

A Case Study of Tourism in North Carolina State Parks Using Google Trends

Aaron Bradley Scott, Liberty University, USA*

ABSTRACT

The purpose of this study is to examine available innovative technologies as a means to forecast visitors to the North Carolina State Park system. The research will use Google Trends as the innovative technology and using the data from Google search queries to measure relationship from searches to visitors. This examination will include literature review and data collection methods. Furthermore, the quantitative measures will include the Pearson Correlation Coefficient (Pearson) and Time-Series Linear Modeling (TSLM), which accounts for seasonal and trending values. The data from the state parks were provided by the Public Information Office of the North Carolina Division of Parks and Recreation. Additionally, the search query data was collected from Google Trends. Two locations within the Appalachian Mountains of Western North Carolina were selected due to the exclusivity of the locations and to capture visit behavior in search queries. Those locations are Mount Mitchell State Park and Grandfather Mountain State Park.

KEYWORDS

Appalachian Mountains, Forecasting, Google Trends, Grandfather Mountain, Linear Modeling, Mount Mitchell, North Carolina, Nowcasting, Search Query, State Parks, Time-Series, Visitors

INTRODUCTION

Tourism is a service-focused industry that spurs economic activity. The industry is found to be reflective of economic growth (Tisdell, 2013). In 2018, tourism represented 7.8 million jobs in the American workforce and carried 2.8% of the country's GDP (Franks & Osborne, 2019). The U.S. Bureau of Economic Analysis (2020) released the 2019 figures indicating higher growth for industries with real GDP recorded at 2.1%. Tourism carries wide-ranging subsectors with varying impact, bringing together cultures within developing or developed regions or countries (Uysal et al., 2016; Kozak & Kozak, 2015). While the calendar year of 2020 will be producing economic numbers marred by the coronavirus global pandemic, it is becoming clear that consumer behavior is changing how travel occurs (Uğur & Akbiyik, 2020).

Tourism, as an industry, relies on other consumption-based industries like transportation, accommodation, food and beverage, recreation, and more (Karuaihe et al., 2015). Both domestic and international tourism were brought into the forefront of economic academics due to the increased per capita income and reduction of transportation costs in western economics after WWII (Polo & Valle, 2015). The act of a consumer engaging in a travel and tourism activity impacts other industries either beneficially or negatively. Generally, positive impacts are discussed around growth activities to the local, state, and national economy. On the other hand, the negative impacts which are discussed

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*Corresponding Author

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among academics and stakeholders are income inequality (Assadzadeh & Yalghouzaghaj, 2015), over-dependency (Rezapouraghdam et al., 2018), carbon emissions (Akadiri et al., 2018) and more.

For the local economy to flourish as a tourist destination, it needs to create an environment for optimally efficient cooperation from politicians, business leaders, and community (Niță, 2014). Tourism has historically proven the adaptations of the industry and relevancy are possible in local economics (Rodriguez et al., 2020). An economic impact study at one of North Carolina's state parks, Hanging Rock State Park, concluded visitors contributed \$26.65 per person to the local economy (Bergstrom et al., 1990). While the economic impact relevancy thirty years later would not hold the same monetary value to local business leaders, it still provides research in how tourism assists and impacts other local industries within the economy. Economic impact studies are a vital tool for assisting the local business leaders in understanding what tourists find the most relevant within their visits and can assist in bettering those segments within their jurisdiction.

Google Trends is a platform that allows researchers across many fields to understand the popularity of search query topics, over time (West, 2020). The platform is accessible to the general public via the online web. Google records samples of search query data from users to measure on a normalized scale in a particular city, state, region, or country (Padhi & Pati, 2017). Google Trends (2020) measures the search volume on a scale from 0 to 100 and sets the highest volume at 100. Due to time being an infinite measure, Google Trends peak scale of 100 will be adjusted to the newest maximum peak and all other data will be adjusted per the scale (Google Trends, 2020). Both state park examples have recorded new peaks during the 2020 global coronavirus pandemic.

