

Aquaculture and Pollution: Biological Issues Versus Economic Potential

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The majority of aquaculture pollution concerns focus on organic and inorganic effluents. However, there is an additional form of pollution associated with aquaculture that may impact both the production success of an aquaculture operation as well as the natural environment with which the operation is juxtaposed -- biological pollution.

Biological pollution in the form of disease transferal between aquaculturally produced products and native stocks (and vice versa) has long been used as a popular argument against the establishment of aquaculture operations. Conversely, the aquaculture industry makes similar claims that native stocks actually are responsible for infecting confined populations. Outside of intentional stockings of hatchery-reared products for stock enhancement or introduction, neither side appears to have a scientifically founded argument as there are no documented cases, in either situation, demonstrating disease transmission (pollution) has been effected.

Another form of biological pollution is genetic pollution. The genetic problems associated with native stocks and aquaculture products were summarized by Busack (1990) as four types of categories of genetic risk: 1) extinction, 2) loss of within-population variability (increased homozygosity), 3) loss of population identity (between-population variability), and 4) domestication selection. These four risk categories are primarily associated with stock enhancement programs or intentional introduction of non-native species. Barring natural catastrophes, rarely will aquaculture escapements be of sufficient numbers to effect any of these four areas of risks, with the possible exception of domestication selection if outcrossing were to occur.

This presentation will discuss the need for domesticated and selected (possibly non-native or hybrid) strains of aquaculture products to successfully compete as a viable economic enterprise. In addition, some of the valid concerns of disease and genetic pollution will be presented in the hope of stimulating discussion of the short-term versus long-term benefits and pitfalls of aquaculture as a viable industry, a means to restore or enhance native populations, as a supplier of alternative species for recreational and commercial fishing, or as a tool to be used in fisheries management.