Watershed influences on nearshore waters across the entire US Great Lakes coastal region

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We have combined three elements of observation to enable a comprehensive characterization of the Great Lakes nearshore that links nearshore conditions with their adjacent coastal watersheds.   The three elements are: 1) a shore-parallel, high-resolution survey of the nearshore using continuous sampling via towed in situ sensors for water quality and plankton; 2) a spatially-balanced, random probability survey of stations across the nearshore with measurements of water quality, plankton, and benthos/sediments; and 3) characterization of all contributing coastal watersheds using metrics developed in a Great Lakes Environmental Indicators (GLEI) project.   We recently completed ~6000 km of high-resolution nearshore tows (virtually all the US coastline of the Great Lakes region, conducted from 2004 to 2010).We piloted a random probability survey in the Lake Erie nearshore during 2009; subsequently, via the National Coastal Condition Assessment, the US nearshore of all five lakes has been sampled (~400 stations in 2010).   All sampling sites (continuous towing and station points) have been geospatially associated with GLEI landscape metrics developed from an extensive GIS base for the US basin. Using these data, we have developed powerful empirical models that link nearshore variability with variability in landscape-level disturbance metrics along the entire US coast.   This presentation uses the information to demonstrate spatial scales at which we can observe how watersheds drive nearshore conditions.   Moreover, spatial patterns suggest dominance by non-point landscape sources where landscape loadings are very high and are now contributing to undesired nearshore conditions.   *This abstract does not necessarily reflect U.S. EPA policy.*