CONCLUSIONS TO CMC DATA DIVING

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STARTING OUT

WHAT'S BEEN DONE

KEY CHALLENGES

SUGGESTIONS AND NEXT STEPS

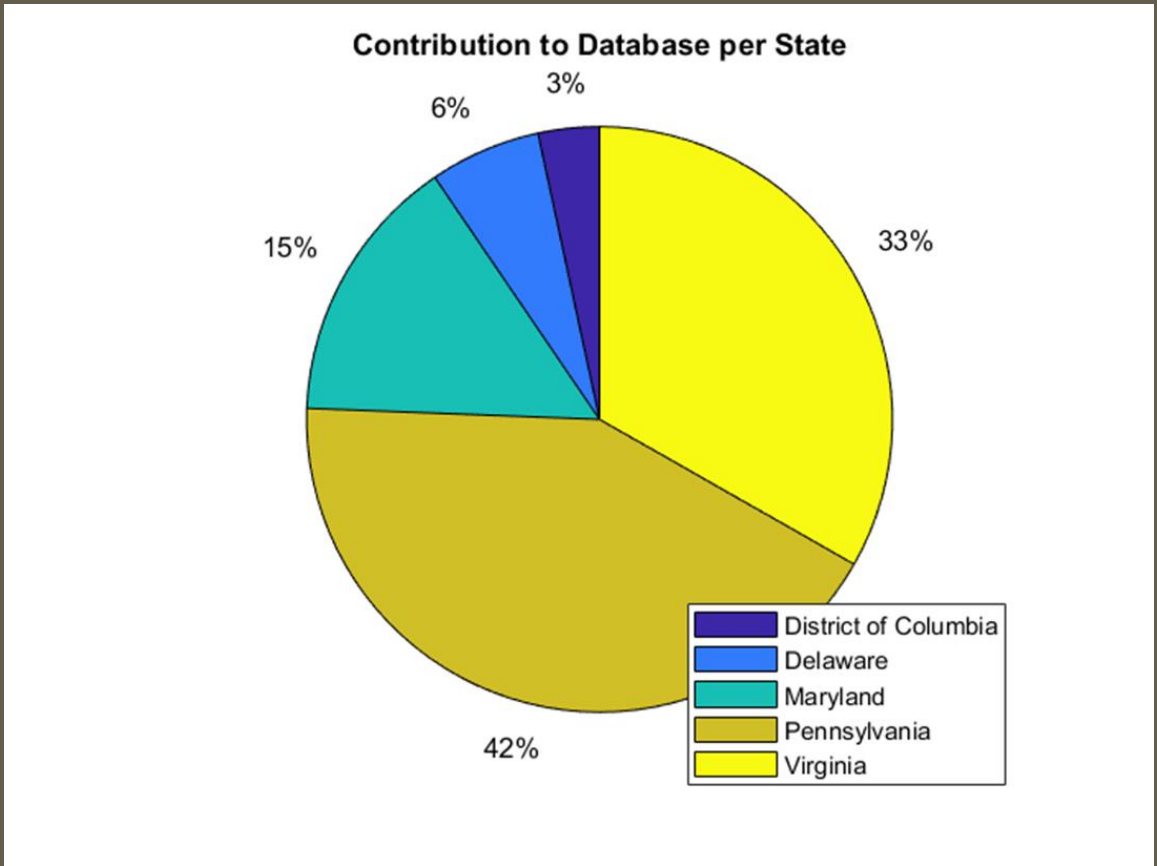
OVERVIEW

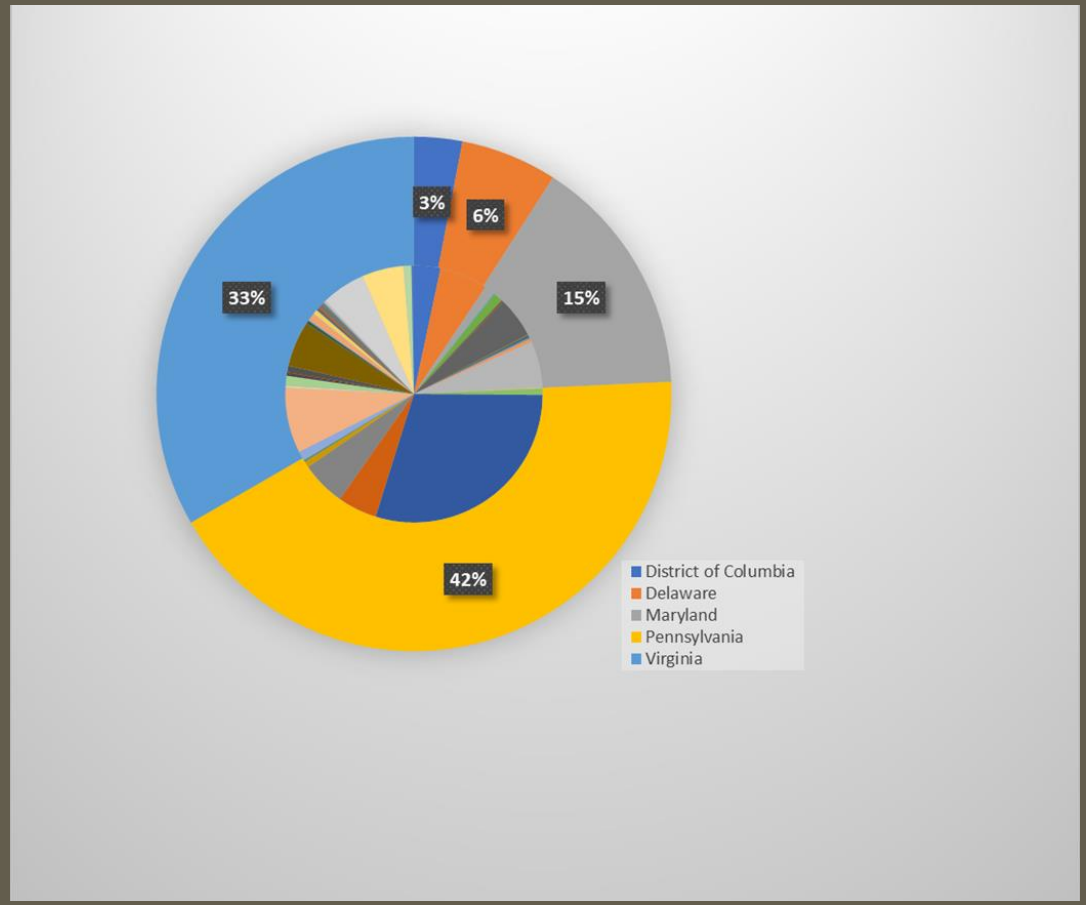
Introduction

- Data from the Chesapeake Data Explorer were extracted on June, 2019.
- The parameters included Alkalinity, Ammonia Nitrogen, E. Coli, Chlorophyll a, Dissolved Oxygen, Dissolved Oxygen % Saturation, Enterococcus, Nitrate- Nitrogen, Nitrite- Nitrate, Orthophosphate, Salinity, Total depth Total Dissolved Solids, Total Kjeldahl Nitrogen, Total Nitrogen, Total Phosphorus, Total Suspended Solids, Water Clarity, Water Temperature, pH, Conductivity, for a total of 21 parameters
- Between Benthic and water quality data sets there are near100,000 data records.
- There are historical data (Early 1990s as of June) and new data (2016-present)
- This data could be used to fill in gaps for data across the watershed

STARTING OUT

- A cautionary tale
  - What I had thought was a good idea in the beginning was to download ALL OF THE DATA in one big megafile by not checking any of the boxes and just going for it
  - This came with its own unique pros and cons
    - It allowed me to get the metadata as a whole list which was useful for understanding the full scope of where the monitoring data has been coming from
    - However, the file was bulky and on my older laptop would freeze and shutdown(However I continued to use this file and it is where all water quality data analysis comes from.)





