Florida's Water Budget

Human & Natural Impacts on Florida's Freshwater

Pre-Questions

1. Access to freshwater is a limiting factor in many ecosystems, what are some other limiting factors that can effect native populations?

2. Draw a diagram that shows a lake water source. Add and label arrows for ways that water can be added to the lake. Add and label arrows for the ways that water can be removed from the lake. (Be sure to include human and natural / non-human sources)

PART 1: Water Used by Florida Counties in 2010

3. What relationship exist between the human population and how much water is used each year (in MILLIONS of gallons)?

4. List the three counties that use the most water. Does your population to usage trend hold true for these three?

5. Assume that Seminole County's water sources can safely have ~110 million gallons withdrawn each day, what would the water supply *limit* the population to Seminole County to. If the population exceeded that limit predict what would happen to the water supply, cost of water, and water ecosystems.

PART 2: Rainfall Additions to the Water Supply

6. Compare the two graphs that you produced in your part 2 coding blocks. Which month had a greater amount of rainfall? Think about plants during these two months, how does the growth differ? Why is that the case? What other limiting factors might contribute?

7. Look at the bar graph of "Average Monthly Water Consumption", compare the water consumption in February and July to the rainfall from the last question? What is the pattern? Why might this be the case?

8. Which 3 counties are consistently in the top 6 for rainfall totals between the two months of data that are being compared? Find them on the map. How might nearby areas with less rainfall benefit from theirs? How might this affect human population? What about agriculture (food supply)?

PART 3: Monitoring Lake Apopka a Freshwater Source for Agriculture

9. What can you infer about the water levels in Lake Apopka in 2005 considering the information on rainfall in the previous tables?

10. Water sources fluctuate with rainfall, usage, and local temperatures. Using the graph and the map that is generated under it, explain why the water levels of the lake fluctuate as they do in this plot.

PART 4: Unstructured Coding

11. Change the code and analyze the data/graphs for the smallest 10 counties.

CODING INSTRUCTIONS

PART 1: Water Used by Florida Counties in 2010

Run the code as it is shown to produce graphs and charts to answer question 3 & 5. Make modifications to the highlighted portion for the unstructured coding. (note that changes to the axis size (xlim & ylim) will be necessary)

```
# Set variables for scatter plot
x = data.Population
y = data.WaterUsed

fig = plt.figure(figsize=(15, 6))
plt.scatter(x,y)
plt.xlim(0,3000000)
plt.ylim(0,350)
plt.title('The Relationship Between Population
plt.xlabel('Population (individuals)')
plt.ylabel('Water Used (million gallons)')

# This actually shows the plot
plt.show()
```

Run the code below to produce graphs and charts to answer questions 4 & 5. Make changes to one or more of the highlighted portions for the unstructured coding portion.

```
# Orginizes by County with the highest water usage in decending order
#Only displays the top 10 highestest water consuming counties by putting .head(10)

mostwater = place.sort_values(by="WaterUsed", ascending = False).head(10)
mostwater
```

PART 2: Rainfall Additions to the Water Supply

Run the code below to produce graphs and charts to answer questions 6-8. Make changes to one or more of the highlighted portions for the unstructured coding portion.

```
feb.sort_values(by="Monthly Total", ascending=True).plot(x="County", y="Monthly Total",
```

```
july.sort_values(by="Monthly Total", ascending=True).plot(x="County", y="Monthly Total",
```

PART 3: Monitoring Lake Apopka a Freshwater Source for Agriculture

Run the code as is to produce the tables and graphs that will help you answer questions 9 & 10. If you are interested in viewing other months or days simply change the dates into the ones you want. (be sure to follow the same format and note that this is only for 2005)

```
lev2.loc["2/1/2005":"2/28/2005", :]
```

```
lev2.loc["7/1/2005":"7/7/2005", :]
```