September-November 2025 Northern Michigan Search Interest Forecast

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Below are my search interest forecasts for the combined Northern Lower and combined Upper Pensinsula places for September, October,and November 2025. Note that the possible range for historical search interest is normalized to a maximum of 100 and a minimum of 0, but forecasts outside this range are permissible as these values are forecasted to be outside the historical range.

For August, actuals were lower than last year for both pensinsulas. However, they were higher than forecasted for the Upper Pensinsula. In other words, for the Upper Peninsula the search interest may have been lower than last year but exceeded last year's downward trend. This result isn't entirely surprising given that this was the pattern for both peninsulas in the July peak. (Note that peak search interest for the Upper Peninsula usually extends into August.) Eventually, the downward trend in search interest should subside. However, I'm not certain that the higher peaks this year necessarily signify the end. Regardless, the current method will eventually adjust for changes in the downward trend.

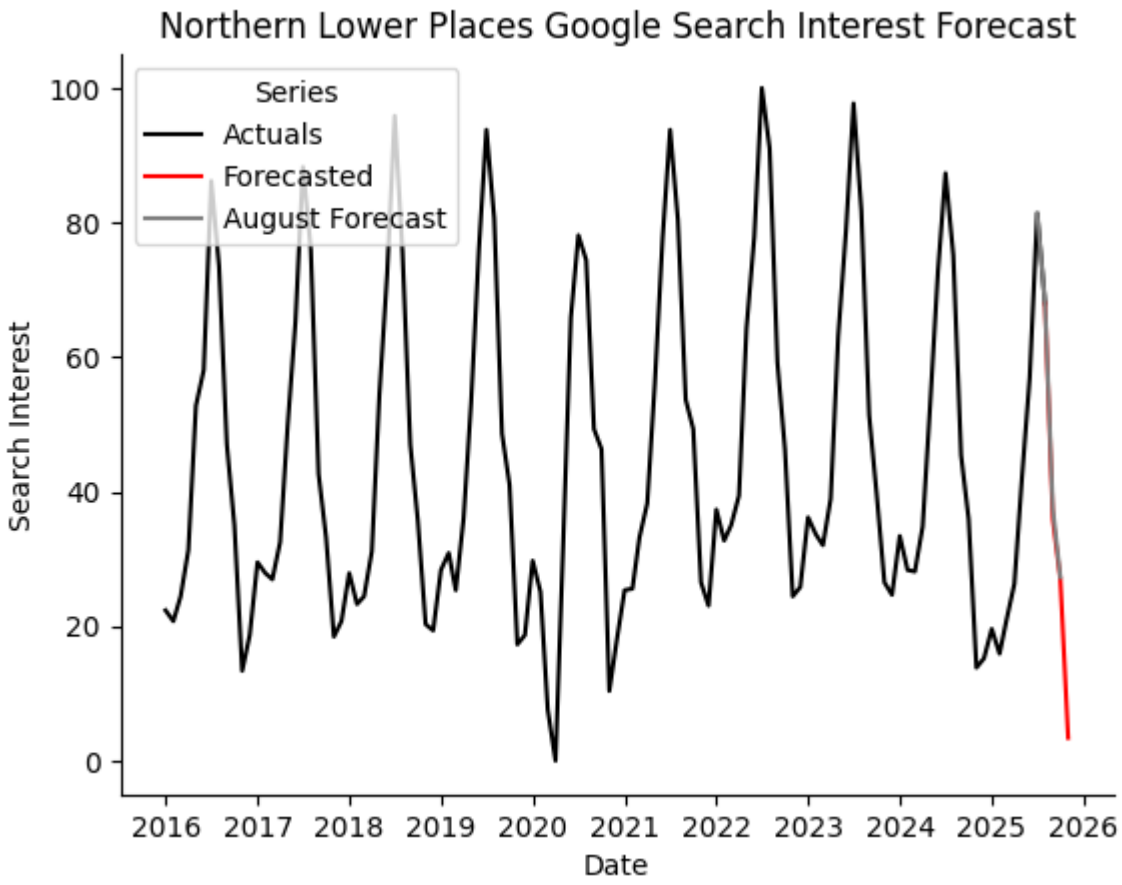
During the original analysis for this project, I found that many places were growing in search interest from other places also in Northern Michigan. This was likely due to renewed interest in outdoor recreation after the pandemic, residents of more populated Northern Michigan areas looking for less congested areas for outdoor recreation and, to a lesser extent, remote workers relocating to Northern Michigan. This trend has seemingly reversed itself starting in 2023/2024. That doesn't mean that many people who gained an interest in Northern Michigan during this period didn't retain it, but they are, at least, acclimated to the area and not actively searching for place names as much as previously.

