

TENNESSEE VALLEY AUTHORITY

RESOURCE GROUP
WATER MANAGEMENT

AQUATIC ENVIRONMENTAL CONDITIONS
IN THE VICINITY OF WATTS BAR NUCLEAR PLANT
DURING THE FIRST YEAR OF OPERATION, 1996

Norris, Tennessee
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EXECUTIVE SUMMARY

As required by the National Pollutant Discharge Elimination System (NPDES) Permit Number TN0020168 for operation of Watts Bar Nuclear Plant (WBN), this report is a composite evaluation of nonradiological preoperational and operational aquatic monitoring conducted from 1973-1979, 1982-1985, and during 1996. The primary objective of the WBN Nonradiological Operational Monitoring Program is to evaluate and compare specific biological and chemical parameters during the first year of operation of WBN to those reported in the WBN Nonradiological Preoperational Assessment. The following biological and chemical components were monitored to detect and evaluate significant effects, if any, of WBN during the first year of operation; juvenile and adult fish, entrainment of fish eggs and larvae, impingement, tailwater fishery creel survey, benthic macroinvertebrates, native mussel fauna, and water quality analysis.

In the vicinity of WBN, occurrence and abundance of ichthyoplankton (fish eggs and larvae) is primarily the result of passage through the turbines at Watts Bar Dam. This is because most fish species are reservoir and not tailwater spawners. Densities and number of taxa of ichthyoplankton passing WBN were low and low-volume hydraulic entrainment resulted in insignificant losses due to plant operation. Macroinvertebrate, juvenile and adult fish relative abundance and species composition were also influenced by releases from Watts Bar Dam. Comparison of fish community sampling during preoperational and operational monitoring showed minimal variations comparing 12 important species. Reservoir Fish Assemblage Index (RFAI) values also remained relatively stable. It is apparent based on comparisons of species composition, relative abundance, catch per unit effort (CPUE), and RFAI scores between

preoperational and operational monitoring, WBN has not adversely impacted the tailwater fish population below Watts Bar Dam during the initial year of operation.

Total tailwater fishing pressure has increased dramatically in the past 23 years. During the first year of operation, a total of 277,284 fishing hours and 60,674 angler trips was estimated. Catfish, sauger, white bass, crappie, sunfish, striped bass/cherokee bass, and black bass were the most sought after species by fisherman. An estimated of 242,036 fish were caught and 108,216 fish harvested from April 1996-April 1997. Peak angling effort occurred in March 1996 and the peak angling trips occurred in June 1996. Temporal analyses showed that seasonal and yearly changes in abundance and other variables for all component populations, except freshwater mussels, were common.

The freshwater mussels in the vicinity of WBN are quite old and most of the 30 species found may not have reproduced in the past 50 years. The first year of operation of WBN has not impacted the benthic macroinvertebrate community or Watts Bar Dam Tailwater fishery.

Abundance trends were noted during preoperational assessment for several communities of macroinvertebrates, plankton, periphyton and harvest of some fish species. These trends are mainly due to the wide range of flow and climatic conditions that occur.

Water quality in the vicinity of WBN, while generally satisfactory, was influenced by releases from Watts Bar Dam, located two miles upstream. In 1996, TVA's Water Management installed an aeration device in the forebay of Watts Bar Reservoir. This will reduce stratification of the forebay in the summer and fall and will provide higher dissolved oxygen levels in the hydro

releases. The first year of operation of WBN has not impacted the water quality in Chickamauga Reservoir.

Overall, it was concluded that WBN operation had no effect on either the aquatic communities nor the water quality in upper Chickamauga Reservoir.