Alligator Washwater Management

Wash water is a necessary part of alligator production, and so is the management of this water. Nondischarge application of wash water onto crop fields or pastures allows producers to economically manage this water while protecting the environment and water supplies from pollution. This guide will help producers understand the basic principles of alligator washwater management.

Why Do We Need To Store Wash Water?

The capability to store used water reduces or eliminates the need to collect, remove and spread wash water as it is produced. The primary reason to store manure is to allow the producer to spread the manure on land at a time that is compatible with the climatic and cropping characteristics of the land. Growth wastewater nutrients can be best used when spread near or during the growing season of the crop. Therefore, the type of crop and method of manure application are important considerations in planning manure storage facilities.

Forage or hay crops generally provide the greatest flexibility in planning land application operations. Warm-season grasses can be greatly enhanced with irrigation from mid-spring to late fall. Overseeding or using some other type of double-cropping scenario have been used by several producers to have growing plants during the majority of the year, but this may reduce quality of Bermuda grass stands and increase summer weeds. Storing wash water for longer periods of time, such as two months, also will reduce the frequency required to irrigate – allowing applications to match crop water requirements.

Climate and associated soil conditions are additional factors that strongly influence the storage. Saturated and wet soil conditions are not suitable for land application of alligator wash water. Retention ponds should be sized to provide a storage period compatible with the required cropping operations (tillage, planting and harvesting) and climatic conditions expected at the production location.

How Much Water Needs to Be Stored?

Determine the volume of water to be drained with each flushing. This can be done by measuring the length and width of your production pens and the depth of water before the pens are drained. To be conservative, record the depth from several pens and take an average of the highest three values. Experience has shown water use often is significantly greater than anticipated.

Estimating wastewater volume:

A. Pen Volume = Length x Width x Average Depth = cubic feet.
B. Flushing Frequency = Maximum number of pens per week that are drained.
C. Storage Period = Number of weeks that wash water will be stored. This typically is between four weeks and six weeks. (More information will be provided below.)
D. Storage Volume = A x B x C = Pen Volume x Flushing Frequency x Number of weeks of storage.

Helpful Water Volume Conversions

1 cubic foot = 7.48 gallons

1 acre-inch of water = 27,154 gallons

1 acre-foot = 325,850 gallons

How Large Should the Storage Pond Be?

Many factors contribute to the volume needed in a manure storage facility. These factors include the number of alligators produced, their harvest age, climatic conditions (such as rainfall and evaporation), storage period and the amount of cleanup water used.

Storage period

Two primary considerations in selecting a manure storage period are the crop growing season and climatic characteristics (rainfall, freezing temperatures) that might influence land application operations. Other considerations might include equipment availability, harvest or planting scheduling; labor availability and management flexibility. Storage/holding ponds should be large enough to hold eight weeks of wash water and should include extra capacity for rainfall and 1-foot deep "freeboard." This freeboard area is an emergency zone to store heavy rainfall during major storms to prevent wastewater from overflowing the storage pond. The freeboard should never be used as extra storage.

Crop considerations

In the case of row or cultivated crops, land application of wash water may not be possible between planting time and harvest. Hence, the minimum storage period would be the growing season of the crop. Forage crops (hay or pasture) may offer greater flexibility for manure application during the growing season. Double cropping should be considered for maximum nutrient uptake. Keep in mind, however, that these practices can reduce the "windows of opportunity" for washwater application, so careful thought and consideration should be given to the potential benefits and problems.

Climatic considerations

In addition to crop considerations, climatic characteristics are an important influence on storage period selection. Adequate storage is needed to hold wash water through periods following winter storms or summer tropical storms when saturated or flooded conditions may occur.

Equipment and labor availability

If equipment and labor for land application of stored wash water are available only seasonally or at certain times of the year, the storage period should be selected accordingly. If custom planters or harvesters are used, they may be available on a particular schedule. In general, longer storage periods offer greater flexibility in managing your cropping and your land application operations.

Rainfall, evaporation

Washwater storage ponds exposed to rainfall should be designed to hold the rainwater that falls on the surface. Some of this rainfall, however, will be lost through evaporation, and the net effect is called "rainfall minus evaporation (R-E)" (Table 1). The average annual rainfall for Lafayette, La., is 59 inches, and the annual evaporation rate is approximately 45 inches per year.

Table 1. Average "rainfall minus evaporation (R-E)" for Lafayette, La.

