Autotrophic Intensification of Pond Aquaculture: Shrimp Production in a Partitioned Aquaculture System

D.E. Brune¹, Kendall Kirk², and A. G. Eversole³

Abstract

Aquaculture production of high-value marine fish and shellfish offers enormous economic potential for both developed and developing countries. Marine shrimp production has a proven track record of enhancing economic development. Unfortunately, site selection of marine shrimp farms has frequently led to adverse environmental impacts. Due to limited site availability and potential for environmental impact, future marine aquaculture development will likely require captive water systems, where the culture water is treated and reused. Most current water recycling technologies are based on industrial waste treatment methods. However, aquaculture facilities will require less expensive methods producing a higher degree of treatment. The Clemson University, Partitioned Aquaculture System reduces land and water requirements of marine shrimp production, eliminates associated potential environmental impacts, and reduces operating costs by producing additional high value aquaculture products. The PAS utilizes high rate algal growth basins as the technique for water treatment and water reuse. The PAS technique offers the potential to double or even quadruple current shrimp production per unit land area in a system which requires only 15% as much water resources, while eliminating water discharge, and recovering wasted nitrogen and phosphorus discharges, which currently pose an eutrophication threat to surface and groundwater supplies.