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AQUACULTURE & FISHERIES INNOVATION LAB

## RESEARCH REPORTS

Sustainable Aquaculture for a Secure Future

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**Title:** Modeling Photosynthetic Production Optimization for Aquaculture Ponds

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**Date:** 13 January 2016

Publication Number: AquaFish Research Report 95-79

**Abstract:** AquaFish will not be distributing this publication. Copies may be obtained by writing to the authors.

In an aquaculture pond, the primary production system serves both as the basis for the natural food chain, and as a primary source of dissolved oxygen (DO). As the productivity of the pond system and the standing crop of phytoplankton increases, so does the degree of fluctuation in diel DO concentrations, water quality, and the degree of vertical stratifications of the water column. In highly turbid pond systems the rapid extinction of incident light in the surface layers results in benthic zones serving only as a net oxygen sinks, even while the surface is exposed to full sunlight and is a net oxygen source. As the standing phytoplankton crop is reduced, self shading decreases, as does total food availability and gross production of oxygen, but the stability of the system, in terms of DO fluctuations and water quality, increases. Therefore, in this respect, the trade-off in balancing the pond system is in terms of gross productive potential versus water-quality stability.

This abstract was excerpted from the original paper, which was published in Aquaculture Engineering (1994). 0144-8609/94/\$07.00

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**AQUAFISH RESEARCH REPORTS** are published as occasional papers by the Management Entity, AquaFish Innovation Lab, Oregon State University, Corvallis, Oregon 97333-3971 USA. The AquaFish Innovation Lab is supported by the US Agency for International Development under Grant No. EPP-A-00-06-00012-00. See the website at <[aquafishcrsp.oregonstate.edu](http://aquafishcrsp.oregonstate.edu)>.