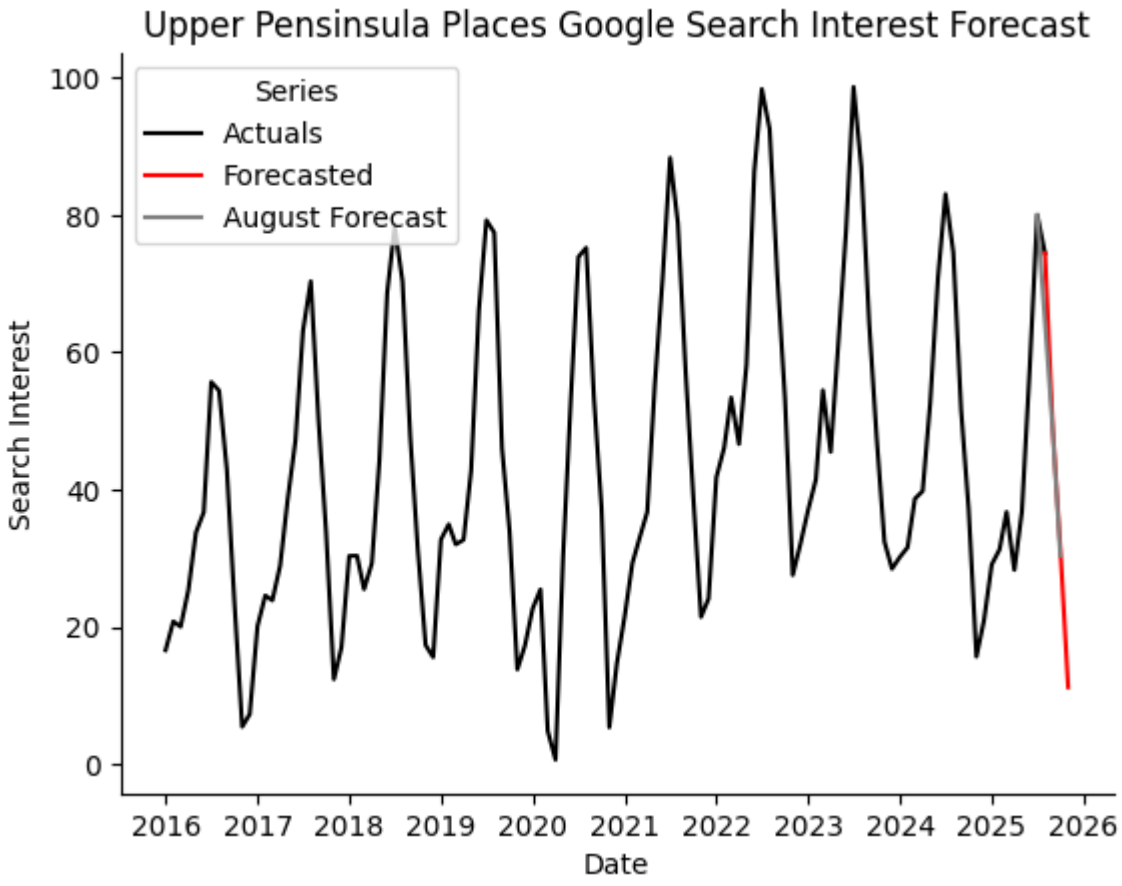
In response to these trends I have performed adjustments essentially using the last 12 months time trend instead of the average trend over the entire time period since 2017. (Of course, I still retain adjustments due to weather forecasts.) This change was first performed in the February 2025 forecast. In the March 2025 forecast, I have also changed my method to average all place and aggregate level data pulls using my saved data pulls starting in April 2024. This is due to variation in the values reported by Google trends from data pull to data pull. This averaging will reduce this variation.

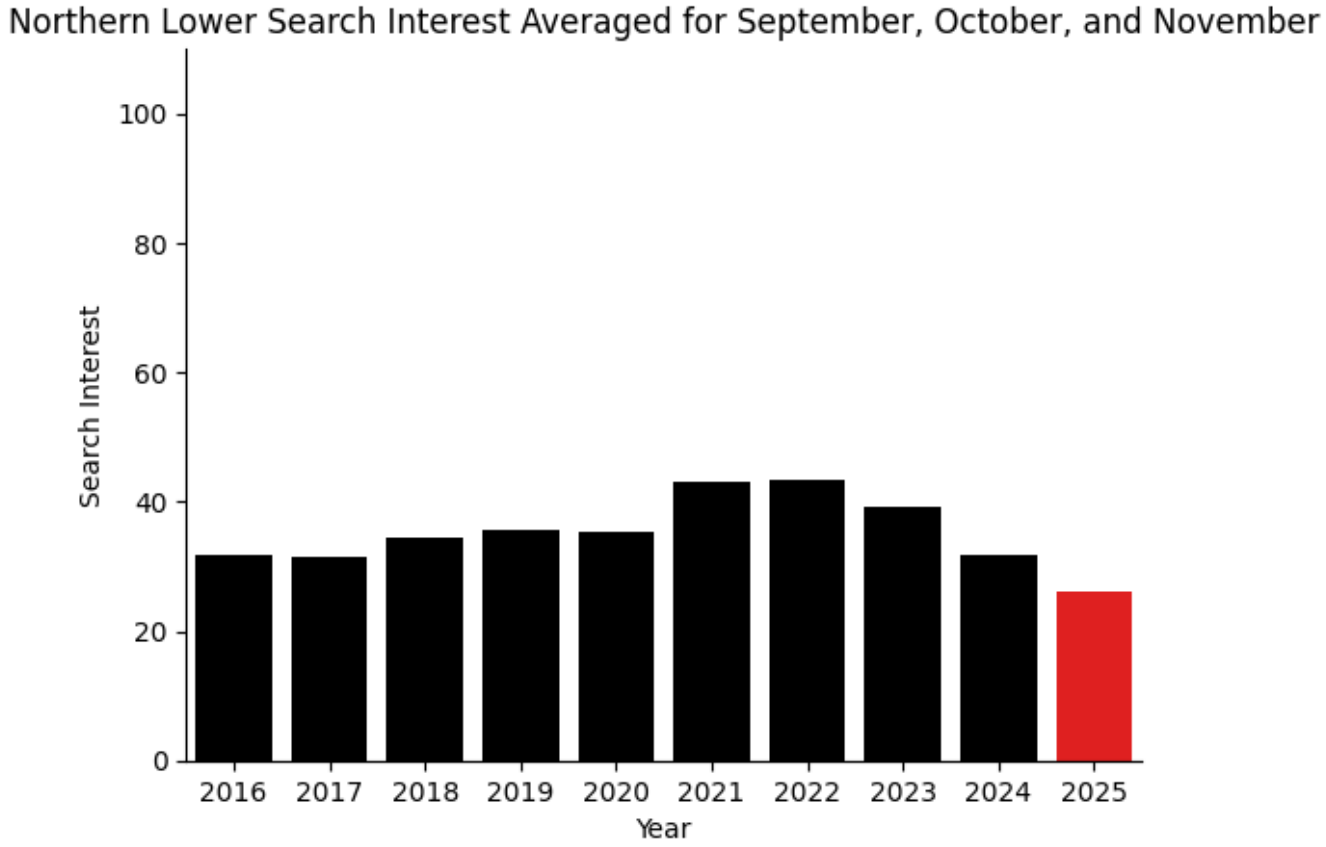
The charts below provide the current forecast and last month's forecast compared to actuals. For both peninsulas, July's forecast is in grey and the current August forecast is in red. These forecasts are very similar to each other.

