NHL Analysis

Sam Wallach

Lena Hill

Derek Johnson

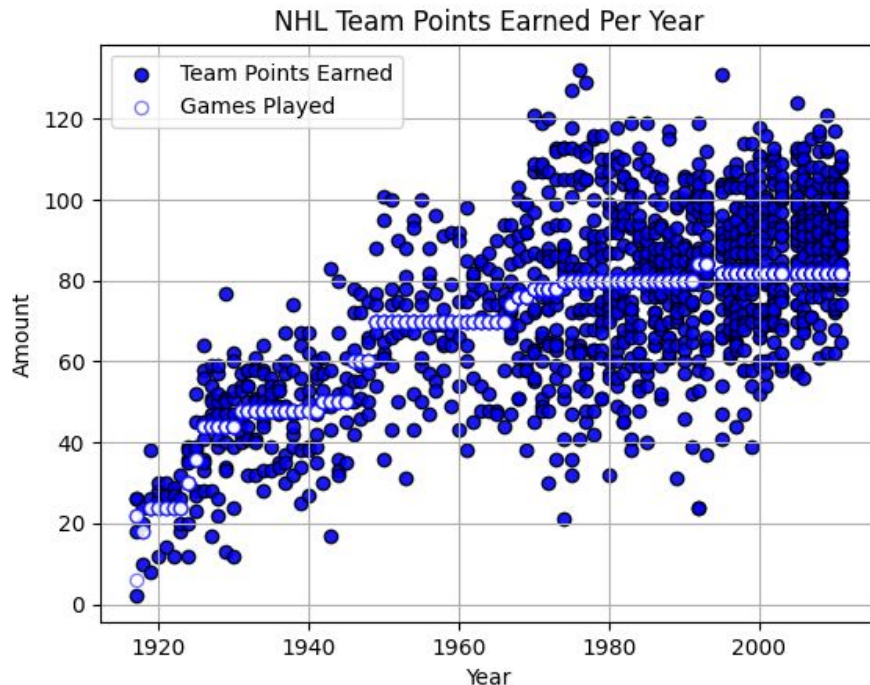Elodie Mwamba

Teri Martin

About the NHL and our project

- Hockey is one of the most popular sports in North America. The National Hockey League (NHL) was founded in 1917 and has experienced significant growth and transformation over the years.
- As a professional league develops, teams improve every facet of their organizations, from arenas and fan engagement to coaching, player acquisition and development.
- There is also an improvement over time in the players themselves. Professional athletes in general have become bigger, faster, stronger and more specialized as compared to their predecessors.
- We were interested in visualizing NHL data to document the league's progression over the last 100 years.
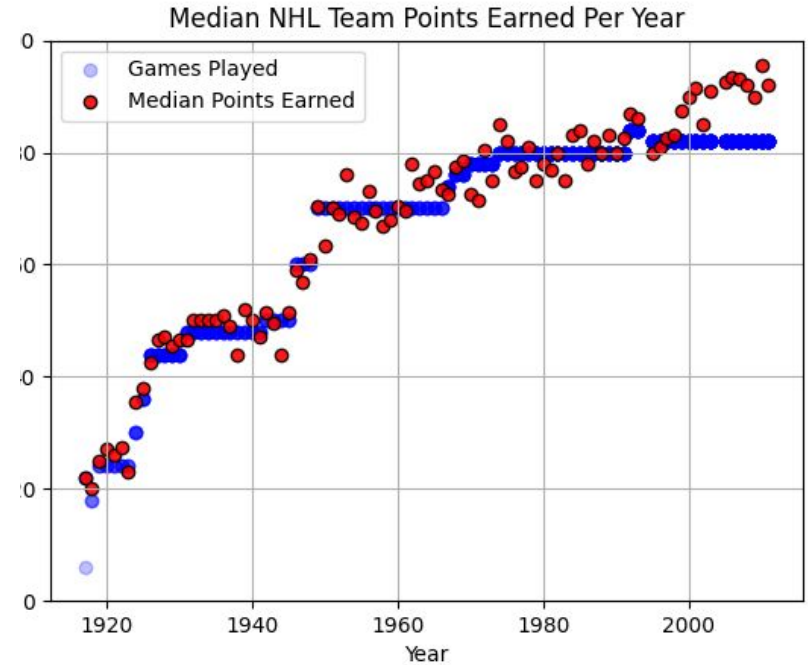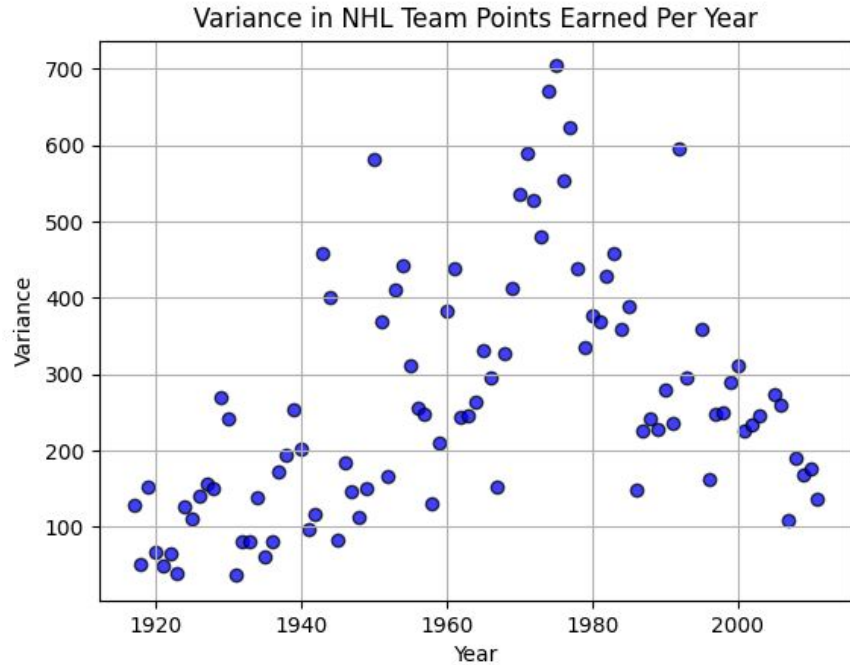
About the dataset

