Individual Coursework Submission Form

Specialist Masters Programme

Surname: Rousseau	**First Name: Miles**
MSc in: Business Analytics	**Student ID number: 230060010**
Module Code: SMM 635	
Module Title: Data Visualization	
Lecturer: Sangseok Joseph Lee	**Submission Date: 3/31/24**

Declaration:
By submitting this work, I declare that this work is entirely my own except those parts duly identified and referenced in my submission. It complies with any specified word limits and the requirements and regulations detailed in the coursework instructions and any other relevant programme and module documentation. In submitting this work, I acknowledge that I have read and understood the regulations and code regarding academic misconduct, including that relating to plagiarism, as specified in the Programme Handbook. I also acknowledge that this work will be subject to a variety of checks for academic misconduct.

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Marker's Comments (if not being marked on-line):

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SMM635 — Final-Term Project Submission

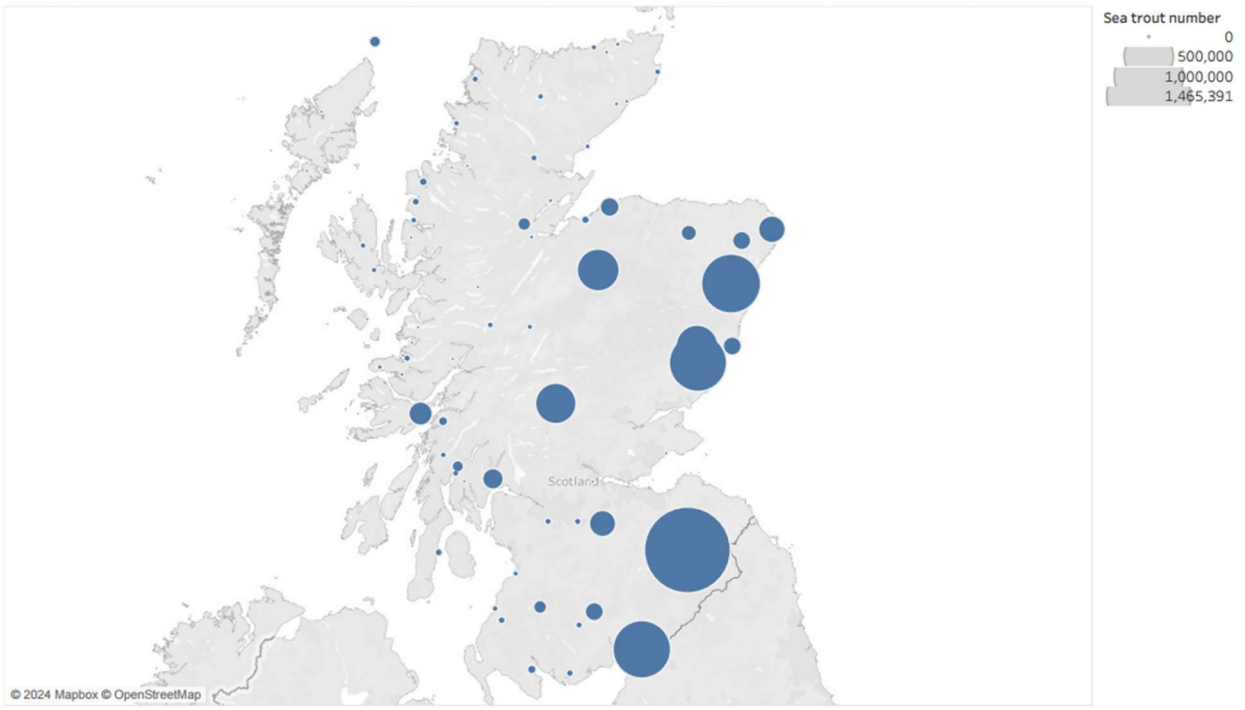
Miles Rousseau

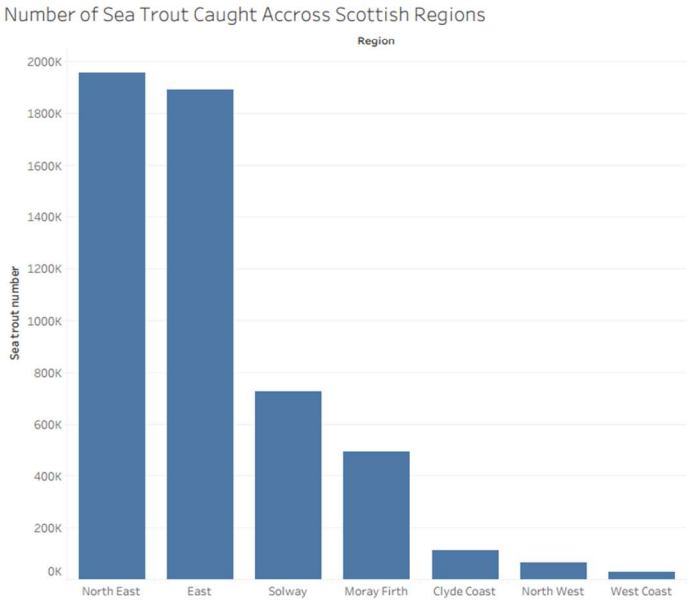
Dataset Link:

https://www.kaggle.com/datasets/mikhail1681/salmon-catch-statistics-for-scotland-19522022

Visualization #1

Q1. How does the number of sea trout caught vary across the country of Scotland for the period studied?