BACKGROUND

Google holds a 66.7% of market share worldwide and is the largest search engine used in the United States (Yang et al., 2014). Google trends has been used to show search query data can assist in stronger forecasting on behavior (Choi & Varian, 2009; Höpken et al., 2018). Previous research has shown Google Trends abilities with tourism in Switzerland (Siliverstovs & Wochner, 2018), Portugal (Dinis et al., 2017), and Japan (Chang et al., 2017), along with many other countries. At the time of writing, there has been no other major publications studying Google Trends and American domestic tourism. As seen in the Bergstrom *et al* (1990) research, forecasting experts use economic viability data as a measure of potential tourism impact. Therefore, it can be concluded that examining the relationship of Google search query data and tourism activity can be viewed as both, modernizing and advantageous.

METHODOLOGY

The data from the state parks were provided by the Public Information Office of the North Carolina Division of Parks and Recreation. Additionally, the search query data was collected from Google Trends. The data for state parks had to be requested for a time period from January 2015 until July 2020, most recent data reported. The data had missing visitor totals reported for the month of April 2019 and April 2020. Interpolation was used by averaging previous recorded April data in the set. The data was provided with additional comments from the park operators on tourism numbers. These comments are provided when it appears visitor numbers were correlated to poor weather, road access, and local traffic pattern shifts. Even though weather may have caused lower attendance, it would be assumed that same weather conditions would also shift interest in Google searches. Therefore, these variables were kept and measured against Google Trends data.

The methodology of selecting two North Carolina state parks, Grandfather Mountain State Park and Mount Mitchell State Park, are the lack of national attention and the regional influence from tourism in Asheville and Boone, North Carolina markets. Additionally, within the region is the largest U.S. National Park by visitors, Great Smoky Mountains National Park (National Park Service, 2020). Asheville, North Carolina was ranked number three in Travel & Leisure magazine's top fifty places

to travel in 2020 (Bake, 2020). Furthermore, Boone is home to Appalachian State University, which has a student enrollment of 19,280 (Bruffy, 2019).

The methods of examining the data will include Pearson correlation coefficient (Pearson) and time-series linear modeling (TSLM). Using Pearson as a method for examining search engine queries and visitors is a method that has been used in previous research (Yang et al., 2014; Chang et al., 2017). The first method, much like Yang et al. (2014), would be to examine Google search query data for a range of 0 to 7 months and seek the highest correlation coefficient. Afterwards, the data can be processed through a time-series linear model and reviewing the summaries. Using time-series linear modeling will account for seasonality and trends. The use of TSLM function is a forecasting package within the R program; which, uses linear modeling with options of seasonality and trend (Chen et al., 2019).

RESULTS

The Pearson results were compiled through a series of lagged search results to visitors at each state park between 0 to 7 months. The highest Pearson results for both state parks were during the non-lagged data. Pearson indicated 0.601 and 0.642 for Mount Mitchell State Park and Grandfather Mountain State Park, respectively for the full time period. As the lagging process continued, the results became less significant. Using the Pearson test, there are different time periods which produce the best possible correlation. Using the time period from January 2017 to July 2020, Mount Mitchell data returned a 0.67 correlation. Data from Grandfather Mountain between July 2018 to July 2020 produced the highest return, beating the threshold set by previous researchers at 0.76 (Yang et al., 2014). Dividing the initial time frame into smaller periods is consistent with research suggesting consumer sentiment and tourism activity work together (Bayih & Singh, 2020). The time periods for observation were matched to consumer sentiment and public knowledge of political uncertainty around 2016 President election and high-profile committee hearings around impeachment inquiries (University of Michigan, 2020).

