

# Pierce County, WA



# Twitter Analysis



Washington State University Vancouver is the only four-year research university in Southwest Washington and the premiere research institution in the Southwest Washington/Portland metro area. As one of four campuses of the Washington State University system, WSU Vancouver offers big-school resources in a small-school environment.

This report is a collaboration between research faculty in the School of Hospitality Business Management, housed in the Carson College of Business, and the School of Engineering and Computer Science. This is the ideal combination of experts to capture, analyze and interpret Twitter data to support decision making for tourism and regional development.

Please visit our website or contact the investigators directly:

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# Executive Summary

Tourism already contributes to the Pierce County economy. To better understand how tourism in Pierce County is perceived and talked about in social media we analyzed public conversations on the microblogging service Twitter.

Within one year (Fall 2015 to Fall 2016) we analyzed some 70 million tweets that met several criteria; that is they contained a keyword provided by Pierce County tourism stakeholders or were posted from within the Pacific Northwest or Pierce County.

We found several that are unique to the Pacific Northwest and Pierce County. However, some of these keywords are not relevant for tourism. For example, the names of area towns are often used in Twitter messages related to job postings. Other keywords are unique and relevant; these are typically keywords related to specific attractions in Pierce County (e.g. #mtrainier) or refer to the Pacific Northwest in general (e.g. #pnw).

With some exceptions most of the keyword for Pierce County have a positive sentiment. Negative sentiments were found for messaging about traffic delays and accidents along the I-5 corridor. Furthermore, several of the Pierce County keyword are truly regional to the Pacific Northwest, whereas others are also used in California, Colorado or in New England.

For tourism stakeholders to effectively communicate Pierce County tourism on Twitter we provide several recommendations such as avoiding using only location names, using specific and unique attractions, adding generic activity and travel keywords. Twitter messages with these keywords are more relevant and allow to amplify the desired Pierce County tourism message on Twitter.

# Understanding Twitter

## Microblogging 101

Twitter is a social networking service that allows users to post short messages with 140 characters or less. The service started in 2006 and today is used by 310 million active users. The service is free and used by individuals, companies etc. to post public messages. Additionally users can send private messages to each other. Public messages are often used by researchers to better understand how certain topics are discussed in the public.

Key characteristics of Twitter are the use of **hashtags** (marked by #, indicating content definition and classification system) and **mentions** (marked by @, indicating a reference to a Twitter account). Hashtags are a classification system that allow users to classify their message. A reader can search for messages with a specific hashtag to get messaged of a certain class. For example, #GoCougs is used to classify a message as relevant for or to support Washington State University. Mentions, on the other hand, allow a users to include another user in a message. That other user is notified and can then also easily respond or retweet (i.e. forward) the message. For example, WSUCougars is the username of the WSU athletics. Adding @WSUCougars to a message includes this user in messages.

The 140 character limit encourages the use of abbreviations. An important hashtag for travel is #ttot, which is short for “travel-talk-on-Twitter”. It is thus a hashtag classifying messages with travel related content.

Furthermore, Twitter users can opt in to attach their geolocation (longitude/latitude) to their messages, allowing researchers to pinpoint users' locations.

# Introduction

## The Value of Twitter Data for Public and Private Tourism Promotion

Decision makers in for-profit businesses and non-profit organizations serving the tourism market in Pierce County play an important role for the economic vitality of the area. Knowing how area visitors and local residents talk about the area is critical to making strategic and operational decisions for the future development of Pierce County as a tourism destination. This report contributes to Pierce County efforts to better understand the conversations developing in the area by examining topic frequency, sentiments, and trends in social media, specifically Twitter. To that end, the Pierce County Economic Development Department collaborated with hospitality and computer science researchers from Washington State University Vancouver to analyze Twitter data about Pierce County.

### **Study Purpose:**

Collecting short messages from Twitter that relate to Pierce County. The goal is to learn how users think and feel about the county.

### **Using this report:**

To direct and inform the direction of and allocation of public funds for tourism promotion by Pierce County and its stakeholders.



# Methodology

## Data Collection

In an effort to gather information about Pierce County from Twitter data, WSU researchers started to “listen” to Twitter conversations relevant to tourism in the area. In a first step, the Economic Development Department reached out to area stakeholders to identify hashtags and mentions that businesses and organizations are using on Twitter. This list of hashtags and mentions represents “local” keywords. Data collection started in November 2015. The analysis of this report (unless stated otherwise) includes original tweets, comments on tweets, and retweets, given that data was available for download from Twitter.

Using the public Twitter streaming API researchers collected 1% of Twitter data using three approaches:

**1) Query Stream Data:** A sample of tweets using all “local” keywords (area filters) regardless of where they originated. This report used only tweets that contain the stated hashtags and mentions and does not include tweets that contain only the text portion of a hashtag or mention (e.g., #Tacoma, but not Tacoma). This gives us a more accurate dataset to work with.

**2) Pierce County Data:** All tweets posted from within Pierce County; based on longitude and latitude data shared by the user.

**3) Pacific Northwest Data:** All tweets posted from within the Pacific Northwest; based on longitude and latitude data shared by the user.

The Twitter streaming API allows to specify a geographic bounding box from within which tweets are streamed. Twitter employs two methods to identify if a tweet matches the bounding box: (1) If geotagging is enabled by a Twitter user, the tweets are posted with longitude and latitude of the location where the tweet was sent and (2) in Spring 2016, Twitter learns tweets’ location even if longitude and latitude tagging is disabled by the user (e.g., through other applications). However, in Summer 2016, this process was reversed.

# Methodology

## Data Analysis

Due to the large amount of data, all analysis is done using software packages rather than manually. Over the past decade, research in computer science has developed very robust tools to analyze large amounts of text data. It is important to understand that there is no software solution specific to the travel and tourism context. This means that there is no software that automatically searches for a travel language.

As such, we combine several well-tested and reliable software packages and search for patterns that inform us about travel and tourism in Pierce County. Leveraging keywords provided by Pierce County stakeholders and travel-related hashtags (e.g., #ttot; travel-talk-on-twitter) enables us to identify travel related tweets about Pierce County.

Please note that the software packages employed are not very user friendly, Windows or Apple-like, software solutions, but rather thousands of lines of code without graphical user interface. This gives us the flexibility to test and retest our code on collected Tweets and fine-tune our analysis over the course of the project.



# Methodology

## Data Analysis

### Sentiment Analysis

Sentiment analysis enables us to understand if tweets containing Pierce County keywords have a positive or negative connotation. Essentially, we evaluate the level of valence or happiness score of each tweet on a 9-point scale (1 = extremely unhappy and 9 = extremely happy). This analysis was conducted multiple times for each set of tweets that contain one of the keywords. This allowed us to extract the happiness level related to each keyword. Our code automatically deletes the so-called stop words (e.g., “and”, “the”). An existing and reliable library provided the sentiment scores for each remaining word in the tweet. Next, the score for a tweet was calculated by summing the scores and dividing them by the number of words in the tweet. The sentiment score for a keyword is the average of sentiment scores of tweets containing that keyword.

### Bi-grams

Bi-grams are any two words that appear exactly next to each other in a tweet. The assumption is that in the English language important words are written next to each other; especially when these are two nouns (e.g., overnight stay, happy hour) and adjectives or adverbs that modify (i.e., describe) nouns and pronouns or verbs, adjectives, or other adverbs, respectively.

Analyzing bi-grams enable us to learn how twitter users write about Pierce County and to glean a message context. We analyzed bi-grams in tweets that contained any of the Pierce County keywords. For instance, if a tweet is "hiking rainier #tacoma #washington", the bi-grams would be ["hiking rainier", "rainier #tacoma", "#tacoma #washington"]. Since both #tacoma and #washington are included in our keyword list, we add all three bi-grams to both #tacoma and #washington's list of correlated terms. We also learn that rainier is correlated with hiking and that a Twitter user geographically places Mt. Rainier in the greater Tacoma area.

