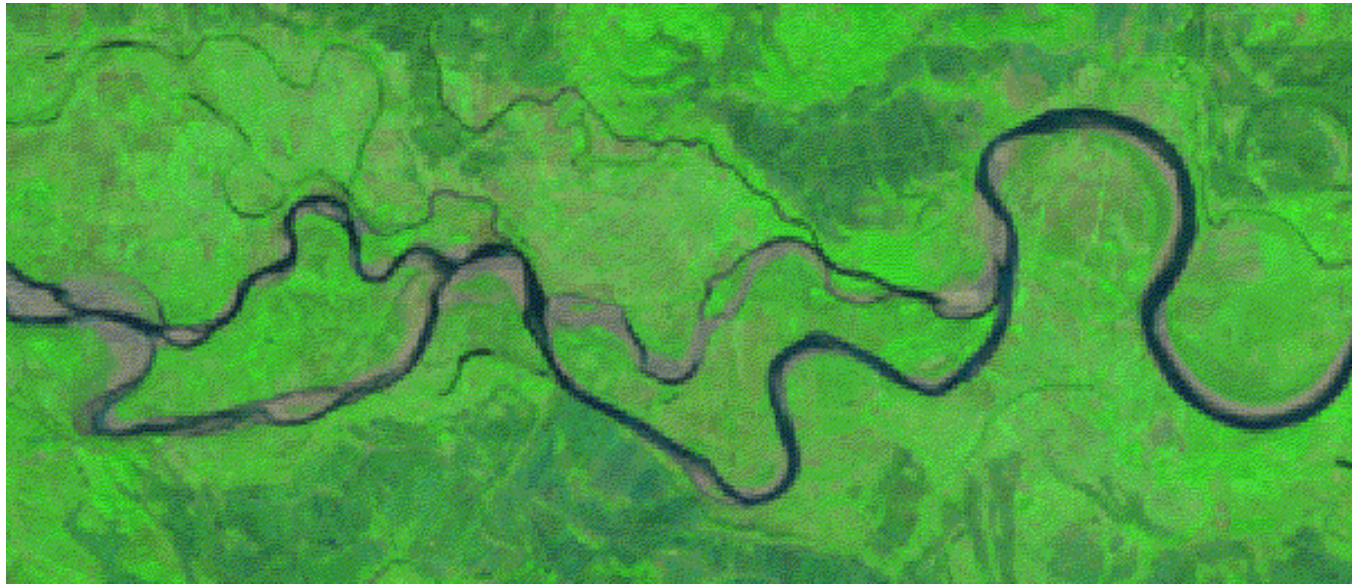
a. Ottawa River - constrained, straight river

b River Rouge, Québec - meandering, sand-bed

c Atorquait River, Nunavut - braided gravel-bed

d. Ekwan River, Ontario
Anabranching (anastomosing)

Mobility of rivers in the Philippines – rivers use their space in different ways

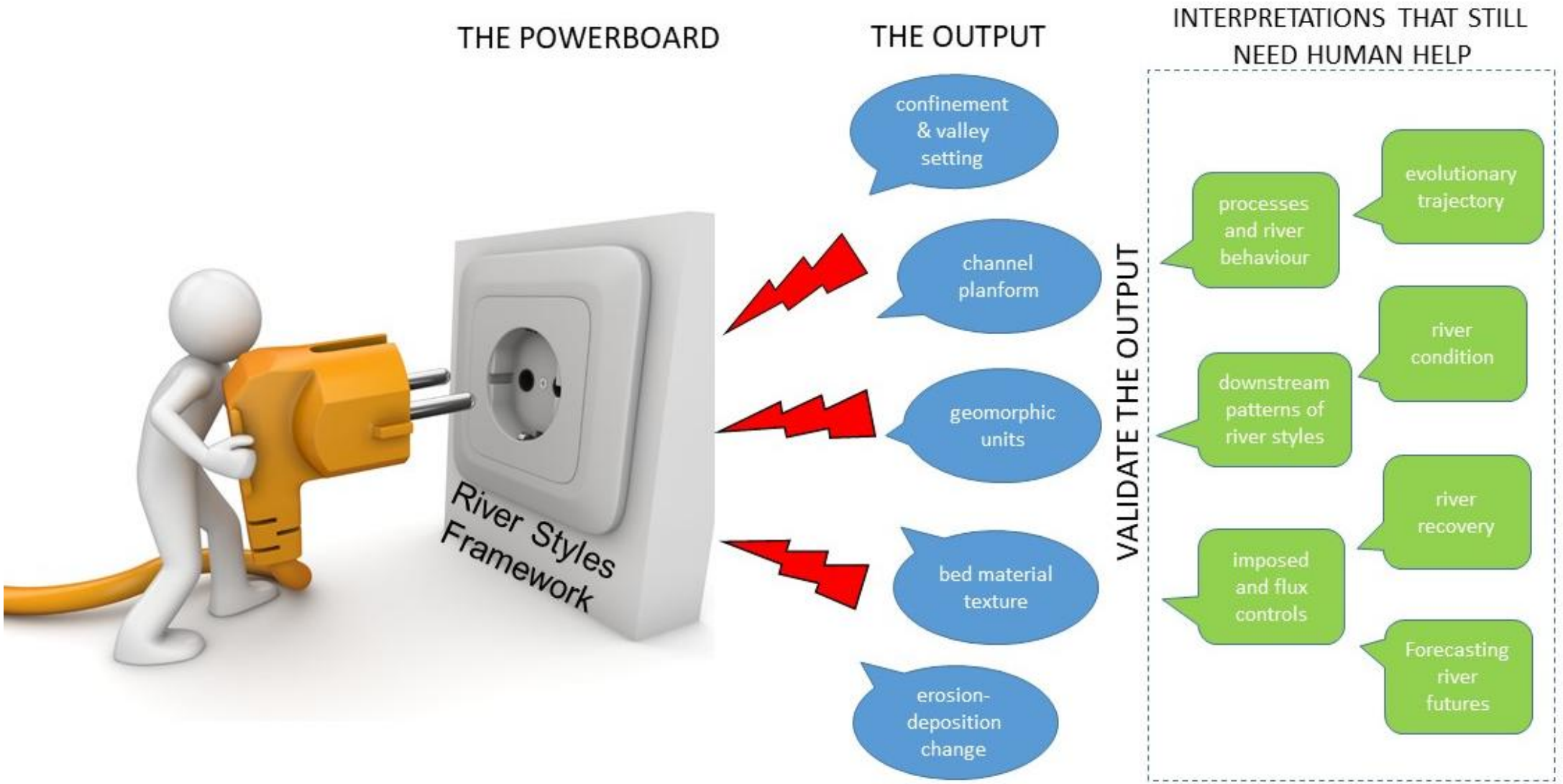


Wandering gravel-bed river: Abulug River

Active meandering river: Cagayan River

Automated mapping

Analysing river character, behaviour, pattern and controls in an era of big-data acquisition and automation (Fryirs et al., 2019)
Multiple knowledges: Make best use of best available understandings

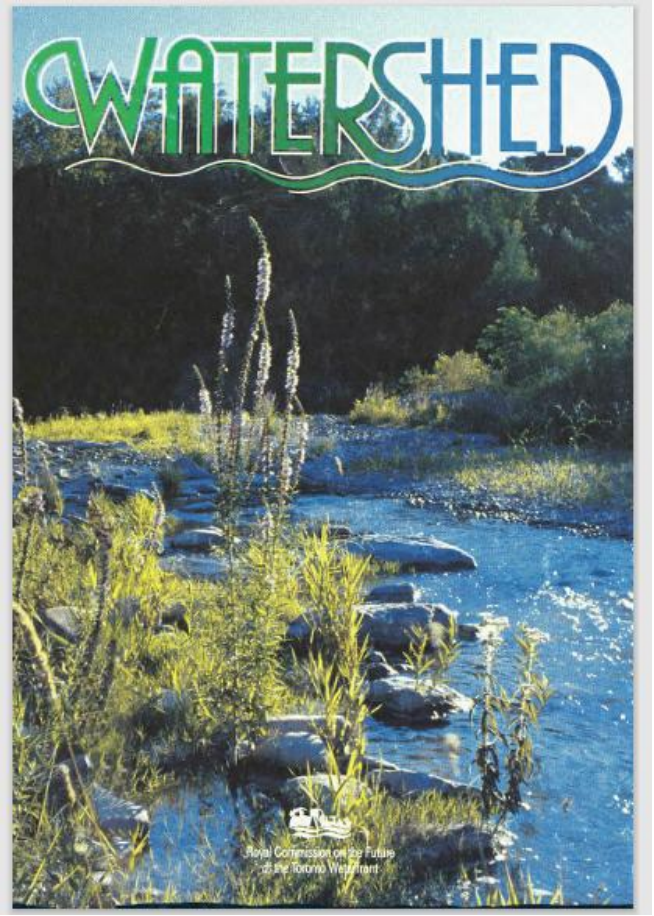


Collaborative research links …

- Longitudinal profile work – stream power
- Connectivity relationships

- Wheaton et al. (2015) – structured approach to mapping
- Geomorphic Unit Toolkit (GUT)
- Valley width (O'Brien et al., 2019)

- Link to Geomorphic Change Detection (GCD)



Justice Crombie – Toronto Waterfront

Stage 2. Evolution & Condition assessment

What is a healthy river?

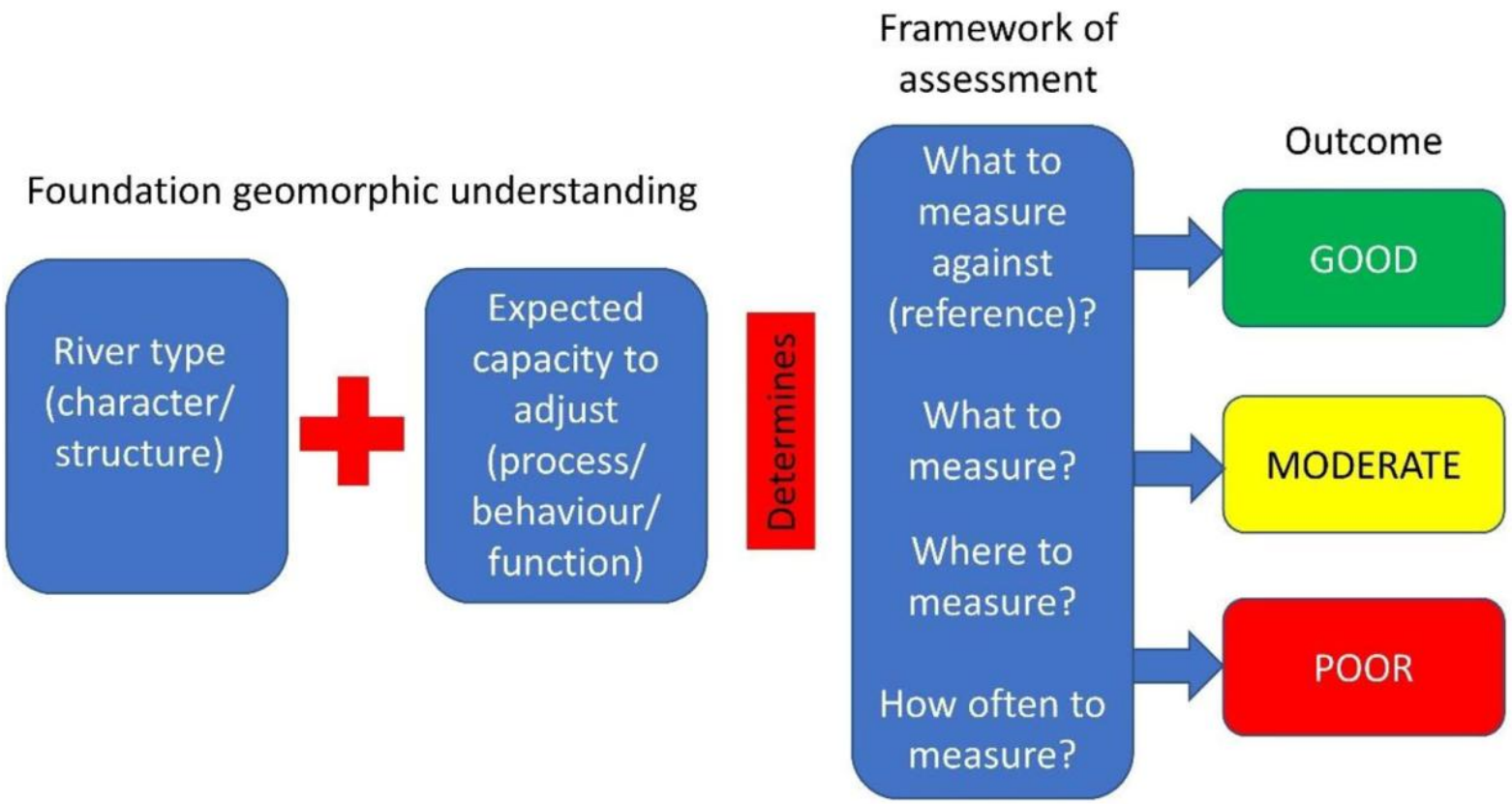
Principles of river condition assessment (Fryirs, 2015; Glassic et al., 2025)

- Compare like with like, carefully considering what you measure against (e.g., range of variability, before/after a flood)
- Measure the right things in the right way, in the right places, at the right time
- Use process-based geoindicators that provide a reliable and relevant signal for the river type under investigation

Premise: The river simply wants to be a river …

- Erosion recreates and regenerates the physical habitat mosaic of a river. Erosion and deposition are good things in the right place, at the right rate, at the right time
- Floods drives river adjustment (and recovery). Some rivers are attuned to extreme events (non-equilibrium relations), others to more frequent, lower-magnitude flows