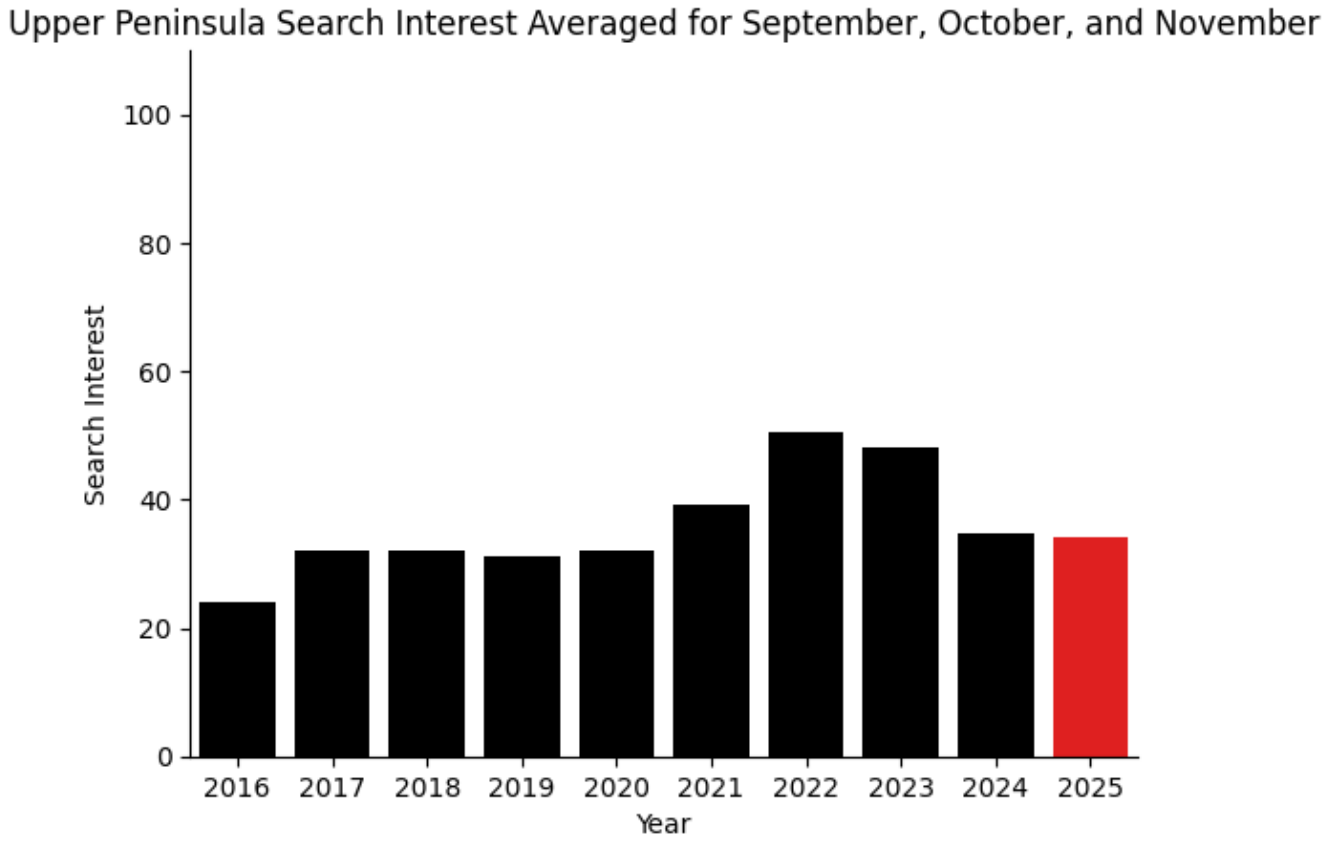
Also provided are barcharts comparing the average search interest for the forecast months (September, October, November) to the same months in previous years. The forecast is lower this year for the Lower

Peninsula but similar to last year for the Upper Peninsula.




Upper Pensinsula Places Google Search Interest Forecast
Series
Actuals
Forecasted
August Forecast
Search Interest
Date
0
20
40
60
80
100
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026


Northern Lower Search Interest Averaged for September, October, and November
Search Interest
Year
0
20
40
60
80
100
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025



The following table shows the top five places that are forecasted to have the highest search interest compared to the same time period in 2024. It's probable that searches for Greenland have been less related to the place in Michigan but rather recent popular press surrounding the territory of Greenland. Two of the remaining places are in the Upper Peninsula. Lewiston is the Northeast lower while Lakes of the North is in the Northwest Lower.

