

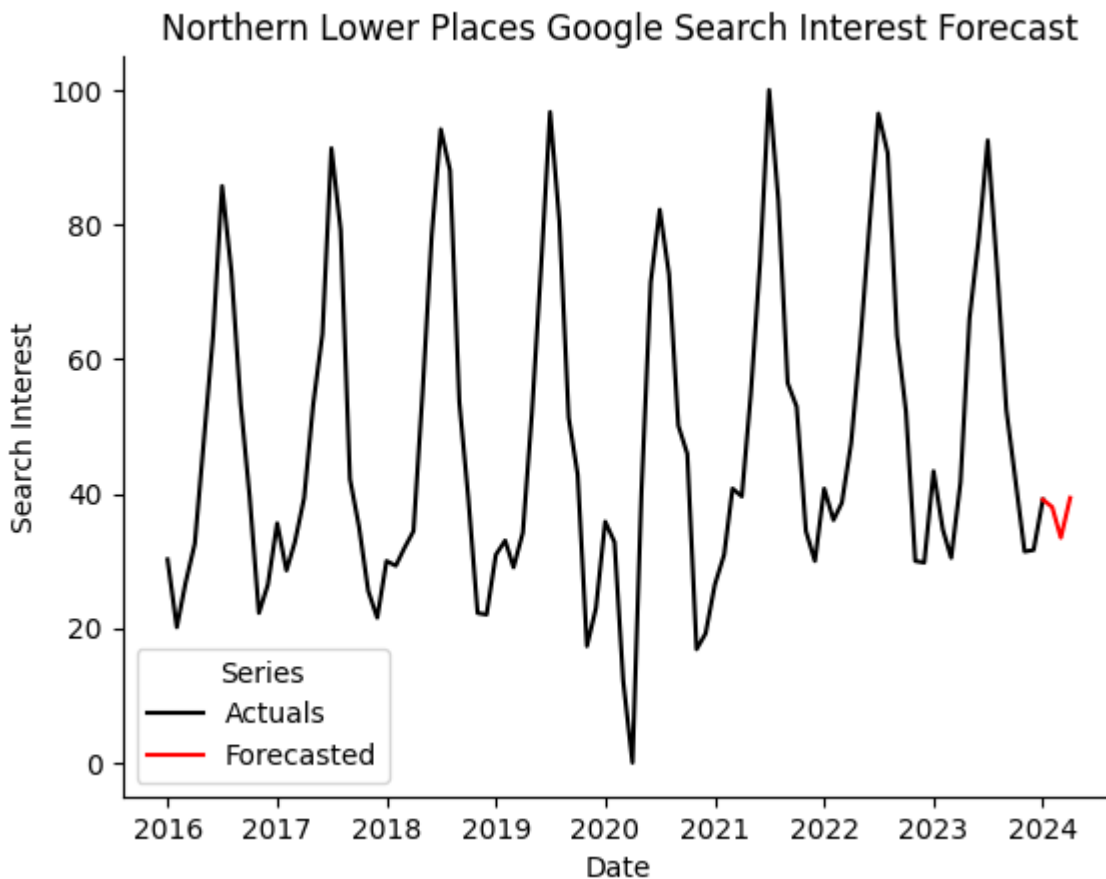
February-April 2024 Northern Michigan Search Interest Forecast

