To explore how the selection of data analysis tools can fundamentally shape what is highlighted in an investigation, Pimental, Horton, and Wilkerson conducted a comparative analysis using several popular tools from multiple tool genres. This file demonstrates how Python can be used to carry out these analyses. The associated commissioned paper, supplementary materials, RMarkdown file, and dataset can be found at https://nicholasjhorton.github.io/K12-Data-Tools. Thanks for Jay Kienzle for translating the example to Python.

```
import pandas as pd

df = pd.read_csv(r"https://nicholasjhorton.github.io/K12-Data-Tools/static/fishdata.cs
df = df[df["Common Name"] == "American lobster"]
df["Region"].replace(["Northeast US Fall","Northeast US Spring"], "Northeast US",
                     inplace=True,
                     )
df.head()
```

	Common Name	Species	Year	Region	Latitude	Longitude	Depth
0	American lobster	Homarus americanus	1971	Gulf of St. Lawrence South	45.896731	-62.476134	NaN
6	American lobster	Homarus americanus	1972	Gulf of St. Lawrence South	46.895090	-64.468539	NaN
7	American lobster	Homarus americanus	1973	Gulf of St. Lawrence South	45.896731	-62.476134	NaN

This vignette

```
print(df["Region"].value_counts())
print(f"Total rows: {df.shape[0]}")
```

```
Northeast US                  89
Maritimes Summer              50
Gulf of St. Lawrence South    48
Name: Region, dtype: int64
Total rows: 187
```

```
df["Region"].value_counts(normalize=True)*100
```

```
Northeast US                  47.593583
Maritimes Summer              26.737968
Gulf of St. Lawrence South    25.668449
Name: Region, dtype: float64
```

```
df["Year"].value_counts()
```

```
1996    4
1993    4
2019    4
1997    4
1998    4
1999    4
2000    4
2001    4
2002    4
2004    4
2005    4
2006    4
2007    4
2008    4
2009    4
2010    4
2011    4
2012    4
2013    4
2015    4
2016    4
1995    4
1994    4
1982    4
1983    4
1976    4
1977    4
1978    4
1979    4
1980    4
1981    4
1992    4
1984    4
1974    4
1985    4
1986    4
1987    4
1988    4
1989    4
1990    4
1991    4
2003    3
2018    3
2014    3
1975    3
2017    3
1971    2
1972    2
1973    2
1970    1
2020    1
Name: Year, dtype: int64
```

```
df["Latitude"].describe()
```

```
count    185.000000
mean      43.547218
std        1.971605
min       40.787100
25%       41.945837
50%       42.957488
75%       45.896731
max       47.227152
Name: Latitude, dtype: float64
```

```
df["Longitude"].describe()
```

```
count    185.000000
mean     -66.246863
std        2.631807
min      -70.236450
25%      -68.720644
50%      -66.130305
75%      -63.452232
max      -60.735165
Name: Longitude, dtype: float64
```

```
import pandas as pd
import plotly.express as px

fig = px.scatter_mapbox(df, lat="Latitude", lon="Longitude",
                        zoom=4.5,
                        color="Region"
                        )
fig.update_layout(mapbox_style="open-street-map")

fig.show()
```


```
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fig = px.scatter_mapbox(df, lat="Latitude", lon="Longitude",
                        zoom=4.5,
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```

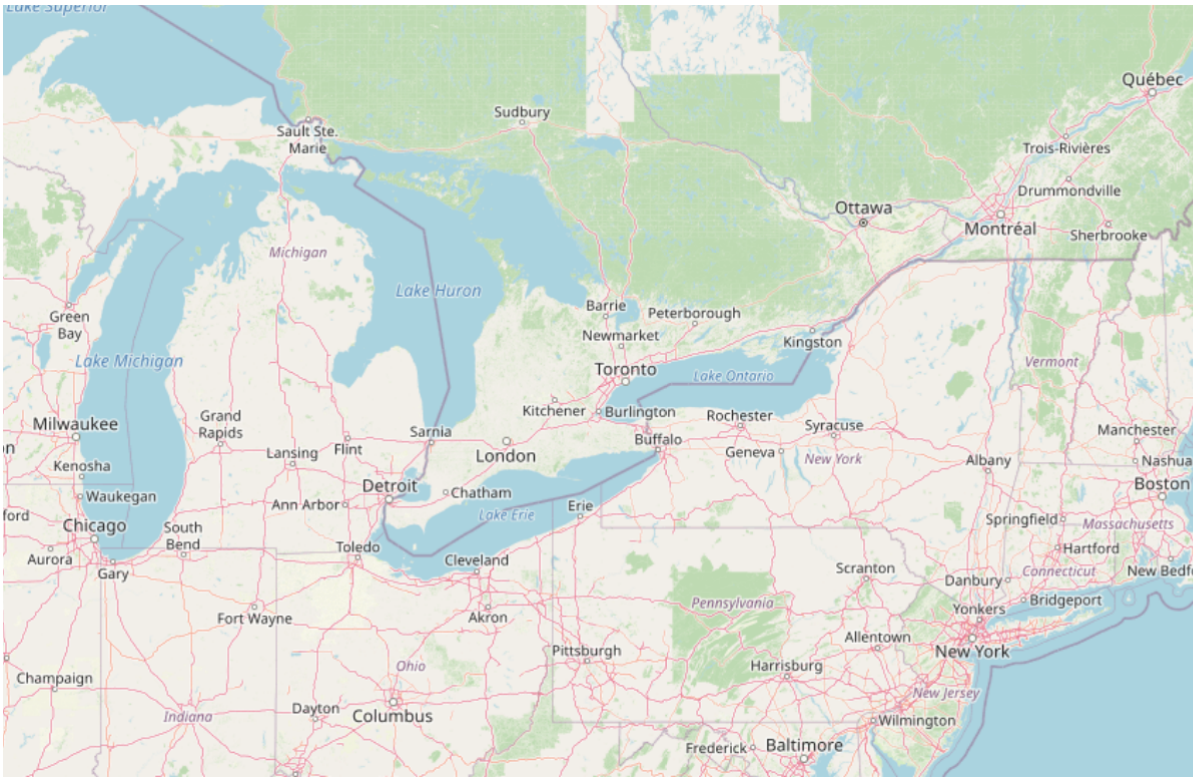

```
import seaborn as sns

sns.lmplot(x="Year", y="Latitude", data=df, hue="Region")
```

```
<seaborn.axisgrid.FacetGrid at 0x7f5d755b3f10>
```