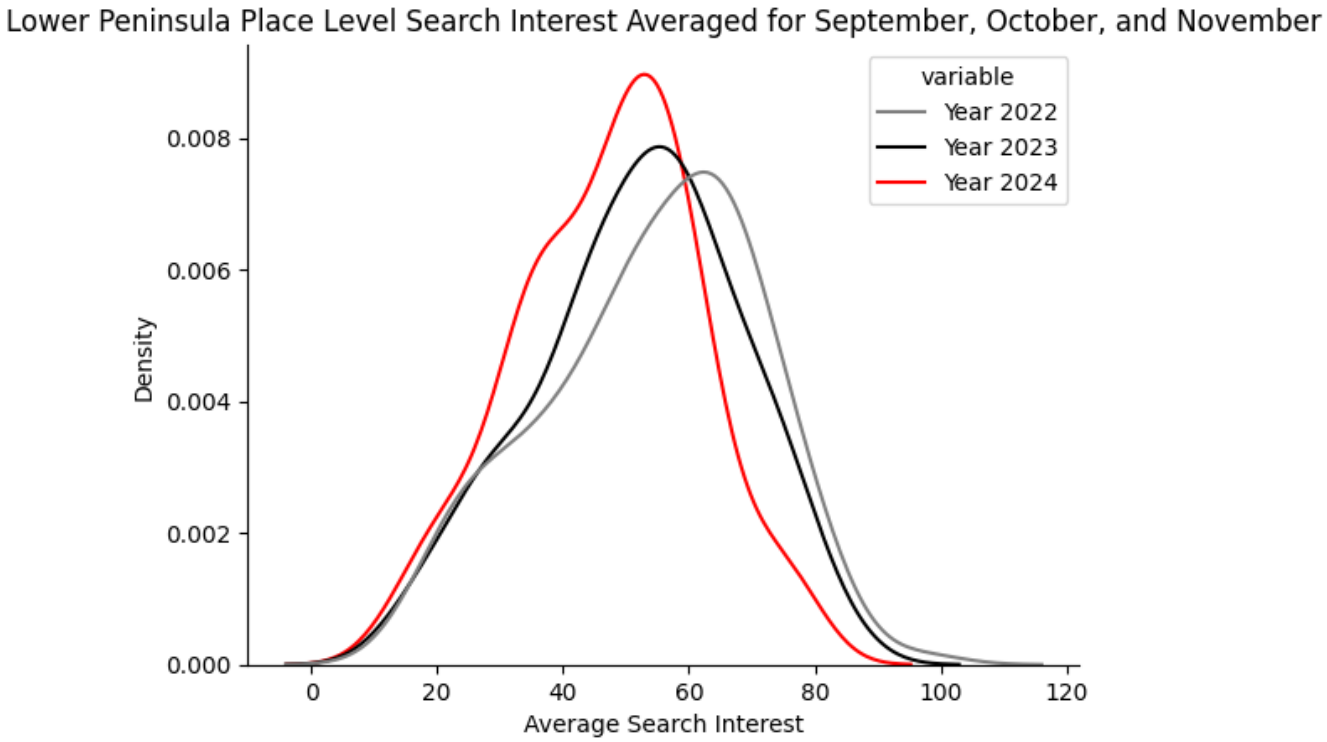
	Place	Peninsula	Difference
0	Rapid River	Upper	25.7
1	Atlantic Mine	Upper	22.7
2	Greenland	Upper	16.4
3	Lewiston	Lower	14.7
4	Lakes Of The North	Lower	10.3

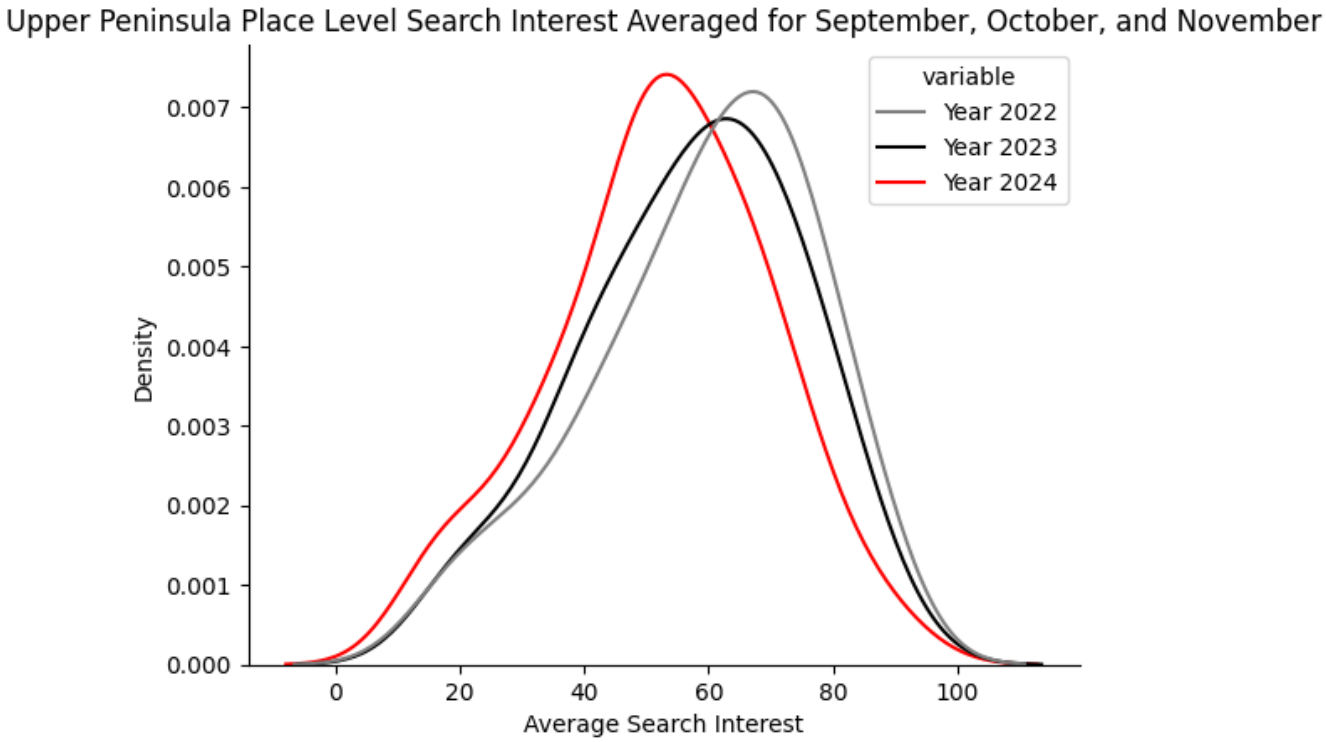
Three things impact the value of the search interest forecasts for each place.

1. The previous year's monthly value for each individual place.
2. While not directly impacting the model forecast, seasonal (12 mo) differencing accounts for the fact that search interest is higher in some portions of the year than others (so previous year actual is impacted).

