

Home on the Big River, Part II: Great River habitat quality indices

The U.S. EPA's EMAP sampled the Upper Mississippi, Missouri and Ohio Rivers from 2004 through 2006 as part of an integrated assessment of ecological condition. These Great Rivers are important human recreational destinations and transportation corridors, and represent significant wildlife habitat. Riparian and instream habitat indicators are needed to assess these waterbodies and diagnose causes of degradation. We developed fish habitat indices by dividing the components of habitat into four categories: Channel complexity, substrate, littoral structures, and human impacts on the river and riparian zones. Fish assemblages were characterized by Non-metric Multidimensional Scaling (NMDS), with the first dimension explaining 63 percent of the variation in both the impounded Mississippi and on the Lower Missouri and unimpounded Mississippi fish communities. More diverse and intolerant fish assemblages on the impounded Mississippi River were best explained by channel complexity, particularly the existence of multiple channels and backwaters and the absence of human-constructed channel constraint. On the Lower Missouri and unimpounded Mississippi Rivers, a more intolerant fish community was associated with less constructed channel constraint, including levees and revetment, more large woody debris, a more diverse range of substrate particle sizes, and less agricultural impacts in the adjacent riparian lands.