

## USES OF TURBIDITY BY STATE AGENCIES

By Bruce Pruitt, Senior Scientist, Nutter & Associates, Inc., Athens, Georgia

1173 South Milledge Ave., Athens, Georgia 30677

(706) 354-7925, fax (706) 354-7928

[bpruitt@nutterinc.com](mailto:bpruitt@nutterinc.com)

### ABSTRACT

**Objective** A questionnaire on uses of turbidity was submitted to state water quality coordinators. The objective of the questionnaire was to determine how turbidity was being used in addressing water quality issues including water quality criteria, what water bodies were being measured using turbidity including ranges observed, what technology was being used to measure turbidity, how turbidity was being calibrated, and how turbidity measurements could be improved in the future. The query also included questions pertaining to TSS, SSC, bedload, and particle size analysis.

**Results** Thirty-two of the fifty states responded to the questionnaire. The majority of the states that responded either used Oracle, STORET, or a “local” database or spreadsheet for data storage and analysis. The primary objective of the majority of the states was the establishment of a water quality criterion for turbidity that was protective of aquatic life. The majority of the states are using EPA method 180.1 for turbidity and method 160.2 for TSS. Turbidity measurements between states range from 0.4 to 2552 NTU. Numeric standards ranged from 5 NTU above ambient conditions to 50 NTU instantaneous measurements. Some states have established numeric standards that are basin-specific, while others vary with water bodies or presence of Salmonids. In general, most states were concerned with the effects of water clarity and light scattering on aquatic biota. Most states are presently using optical backscatter or optical transmission technology either by measuring *in situ* or on an environmental sample collected by grab or single-point, automatic sampler. The majority of the states are using formazin as a standard. Only three of the states that responded are using integrated sampling methods. Only three states are attempting to correlate turbidity with TSS or biological impairment. Only three of the states are presently using or planning to use SSC. The rest are using TSS. Four states are measuring particle size distribution using a wet sieve method. No states are presently measuring bedload. Most states recognize interferences (e.g., algal blooms), however, no states are attempting to adjust turbidity measurements accordingly.

**Future Needs** Most states agreed that more effort should be devoted toward improving the relationship between turbidity, TSS, SSC, channel stability, and biological impairment. In addition, many states expressed a need for establishing reference fluvial sediment conditions and means of measuring significant departure from reference conditions. Improvements need to be made in depth integrated isokinetic samplers. Many states were in favor of a consistent procedure and less expensive probes that can be rapidly deployed and are stable in the field. Several states expressed the need for additional long-term, stream discharge, suspended and bedload data. Instrumentation used for *in situ* measurements needs to be specially equipped for high bridge deployment with stabilization fins.