# Keywords

## List of Keywords Used and Found in Every Quarter Provided by Stakeholders

#5miledrive	@gtctc	#npscentennial	#tacomadome
#bestofnorthwest	@harborwildwatch	@oddotterbrewing	@tacomadome
buckley	highland games	#outdoornation	@tacomagame
#carshows	#ilovethepnw	#outdoorwomen	#tacomarainiers
#chambersbay	@ismtrainerout	#pdza	@tacomasummer
@chambersbaygolf	#jblm	#pnw	@tacomataks
#choosmountains	@jblm_pao	#pnwwonderland	#tacomawa
@cityoflakewood	joint base lewis-mcchord	#pointdefiance	tall ships
@cityoftacoma	@katiedownstav	#pointdefiancepark	#thatpnwlife
#collectorcars	@kingsbooks	#ptdefiance	@theredhot
@crystalmountain	#lakewood	#pugetsound	#titlowpark
@crystalmt	#lemayacm	#puyallup	#trainsarecool
@donruiztnt	#liveauthentic	#puyallupfair	@traveltacoma
#dupont	#livepnw	#railfan	#ttot
@exit133	#livewashington	@railroadinner	#universityplace
#exploremore	lumberjack nationals	#rainier	#upperleftusa
#familyfun	@mattdriscoll	@rainiersland	#usopen
#farmersmarkets	@meadowparkgc	#rustonway	#usopen2015
#fife	@metparkstacoma	#scenicwa	#viewsofpnw
#findyourpark	#metroparkstacoma	@sonicsguy	@visitmtrainier
#fivemiledrive	mountain climbing	@southtacoma	#walk253
#fortnisqually	@mountrainiernps	#sportsevents	#wanderwashington
@fortnisqually	#mtrainier	#sprayground	#Washington
foss waterway	@mtrainierva	#spraygrounds	#washingtontrails
#gigharbor	@museumofglass	#sumner	#wastate
@gigharborguide	#nationalparks	#tacoma	#wastatefair
#glassblowing	#neverstopexploring	#tacoma_wa	#wildflowers
#golfisgreat	@norhtacoma	@tacomaaartmuseum	#wrightpark
gondola	#northwestisbest	#tacomaarts	zoo lights
@grandcinema	#northwestnature	@tacomacabana	
@grit_city	@northwesttrek	@tacomacc	
#gtctc	#nps	@tacomacomedy	

# Keywords

List of Keywords Used, but not always Found in Every Quarter  
Provided by Stakeholders

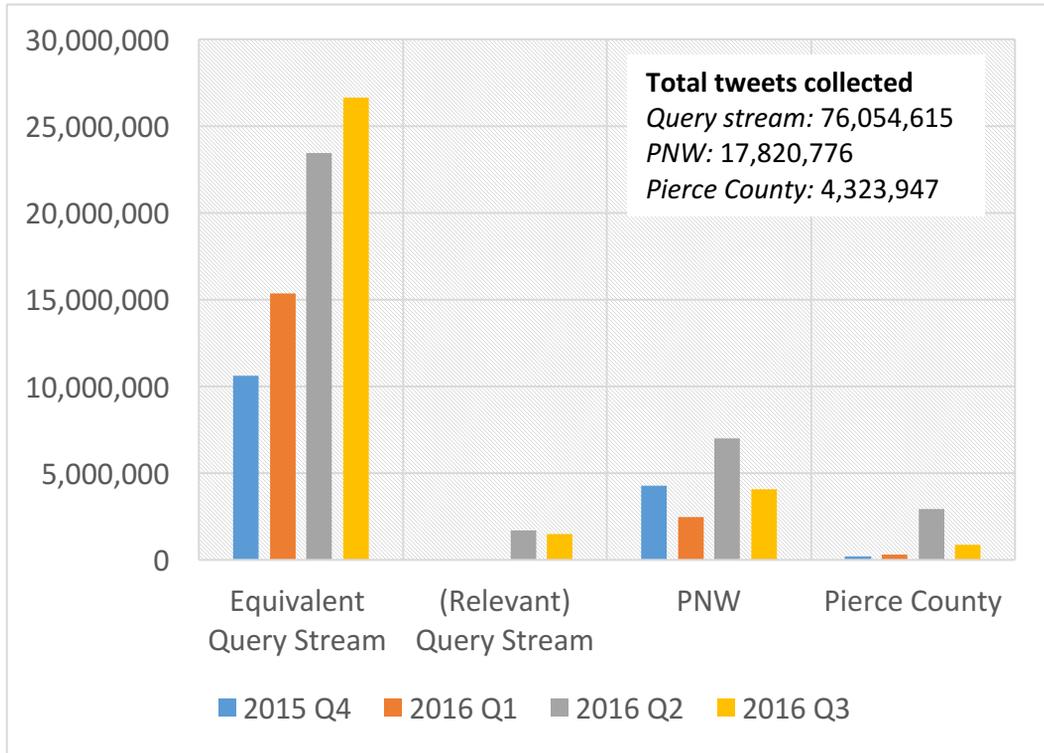
@alexanders\_inn  
#ask253  
#bigwashington  
#blownawaytacoma  
@copprcrkrest  
#downtown2defiance  
@downtownwaterfrontalliance  
#elbewa  
#elbewashington  
fantasy lights  
festival of sail  
#gigharborguide  
@gigharborwashington  
@go\_lutes  
@harborhistorymuseum  
#itsducky  
#livewashinton  
#motorsportmayhem  
#nwtrek  
@nwtrek  
paddler's cup  
@paddlerscup  
#partybigwa  
#ptdefiancepark  
#rainierblooms  
#sharethefair  
#spiritofrainier  
#swancreekpark  
#tacomaconventioncenter  
@tacomafarmersmarkets  
@tacomafoodie  
#tacomaglassblowingstudio  
#tacomaparks  
@telltacoma  
#titlow  
#traveltacoma  
@uptowngigharbor  
#visitmrsr  
#visitrainier  
#waspringfair



# = Hashtag  
@ = Mention

# Collected Tweets

Total Tweets | Four Quarters

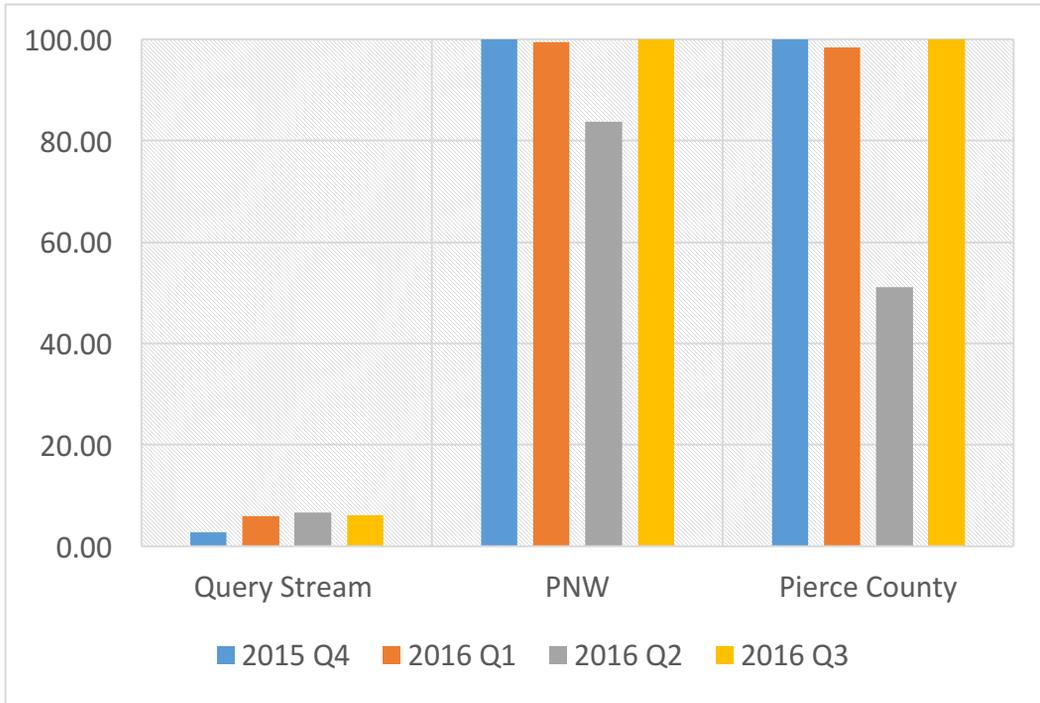


Tweets collected in the query stream increased quarter-over-quarter, while notable increase in geotagged tweets can be observed during 2016 Q2 in the Pacific Northwest and Pierce County data. This is due to the inclusion of non-geotagged tweets from which approximate locations of the users were recognized by the system.



# Collected Tweets

Percent of Geotagged Tweets | Four Quarters

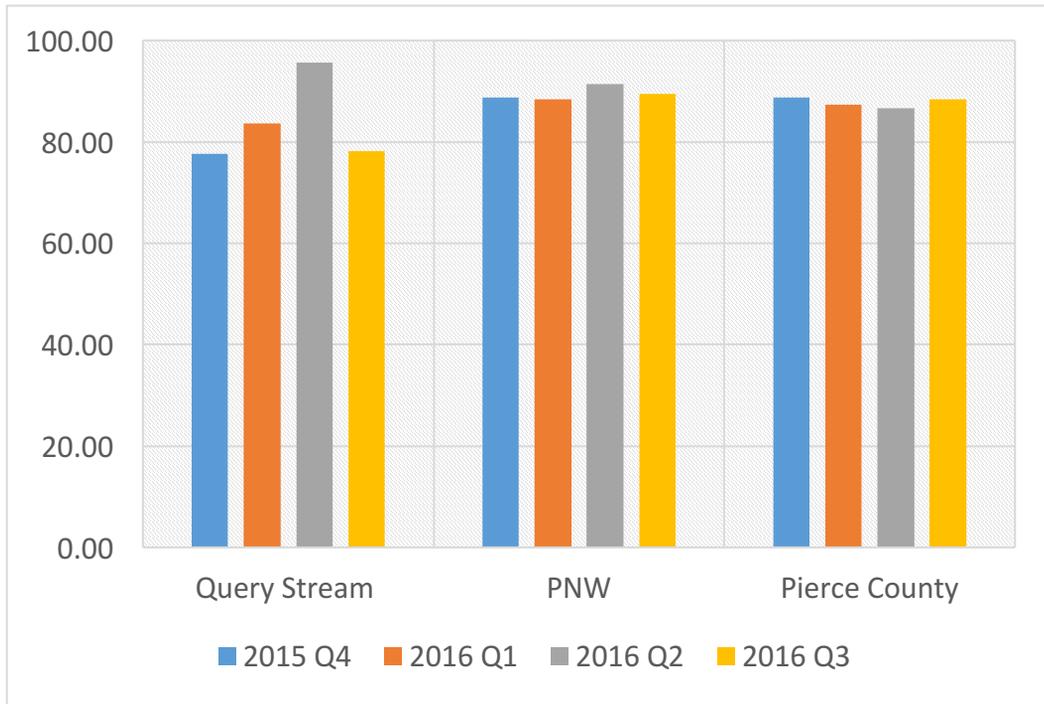


The difference in the share of geotagged tweets during 2016 Q2 in the Pacific Northwest and Pierce County data is due to the inclusion of non-geotagged tweets from which approximate locations of the users were recognized by the system.