- We utilized a set of files that track a variety of NHL statistics from 1917 to present. Datasets include:
  - Team performance
  - Player scoring
  - NHL Draft results
  - League end-of-season awards
  - NHL attendance data
- How have these metrics fluctuated over time and what does that say about the evolution of the league? How can these changes be explained?
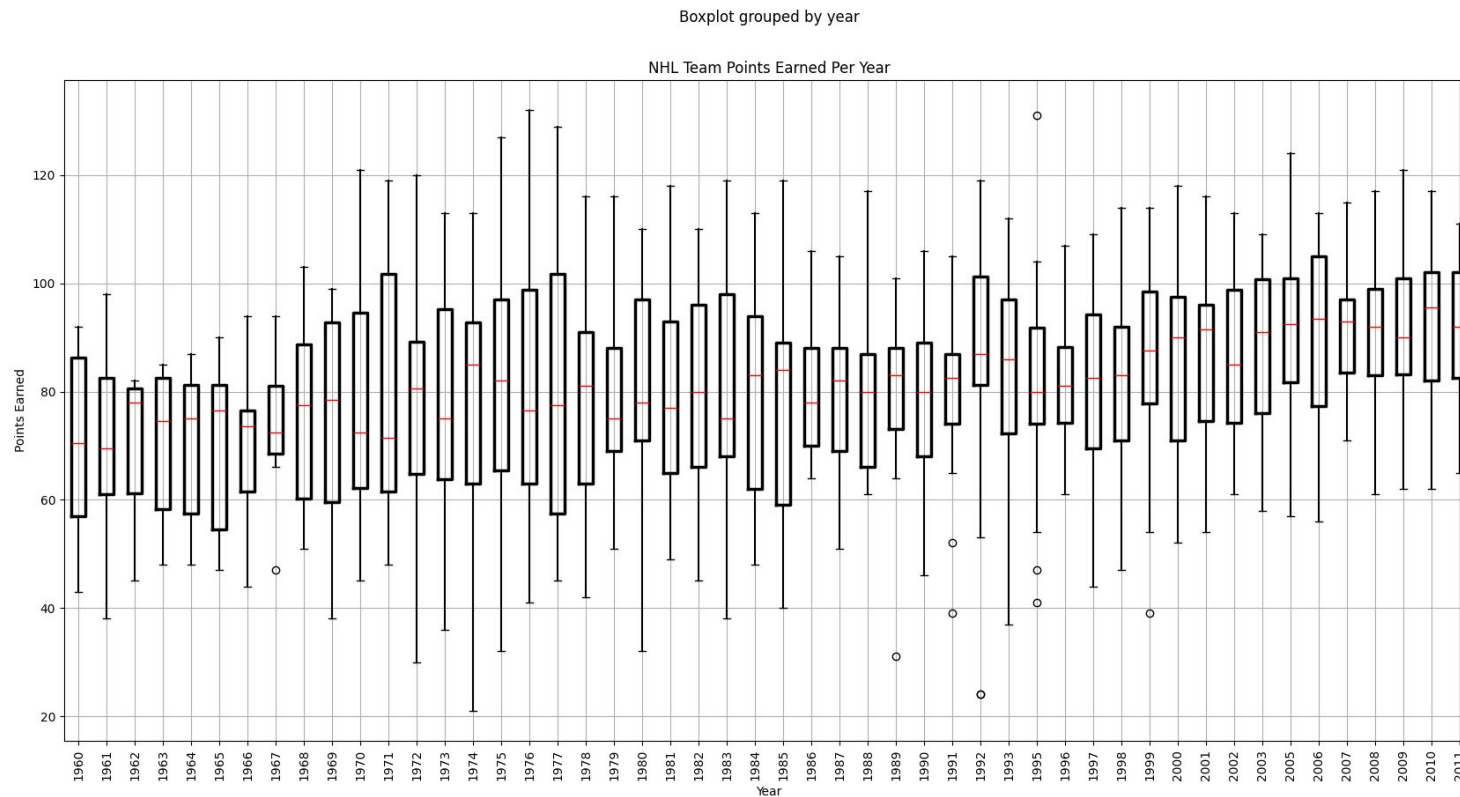
Team Performance

- Has team performance changed over time?
