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**NHDPlus-BASED DECISION SUPPORT SYSTEMS APPLYING SPARROW AND OTHER TOOLS TO
ENCOURAGE WATERSHED-BASED WATER QUALITY MANAGEMENT**

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ABSTRACT: RTI has applied the EPA Reach Files (RF1, RF2, and RF3), the National Hydrography Dataset (NHD), and the enhanced NHD (the NHDPlus) in building flexible upstream/downstream frameworks for use as water quality decision support tools. These watershed-oriented frameworks are typically defined as the networked hydrology upstream of a selected point of interest, but considerations can also be given to administrative boundaries (e.g., state lines, tribal reservations, military bases). Additionally, important natural hydrological gradients (e.g., the western snowpack zone) can also be defined and modeled in their entirety. RTI has added models to these watershed frameworks to create web-based decision support tools. RTI has worked with several types of models, ranging from empirical to process-based models. As shown in the presentation, RTI has combined several calibrated versions of SPARROW (SPAtially Referenced Regressions on Watershed Attributes), a powerful empirical model, with the upstream/downstream NHDPlus capabilities in real-time, web-based applications. The applied versions of SPARROW range in level of granularity from the 8-digit hydrologic unit (HUC8) original national SPARROW, to the smaller WBD (Watershed Boundary Dataset) units (e.g., HUC12 subwatersheds), to the flowline catchments in the NHDPlus. RTI support for EPA's National Ambient Air Quality Standards also provided an opportunity to develop a web-based version of the existing Version 3 Chesapeake Bay SPARROW for the Potomac River basin and a new calibrated version of SPARROW targeted at the Neuse River Watershed within North Carolina using data from the U.S. Geological Survey's South Atlantic-Gulf Region-Tennessee River Basin (SAGT) SPARROW application (both on an enhanced RF1 network). EPA has stressed a watershed perspective for water quality planning and management since 1991, and recent EPA guidance re-emphasizes the importance of a flexible application of watershed-based frameworks for the TMDL program and in pursuing nutrient management approaches. Using several of the applications described above, examples are provided on the potential of SPARROW and related tools (e.g., Bayesian techniques) combined with RTI geospatial systems to organize smaller impaired water listings into larger drainage areas that become efficient frameworks for pursuing watershed management and implementation plans for ecologically significant landscape units.

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