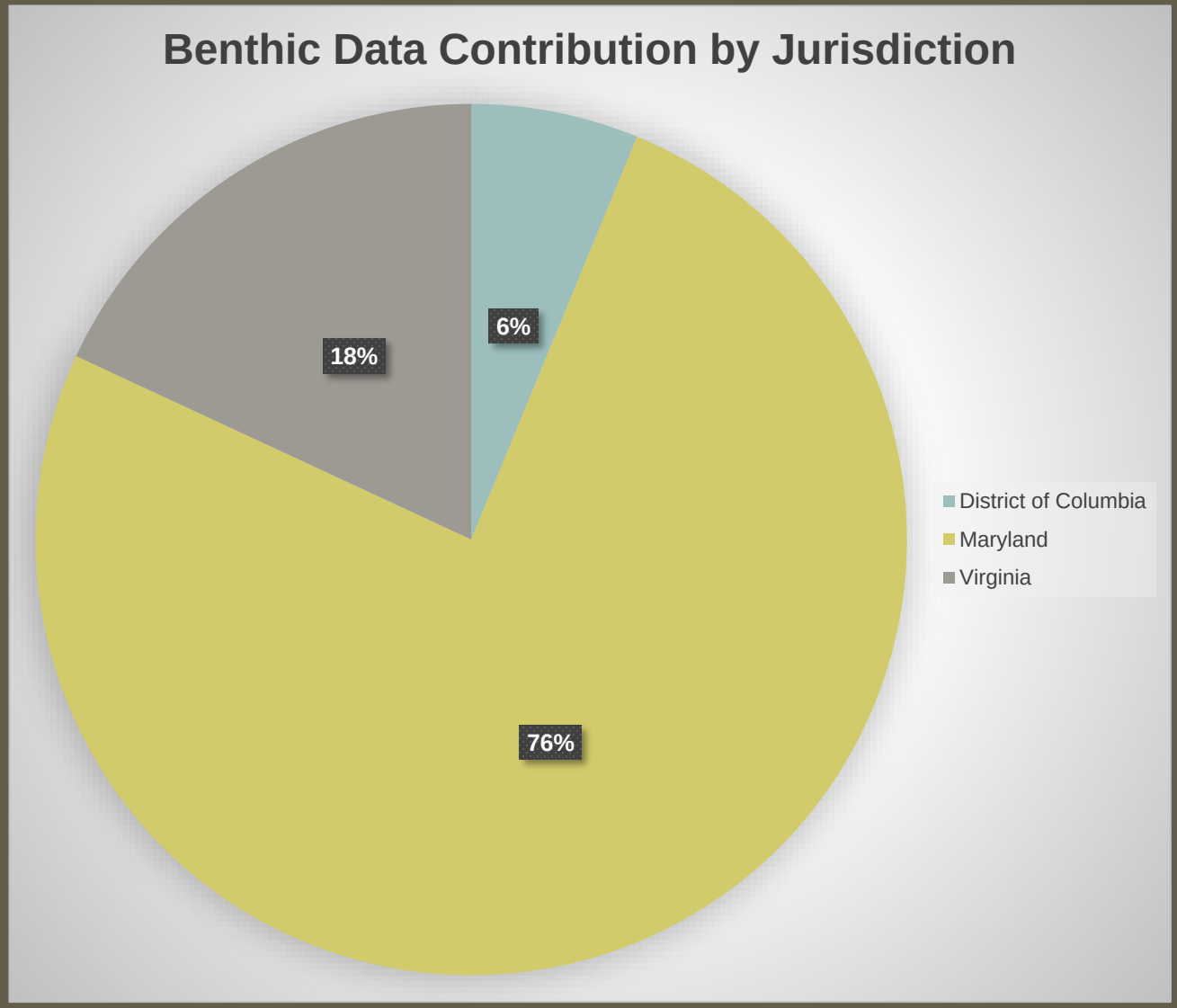
OVERALL CONTRIBUTION BY JURISDICTION

N=13249

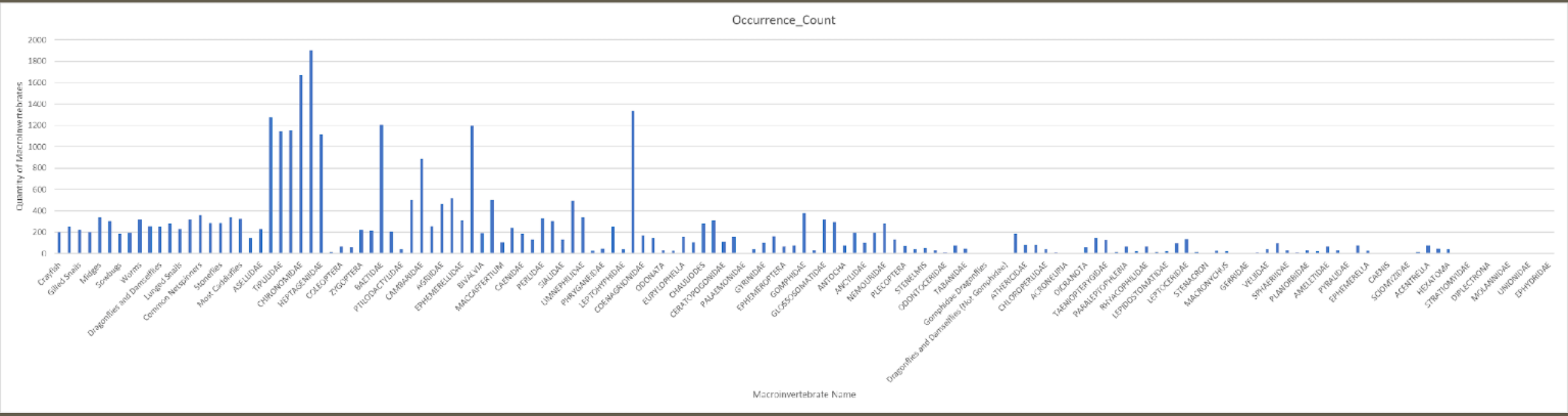
BENTHIC MACROINVERTEBRATE DATA

BENTHIC DETAILS

N=30714

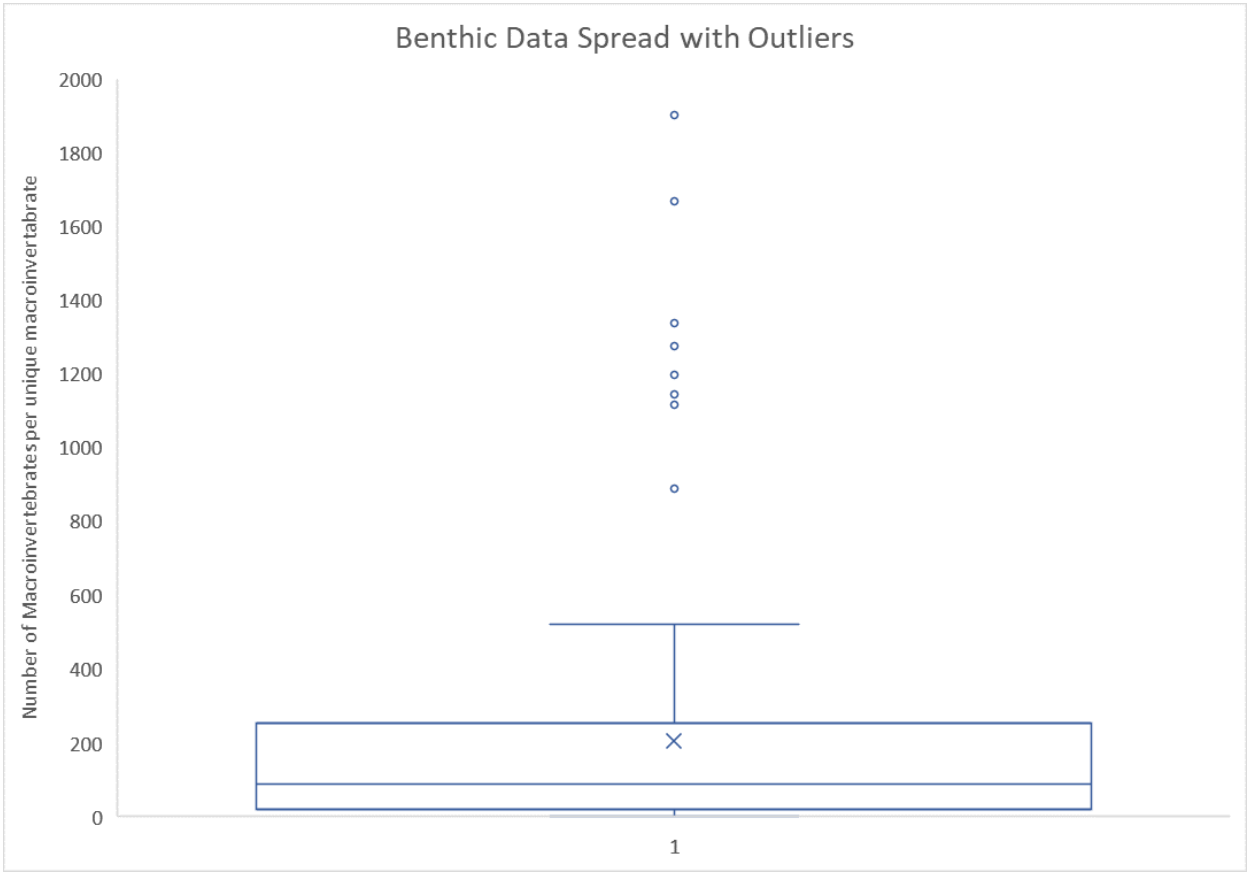


