

March-May 2025 Northern Michigan Search Interest Forecast

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Below are the search interest forecasts for the combined Northern Lower and combined Upper Pensinsula places for March, April, and May 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 February, actuals were similar to last year for the Upper Peninsula and lower than last year for the Lower Peninsula. Both Peninsulas have trended downward in search interest over the past few years. However, the Upper Pensinsula did not continue this downward trend likely due to winter conditions more conducive to winter sports, as Upper Peninsula search interest is more driven by winter sports.

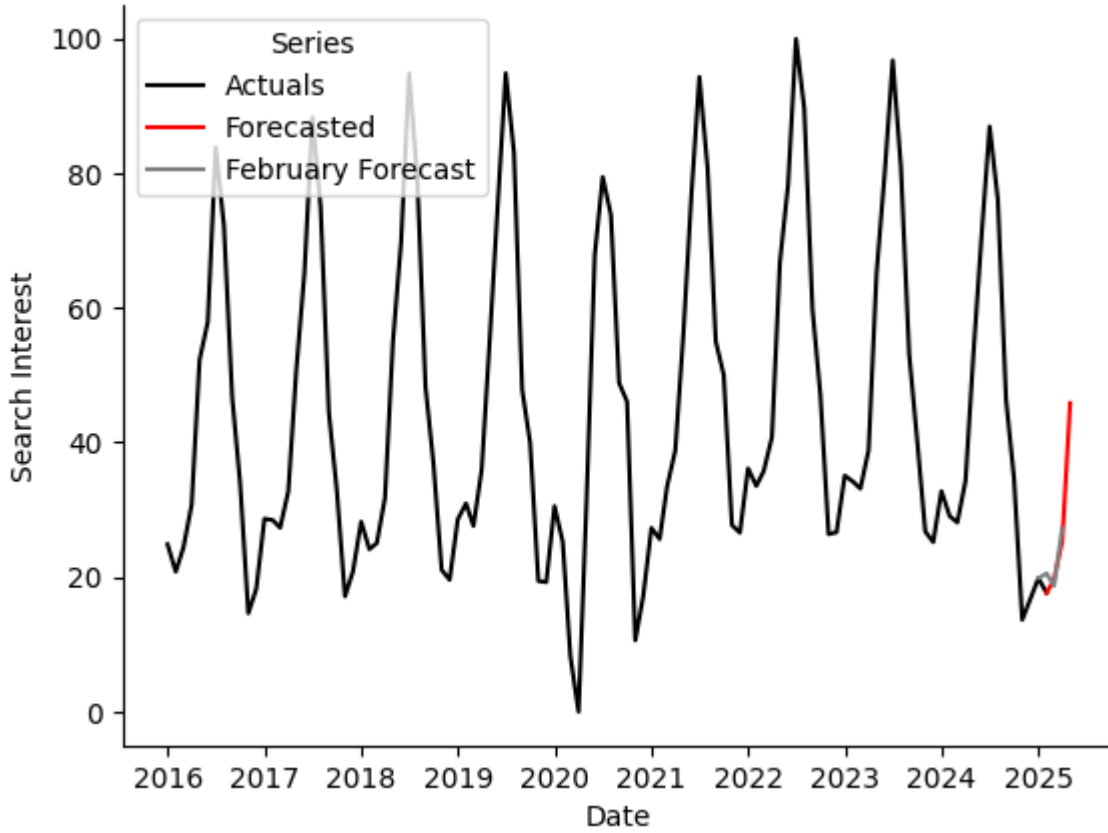
During the original analysis for this project, I found that many places were growing in search interest from other places also in Northern Michigan. This was likely due to renewed interest in outdoor recreation after the pandemic, residents of more populated Northern Michigan areas looking for less congested 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.