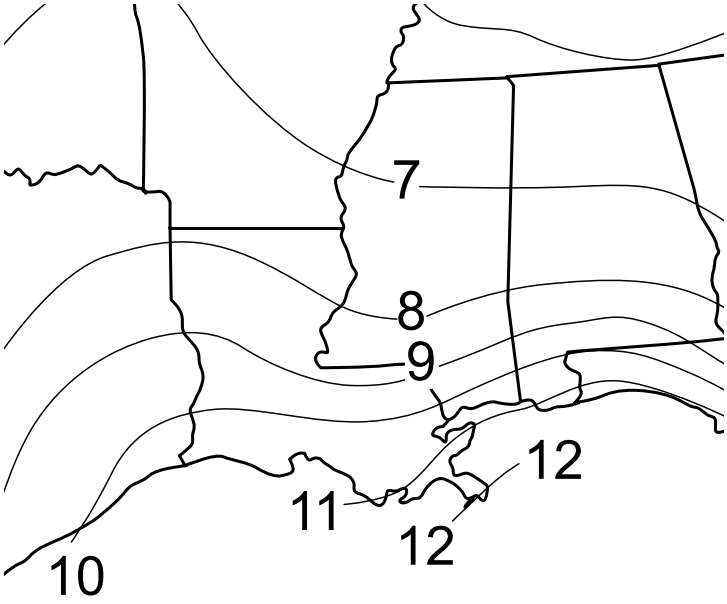
Month	Rainfall (inches)	Evaporation (inches)	R-E (inches)
January	5.28	1.83	3.45
February	5.20	2.17	3.03
March	4.51	3.40	1.11
April	5.12	4.46	0.66
May	4.88	5.36	-0.48
June	7.35	5.44	1.91
July	4.80	5.39	-0.59
August	4.89	5.08	-0.19
September	4.17	4.38	-0.21
October	4.21	3.59	0.62
November	4.31	2.49	1.82
December	4.69	1.79	2.90

While rainfall data usually is readily available, many factors influence evaporation, which sometimes results in a scarcity of meaningful data. For example, evaporation tends to be much higher during summer than during winter, so monthly rainfall and evaporation data should be examined to determine the monthly sequence with the highest R-E value.

25-year, 24-hour storm

Federal regulations require that storage ponds have the minimum capability of holding the lot runoff and direct rainfall resulting from the 25-year, 24-hour storm. The volume resulting from a 25-year, 24-hour storm is equal to the storm itself (inches of rain falling in 24 hours) plus runoff that may enter the pond area. For a manure storage facility exposed to rainfall, the depth required to store the

Figure 1. 25-year, 24-hour storm depth for Louisiana.



25-year, 24-hour storm is simply the depth, or inches of rainfall, represented by the storm itself. Rainfall depths in southern Louisiana for a 25-year, 24-hour storm range from 9 to 12 inches (Figure1).

Wastewater application

Ideally, wash water is stored in the storage pond and periodically applied to pasture or crop land at such a rate as to avoid runoff from the field. This management of a "nondischarge" application system enables alligator producers to avoid having to obtain a water quality discharge permit that is managed by the Louisiana Department of Environmental Quality. Producers can work with the LSU Ag Center to develop the necessary best management practices (BMPs) to prevent wastewater losses from their fields and submit a letter describing the BMPs to the Office of Soil and Water Conservation at the Louisiana Department of Agriculture and Forestry. The LDAF will notify LDEQ that the farm will be managing a nondischarge wastewater system.

The amount of water that can be irrigated on land without causing runoff depends on soil characteristics, vegetation and weather. Depending on these factors, applications of ¼ to ½ inch per acre per day can be applied. Irrigation should be evenly distributed across the entire area to be most effective and should be applied through surface, furrow or sprinkler irrigation.

Excess nutrients in soil or excess nutrients in irrigation water, if it leaves the field, may affect the environment when they are dissolved or eroded and transported to surface or groundwater supplies. Excess phosphorus in surface waters can result in eutrophication and a decrease in oxygen levels in the water that leads to loss of animal life. Nitrogen compounds may harm human health and are toxic to fish. In addition, erosion of manure may contaminate water supplies with pathogens such as E. coli or Cryptosporidium. Minimizing these environmental risks requires using best management practices when applying manure to crop land.

While most transport of phosphorus occurs with the erosion of soil sediment, it also can leach if soil phosphorus levels are too high. Phosphorus accumulates in soils if applied in quantities greater than those removed by crops. Accumulation of phosphorus in the soil can be measured by soil-testing.

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