**TSM 352 Land and Water Mgt Systems**

**Distribution of Water from a Garden Sprinkler**

**(Due Tuesday, April 28th, 2015)**

## Irrigation Exercise

In residential areas, irrigation water is mostly applied to lawns with sprinklers. The efficiency of these systems can be manipulated by adjusting the placement of the sprinklers. In this exercise we will try to predict the relative distribution of water from a garden sprinkler.

## Objectives

The objective of this exercise is to determine the spacing of sprinklers for maximum distribution efficiency.

## Equipment

Sprinkler, catch buckets, measuring cylinder

## Procedure

1. Turn the faucet on for a full minute and observe the range of coverage of the sprinkler. After the minute is up, turn off the faucet.
2. Place eight catch buckets at equally spaced interval over this range. Label the catch buckets starting with “A” for the bucket next to the sprinkler, “B” for the next bucket, and so on.
3. In the “Predicted Rank” column put a 1 beside the bucket in which you think the most water will fall, a 2 beside the bucket with the second amount, and so on.

|  |  |  |  |
| --- | --- | --- | --- |
| Catch Bucket # | Predicted  Rank | Measured  Rank | Score  |Measured – Predicted| |
| A |  |  |  |
| **B** |  |  |  |
| **C** |  |  |  |
| **D** |  |  |  |
| **E** |  |  |  |
| **F** |  |  |  |
| **G** |  |  |  |
| **H** |  |  |  |
| **Total Score** | | |  |

1. Turn on the faucet and run the sprinkler for 10 minutes. Using the measuring cylinder, determine the volume of water caught in each catch bucket. Record this information below and determine the measured ranks.

|  |  |  |
| --- | --- | --- |
| Catch Bucket # | Volume  (cc) | Measured  Rank |
| A |  |  |
| **B** |  |  |
| **C** |  |  |
| **D** |  |  |
| **E** |  |  |
| **F** |  |  |
| **G** |  |  |
| **H** |  |  |

1. Based on the results, fill in the “Measured Rank” column. How accurate were you at predicting the sprinkler distribution?
2. Since all the buckets are the same size and shape, catch volume is a proxy for catch depth. Use this information to determine the distribution efficiency for a single sprinkler.
3. By superimposing the catch depth from a second sprinkler placed at a range of distances from the first, determine the spacing that produces the greatest distribution efficiency.
4. Determine the distribution efficiency of 4 sprinklers placed at the corners of a square with sides of length equal to the spacing calculated in Step 7 above, using only points on the edge and within the square.
5. *Bonus: Determine the distribution efficiency for 3 sprinklers placed at the corners of an equilateral triangle with sides of length equal to the spacing calculated in Step 7 above, using only points on the edge and within the triangle.*

Turn in a formal lab report and the Excel file with your efficiency calculations.