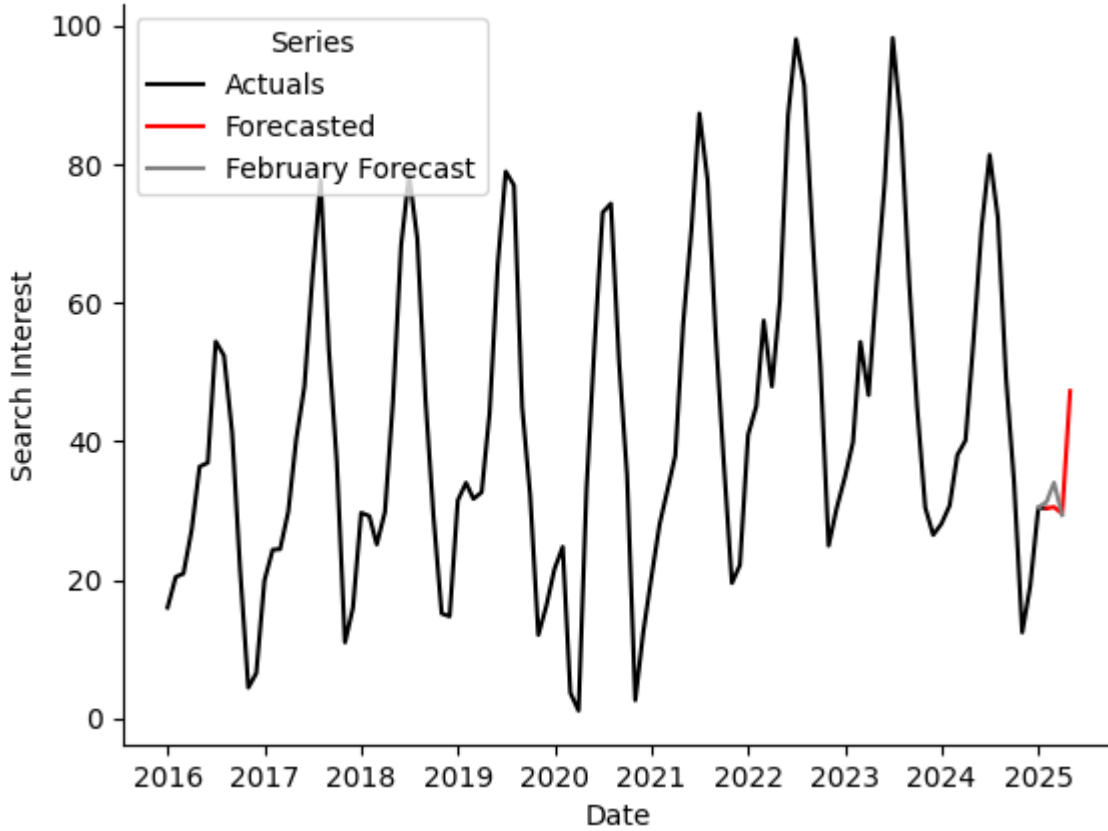
The charts below provide the current forecast and last month's forecast compared to actuals. For both peninsulas, February's forecast is in grey and the current March forecast is in red. These forecasts are very similar to eachother. In February, the actuals are very close to the February forecast.

Also provided are barcharts comparing the average search interest for the forecast months (March, April, May) to the same months in previous years. The forecast is lower this year for both peninsulas. This is reasonable given the downward trend for both pensinsulas.

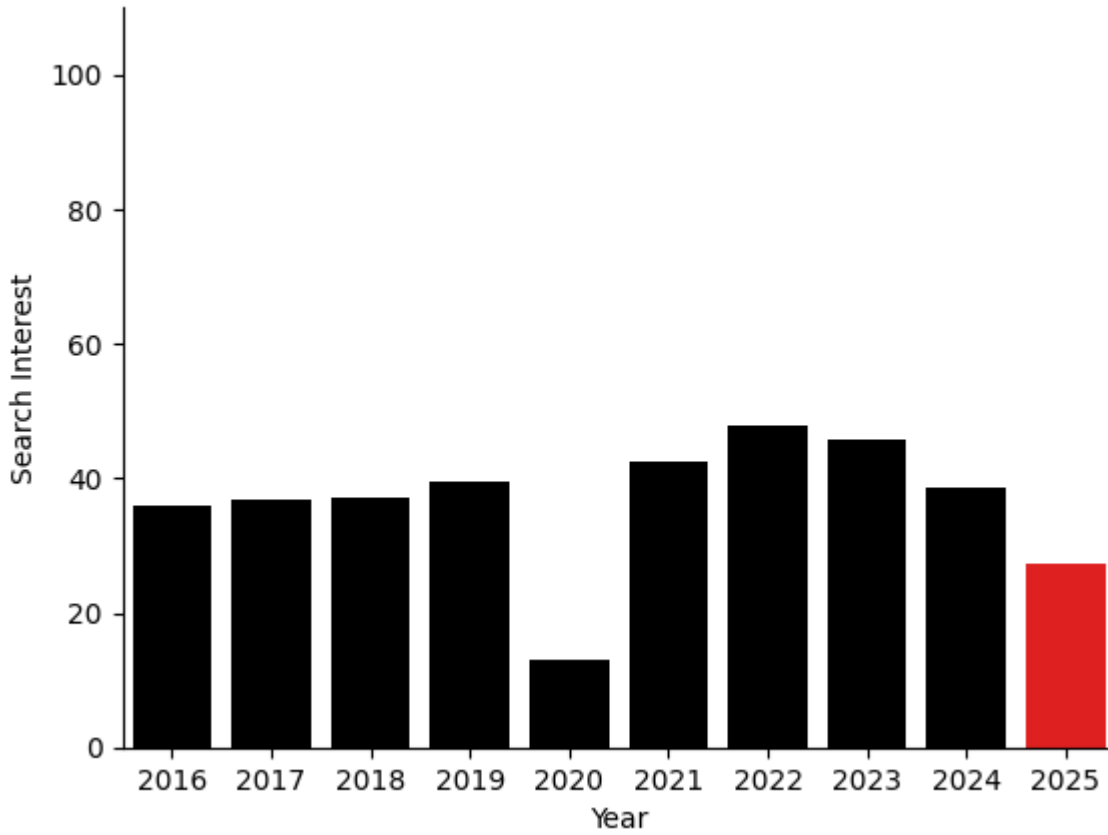
Northern Lower Places Google Search Interest Forecast



