

Control of Erosion by Effluents

BMP No. 5



Definition

Water discharging from ponds can cause erosion at the pipe outlet and in the downstream conveyance ditches or water courses. Suspended soil particles can increase the possibility of turbidity and sedimentation in receiving streams. On the other hand, if pipe outlets are properly protected and ditches are designed and constructed for permissible velocities, erosion will be minimal.

Explanation

Pond water is usually discharged through a pipe extending through the dam or embankment. Water usually discharges from drainpipes into ditches or directly into streams. Erosion may occur at the point of exit from the drainpipe in ditches during conveyance of effluent from ponds to streams. Therefore, methods to reduce water velocity and impact on the soil are essential to maintaining quality of effluents from catfish ponds.

Control methods

Practices

- *Install structures such as riprap plunge basins to prevent drainpipe discharge from impacting and eroding soil.*
- *Construct discharge ditches of adequate size, with proper side slopes, and with proper vegetative or structural measures to prevent excessive water velocity and resulting erosion of bottoms and sides.*
- *Install riprap in bottoms of ditches in places that are susceptible to erosion.*

Implementation notes

Control of erosion by effluent is a simple matter that involves reducing the energy of impact of discharge upon soil, reducing water velocity in ditches to prevent scouring, and extending drainpipes beyond critical points for erosion.

Drainpipes from ponds should be extended at least 6 feet beyond toes of dams or embankments at an elevation near the ditch bottom. Also, the outlet area of the drainpipe should be protected with a riprap plunge pool (See Figure 1). The stone-protected pool will prevent water from impacting on soil, and it will reduce the energy of the water to lessen the potential for erosion as the water flows away from the initial impact zone.

Where drainpipes discharge directly into streams, they should extend far enough over the streambank to prevent discharge from causing erosion, and be located at an elevation near the normal water level of the stream. Erosion of the stream bottom by falling water can be avoided by installing riprap in the area of impact. This practice is illustrated in Figure 2. Where extension of pipes into streams is not practical, riprap protection should be provided from the pipe to a stable outlet.

Ditches for conveying water to streams should be designed according to permissible velocities for the type of soil and vegetation. Structural protection, such as riprap, may be necessary in ditch bottoms where vegetation cannot be maintained. Where permissible velocities cannot be maintained from the pond to stream, grade control structures may be necessary.

References

Yoo, K. H. and C. E. Boyd. 1994. Hydrology and Water Supply for Pond Aquaculture. Chapman and Hall, New York, New York.

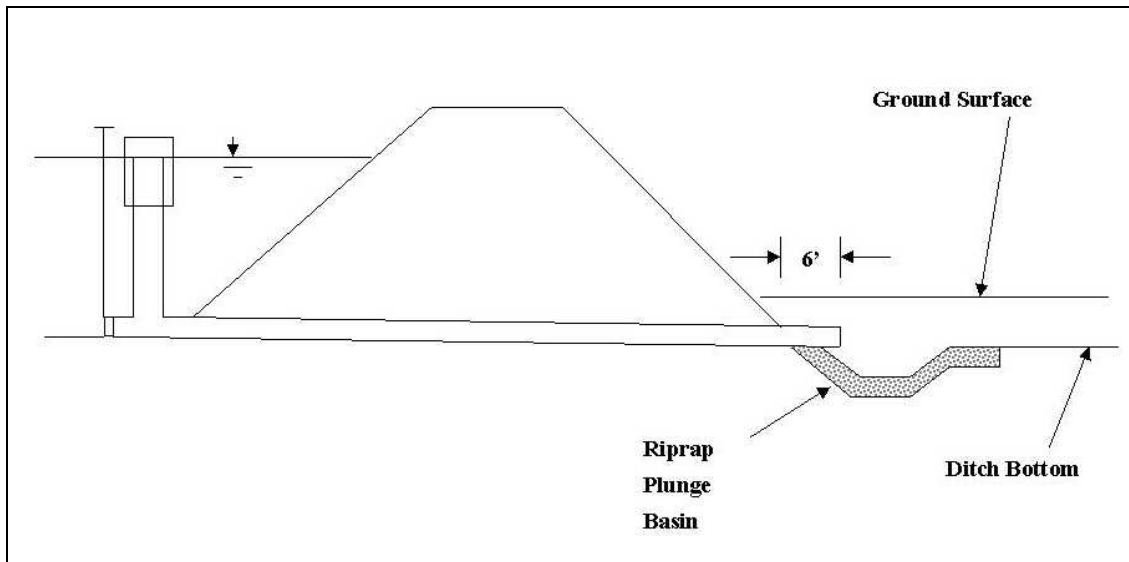


Figure 1. Illustration of proper release of effluent from a pond into a ditch.

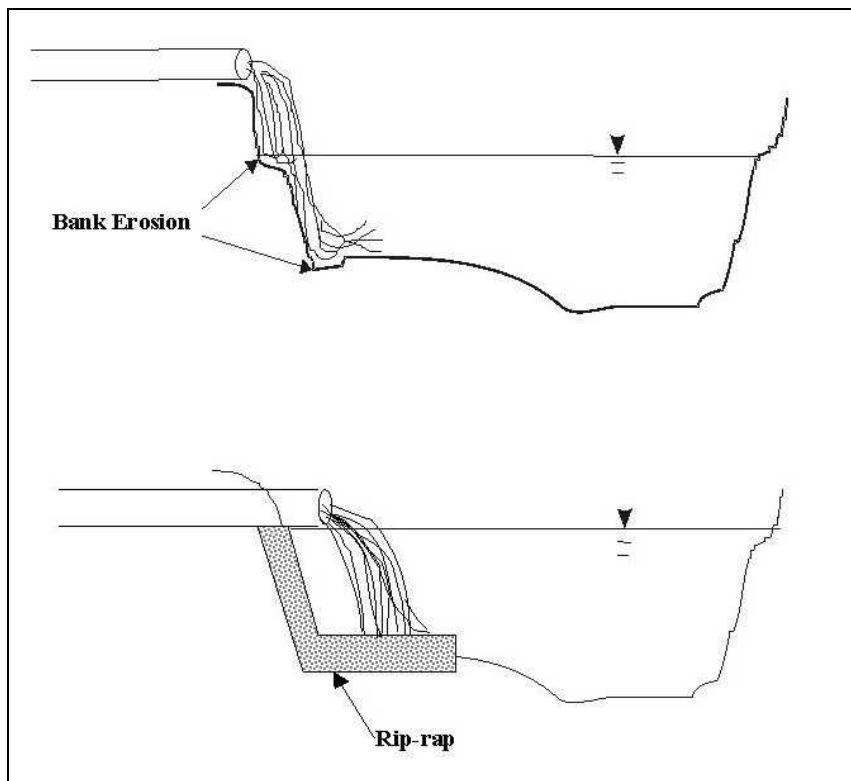


Figure 2. Illustration of improper (upper) and proper (lower) discharge into stream.



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