# Collected Tweets

Percent of Tweets Written in English | Four Quarters

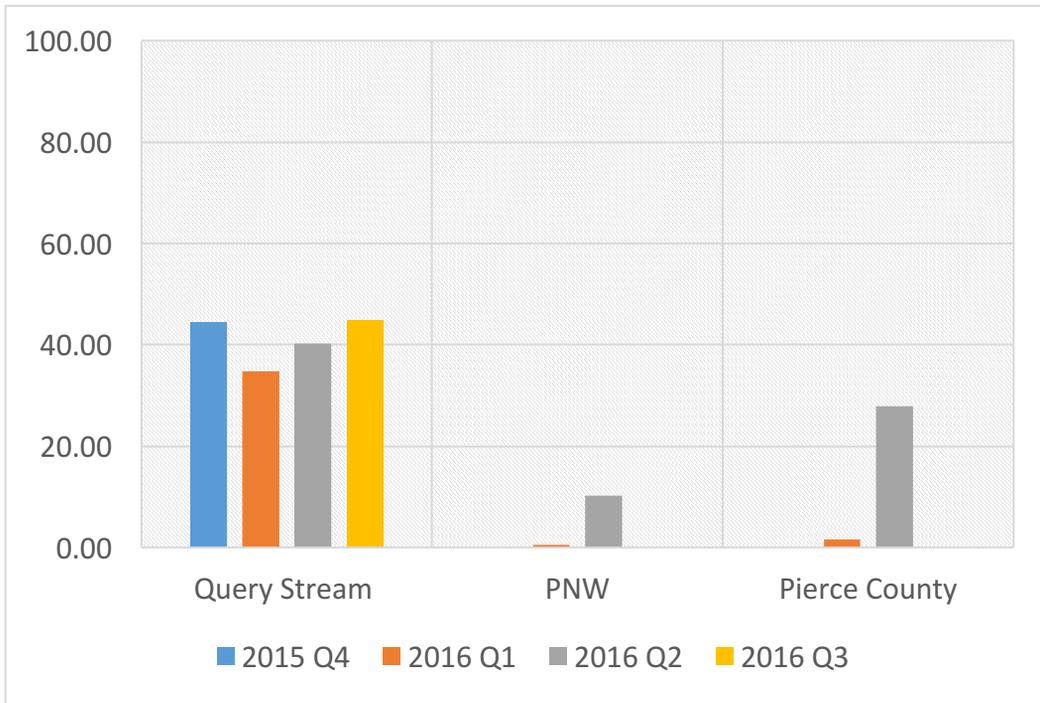


The percentage of tweets written in English is consistent in Pacific Northwest and Pierce County data. A slightly larger percentage was found during 2016 Q2 in the Query Stream data. This might be related to events in other quarters where certain keywords were used in communication using foreign languages (e.g., gondola).



# Collected Tweets

## Percent of Retweets | Four Quarters



Only original tweets (not retweets) can be geotagged. The presence of retweets during 2016 Q2 in the Pacific Northwest and Pierce County data, where all tweets were supposed to be geotagged, is due to the inclusion of (non-geotagged) retweets from which approximate locations of the users were recognized by the system.



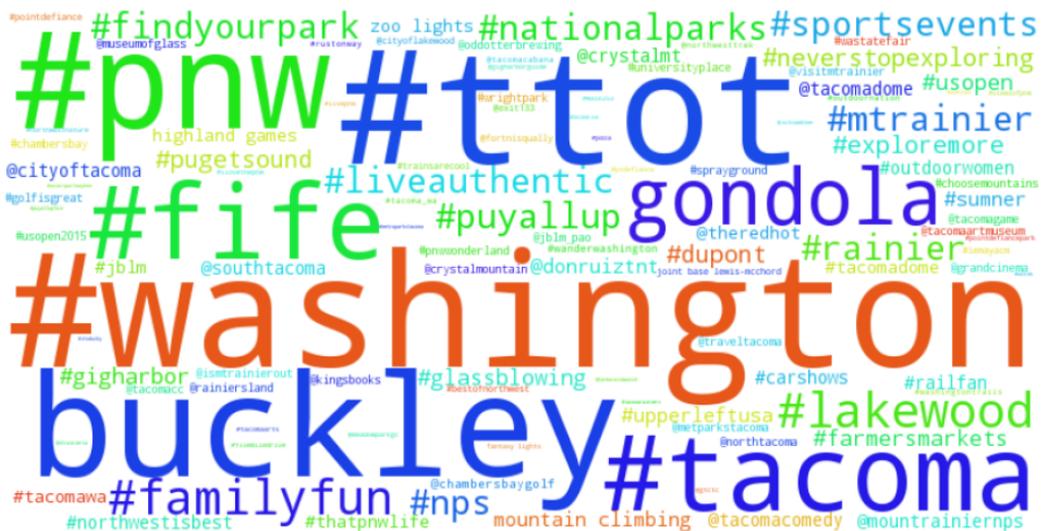
# Important Keywords

Query Stream, No Retweet | 2015 Q4 & 2016 Q1

## 2015 Q4



## 2016 Q1





# Important Keywords

## Query Stream, No Retweet | Four Quarters

Several keywords are consistently found in the Top 10: #ttot, #washington, #findyourpark, #pnw, #tacoma, #fife, #usopen, buckley, #familyfun, gondola. While #washington dominated the query stream within the first two quarters, #ttot (travel-talk-on-twitter) was most prominent in original tweets during Q2 and Q3 of 2016, indicating intensified travel-related communication during tourism seasons. As expected, event-related keywords (e.g., zoo lights, fantasy lights, #farmersmarket) are seasonal, while activity-related keywords (e.g., #familyfun, #neverstopexploring, #exploremore) are more enduring, quarter-over-quarter.