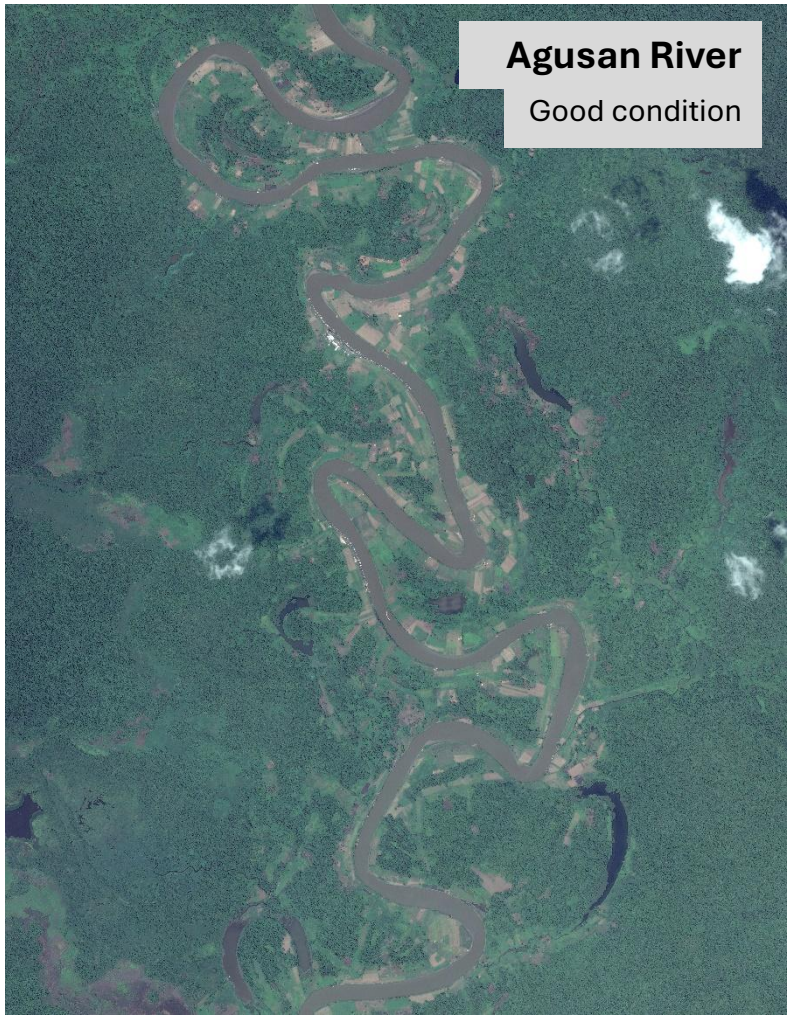
Brierley & Fryirs (2022) Fig 5: Approach to assessment of geomorphic river condition



- Rivers are disturbance-driven & dynamically adjusting
- What's good in one may be bad in another
- Need to understand system state (when was the last flood?)
- What is the river type & character and how is it expected to adjust?
- Determines reference condition & measurement parameters for management

Good and poor condition examples of a braided river in the Philippines

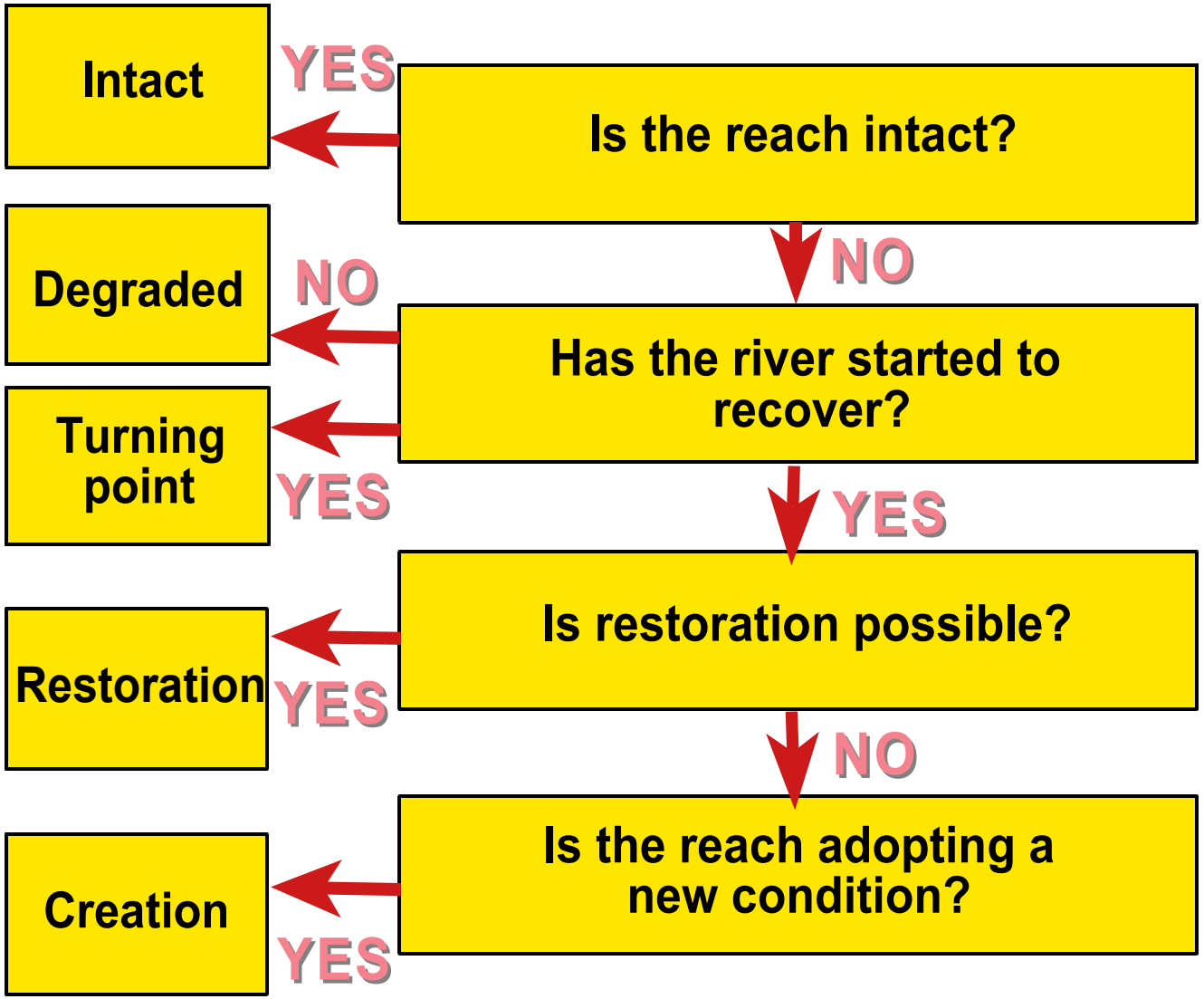
Good and poor condition examples of a meandering river in the Philippines

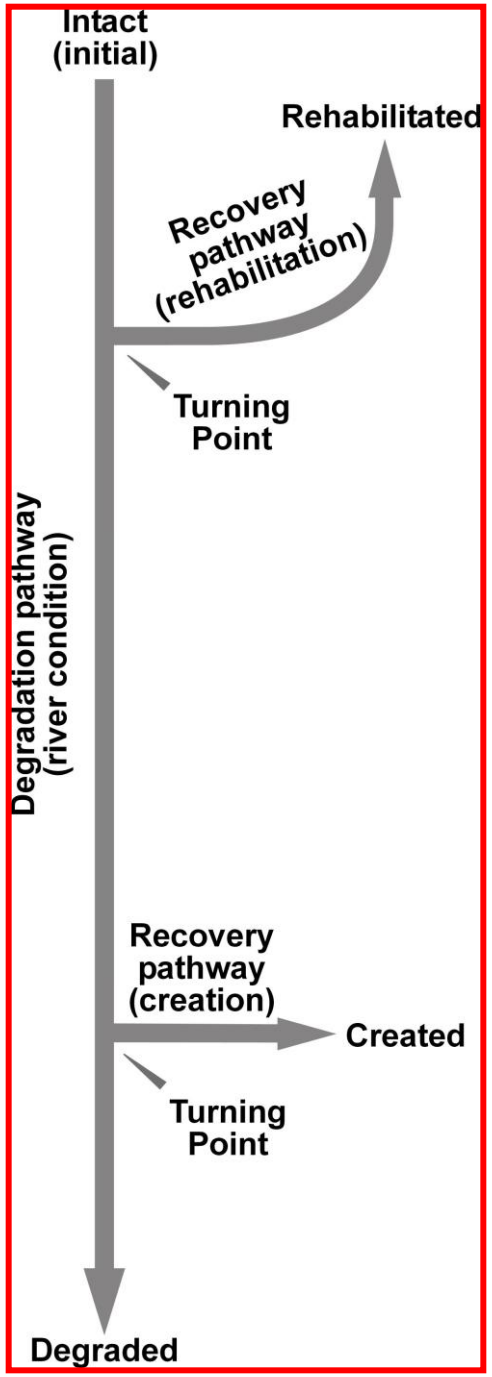


Measuring the wrong things in the wrong way in the wrong places will never allow us to determine whether the condition of the river and the effectiveness of management practices are improving or not

Stage 3. Recovery – What is realistically achievable?

The River Recovery Diagram (Fryirs & Brierley, 2016)





Geomorphic unit indicators of river recovery (Fryirs et al. 2018, LDD)

Well vegetated, stable benches

Wolumla Creek @ South Wolumla Rd Source: K. Fryirs

Re-emergence of bedrock pools

L: Sandy Creek, R: Bemboka River Source: K. Fryirs

Distinct, well-defined low flow channel (in sand)

Bega River at Hwy Bridge Source: K. Fryirs

Well vegetated, stable bars and islands

Bega River @ Candelo-Bega Rd Source: K.Fryirs

Swamp reformation

Upper Wolumla Creek Source: K. Fryirs

Re-emergence of alluvial pools and riffles (in sand)

L: Candelo Creek, R: Lower Bega River Source: Philippa Street, K. Fryirs

Stage 4. Management applications of the River Styles Framework

Applied Geography 31 (2011) 1132–1143

Contents lists available at ScienceDirect

Applied Geography

journal homepage: www.elsevier.com/locate/apgeog

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

Gary Brierley [a,*], Kirstie Fryirs [b], Nick Cook [c], David Outhet [d], Allan Raine [c], Lucy Parsons [c], Michael Healey [c]

Applied Geography
Volume 22, Issue 1, January 2002, Pages 91-122

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

G Brierley [a], K Fryirs [a], D Outhet [b], C Massey [c]

Fryirs, K. A., Brierley, G. J., & Dixon, T. (2019). Engaging with research impact assessment for an environmental science case study. *Nature Communications*, *10*(1), 4542.

PLOS ONE

RESEARCH ARTICLE

Things we can do now that we could not do before: Developing and using a cross-scalar, state-wide database to support geomorphologically-informed river management

Kirstie Fryirs[1]*, Fergus Hancock[2], Michael Healey[2], Simon Mould[1,2], Lucy Dobbs[2], Marcus Riches[3], Allan Raine[2], Gary Brierley[1,4]

Wiley Interdisciplinary Reviews: Water

WILEY

WIREs WATER

PERSPECTIVE OPEN ACCESS

Practitioner Readiness: Developing Communities of River Practitioners (CoRPs) to Deliver Proactive Management Practices That Work With the River

Gary Brierley[1] | Kirstie Fryirs[2] | Richard Williams[3] | Richard Boothroyd[4] | Pamela Louise Tolentino[3]

Applications and impact + case study examples

- https://riverstyles.com/applications-and-impact/
- https://riverstyles.com/resource-hub/

YouTube video

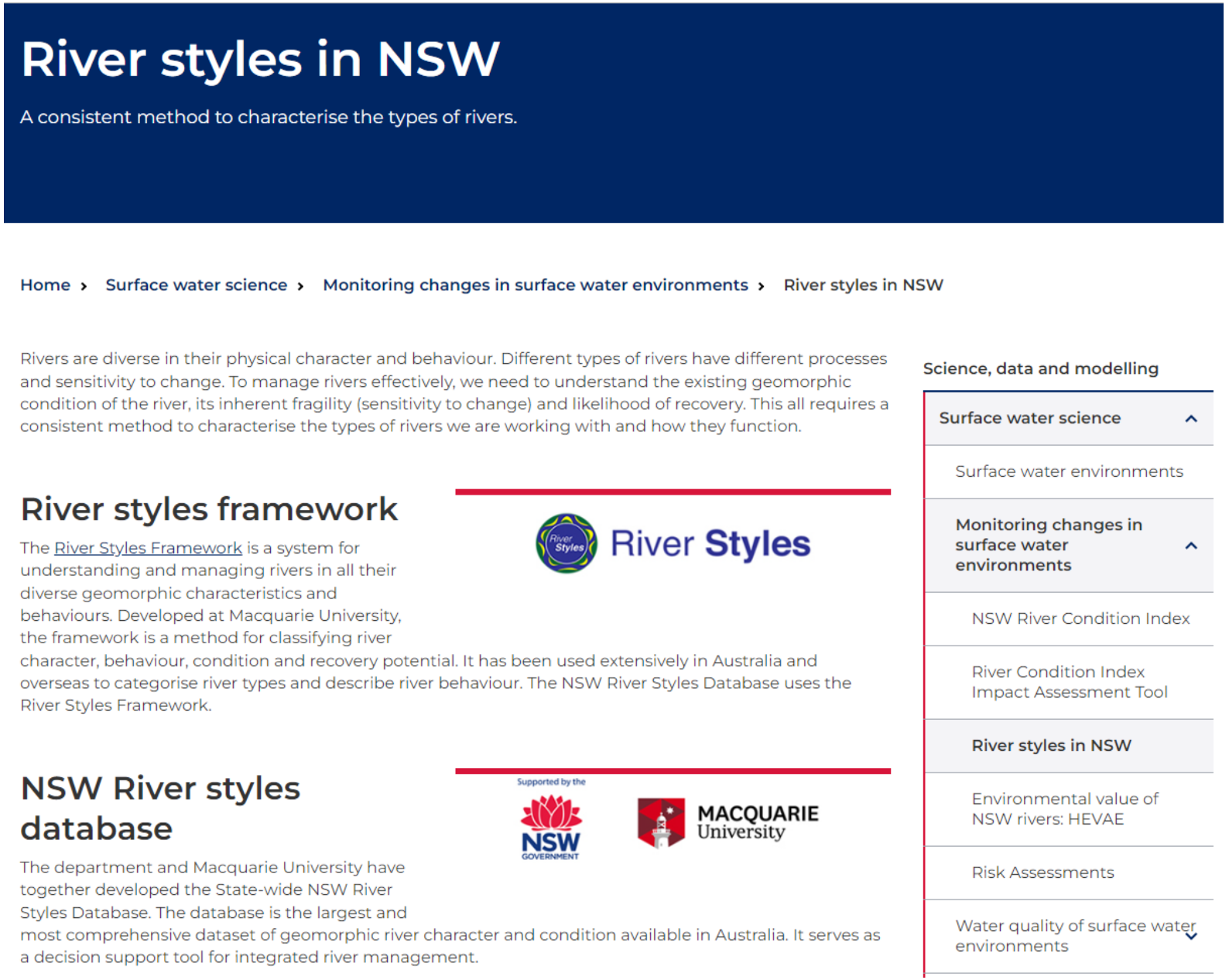
- https://www.youtube.com/watch?v=HbHA91uP84E&t=10s

