

## **Stable Channel Design Tool Using the Capacity/Supply Ratio (CSR)**

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**Abstract.** As the need for river restoration becomes more apparent and desired, better methods and tools for restoration design need to be developed to increase the occurrence of successful and sustainable projects. Many methods and tools have been developed for channel design, though most rely upon a single representative discharge which may lead to the over simplification of design in some cases. It is beneficial for designers to know when a simplified design may not be viable and to have the required resources to produce alternative designs. The Capacity/Supply Ratio (CSR) provides a process-based design methodology that balances the sediment transport capacity of the design reach of interest to the sediment supply of a stable upstream reach over the entire flow duration curve (FDC). We present a tool that was developed using the VBA programming language in Excel and produces stable channel slope/width combinations based on the CSR methodology for both sand and gravel bed streams. The CSR Stable Channel Design Tool's (CSR Tool) code structure was based on Copeland's method in HEC-RAS and was tested with a single discharge to match outputs. Preliminary analyses comparing Copeland's method to the CSR Tool indicate that there may be notable differences in designs between the two methods. These examples specifically suggest that the CSR method is most needed when designing labile channels and channels with flashy and dynamic flow regimes. The CSR Tool provides a resource for river restoration practitioners to utilize process-based design techniques that can promote more reliable and sustainable designs for dynamic systems with uncertain climatic futures.