

**PRACTITIONERS AT RISK:  
MANAGING RISK AND UNCERTAINTY AT STREAM RESTORATION<sup>AFS</sup>**

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Stream restoration projects, especially those that involve natural channel design, have an inherent element of risk and uncertainty. Risk involves identifying the possible outcomes associated with different alternatives. Uncertainty involves a situation where probabilities cannot be assigned to outcomes. Since most stream restoration failures are related to the effects of flooding, the probability of risk can often be quantified using hydrologic analysis—if the threshold of failure is also quantified. With increased attention to geomorphic process, and the availability of readily applied hydraulic and sediment modeling tools, the mechanisms of failure can be quantified. Designers can use various techniques or measures to satisfy component-specific design criteria. Hydrologic probability, either unbounded by time or within a given time-window, can then be assigned to quantify the risks of project failure. Additionally, it is also appropriate to recognize the inherent uncertainty in restoration design.

Examples of uncertainty are the lack of sufficient, accurate or representative data, or where an equation or model is used at its boundary of applicability. Restoration practitioners should be encouraged to openly discuss and record the risk and uncertainty in their work, but should be careful of speaking in terms that denote certainty when such certainty does not exist. Using good science, practitioners should strive to describe and manage risk at a level acceptable to project stakeholders. Discussion of risk and uncertainty, use of design criteria, and adequate documentation of design will all contribute to further maturation of the profession.