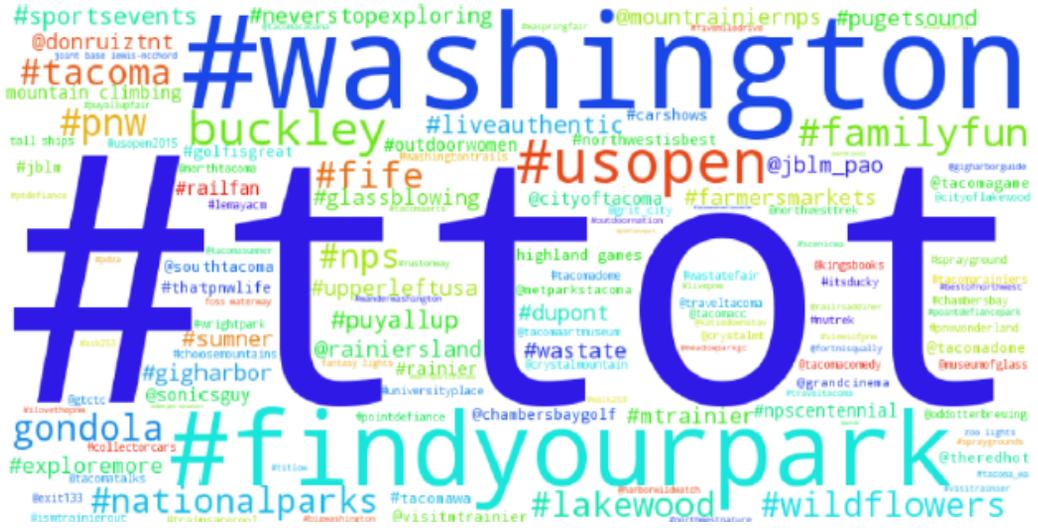
2015 Q4		2016 Q1		2016 Q2		2016 Q3	
Keyword	N	Keyword	N	Keyword	N	Keyword	N
#washington	158890	#washington	255362	#ttot	226302	#ttot	166259
#ttot	124953	#ttot	246438	#washington	199529	#washington	153972
buckley	29685	buckley	68535	buckley	59271	#usopen	138623
#tacoma	27072	#pnw	35899	#pnw	34951	buckley	51810
#pnw	19790	#tacoma	35298	#usopen	33296	#pnw	31218
zoo lights	16548	#fife	30745	#tacoma	30889	#familyfun	30772
#fife	16114	gondola	30406	#familyfun	30252	#findyourpark	26618
#lakewood	15272	#familyfun	22125	#findyourpark	29685	#tacoma	24958
gondola	14192	#lakewood	22093	#fife	24758	gondola	20962
#familyfun	13810	#sportsevents	13923	gondola	22099	#fife	15893
#sportsevents	9163	#nationalparks	12119	#lakewood	16128	#lakewood	13752
#nationalparks	6273	#mtrainier	10774	#sportsevents	14454	#nationalparks	11767
#liveauthentic	5457	#findyourpark	10738	#nationalparks	12748	#sportsevents	10861
#puyallup	5108	#rainier	10376	#wildflowers	9580	#pugetsound	9615
#findyourpark	4476	#puyallup	8943	#puyallup	8870	#nps	8876
#neverstopexploring	3554	#liveauthentic	8339	#nps	8428	#wildflowers	7347
#nps	3523	#nps	7974	#liveauthentic	6543	#puyallup	6744
#dupont	2176	#neverstopexploring	5894	#neverstopexploring	4877	#liveauthentic	4370
#pugetsound	2050	#dupont	3627	#dupont	3167	#neverstopexploring	3961
#gigharbor	1878	#pugetsound	3449	#exploremore	3001	#exploremore	2175
#exploremore	1727	#exploremore	2971	#pugetsound	2889	#dupont	2059
#rainier	1463	#gigharbor	2027	#farmersmarkets	2520	#farmersmarkets	1905
#mtrainier	1009	#usopen	1883	#gigharbor	1957	#mtrainier	1641
#usopen	948	#farmersmarkets	1343	@rainiersland	1735	#gigharbor	1595
mountain climbing	836	#glassblowing	1325	#sumner	1722	@rainiersland	1336



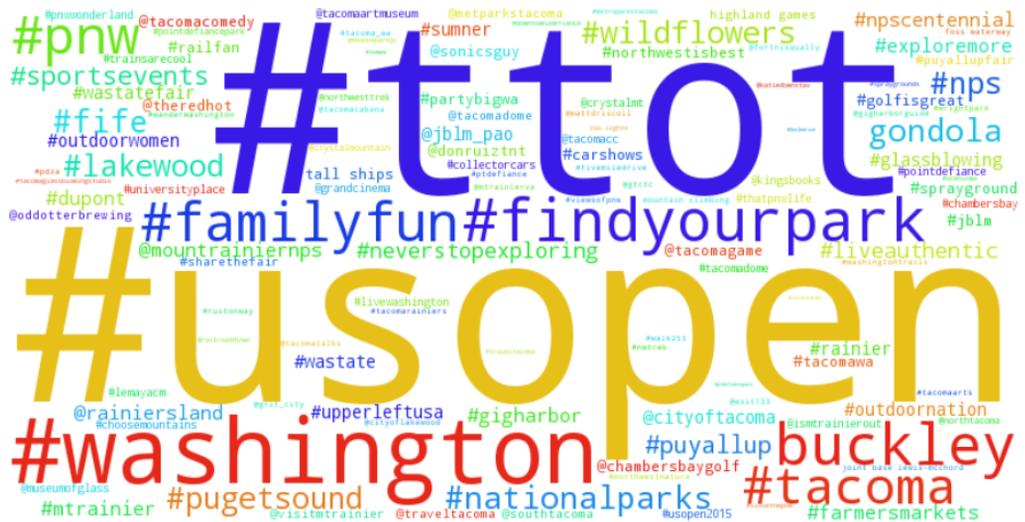
# Important Keywords

Query Stream, with Retweet | 2016 Q2 & 2016 Q3

## 2016 Q2



## 2016 Q3



# Important Keywords

## Query Stream, with Retweet | Four Quarters

The composition of high-frequency keywords in the data that include retweets is similar to that of the data without retweets, with the same keywords dominating the Top 10. However, it is important to note that several keywords have nearly doubled the frequency, indicating a higher rate of being retweeted. In other words, these keywords (i.e., #ttot, #findyourpark) are shareable (more likely to go viral). For example, in 2015 Q4 and 2016 Q1, #ttot is ranked 2<sup>nd</sup> in the original tweets (after #washington), it is ranked first in the dataset with retweets. #usopen was most shared in the last quarter (2016 Q3). It can be suggested that using well-known hashtags such as #findyourpark and #ttot will increase the chance for the content (i.e., tweets) to be found and shared.

2015 Q4		2016 Q1		2016 Q2		2016 Q3	
Keyword	N	Keyword	N	Keyword	N	Keyword	N
#ttot	257097	#ttot	471246	#ttot	420992	#usopen	387077
#washington	184244	#washington	313959	#washington	254451	#ttot	302167
buckley	42946	buckley	109486	#findyourpark	116901	#washington	202118
zoo lights	41384	#tacoma	47188	#usopen	108664	#findyourpark	102296
#tacoma	34994	#pnw	46433	buckley	93149	buckley	81926
#pnw	25429	#findyourpark	41283	#familyfun	55636	#familyfun	48165
#fife	19667	gondola	38935	#pnw	45398	#pnw	41330
#findyourpark	18849	#fife	37134	#tacoma	37035	#tacoma	32054
gondola	18363	#familyfun	34037	#fife	34129	#nationalparks	25877
#familyfun	18357	#nationalparks	27100	gondola	30997	gondola	25843
#lakewood	16351	#lakewood	23914	#nationalparks	27398	#fife	21112
#nationalparks	11408	#sportsevents	14265	#wildflowers	17887	#lakewood	16954
#sportsevents	9396	#nps	12341	#lakewood	17625	#wildflowers	16755
#nps	6647	#mtrainier	11559	#nps	15034	#nps	16419
#liveauthentic	6452	#rainier	10705	#sportsevents	14726	#pugetsound	10970
#neverstopexploring	5906	#liveauthentic	9535	#puyallup	9438	#sportsevents	10949
#puyallup	5629	#puyallup	9530	#liveauthentic	7468	#puyallup	7384
#usopen	4469	#usopen	8797	#neverstopexploring	6442	#neverstopexploring	5120
#dupont	3323	#neverstopexploring	8334	#farmersmarkets	4824	#liveauthentic	4850
#pugetsound	2562	#dupont	5502	#dupont	4679	#exploremore	3541
#gigharbor	2288	#pugetsound	4436	#exploremore	4305	#farmersmarkets	3480
#exploremore	2163	#exploremore	4131	@mountrainiernps	4282	#dupont	3014
@crystalmt	1950	@mountrainiernps	3378	#pugetsound	3847	@mountrainiernps	2642
#rainier	1697	mountain climbing	2694	@rainiersland	2993	#mtrainier	2583
#mtrainier	1590	#gigharbor	2418	#gigharbor	2409	@rainiersland	2427





# Important Keywords

## Pacific Northwest Data, No Retweet | Four Quarters

The dataset are dominated by location keywords (e.g., #tacoma, #pnw, #puyallup, #washington). Additionally, references to life in the Pacific Northwest (e.g., #northwestisbest, #thatpnwlife, #upperleftusa) are also prominent in the dataset. It was observed that the composition of the top keywords was relatively stable quarter-over-quarter. Compared to the query stream data, only a few event-related and activity-related keywords appear on the list: zoo lights made it into the top 10 in 2015 Q4 and #findyourpark in 2016 Q2 and Q3. #ttot, which is dominant in the query stream data, only made it into the top 25 in 2016 Q2.