Cross-scalar applications of the River Styles database (Fryirs et al., 2021)

Scale	Applications
Site/reach	Type of river and its behaviour (geo-eco-hydrology) Link to local values
Sub-catchment & Catchment	Don't fight the site – frame each reach in its catchment context Address threatening processes Minimise negative onsite & offsite impacts Transfer contextualised reach-scale understandings and applications
Regional (state, territory)	Integrate and align decision-making across disciplines and agencies Transfer contextualised catchment-scale understandings and applications Prioritise activities for strategic and efficient use of resources and optimal return on investment
National	Whole-of-Government (and non-government) programmes State of Environment reporting Situate local, catchment and regional conservation and rehabilitation goals in context of national priorities
Intercontinental	Cross-comparative framework Meet UN Sustainable Development Goals, Ramsar convention, etc

NSW River Styles database

https://water.dpie.nsw.gov.au/science-data-and-modelling/surface-water/monitoring-changes/river-styles-in-nsw



River styles in NSW

A consistent method to characterise the types of rivers.

Home › Surface water science › Monitoring changes in surface water environments › River styles in NSW

Rivers are diverse in their physical character and behaviour. Different types of rivers have different processes and sensitivity to change. To manage rivers effectively, we need to understand the existing geomorphic condition of the river, its inherent fragility (sensitivity to change) and likelihood of recovery. This all requires a consistent method to characterise the types of rivers we are working with and how they function.

River styles framework

River Styles

The River Styles Framework is a system for understanding and managing rivers in all their diverse geomorphic characteristics and behaviours. Developed at Macquarie University, the framework is a method for classifying river character, behaviour, condition and recovery potential. It has been used extensively in Australia and overseas to categorise river types and describe river behaviour. The NSW River Styles Database uses the River Styles Framework.

NSW River styles database

Supported by the NSW GOVERNMENT

MACQUARIE University

The department and Macquarie University have together developed the State-wide NSW River Styles Database. The database is the largest and most comprehensive dataset of geomorphic river character and condition available in Australia. It serves as a decision support tool for integrated river management.

Science, data and modelling

- Surface water science
  - Surface water environments
  - Monitoring changes in surface water environments
    - NSW River Condition Index
    - River Condition Index Impact Assessment Tool
    - River styles in NSW
    - Environmental value of NSW rivers: HEVAE
    - Risk Assessments
  - Water quality of surface water environments

River Styles Water in NSW

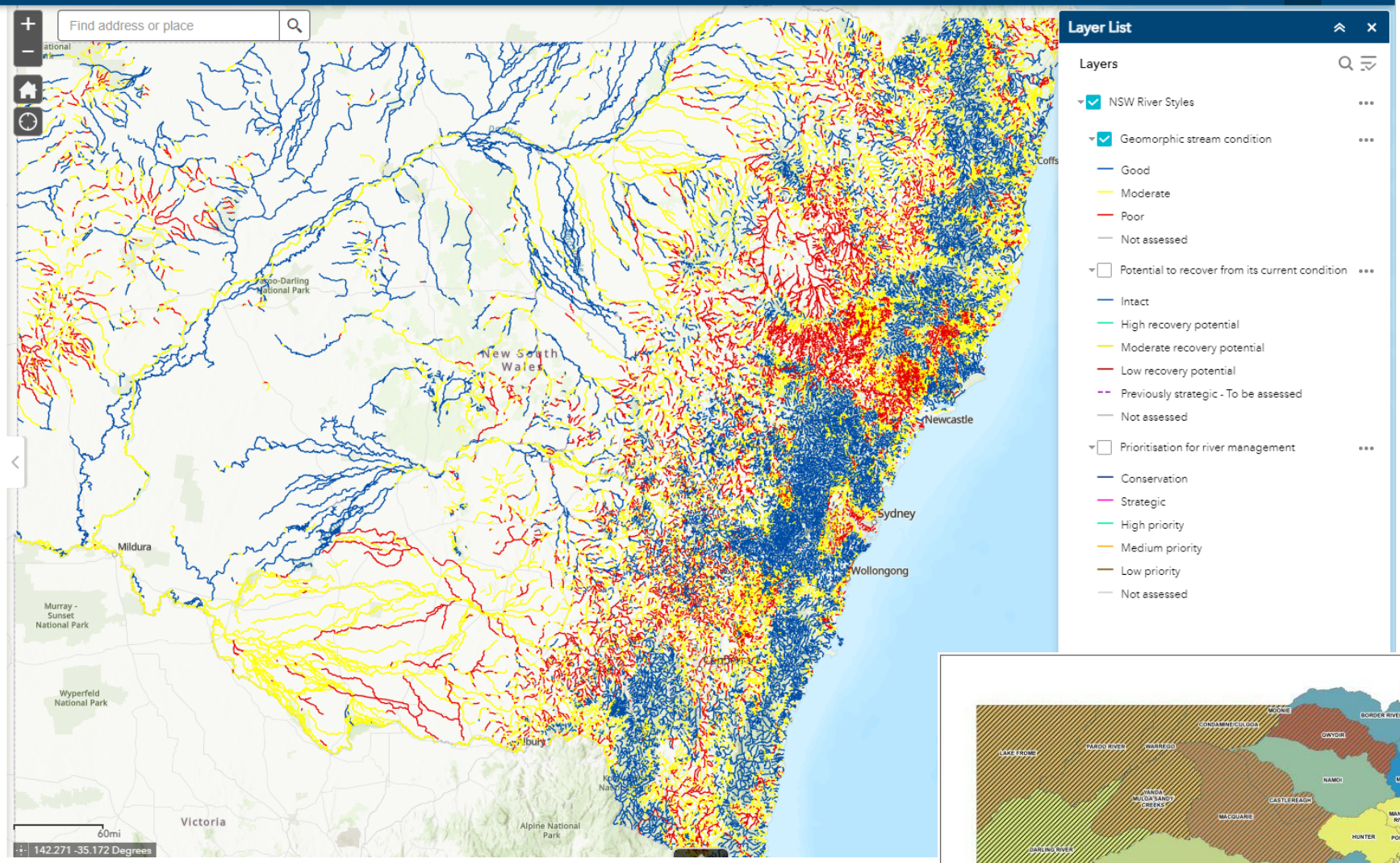
NSW GOVERNMENT

Rivers in New South Wales display a broad range of physical forms and processes. Their form, or character, is a result of many factors including their position in the landscape, geology, land use (both current and historical), runoff and streamflow (amount and variability), sediment dynamics and vegetation. Understanding the processes and responses, or behaviour, of these systems, allows us develop ways to support and improve riverine health. Healthy rivers are critical for the plants and animals that live there, but also have important cultural, social and economic value.

River Styles is a framework developed at Macquarie University that describes the physical characteristics and diversity of rivers and assesses geomorphic stream condition. It considers their capacity to adjust, sensitivity to change due to disturbance, and the pressures (natural and human) that affect their geomorphic condition. It further considers whether a river reach is likely to improve its geomorphic condition over a reasonable timeframe (normally decades) if left alone and provides guidance to help with the prioritisation of river management activities on a conservation-first basis.

The New South Wales River Styles companion document provides an explanation of the dataset and the River Styles framework.

The following web map services are available to add to your own Geographic Information System:
NSW River Styles ESRI Map Service
NSW River Styles ESRI Feature Service
NSW River Styles is also available on SEED



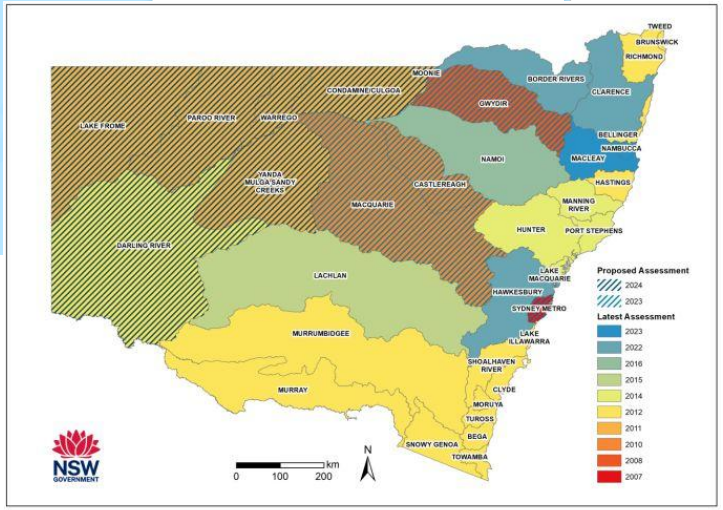
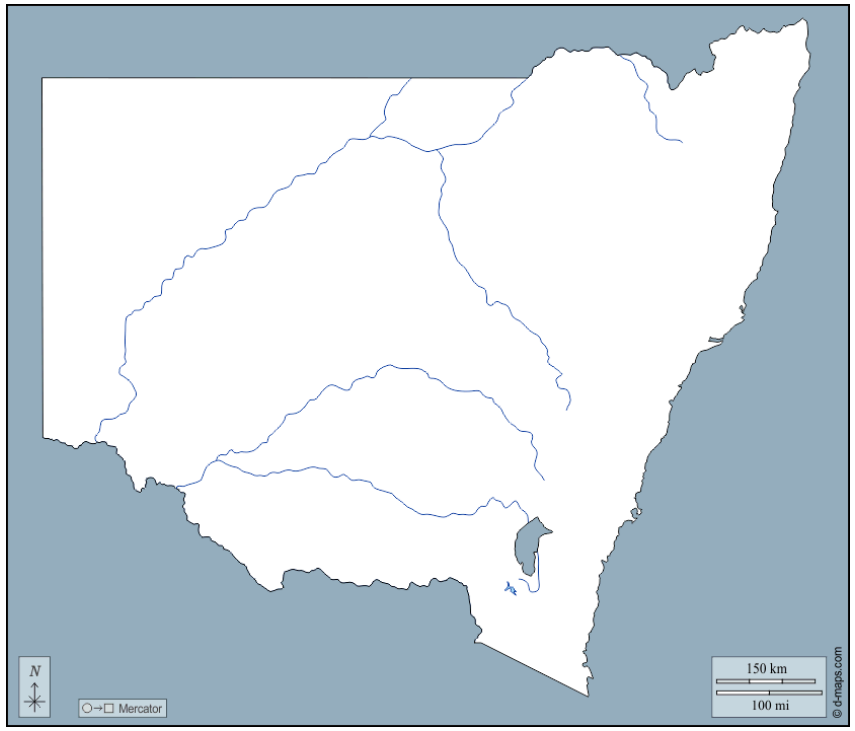


Figure 2. Status of state-wide River Styles assessments. The angled line shows the dates for proposed assessments.

