Recovery Potential Metrics
Summary Form

Indicator Name: CERTAINTY OF RESTORATION TECHNIQUES

Type: Social Context

Rationale/Relevance to Recovery Potential: The development of restoration techniques and the knowledge of their range of applicability are still incomplete. Waters whose restoration can be accomplished by known, tested techniques are stronger prospects for recovery potential than those facing uncertainty about technique applicability or effectiveness. As track records are still being developed for many techniques, and settings vary so widely, uncertainty about techniques is still common. Extensive familiarity with techniques and their applicability is needed for applying this metric.

How Measured: Possible to have experts estimate the availability of applicable restoration techniques using something like the following scoring:

0 – no restoration technique applicable
1 – technique applicability uncertain
2 – known technique moderately applicable and feasible
3 – known technique highly applicable and feasible

Data Source: Unlikely to be map-based information, but rather reliant on expert judgment of whether routine techniques for addressing specific impairments and settings are available. May be adapted to a geographic basis by first identifying waterbody type, size (e.g. Strahler order), and pollutant types from the 303(d) datasets, then having experts estimate the availability of applicable restoration techniques using the scoring described above. Various stream restoration techniques, searchable by region, are available through the National River Restoration Science Synthesis Database (See: http://nrrss.nbii.gov/). USDA may have resources about applicability of restoration practices in agricultural settings.

Indicator Status (check one or more)

___x__ Developmental concept.
_____ Plausible relationship to recovery.
_____ Single documentation in literature or practice.
___x__ Multiple documentation in literature or practice.
_____ Quantification.

Comments: pilot. Applicability could be widespread but potentially data-limited in knowledge of restoration techniques performance and applicability limits.

Supporting Literature (abbrev. citations and points made):

- (Bernhardt and Palmer 2007) The restoration options for urban streams are highly constrained by available land, urban infrastructure, political pressures, and a lack of technical knowledge about how to apply standard restoration techniques in urban settings (Nilsson et al., 2003; Niezgoda & Johnson, 2005) (746).
- (Russell et al., 1997) The socio-political factors that contribute to restoration decisions were not taken into account. Such factors as engineering capability, cost, land ownership, and legal mandates admittedly play a major role in determining if, when, where, and how a restoration project comes into being. Though beyond the scope of this project, these factors could, to some degree, be considered within a GIS environment (66).

- (Roni et al., 2002) In the cases where instream restoration techniques are implemented, they should occur in reaches with gradients less than 5%. Placing wood or other structures in steeper channels is less likely to have the desired physical or biological benefits. The most effective structures for enhancing salmonid spawning areas in lower-gradient streams (<3%) appear to be “V” weirs or diagonal weirs
- (Roni et al., 2002) Large woody debris or boulder placement has become one of the most common techniques to improve fish habitat and compensate for the simplification (loss of habitat complexity) of stream habitat caused by decades of land-use practices. Reported failure rates for various types of wood and boulder structures are highly variable, ranging from 0% to 76%. The available evidence suggests that most instream structures persist for less than 20 years, though little long-term monitoring has occurred.
- (Roni et al., 2002) Restoring fish passage is an effective way to increase the availability of habitat and can result in relatively large increases in potential fish production for a nominal cost. Barrier removal projects accounted for 52% of steelhead and 72% of chinook salmon parr produced from four projects between 1986 and 1988.
- (Van Zyll De Jong et al., 1997) For studies on a Newfoundland stream, boulder clusters were successful at creating habitat diversity as evident in the increase in density of Atlantic salmon post-treatment. The boulder clusters increased the variability in depth, substrate, cover, and current velocity in extremely uniform, channelized reaches.