Recovery Potential Metrics
Summary Form

Indicator Name: SEVERITY OF LOADING

Type: Stressor Exposure

Rationale/Relevance to Recovery Potential: For impaired waters where needed load reductions have been calculated, the magnitude of necessary reductions compared with current loadings has been shown to relate to likelihood of successful restoration, although this metric is not necessarily a determinant of irreversible degradation. Case studies of restoration successes showed multiple cases where if needed load reductions were less than 50% of current levels, more restoration successes were achieved. The 50% figure is likely not a consistent threshold value and data of this sort are limited, thus the metric is best used to array a set of waters into quantiles based on expert judgment about % loading reduction.

How Measured: If a TMDL is the source of the loading information, compare the current loading estimates with the TMDL target loading calculation. The measure can address the percent reduction needed.

Data Source: The National TMDL Tracking System (See: http://www.epa.gov/waters/tmdl/) and the Assessment TMDL Tracking and Implementation System (ATTAINS) (See: http://www.epa.gov/waters/ir/) contains information on 303d-listed waters by state and by semi-annual reporting cycle. Loading estimates generally need to come from completed TMDLs or watershed models. Most completed TMDLs are available online via state or EPA websites.

Indicator Status (check one or more)

_____ 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):

- (Benham et al 2007) Of the 13 TMDLs that quantified needed pollutant load reductions, most (10) called for moderate reductions in the 25-50% range; four called for reductions in the 0-24% range; three called for reductions in the 51-75% range; and five called for reductions in the 76-100% range. The magnitude of the pollutant reduction gives some idea as to the practicability of achieving the TMDL; larger percent reductions are generally more difficult to achieve.
- (Palik et al., 2000). Highly disturbed sites require greater effort to restore than minimally disturbed sites (following the idea of thresholds of irreversibility; Aronson et al. 1993).
- (Palik et al., 2000) RPI integrates information on ecosystem conservation status (historical vs. current rarity), with effort to restore a selected polygon to a reference condition. Our assumption for the latter is that cost to restore a disturbed site to the reference condition increases as degree of dissimilarity to the reference ecosystem increases (194).
- The lack of clear downstream nutrient increases suggests that current water quality impairment in the lower river and estuary may result from chronic nutrient overload rather than recent changes in the watershed. If this is true, then the impact of a planned 30% nitrogen loading reduction may not be immediately apparent. We calculate that, given annual variability, detecting a load reduction of this magnitude will take at least four years, and, should nutrients accumulated in the watershed become a significant source,

detecting the resulting ecological improvements is likely to take substantially longer. (Long-term changes in watershed nutrient inputs and riverine exports in the Neuse River, North Carolina (Taken from abstract for Long-term Changes in Watershed Nutrient inputs and riverine exports in the Neuse River, North Carolina. Craig A. Stow, Mark E. Borsuk and Donald W. Stanley, Water Research, Volume 35, Issue 6, April 2001.)