Ontario is 25% larger than New South Wales

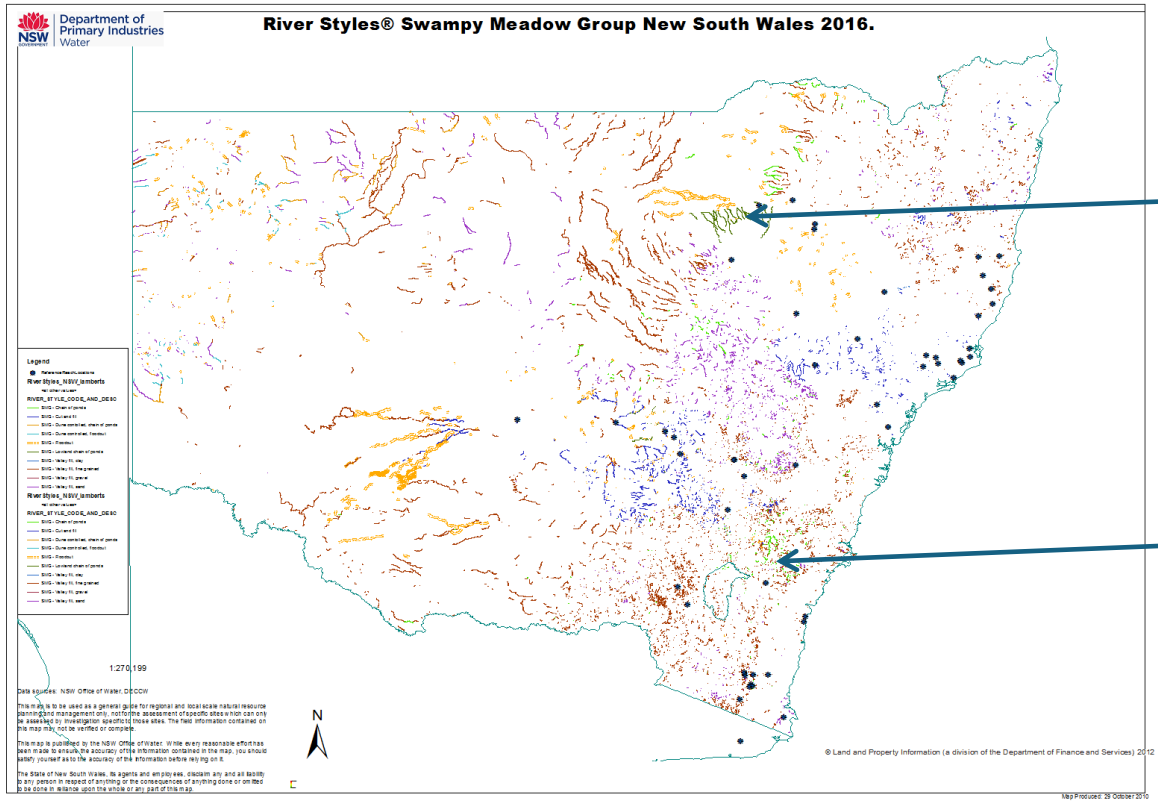


New South Wales: 800,642 km^2

Ontario: 1,076,395 km^2

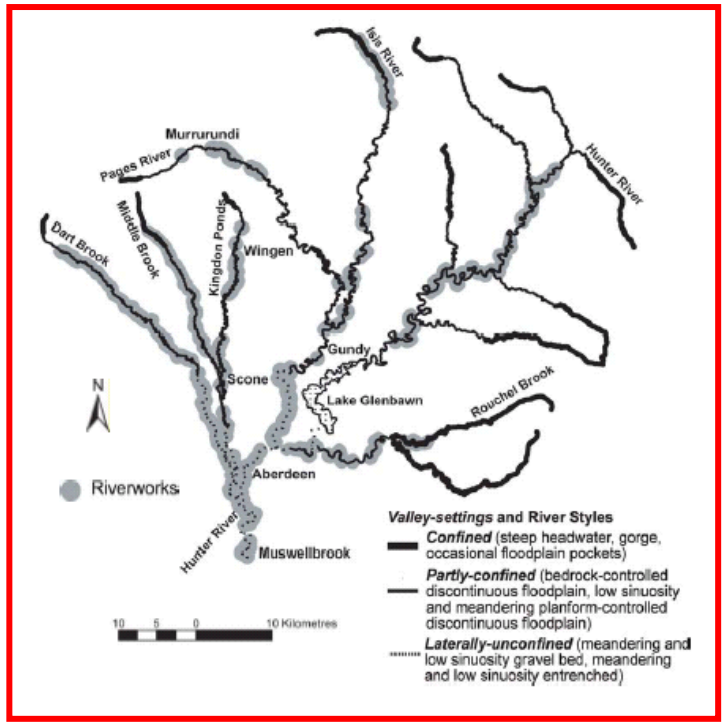
Stage 1 Applications: Prioritisation of RARE and THREATENED River Styles for management decisions and/or inclusion in environmental water rules

Address physical impacts to ecosystem requirements and access to water
Identification of rare River Styles for protection in policy at State level and Federal Bioregional Plans

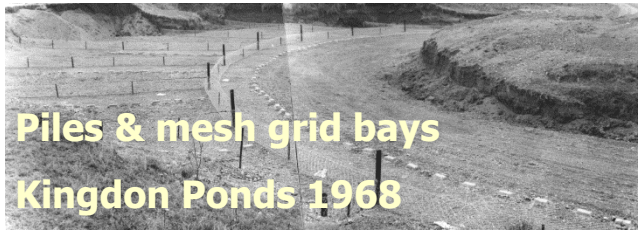


Chain-of-ponds River Style

Stage 1 Applications: Tailoring on-ground actions to River Style character and behaviour – choosing the right tools for the job



Upper Hunter – 517 riverworks installed since 1950 on almost every river course (Spink et al., 2009)



- In the past, same types of works applied to different types of river and different forms of river adjustment
- Lack of understanding of causes (bed instability) and recovery potential of reaches
- Now designing river-type appropriate plans and structures that work with style, condition and recovery potential

Stage 2 Applications: Identifying expected reference reaches for monitoring and evaluation

Measuring or monitoring condition indicators at appropriately contextualised reference reaches for each River Style in NSW

Low sinuosity cobble bed

Wandering gravel bed

Stage 2 Applications: NSW River Condition Index

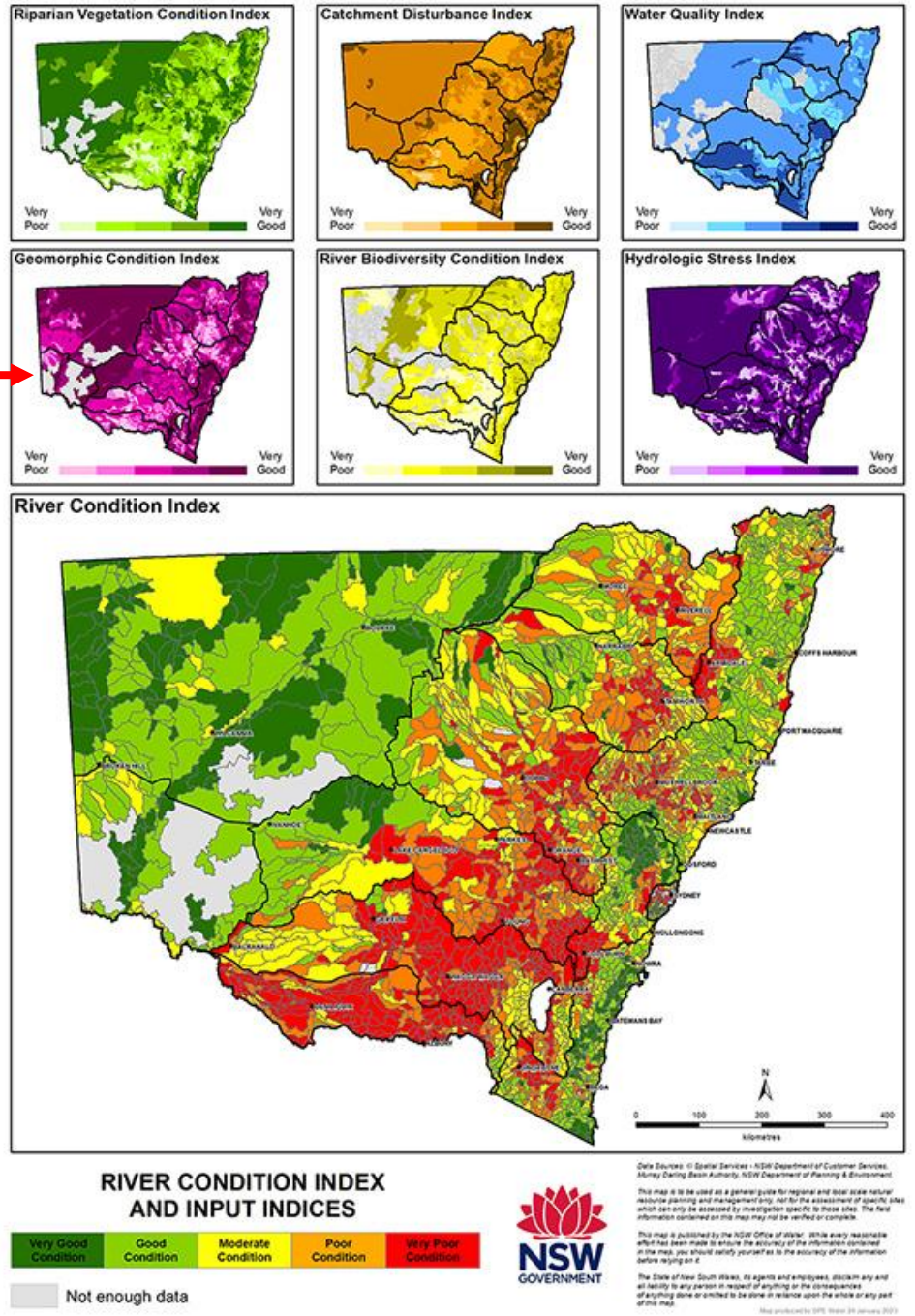
State- and region-scale bioregional assessments

Identifying the right problems to treat (limiting factors), and what to leave alone

Framing geomorphology alongside:

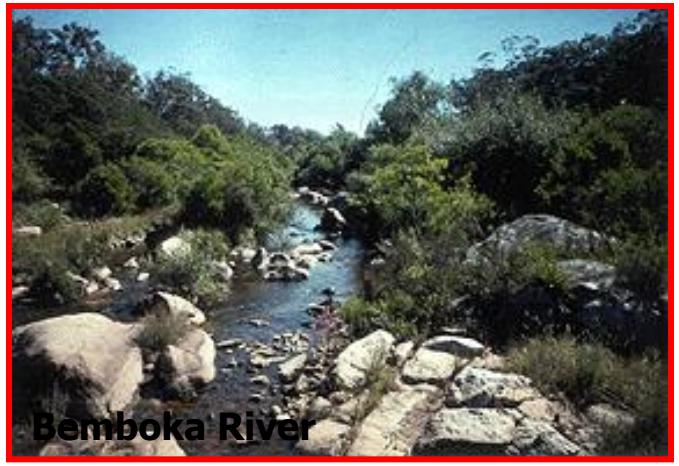
- Riparian vegetation condition
- Catchment disturbance
- Water quality
- River biodiversity
- Hydrologic stress

River Styles Stage 2 condition



Stage 2 Applications: Using condition to define targets for river rehabilitation (Confined, bedrock margin-controlled, occasional floodplain pockets, sand bed)

Moderate condition



- Weed management in channel and on floodplain
- Encourage continuous endemic riparian zone
- Enhance pool re-emergence
- Encourage wood accumulation

Good condition

Poor condition

- Plant riparian vegetation with natives
- Reduce exotic vegetation coverage
- Reduce sediment input
- Re-emergence of bedrock and pools

Moderate condition

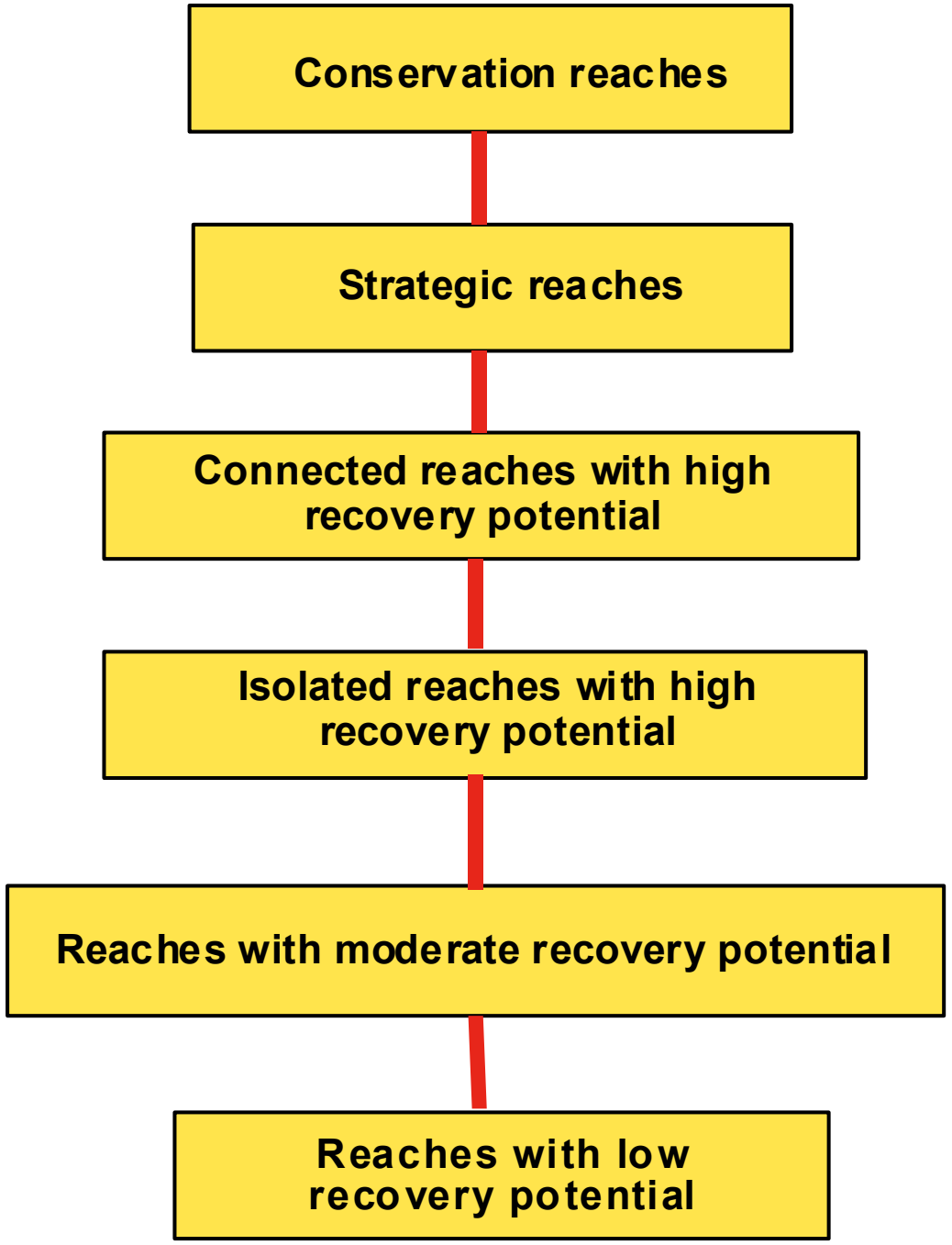
Stage 3 Applications: Prioritisation of river conservation and rehabilitation based on recovery potential