2015 Q4		2016 Q1		2016 Q2		2016 Q3	
Keyword	N	Keyword	N	Keyword	N	Keyword	N
#tacoma	10632	#tacoma	9359	#tacoma	10387	#tacoma	8536
#puyallup	3523	#pnw	3339	#pnw	4263	#pnw	4141
#pnw	2697	#puyallup	3330	#puyallup	3665	#puyallup	3256
#washington	1049	#washington	1229	#washington	1875	#washington	1876
zoo lights	1045	#lakewood	946	#lakewood	971	#lakewood	1005
#lakewood	967	#gigharbor	554	#gigharbor	675	#gigharbor	688
#gigharbor	532	#sumner	279	#sumner	499	#sumner	333
#sumner	253	#pugetsound	173	#fife	345	#mtrainier	310
#fife	225	#upperleftusa	159	#pugetsound	303	#findyourpark	302
#mtrainier	161	#fife	135	#findyourpark	253	#pugetsound	258
@theredhot	135	#mtrainier	135	#mtrainier	230	#fife	256
#upperleftusa	130	@crystalmt	132	#upperleftusa	224	#upperleftusa	210
#pugetsound	126	@theredhot	103	@rainiersland	161	@theredhot	156
@crystalmt	113	#dupont	73	@donruiztnt	152	#wastatefair	141
buckley	89	#northwestisbest	73	@theredhot	121	#nps	98
#thatpnwlife	69	@donruiztnt	70	#wildflowers	105	#usopen	96
#universityplace	59	#thatpnwlife	61	buckley	100	@rainiersland	91
fantasy lights	55	zoo lights	56	#dupont	89	#familyfun	89
#northwestisbest	52	#findyourpark	51	#ttot	87	#nationalparks	88
@donruiztnt	49	#familyfun	48	#universityplace	87	@cityoftacoma	83
#jblm	48	#universityplace	46	#wastate	83	buckley	79
#rainier	47	#neverstopexploring	44	#northwestisbest	83	#partybigwa	78
#dupont	45	@cityoftacoma	42	#nationalparks	82	#tacomawa	75
@tacomacomedy	42	joint base lewis-mchord	39	#usopen	77	#livewashington	71
#findyourpark	34	gondola	37	#familyfun	75	#northwestisbest	65





# Important Keywords

Pierce County Data, No Retweet | Four Quarters

Similar to the Pacific Northwest data, the Pierce County data are dominated by location keywords, including city names, attractions, etc. (e.g., #tacoma, #puyallup, #pnw, #lakewood, #mtrainier). The composition of the top keywords was also relatively stable quarter-over-quarter. zoo lights made it into the top 10 in 2015 Q4 and #ttot only made it into the top 25 in 2016 Q2.

On the next page, word clouds consisting of filtered keywords (after eliminating the most dominant keywords) from Pacific Northwest and Pierce County data were compared side by side. It can be observed that both sets of data contain location keywords more than event- or activity-related keywords.

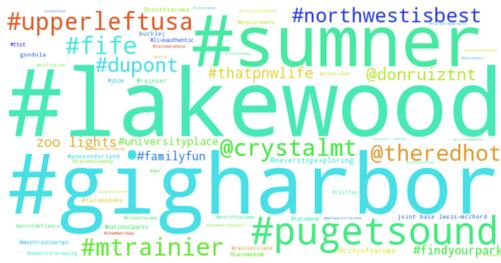
2015 Q4		2016 Q1		2016 Q2		2016 Q3	
Keyword	N	Keyword	N	Keyword	N	Keyword	N
#tacoma	9715	#tacoma	9113	#tacoma	11219	#tacoma	9250
#puyallup	1436	#puyallup	1040	#puyallup	3772	#puyallup	3511
#lakewood	896	#pnw	1002	#pnw	1607	#pnw	1472
#gigharbor	230	#lakewood	892	#lakewood	997	#lakewood	1103
#fife	217	#washington	473	#washington	969	#washington	744
#pnw	190	#gigharbor	212	#gigharbor	698	#gigharbor	720
#sumner	119	#fife	139	#sumner	490	#sumner	354
@theredhot	111	#sumner	137	#fife	395	#fife	271
zoo lights	90	#pugetsound	82	#mtrainier	173	#mtrainier	249
#washington	70	#mtrainier	82	#pugetsound	158	@theredhot	164
#universityplace	58	@crystalmt	80	@rainiersland	153	#wastatefair	136
#mtrainier	54	@theredhot	78	@theredhot	134	#pugetsound	109
@crystalmt	50	#upperleftusa	72	#universityplace	99	#upperleftusa	90
fantasy lights	39	#universityplace	51	#dupont	93	@cityoftacoma	86
#jblm	31	#dupont	46	#upperleftusa	87	@rainiersland	79
#dupont	27	#northwestisbest	36	buckley	68	#partybigwa	79
#tacomadome	19	@cityoftacoma	27	#jblm	66	#tacomawa	75
buckley	16	#tacomawa	27	joint base lewis-mcchord	61	buckley	70
@metparkstacoma	13	#tacomadome	25	@donruiztnt	60	#dupont	65
#tacomawa	13	@southtacoma	22	@southtacoma	53	#universityplace	65
#chambersbay	13	#thatpnwlife	20	@cityoftacoma	52	#livewashington	64
@southtacoma	12	@oddotterbrewing	18	#findyourpark	46	joint base lewis-mcchord	53
@oddotterbrewing	12	#rainier	15	#northwestisbest	41	#puyallupfair	51
@traveltacoma	12	@northtacoma	15	#ttot	36	#findyourpark	48
@cityoftacoma	10	zoo lights	13	#rainier	36	#northwestisbest	44

# Important Keywords

Filtered Keywords in Geotagged Tweets | Four Quarters

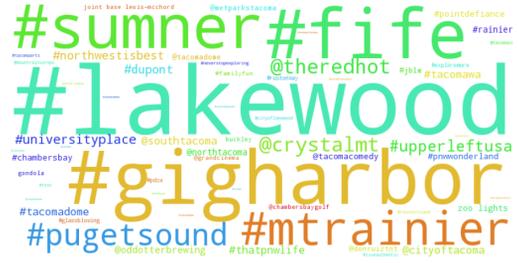
## Pacific Northwest Data

2016 Q1



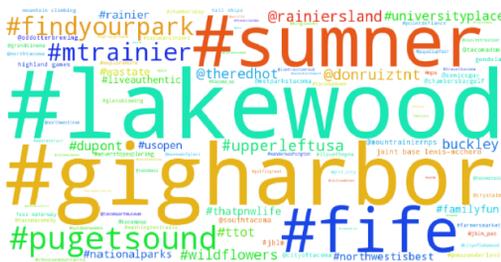
## Pierce County Data

2016 Q1



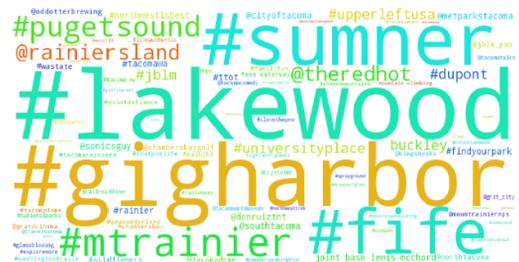
## Pacific Northwest Data

2016 Q2



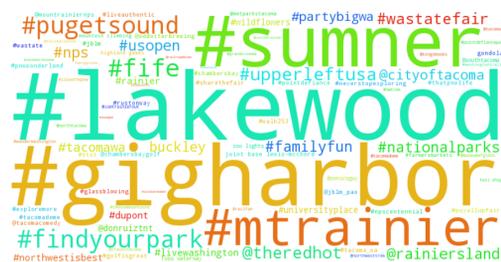
## Pierce County Data

2016 Q2



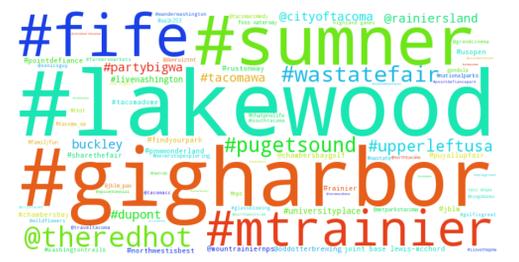
## Pacific Northwest Data

2016 Q3



## Pierce County Data

2016 Q3



# Important Keywords

Top Retweeted Keywords | Query Stream, Pacific Northwest, and Pierce County Data

## 2015 Q4

- Zoo Lights
- USOpen
- Sumner
- USOpen2015
- FindYourPark
- NPS
- Gondola
- Joint Base Lewis McChord
- MtRainierNPS

## 2016 Q1

- @mountrainiernps
- #findyourpark
- #usopen
- @tacomadome
- #nps
- zoo lights
- gondola
- mountain climbing
- buckley

## 2016 Q2

- #usopen
- @mountrainiernps
- #findyourpark
- gondola
- buckley
- #familyfun
- @cityoftacoma
- #washington
- #fife

## 2016 Q3

- #findyourpark
- @mountrainiernps
- #usopen
- #familyfun
- #wildflowers
- buckley
- #washington
- @cityoftacoma
- gondola



# Relevant Keywords

## Analysis of Bi-Grams | Query Stream Data

Based on the top bi-grams, it can be observed that some keywords are more relevant than others. Tweets containing popular travel keywords are relevant to travel and tourism, but irrelevant to Pierce County. Those with location keywords are relevant to Pierce County, but irrelevant to tourism. Some location keywords were used for other locations (e.g., #fife refers to a city in Scotland) or non-local references (e.g., #buckley refers to people's last name).