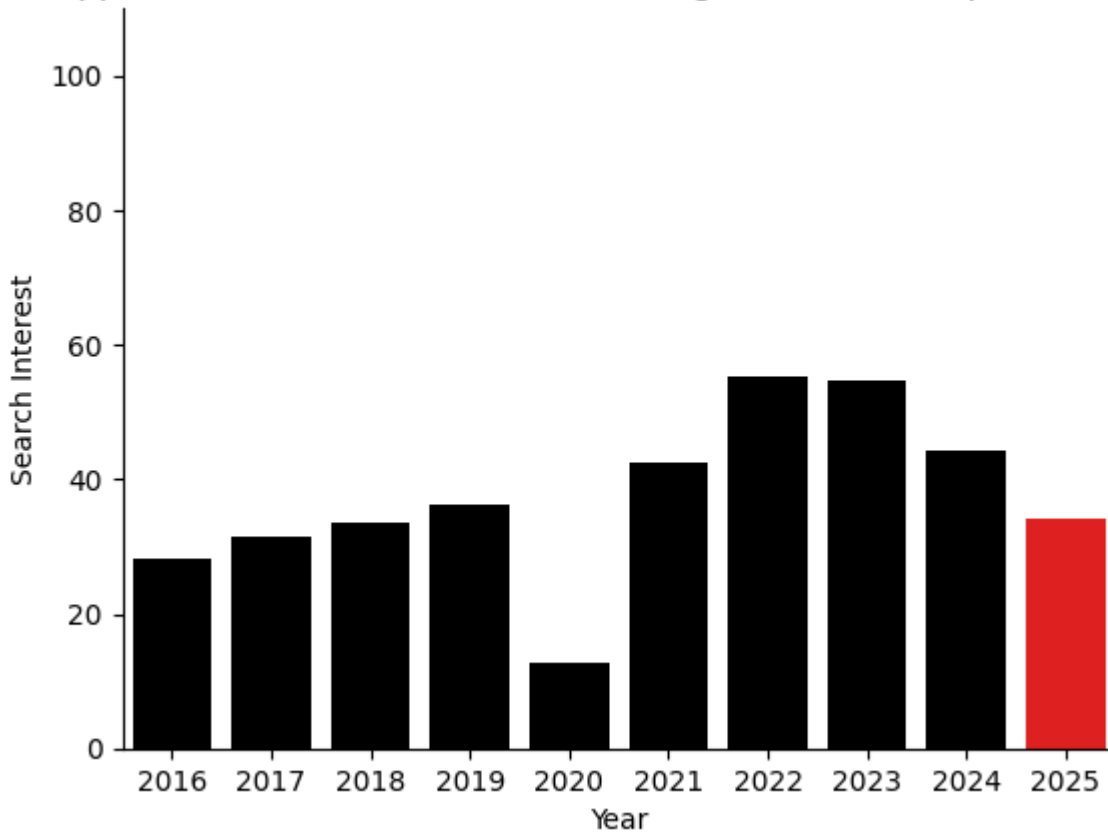
Upper Pensinsula Places Google Search Interest Forecast



Northern Lower Search Interest Averaged for March, April, and May



Upper Peninsula Search Interest Averaged for March, April, and May



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. Rapid River is near Escanaba and Atlantic Mine is on the Keewenaw Peninsula. Tustin is on the west side of the Northern Lower and Vanderbilt is on I-75. There isn't a very discernable trend in these places for this forecast. However, spring is also a season without high profile attractions for Northern Michigan. 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.