Quantity of Macroinvertebrates by Type



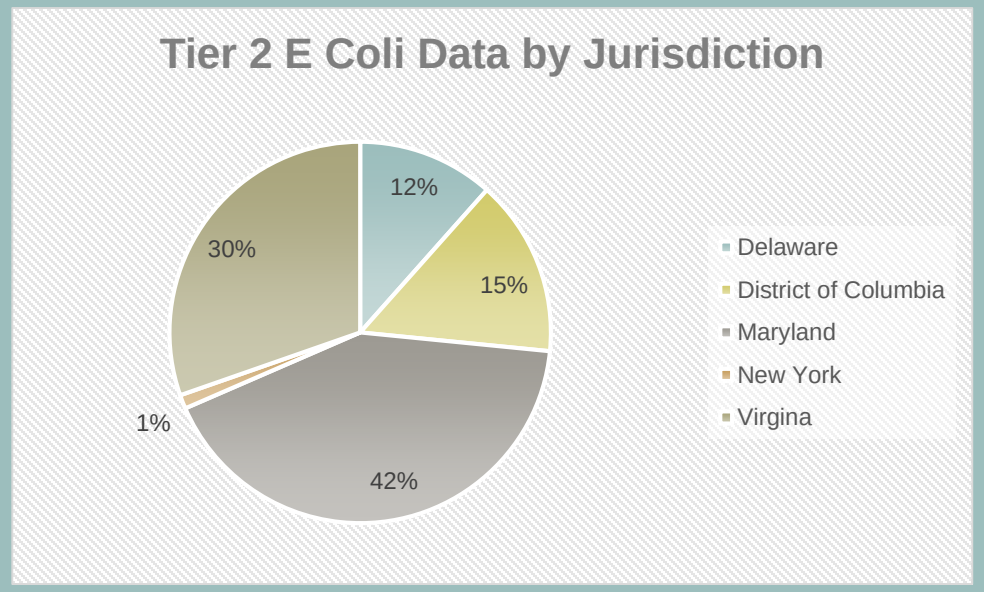
30714 Total Benthic Macroinvertebrates recorded

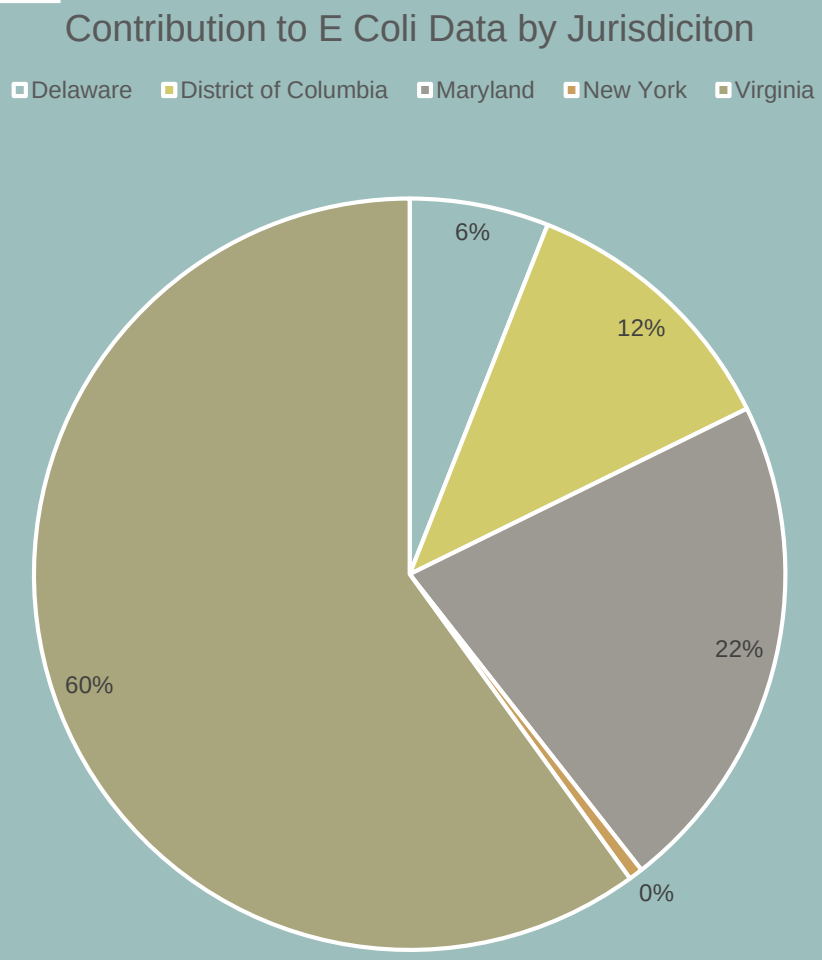
After creating this, I found that the count sometimes has 1 found and some times more than 1


Benthic Data Spread with Outliers
Number of Macroinvertebrates per unique macroinvertabrate
2000
1800
1600
1400
1200
1000
800
600
400
200
0
1