What is the main insight of the chart? (MAX 200 WORDS) Why do you think this is insightful?

The main insight of these charts is that the number of sea trout caught is concentrated on the eastern side of Scotland. While fishing operations take place throughout Scotland, most of the Sea Trout is caught in the Eastern and Northeastern fishing districts. This insight paints a picture of the Sea trout ecology and fishing habits. Sea trout, like many migratory fish, follow specific migration routes influenced by water temperature, salinity levels, and availability of food. The eastern side of Scotland may provide more favourable conditions along these migration routes, attracting a higher concentration of sea trout. Additionally, due to Scotland's Geography the eastern side of the country is comprised of mainly lowlands while the western side is mainly highlands. Lowlands are where the mouth of the rivers can be found which have more extensive rivers systems that provide spawning grounds for Sea Trout. Lastly, the visualization shows where most fishing takes place in Scotland which would lead to higher numbers of fish caught.

Most of district names are not recognized on Tableau, many had to be inputted by entering the coordinates. This was interesting to me as it showed the limitations of Tableau dealing with obscure geographical locations.

Visualization #2

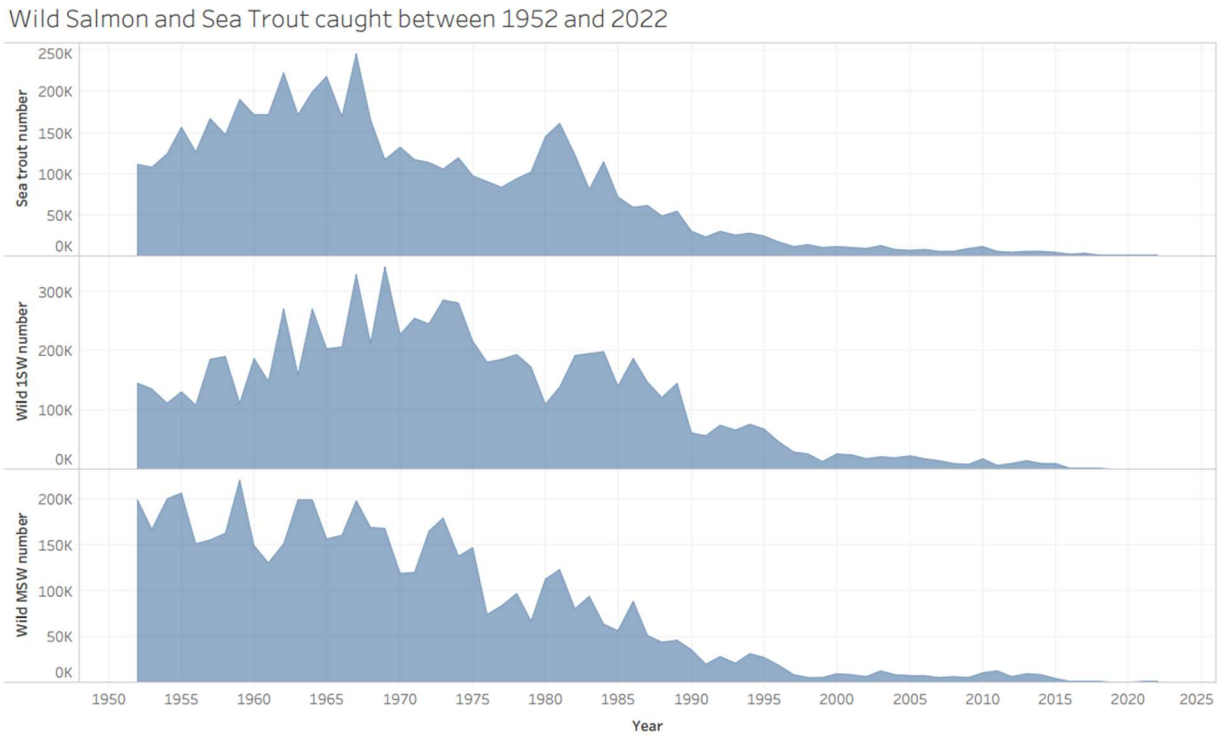
Q2. What is the seasonality of fishing over the year on average for all wild caught fish in Scotland?