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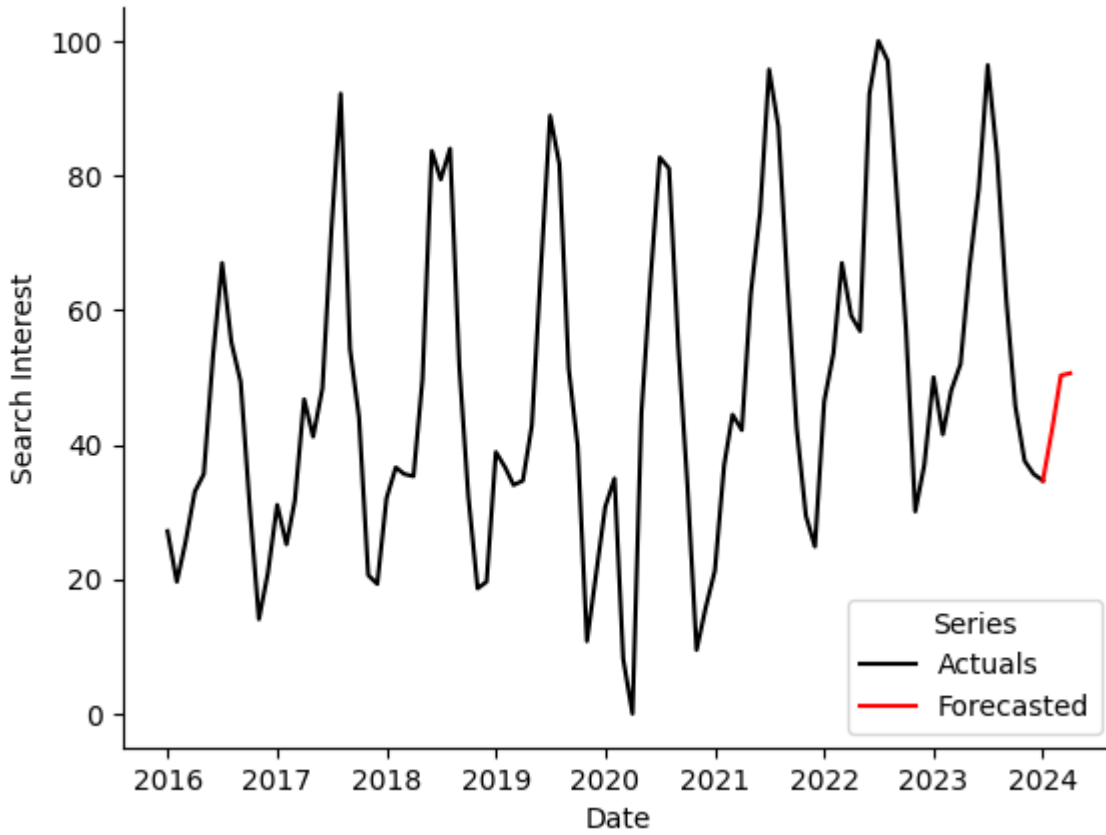
Below are the search interest forecasts for the combined Northern Lower and combined Upper Peninsula places for February, March, and April 2024. Note that the possible range for historical search interest is normalized to a maximum of 100 and a minimum of 0, but forecasts outside this range are permissible as these values are forecasted to be outside the historical range.

Also provided are barcharts comparing the average search interest for the forecast months (February, March, April) to the same months in previous years.

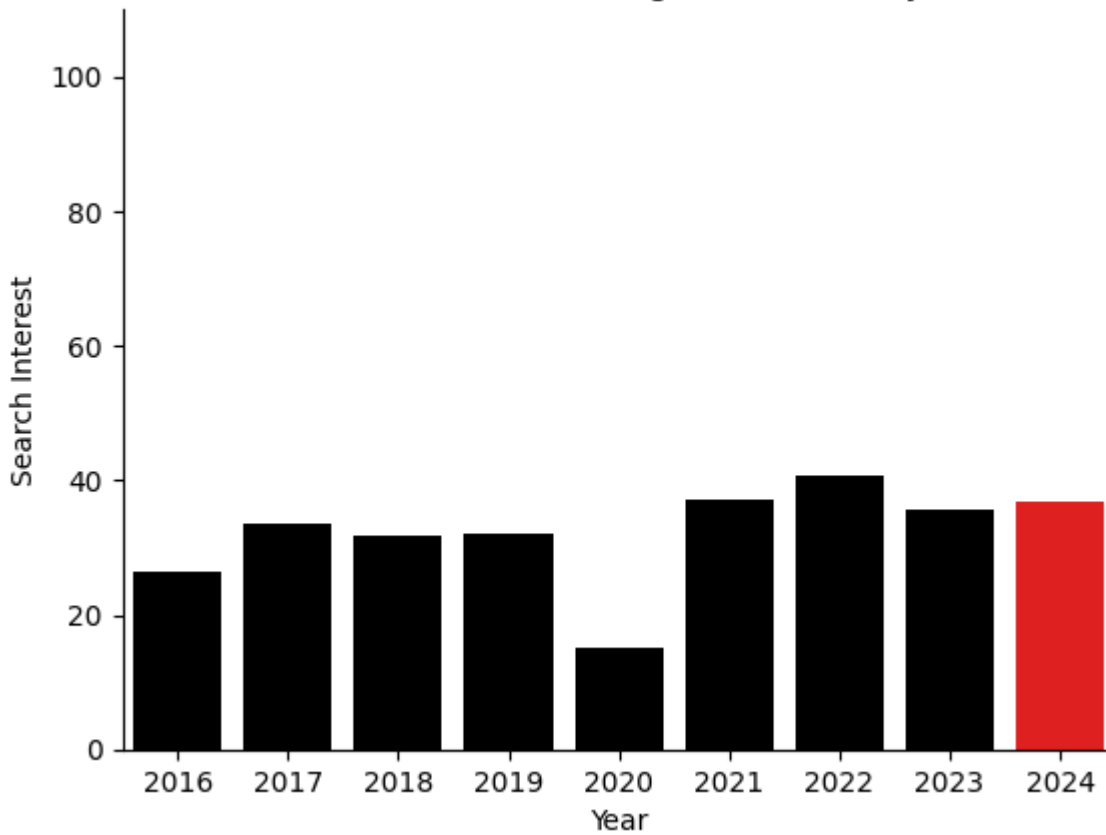
The forecast for both peninsulas is slightly higher than last year but lower than in 2022.



