

# PHOTOSYNTHETIC EFFICIENCY OF PHYTOPLANKTON POPULATIONS IN A RESERVOIR RECEIVING THERMAL EFFLUENTS

---

Author: Gerald Franklin Bowling, III

From October 1978 to October 1979 measurements of primary productivity, incident PAR, temperature, chemical, optical and phytoplankton community characteristics were made monthly to assess the impact of the thermal effluent on phytoplankton photosynthetic efficiency (PE). PE was defined as percentage ratio of rates of calories of PAR received. Results showed Fairfield Reservoir as eutrophic and phytoplankton to be productive and well adapted to the selective forces of entrainment. The impact of increased temperature associated with the thermal effluent varied from stimulation of PE and integral primary productivity during fall months to inhibition during summer. Summer was considered critical for the survival of the phytoplankton community due to thermal, nutrient and light related factors. PE and integral primary productivity declined when summer water temperatures exceeded 32<sup>o</sup>. Mean PE for the study was 0.7% and mean integral primary productivity was 125 mgC m<sup>-2</sup> hr<sup>-1</sup>. Green algae dominated or co-dominated the phytoplankton community most of the year. Blue-green algae dominated or co-dominated during spring and summer months.

*Masters Thesis  
Department of Biology  
Stephen F. Austin State University  
Nacogdoches, Texas 75962*