What is the main insight of the chart? (MAX 200 WORDS) Why do you think this is insightful?

The main insight of this chart is that wild fishing mainly takes place during the summer months. This is insightful because it shows the seasonal behaviour of fish, the patterns of fishing activity and the impact of fishing regulations. Salmon and Trout, the species that are tracked in this chart, exhibit seasonal behaviour patterns. In Scotland, summer months often coincide with periods of increased feeding and spawning for both species. Thus, fishermen may prefer to fish during these months when fish are more active and the chances of successfully catching a fish is elevated. During the summer, the weather is milder, and the days are longer which also contributes to the number of fish caught because more fishermen are out fishing. The summer also attracts tourists, which again means more fishermen who are actively fishing, and more fish caught. Lastly from a regulatory perspective, Scotland restricts the fishing season for wild multi season and single season salmon, and sea trout from approximately February to October. As seen in the graph, little to no fish are caught in-between October and January. Potential fishermen/fisheries can use this graph to concentrate their fishing efforts between June and July when most fish are caught.

Visualization #3

Q3. How does the pattern of wild salmon and sea trout caught change over the years studied?



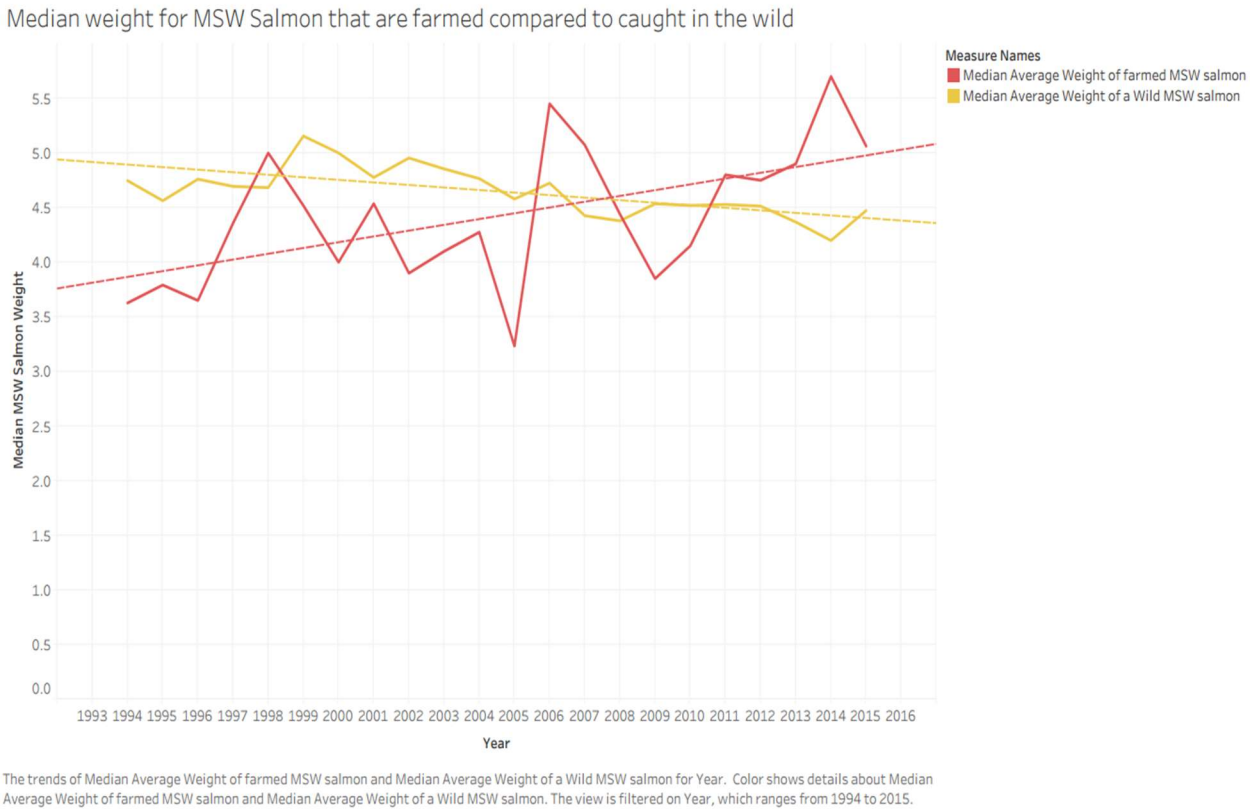
The plots of sum of Sea trout number, sum of Wild 1SW number and sum of Wild MSW number for Year. The view is filtered on Year, which keeps non-Null values only.