### General Travel Keywords

**#ttot:** travel photography, travel videography, travel tips

**#findyourpark:** promotion from the National Parks Service, NPS 100<sup>th</sup> Birthday

**#familyfun:** parenting, family leisure time, family getaway

#travel #ttot  
#ttot #travel  
#ttot #photography  
#ttot #travelpics

national park  
national parks  
#findyourpark #nps100  
park week

#familyfun #games  
easter #familyfun  
party #game  
#parenting #familyfun

### Location Keywords

**#tacoma:** employment opportunities in Tacoma, WA

**#washington:** employment opportunities in Washington, DC

**#lakewood:** employment opportunities in Lakewood, WA and Lakewood, NJ

#tacoma wa  
#jobs #hiring  
#hiring #careerarc  
wa #hiring

#washington dc  
#jobs #hiring  
#jobs #washington  
#hiring #careerarc

#jobs #hiring  
#hiring #careerarc  
we're #hiring  
#lakewood nj

# Relevant Keywords

## Analysis of Bi-Grams | Pacific Northwest Data

Geotagged tweets are dominated with location keywords, which are more relevant to Pierce County, but irrelevant to tourism. While rarely used, specific attraction keywords are relevant to travel/tourism activities in Pierce County. Importantly, specific Pacific Northwest keywords (e.g., #upperleftusa, #northwestisbest, #pnwonderland) are used to express the Pacific Northwest pride (e.g., natural beauty, lifestyle). While most tweets containing these keywords are not relevant to specific tourism activities/events, they can be effective for tourism promotion when combined with other keywords.

### Location Keywords

**#tacoma**: employment opportunities in Tacoma, WA

**#lakewood**: employment opportunities in Lakewood, WA

**#gigharbor**: employment opportunities in Gig Harbor, WA

#tacoma wa  
#hiring #careerarc  
#jobs #hiring  
wa #hiring

#lakewood wa  
#hiring #careerarc  
#jobs #hiring  
#nursing #jobs

#gigharbor wa  
#hiring #careerarc  
#jobs #hiring  
#retail #jobs

### Specific Attraction Keywords

**#mtrainier**: view and activities in Mt. Rainier; Seattle, WA and Gig Harbor, WA

**@crystalmt**: activities in Crystal Mountain, references to Enumclaw, WA

**@theredhot**: activities and offering, references to Tacoma, WA

mt rainier  
mount rainier  
gig harbor  
#seattle #mtrainier

crystal mountain  
mountain ski  
ski area  
enumclaw wa

tacoma wa  
pale ale  
@theredhot tacoma  
special @theredhot

# Relevant Keywords

## Analysis of Bi-Grams | Pacific Northwest Data

### Pacific Northwest Keywords

**#pnw**: the Pacific Northwest, references to Seattle, WA and Portland, OR

**#upperleftusa**: the Pacific Northwest, natural beauty, tourism activities

**#seattle #pnw**  
**#pnw #pnwonderland**  
**#pdx #pnw**  
**#washington #pnw**  
**#oregon #pnw**

**#pnw #upperleftusa**  
**#upperleftusa #pnwonderland**  
**#upperleftusa #pnwlife**  
**#upperleftusa #westcoast**  
**#upperleftusa #hike**

### Analysis

City or location names are used in social media communication for multiple purposes in various contexts, including economic sectors. City names in Pierce County are used on Twitter mostly for employment-related communication originating from the Pacific Northwest area, but not for travel- and tourism-related communication. Therefore, generic city names should be excluded from tracking and analyzing tourism communication on social media. Social media users use travel and attraction keywords to communicate tourism events and activities.



# Relevant Keywords

## Analysis of Bi-Grams | Pierce County Data

Similar to the Pacific Northwest data, location keywords dominate the Pierce County data. These keywords are relevant to employment opportunities in Pierce County, but irrelevant to tourism (examples from different locations are provided below). Bi-grams for specific attraction keywords are identical to the Pacific Northwest data. Tweets with Pacific Northwest keywords contain more relevant references to Pierce County, although references to Seattle, WA persist.

### Location Keywords

**#fife**: employment opportunities in Fife, WA

**#puyallup**: employment opportunities in Puyallup, WA

**#sumner**: employment opportunities in Sumner, WA

**#fife wa**  
**#hiring #careerarc**  
**#jobs #hiring**  
**#transportation #jobs**

**#puyallup wa**  
**#hiring #careerarc**  
**#jobs #hiring**  
**#nursing #jobs**

**#sumner wa**  
**#hiring #careerarc**  
**#jobs #hiring**  
**#manufacturing #jobs**

### Pacific Northwest Keywords

**#pnw**: the Pacific Northwest, natural beauty

**#upperleftusa**: the Pacific Northwest, photography, activities

**#tacoma #pnw**  
**#pnw #pnwlife**  
**tacoma washington**  
**chambers bay**  
**#pnwonderland #nofilterneeded**

**#pnw #upperleftusa**  
**#upperleftusa #pnwonderland**  
**#vsco #vscocam**  
**#upperleftusa #hike**  
**wonderland pc**

As in the Pacific Northwest data, social media users use attraction and Pacific Northwest keywords to communicate tourism related activities and events.

# Keywords with Pictures

## High Frequency Keywords in Tweets with Pictures and Instagram | Query Stream Data

Pictures are often posted on social media to demonstrate people's opinion of and experiences in various places and events. Therefore, keywords used to caption pictures within a tweet or Instagram post are important representations of images of places and events in the minds of social media users (i.e., organic destination image).

### Query Stream Data

In the query stream data, #ttot was most frequently used with pictures, followed by #washington. #usopen was dominant in 2016 Q3 when the popular event took place. #findyourpark was gaining prominence since 2016 Q1 in celebration of NPS Centennial (100<sup>th</sup> birthday).

#### 2015 Q4



#### 2016 Q1



#### 2016 Q2



#### 2016 Q3





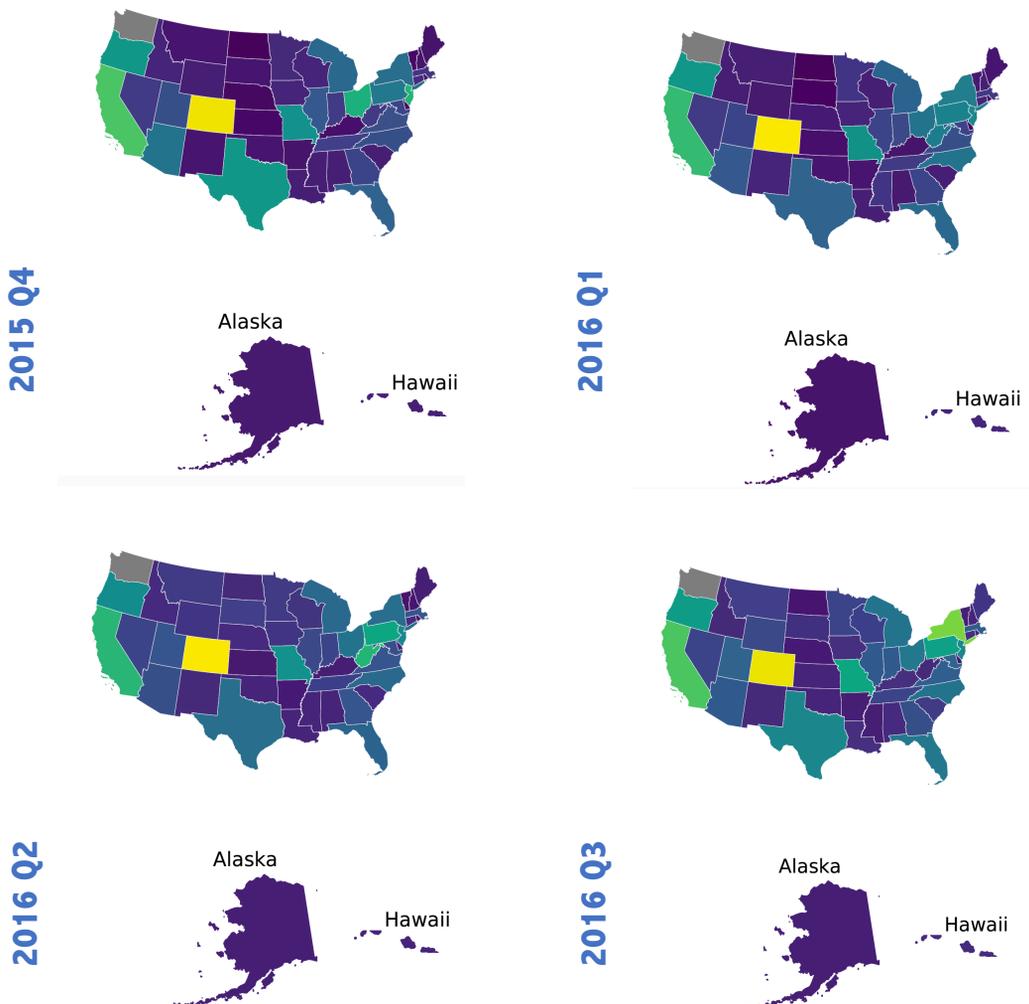
# Keywords Reach

## Usage Distribution of Keywords in the United States

The provided keywords are also used in other regions around the country. Notably, the following states saw heavy usage of the keywords over the year: Colorado, Missouri, California, West Virginia, New York and Florida.