Conservation first: Look after the good bits and unique attributes

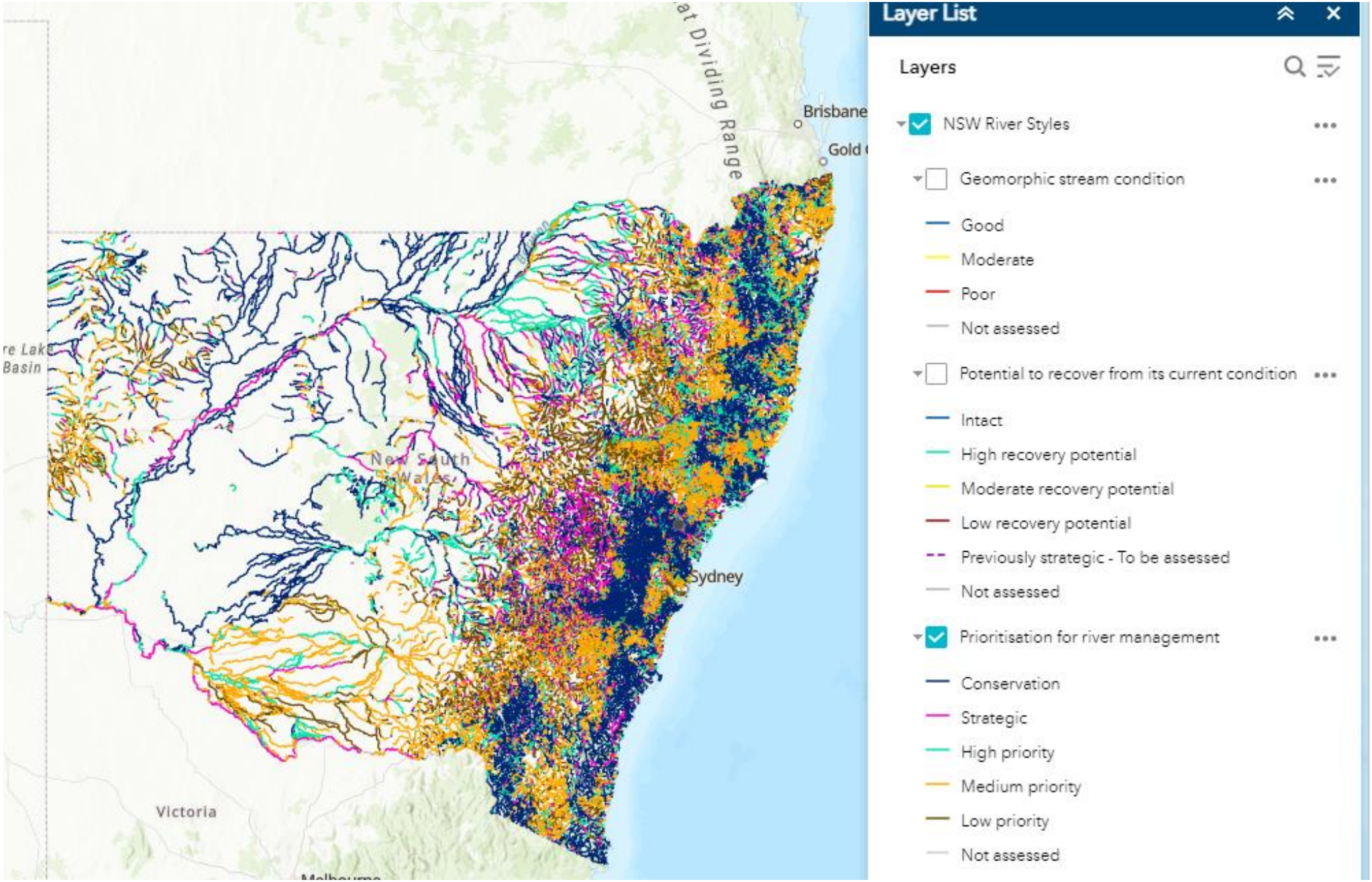
Don't fight the site (Brierley & Fryirs, 2009)

Target key problems & threatening processes in a strategic (proactive) manner – identify and rectify problems (causes, not symptoms)

Minimise off-site impacts - Link reaches to enhance prospects for sustainable success (e.g. consideration of sand slugs, head cuts, etc)

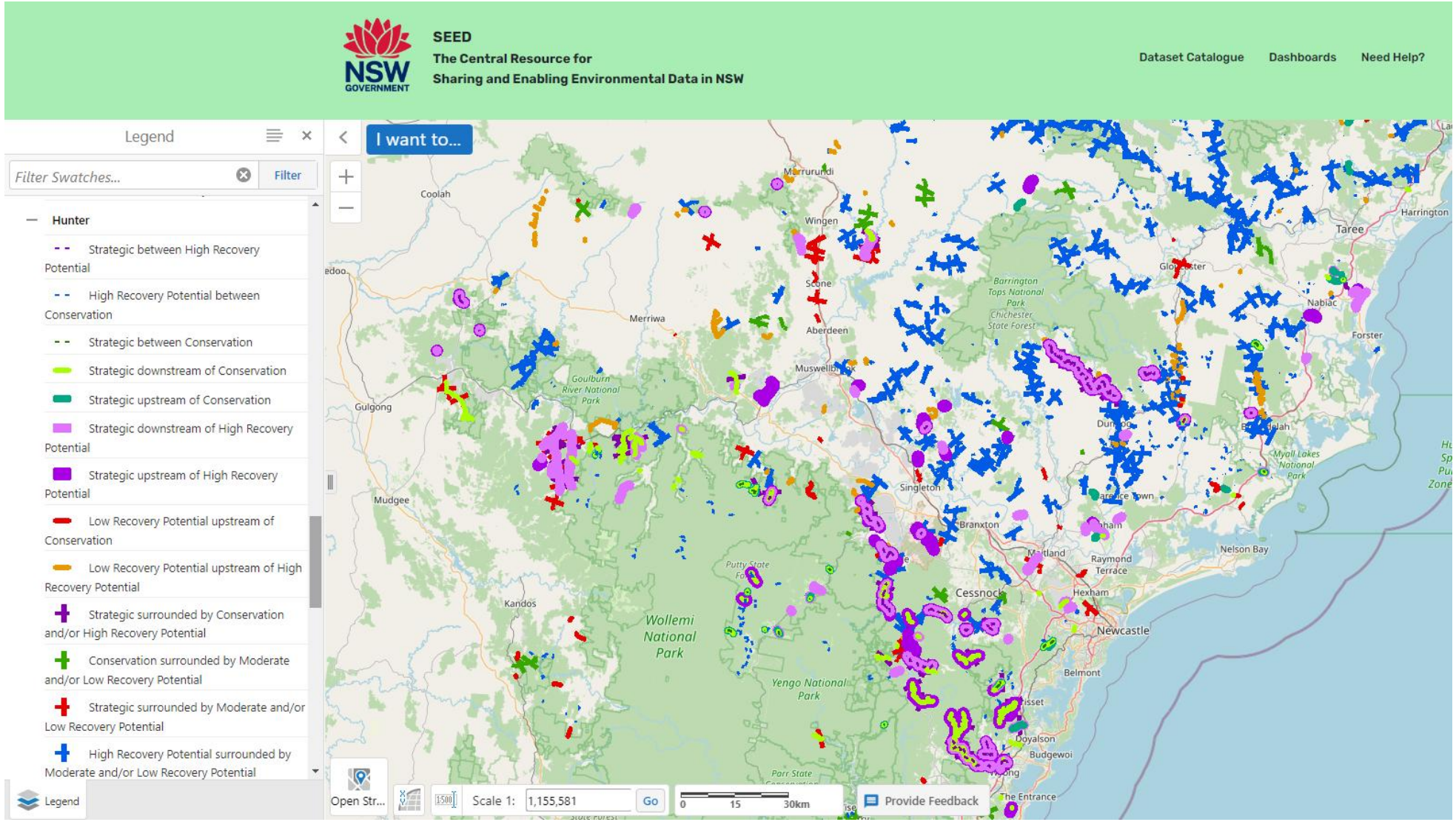


Stage 3 Applications: Prioritization based on recovery potential



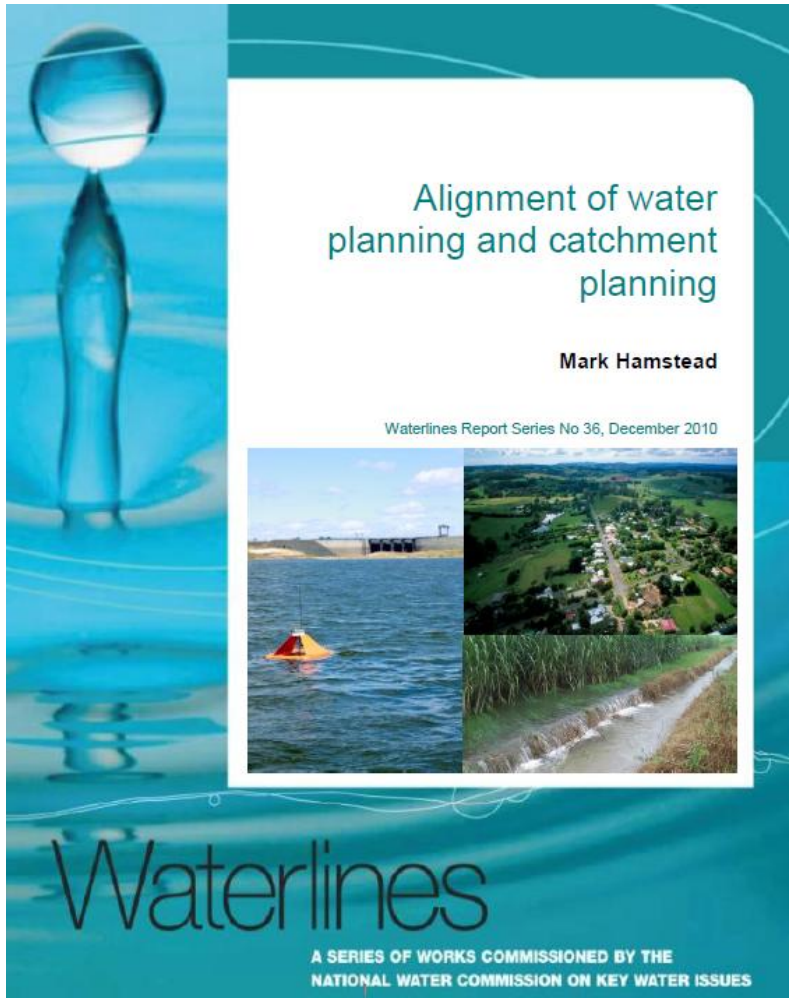
Stage 3 Applications: Prioritizing riparian corridor revegetation for Natural Flood Management (Agnew & Fryirs, 2022)

SEED portal: https://datasets.seed.nsw.gov.au/organization/macquarie-university



Geomorphology informs water management decision making

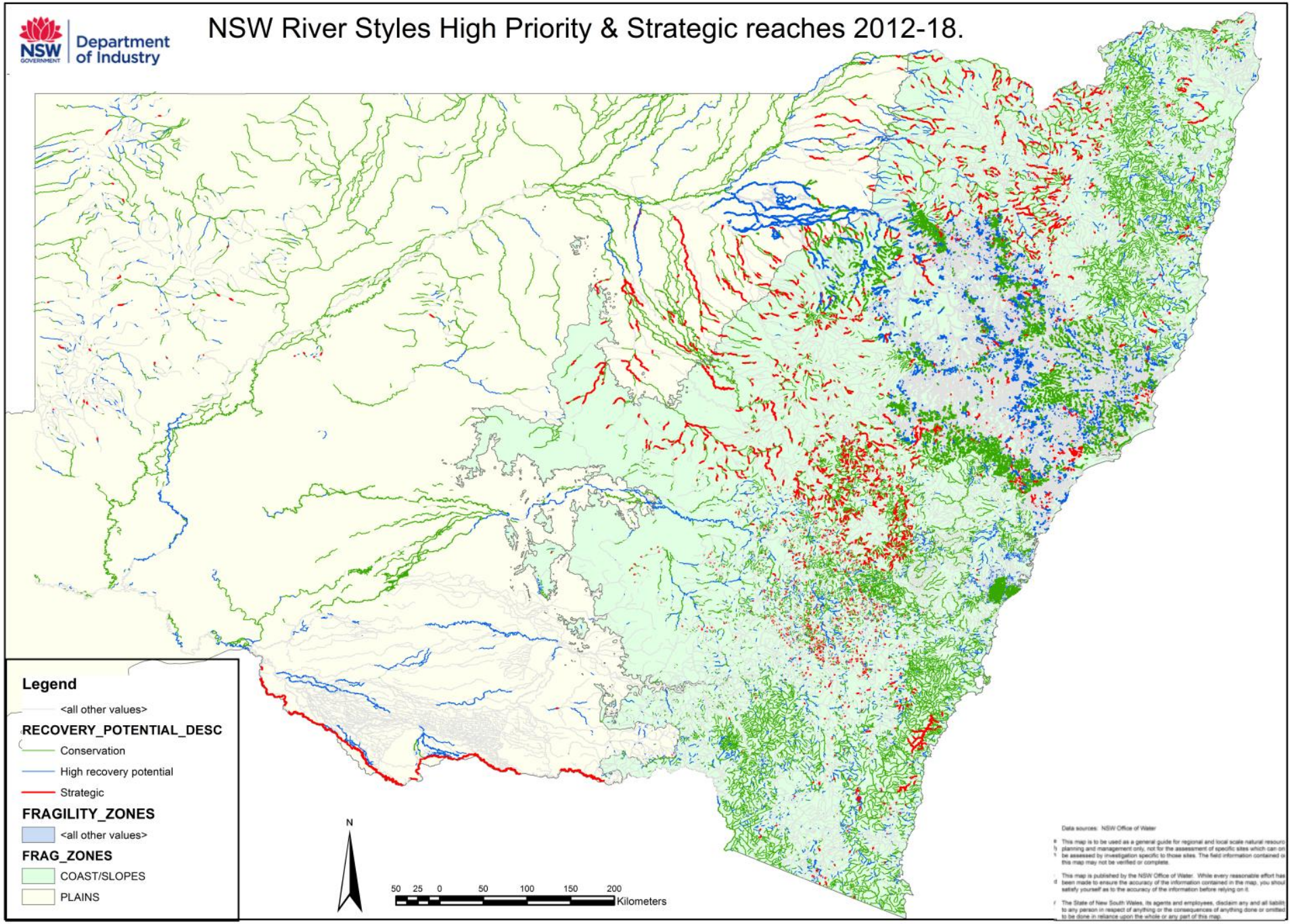
New South Wales water planning and Commonwealth reporting



