Recovery Potential Metrics
Summary Form

Indicator Name: WATERSHED PERCENT LEGACY URBAN

Type: Stressor Exposure

Rationale/Relevance to Recovery Potential: The age of an urbanized area or specifics of its history may have implications for its legacy pollutants in groundwater that can affect recovery. Built-up urban and industrial pollutants in groundwater can continue to be discharged through influent groundwater connections for decades.

How Measured: % urban land cover categories from a historic source.

Data Source: Although geospatial data on past urban land is date-limited, one national digital source (LUDA/GIRAS) characterized urban usage in the 1970s at coarse resolution (10 acre mapping unit). Locally older data may be available in isolated areas, or where historical aerial analyses back to the 1930s may have been conducted using airphotos. Measurable with suitable data as percent by area within watershed or corridor. Historical land cover data is available through the USGS Land Cover Institute (See: http://landcover.usgs.gov/cropland/index.php). NLCD land cover data is available as far back as 1992 (http://landcover.usgs.gov/natllandcover.php). MRLC provides calculated data on the change for all of the NLCD land use classes between 2001 and 2006 (http://www.mrlc.gov/nlcd06_data.php). The Historical Topographic Map Collection includes published U.S. maps of all scales and editions, and are offered as a georeferenced digital download or as a scanned print from the USGS Store (see http://nationalmap.gov/historical/).

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.

Comments:

Examples from Supporting Literature (abbrev. citations and points made):

- (Potter et al 2004) Current land cover, however, may not be as important as past land use in predicting current stream invertebrate diversity, because sustained anthropogenic disturbance such as agriculture or urban development could profoundly alter biotic communities with lasting effects (Harding and others 1998).
- (Paul and Meyer 2001) PCBs are still frequently detected in urban areas of the United States, even though their use in manufacturing was outlawed because of their carcinogenic effects. These compounds are very stable and are still found in fish at concentrations exceeding consumption-level guidelines in urban rivers such as the Chattahoochee River below Atlanta, Georgia (Frick et al. 1998). PCB concentrations were highly correlated with urban land use in the Willamette Basin in Oregon as well (Black et al. 2000) (345).
- (Roy et al., 2007) Results from this study and other studies suggest that human alteration affects stream processes at multiple spatial extents. In addition to % land cover within catchments and riparian areas, the continuity of riparian forests (Stewart et al. 2001) and

historic land use in the catchment (Harding et al. 1998) likely also influence fish assemblages (398-399).

- (Freeman and Marcinek 2006) Present and past land use, geomorphology and instream habitat structure, pollutants, species interactions, and stochastic variation may all influence the composition of local fish assemblages (445).
- (Gergel et al., 2002) Quantification of historical land cover can also contribute to useful landscape indicators. Harding et al. (1998) examined fish and invertebrates in 24 catchments in western North Carolina and found that percent forest in the catchment determined from 1950's aerial photographs explained current fish and invertebrate diversity better than land cover from the 1990's. Harding et al. (1998) suggest that in currently forested catchments, historic land use may be a more useful indicator than present land cover (122).
- (Roy et al., 2007) Results from this study and other studies suggest that human alteration affects stream processes at multiple spatial extents. In addition to % land cover within catchments and riparian areas, the continuity of riparian forests (Stewart et al. 2001) and historic land use in the catchment (Harding et al. 1998) likely also influence fish assemblages (398-399).
- (Gage et al., 2004) Changing land use patterns, including increases in impervious surfaces and construction near riparian zones, affect deposition of sediment, flow patterns (Oberlin et al. 1999), and stream communities (Décamps 1993, Thornton et al. 2000). Land use practices can strongly impact aquatic diversity well into the future; e.g., Harding et al. (1998) found that land use in the 1950s was the best predictor of present day diversity in streams (345).
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