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**A. Annotated References on Monitoring**

In addition to the monitoring references listed above, many documents contain information useful in designing a monitoring program for CSO controls. This section briefly highlights information from these documents, as well as from some of the documents listed above.

- The Water Environment Federation's *Combined Sewer Overflow Pollution Abatement Manual of Practice* No. FD-17 (WPCF, 1989) includes discussions on establishing planning objectives for characterizing receiving waters, their aquatic life, and meteorologic conditions; identifying critical events; evaluating system load characteristics; selecting analytic methods; mapping the system; developing the sampling plan; selecting field sampling procedures; monitoring CSS and environmental flow; and modeling.
- *Design of Water-Quality Monitoring Systems* (Ward et al., 1990) includes insightful discussions on the design of monitoring plans, the essential role of statistics, frameworks for designing water-quality information systems, quantification of information, data analysis, and the documentation of monitoring plans. This reference also includes four case studies of large-scale and long-term monitoring programs.
- *NPDES Storm Water Sampling Guidance Document*, EPA 833-B-92-001, (EPA, 1992) details EPA's requirements for monitoring storm water discharges. When such monitoring is required as a condition of a CSS's NPDES permit, monitoring efforts for CSO control should be coordinated with this required monitoring effort in order to maximize data collection efficiencies and minimize monitoring costs.
- *A Statistical Method for Assessment of Urban Stormwater Loads, Impacts, and Controls*, EPA 440/3-79-023, (Driscoll et al., 1979) discusses approaches for defining the purpose of monitoring programs; monitoring rainfall; using rainfall data to project and evaluate impacts; selecting monitoring sites; characterizing drainage basins; determining study periods, sampling frequencies, and sampling intervals during storms; selecting sampling procedures and sampling parameters; understanding special considerations for monitoring receiving waters; and using continuous monitoring. It also provides an extensive literature compilation regarding storm water and CSO monitoring.
- *Data Collection and Instrumentation in Urban Stormwater Hydrology* (Jennings, 1982) reviews data and instrumentation needs for urban storm water hydrology. This reference considers monitoring strategy design and the collection and use of data to characterize rainfall, other meteorological characteristics, streamflows, receiving water biologies and chemistries, and land use.

- *Use of Field Data in Urban Drainage Planning* (Geiger, 1986) describes rainfall-runoff processes and data collection constraints, the need to match data collection to study objectives, the use of data in urban drainage planning, the application and verification of models used in urban drainage planning, the validity of the design storm concept, the reliability of storm water simulations, and the real-time use of monitoring data in control and sewer system operation.
- “Water Body Survey and Assessment Guidance For Conducting Use Attainability Analyses (UAA).” In *Water Quality Standards Handbook* (EPA, 1994). The UAA concepts discussed in this Handbook include useful field sampling methods, modeling, and interpretation approaches in three Technical Support Documents for flowing waters, estuaries, and lakes (EPA, 1983b, 1984a, and 1984b).
- Several guidance documents that discuss or pertain to EPA’s Waste Load Allocation (WLA) process also provide useful information on a wide range of topics that are potentially valuable when planning monitoring programs for CSO control:
  - *Guidance for State Water Monitoring and Waste Load Allocation Programs* (EPA, 1985) includes a chapter on monitoring for water-quality-based controls. It discusses the process of collecting and analyzing effluent and ambient monitoring data in establishing water quality standards and EPA’s responsibilities in this process.
  - *Handbook - Stream Sampling for Waste Load Allocation Applications* (Mills et al., 1986) addresses sampling considerations for acquiring data on stream geometry, hydrology, meteorology, water quality, and plug flows. It also reviews sampling considerations for gathering data to meet various modeling needs.
  - “Nutrient/Eutrophication Impacts,” Chapter 2 of *Technical Guidance Manual for Performing Waste Load Allocations, Book IV: Lakes and Impoundments*, (Mancini et al., 1983) primarily emphasizes modeling considerations. However, this chapter also provides useful introductions to approaches for estimating loading rates to standing water systems and needs for monitoring data to support modeling efforts.
  - *Technical Guidance Manual for Performing Waste Load Allocations, Book III: Estuaries, Part 2: Application of Estuarine Waste Load Allocation Models* (Martin et al., 1990) includes a chapter on monitoring protocols for calibrating and validating estuarine WLA models. It reviews the types of data needed, frequency of collection, spatial coverage, and quality assurance.
  - *Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water* (Mills et al., 1985a, b) presents a broad array of modeling and data management approaches for assessing aquatic fates of toxic organic substances, waste-load calculations, rivers and streams, impoundments, estuaries, and ground waters.