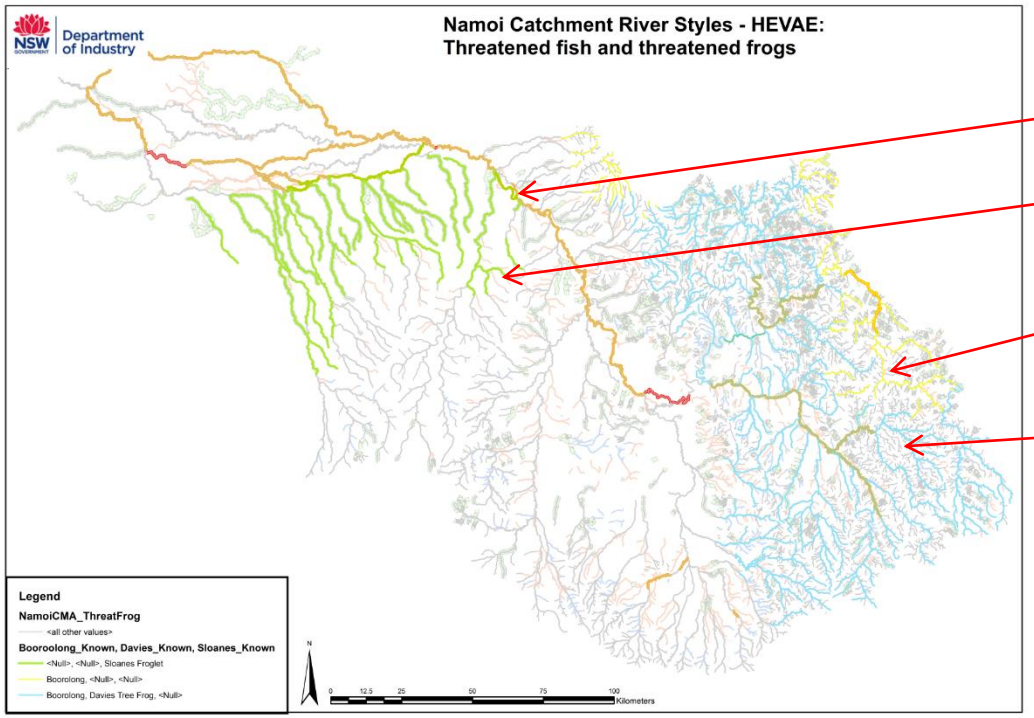
- Defensible, evidence-based categorisation and prioritisation of reach to catchment scale type, state and condition
- Accountability for how status, assessments and rules are determined
- Collaborations across DPI Water & external agencies (OEH, DPI Fisheries, LLS, Soil Conservation Service, Cwth Dept Environment, MDBA)
- Targeted management of water extraction stress

NSW GOVERNMENT | Department of Primary Industries Water

River Styles input into analyses of High Ecological Value Aquatic Ecosystems



Fish communities and threatened species distributions, and habitat mapping and assessment across NSW



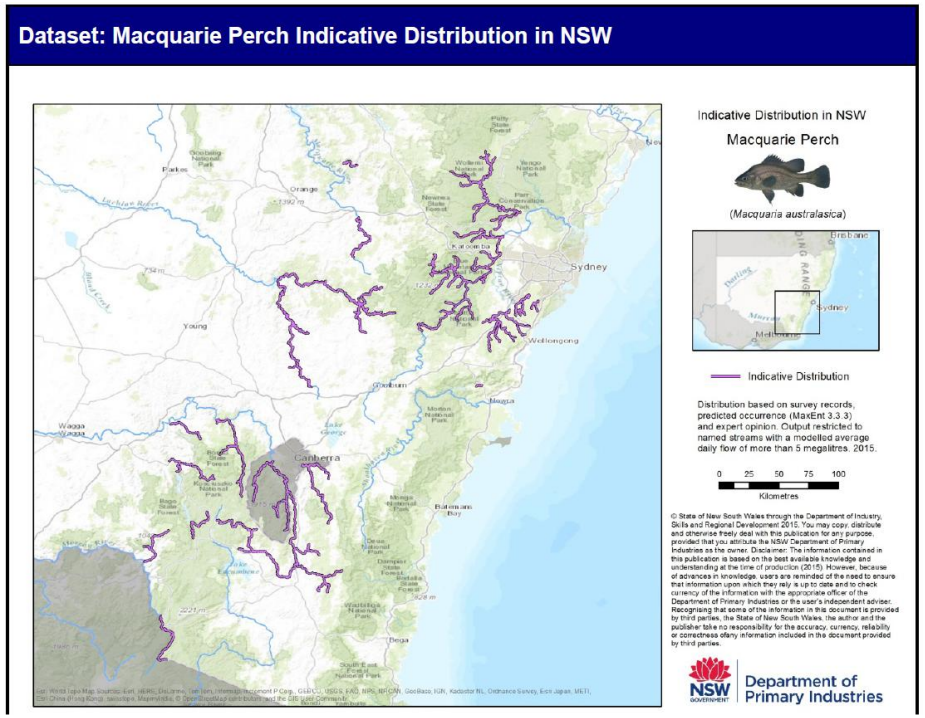
Golden perch

Sloanes froglet

Booroolong frog

Davies tree frog

- To assess distribution and status of fish communities at the reach scale
- Support strategic planning frameworks to ensure integration of biodiversity considerations in planning
- Monitor improvements in habitat condition and status



Changing perspectives … Let the river do the work … just help it along by enhancing recovery

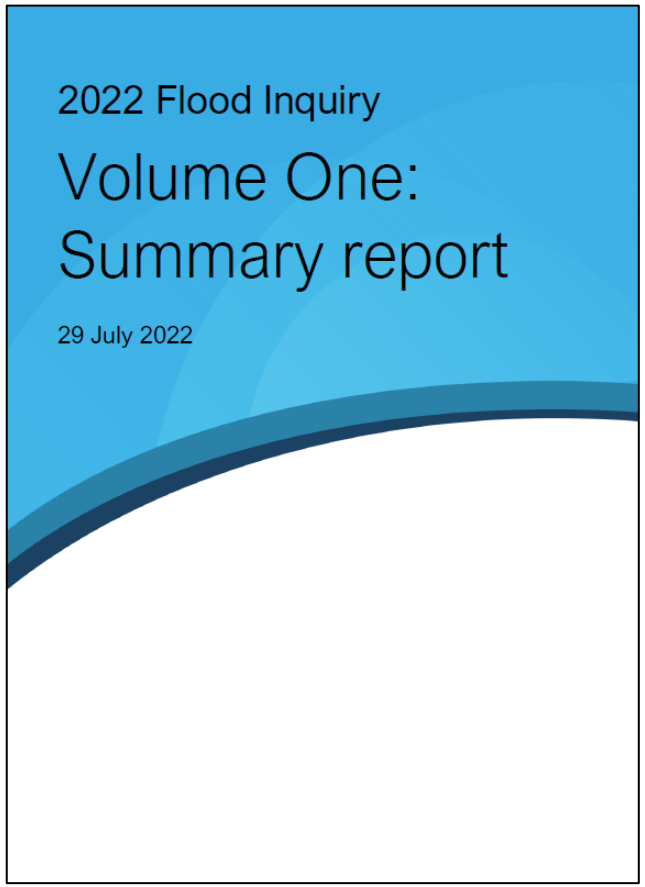
2022 NSW GOVERNMENT INDEPENDENT FLOOD INQUIRY

Recommendation 20 – Floodplains as an asset (p30)

- consider “floodplains as an asset” including “letting watercourses largely flow naturally rather than implementing engineering barriers such as flood levees and mitigation schemes to stop floods”
- reconsider land use planning and all development on floodplains.

Recommendation 27 – Environment (p36)

- specifies the need to “develop an Indigenous led cultural landscape restoration strategy….for nature-based flood mitigation and adaptation which would see large-scale native revegetation and wetland restoration”, starting in the Northern Rivers region.



Professional short courses & Publications

Started in NSW (1998) –5 day course run more than 20 times

New Zealand, US (Oregon, Utah), Canada (BC), Brazil, Colombia, China, India, Malaysia, Japan, Singapore, Philippines, REFORM Project (EUFP7 Project – Netherlands, UK, Austria, France, Italy, Spain, Poland, Czech Republic, Sweden)

Brierley et al. (2019). The use of the River Styles Framework as a tool to 'work with nature' in managing rivers in Brazil: Examples from the Macaé Catchment. *Revista Brasileira de Geomorfologia*, *20*(4).

Fryirs et al. (2019). 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. *Revista Brasileira de Geomorfologia*, *20*(4).

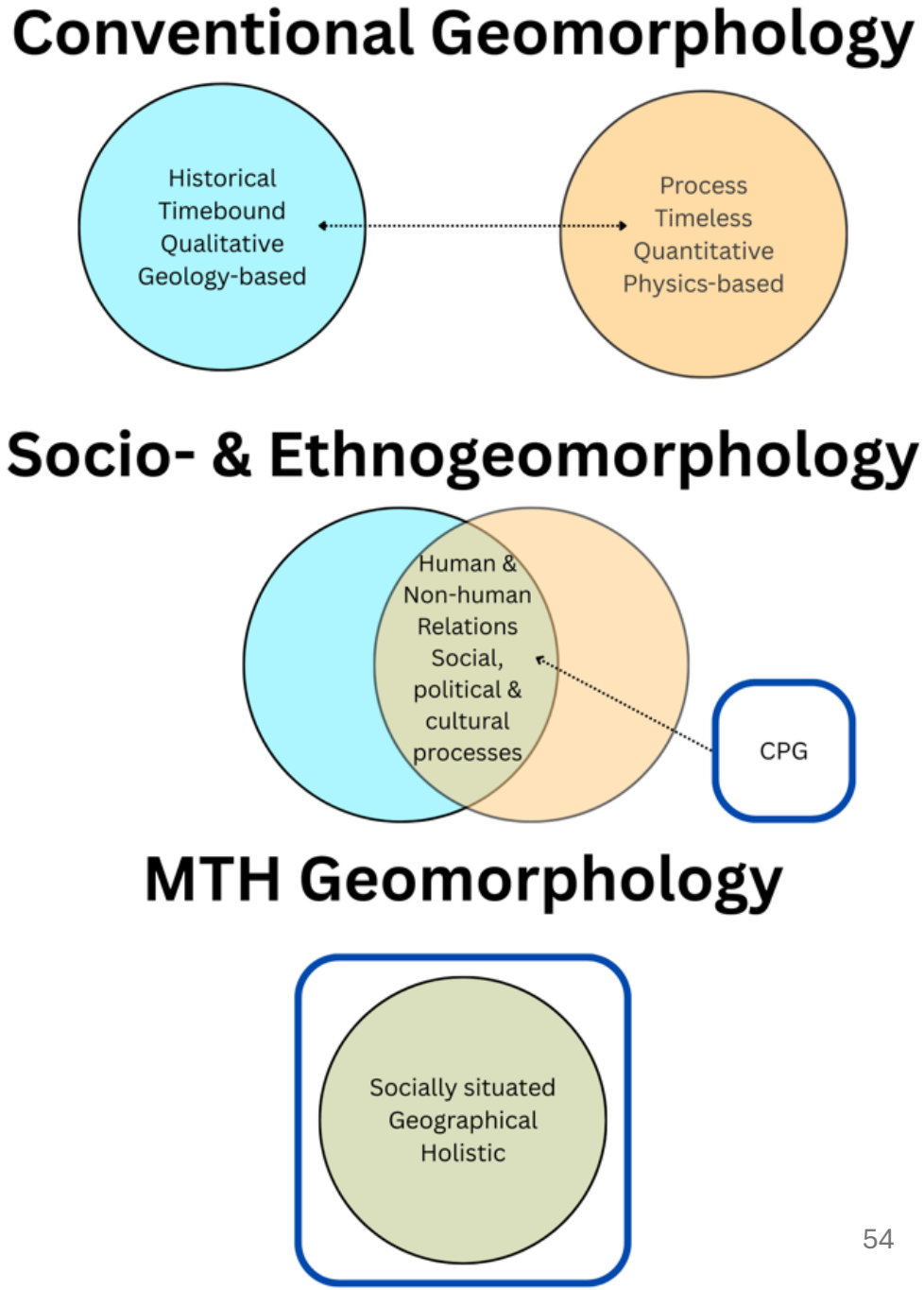
Reid et al. (2026). Reframing and operationalizing holistic, geomorphologically informed river management in British Columbia, Canada. *Canadian Journal of Fisheries and Aquatic Sciences*, *83*, 1-18.

Mitchell et al. (2024). Developing an equitable agenda for international capacity strengthening courses: environmental pedagogies and knowledge co-production in the Philippines. *Journal of Geography in Higher Education*, *48*(2), 281-311.

Tolentino et al. (submitted). PHRIVERS: An aspirational agenda for nature-based river management in the Philippines. *River*.