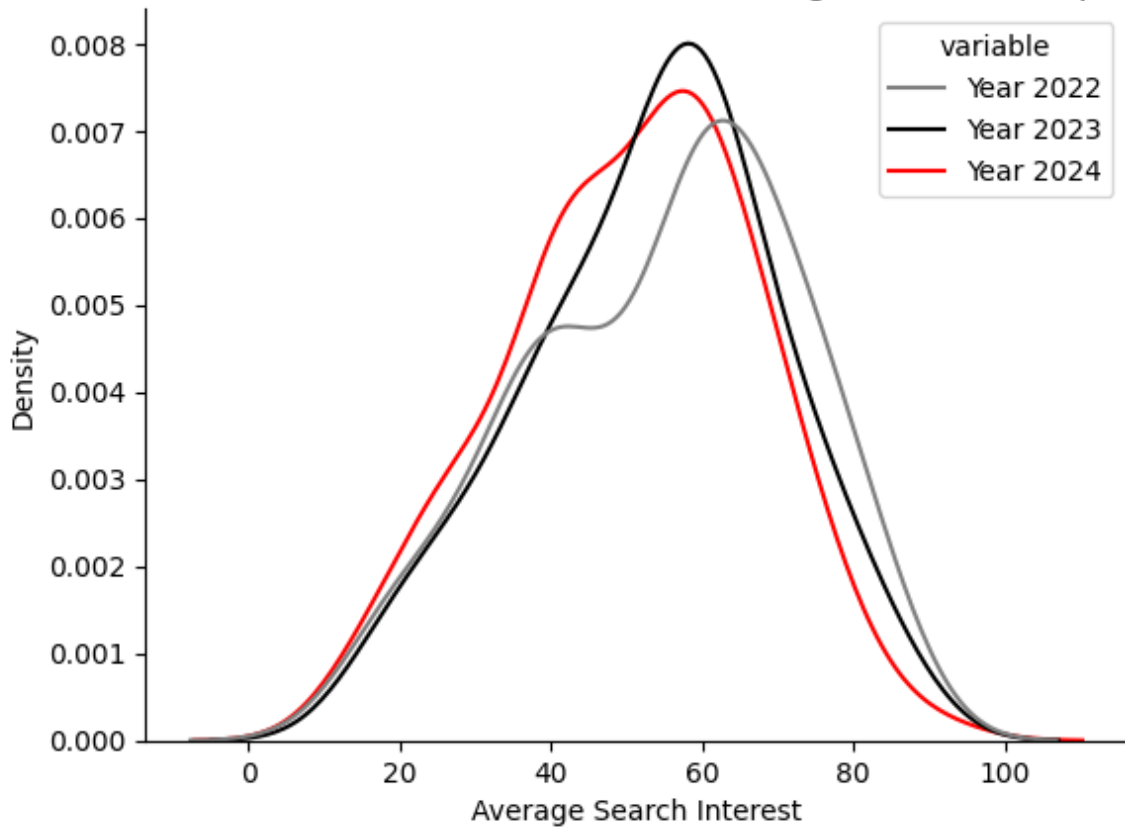
	Place	Peninsula	Difference
0	Rapid River	Upper	15.4
1	Greenland	Upper	12.0
2	Atlantic Mine	Upper	11.5
3	Tustin	Lower	7.2
4	Vanderbilt	Lower	6.2

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

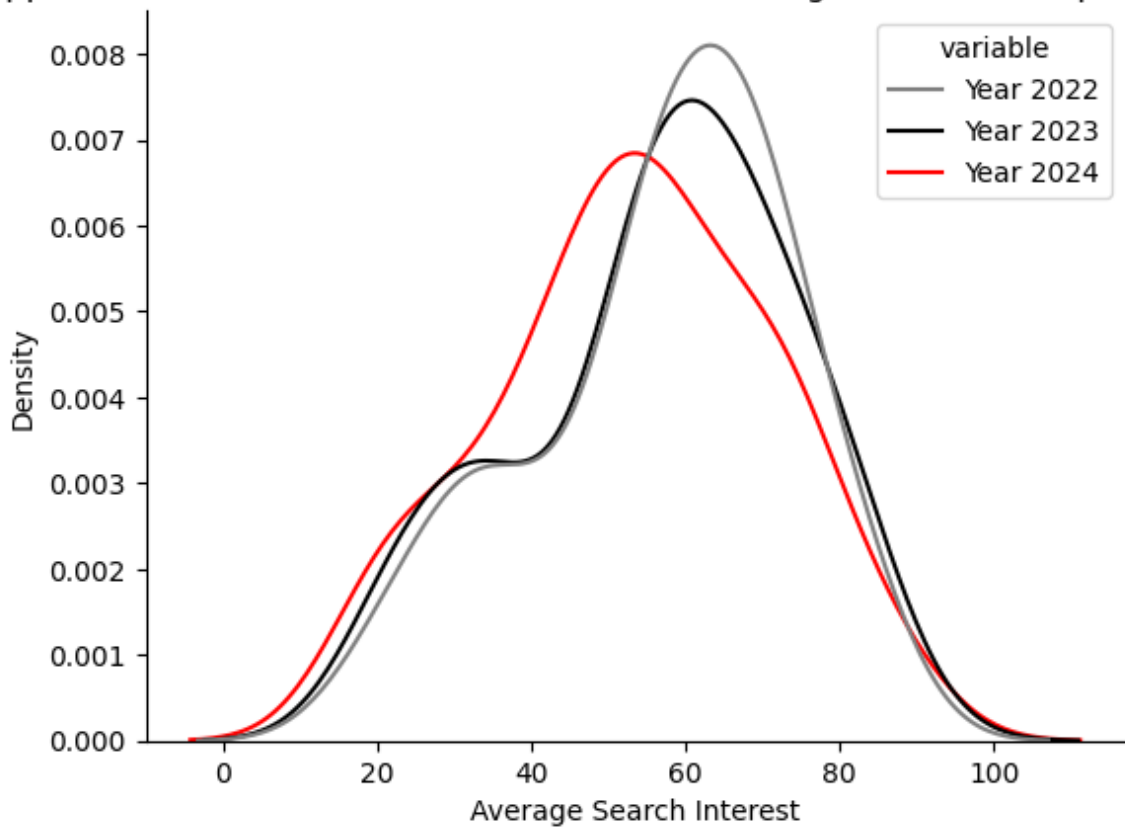
1. The previous year's monthly value for each individual place.
2. While not directly impacting the model forecast, seasonal (12 mo) differencing accounts for the fact that search interest is higher in some portions of the year than others (so previous year actual is impacted).
3. Model difference: based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

