

Lagoons: Flow Measurement

Part Two of a Three Part Series

Calculating the flow of a discharge is probably one of the more difficult tasks because you do not have an exact way of measuring. In second part of a three part series on lagoon management, I will give you a couple of ways to determine the discharge flow.

BUCKET METHOD

You will need 2 things: a watch and a container with a known volume. Usually a 1-gallon or a 5-gallon container will suffice.

First, when you are ready to discharge your lagoon, open the discharge pipe and set the volume in the pipe where you feel you are confrontable (not too fast not too slow or about a 1/3 to half the pipe). Next, using the container of choice, you will need to record the time it takes to fill it. You are now able to begin calculating how many gallons you are discharging into the stream. I will demonstrate the calculation using a 5-gallon bucket.

Let's say the 5-gallon bucket fills in 10 seconds, you will use this as your starting point to begin your calculations.

- 1) Convert to gallons per minute (gpm)
Take the amount of time (10 seconds) it took to fill container and multiply by 6 to get to minutes, now take amount of liquid collected (5 gallons) and also multiply it by 6, which is 30. Now your equation is in gallons per minute (gpm)
- 2) Take your gpm and multiply by number of minutes in a day.
(60 minutes x 24 hour in a day) = 1440 minute in a day.
- 3) Take your 30 gpm x 1440 m/d = 43, 200 gallons per day.

Now you have the flow for the day, you must do this every day you discharge your lagoon. Also you will need to have your flow in million gallons per day (MGD) to record on your Discharge Monitoring Report.

- 4) To change your flow into mgd, simply divide by 1,000,000.
Example: 43,200 gpd divided by 1,000,000 = .0432 MGD

DIMENSIONS METHOD

You will need to know the dimensions of your lagoon for this method and if you know how many acres of lagoon you have that is even better.

The only thing you need is a way to measure how much the lagoon drops every day. Most lagoons have a scale of some sort, such as a graduate ramp or maybe a post in the lagoon.

The next thing to do is isolate the lagoon that you are planning to discharge. DO NOT discharge a lagoon if it is receiving influent flow, because it has not had the enough time

to treat and also the flow coming in, must be calculated into your flow, if you are dropping the level of your lagoons.

- 1) Take an initial measurement, and start your discharge, the next day at the same time measure how much the lagoon has dropped. Measure the amount lowered every day you are discharging. Now you are ready for your calculations:

Say you had a 5 acres lagoon and lowered it 4 inches in a day.

- 2) You will need to know how many square foot are in an acre. I know there is 43,560 square feet in 1 acre.
- 3) Take the 5 acres x 43,560 sq/ft = 217,800 of total sq ft., then take the 4 inches divide by 12 inch in a 1 foot, this equals .33 ft. Take the 217,800 sq. ft. x .33 ft of drop = 71, 874 cubic ft. Then multiply it by 7.48 to get to gallons. This equals 537,617 gallons in one day. You will again need to calculate this each day until you are done discharging.
- 4) To change your flow into mgd, simply divide by 1,000,000.
Example: 537617 gpd divided by 1,000,000 = .537 MGD

You need to determine which method works best for your plant and hopefully the steps listed above takes some of the difficulty out of calculating your flow.

In the next issue, I will focus on sampling procedures on a lagoon system. As always, if you have questions please give me a call.