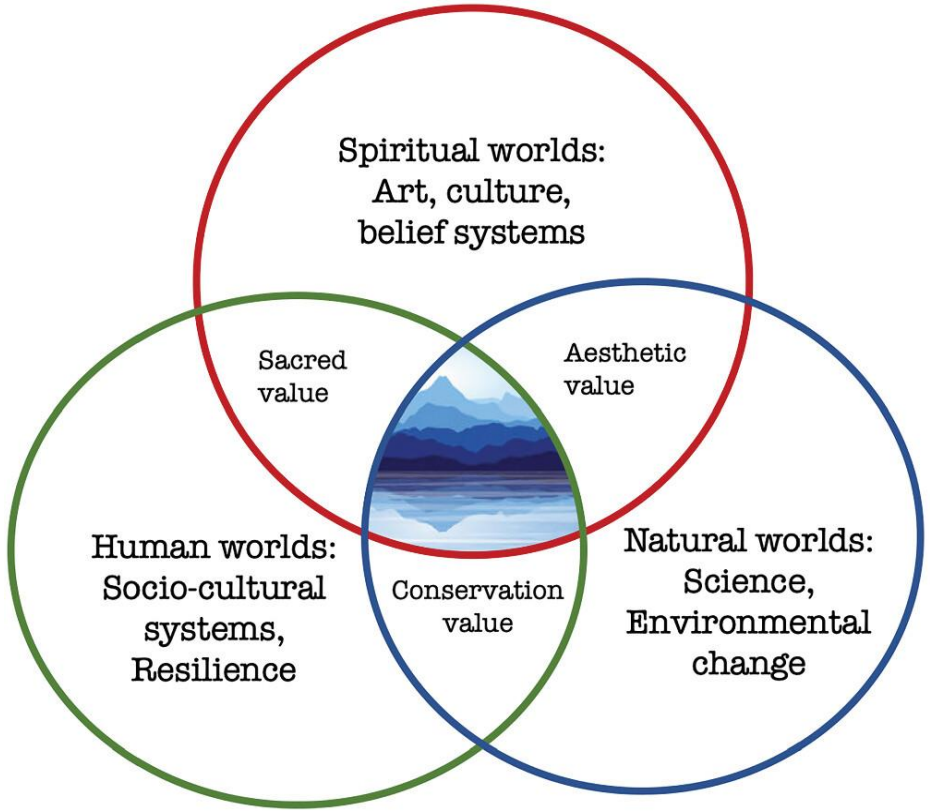
Where to from here?

More-than-human geomorphologies Thomas et al. (2026)



Multiple geomorphologies … meetings of worlds

(Brierley et al., 2019; Wilkinson et al., 2020)



Michèle Koppes (2022)
Braiding knowledges of braided rivers

Working with rivers …

- Dao follows the laws of nature, leaving nature to go its way
- Emergent relations … as nature evolves, so must civilization




I.S. INTEGRATIVE SCIENCES Rivers RECHERCHES ET ACTIONS

A more-than-human approach to river restoration. Lessons from Aotearoa New Zealand and China

Gary Brierley, University of Auckland (Waipapa Taumata Rau)

Co-authors: Megan Thomas (UoA); Meiqin Han (Lanzhou U); Dan Hikuroa (UoA); Anne Salmond (UoA); Billie Lythberg (UoA); He Qing Huang (CuGW)

30 juin > 4 juillet LYON 2025

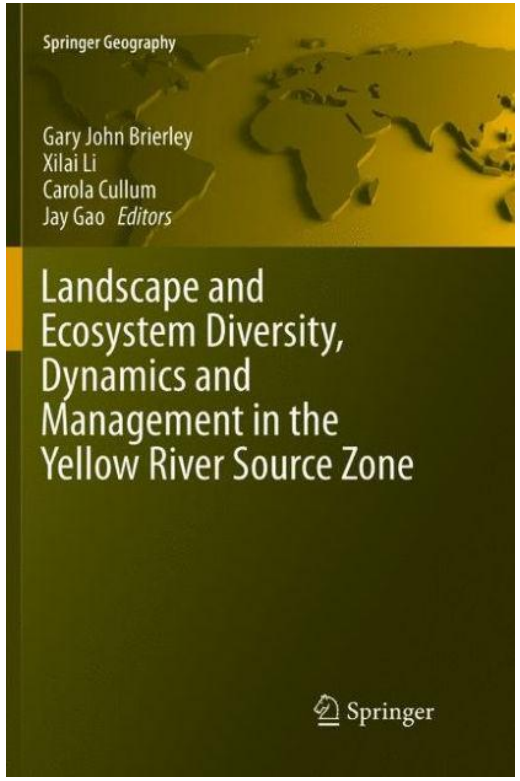
Waipapa Taumata Rau University of Auckland

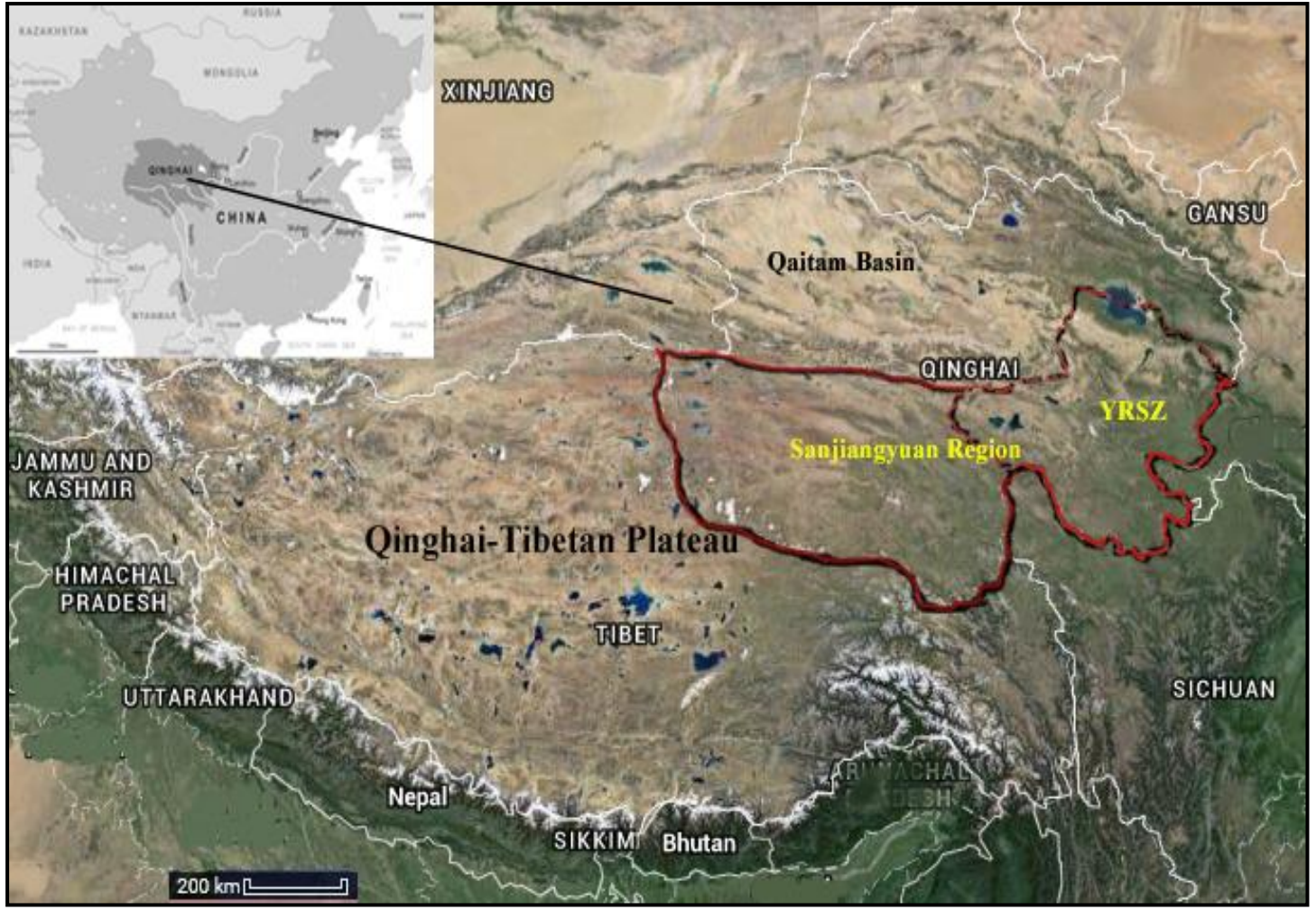
Three Brothers Project
Qinghai, Tsinghua, Auckland Universities (& CAS)

Passion to protect local values-grazing-adapted ecosystems

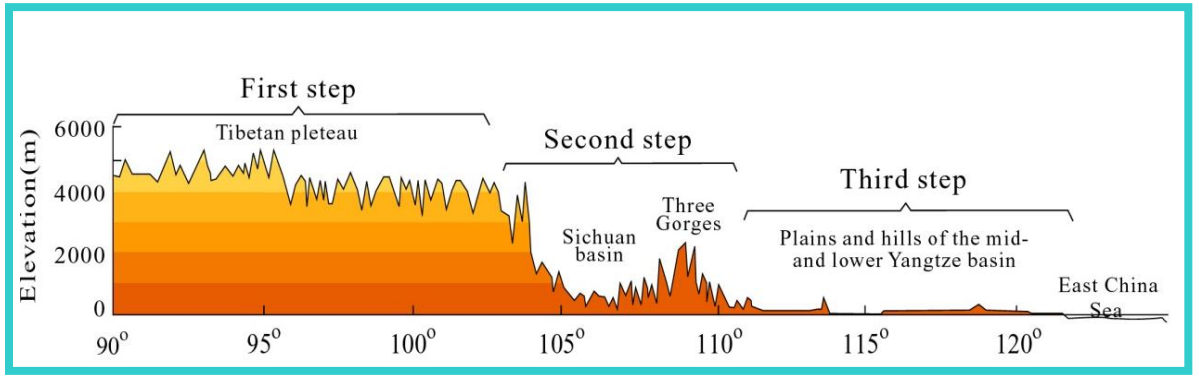
Field analyses, Digital twins, Local knowledges

Landscape = common-ground … agriculture, engineering, geography





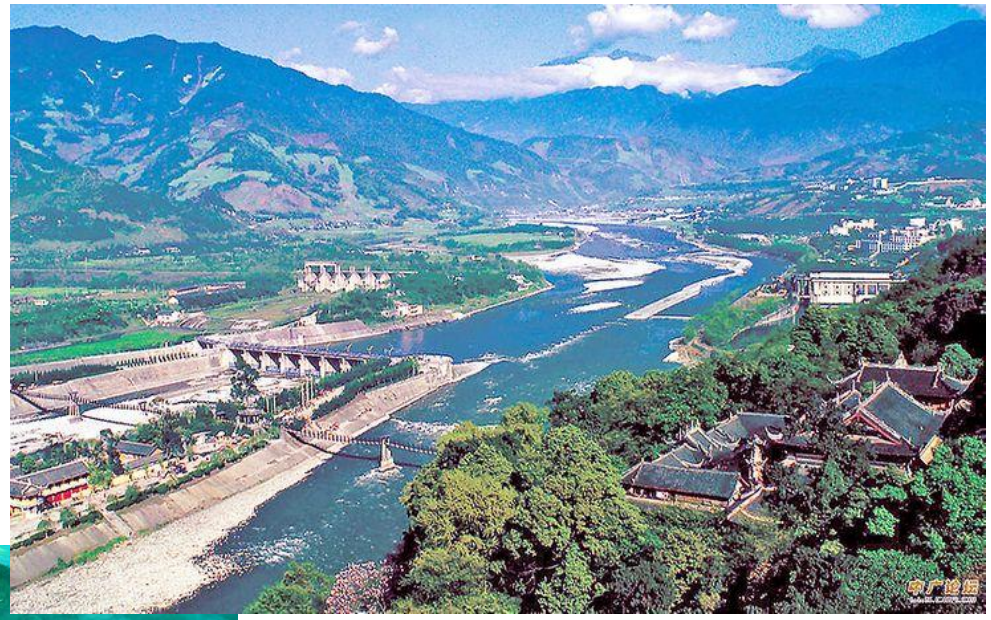
The Roof of the World
The Third Pole
The Water Tower of Asia



It’s a very special place!

Remarkable diversity: people, landscapes, ecosystems

Learning lessons from the Min River at Dujiangyan – 2400 year continuously operating irrigation system that ‘works with the river’



Let the river do the work …

Importance of passive restoration … the ‘do nothing approach’ (*wuwei*)

Vested interests of the river restoration industry …

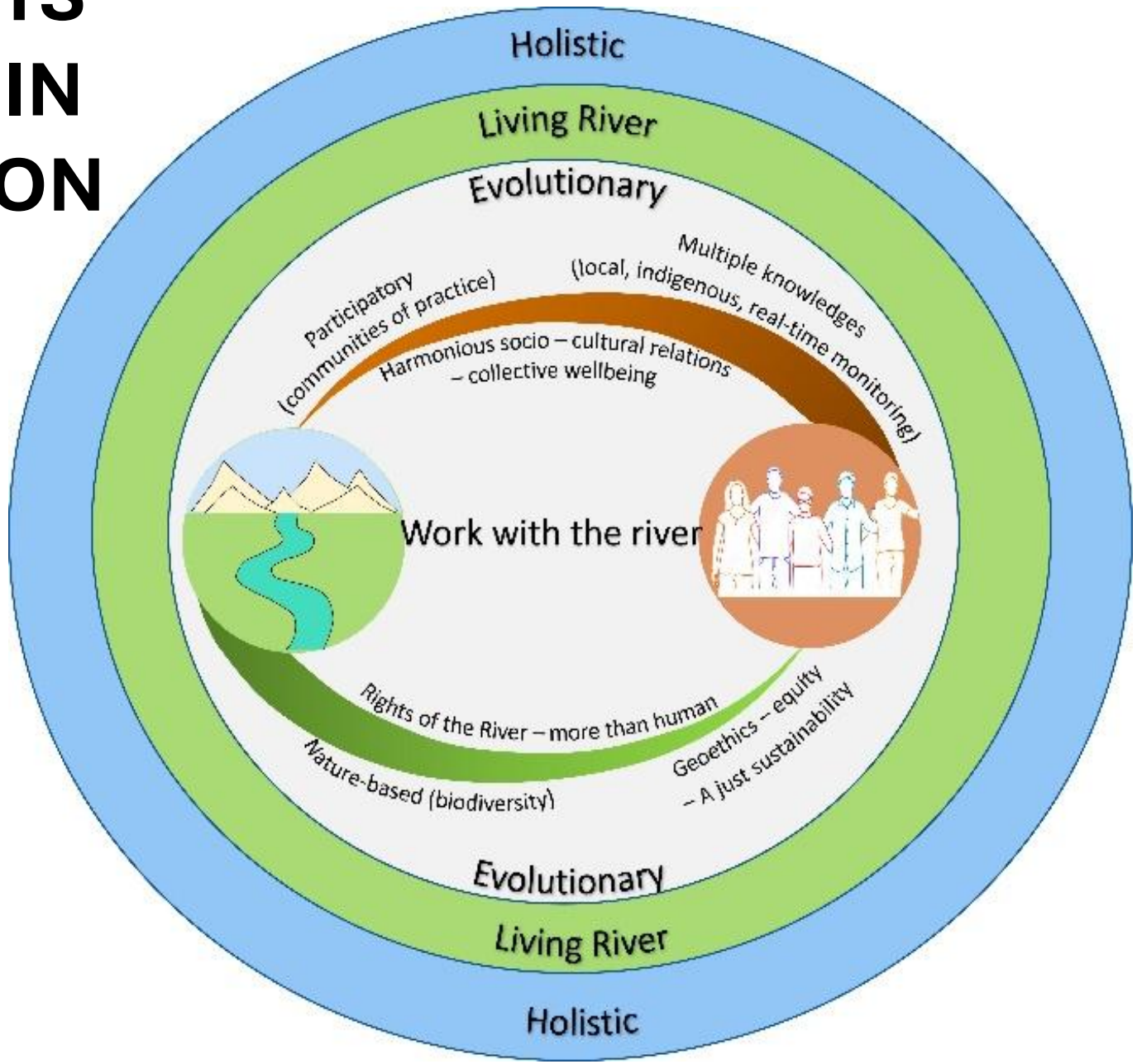
Politics of river classification

- Tadaki et al. (2014). River classification: theory, practice, politics. *Wiley Interdisciplinary Reviews: Water*, *1*(4), 349-367.