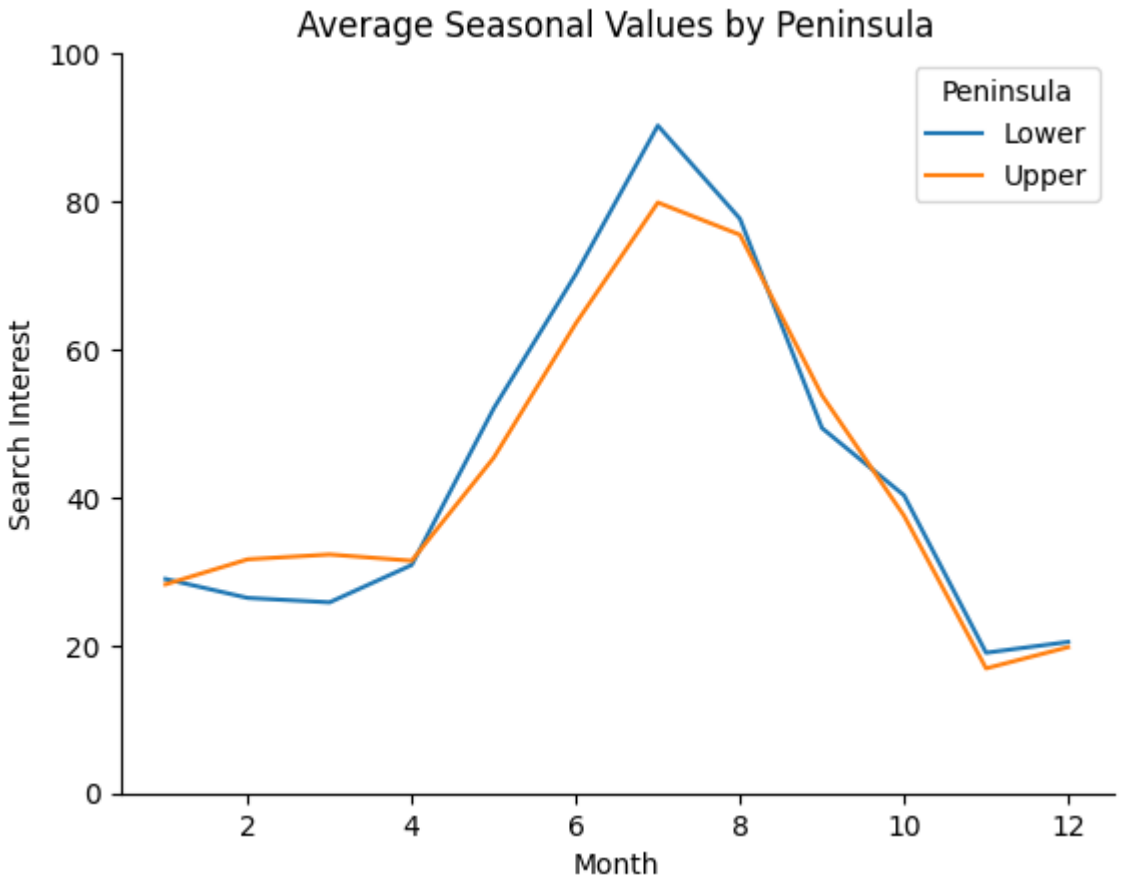
3. Model difference: based on forecasted weather and gas price changes, the model will predict 12 mo changes from the previous year for each individual place. These levels are adjusted for the previous 12 month trend. Then these new levels are aggregated via regression to the peninsula level series.

The two KDE plots below plot the distributions of the individual place actual values for the months of September, October, and November for the previous three years. Note that the values for 2024 serve as the last actual values for 2025. For both peninsulas, the last actuals for 2024 are lower than 2023 and 2022. I believe this shows the impact the downward trend in search interest since 2023/2024.

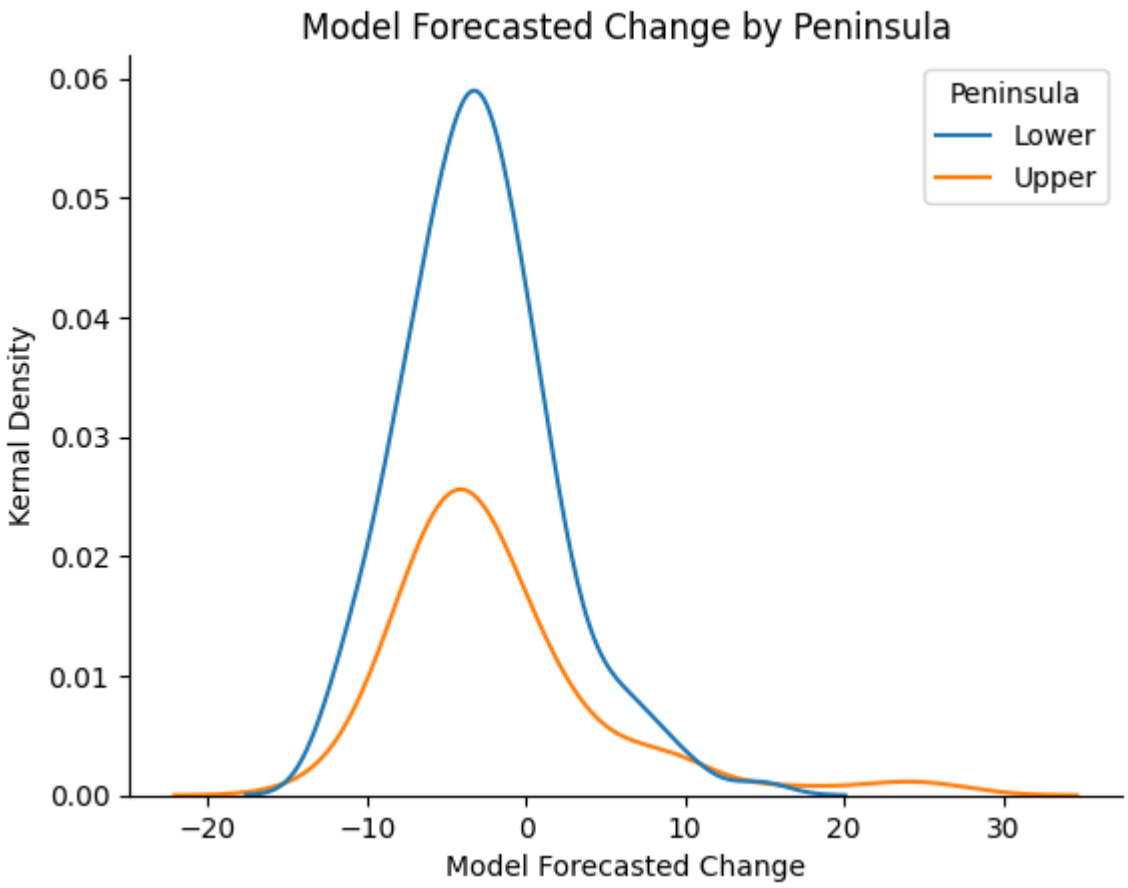




The following figure shows the aggregate average search interest for each calendar month. Both the Upper and Lower Pensinsulas have a seasonal peak in July/August with the Lower Peninsula peak solidly in July. The Upper Peninsula has higher values for January-March likely due to winter snow sports like snowmobiling. For the September-November forecast period, we should see search interest in dropping from summer peak levels proceeding into fall.