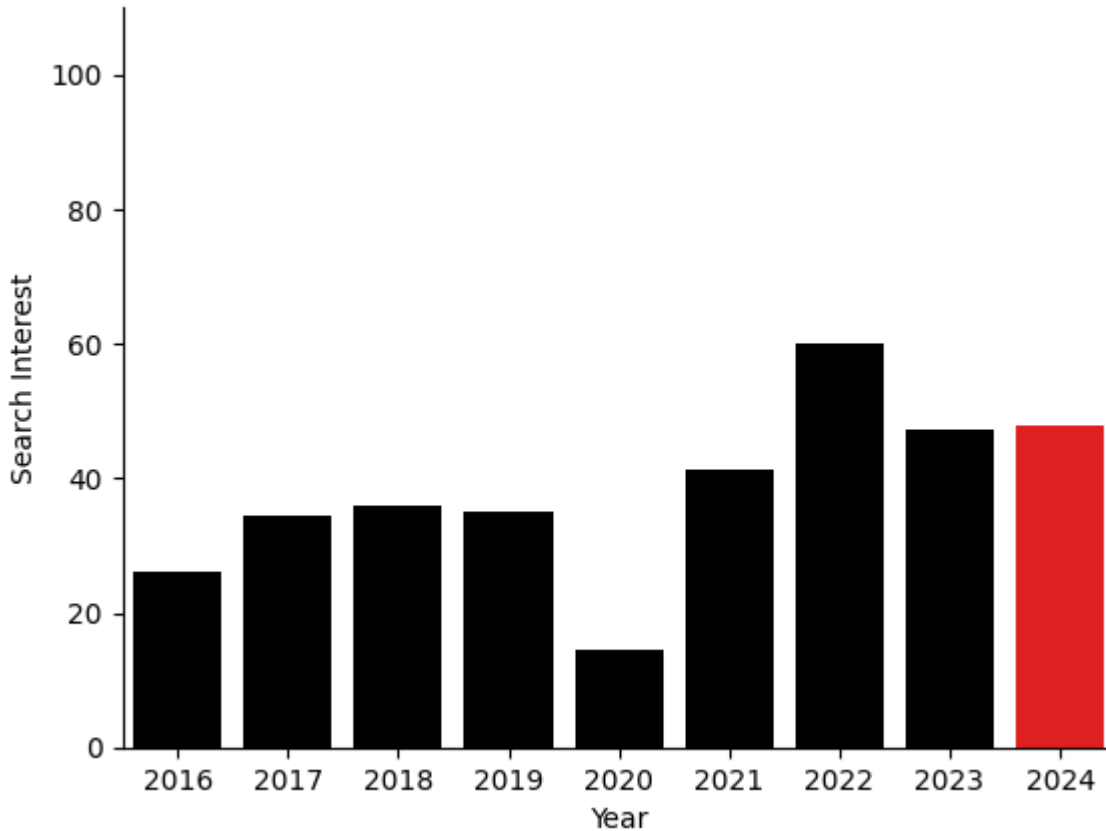
Upper Pensinsula Places Google Search Interest Forecast



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



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



The following table shows the top five places that are forecasted to have the highest search interest compared to the same time period in 2023. All of these places are in Northwest Michigan except Skidway Lake which is in the southern portion of Northeast Michigan and Gladstone which is on Lake Michigan in the Upper Peninsula.