- Teams earn 2 points for a win, 0 points for a regulation loss and 1 point for an overtime loss.
- The distribution of team results is clearly condensed from the 1970's to 2011, which perhaps shows that the league's competitive balance improved.
- This is also evident when looking at the results by variance, median and quartile.

NHL Team Points Earned Per Year

Team Performance

Team Performance by Quartile

Boxplot grouped by year
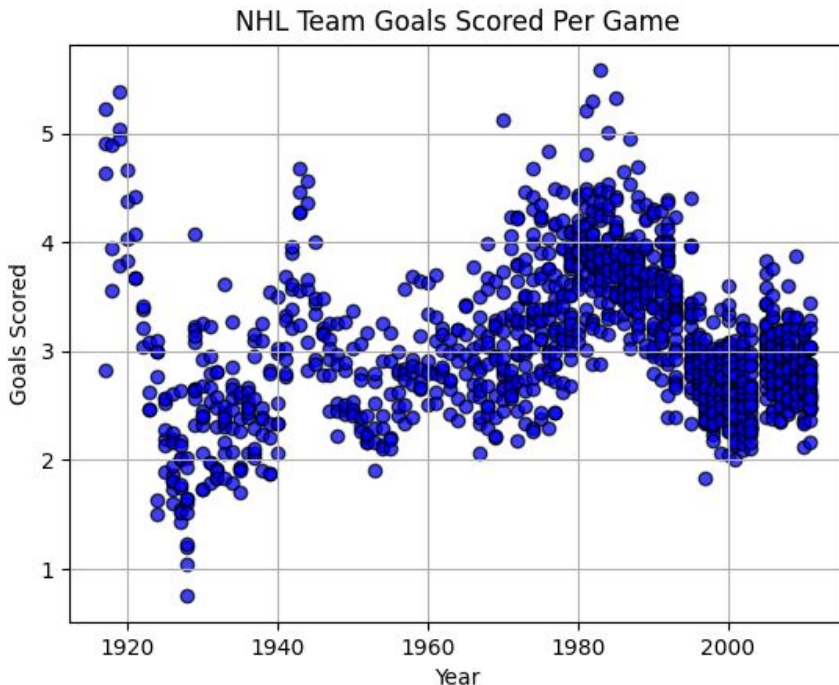
NHL Team Points Earned Per Year