What is the main insight of the chart? (MAX 200 WORDS) Why do you think this is insightful?

The main insight of this chart is that throughout the period studied the number of wild MSW salmon, wild 1SW salmon and sea trout caught have all declined, indicating that the wild fish populations of these species are all struggling. This is insightful because the charts show a massive decrease in fish caught over the years, which should alarm regulatory organizations and fishermen that Scotland's fisheries are facing a calamitous crisis. Human activities such as urbanization and water pollution have led to the degradation and loss of critical freshwater habitats, including spawning grounds and nursery areas. Degraded habitats can negatively impact fish reproduction, survival rates, and overall population health. The impacts of habitat degradation can be seen in the falling number of fish caught over the years in the charts above. Overfishing can also be a main leading factor in the reduction of fishes caught. Historically, overfishing has been a major threat to wild salmon and sea trout populations in Scotland. Unsustainable fishing practices can significantly reduce fish populations over time. Conservationists can use this chart to advocate for more sustainable fishing and habitat management to stop the damage done before its too late and the total wild fish population collapses.

Visualization #4

Q4. How does the median weight vary for MSW salmon that are farmed compared to ones that are caught wild?



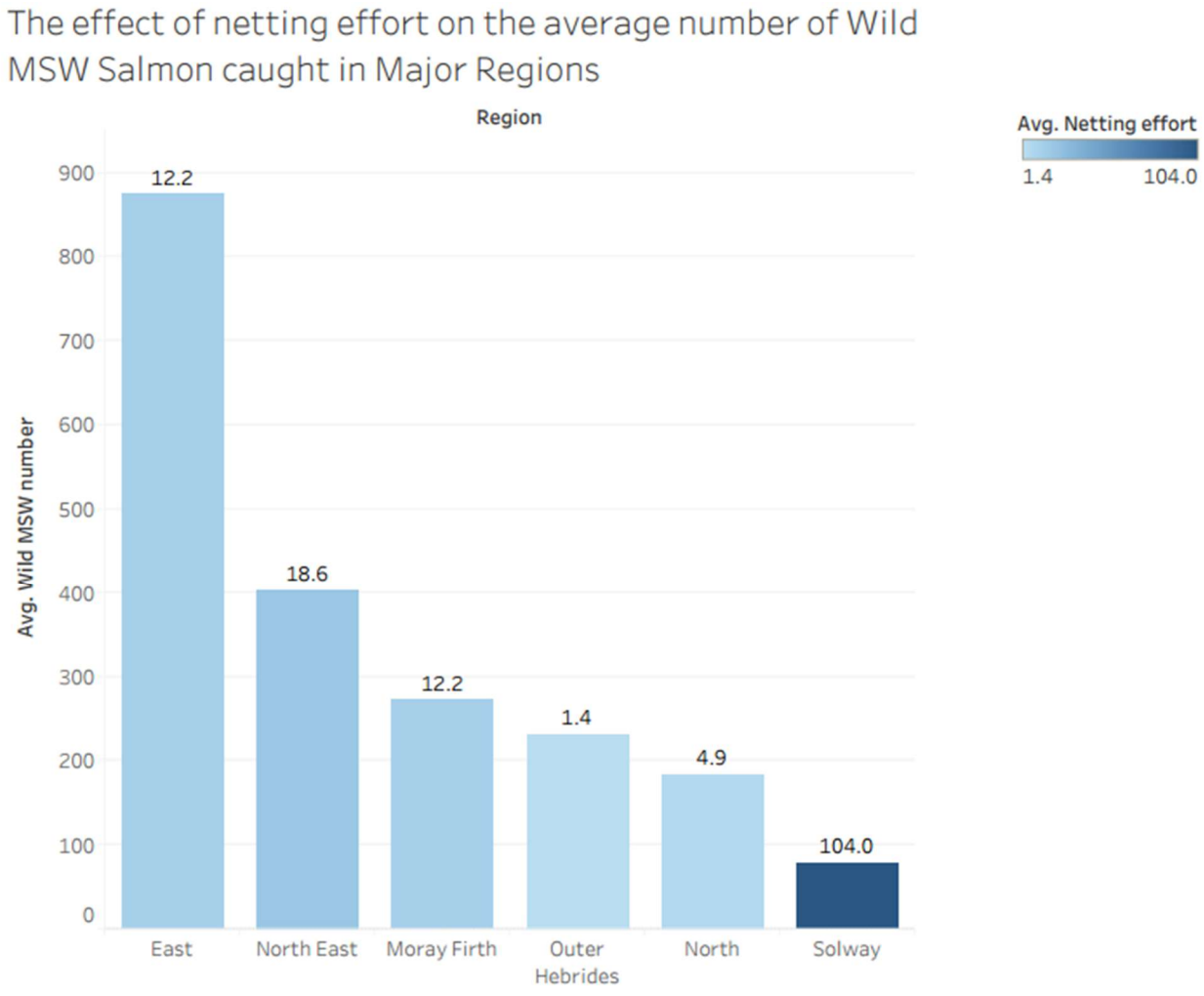
*Data for farmed salmon only available from 1994 to 2015

What is the main insight of the chart? (MAX 200 WORDS) Why do you think this is insightful?

The main insight from this chart is that farmed salmon populations are showing signs of a healthy growth in weight compared to wild salmon populations where weight of catches is declining. This chart indicates the average farmed salmon is getting heavier year by year while the average wild salmon is becoming lighter. Farmed salmon production involves controlled environments and intensive management practices that optimize growth rates. These controlled conditions allow for consistent growth and larger average weights compared to wild salmon populations. Additionally, selective