	Place	Peninsula	Difference
0	Free Soil	Lower	9.3
1	Gladstone	Upper	8.7
2	Tustin	Lower	8.1
3	Parkdale	Lower	6.6
4	Skidway Lake	Lower	5.9

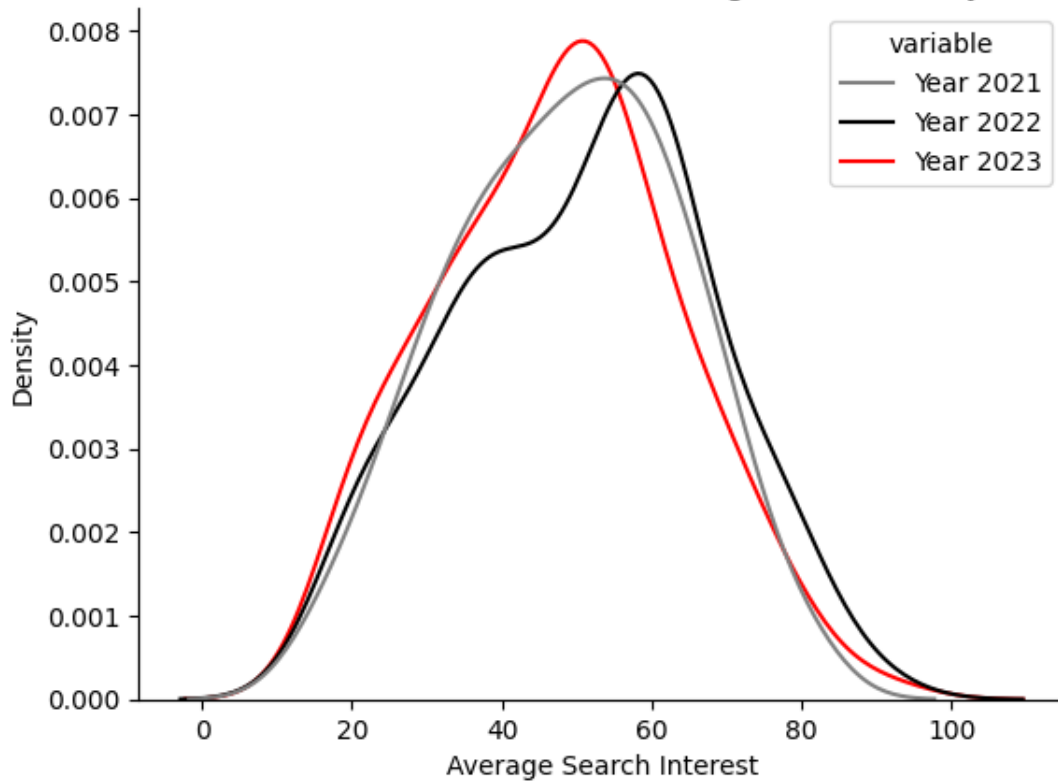
Three things impact the value of the search interest forecasts for each place.

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 new levels are aggregated via