Team Performance - Takeaways

- Over time, we found a decrease in team point variance and an increase in median points earned per year. We also noticed a decrease in size on the boxplot between the first and third quartile, specifically from the 1970's to 2011.
- These results point to a more competitive and balanced league as a whole. This can be explained by a variety of factors, including:
  - Salary cap restrictions
  - Draft structure (worst team from previous year earns the fist pick)
  - Increase in player quality and development
- A balanced league provides greater entertainment value, as more teams deeper into the season have realistic chances of qualifying for the playoffs.
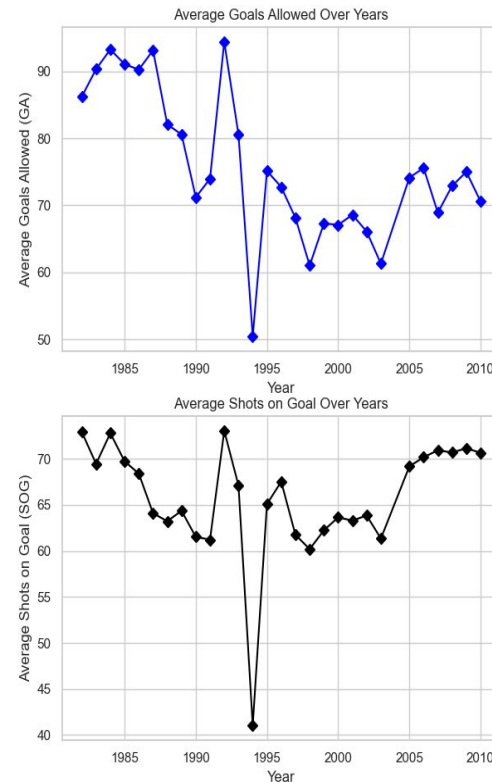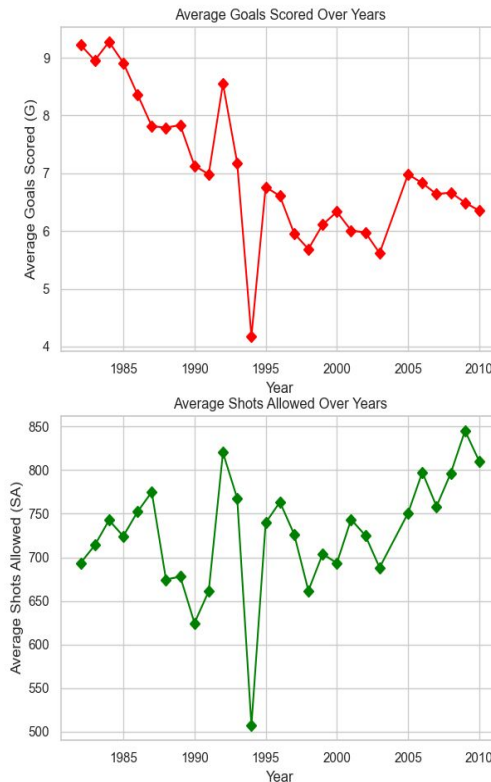
Team Scoring