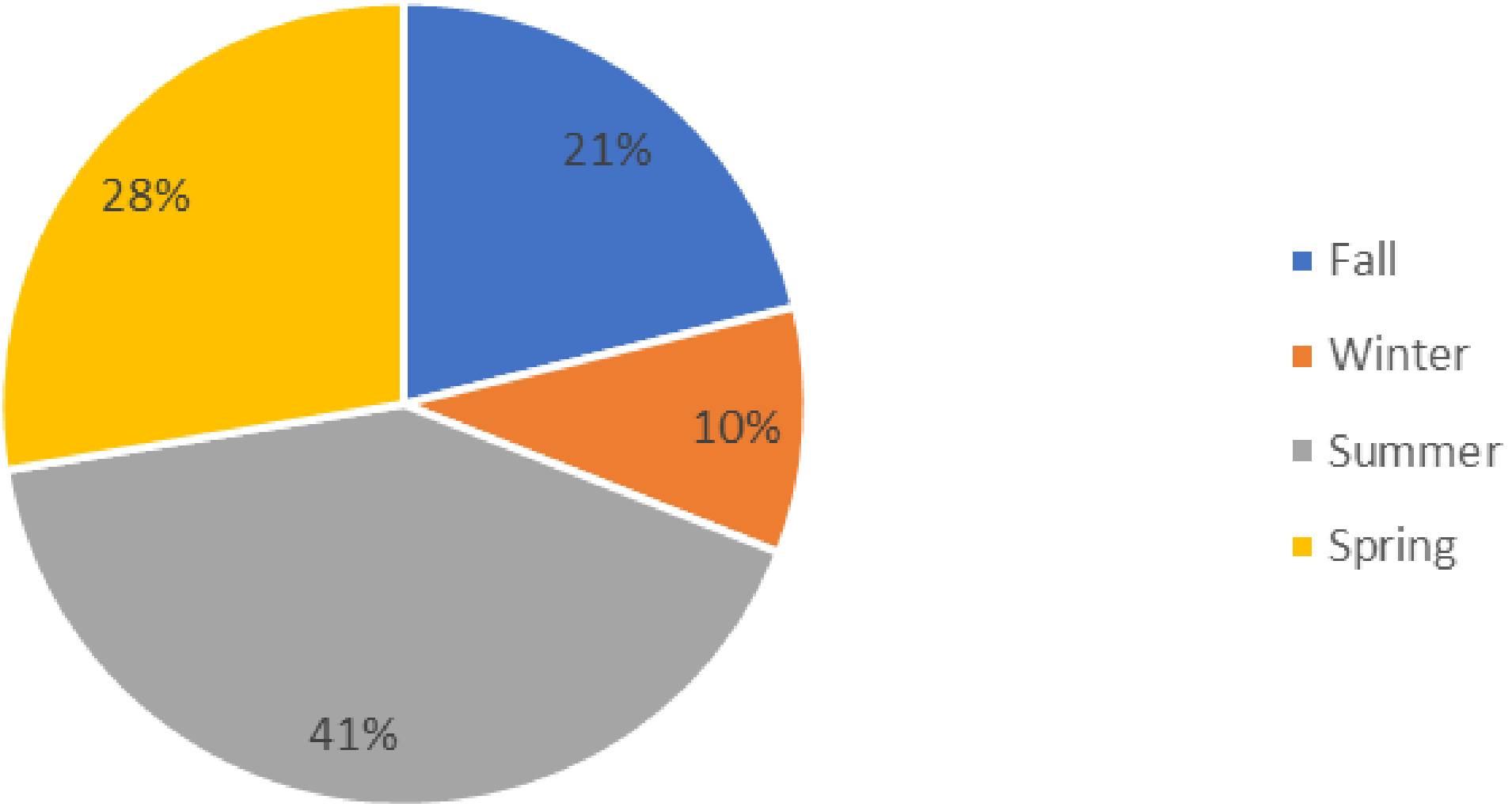
DEEPER DIVE: LOOKING AT PARAMETER BY JURISDICTION

- By parameter- E Coli
  - 2306 Total Data Points
  - 113 Tier 1, 1193 Tier 2

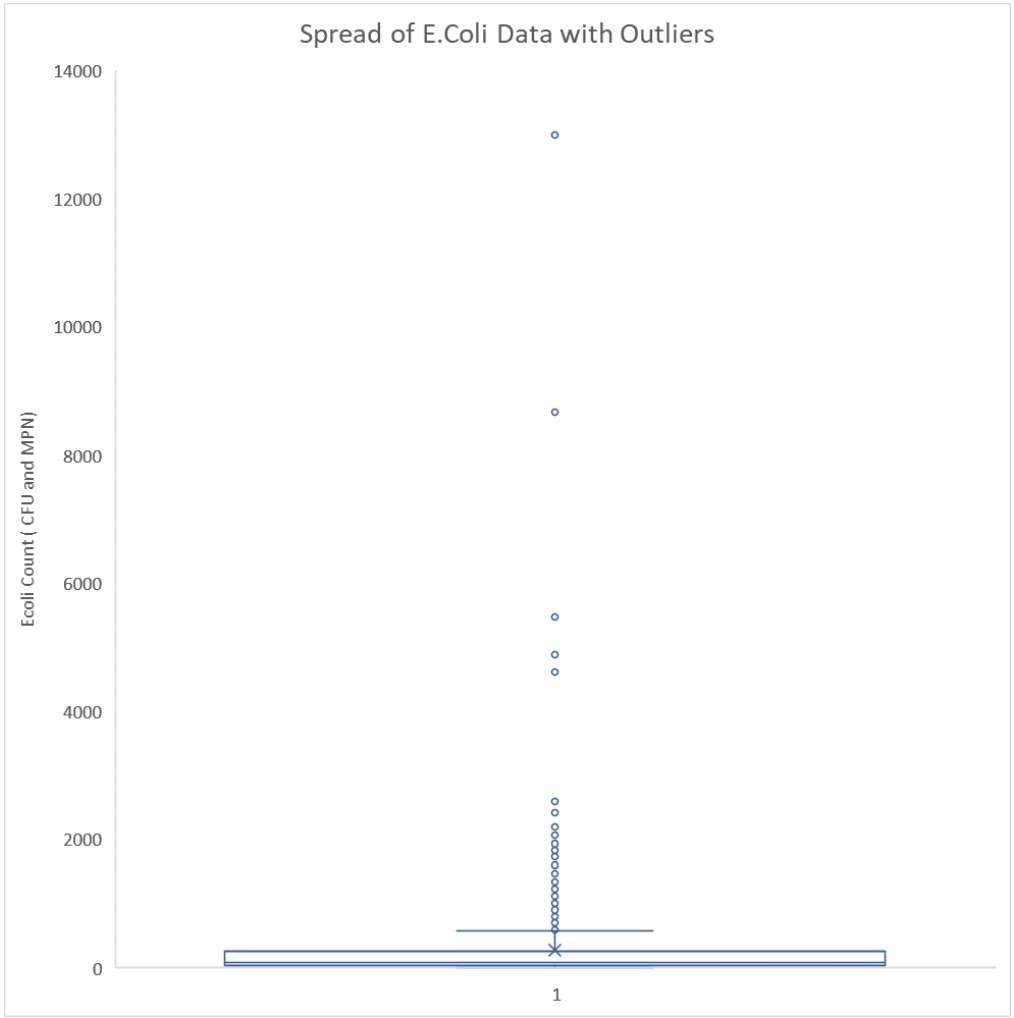


