Recovery Potential Metrics
Summary Form

Indicator Name: FINE SEDIMENT TRANSPORT CAPACITY

Type: Ecological Capacity

Rationale/Relevance to Recovery Potential: Moderate- to high-gradient streams and rivers are normally coarse-bedded and have aquatic communities adapted to coarse sediments. Fine sediment inputs commonly impair those communities. A system's capacity to move fine sediment and reestablish dynamic equilibrium affects how quickly it can recover from excess fine sediment loading.

How Measured: Channel gradient can be field-measured very accurately at selected points. Topographic information or elevation datasets are less accurate but allow for coarse estimates of gradient anywhere. Sinuosity is better measured from high-resolution NHD or similar source than medium-resolution NHD.

Data Source: Elevational datasets.

Indicator Status (check one or more)
___x__ Developmental concept.
___x__ Plausible relationship to recovery.
______ Single documentation in literature or practice.
___x__ Multiple documentation in literature or practice.
______ Quantification.

Supporting Literature (abbrev. citations and points made):

- (Nelson and Booth 2002) Fine and coarse sediment transported by surface water can result in different types of problems. Fine sediment generally causes water-quality problems, both in-channel and to receiving water bodies. In addition to turbidity concerns, other non-point source pollutants such as nutrients and heavy metals can form complexes with the clay minerals in fine sediment, contributing to lake eutrophication and toxicity to aquatic organisms that live in or feed on bottom sediments (Novotny and Olem, 1994). Fine sediment also can occupy pore spaces in salmon spawning gravel, limiting permeability and reducing oxygen delivery to fish eggs deposited in the gravel (Bjornn and Reiser, 1991). In contrast, increased coarse sediment supply does not raise chemical concerns but can cause channel aggradation, resulting in reduced flow capacity that can lead to flooding or navigational problems and channel instability (51).

- (Nelson and Booth 2002) Fine sediment is generally transported through the system out to Lake Sammamish, where it potentially contributes to long-standing eutrophication problems because of associated phosphorus. Coarse sediment accumulation has been implicated in reduced channel capacity and consequent flooding (66).

- (Voelz et al., 2005) Lower levels of sedimentation have little effect on benthic macroinvertebrates (e.g., Rabeni and Minshall, 1977), but in general a reduction in diversity occurs in response to increased levels of deposited sediments (e.g., Gammon, 1970; Brusven and Prather, 1974; Ogbeibu andVictor, 1989; Zuellig *et al.*, 2002). Richards *et al.* (1997) found that clinger and scraper taxa declined with increased sedimentation. In a study that experimentally manipulated benthic fine sediment levels, Angradi (1999) observed reductions in EPT taxa richness and an increase in the proportion of Ephemeroptera that were Baetidae when sediment levels were increased. Gammon (1970) found large reductions in densities and some loss of taxa due to suspended sediments, whereas Gray and Ward (1982) observed differential responses to sediment input, but little loss of taxa (197).

- (Paul and Meyer 2001) Sediment texture is also important, and metal concentration in sediments was inversely correlated to sediment particle size in several urban New Jersey streams (Wilber & Hunter 1979). In addition, geomorphic features have been shown to influence metal accumulations. Higher sediment metal concentrations were found in areas of low velocity (stagnant zones, bars, etc.) where fine sediments and organic particles accumulate, whereas areas of intermediate velocities promoted the accumulation of sand-sized metal particles, which can also be common in urban streams (Rhoads & Cahill 1999) (344).