



Y S I Environmental

ECSI Manages Habitat in High Hydrogen Sulfide Environments with Optical DO

Application Note



PSEG, a New Jersey power generation company, has worked with the states of Delaware and New Jersey to construct fish passage facilities at twelve dams along tributaries of the Delaware River and Bay to restore fish habitat within the Delaware River Basin. The basin comprises 13,539 square miles, including portions of Delaware, New Jersey, New York, and Pennsylvania. Environmental Consulting Services Inc. (ECSI), of Middletown, Delaware has been maintaining and monitoring the success of the fish ladders during the spring spawning migrations of Alewife (*Alosa pseudoharengus*) and Blueback herring (*Alosa aestivalis*).

A fish ladder is a structure on or around artificial barriers (such as dams and locks) to facilitate natural fish migration. Most fishways enable fish to pass around the barriers by swimming and leaping up a series of relatively low steps into the waters on the other side.

Initially, spawning condition fish were moved from below the dams and released in the lakes to provide a stock of fish with an instinct to home on the upstream spawning grounds. In subsequent years returning spawning run herring are counted utilizing the ladders.

Since the first Alaska Steeppass fish ladders were constructed in 1996, anadromous fish access has been restored to 1,001 acres of impounded habitat and 133 miles of stream habitat previously made inaccessible by man-made obstacles. The Alaska steeppass is a prefabricated, modular style of Denil fish ladder originally developed for use in remote locales. The steeppass is a relatively economical, lightweight fishway, where one 10-foot aluminum unit weighs only about 1,500 pounds.

The watershed types of the newly opened habitat include forest, cultivated agricultural land, residential, and dense urban land. This diversity of land use results in differences in point and nonpoint discharges of water into the streams. Measuring water conditions is a significant part of the overall monitoring program. ECSI has been using YSI temperature, salinity, and dissolved oxygen handheld meters to evaluate the water quality for many years. These meters have proven to be real work horses for ECSI in the numerous monitoring programs. They currently maintain ten meters for use on various fisheries monitoring projects in the Mid-Atlantic region.

Several years ago, ECSI installed YSI multiparameter sondes in the lower Delaware River for continuous water quality monitoring. They employed the YSI ROX® optical dissolved oxygen probe and found that the probe maintains calibration for up to eight weeks in their monitoring application. Due to the nature of the optical technology, it is resistant to the hydrogen sulfide contamination experienced with polarographic sensors.



ECSI scientist, John Foster, uses the YSI ProODO optical handheld DO instrument, attached to the cable management kit, to measure water quality in high hydrogen sulfide environments.

High levels of hydrogen sulfide exist in certain areas along the Delaware River Basin and can cause electrode fouling and additional cleaning requirements on traditional membrane covered sensors. Optical sensor technology eliminates the membrane and subsequent fouling issues when used in high hydrogen sulfide environments. Using optical technology allows ECSI to eliminate the maintenance of cleaning the anodes which are susceptible to hydrogen sulfide interferences.

Additionally, in 2008, ECSI started using the YSI ProODO™ handheld optical dissolved oxygen meter. ECSI indicates it is simple to use, calibration is required infrequently, and there are no membranes that are susceptible to fouling and replacement. Most importantly, the probe can be used in high concentrations of hydrogen sulfide without contamination and slowing of response time. The meter has been rugged; it is carried around in a bucket and has even fallen onto a concrete dam face without sustaining damage.

For ECSI, the optical DO technology has been a blessing in their high hydrogen sulfide environments and the ruggedness of the YSI products have been invaluable to their extensive field work.

“We are very pleased with the convenience, usability, and ruggedness of the ProODO; and highly recommend it to anyone needing to monitor dissolved oxygen.” John Foster, ECSI

For additional information including specifications on YSI instruments, please visit: www.ysi.com

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