Figure 1. Pearson Correlation Coefficient

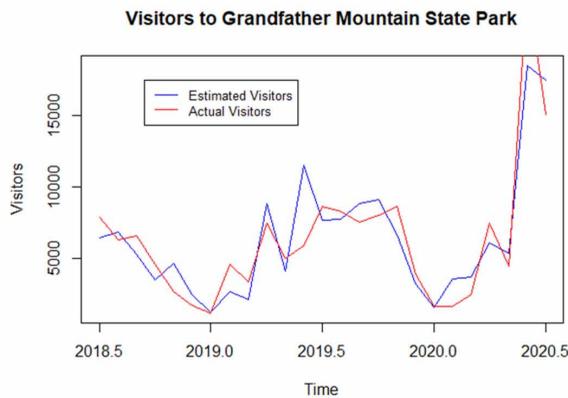
<i>Monthly Visitors to Monthly Google Trends Data, Jan 2015 - Jul 2020</i>								
	Non-Lag	Lag 1	Lag 2	Lag 3	Lag 4	Lag 5	Lag 6	Lag 7
Mount Mitchell	0.601359	0.430091	0.363268	0.165397	-0.062220	-0.287963	-0.490193	-0.466129
Grandfather Mountain	0.642529	0.446326	0.196825	0.027831	-0.197280	-0.362067	-0.482527	-0.45621
<i>Monthly Visitors to Monthly Google Trends Data, Jan 2017 - Jul 2020</i>								
Mount Mitchell	0.670700	0.535123	0.408512	0.087123	-0.172505	-0.382674	-0.567894	-0.66129
Grandfather Mountain	0.732871	0.569420	0.223880	0.041472	-0.127606	-0.313935	-0.408729	-0.43849
<i>Monthly Visitors to Monthly Google Trends Data, Jul 2018 - Jul 2020</i>								
Mount Mitchell	0.59465	0.44537	0.46936	0.00869	-0.16881	-0.26259	-0.46961	-0.6297
Grandfather Mountain	0.79251	0.60212	0.03084	-0.25534	-0.36611	-0.45667	-0.43001	-0.3069

Data collected from NC State Parks and Google Trends

. Mount Mitchell State Park produced a model that did not find significance with Google search query data or trend. The model does note eight months of the year, seasonality is statistically significant

with a higher adjusted r-square (Table-4). When examining Grandfather Mountain State Park output, seasonality and trend were not statistically significant. Although, Grandfather Mountain State Park shows Google search query data as statistically significant. The intercept is not significant (Table-5). Overall, the Grandfather Mountain model has an adjusted r-square of 0.604 with a significant p-value and f-statistic. Therefore, roughly 60% of the visitors to Grandfather Mountain State Park can be explained by Google search query volumes.

Figure 2. Visitors to Grandfather Mountain State Park



Data collected from NC State Parks and Google Trends

CONCLUSION

When examining the Pearson results, it becomes clear that nowcasting Google search query data to visitors are possible for the parks. The time-series linear regression produced results that were statistically significant for one park out of the two observed. The Pearson correlation coefficient for Grandfather Mountain State Park yielded higher correlations greater than Yang et al. (2014). Furthermore, to the best of the author's knowledge there has been no studies using the time-series linear model as a tool to examine forecasting capabilities. Even more so, using the combined guidelines set forth by previous work to measure American domestic tourism. The relationship for Google search query data and attendance at the state parks would be expected to continuously improve over time due to technological advancements and potential pushes for further digital reliance from the 2020 global coronavirus pandemic. Therefore, continuous research on this topic and potentially using other innovative technologies as a medium of nowcasting should be further explored. This study concludes that Google Trends can assist stakeholders in creating stronger forecasting for park visits.