breeding programs in fish farming allows to produce salmon populations with enhanced growth potential, a process that will compound year on year. On the other hand, wild salmon populations face numerous environmental stressors and natural fluctuations that can affect growth rates and body condition. As mentioned in the visualization 3, wild salmon catches and populations are decreasing throughout Scotland. The same factors that lead to decrease in population size affect the overall health of the wild salmon and can lead to the decrease in average weight seen in the chart above. Balancing sustainable farming practices with effective wild salmon conservation is essential for ensuring a healthy wild salmon ecology and meeting global salmon demand in a responsible manner.

Visualization #5

Q5. How does the netting effort affect the average number of wild MSW salmon caught for the various regions?



Average of Wild MSW number for each Region. Color shows average of Netting effort. The marks are labeled by average of Netting effort. The data is filtered on Method, which keeps Fixed Engine: Retained and Net and Coble: Retained.

What is the main insight of the chart? (MAX 200 WORDS) Why do you think this is insightful?

The main insight from this chart is that the average number of fish caught is not correlated with the amount of crew members fishing (netting effort) but interesting more affected by the region in which the fishing takes place. Solway has an average of 103 crew members per fishing report with only an average of around 100 wild MSW caught. On the other hand, the eastern region of Scotland has an average of 12 crew members per fishing report with a large average of around 900 wild MSW caught. This indicates that despite a considerable labour force dedicated to fishing activities, the catch output is not proportionately higher. Factors such as favourable fishing grounds, abundant fish populations, or effective fishing strategies have a greater impact on fish production. This is insightful because individuals looking to set up fishing companies can use this chart to help their decision-making in where to base their operations. Understanding regional nuances becomes crucial for fisheries management and optimizing fishing practices to ensure sustainable yields.