

CHAPTER TWO: PRACTICAL CONSIDERATIONS TO BE RESOLVED WHEN APPLYING THE RIVER STYLES® FRAMEWORK

Prior to undertaking a River Styles assessment various practical considerations must be addressed. These issues are appraised in a generic way in this chapter, while the following chapter describes how these issues were resolved in Bega catchment.

2.1 Scale and resolution issues in applications of the River Styles® framework

The River Styles framework provides a comprehensive yet adaptable framework that allows differing practitioners to derive data on river character and behaviour that can be utilised in a meaningful manner by other users. Obviously, the use of River Styles reports are utilised should be innately tied to the quality of the data that has been recorded. The reliability of a River Styles report will depend on:

- ***The skills base of the practitioner and user.*** The River Styles® framework is not a prescriptive black box exercise that places each reach into a limited range of categories. Rather it presents a way of reading the landscape. Each river operator must understand and document the limitations imposed by the scale/resolution of the work they are completing. The combination of air photograph interpretation and field analytical skills requires some basic geomorphology training.
- ***The timeframe in which the study is completed.*** In general terms, the time available to complete a River Styles analysis dictates the scale at which data can be collected and compiled. As cross-catchment consistency is critical, careful judgement must be made on the scale of inquiry and related time management issues at the outset of a project. Depending on the level of detail required, field analysis of River Styles can take up to a day per site. To complete Stage One of the framework the time ratio for office-field based tasks is about 2:1. To complete Stages Two-Four, considerable time is spent on evolutionary assessments and analysis of catchment limiting factors. These are also field intensive exercises, with an office-field ratio of about 1:1.
- ***The scale at which data are reported and analysed.*** For many management applications, broad reconnaissance knowledge of the catchment as a whole may suffice. In many instances, initial catchment-framed assessments at a coarse resolution present a template onto which finer scale work can be added for particular issues or reaches. Ideally, however, the scale of analysis applied in the River Styles maps is consistent across the catchment. For example, coarser analysis of a 20,000 km² catchment in which reaches are defined for River Styles at a mapping scale of 1:25,000 provides a basis from which more detailed mapping of River Styles boundaries at a scale of 1:10,000 can be performed. The critical factors that guide identification of River Styles at either of these, or other, scales are essentially the same. It is simply the level of resolution of the mapping, and hence the specificity of reach boundaries, that varies at differing scales. In each assessment and

application of the River Styles procedure it must be stated explicitly at what scale the analysis has been undertaken, as the scale at which data are derived must constrain the way in which the data are used subsequently.

- ***Splitting versus clumping.*** The resolution of analysis undertaken in the River Styles framework is dependent on the purpose to which the information is to be utilised. The assessment of ‘near-uniform’ river character and behaviour in a reach will vary dependent on the scale at which the River Styles framework is applied. There will be no definitive, final statement on variants of River Styles, as no magic number can meaningfully summarise the diversity of natural river forms and processes. Different end users will prefer a clumped rather than a split approach to the differentiation and labelling of River Styles. Much deliberation will be encountered over whether reaches should be split into individual River Styles, or clumped together as a broader reach of a single River Style in which there is a range or alternating patterns of river character and behaviour (sometimes referred to as a segment). Alternatively, localised features inevitably get buried in broader-scale analyses, but may be very important considerations in finer resolution work (e.g. assessments of geodiversity). As indicated previously, cross-catchment consistency in the scale of application, and documentation of adopted procedures, are critical.
- ***Boundaries between River Styles.*** The boundaries between River Styles are defined by a change in the diagnostic features of a Style such that a change in geomorphic structure results. These boundaries can be distinct or gradual. Distinct changes often coincide with tributary-trunk confluences, changes in valley gradient (e.g. at bedrock steps) or changes in valley width and morphology associated with lithological or structural boundaries. Gradual changes are less easily pinpointed. These transition zones are often coincident with gradual downstream changes in valley width and morphology, or valley slope. For example, a change from occasional to discontinuous floodplain pockets may occur over several kilometres of river course, requiring a pragmatic decision about the placement of the boundary. The boundary between river reaches in these cases is placed in the middle of this transition zone and a gradual boundary noted. Once more, specific issues faced in identifying and characterising boundaries must be documented in each report.
- ***Labelling River Styles.*** Particular problems emerge in putting labels onto River Styles, striving to achieve a balance between consistency, interpretative meaning, and ease of communication. At times this has proved impossible, and borders on the farcical as a dozen or more terms are merged into the label. Putting boxes, boundaries or labels on nature is NOT the underlying message of the framework. Much is learnt from ongoing debates about how to define a reach, assessment of how it looks and behaves, interpret how it is likely to change, and application of a label to it. Ultimately, the River Styles® framework, and the intent with which it has been developed, provides a learning tool through which geomorphologists can summarise river character, behaviour, condition and recovery potential, convey these insights to a range of practitioners from other disciplines, and

relate these insights to management issues. In essence, the River Styles framework provides a series of systematic procedural steps with which to guide observations on river geomorphology in a meaningful, coherent and consistent manner.

- ***A cautionary note on practical applications of River Styles insights in river rehabilitation programs.*** As any given reach represents a summary of a range of river character and behaviour, a precautionary approach to management applications should always be adopted, such that suggested management treatments are appropriate to the specific problem to be addressed. Such applications must be cognisant of local river dynamic and potential off-site (upstream and/or downstream) considerations. The coherent catchment-framed basis of the River Styles framework is NOT intended to replace detailed field-based analytical enquiry and interpretations of local river history and change. However, applications of the framework provide a consistent and meaningful manner with which to order and organise insights into river character and behaviour such that analyses and interpretations of river forms and processes can be translated from one field situation to another, over an array of spatial scales. Hence, site- or reach-specific insights are evaluated in light of their catchment context so that cross-catchment comparisons can be meaningfully undertaken.

2.2 Tailoring the River Styles assessment to the aims of the exercise

One of the innate strengths of the River Styles framework is its flexibility, in terms of both its application and the range of purposes to which assessments can be utilised (Brierley et al., 2002). In its entirety, the River Styles framework provides a coherent set of geomorphic insights into the past, present and future character, behaviour and condition of rivers throughout a catchment. However, it is recognised explicitly that practical circumstances may not permit fine resolution assessments across an entire catchment. Indeed, a full assessment of evolution, condition and river recovery may be beyond the needs of some projects. In such circumstances, these additional layers of information can be added to the baseline survey of river character and behaviour, as needs change. Applications of the River Styles framework can readily be tailored to meet the needs of various management purposes, but ultimately it is this catchment-wide template that presents a coherent basis for integrative thinking regarding the suite of management objectives.

Application of the River Styles framework is not intended to be a prescriptive exercise. Depending on the nature of the catchment under investigation, differing layers of information are required to analyse River Styles. For example, differing forms of direct human-induced changes to river forms and processes are primary attributes of some river systems, but these considerations are seldom specified in the case study presented here. In all applications of the River Styles framework, however, definition of River Styles must be undertaken in a rigorous and consistent manner across a catchment.