Auburn University and USDA/Natural Resources Conservation Service

Alabama Aquaculture Best Management Practice (BMP)

Managing Ponds to Reduce Effluent Volume

BMP No. 2

Definition

Catfish ponds can release effluents following rainfall events and when they are intentionally drained. Effluent volume can be reduced by operating ponds to maximize storage capacity and by draining them only when necessary.

Explanation

Discharge from ponds occurs when the amount of water entering ponds exceeds the capacity of ponds to store water. During periods of heavy rainfall and runoff, ponds fill to capacity and overflow cannot be avoided. Storm overflow from catfish ponds in Alabama occurs mostly in winter and spring because rainfall normally is abundant and conditions are optimum for producing runoff on watersheds. During summer and fall there is little runoff and ponds filled to the top of the overflow pipe can have discharge due to rainfall directly into the pond. This overflow can be largely avoided if ponds are not full to tops of overflow pipes when rain occurs.

Water also is intentionally discharged from ponds. Water from wells or streams is sometimes pumped into ponds for the purpose of improving water quality and conditions for fish production by flushing water of reduced quality from ponds. This practice is called water exchange. Ponds also may be partially drained to facilitate fish harvest, or they may be completely drained to harvest fish or to renovate pond earthwork. Alabama Department of Environmental Management (ADEM) rules require that discharge of pollutants be prevented or minimized to the maximum extent practical to ensure in-stream water quality.

Prevention of discharge

Practices

The following statements summarize the practices that should be used to reduce the volume of draining effluent and storm runoff from ponds:

- *Construct seine-through ponds when possible.*
- *Harvest fish by seining and without partially or completely draining ponds unless it is necessary to permit harvest in deep ponds, to renovate fish stocks, or to repair pond earthwork.*
- *Maintain adequate storage capacity to capture rain falling into ponds during summer and early fall.*
- *Do not flush well or stream water through ponds.*

Implementation notes

There is no reason to drain most catfish ponds frequently as fish can be harvested by seining. A recent study indicated that catfish ponds are partially drained about once every 6 years to renovate fish stocks. Large fish must be removed from ponds because they compete with small fish for feed, and large fish do not convert feed to fish flesh as efficiently as smaller ones. After about 15 to 20 years, ponds must be completely drained to repair earthwork. Thus, the usual industry practice does not require ponds to be drained often. Of course, not all producers will be able to implement this practice because some ponds cannot be seined.

By not draining ponds on an annual basis, the volume of draining effluent entering streams can be greatly reduced. Considering an average pond depth of 5.5 feet, annual pond draining would yield 82.5 acre-feet of effluent per acre of pond surface in 15 years, while the seine-harvest method would yield about 11 acre-feet of effluent per acre of pond surface in 15 years. Moreover, studies at Auburn University revealed that water quality problems did not increase in catfish ponds which were not drained each year.

Ponds normally are full of water at the end of April, and water levels then decline until the end of November. During this period there usually is little runoff into ponds and pond evaporation exceeds rain falling directly into ponds. The 24-hour rainfall rarely exceeds 3 or 4 inches in water depth. Pond water levels usually begin to decline in late spring. Make-up water should be added, but the water level should be kept 3 to 4 inches below tops of overflow pipes. Storm overflow should not occur during summer and fall if this practice is followed. This practice is illustrated in Figure 1. If this practice creates shallow water around the edges of the pond, the edges should be deepened during the next pond renovation.

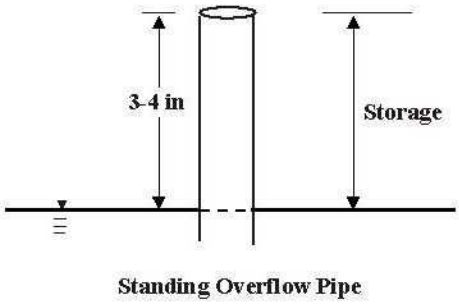

Figure 1. Illustration of practice of maintaining the water's level below the top of standing drain pipe to provide storage volume for summer and fall rainfall.

Water exchange is sometimes used to flush plankton, ammonia, and nitrite from ponds or to improve dissolved oxygen concentration. Research has shown that water exchange normally is not effective. Application of sufficient mechanical aeration will prevent low dissolved oxygen and increase the capacity of nitrifying bacteria to oxidize ammonia and nitrite to non-toxic nitrate. Thus, farmers should not use water exchange.

References

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