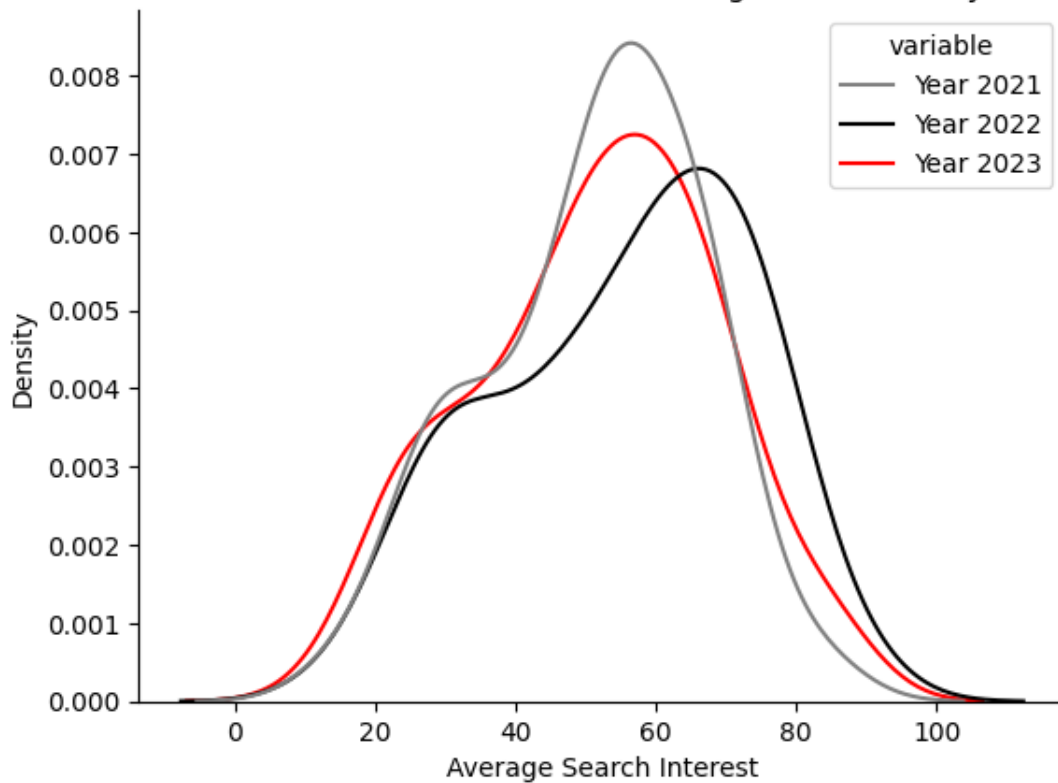
regression to the peninsula level series.

The two KDE plots below plot the distributions of the individual place actual values for the months of February, March, and April for the previous three years. Note that the values for 2023 serve as the last actual values for 2024. For the Lower Peninsula, the 2023 values are lower than the other two years. For the Upper Peninsula, the 2023 values are lower than 2022 but similar to 2021.

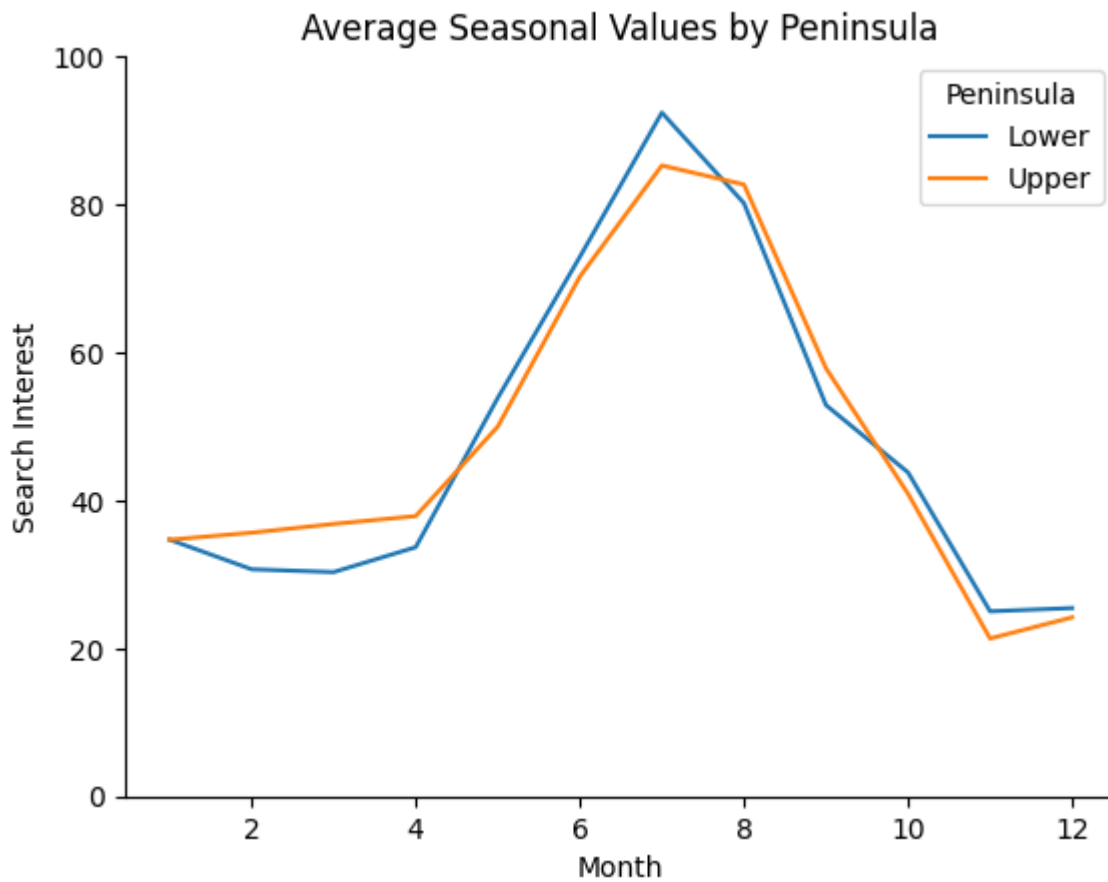
Lower Peninsula Place Level Search Interest Averaged for February, March, and April