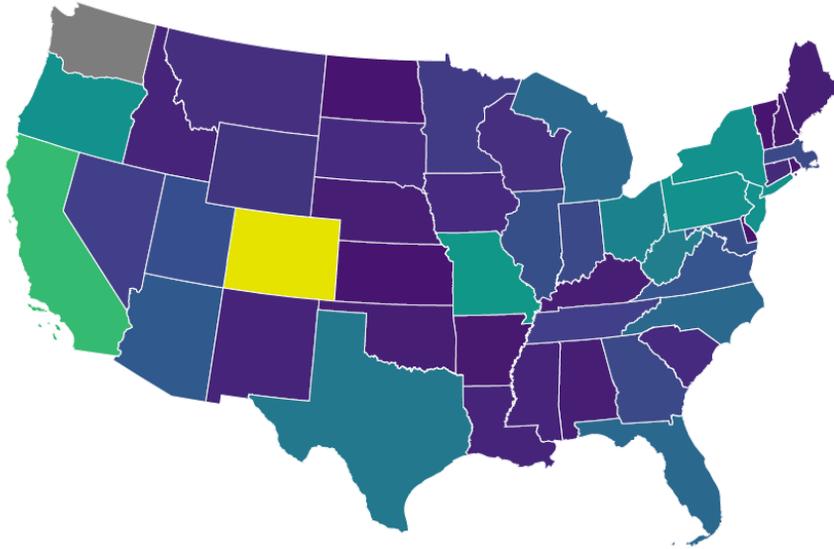
### Reading the Figure:

- Colors are based on frequency counts of keywords tweeted from US states.
- The lighter the color, the more often keywords were used in these states. Washington state (highest frequency counts) is exempt as the high counts bias the color scale scale (see page 37 for state counts).



# Keywords Reach

Usage Distribution of Keywords in the United States (All Quarters)



Alaska



Hawaii



# Keywords Reach

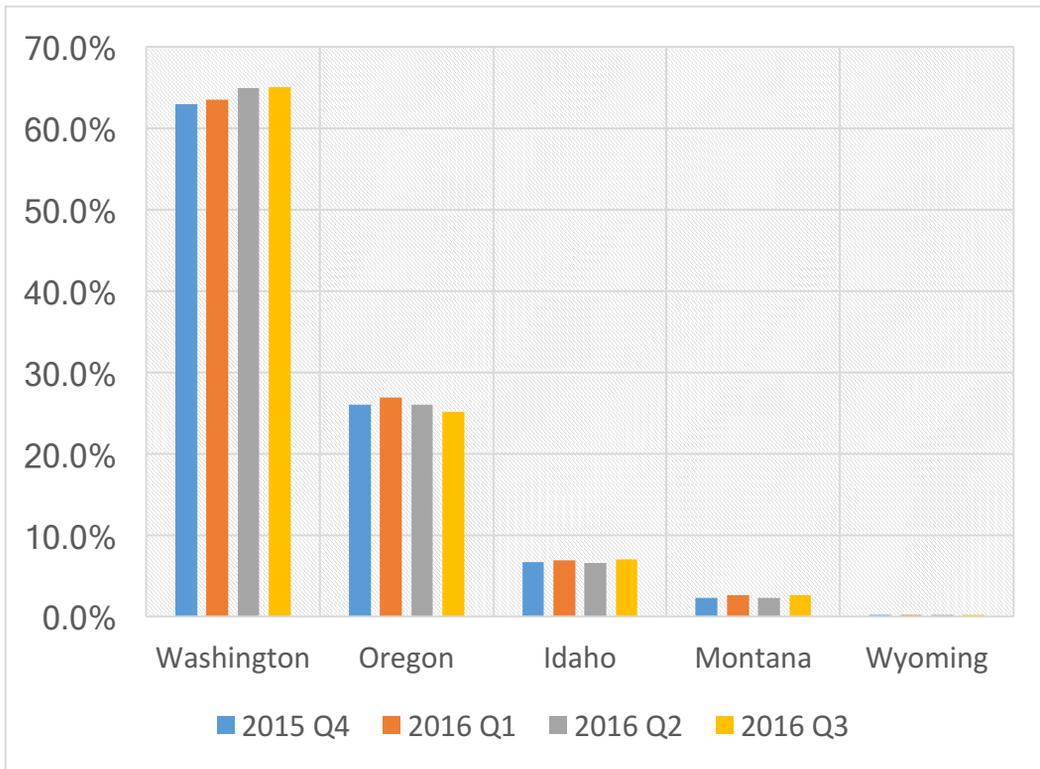
Frequency of keywords tweeted from within US states

	2015 Q4	2016 Q1	2016 Q2	2016 Q3	All data		2015 Q4	2016 Q1	2016 Q2	2016 Q3	All data
Alabama	34	35	70	75	214	Montana	20	43	174	166	403
Alaska	25	21	51	43	140	Nebraska	6	38	98	36	178
Arizona	548	355	318	355	1576	Nevada	118	142	263	215	738
Arkansas	16	25	44	46	131	New Hampshire	16	49	29	53	147
California	1,893	2,132	2,297	2,265	8,587	New Jersey	1,546	1,012	1,113	914	4,585
Colorado	3,437	4,471	5,141	3,998	17,047	New Mexico	21	61	88	69	239
Connecticut	64	62	95	94	315	New York	466	785	675	2759	4,685
Delaware	5	8	48	22	83	North Carolina	229	710	651	659	2,249
D.C.	15,639	30,741	29,041	27,994	103,415	North Dakota	2	4	90	24	120
Florida	373	541	580	717	2,211	Ohio	1,473	651	747	681	3,552
Georgia	177	229	379	277	1,062	Oklahoma	22	26	65	54	167
Guam	3	1	10	1	15	Oregon	1,013	1,295	1,252	1,316	4,876
Hawaii	35	55	65	76	231	Pennsylvania	589	945	1,783	1,392	4,709
Idaho	48	44	95	74	261	Puerto Rico	5	23	8	27	63
Illinois	284	196	302	344	1,126	Rhode Island	13	18	21	51	103
Indiana	120	239	260	354	973	South Carolina	41	49	99	133	322
Iowa	53	68	153	85	359	South Dakota	20	5	198	101	324
Kansas	9	16	38	51	114	Tennessee	142	160	214	189	705
Kentucky	14	24	52	90	180	Texas	1,004	452	712	914	3,082
Louisiana	39	42	78	84	243	Utah	222	219	366	430	1,237
Maine	19	25	53	115	212	Vermont	7	33	27	42	109
Maryland	183	199	334	439	1,155	Virginia	218	284	369	393	1,264
Massachusetts	105	142	377	386	1,010	Washington	16,343	23,386	27,841	23,534	91,104
Michigan	415	476	591	633	2,115	West Virginia	127	834	2201	73	3235
Minnesota	58	131	171	206	566	Wisconsin	52	41	130	176	399
Mississippi	40	138	66	39	283	Wyoming	33	36	159	232	460
Missouri	912	1212	1,395	1,502	5,021						

# Keywords Reach

## Usage Distribution across the Pacific Northwest States

The distribution of tweets across the PNW states throughout the year was consistent. Most geotagged tweets originated from Washington, followed by Oregon. However, it is important to note that the small percentage of tweets originating from Montana account for about the same impact on the state population as the tweets originating from Oregon. In other words, the few tweets from Montana influence the same share of the state population as do tweets from Oregon.



### Bounding box:

42.015167, -124.583271 (SW)

48.977444, -111.053959 (NE)

# Tweet Sentiments

## Sentiment Analysis | Query Stream Data

Nearly all tweets in the query stream data have positive sentiments, only a few keywords have neutral sentiments. The following tables present keywords used in tweets with neutral (in grey) or negative (in red) sentiments.

2015 Q4	2016 Q1
#dupont	#jblm
@southtacoma	#dupont
#tacomawa	
@donruiztnt	
#jblm	

2016 Q2	2016 Q3
@donruiztnt	@donruiztnt
#dupont	@southtacoma
@southtacoma	#dupont
@sonicsguy	#jblm
#jblm	#tacomadome
	#pugetsound

*Note: see appendix for the full list of all keywords for all data streams in all time periods.*

### Sentiment Classification:

6+ = positive (green)

4 – 6 = neutral (grey)

<4 = negative (red)

# Tweet Sentiments

## Sentiment Analysis | Pacific Northwest Data

2015 Q4	2016 Q1
#sumner	buckley
joint base lewis-mcchord	#lakewood
#lakewood	@southtacoma
buckley	#fife
@southtacoma	#sumner
@ismtrainerout	#dupont
#dupont	joint base lewis-mcchord
@rainiersland	#jblm
@tacomagame	
#fife	
#jblm	
2016 Q2	2016 Q3
#fife	#lakewood
@northtacoma	#sumner
@sonicsguy	#fife
@southtacoma	@cityoftacoma
#usopen	@donruiztnt
#tacomadome	#jblm
#dupont	#tacomadome
joint base lewis-mcchord	joint base lewis-mcchord
#jblm	

*Note: see appendix for the full list of all keywords for all data streams in all time periods.*

