Appendix 9 Rosgen Stream Type Classification

Rosgen Stream Type Classification

The physical processes that define the geomorphic character of streams and rivers are universally observable. The objective of classifying streams on the basis of channel morphology is to set categories of discrete stream types so that consistent, reproducible descriptions and assessments of condition and potential can be developed. The Rosgen classification scheme is a uses a hierarchical assessment of stream channel morphology to:

1. Predict a river's behavior from its appearance;
2. Develop specific hydraulic and sediment relationships for a given stream type and its state;
3. Provide a mechanism to extrapolate site-specific data to stream reaches having similar characteristics; and
4. Provide a consistent frame of reference for communicating stream morphology and condition among a variety of disciplines and interested parties (Rosgen, 1996).

Level I classification
A Level I classification in the Rosgen system describes the geomorphic characteristics that result from integrating basin relief, landform, and valley morphology. The dimension, pattern, and profile of rivers are used to delineate geomorphic types at a coarse scale (Rosgen, 1996). This procedure is typically conducted through the evaluation of topographic maps, aerial photographs, and field verification. A Level I stream classification serves the following four primary functions:

1. It integrates basin characteristics, valley types, and landforms with respect to the morphology of the stream system;

2. It provides a framework for organizing and communicating river information;

3. It provides the information for prioritizing the need for detailed assessments or companion inventories; and

4. It provides information that can be used to correlate similar general level inventories such as fisheries habitat, boating categories, riparian habitat, etc.

The information derived from a Level I evaluation is the least specific, but it provides a rapidly-obtainable starting point from which a detailed evaluation can be drawn. Through a Level I characterization, valley types and landforms are evaluated, and the study stream is then categorized as one of the following nine stream types: Aa+, A, B, C, D, DA, E, F, and G (Figure 2 and Figure 1). The reader is referred to Rosgen (1996) for a comprehensive treatment of all stream and valley types.

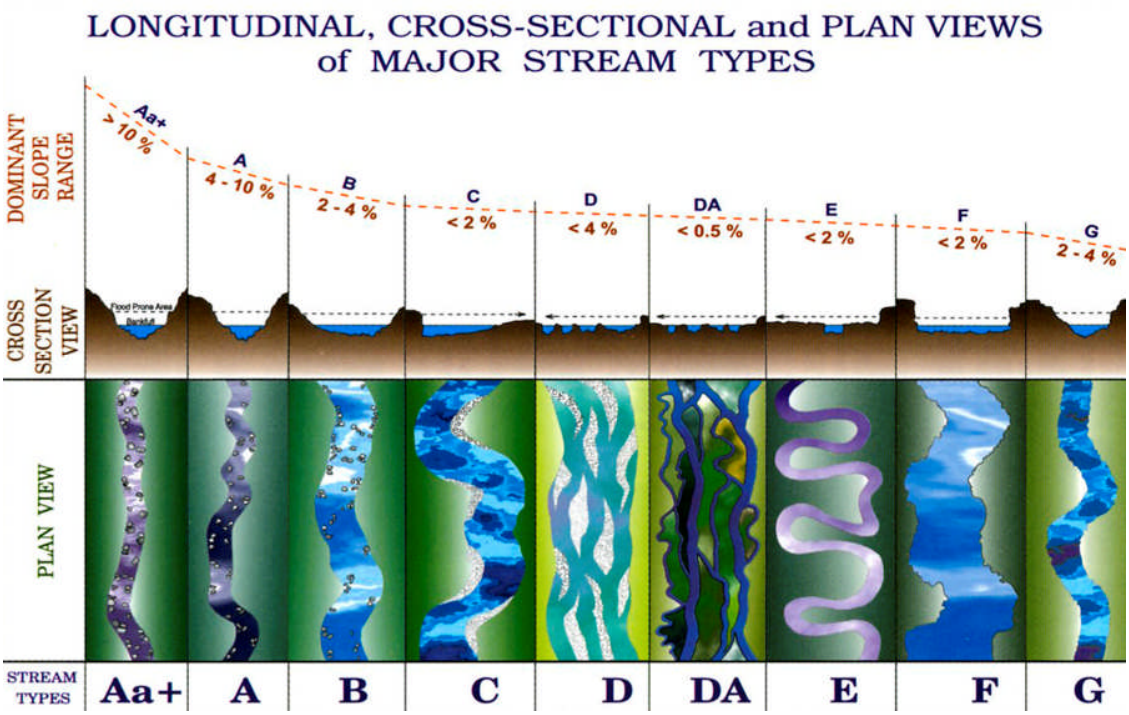

Figure 1. Broad level stream classification delineation showing longitudinal, cross-sectional, and plan views of major stream types (Rosgen and Silvey, 1998).