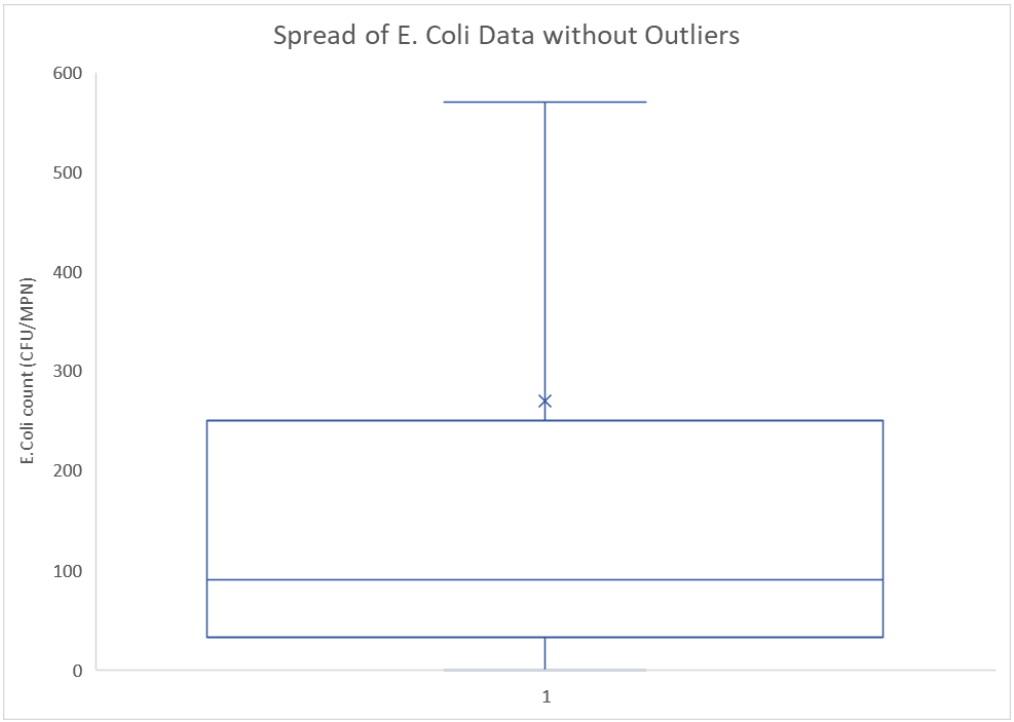


E Coli Data Contribution by Season



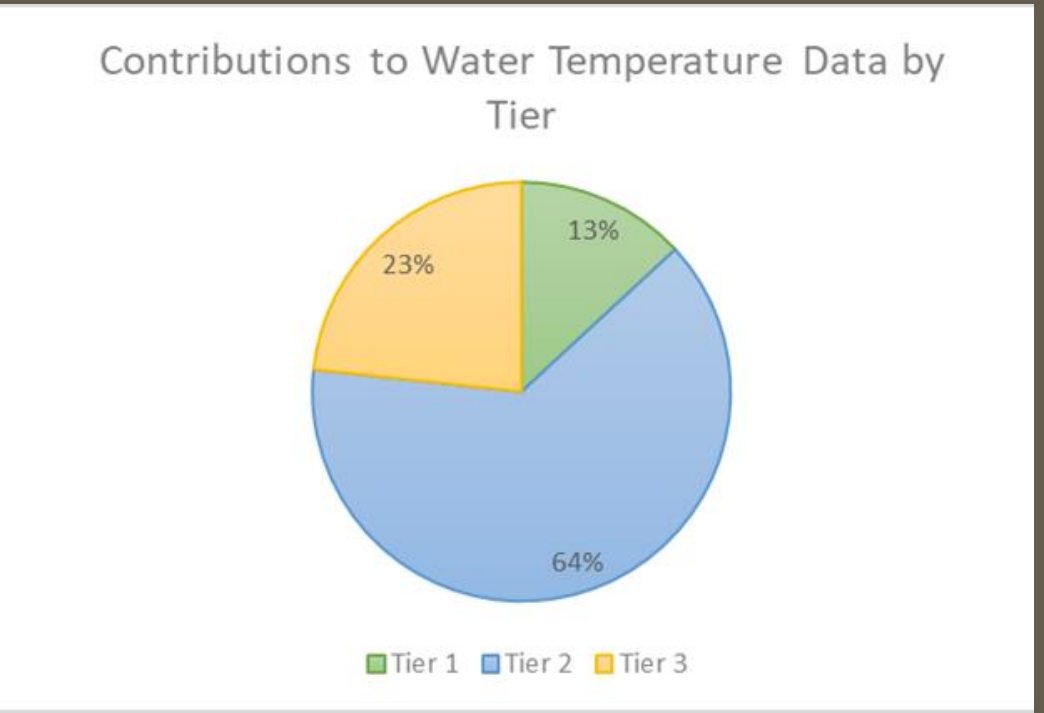
N= 2306

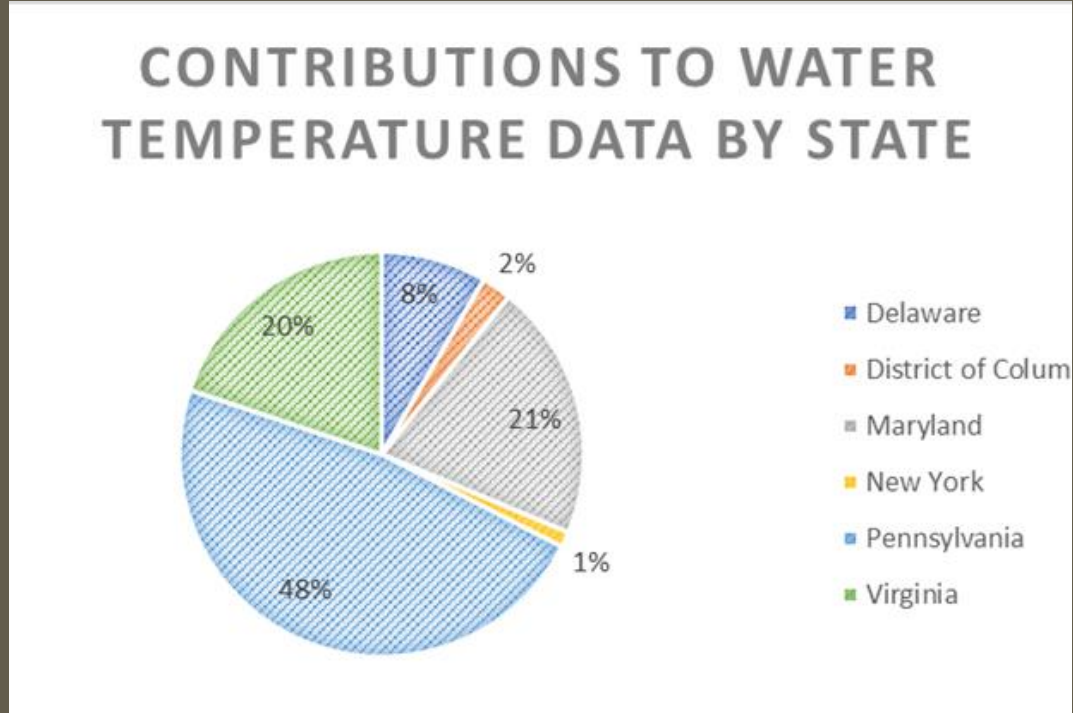

Spread of E.Coli Data with Outliers