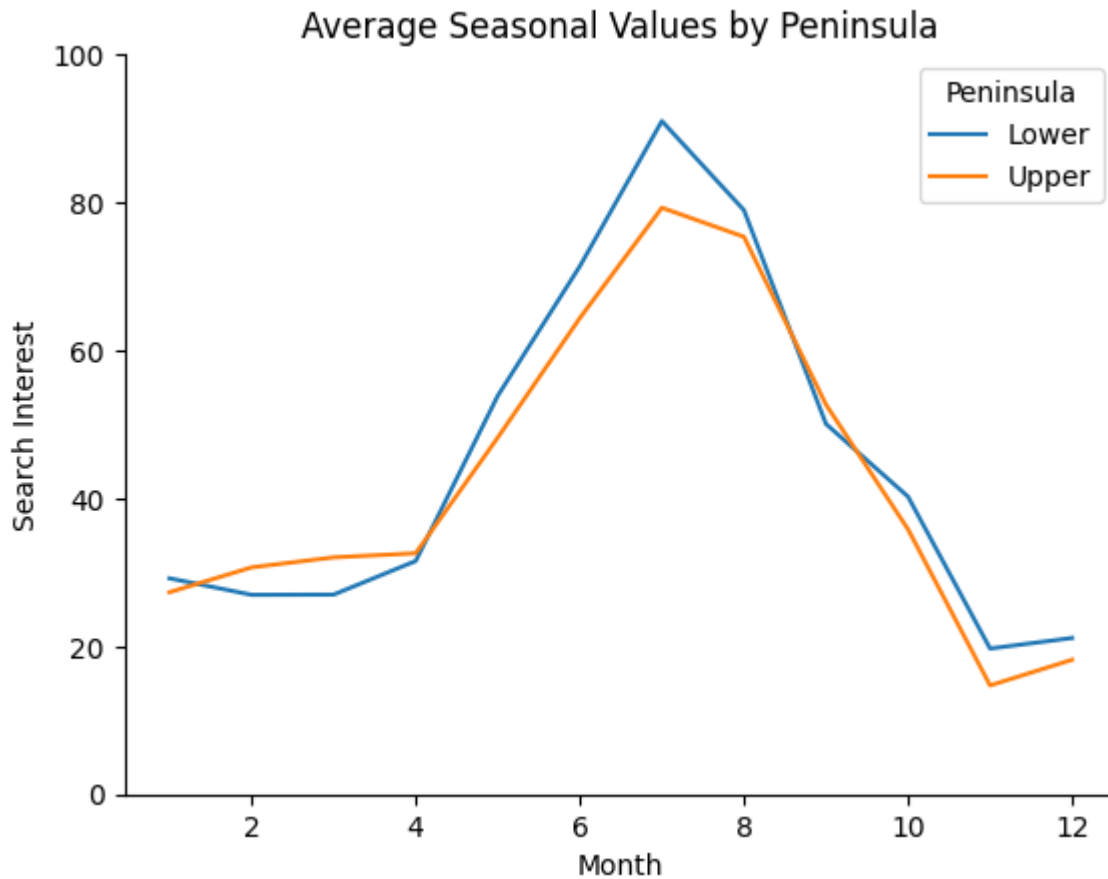
Lower Peninsula Place Level Search Interest Averaged for March, April, and May



