Valley Type I

A Type I valley is V-shaped, confined, and is often structurally controlled and/or associated with faults. Elevational relief is high, valley floor slopes are greater than 2 percent, and landforms may be steep, glacial scoured lands, and/or highly dissected fluvial slopes. Valley materials vary from bedrock to residual soils occurring as colluvium, landslide debris, glacial tills, and other similar depositional materials. Stream types commonly observed in Valley Type I include types “A” and “G,” which are typically step/pool channels with steeper channel slopes exhibiting cascade bed features. Stream channel erosional processes vary from very low and stable to highly erodible, producing debris torrents or avalanches. Often the “A” stream types in certain hydro-physiographic provinces are the starting or conveyance zones for snow avalanches. Examples of Valley Type I are shown in Figure A-3 and illustrated in Figure A-4.
Valley Type II

Valley Type II exhibits moderate relief, relatively stable, moderate side slope gradients, and valley floor slopes that are often less than 4 percent with soils developed from parent material (residual soils), alluvium, and colluvium. Cryoplanated uplands dominated by colluvial slopes are typical of the land-types that generally comprise Valley Type II in the northern Rocky Mountains. The stream type most commonly found in Valley Type II are the “B” types, which are generally stable stream types, with a low sediment supply and bed features normally described as “rapids.” Less common are “G” stream types that are observed generally under disequilibrium conditions. Examples of Valley Type II are shown in Figure A-5 and the illustration in Figure A-6.

Figure A-5. Valley Type II, moderately steep, gentle sloping side slopes often in colluvial valleys (B stream types) (Rosgen, 1996).

Figure A-6. Valley Type II, moderately steep, gentle sloping side slopes often in colluvial valleys (Rosgen, 1996).
Valley Type III

Valley Type III is primarily depositional in nature with characteristic debris-colluvial or alluvial fan landforms, and valley-floor slopes that are moderately steep or greater than 2 percent. Stream types normally occurring in Valley type III are the “A,” “B,” “G,” and “D” types. The “B” stream type, which is less common on alluvial or colluvial fans, occurs primarily on “non-building” stable fans and where riparian vegetation is well established along the drainage-way. The “G” stream type prevails where there is little established riparian vegetation in the presence of high bedload transport on actively “building” fans, similar to the multiple distributary channels of the “D” stream type. Examples of Valley Type III are shown in Figure A-7 and the illustration in Figure A-8.

Figure A-7. Valley Type III, alluvial fans and debris cones (A, G, D and B stream types (Rosgen, 1996).  

Figure A-8. Valley Type III, alluvial fans and debris cones (Rosgen, 1996).
Valley Type IV

Valley Type IV consists of the classic meandering, entrenched or deeply incised, and confined landforms directly observed as canyons and gorges with gentle elevation relief and valley-floor gradients often less than 2 percent. Valley Type IV is generally structurally controlled and incised in highly weathered materials. These stream types are also often associated with tectonically “uplifted” valleys. The “F” stream type is most often found in Valley Type IV; however, where the width of the valley floor accommodates both the channel and a floodplain, C channels are often observed. Depending on streamside materials, the sediment supply is generally moderate to high. Examples of Valley Type IV are shown in Figure A-9 and the illustration in Figure A-10.

Figure A-9. Valley Type IV, gentle gradient canyons, gorges and confined alluvial valleys (F or C stream types) (Rosgen, 1996).

Figure A-10. Valley Type IV, gentle gradient canyons, gorges and confined alluvial valleys (Rosgen, 1996).
Valley Type V

Valley Type V is the product of a glacial scouring process where the resultant trough is now a wide, “u-shaped” valley, with valley-floor slopes generally less than 4 percent. Soils are derived from materials deposited as moraines or more recent alluvium from the Holocene period to the present. Landforms locally include lateral and terminal moraines, alluvial terraces, and floodplains. Deep, coarse deposition of glacial till is common, as are glacio-fluvial deposits, with the finer size mixture of glacio-lacustrine deposition above structurally controlled reaches. The stream types most often seen in Valley Type V are “C,” “D,” and “G.” Examples of Valley Type V are shown in Figure A-11 and the illustration in Figure A-12.

Figure A-11. Valley Type V, moderately steep valley slopes, “U” shaped glacial trough valleys (D and C stream types) (Rosgen, 1996).

Figure A-12. Valley Type V, moderately steep valley slopes, “U” shaped glacial trough valleys (Rosgen, 1996).
Valley Type VI

Valley Type VI, termed a fault-line valley, is structurally controlled and dominated by bedrock and/or colluvial slope building processes. The valley-floor gradients are moderate, often less than 4 percent, but can be steep. Some alluvium occurs amidst the extensive colluvial deposits and stream patterns are controlled by the confined, laterally controlled valley. Sediment supply is low. Stream types are predominantly “B” types with fewer occasions of “C” and “F” types in the wider and flatter valley reaches. Under steeper gradients, “A” and “G” stream types are observed. Examples of Valley Type VI are shown in Figure A-13 and the illustration in Figure A-14.

Figure A-13. Valley Type VI, moderately steep, fault controlled valleys (B, G and C stream types) (Rosgen, 1996).