- Has goal scoring evolved over time?
- A steady increase in goals scored per game is observed from the 1950's to the 1980's.
- The subsequent decrease in goals scored per game can be attributed to a variety of factors:
  - Defense emphasis (in coaching, player development, tactics, etc.) to counteract NHL offenses.
  - The 1985 offsides rule change (which prevented players from staying in the offensive zone)
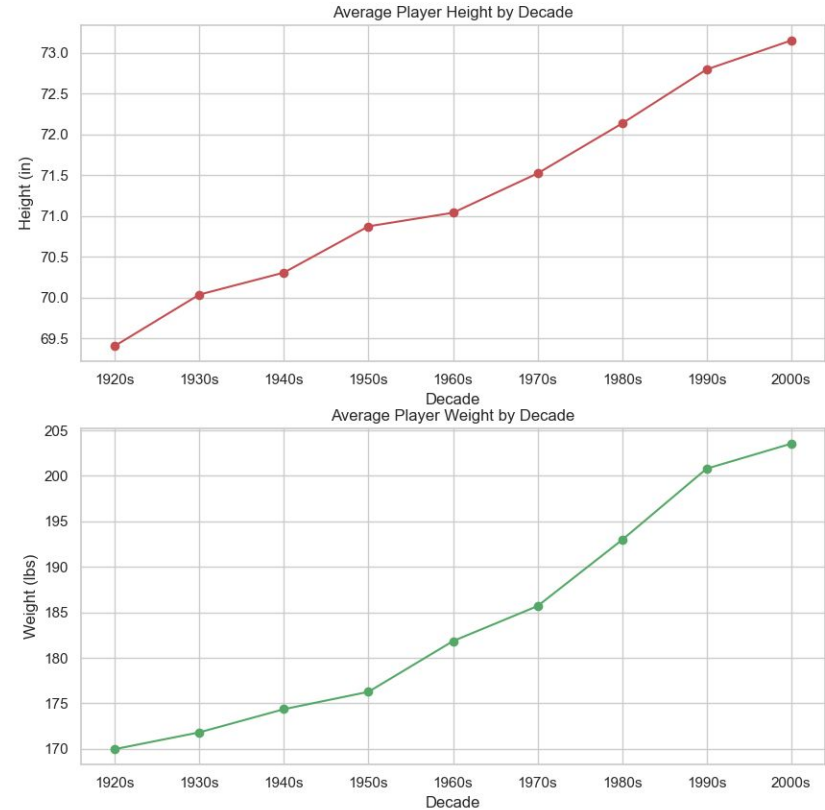

NHL Team Goals Scored Per Game

Player Average Statistics

- **Shots Allowed and Goals Allowed:** In the early years (1982-1990), both the average shots allowed and goals allowed per game were relatively higher. Over time, there seems to be a trend of reducing the number of shots and goals allowed.
- **Goals:** The average number of goals scored per game fluctuates across the years but generally follows a pattern of decrease in the later years.
- **Shots on Goal:** The average shots on goal per game also shows some variation, but there isn't a clear trend across the years.
- **Notable Events:** The years 1994 and 2012 stand out due to lockouts, resulting in fewer games played, which influenced the lower averages in all four categories for those years.

Player Measurables

There has been a consistent rise in measurable attributes such as height and weight, providing additional evidence of the league's emphasis on acquiring larger, stronger, and faster players.