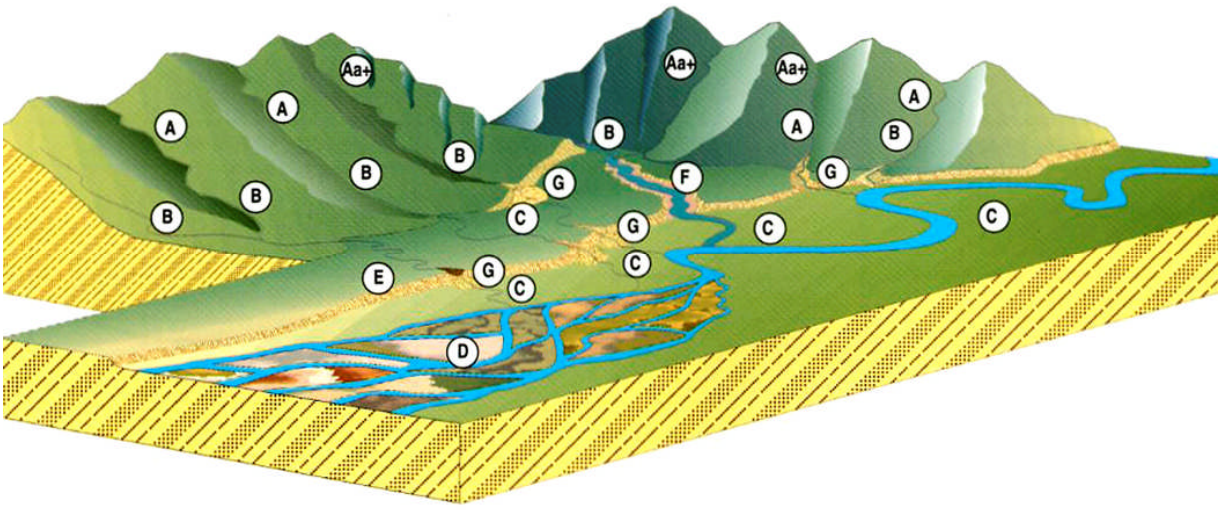

Figure 2. Example of broad level delineation of stream types at Level I (Rosgen and Silvey, 1998)

Level II classification

"River and stream morphology is determined by the interplay of the forces acting to create channel dimensions versus the forces resisting that action. River bed features, dimensions, and

patterns for rivers influenced by structural controls are naturally different from those systems influenced by alluvial patterns of deposition. While Level I stream types are distinguished primarily on the basis of the valley landforms and channel dimensions observable on aerial photos and maps, Level II stream types are determined with field measurements from specific channel reaches and fluvial features within the river's valley" (Rosgen, 1996).

Level II stream type delineation criteria are based on:

Channel cross-section:

- Entrenchment Ratio: A computed index value which is used to describe the degree of vertical containment of a river channel (width of the flood-prone area at an elevation twice the maximum bankfull depth/bankfull width) (See Figure 3).
- Width/Depth Ratio: An index value which indicates the shape of the channel cross-section (ratio of bankfull width/mean bankfull depth)
- Dominant Channel Materials: A selected particle size index value, the D50, representing the most prevalent of one of six channel material types or size categories, as determined from a channel material size distribution analysis.

Longitudinal profile:

- Slope: Slope of the water surface averaged for 20-30 channel widths.
- Bed Features: Secondary delineative criteria describing channel configuration in terms of riffle/pools, rapids, step/pools, cascades and convergence/divergence features which are inferred from channel plan form and gradient.

Plan-form (pattern) features as measured and computed from collected field data:

- Sinuosity: defined as stream length/valley length or valley slope/channel slope.
- Meander width: A secondary delineative criterion defined as meander belt width/bankfull width that describes the degree of lateral channel containment, and is primarily used is assisting aerial photo delineation of stream types (Rosgen, 1996).