14000
12000
10000
8000
6000
4000
2000
0
Ecoli Count (CFU and MPN)
1

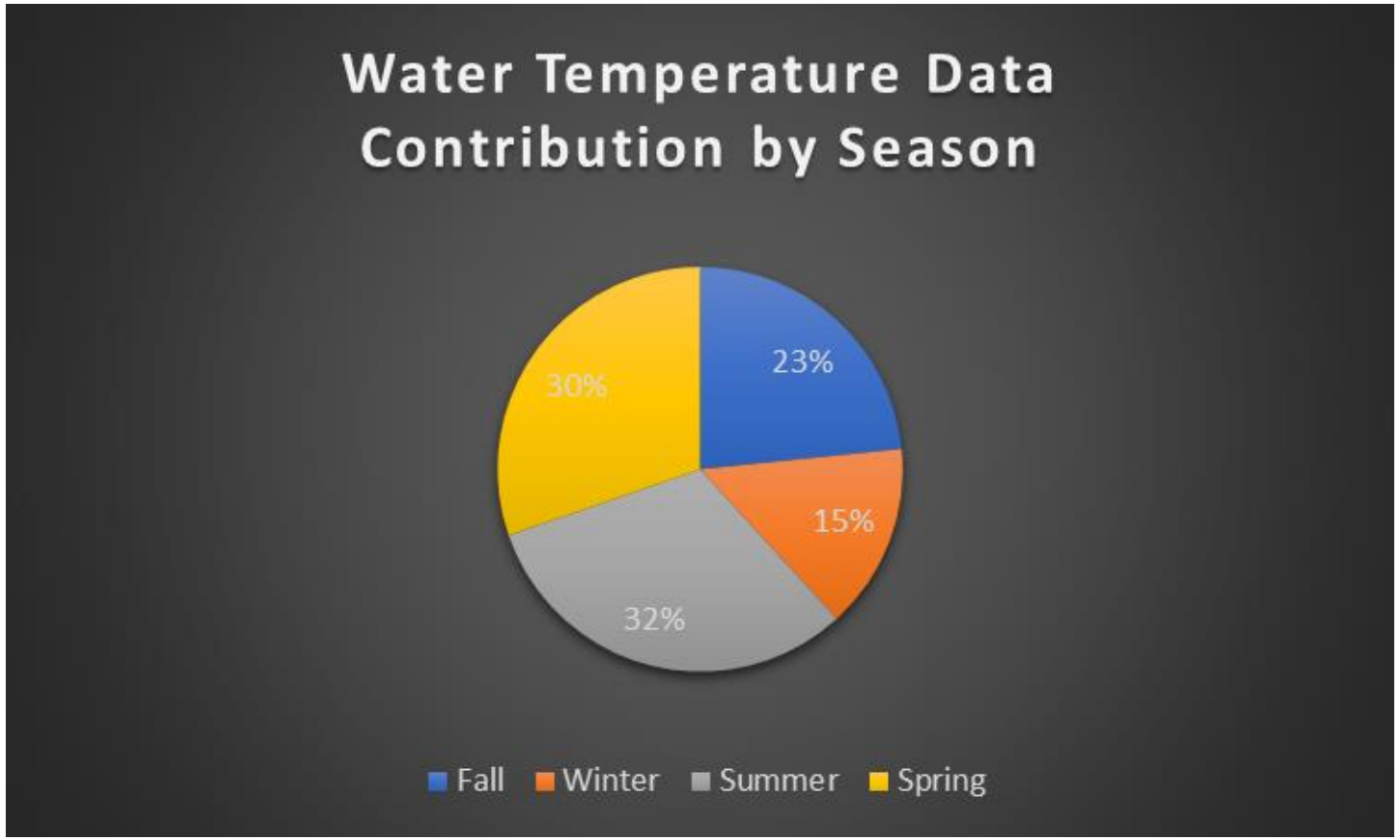

Spread of E. Coli Data without Outliers
600
500
400
300
200
100
0
E.Coli count (CFU/MPN)
1

