

Combined Sewer Overflow Impact Assessment

AQUATIC IMPACT ASSESSMENT PROJECT

Site Location: Southeastern Connecticut
Client: Confidential Client
Date: 2008

Combined sewer overflow (CSO) discharges contain a range of pollutants. The ecological effects of CSO and wastewater discharge in estuaries are primarily directed at the soft-bottom benthos and other aquatic biota. CSO discharges also contribute to aesthetic pollution and an increased human health risk. As part of an assessment to explore closing 15 CSOs, O'Reilly, Talbot & Okun (OTO) subcontracted to Kleinschmidt Associates. An index of biological integrity was created by collecting data and analyzing river habitat properties, benthic invertebrate assemblages and fish communities. OTO also conducted a qualitative assessment of human health risk.

Using the data collected in 2007, sites were classified using hierarchical and agglomerative cluster analysis. Biological metrics were assigned to the fish and benthic invertebrate communities. The metrics were assessed and summed for each CSO site for use in an Index of Biological Integrity (IBI). Using the summed metric scores, each CSO was ranked. Other analyses included the non-parametric Spearman rank order correlation coefficients and backward stepwise linear regression. These techniques were used to identify significant relationships between community metrics and habitat properties.

The results of the ecological characterization indicate a habitat gradient and confirm a number of *a priori* assumptions concerning the distribution of benthic invertebrates and fishes. In addition to widely substantiated abiotic relationships in estuaries including those with salinity, depth, and substrate type were confirmed. The fish community observed was stressed and evidence of avoidance behavior was observed. Dominant fishes included Atlantic menhaden and Atlantic silverside. The adverse effects of water quality are most strongly expressed by the benthic invertebrate community, which was dominated by Oligochaeta and Diptera.

Based upon the Connecticut Department of Environmental Protection designations, water quality is depressed. As a consequence, certain recreation activity types are compromised and in the case of primary contact recreation, eliminated completely. It is believed that the improvement in local water quality through the repair/removal of the 15 CSOs examined will enhance the quality of experience for recreational users engaged in activities including boating and fishing.