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APPENDIX A - TABLES

Table 1. 2015 – 2017 Raw Data collected from NC State Parks and Google Trends

Year	Month	Visit_Mitchell	Visit_Grandfather	GTSQ_Mitchell	GTSQ_Grandfather
2015	1	1400	2255	4	6
2015	2	188	910	7	6
2015	3	5018	3657	12	11
2015	4	12981	7375	8	4
2015	5	23383	10306	12	24
2015	6	52072	9944	20	20
2015	7	52270	15180	21	17
2015	8	41593	13632	12	25
2015	9	33858	7797	8	17
2015	10	71200	12181	18	25
2015	11	15726	5377	16	9
2015	12	6280	5983	8	13
2016	1	2880	2621	32	9
2016	2	323	1193	12	14
2016	3	8272	6947	15	11
2016	4	17200	7109	5	20
2016	5	39117	6209	22	20
2016	6	51840	9533	25	35
2016	7	64752	14401	30	52
2016	8	50998	6777	25	32
2016	9	49456	7678	14	17
2016	10	93184	13596	16	24
2016	11	14791	7382	4	13
2016	12	5278	3566	7	17
2017	1	6084	2941	5	30
2017	2	7973	4600	7	12
2017	3	7398	4866	6	4
2017	4	25508	9309	15	29
2017	5	36452	7495	18	37
2017	6	46087	10594	22	65
2017	7	64896	11696	25	51
2017	8	47217	9659	12	16
2017	9	39888	10331	21	12
2017	10	69549	8633	26	27
2017	11	19745	4742	14	16
2017	12	4674	2782	6	13

Data collected from NC State Parks and Google Trends

Table 2. 2018 – 2020 Raw Data collected form NC State Parks and Google Trends

2018	1	428	666	9	9
2018	2	6437	1874	7	6
2018	3	5609	2808	16	15
2018	4	17566	6059	13	16
2018	5	32234	4142	16	28
2018	6	45932	6384	14	22
2018	7	63037	7866	23	36
2018	8	44065	6282	20	25
2018	9	35721	6577	13	23
2018	10	63722	4604	10	18
2018	11	9041	2707	9	15
2018	12	2803	1712	8	14
2019	1	5371	1187	5	17
2019	2	3365	4620	7	15
2019	3	11441	3376	9	11
2019	4	18314	7463	11	30
2019	5	45016	5035	21	32
2019	6	49007	5920	18	30
2019	7	63192	8637	21	36
2019	8	6282	8296	17	23
2019	9	56176	7558	11	37
2019	10	69381	8001	29	45
2019	11	18911	8621	12	20
2019	12	8893	3949	5	11
2020	1	2495	1637	14	12
2020	2	1424	1650	14	13
2020	3	5131	2490	8	13
2020	4	18314	7463	3	6
2020	5	10845	4440	23	32
2020	6	24071	24072	31	65
2020	7	69128	15093	41	88
Data collected from NC State Parks and Google Trends					

Table 3. Part 1 showing 2015 – 2017 Pearson Correlation Coefficient Test for Mount Mitchell State Park

Year	Month	Visit_Mitchell	Non_Lag	Lag_1	Lag_2	Lag_3	Lag_4	Lag_5	Lag_6	Lag_7
2015	1	1400	4	Lag_1	Lag_2	Lag_3	Lag_4	Lag_5	Lag_6	Lag_7
2015	2	188	7	4	Lag_2	Lag_3	Lag_4	Lag_5	Lag_6	Lag_7
2015	3	5018	12	7	4	Lag_3	Lag_4	Lag_5	Lag_6	Lag_7
2015	4	12981	8	12	7	4	Lag_4	Lag_5	Lag_6	Lag_7
2015	5	23383	12	8	12	7	4	Lag_5	Lag_6	Lag_7
2015	6	52072	20	12	8	12	7	4	Lag_6	Lag_7
2015	7	52270	21	20	12	8	12	7	4	Lag_7
2015	8	41593	12	21	20	12	8	12	7	4
2015	9	33858	8	12	21	20	12	8	12	7
2015	10	71200	18	8	12	21	20	12	8	12
2015	11	15726	16	18	8	12	21	20	12	8
2015	12	6280	8	16	18	8	12	21	20	12
2016	1	2880	32	8	16	18	8	12	21	20
2016	2	323	12	32	8	16	18	8	12	21
2016	3	8272	15	12	32	8	16	18	8	12
2016	4	17200	5	15	12	32	8	16	18	8
2016	5	39117	22	5	15	12	32	8	16	18
2016	6	51840	25	22	5	15	12	32	8	16
2016	7	64752	30	25	22	5	15	12	32	8
2016	8	50998	25	30	25	22	5	15	12	32
2016	9	49456	14	25	30	25	22	5	15	12
2016	10	93184	16	14	25	30	25	22	5	15
2016	11	14791	4	16	14	25	30	25	22	5
2016	12	5278	7	4	16	14	25	30	25	22
2017	1	6084	5	7	4	16	14	25	30	25
2017	2	7973	7	5	7	4	16	14	25	30
2017	3	7398	6	7	5	7	4	16	14	25
2017	4	25508	15	6	7	5	7	4	16	14
2017	5	36452	18	15	6	7	5	7	4	16
2017	6	46087	22	18	15	6	7	5	7	4
2017	7	64896	25	22	18	15	6	7	5	7
2017	8	47217	12	25	22	18	15	6	7	5
2017	9	39888	21	12	25	22	18	15	6	7
2017	10	69549	26	21	12	25	22	18	15	6
2017	11	19745	14	26	21	12	25	22	18	15
2017	12	4674	6	14	26	21	12	25	22	18