Average Player Height by Decade

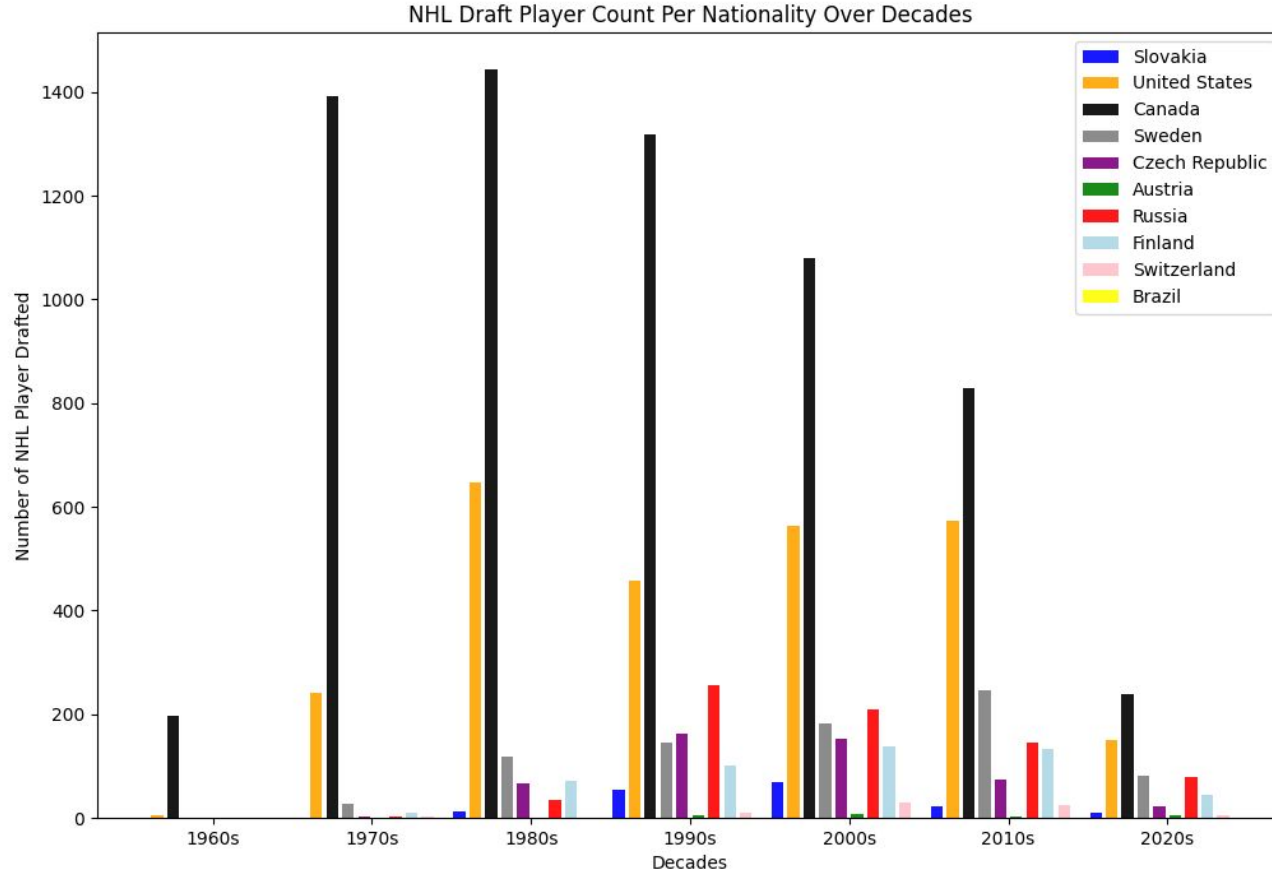