
AWRA 2011 ANNUAL WATER RESOURCES CONFERENCE
Albuquerque, New Mexico

November 7-10, 2011

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CHEMICAL TREATMENT OF STORMWATER - 25 YEARS OF INNOVATION

Jeffrey Herr*

ABSTRACT: With the increasing pressure to reduce nutrient loads in stormwater runoff to meet TMDL requirements and stricter surface water quality criteria, local governments must implement cost effective solutions to meet nutrient load reduction requirements. Chemical treatment of stormwater runoff is one of those solutions. The primary benefits of chemical treatment include: minimal land requirement (5-10% of traditional); low life cycle cost per mass pollutant removed (\$40-60/lb TP); and ability to consistently remove 90% of total phosphorus, total suspended solids and turbidity and 99+% of bacteria. The addition of a coagulant, such as aluminum sulfate, to stormwater forms precipitates which trap particulate pollutants as well as dissolved phosphorus. In a typical configuration, runoff from common rain events is diverted off-line, and the resulting floc settles in an off-line pond. The accumulated floc is either sent to the wastewater system or dewatered and beneficially used. Some systems also include upstream constructed wetlands to reduce chemical usage. In 1985, a lake restoration project was initiated at Lake Ella, a shallow hypereutrophic lake in Tallahassee, Florida, which received untreated stormwater runoff from a highly impervious urban watershed. Since there was no land surrounding Lake Ella that could be used for the construction of traditional stormwater management facilities, alternate stormwater treatment methods were considered. The construction of a chemical injection stormwater treatment system was completed in January 1987, resulting in a significant improvement in water quality. An in-depth 2 year operations study identified only positive effects on lake water and sediment chemistry and biota. Over 35 chemical stormwater treatment systems have now been constructed to treat stormwater runoff and improve water quality. Chemical treatment of stormwater runoff has now been used as a viable stormwater treatment alternative in urban areas for 25 years. These types of projects are now being planned to offset required TMDL nutrient load reductions at wastewater treatment facilities due to the lower cost and environmental benefits. This presentation includes information on the history and science of chemical treatment, along with the progression of designs from early in-line systems to today's off-line systems with automated controls and floc removal systems.

* National Stormwater Leader, Brown and Caldwell, 990 Hammond Drive, Suite 400, Atlanta, GA 30328 USA, Phone: 770-673-3673, Fax: 770-396-9495, Email: jherr@brwnald.com