Data collected from NC State Parks and Google Trends

Table 4. Part 2 Continued after 2018, Pearson Correlation Coefficient Test for Mount Mitchell State Park

Year	Month	Visit_Mitchell	Non_Lag	Lag_1	Lag_2	Lag_3	Lag_4	Lag_5	Lag_6	Lag_7
2018	1	428	9	6	14	26	21	12	25	22
2018	2	6437	7	9	6	14	26	21	12	25
2018	3	5609	16	7	9	6	14	26	21	12
2018	4	17566	13	16	7	9	6	14	26	21
2018	5	32234	16	13	16	7	9	6	14	26
2018	6	45932	14	16	13	16	7	9	6	14
2018	7	63037	23	14	16	13	16	7	9	6
2018	8	44065	20	23	14	16	13	16	7	9
2018	9	35721	13	20	23	14	16	13	16	7
2018	10	63722	10	13	20	23	14	16	13	16
2018	11	9041	9	10	13	20	23	14	16	13
2018	12	2803	8	9	10	13	20	23	14	16
2019	1	5371	5	8	9	10	13	20	23	14
2019	2	3365	7	5	8	9	10	13	20	23
2019	3	11441	9	7	5	8	9	10	13	20
2019	4	18314	11	9	7	5	8	9	10	13
2019	5	45016	21	11	9	7	5	8	9	10
2019	6	49007	18	21	11	9	7	5	8	9
2019	7	63192	21	18	21	11	9	7	5	8
2019	8	6282	17	21	18	21	11	9	7	5
2019	9	56176	11	17	21	18	21	11	9	7
2019	10	69381	29	11	17	21	18	21	11	9
2019	11	18911	12	29	11	17	21	18	21	11
2019	12	8893	5	12	29	11	17	21	18	21
2020	1	2495	14	5	12	29	11	17	21	18
2020	2	1424	14	14	5	12	29	11	17	21
2020	3	5131	8	14	14	5	12	29	11	17
2020	4	18314	3	8	14	14	5	12	29	11
2020	5	10845	23	3	8	14	14	5	12	29
2020	6	24071	31	23	3	8	14	14	5	12
2020	7	69128	41	31	23	3	8	14	14	5
Pearson Correlation Coefficient	Jan 2015 - Jul 2020	0.601359	0.430091	0.363268	0.165397	-0.06222	-0.28796	-0.49019	-0.46656	
	Jan 2017 - Jul 2020	0.6707	0.535123	0.408512	0.087123	-0.1725	-0.38267	-0.56789	-0.6613	
	Jul 2018 - Jul 2020	0.594646	0.445367	0.469358	0.008686	-0.16881	-0.26259	-0.46961	-0.62971	

Data collected from NC State Parks and Google Trends

Table 5. Part 1 showing 2015 – 2017, Pearson Correlation Coefficient Test for Grandfather Mountain State Park