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

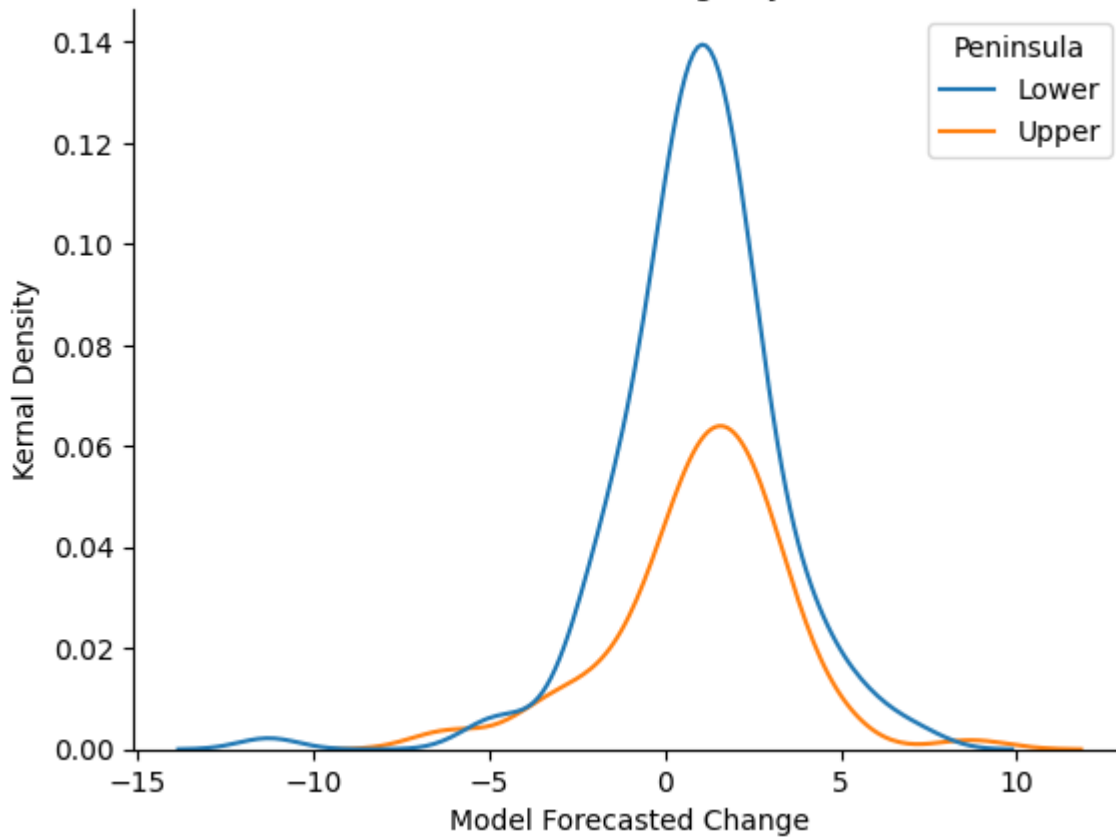


The following figure shows the aggregate average search interest for each month. Both the Upper and Lower Peninsulas have a seasonal peak in July/August with the Lower Peninsula peak solidly in July. The Upper Peninsula values have higher values for January-March likely due to winter snow sports like snowmobiling. For the February-April forecast period, we should expect some of the lowest search interest values for the Lower Peninsula, except for November and December.