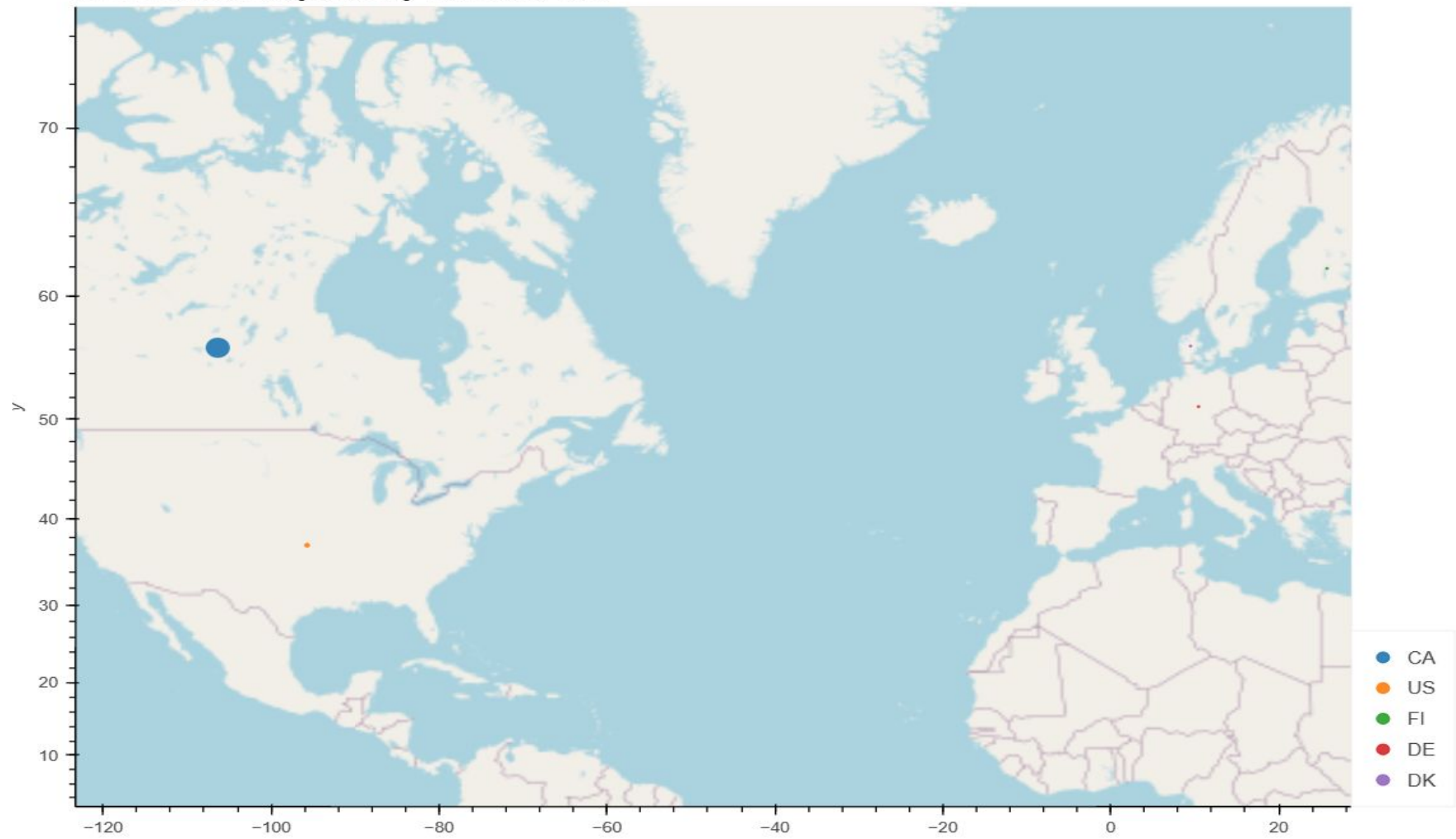Average Player Weight by Decade

