Best Management Practices in Crawfish Production – Good for Producers and Coastal Watersheds

Introduction

Crawfish farming is considered by many to be a relatively environmentally friendly use of land. Incorporating crawfish aquaculture with traditional agriculture serves as a productive form of land and water conservation. Often, land that is only marginally acceptable for traditional row crops is used for crawfish production. In addition to providing benefits to rural economies and a highly valued and desirable seafood product, crawfish ponds serve as favorable wetland habitat to many species of waterfowl, wading birds, reptiles, amphibians and furbearers. Nonetheless, crawfish farming has come under increasing scrutiny from environmental advocacy groups in recent years, just like other forms of aquaculture and agriculture.

Holding water at seasons end

Surface water

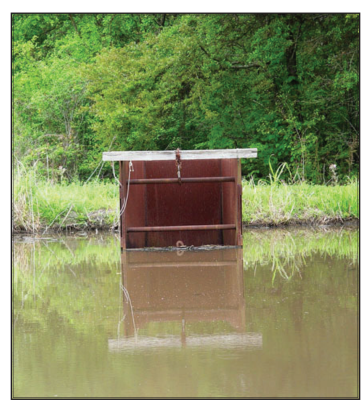
Several agricultural industries have developed Best Management Practices (BMPs) to respond to the need to improve economic and environmental performance. Voluntary best management practices in crawfish production are an effective and practical means for conserving water, reducing energy use and pumping costs, protecting the environment, and enhancing the public's perception of crawfish farming.

Baffle levees for water circulation

In almost every instance, when surface waters are used for crawfish production, the water leaving the ponds is of equal or better quality than when it was pumped in. Nonetheless, discharge of pond water into surrounding watersheds has been cited by some as the primary environmental concern with crawfish farming. Effluents (tailwaters) are discharged when rainfall exceeds pond storage capacity, when ponds are flushed to improve water quality, and when ponds are drained at the end of the production season. Crawfish effluent water is usually low in nutrients and oxygen demand, but turbidity and suspended solids can be high at certain times of the year. The following set of BMPs have been identified to minimize potential impact of crawfish pond tailwater on the environment. Many of these practices will also result in reduced water use, with associated reductions in energy and pumping costs.

Standpipe

1. **Capture and store rainfall to reduce effluent volume and pumping costs**. Allowing the normal pond level to fall at least 4 inches below the level of the standpipe (or more, depending on the season and pond design) from normal evaporation without re-filling will greatly reduce the volume of water leaving ponds during rainfall events by increasing the storage capacity of the pond to accumulate rainfall. Drain pipes within ponds can be painted a bright color to indicate the target water depth at which pumping is needed. An added benefit of this practice is the reduced need for pumping well water to maintain ponds at or near maximum depths.



Pond drain

2. **Install drain outlets to draw overflow from the pond surface**. Water from the lower layers of a pond is generally of poorer quality than that near the surface. This difference can be especially true in terms of suspended solids, oxygen demand and nutrients. Pond drains should be constructed to allow water to leave the pond from

the surface, not the bottom. Existing drains that draw from the pond bottom and incorporate external structures to regulate pond depth should be modified during regularly scheduled pond renovations to draw water from near the pond surface.

3. **Reduce pumping costs and improve flushing efficiency**. When flushing crawfish ponds to improve water quality, avoid pumping and draining at the same time. At initial flood-up, fill the pond to only one-half to two-thirds of its maximum storage capacity. To flush the pond, open the drains and allow the entire pond to drop to a depth of roughly one-fourth of storage capacity. Then re-fill the pond with fresh water, again to no more than one-half to two-thirds of maximum storage capacity. This type of flushing ensures that stale water will be diluted with fresh water throughout the entire pond, preventing the establishment of “dead” areas where water will not normally flow with conventional flushing. Additionally, less water is used and released to the environment. The pond can be filled to maximum depth (storage capacity) in late November or early December when temperatures have dropped sufficiently. Baffle levees can also be used to direct water flow through the pond to eliminate low oxygen areas. In areas where the quality of surface water is occasionally unacceptable or where well water must be pumped from great depths, water recirculation can be a cost-effective alternative to pumping.