The Level II classification is summarized in Figure 3.

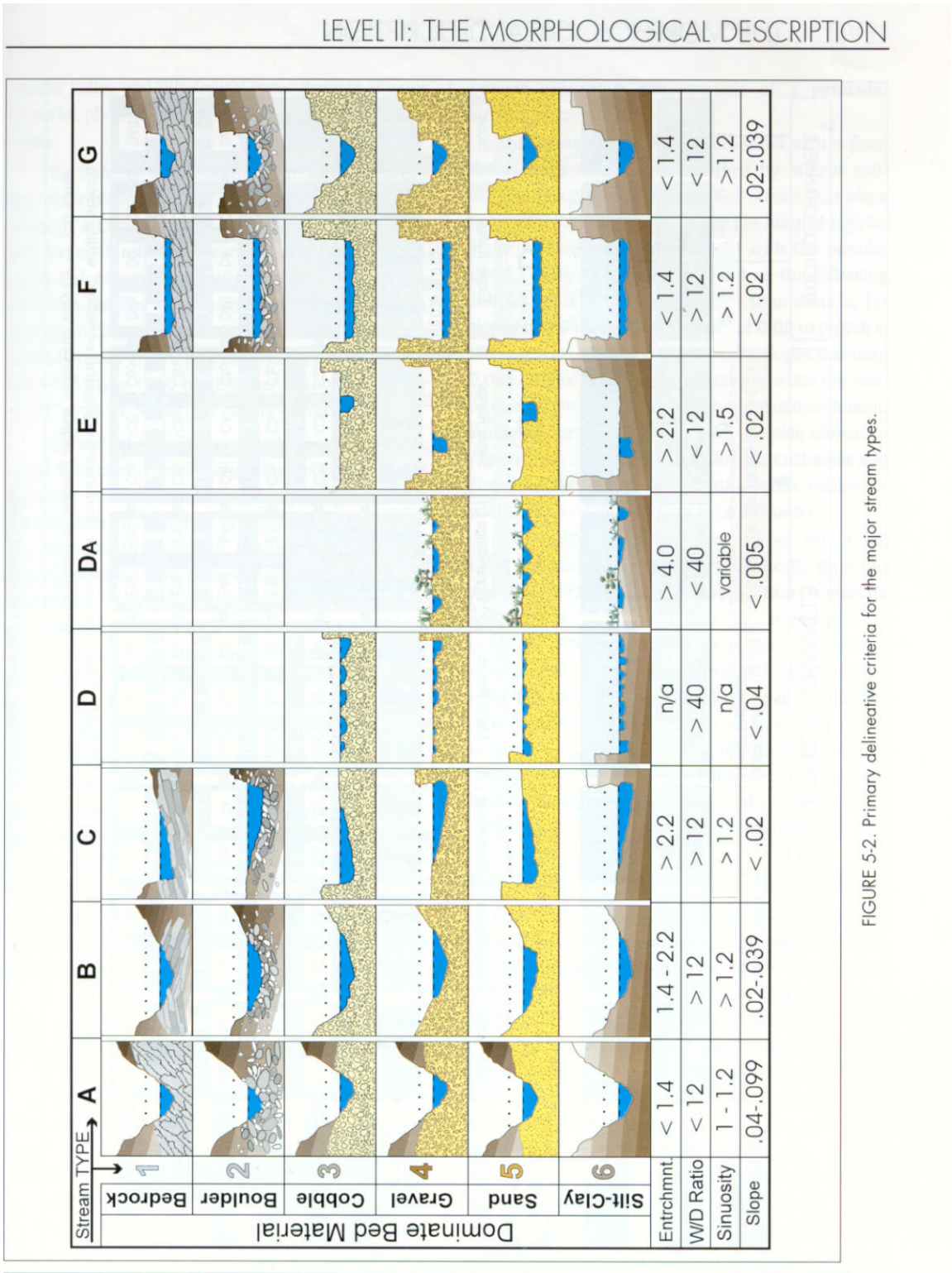

Figure 3. Delineative criteria for the major stream types in Rosgen's stream classification system (Rosgen, 1996).