Figure A-14. Valley Type VI, moderately steep, fault controlled valleys (Rosgen, 1996).
Valley Type VII

Valley Type VII consists of a steep to moderately steep landform, with highly dissected fluvial slopes, high drainage density, and a very high sediment supply. Streams are characteristically deeply incised in either colluvium and alluvium or in residual soils. The residual soils are often derived from sedimentary rocks such as marine shale. Depositional soils associated with these highly dissected slopes can often be eolian deposits of sand and/or marine sediments. This valley type can be observed over a variety of locations, from the provinces of the Palouse Prairie of Idaho, the Great Basin or high deserts of Nevada and Wyoming, the Sand Hills of Nebraska, to the Badlands of the Dakotas. The majority of stream types found in Valley Type VII are the “A” and “G” types, which are channels that have moderate to steep gradients, are entrenched (deeply incised), confined, and unstable due to the active lateral and vertical accretion processes. Examples of Valley Type VII are shown in Figure A-15 and the illustration in Figure A-16.
Valley Type VIII

Valley type VIII is most readily identified by the presence of multiple river terraces positioned laterally along broad valleys with gentle, down-valley elevation relief. Alluvial terraces and floodplains are the predominant depositional landforms, which produce a high sediment supply. Glacial terraces can also occur in these valleys but stand much higher above the present river than the alluvial (Holocene) terraces. Soils are developed predominantly over alluvium originating from combined riverine and lacustrine depositional processes. Stream types “C” or “E,” which have slightly entrenched, meandering channels that develop a riffle/pool bed-form, are normally seen in the Type VIII valley. However, “D,” “E,” and “G” stream types can also be found, depending on local stream and riparian conditions. Examples of Valley Type VIII are shown in Figure A-17 and the illustration in Figure A-18.

Figure A-17. Valley Type VIII, wide, gentle valley slope with a well developed floodplain adjacent to river terraces (Rosgen, 1996).

Figure A-18. Valley Type VIII, wide, gentle valley slope with a well developed floodplain adjacent to river terraces (Rosgen, 1996).
Valley Type IX

Valley Type IX is observed as glacial outwash plains and/or dunes, where soils are derived from glacial, alluvial, and/or eolian deposits. Due to the depositional nature of the developed landforms, sediment supply is high, and the commonly occurring “C” and “D” stream types are associated with high rates of lateral migration. Examples of Valley Type IX are shown in Figure A-19 and the illustration in Figure A-20.

Figure A-19. Valley Type IX, broad, moderate to gentle slopes, associated with glacial outwash and/or eolian sand dunes (predominately D and some C stream types) (Rosgen, 1996).

Figure A-20. Valley Type IX, broad, moderate to gentle slopes, associated with glacial outwash and/or eolian sand dunes (Rosgen, 1996).
Valley Type X

Valley Type X is very wide with very gentle elevation relief and is mostly constructed with alluvial materials originating from both riverine and lacustrine deposition processes. Soils are primarily alluvium, and while less common, may also be derived from eolian deposition. Landforms commonly observed as Valley Type X are coastal plains, broad lacustrine and/or alluvial flats, which may exhibit peat bogs and expansive wetlands. Stream types “C,” “E,” and “DA” are the most commonly observed, although in many instances, where streams have been “channelized” or the local base level has been changed, “G” and “F” stream types are found. Examples of Valley Type X are shown in Figure A-21 and the illustration in Figure A-22.

Figure A-21. Valley Type X, very broad and gentle slopes, associated with extensive floodplains - Great Plains, semi-desert and desert provinces; coastal plains and tundra (Rosgen, 1996).

Figure A-22. Valley Type X, very broad and gentle slopes, associated with extensive floodplains - Great Plains, semi-desert and desert provinces; coastal plains and tundra (Rosgen, 1996).
Valley Type XI

Valley type XI is a unique series of landforms consisting of large river deltas and tidal flats constructed of fine alluvial materials originating from riverine and estuarine depositional processes. The Type XI valleys or delta areas are often seen as freshwater and saltwater marshes, natural levees, and crevasse splays. There are four morphologically distinct delta areas, initially described by Fisher et al. (1969), which produce different stream types or patterns and include: the elongated, high-constructive delta (Figure A-23); the lobate, high constructive delta (Figure A-24); the wave-dominated, high destructive delta (Figure A-25); and the tide-dominated, high-constructive delta (Figure A-26). An additional delta landform is presented here, representative of extensive wetlands, peat, and cohesive sediments with multiple, stable channels typical of the “DA” (anastomosed) stream type (Figure A-27).

The corresponding stream types found in delta areas are primarily the distributary channels of stream type “DA,” or the multiple channel systems of the “D” stream type, along with occasional “C” and “E” stream types. The “DA” stream type is more common to the delta landforms shown in Figure A-27, which are the tide-dominated, stable deltas with numerous wetland islands, and the base level of the channel system controlled by either lake or sea levels.

Figure A-23. Valley Type XI, Deltas - elongated, highly constructive delta with a distributary channel system (adapted from Fisher et al., 1969; Rosgen, 1996).
Figure A-24. Valley Type XI, Deltas - highly constructive deltas with a lobate configuration and distributary channel system (adapted from Fisher et al., 1969; Rosgen, 1996).

Figure A-25. Valley Type XI, Deltas - highly destructive, wave-dominated delta (adapted from Fisher et al., 1969; Rosgen, 1996).
Figure A-26. Valley Type XI, Deltas - highly destructive, tide-dominated delta (adapted from Fisher et al., 1969; Rosgen, 1996).

Figure A-27. Valley Type XI, Deltas - anastomosed river delta pattern with supporting stable wetlands and channels (adapted from Fisher et al., 1969; Rosgen, 1996).