Finally, forecasts are determined by the forecasted place level change from the previous year based on weather and gasoline prices and are adjusted based on the last 12 months of trends for each individual place. For both peninsulas, the most likely forecasted change from the previous year is now negative, because we are now adjusting for the aggregate negative trends during the last 12 months. (Note, however, that the final forecast numbers by peninsula are weighted by the size of the contribution of the place to total search interest.)



Places Impacted by Weather and Gas Prices

In addition to the above more aggregated analysis, I will now look at places that are impacted by weather and gasoline prices. (Many places are not impacted by these factors in the model and instead have an average increase or decrease year over year.) After identifying the places impacted by weather or gas prices, I then divide these places projected to have higher or lower search interest (on average) during the forecast months from the previous year. This is due to both the impact of weather and gasoline prices and the average trend year over year.

For the Northern Lower Peninsula, 53 of 142 places are impacted by weather or gasoline prices in the model. Of these, 16 are forecasted to have higher search interest during these three months than last year. The remaining are forecasted to have lower search interest than last year. These places are listed and the chart shows their yearly average search interest values for the three forecast months. Here, the verticle line signifies the start of the forecast period.

```
Northern Lower Places with Weather Impact Higher Interest than Last Year
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```
['luther', 'bellaire', 'lake city', 'walloon lake', 'manistee lake', 'bay view', 'fou
ntain', 'arcadia', 'custer', 'lewiston', 'eastport', 'buckley', 'levering', 'maple gr
ove', 'boon', 'atlanta']
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```
_____________________________________
Northern Lower Places with Weather Impact Lower Interest than Last Year
_____________________________________
['sand lake', 'mackinac', 'bear lake', 'east tawas', 'hubbard lake', 'onaway', 'ceda
r', 'saint helen', 'omer', 'bay shore', 'pellston', 'scottville', 'evart', 'gladwin',
'manton', 'posen', 'skidway lake', 'brethren', 'boyne falls', 'ellsworth', 'kaleva',
'kingsley', 'ironton', 'central lake', 'grawn', 'mcbain', 'south boardman', 'oak hil
l', 'pilgrim', 'oden', 'advance', 'empire', 'norwood', 'falmouth', 'turner', 'chums c
orner', 'honor']
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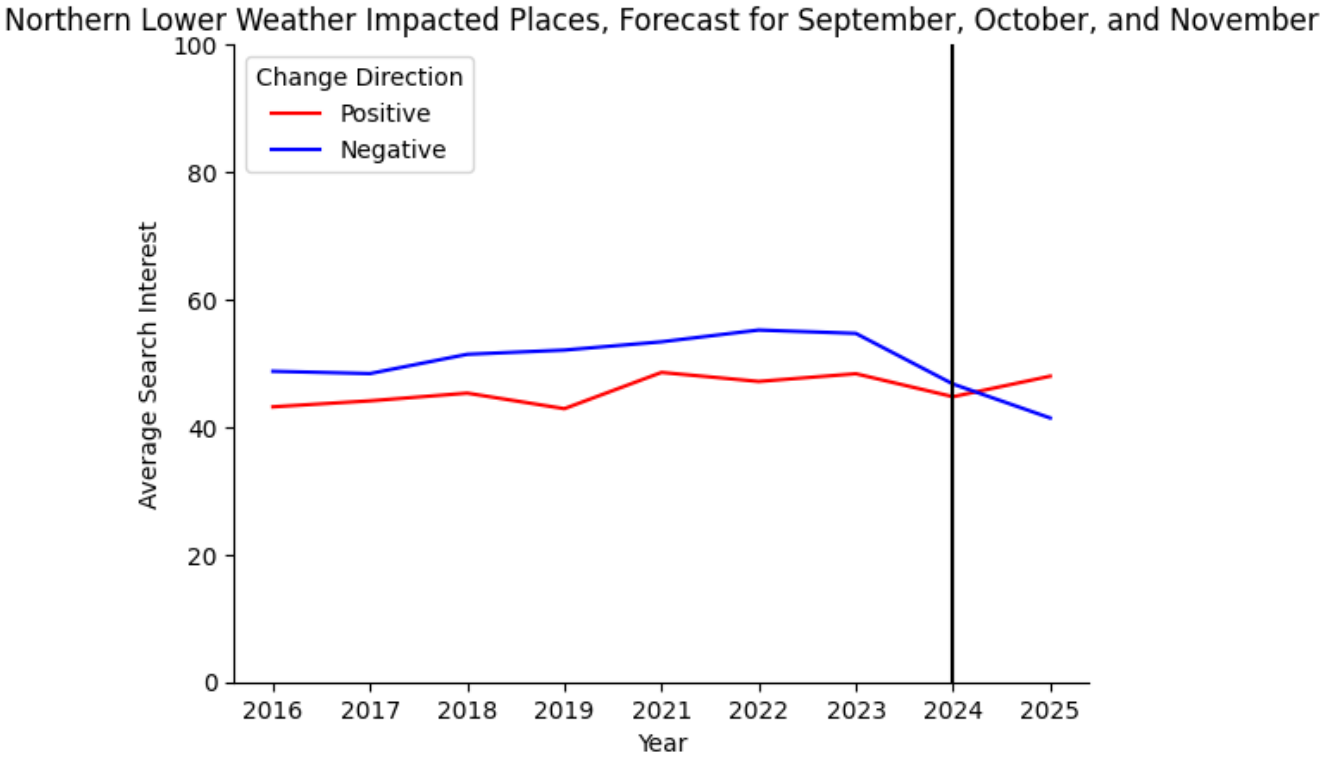

For the Upper Peninsula, 26 of 72 places are impacted by weather or gasoline prices in the model. Of these, 7 are forecasted to have higher search interest during these three months than last year. The remaining are forecasted to have lower search interest than last year. These places are listed and the chart shows their yearly average search interest values for the three forecast months. Here, the verticle line signifies the start of the forecast period.