Upper Peninsula Place Level Search Interest Averaged for March, April, and May

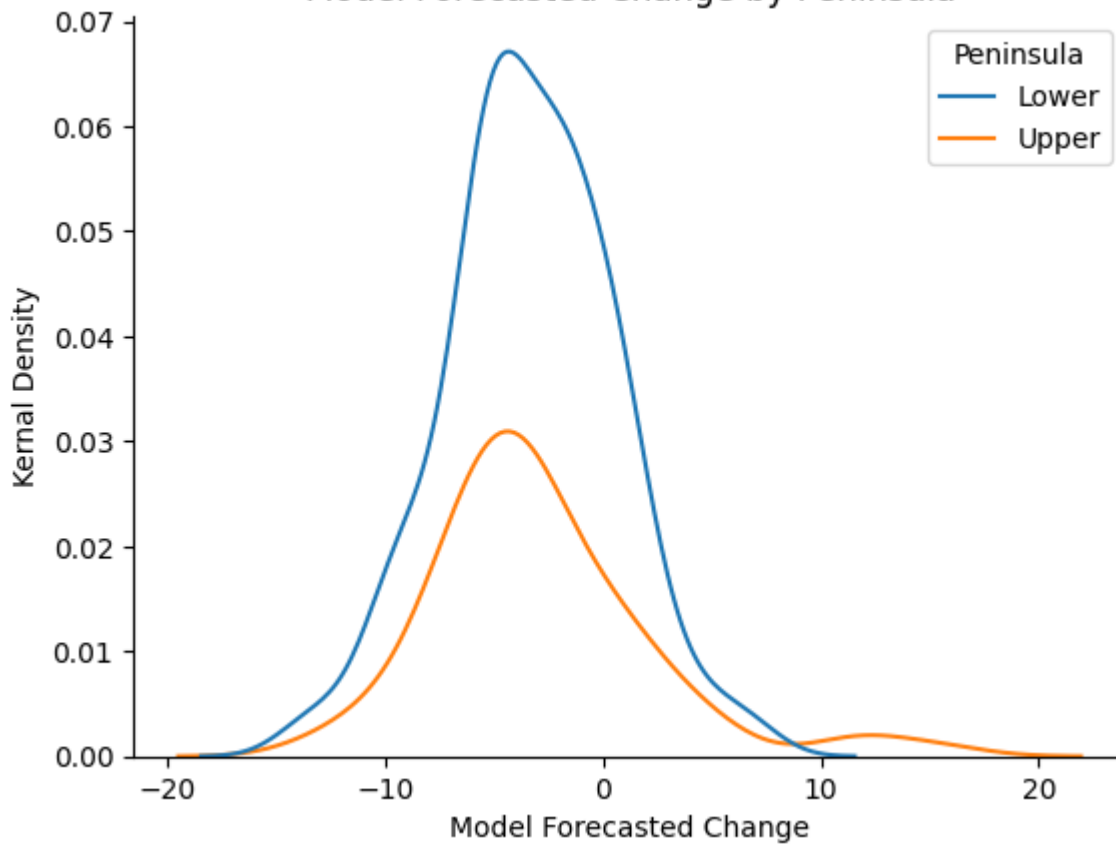


The following figure shows the aggregate average search interest for each calendar month. Both the Upper and Lower Peninsulas have a seasonal peak in July/August with the Lower Peninsula peak solidly in July. The Upper Peninsula has higher values for January-March likely due to winter snow sports like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



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.)

Model Forecasted Change by Peninsula



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, 70 of 142 places are impacted by weather or gasoline prices in the model. Of these, 15 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 vertical line signifies the start of the forecast period.

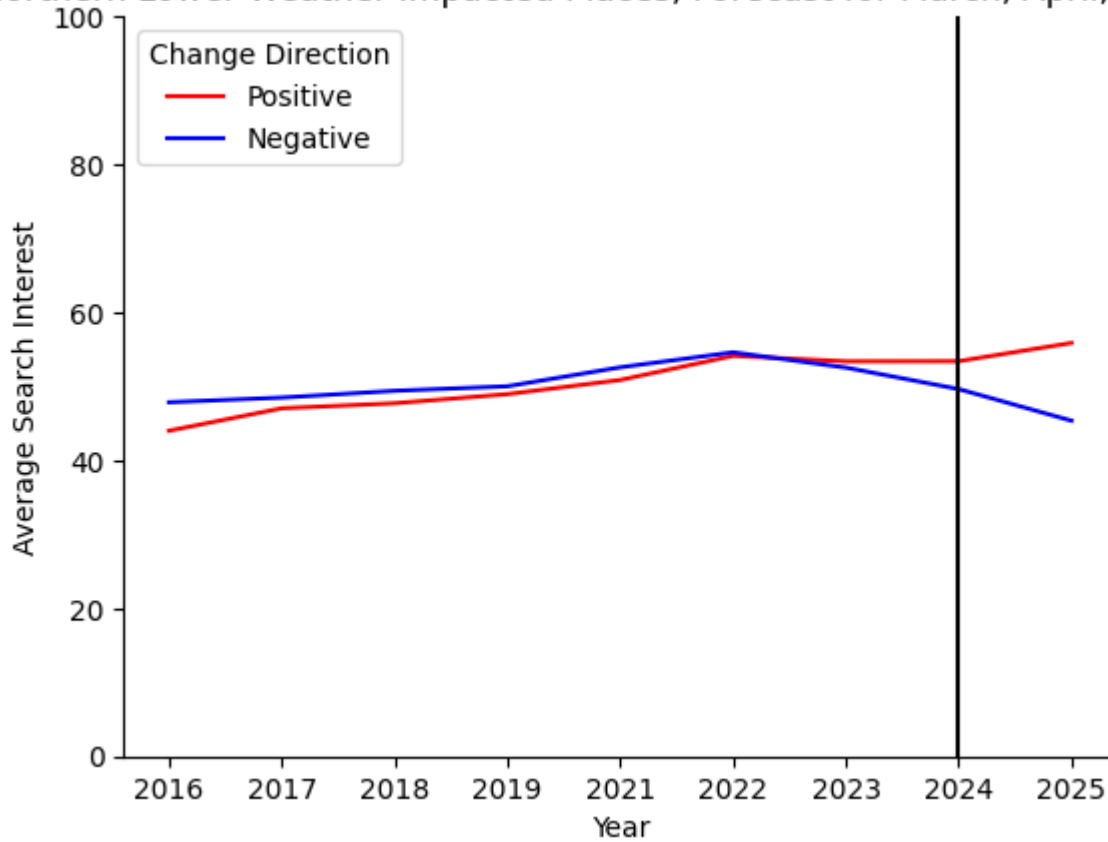
Northern Lower Places with Weather Impact Higher Interest than Last Year

