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"Superfund Sediment, Combined Sewer Overflow Discharges, Low Head Dams, and Urbanization Confound Existing Water Use Designations---A Kokomo, Indiana Case Study"

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BACKGROUND:

Kokomo Indiana has 30 Combined Sewer Overflows (CSOs) that discharge into three separate streams pursuant to a newly issued NPDES permit. Two of the water bodies into which the CSOs discharge contain approximately 20,000 linear feet of Superfund site contaminated sediment consisting mainly of heavy metals and organic chemicals. There are four low-head dams on the same two streams, all within the combined sewer service area. As a prerequisite to developing the CSO Long Term Control Plan (LTCP), the Indiana Department of Environmental Management (IDEM) required Kokomo to conduct a stream reach characterization and evaluation of each water body to: (1) assess the environmental impacts, if any, caused specifically by CSO discharges; (2) objectively establish a priority rank order by which CSOs will be addressed in the LTCP; and (3) to establish an in-situ baseline of the aquatic ecosystem utilizing physical, biological, and chemical metrics to assess the future efficacy of the LTCP.

METHODOLOGY:

The boundary limits of the contaminated sediment were not known, with precision, on either stream. Therefore, sediment vertical profile camera technology was utilized to provide quantitative data on the physical and biological components of the sediment surface and immediate subsurface sediment layers to define the boundaries of the contaminated sediemnt.

A Habitat Assessment was conducted utilizing the protocols identified in the "Methods for Habitat Assessment and Physiochemical Parameters"; USEPA/841-B-99-002, July 1999 document.

A multi-habitat Biological Community Sampling Survey was conducted in the spring and fall of 2001 at eight in-stream monitoring sites.

Water column chemistry samples at the eight sites were collected in both dry and wet weather and various CSO discharge samples were collected during CSO discharge events. Wet weather events were initiated whenever the first CSO discharged. Samples were subsequently collected at the CSO discharge locations and the eight in-stream sites at 4-hours, 8-hours; 12-hours and 24-hours after initiation of the event.

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FINDINGS:

Water quality standards are met during dry weather in both streams. Bacteria water quality criteria are exceeded during wet weather events and for a short time (about 24-hours) immediately after the event in both streams. In-stream bacteria concentrations in both streams exceeded water quality criteria during wet weather events as the streams entered the Kokomo city limits. The water quality background conditions are uncontrollable by the city.

CONCLUSIONS:

1. If all CSOs were eliminated in Kokomo, water quality violations would persist.
2. When water quality criteria are exceeded, excursions are short lived.
3. The aquatic habitat is adversely impacted by: (a) in-stream modifications (low head dams), and (b) the heavily modified riparian zone.
4. The biological community generally corresponds to the existing physical habitat suggesting limited chemical pollutant impacts.
5. Indicator species such as top level carnivores (Walleye and Smallmouth Bass) support the premise that a healthy fish community exists in both streams. However, IDEM has issued Fish Consumption Advisories (FCAs) so the community believes the streams are not "fishable".
6. The aquatic ecosystem demonstrates a relatively balanced and recovered community immediately down stream of the confluence of the two creeks.

ISSUES RAISED:

1. Can USEPA and the state agencies create wet weather water quality standards absent a never ending Use Attainability Analysis?
2. What is the proper definition of "Fishable"?
3. Can human health risk assessments be utilized to divide recreational use into meaningful subcategories?

ABOUT THE AUTHOR:

Barton G. Jones is a registered professional environmental engineer with over 37-years of applied experience. He received his B.C.E. from Georgia Tech and his M.B.A. from the University of Dubuque. Mr. Jones sits upon the Water Environment Federation's Technical Practice Committee Control Group and Chair's its Surface Water Quality and Ecology Committee. He has spoken at a large number of WEFTEC meetings and many annual meetings of the Alabama, Central States (Minnesota, Wisconsin, and Illinois), Georgia, Hawaii, Indiana, Iowa, Kentucky-Tennessee and South Carolina Water Environment Associations. He is a nationally recognized expert in environmental regulatory matters involving the Clean Water Act.