

Ecological Risk Assessment based on Watershed System Assimilative Capacity in Lake Texoma, Texas-Oklahoma, USA

유역시스템 정화력을 고려한 생태위해성평가 사례연구:
Lake Texoma Watershed (TX&OK, USA)를 대상으로

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ABSTRACT

Lake Texoma is located on the border of southern Oklahoma and northern Texas. It has 93,000 surface acres, and is a focus of the recreation, and farming industries in the region. There are potential stressors around the Lake Texoma watershed that may cause adverse ecological effects in the lake. System assimilative capacity (SAC) is the ability of abiotic and biotic processes to attenuate the stressors. SAC Exceeded indicates potential of occurring adverse eco-effects. A number of representative chemical release sites and stressor sources in the surrounding watershed were characterized, and several impact sites having stressors sources, such as being near agriculture, landfills, housing areas, oil production fields and heavy use recreational activity, were selected for surface water, sediment, and groundwater monitoring. A paired reference site, having similar physical characteristics as its impact site, was also chosen based on its proximity to the impact site. Lake water samples were collected at locations identified as marina entrance, gasoline filling station, and boat dock at five marinas selected on Lake Texoma from September 1999 to December 2001. Paired water and sediment samples were also collected. Groundwater samples were collected at about 70 producing monitoring wells. Water quality parameters measured were inorganics (nitrate, nitrite, orthophosphate, ammonia, sulfate, and chloride), dissolved methane, total organic carbon (TOC) (or DOC), volatile organic compounds (VOCs) such as methyl *tert*-butyl ether (MTBE) and BTEX, and a suite of metals. Biotic communities were evaluated at impact and reference sites. Five basic components were measured; two terrestrial components (plants and bird communities) and three aquatic components (benthic invertebrates, littoral-zone fishes, ecosystem attributes). Potential impacts to these communities were evaluated.