Effluent permits commonly required by governments

1 August 2001 Claude E. Boyd, Ph.D. Christopher Jackson, Ph.D.

73% of respondents had program to cut water exchange

Collecting effluent water sample after passage through sedimentation area and artificial wetland (background).

A major environmental concern related to shrimp aquaculture is the potential water pollution that results from the release of effluents into natural water bodies. Some governments are issuing effluent permits to shrimp farms and other aquaculture operations in an effort to control such releases. Through its Responsible Aquaculture Program, the Global Aquaculture Alliance has developed effluent quality standards and best management practices intended to reduce the volume and improve the quality of pond effluents.

Effluent permits

Eighteen responses were obtained in time for this preliminary Global Shrimp OP: 2001 report, with five of these from the Eastern Hemisphere. More than half (56 percent) the respondents indicated they were required by their governments to obtain an effluent permit for their shrimp farms, and half were required to monitor water quality as a condition of the permits.

Respondents with no requirement for an effluent permit came from a range of countries in both the East and the West. A requirement to monitor water quality was imposed by a lending agency on 39 percent of the respondents.

Criteria for permits

All permits had pH as a criterion. Other common criteria were total suspended solids, dissolved oxygen, biochemical oxygen demand, and total nitrogen. Variables and limits in permits generally were similar to those recommended in GAA's Responsible Aquaculture Program.

The most notable exceptions were a total suspended solids limit of 40 milligrams per liter in one permit, and minimum pH limits of 7 and 7.5 in two other permits. Most permits allowed total suspended solids up to 50 milligrams per liter, and pH down to 6.0. Such restrictive limits for these two variables do not seem reasonable, for a minimum pH of 6.0 is usually allowed in effluent permits.

Effluent samples

Effluent samples were usually collected by farm staff and analyzed at the shrimp farm or sent to a private or governmental laboratory. In only one case (in Venezuela), did a regulatory agency come to a farm, take effluent samples, and analyze them. According to the survey results, reporting of effluent-quality data was normally done at intervals of one month or less. Only one permit allowed quarterly reporting.

Calculating effluent loads

Six Six respondents reported they were required to calculate and report effluent loads of selected variables, but only three of these (from Belize, Mexico and Australia) also measured the effluent volume, which is necessary to compute loads. Only 46 percent of respondents measured effluent volume necessary for computing loads.

Water quality

Fifteen participants in the survey provided typical concentrations of water quality variables in effluents. The usual concentration ranges were: pH, 7 to 9; dissolved oxygen, 3 to 7 milligrams per liter; total nitrogen, 1-4 milligrams per liter; total phosphorus, 0.1 to 0.3 milligrams per liter; total suspended solids, 20 to 60 milligrams per liter; biochemical oxygen demand, 10 to 30 milligrams per liter. These findings are encouraging, because the values are generally usual concentrations of water quality variables in effluents in compliance with suggested GAA effluent standards.

Water exchange

Sump pump for water reuse after passage through sedimentation pond and artificial wetlands.

All participants in the survey practiced water exchange, with average exchange rates given as 5 percent or less by 68 percent of respondents. Almost threefourths (73 percent) of participants said they have a program to reduce water exchange below present levels.

Effluent treatment

The main method of effluent treatment was the use of settling basins. Half the respondents reported that they had installed settling basins. These basins normally were used to treat effluent before discharge into natural water bodies, but two respondents used settling basins to treat water before reusing it.

Slightly more than half of those in the survey replied that settling basins had been installed voluntarily. Only 30 percent of those responding said that final effluent outfalls were in mangrove or other sensitive ecological habitats.

Culture of other species

About 20 percent responded that they cultured other species, such as bivalves or seaweed in discharge canals or settling basins, to improve water quality. However, none of the farms generated significant income from this activity.

Water reuse

Water reuse is not common. Only three respondents – in Australia, Belize, and India – practiced water reuse. On two of the farms, only water released during normal water exchange was reused. For the remaining farm, water discharged when ponds are drained for harvest also was reused.

Conclusion

At this early stage of the Global Shrimp OP: 2001 program, the survey revealed several pertinent points. Permits for effluent discharge from shrimp farms are common. Although farms are trying to reduce water exchange rates, water reuse is seldom practiced. Settling basins are the most common method of effluent treatment.

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Farm cages should be sited where water quality is good and water velocity is adequate. The size, shape and position of cages should be selected to favor rapid flushing.

Responsibility

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In general, lower-intensity pond and cage farming tends to discharge higher overall pollution loads in farm effluents than closed aquaculture systems.

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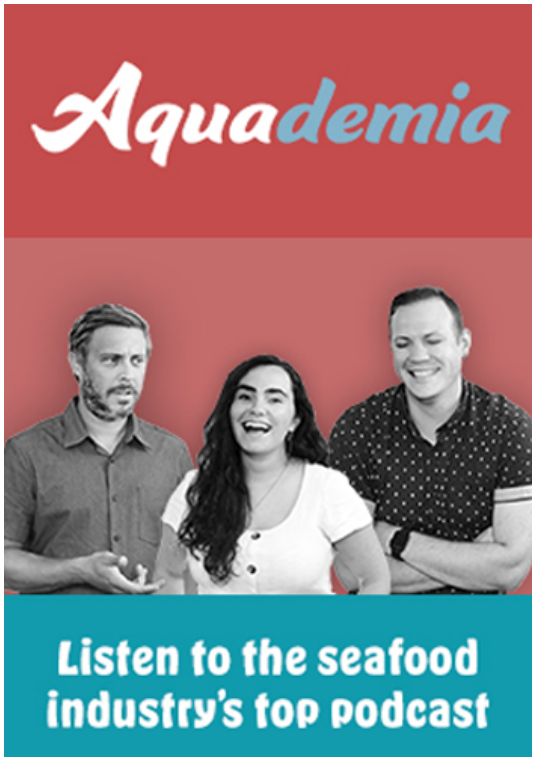

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