Year	Month	Visit_Grandfather	Non_Lag	Lag_1	Lag_2	Lag_3	Lag_4	Lag_5	Lag_6	Lag_7
2015	1	2255	6	Lag_1	Lag_2	Lag_3	Lag_4	Lag_5	Lag_6	Lag_7
2015	2	910	6	6	Lag_2	Lag_3	Lag_4	Lag_5	Lag_6	Lag_7
2015	3	3657	11	6	6	Lag_3	Lag_4	Lag_5	Lag_6	Lag_7
2015	4	7375	4	11	6	6	Lag_4	Lag_5	Lag_6	Lag_7
2015	5	10306	24	4	11	6	6	Lag_5	Lag_6	Lag_7
2015	6	9944	20	24	4	11	6	6	Lag_6	Lag_7
2015	7	15180	17	20	24	4	11	6	6	Lag_7
2015	8	13632	25	17	20	24	4	11	6	6
2015	9	7797	17	25	17	20	24	4	11	6
2015	10	12181	25	17	25	17	20	24	4	11
2015	11	5377	9	25	17	25	17	20	24	4
2015	12	5983	13	9	25	17	25	17	20	24
2016	1	2621	9	13	9	25	17	25	17	20
2016	2	1193	14	9	13	9	25	17	25	17
2016	3	6947	11	14	9	13	9	25	17	25
2016	4	7109	20	11	14	9	13	9	25	17
2016	5	6209	20	20	11	14	9	13	9	25
2016	6	9533	35	20	20	11	14	9	13	9
2016	7	14401	52	35	20	20	11	14	9	13
2016	8	6777	32	52	35	20	20	11	14	9
2016	9	7678	17	32	52	35	20	20	11	14
2016	10	13596	24	17	32	52	35	20	20	11
2016	11	7382	13	24	17	32	52	35	20	20
2016	12	3566	17	13	24	17	32	52	35	20
2017	1	2941	30	17	13	24	17	32	52	35
2017	2	4600	12	30	17	13	24	17	32	52
2017	3	4866	4	12	30	17	13	24	17	32
2017	4	9309	29	4	12	30	17	13	24	17
2017	5	7495	37	29	4	12	30	17	13	24
2017	6	10594	65	37	29	4	12	30	17	13
2017	7	11696	51	65	37	29	4	12	30	17
2017	8	9659	16	51	65	37	29	4	12	30
2017	9	10331	12	16	51	65	37	29	4	12
2017	10	8633	27	12	16	51	65	37	29	4
2017	11	4742	16	27	12	16	51	65	37	29
2017	12	2782	13	16	27	12	16	51	65	37

Data collected from NC State Parks and Google Trends

Table 6. Part 2 Continued after 2018, Pearson Correlation Coefficient Test for Grandfather Mountain State Park

Year	Month	Visit_Grandfather	Non_Lag	Lag_1	Lag_2	Lag_3	Lag_4	Lag_5	Lag_6	Lag_7
2018	1	666	9	13	16	27	12	16	51	65
2018	2	1874	6	9	13	16	27	12	16	51
2018	3	2808	15	6	9	13	16	27	12	16
2018	4	6059	16	15	6	9	13	16	27	12
2018	5	4142	28	16	15	6	9	13	16	27
2018	6	6384	22	28	16	15	6	9	13	16
2018	7	7866	36	22	28	16	15	6	9	13
2018	8	6282	25	36	22	28	16	15	6	9
2018	9	6577	23	25	36	22	28	16	15	6
2018	10	4604	18	23	25	36	22	28	16	15
2018	11	2707	15	18	23	25	36	22	28	16
2018	12	1712	14	15	18	23	25	36	22	28
2019	1	1187	17	14	15	18	23	25	36	22
2019	2	4620	15	17	14	15	18	23	25	36
2019	3	3376	11	15	17	14	15	18	23	25
2019	4	7463	30	11	15	17	14	15	18	23
2019	5	5035	32	30	11	15	17	14	15	18
2019	6	5920	30	32	30	11	15	17	14	15
2019	7	8637	36	30	32	30	11	15	17	14
2019	8	8296	23	36	30	32	30	11	15	17
2019	9	7558	37	23	36	30	32	30	11	15
2019	10	8001	45	37	23	36	30	32	30	11
2019	11	8621	20	45	37	23	36	30	32	30
2019	12	3949	11	20	45	37	23	36	30	32
2020	1	1637	12	11	20	45	37	23	36	30
2020	2	1650	13	12	11	20	45	37	23	36
2020	3	2490	13	13	12	11	20	45	37	23
2020	4	7463	6	13	13	12	11	20	45	37
2020	5	4440	32	6	13	13	12	11	20	45
2020	6	24072	65	32	6	13	13	12	11	20
2020	7	15093	88	65	32	6	13	13	12	11
Pearson Correlation Coefficient			0.642529	0.446326	0.196825	0.027831	-0.19728	-0.36207	-0.48253	-0.45621
			0.732871	0.56942	0.22388	0.041472	-0.12761	-0.31393	-0.40873	-0.4385
			0.792514	0.602121	0.030843	-0.25534	-0.36611	-0.45667	-0.43001	-0.30699