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['caberfae', 'glen arbor', 'bellaire', 'arcadia', 'benzonia', 'scottville', 'ossineke', 'buckley', 'lakes of the north', 'hillman', 'tustin', 'free soil', 'vanderbilt', 'boon', 'honor']
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Northern Lower Places with Weather Impact Lower Interest than Last Year

['sand lake', 'ludington', 'mackinac', 'crystal mountain', 'luther', 'northport', 'suttons bay', 'elk rapids', 'traverse city', 'lake ann', 'lake leelanau', 'au sable', 'charlevoix', 'manistee', 'tawas city', 'bay view', 'grayling', 'custer', 'harrisville', 'boyne city', 'onaway', 'cedar', 'alden', 'mesick', 'rogers city', 'wellston', 'omer', 'fife lake', 'west branch', 'harrison', 'elberta', 'maple city', 'alpena', 'gladwin', 'clare', 'kalkaska', 'brethren', 'ellsworth', 'irononton', 'central lake', 'beaverton', 'gaylord', 'mcbain', 'mancelona', 'oak hill', 'jennings', 'reed city', 'pilgrim', 'sterling', 'parkdale', 'lincoln', 'baldwin', 'norwood', 'falmouth', 'chums corner']

Northern Lower Weather Impacted Places, Forecast for March, April, and May



For the Upper Peninsula, 27 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 vertical line signifies the start of the forecast period.

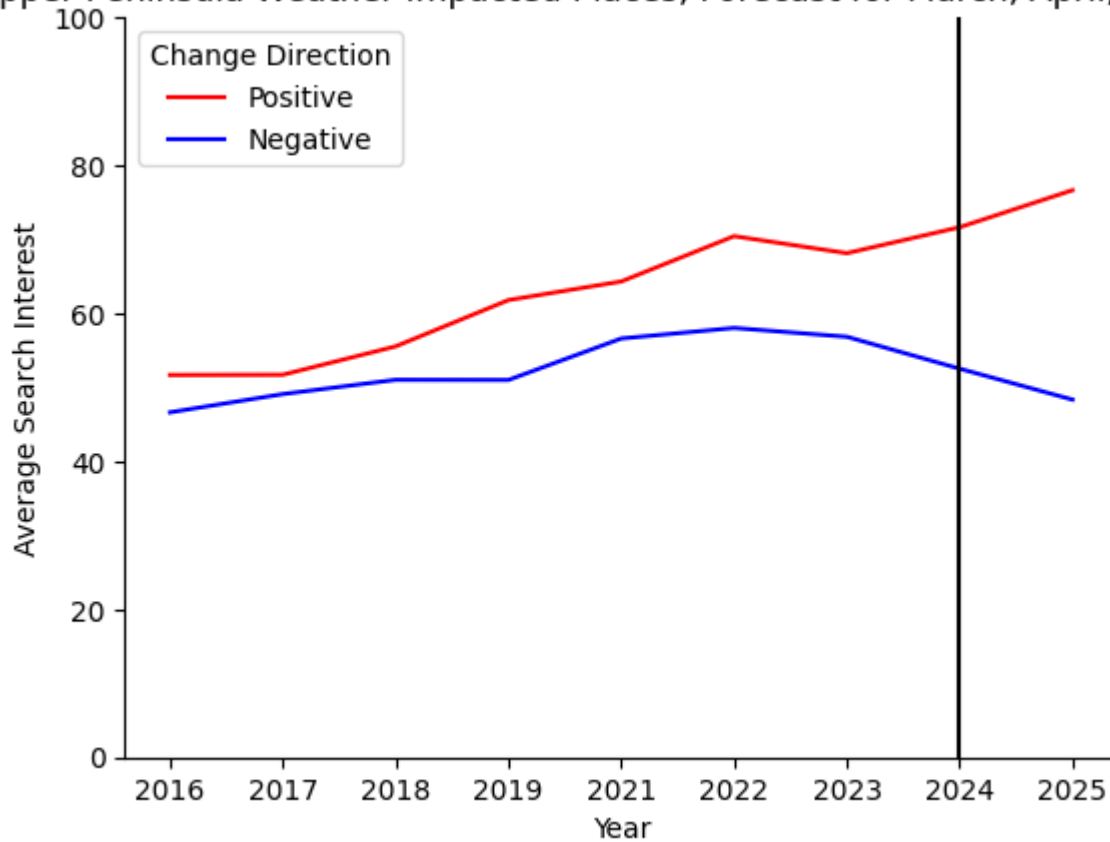
Upper Peninsula Places with Weather Impact Higher Interest than Last Year