```
Upper Peninsula Places with Weather Impact Higher Interest than Last Year
_____________________________________
['big bay', 'white pine', 'chassell', 'norway', 'atlantic mine', 'laurium', 'south ra
nge']

_____________________________________
Upper Peninsula Places with Weather Impact Lower Interest than Last Year
_____________________________________
['newberry', 'sault', 'michigamme', 'eagle harbor', 'fulton', 'mohawk', 'bergland',
"l'anse", 'crystal falls', 'menominee', 'iron river', 'iron mountain', 'dollar bay',
'republic', 'three lakes', 'daggett', 'stephenson', 'covington', 'ewen']
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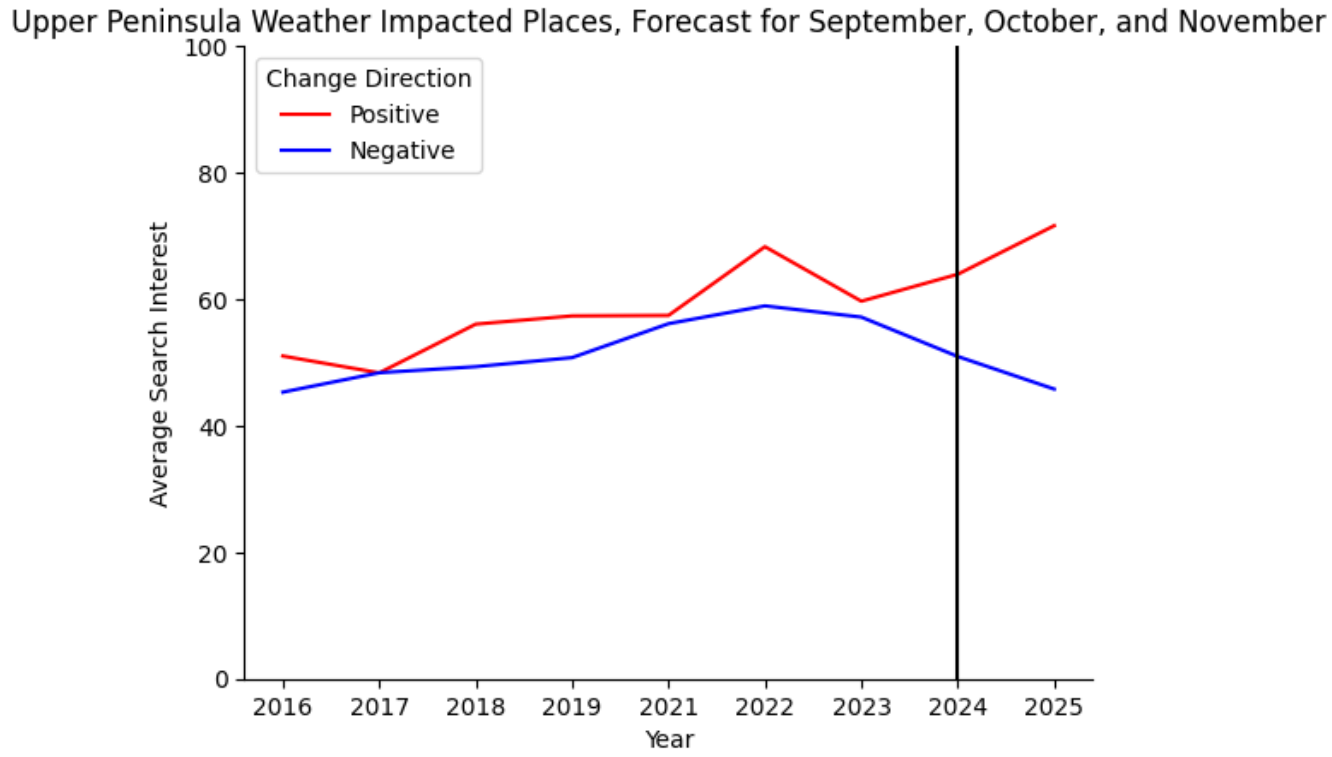
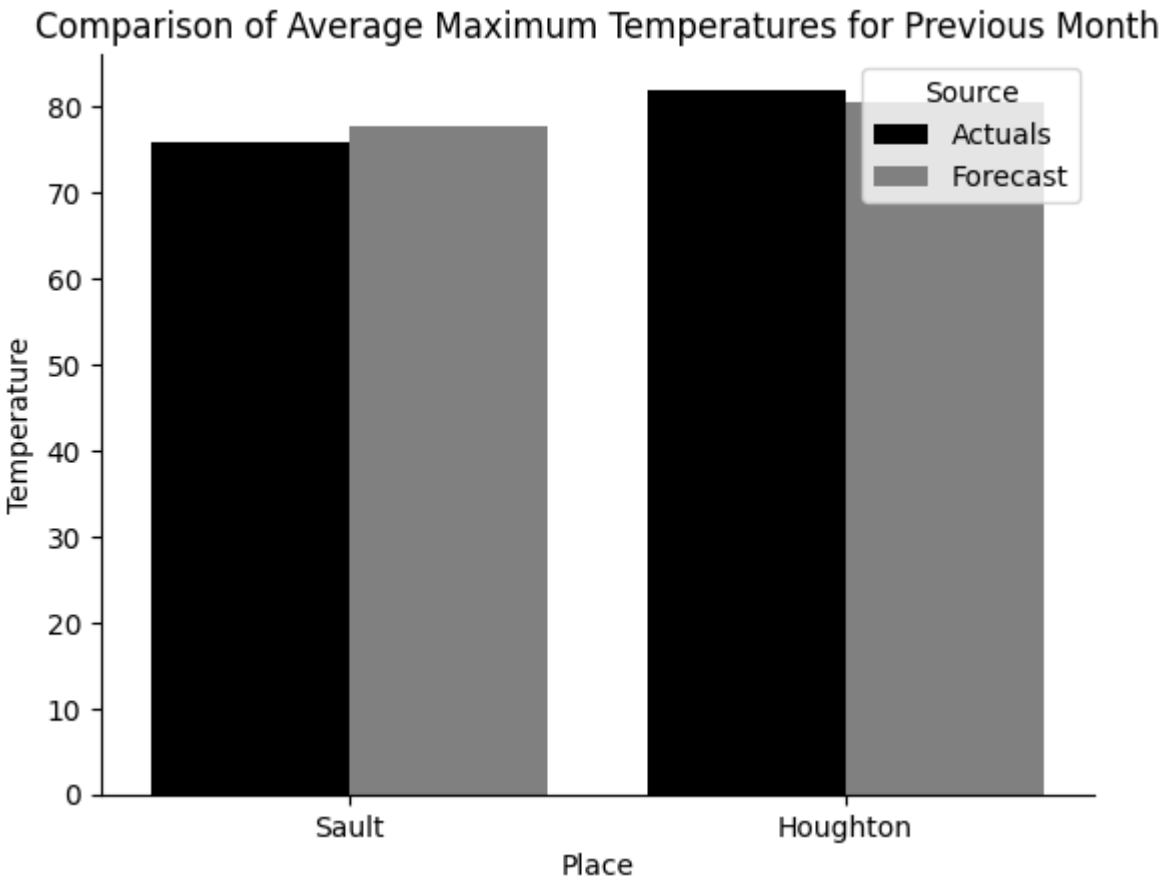