Data collected from NC State Parks and Google Trends

Table 7. Jan 2017 – Jul 2020, Mount Mitchell State Park Time-Series Linear Model

```

> summary(tslm(MMitchell~MMGoogle+season+trend))

Call:
tslm(formula = MMitchell ~ MMGoogle + season + trend)

Residuals:
    Min       1Q   Median       3Q      Max
-23987.5 -3416.8   303.1   2994.7  15176.6

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)   8217.2     5284.4   1.555 0.130792
MMGoogle      -147.0       290.6  -0.506 0.616885
season2       1458.2     6294.8   0.232 0.818432
season3       4379.7     6308.4   0.694 0.493040
season4      17200.1     6328.0   2.718 0.010964 *
season5      29913.6     7060.1   4.237 0.000209 ***
season6      40487.8     7297.7   5.548 5.54e-06 ***
season7      65374.8     8348.4   7.831 1.23e-08 ***
season8      30294.3     7184.1   4.217 0.000221 ***
season9      41684.9     7064.1   5.901 2.09e-06 ***
season10     66466.5     7806.2   8.515 2.22e-09 ***
season11     13524.6     6869.6   1.969 0.058604 .
season12     2477.9      6853.2   0.362 0.720293
trend        -179.5       113.3  -1.584 0.123963
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 8899 on 29 degrees of freedom
Multiple R-squared:  0.8991,    Adjusted R-squared:  0.8539
F-statistic: 19.88 on 13 and 29 DF,  p-value: 5.266e-11

Data collected from NC State Parks and Google Trends
    
```

Table 8. Jul 2018 – Jul 2020, Grandfather Mountain State Park Time-Series Linear Model

```

> summary(tslm(GFD.Visit~GFD.Google+season+trend))

Call:
tslm(formula = GFD.Visit ~ GFD.Google + season + trend)

Residuals:
    Min       1Q   Median       3Q      Max
-5591.1 -1219.1   23.5  1219.1  5591.1

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) -2294.34   2474.14  -0.927  0.3737
GFD.Google   164.17    61.56   2.667  0.0219 *
season2     1703.09   3043.90   0.560  0.5870
season3     1727.43   3057.84   0.565  0.5835
season4     5170.44   3054.62   1.693  0.1186
season5         44.60   3185.14   0.014  0.9891
season6     7656.51   3550.81   2.156  0.0541 .
season7     2744.83   3663.68   0.749  0.4695
season8     4827.37   3189.78   1.513  0.1584
season9     3518.88   3276.31   1.074  0.3058
season10    2405.63   3281.82   0.733  0.4789
season11    3963.48   3060.58   1.295  0.2218
season12    1848.83   3043.62   0.607  0.5559
trend         101.99    105.98   0.962  0.3565
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 3041 on 11 degrees of freedom
Multiple R-squared:  0.8185,    Adjusted R-squared:  0.604
F-statistic: 3.815 on 13 and 11 DF,  p-value: 0.01633

Data collected from NC State Parks and Google Trends
    
```

Aaron Bradley Scott holds a BA in Political Science from Lenoir-Rhyne University and MS in Applied Economics from Southern New Hampshire University. He is currently a PhD student in Public Policy at Liberty University, Helms School of Government. Mr. Scott holds research interest in economic tourism and policy development.