['gladstone', 'white pine', 'hancock', 'rapid river', 'menominee', 'atlantic mine', 'south range']

Upper Peninsula Places with Weather Impact Lower Interest than Last Year

['munising', 'copper harbor', 'newberry', 'sault', 'houghton', 'manistique', 'big bay', 'ironwood', 'gwinn', 'ishpeming', 'bergland', 'iron river', 'bessemer', 'calumet', 'hubbell', 'republic', 'three lakes', 'kincheloe', 'stephenson', 'ewen']

Upper Peninsula Weather Impacted Places, Forecast for March, April, and May



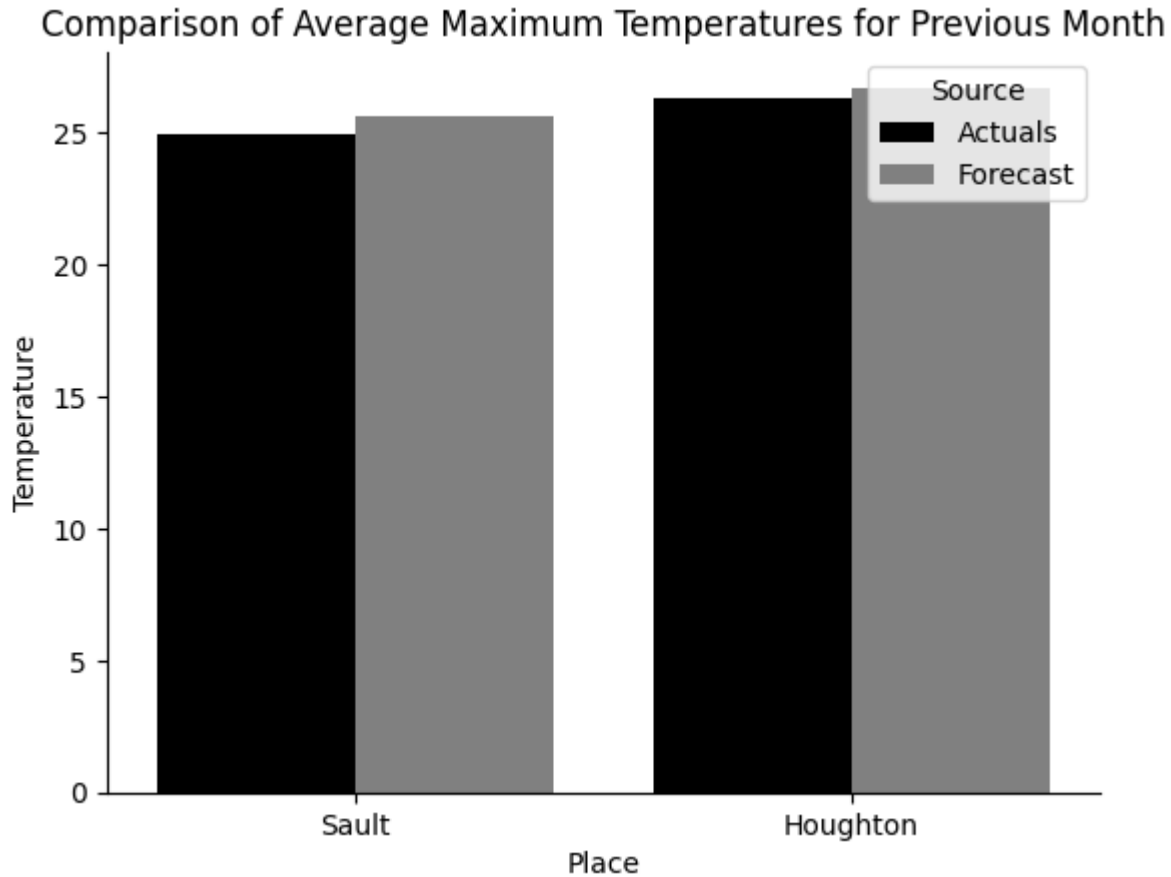
One last factor to consider is my source for weather forecasts, with a focus on temperature. All of my historical weather data used to train my models is from weather.gov. However, I source temperature forecasts from both weather.gov (average of averages) and accuweather (average maximums and average 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 January, the normal average temperature is 19.1 degrees for Houghton Lake and 13.1 degrees for Sault St Marie. The actual average temperature values were Houghton Lake 20.3 and Sault St Marie 14.4. So actual temperatures were higher than normals for Sault St Marie but lower for Houghton Lake.

Based on the accuweather forecasts, actual maximums were almost identical to forecasted. However, actual minimums were slightly higher than forecasted.



Comparison of Average Minimum Temperatures for Previous Month

