TSM 352 HOMEWORK ASSIGNMENT 01

**Due Monday, February 2nd at 11:59 pm**

**Please be sure to list all the sources used to answer these questions.**

1. List five invasive species (at least two animals and two plants) that provide a challenge to Illinois’ land and water resources. Write a short report (two or three paragraphs) about one of the species you listed.
2. Based on the 2008 Illinois Groundwater Use Assessment, determine
* The groundwater standard for nitrate in groundwater
* The average nitrate concentration in groundwater
* The percentage of wells in which the nitrate concentration exceeded the groundwater standard.

**1.** **The groundwater standard for nitrate is 10 milligrams/liter**

**2. The average nitrate concentration in groundwater is 5.6 ug/L**

**3. The percentage of wells in which the nitrate concentration exceeded the groundwater standard.**

**Total of 301 wells (or 68 wells with nitrate) , 4 wells have >10 ug/l**

**So, 1.33% (5.9 %) of wells of wells exceed the groundwater standard**

1. Determine the area of a triangular field in square feet, and square meters, if the lengths of the three sides are 500, 600, and 900 ft.

**s =(500 + 600 + 900) / 2 = 1000**

**Area = Square root(1,000 \* (1,000 - 500) \* (1,000 - 600) \* (1,000 - 900)) = 141,421.4 ft2**

**= 13138.5 m2**

1. If the watershed area on a map measured with a planimeter is 36.2 square inches and the scale of the map is 100 ft/in., compute the area of the watershed in acres and hectares.

**Length ratio = 100 ft/in.**

**Therefore area ratio = 100\*100 = 10,000 sq. ft/sq. in.**

**Area = 36.2\*10000 = 362,000 sq. ft = 362000/43560 = 8.31 acres**

1. Determine the area, to the nearest acre, and to the nearest hectare, of the field bounded by the following latitudes and longitudes.

39.994957 -88.197959

39.996084 -88.197963

39.996105 -88.194476

39.992495 -88.194439

39.992467 -88.199121

39.99496 -88.199138

**[Link to Excel Worksheet](%5C%5C%5C%5CAGE-WEB%5C%5Ctsm352%5C%5CHomework2015%5C%5CHomework01.xlsx)**

1. In 1990, USDA reported that each American farmer produced enough food for himself and 102 others. What is the corresponding number for 2013? If the average American farm contains 235 acres of land and needs 320,000 gallons of water per acre to produce this food, how much water is needed to produce the food the average American will eat this year?

|  |  |
| --- | --- |
| **Size of Average Farm (acres)** | **235** |
| **Number of people served per farm** | **103** |
| **Acres per person** | **2.28** |
| **Gallons/acre** | **320000** |
| **Gallons per acre/acres per person** | **729,600** |
|  |  |

1. Based on the website below, what is the combined volume of water used daily in the US, China, India, Brazil and Nigeria? What is the percentage for each country? <http://www.data360.org/dsg.aspx?Data_Set_Group_Id=757>

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Country** | **Daily water use per person (L)** | **Population\*** | **Daily Water Use (cubic meter)** | **Percentage** |
| **USA** | **575** | **322,583,006** | **185,485,228** |  **36** |
| **China** | **86** | **1,393,783,836** | **119,865,410** |  **23** |
| **India** | **135** | **1,267,401,849** | **171,099,250** |  **33** |
| **Brazil** | **187** | **202,033,670** | **37,780,296** |  **7** |
| **Nigeria** | **36** | **178,516,904** | **6,426,609** |  **1** |
|  |  |  | **520,656,793** |  **100** |

**\*: http://www.worldometers.info/world-population/population-by-country/**