Vegetated drainage ditch

4. **Minimize sediment loading when draining**. Harvesting activity, wind, waves and crawfish foraging actions cause turbidity, or muddy water. Although this condition can be alleviated somewhat in crawfish-only ponds by postponing draining until most of the crawfish present have burrowed in the early summer, it poses problems in ponds where draining must be accomplished much earlier to allow for a commercial rice or other crop to be planted. In these instances, no specific recommendations have been formulated to reduce suspended sediments in ponds or tailwater, but suspending harvest activities for 1-2 weeks prior to draining may improve water clarity prior to discharge. The use of vegetated filter strips and channel vegetation (vegetated drainage ditches) will probably be beneficial in improving water clarity because heavy sediments settle out and are trapped as water velocity is reduced as it passes through the vegetation. Other approaches, such as maintaining in-pond buffer zones of natural aquatic vegetation like alligatorweed, reduce the level of suspended sediments in water caused by disturbance of the pond bottom from wind and wave action and erosion of pond levees.


Water detention

5. **Practice water detention during summer drawdown**. A majority of suspended solids and nutrients are discharged from crawfish ponds in the last remaining 10 to 20 percent of the pond water. Retaining water several days prior to complete draining, or allowing the remaining water to evaporate if forage production practices will allow,can significantly reduce nutrient loads in tailwater. This occurs because many nutrients are bound to particles of sediment, which can settle out of the water column prior to discharge.

6. **Reuse pond water**. To save on pumping costs, conserve groundwater and reduce tailwater discharge, if possible. Pond water can occasionally be pumped into adjacent ponds or reservoirs and then reused. Transfer can usually be accomplished with a low-lift pump, and water can be replaced later by siphon. In some circumstances, it may be possible to drain water directly into ponds with lower elevations.


Man with re-lift pump

7. **Use tailwater for irrigation**. Under some conditions, pond water discharge can be used to irrigate crops. Most crawfish aquaculture in Louisiana occurs in areas used for rice agriculture, and crawfishponds are frequently adjacent or in close proximity to rice crops. Tailwater discharged in spring and summer into drainage ditches can be re-lifted or, in some cases, directly used to irrigate and replenish water in rice fields, which are

planted in mid-March through April. Under some circumstances, diverting pond discharge can result in excessive erosion, so care must be taken when considering this practice.

Natural vegetation ditch

8. **Use natural or constructed wetlands and sedimentation ditches to reduce tailwater solids and nutrients**. Natural wetlands are an effective means of treating aquaculture effluents, but care must be taken not to overload these systems. The presence of established stands of aquatic plants in spring and summer in ponds with volunteer vegetation increases nutrient uptake and reduces the level of suspended sediments in water caused by disturbance of the pond bottom from wind and wave action and erosion of pond levees. Although dense stands of volunteer aquatic plants are usually considered problematic in commercial crawfish operations, establishing manageable stands or strips of aquatic plants, such as alligatorweed, inside ponds (even when using cultivated forages such as rice or sorghum-sudangrass) may help to improve effluent quality, as well as provide cover and food when other forages have become depleted. Drainage ditches, particularly those with a slight gradient and containing emergent aquatic plants, can effectively function as settling basins for heavier solids. Sediments that accumulate in drainage ditches over time and hinder drainage can be removed in some cases and used to rebuild levees.

9. **Practice erosion control in drained ponds**. When ponds are drained and idle, especially in winter in Louisiana, substantial erosion of the exposed pond bottom can occur, affecting both the serviceability of the pond and the receiving waters on the outside of the drain pipe. For this reason, drains should always be closed if possible when ponds sit empty, and ponds should be partially or completely refilled as quickly as possible.

Levee re-built from sediment

10. **Minimize environmental impacts during pond renovation**. Use sediment from within the pond to rebuild levees and fill in low areas. Do not remove it from the pond unless absolutely necessary. During renovation, drains should be kept closed to minimize erosion and discharge of sediment. Levee height usually can be increased at this time to allow more management flexibility in capturing and storing rainfall or water from surrounding ponds. In this way, effluents also will be further reduced.

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