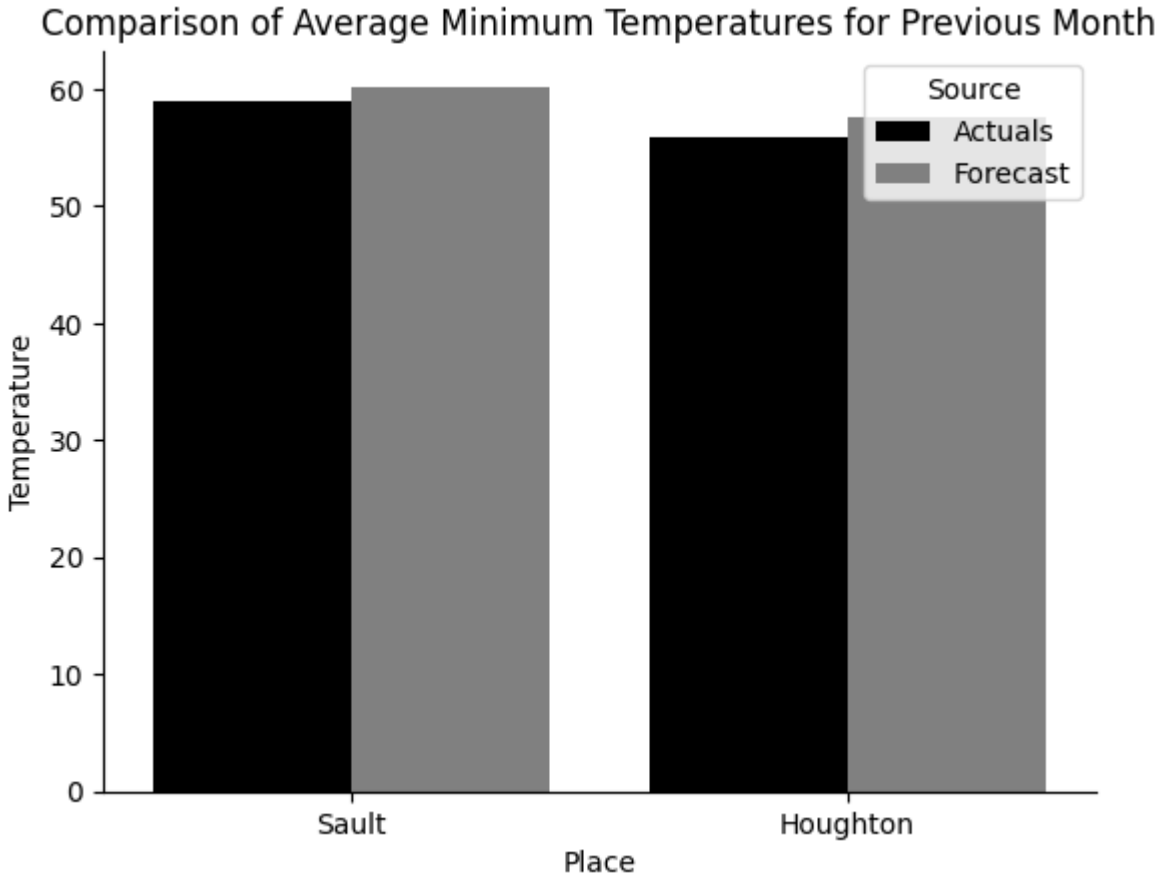
One last factor to consider is my source for weather forecasts, with a focus on temperature. All of my historical weather data used to train my models is from weather.gov. However, I source temperature forecasts from both weather.gov (average of averages) and accuweather (average maximums and average minimums). To some degree, it's difficult to compare these sources because average, maximum, and minimum temperatures are different statistics. Nonetheless, throughout this project, I've found that weather.gov usually forecasts above normal temperatures. To some extent I wonder if forecasts from a government agency are more likely to be high given politics surrounding issues like global warming.

Therefore, I will roughly track the one month forward predictive performance of the weather.gov and accuweather forecasts. First, I will look at the previous month's average temperature and determine if it actually was above historical normals. Next, I will compare the previous month's forecasted accuweather average max and min temperatures to actual values.

For August, the normal average temperature is 65.8 degrees for Houghton Lake and 64.5 degrees for Sault St Marie. The actual average temperature values were Houghton Lake 69 and Sault St Marie 67.8. So actual temperatures were somewhat higher than normal for August.

Based on the accuweather forecasts, actuals and forecasts were extremely similar for both places min and max.


Comparison of Average Maximum Temperatures for Previous Month
Source
Actuals
Forecast
Temperature
0
10
20
30
40
50
60
70
80
Sault
Houghton
Place


Comparison of Average Minimum Temperatures for Previous Month
Source
Actuals
Forecast
Temperature
60
50
40
30
20
10
0
Sault
Houghton
Place