DEEPER DIVE: LOOKING AT PARAMETER BY JURISDICTION

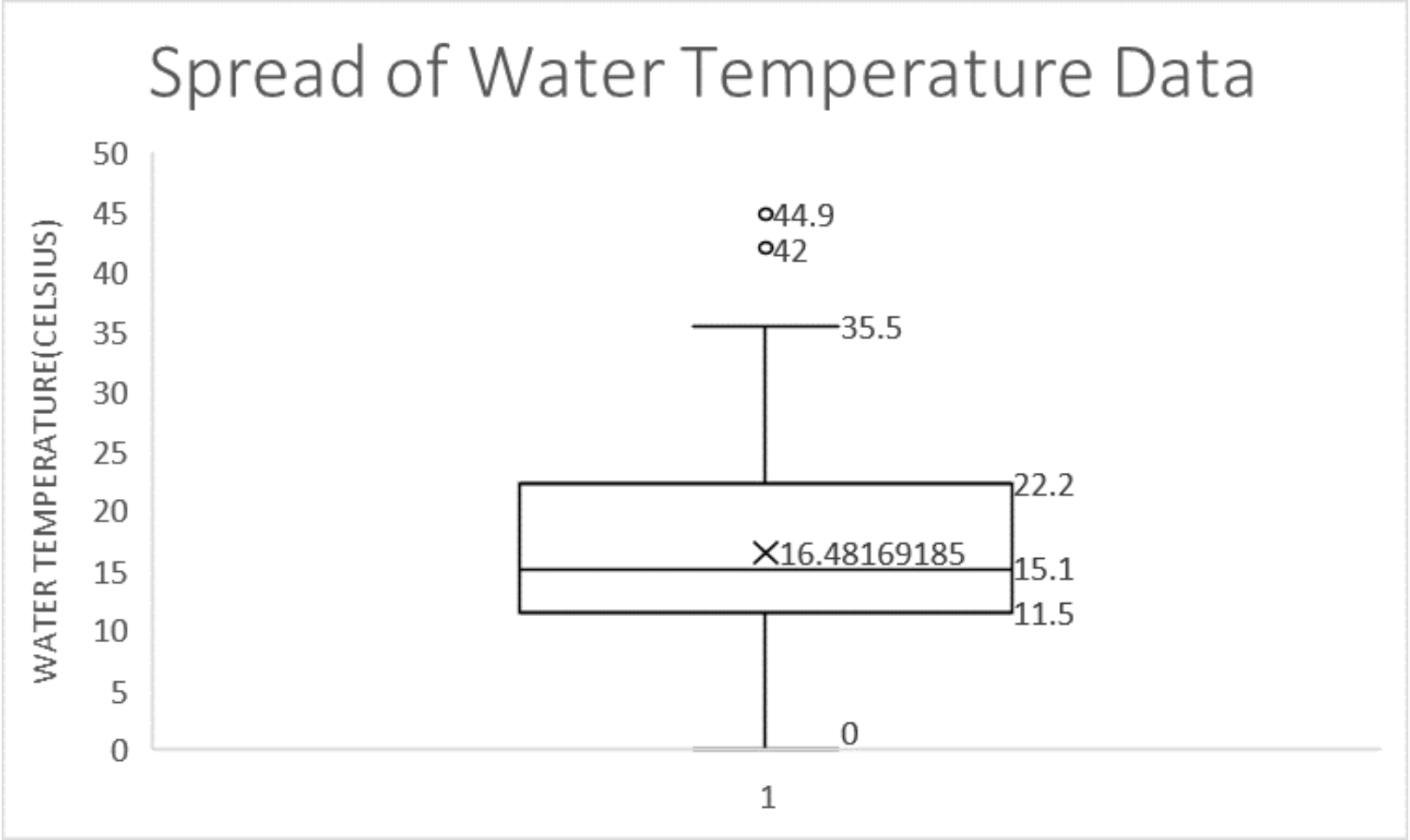
- By Parameter: Water Temperature
  - All Tier 3 data is from Delaware and Maryland (Anne Arundel, Baltimore, Caroline, Dorchester, Cecil, Charles, Kent, Queen Anne, Somerset, St. Mary's, Talbot, Wicomico Counties)
  - 8872 Total Data Points






Water Temperature Data
Contribution by Season
23%
15%
32%
30%
Fall
Winter
Summer
Spring

N=8872


Spread of Water Temperature Data
WATER TEMPERATURE(CELSIUS)
50
45
40
35
30
25
20
15
10
5
0
44.9
42
35.5
22.2
16.48169185
15.1
11.5
0
1

MAPPING OF WATER TEMPERATURE, E COLI, AND MACROINVERTEBRATES OVER TIME

THESE ARE CURRENTLY PACKAGES IN MY ESRI ACCOUNT!

https://uvm.maps.arcgis.com/home/content.html?view=table&start=1&num=20&sortOrder=desc&sortField=modified&folder=dbrownm#content

CONCLUSIONS

WATER TEMPERATURE

- Water Temperature appears consistent with the seasons they are in
- It seems as though most locations have relatively small bodies of water where they are measuring, so the summer temperatures are high
- However, some outlier points are so extreme that it seems that they are in Fahrenheit instead of Celsius

E. COLI

- A large amount of the data is less than 100 MPN/ CFU
  - But a lot of the data is far above that
- Due to the nature of this data, it is hard for me to draw any conclusions

KEY CHALLENGES

Rapid Obsolescence

- Whether it was not downloading all the data or I had made my download of the data so messy that I needed to scrap it and redownload a new version, There was a lot of times I needed to go back to the site to get the files again
- The issue was that in going back, things would change causing repetition or inaccuracies

Excel Sheets

- When downloading excel sheets(with water quality parameters) each comes out without a marker to what data set

Suggestions and Next Steps

- Example uses for this data:
  - USGS efforts to have more water temperature datasets
  - Determining if local swimming areas are safe based on E. Coli Indicators
  - Filling Benthic Macroinvertebrate data gaps
- And this is just for 3 of the parameters collected!!!

ANY QUESTIONS?

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