KEY GEOMORPHIC TRAITS TO INCORPORATE WITHIN ECOLOGICAL CIVILIZATION

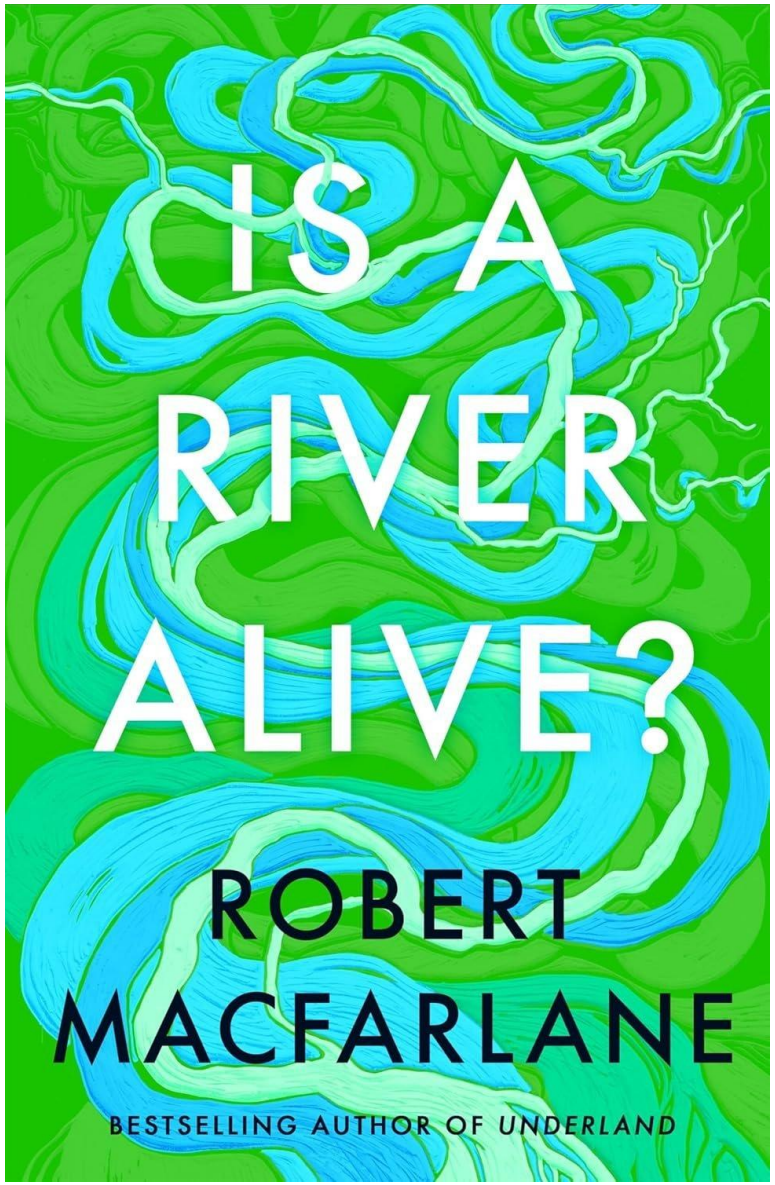
Respect Diversity: Convergence through relationality

1. Indivisible entity (pattern, connectivity)
2. Dynamically-adjusting (morphodynamics)
3. Emergent (evolutionary trajectory)

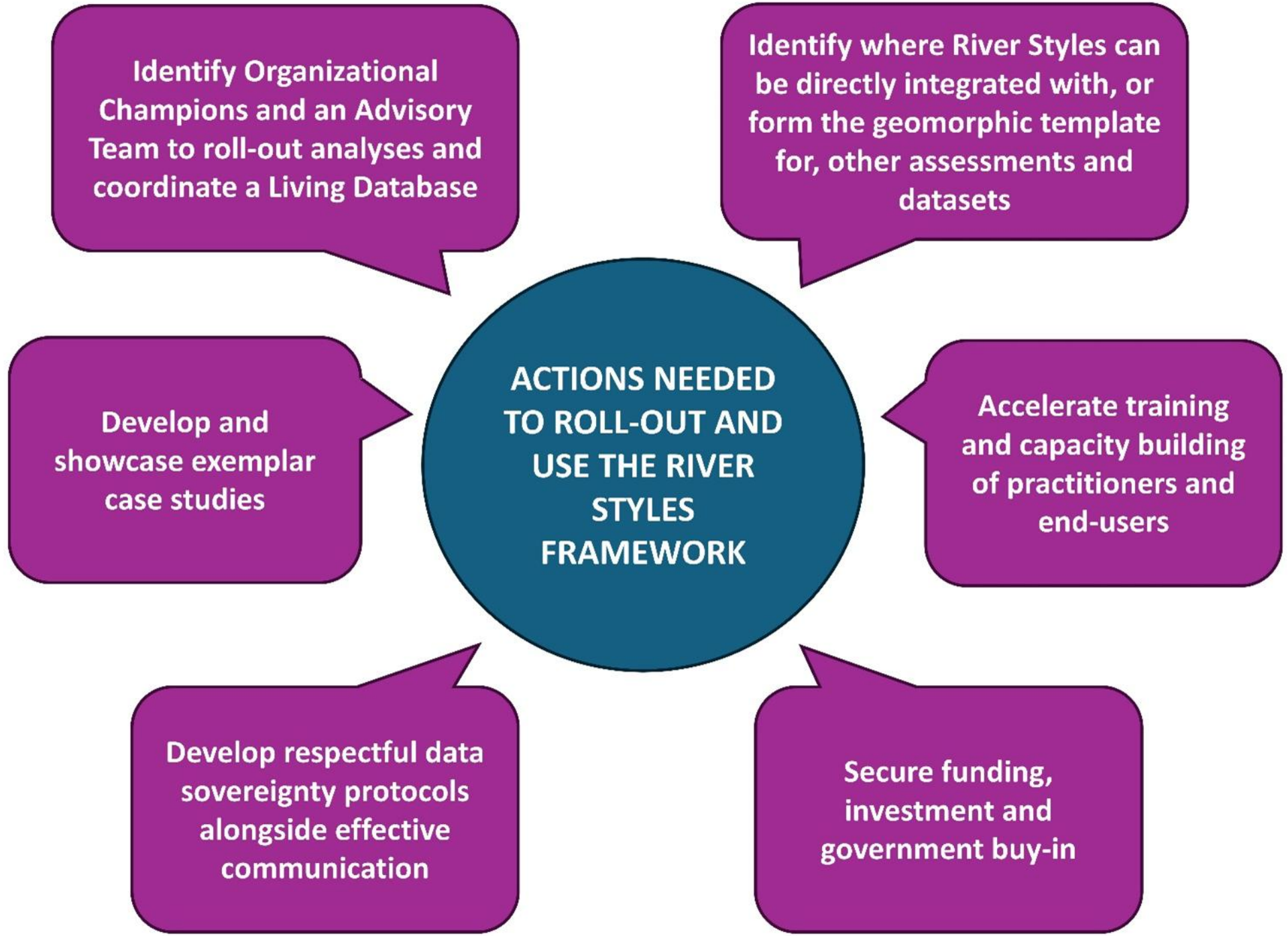


Pedagogies of Hope (Freire, 1994)

- Rivers as kin (Cohen et al., 2023; Linton & Pahl-Wostl, 2023)
- Riverhood (Boelens et al., 2023)
- River culture (Wantzen et al., 2024)
- River rhythmicity (Jackson et al., 2022)
- Storytelling & river management (Stevens et al., 2026)
- Ongoing work in Brazil & Italy … Interview with a river, liberty, no-authority

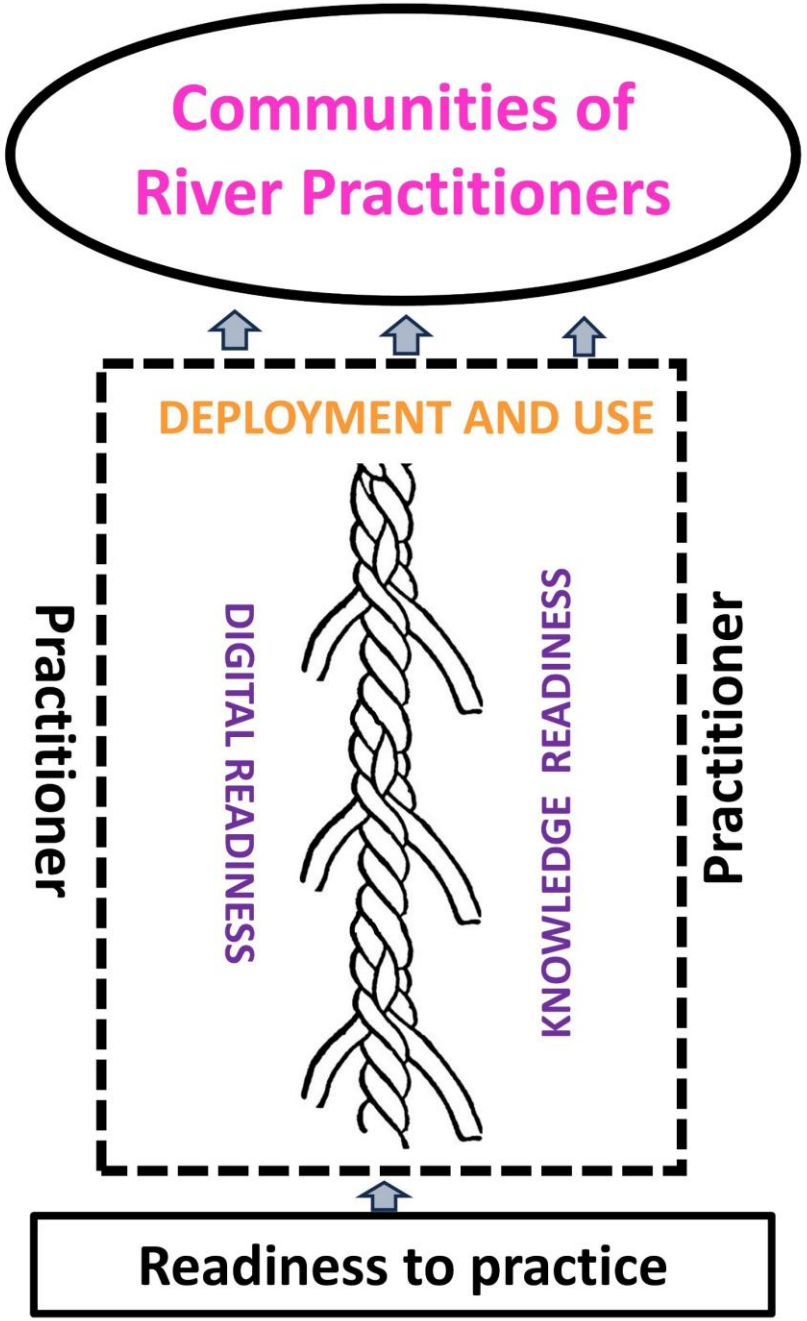


An aspirational agenda



Reid et al. (2026). Reframing and operationalizing holistic, geomorphologically informed river management in British Columbia, Canada. *Canadian Journal of Fisheries and Aquatic Sciences*, *83*, 1-18.

CoRPs (Brierley et al., 2025)



Moving forward together: Collective wellbeing – Inclusive, shared approach to learning

Place-based, catchment-specific applications (Bioregionalism) … Grounded applications that ‘keep it real’ (cf., Digital worlds & AI)

Herman Hesse (1951) *Siddhartha, p105*

"The river has taught me to listen; you will learn from it, too. The river knows everything; one can learn everything from it."

Freya Mathews (2023) The Dao of Civilization, p52

“In wending its way thither and thereby achieving a destination proper to its nature, it (the river) simultaneously assists others in achieving their ends, sustaining the entire landscape with its waters, giving life to all things. ‘Doing nothing’ then, the river ensures that everything is done, that its work of sustaining the world is accomplished.”

Closing thoughts

Changing practices in the conduct and use of geomorphology … working with the river

- Let the River Speak (Listen to the river & learn from it)
- Beyond management: (Re)learning to live generatively with living rivers

The River Styles Framework provides an organizational tool to support coherent, proactive geomorphologically-informed management applications

- Maximizing prospects of AI & Big Data
- Local knowledges, local relations to rivers …

How effectively do contemporary management practices ‘work with the river’ in Ontario?

Thanks …

Waipapa Taumata Rau
University of Auckland