

# DISSOLVED GAS SUPERSATURATION ASSOCIATED WITH THE THERMAL EFFLUENT OF AN ELECTRIC GENERATING STATION AND SOME EFFECTS ON FISHES

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Author: Alexander Frank Ciesluk, Jr.

Levels of dissolved gases monitored at several locations in the intake and discharge water of the Big Brown Steam Electric Station, Fairfield, Texas, indicated that gas saturation levels in the cooling water of the generating station increased following condenser cooling and were greater than 100%. Percent saturations of total dissolved gas were determined with a Weiss Gas Satrometer and ranged from 100.5 to 115.0% in the discharge water. Saturation levels were directly related to the power plant T and the gas content of the intake water. Percent saturations of dissolved nitrogen gas, calculated from total gas measurements, remained near 100% in the surface intake water and varied little during 24 hour periods. Oxygen saturations in the intake water fluctuated seasonally and during 24 hour periods. Nitrogen had a greater influence than oxygen on total gas levels, but extreme fluctuations in oxygen levels produced noticeable variations in total gas levels. Gas saturations decreased with the distance the effluent had traveled.

Some golden shiners (Notemigonus crysoleucas), longear sunfish (Lepomis megalotis), and channel catfish (Ictalurus punctatus), held in cages, exhibited external symptoms of gas-bubble disease after exposure to the gas-supersaturated effluent water. Channel catfish and longear sunfish were more susceptible to gas supersaturation than bluegill sunfish (Lepomis macrochirus). Incidence of the disease was related to the degree of gas supersaturation and the length of exposure time.

Tolerance of red shiners (Notropis lutrensis), bluegill sunfish, and largemouth bass (Micropterus salmoides) to gas supersaturation was studied in the laboratory. Bluegills and largemouth bass had similar tolerances at all levels tested and tolerated gas saturations as high as 117-118% for 72 hours. Red shiners were more susceptible to gas supersaturation than bluegills or bass.

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*Department of Wildlife and Fisheries Sciences*  
*Texas A&M University*  
*College Station, Texas 77843*