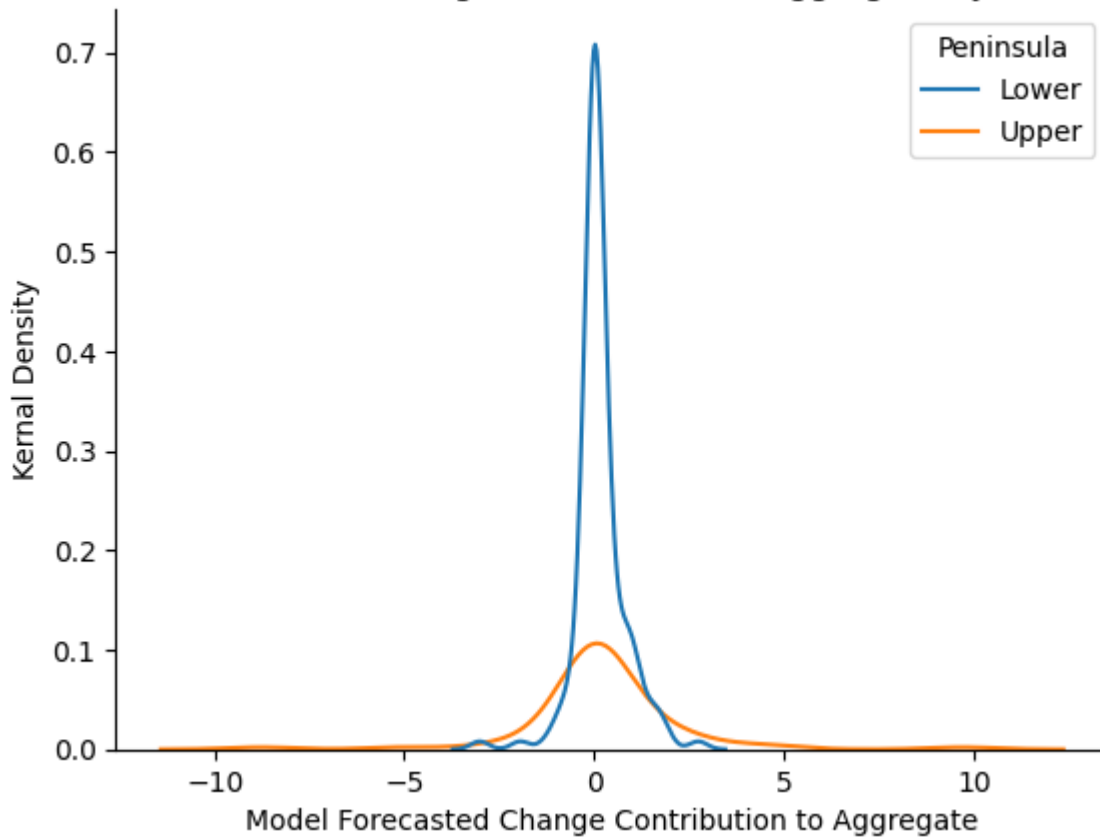
Finally, forecasts are determined by the forecasted place level change from the previous year based on weather and gasoline prices. For both peninsulas, the most likely forecasted change from the previous year is positive, but more so for the Upper Peninsula.

Model Forecasted Change by Peninsula



The following shows the distribution of individual place changes weighed by their estimated impact on the aggregate series (i.e. places with higher search interest will have a higher impact on the aggregate value). Note that after weighting, now the forecasted changes are much closer to zero. This is partly because places with less search interest often have more variance in search interest values.

Model Forecasted Change Contribution to Aggregate by Peninsula



The following chart shows the average of the changes over the forecast period for places in each peninsula. These changes are weighted by their contribution to the aggregated peninsula forecasts as discussed in the figure above. The Upper Peninsula is much more positive than the Lower Peninsula which is close to zero.

Average Place Change Weighted by Contribution to Peninsula Aggregate