NHL Popularity

NHL Attendance

NHL fan attendance has consistently risen since the inception of the league. The only exceptions were in 1994 and 2012, during league lockouts when fewer games were played; excluding these instances, the league has generally experienced an upswing in fan attendance.

NHL Draft Player Count Per Nationality by Decades
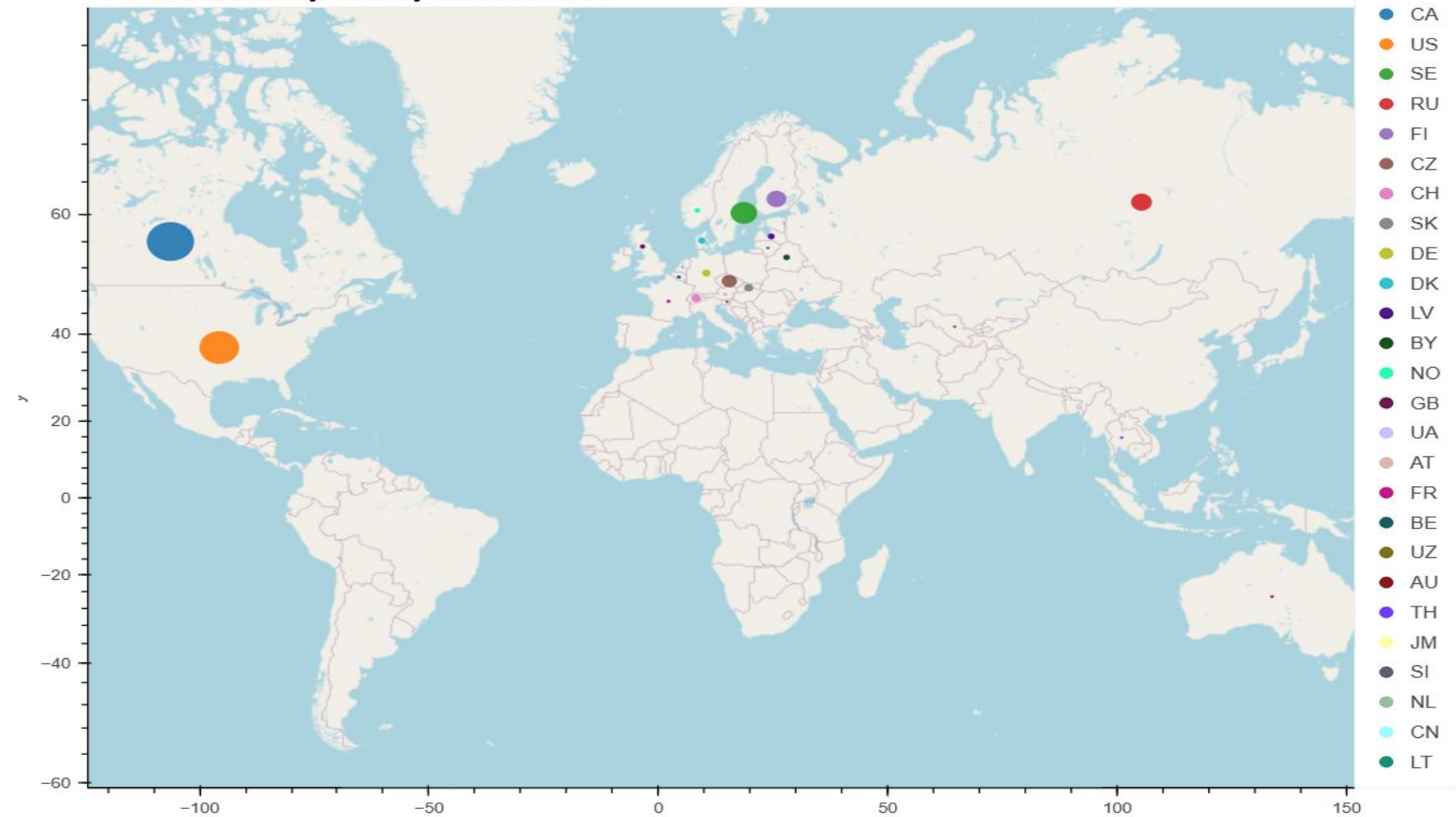

NHL Draft Player Count Per Nationality Over Decades

Since the 1960s, there's been a notable surge in diversity among NHL players. Back then, most drafted players were Canadians or Americans, but now, players come from over 10 different countries, with a significant increase in those with European nationalities.

NHL Draft Count by Country from 1960-1970

14

NHL Draft Count by Country from 2010-2020

15

Data Insights & Conclusions

- Team Performance
  - A tighter distribution of NHL team points earned per season shows an increase in the competitive balance and quality of the league.
  - Some of the factors that contributed to this trend were rule changes, salary cap restrictions, and an overall development of players and coaching.
- Scoring
  - A steady increase in scoring from the 1950's-early 1980's gave way to a decrease in scoring from the 1980's-early 2000's.
  - As the league developed offensively, tactical changes, rule changes, and an overall defensive emphasis helped teams better defend NHL offenses.
- Attendance
  - Fan attendance at NHL games has steadily risen during their modern era, which points to a more compelling product that brings people are interested to view in-person.
- NHL Draft
  - What started as primarily as a league comprised of U.S. and Canadian players has evolved to attract players from other hockey-playing countries around the world.
  - More robust scouting departments help to find NHL-caliber players around the world, which in turn improve the quality of the league.