# Tweet Sentiments

## Sentiment Analysis | Pierce County Data

2015 Q4	2016 Q1
#lakewood	@northtacoma
joint base lewis-mcchord	@southtacoma
buckley	#lakewood
#fife	@chambersbaygolf
#glassblowing	#fife
#dupont	@donruiztnt
#jblm	#sumner
	#dupont
	@crystalmountain
	#jblm
	joint base lewis-mcchord
2016 Q2	2016 Q3
#tacomadome	#sumner
@southtacoma	#fife
#dupont	@cityoftacoma
joint base lewis-mcchord	#jblm
#jblm	#tacomadome
	joint base lewis-mcchord

*Note: see appendix for the full list of all keywords for all data streams in all time periods.*

# Tweet Sentiments

## Sentiment Analysis | All Data

The neutral sentiment associated with city names (e.g., #sumner, #lakewood, #fife) can be explained by the dominant topic in the tweets containing these keywords, announcement of employment opportunities. These tweets typically contain neutral texts (i.e., objective statements) instead of emotional texts (i.e., subjective feelings or opinions). The sentiment of other keywords can be associated with special topics. For example, tweets containing #dupont in Query Stream data, which consistently score neutral, are dominated by facts and opinions about DuPont company. Based on the top bi-grams, it can be observed that some tweets contain negative sentiments toward the management (e.g., “#dupont cut,” “worst nightmare,” “dow merger”). Tweets originating from the Pacific Northwest and Pierce County refer to Dupont, WA. They contain announcements of employment opportunities and reporting on traffic (e.g., “engineering jobs,” “stop traffic,” “blocked #dupont”). Similar results were found in other location keywords. @southtacoma has a mix of negative (e.g., “bad,” “worst,” “sad”) and positive (e.g., “love”) texts, mostly in followers’ reactions to shared news. Similar results were found in @sonicsguy and @donruiztnt.

#jblm, joint base lewis-mcchord, and #tacomadome scored negative in the Pacific Northwest and Pierce County data for several quarters (it was positive in 2016 Q1). For both #jblm and joint base lewis-mcchord keywords, most tweets are about traffic alerts, including accidents and delay (e.g., “traffic back,” “stop traffic,” “lane blocked”). For #tacomadome, tweets are mainly about performances held in the event space. The negative sentiment does not necessarily correspond to audience disappointment. On the contrary, many tweets contain negative words that are meant to express positive evaluation (e.g., “[performer] killed it on the stage tonight”) as well as titles of performers’ albums or songs that contain negative keywords (e.g., “Never Say Die”).

# Lessons Learned

## What we use that others don't

Location names dominated the local tweets, which are geotagged tweets originating from the PNW and Pierce County bounding boxes, as evident in the top keywords: #tacoma, #puyallup, #washington, #lakewood, etc. Most are not relevant to tourism/travel. This indicates that: (1) tourists, residents, and tourism agencies in Pierce County do not use these keywords in Twitter communication or (2) generally, the number of tourism-related communication on Twitter in Pierce County is relatively small compared to that of other topics (e.g., employment, traffic reporting). In any case, while these keywords are truly local (except for identical city names that exist in other areas, such as Fife and Lakewood), they are not effective in communicating the distinctive characteristics of tourism products and experiences in Pierce County.

Keywords associated with the Pacific Northwest are also used more extensively in the local tweets: #pnw, #upperleftusa, #northwestisbest, #pnwonderland, #thatpnwlife, etc. In contrast to location names, tweets containing these keywords communicate the appeal of the Pacific Northwest, including its natural beauty and quality of life. Specifically, #pnw is the top keyword for local tweets with pictures and Instagram posts. Therefore, in contrast to city names, these keywords are more effective in communicating what the Pacific Northwest and Pierce County have to offer in terms of tourism activities and experiences. Moreover, due to the nature of these keywords (i.e., being used to demonstrate PNW pride), tweets with these keywords are generally positive. This signifies the effectiveness of using these keywords in tourism communication.



# Lessons Learned

## What we use that others don't

Tweets using attraction or business names as keywords are also uniquely local (e.g., #mtrainier, @crystalmt, @theredhot). However, they are extremely small in proportion compared to the entire local tweet population. The proportion might reflect the relative share of visitation or patronage to the respective attractions or establishments, but the tweets are most likely posted by relevant users (i.e., visitors to local attractions). Therefore, using specific attraction keywords in tourism communication can be effective to appeal to those with relevant interest (i.e., target audience). See the below table for examples.

Keyword examples	Unique?	Relevant?
<b>Location Keywords</b> #tacoma #sumner #gigharbor	Yes	No
<b>PNW Keywords</b> #pnw #upperleftusa #northwestisbest	Yes (PNW)	Yes
<b>Attraction Keywords</b> #mtrainier @crystalmt #tacomadome	Yes (PC)	Yes

# Lessons Learned

## What others use that we don't

Comparing the top keywords between the Query Stream data and the local geotagged data, it can be observed that several general travel keywords are more prominent elsewhere than locally: #ttot (i.e., highest in frequency), #findyourpark, #familyfun, #neverstopexploring, etc. However, because the local geotagged data can be considered a fraction, albeit not exact, of the Query Stream data and that we did not capture comparable location or attraction keywords in other areas, we cannot make a definitive conclusion that these keywords are underused in Pierce County. Since these keywords are relevant to tourism and have a higher tendency to be retweeted, Pierce County can take advantage of using these well-known keywords (i.e., as they are being used extensively across the country) in tourism communication. Using these keywords can also be effective to appeal to potential tourists from outside the PNW area. See the below table for examples.

Keyword examples	Unique?	Relevant?
<b>General Travel Keywords</b> #ttot #findyourpark #neverstopexploring	No	Yes



# Lessons Learned

## What we do that others do as well

While some event- and attraction-related keywords can be truly local, generic event and attraction identifiers (e.g., “farmersmarket,” “gondola”) are used across the country in the Query Stream data and, thus, are not unique to Pierce County. Additionally, the same keywords are used for events that are held simultaneously in different areas across the country (e.g., zoo lights) or consecutively (i.e., US Open). Furthermore, #usopen is relevant for both tennis and golf tournaments (in 2016 Q2 249 bigram tweets with tennis and 2,085 with golf; in 2016 Q3 3,687 bigram tweets with tennis, none with golf). While the latter can be traced based on the time tweets were posted, the former can only be traced based on geotags. For example, “zoo lights” is one the Top 10 keywords in Pierce County in 2015 Q4, but of smaller magnitude (ranked #6, but only about one tenth the frequency of the #1 keyword #washington). In Query Stream data that include retweets, it ranked 4<sup>th</sup> in the same quarter. See the below table for examples.

Keyword examples	Unique?	Relevant?
<b>Generic Event Keywords</b> #farmersmarket #gondola	No	No
<b>Specific Event Keywords</b> (with Replication) zoo lights #usopen	Yes and No (time-bound)	Yes
<b>Specific Event Keywords</b> (No Replication) #wastatefair	Yes	Yes

# Lessons Learned

## Our Reputation

In all data streams, tweets containing the provided keywords are mostly positive. Among those that consistently score the highest on the happiness scale across all quarters in the Query Stream data are keywords related to Mt. Rainier (e.g., @mountrainiernps, @visitmtrainier, @ismtrainierout, #mtrainier), National Parks Service (e.g., #npscentennial, #nationalparks, #findyourpark), Travel Tacoma, and Highland Games; all of which are relevant to travel and tourism. Some of these keywords also scored highest locally (in geotagged data), with the addition of #ttot, #pointdefiance, and #chambersbay in the PNW data. Only a few scored 7 or higher: #liveauthentic, @tacomacomedy, @metparkstacoma, and #chambersbay. This indicates that tourism attractions and activities in Pierce County (and PNW) have a positive reputation and are communicated in a positive way on social media.

Negative sentiments are linked to communication of traffic delays and accidents in locations along the I-5 corridor. This might be due to official twitter users (e.g. Total Traffic SEA and WSDOT Tacoma Traffic) posting traffic alerts and updates almost every hour using location names in their tweets. While these tweets are generally irrelevant to tourism products, traffic is a big part of the visitor experience. Therefore, these may cast an influence on the reputation of Pierce County as a destination in terms of its accessibility. On the other hand, these can be a helpful resource for visitors driving to and through areas in Pierce County if communicated positively by tourism marketers through retweets with comment.



# Lessons Learned

## Our Competition

The Pierce County keywords are also used in conjunction with references to other competing destinations and locations. For example, geotagged tweets containing #ttot in both PNW and Pierce County data make references to Seattle and Ski Hood (Mt. Hood, Oregon). In the PNW data, the PNW keywords (e.g., #upperleftusa, #thatpnwlife, #pnwonderland) are used with references to Oregon and Portland. In fact, the share of local keywords being used in the state of Oregon is around 30% that of Washington over the year. It can be suggested that while the PNW keywords can be appealing to potential visitors outside of the PNW region, they are not unique to Washington (and Pierce County specifically).

In both PNW and Pierce County data, tweets containing specific Pierce County attractions (e.g., #mtrainier) often also make references to Seattle. Indeed, Seattle was ranked prominently in bi-grams for Query Stream and PNW data with keywords around Mount Rainier. This might be an indication that tourists see Pierce County attractions as complements to Seattle or part of the Seattle experience.



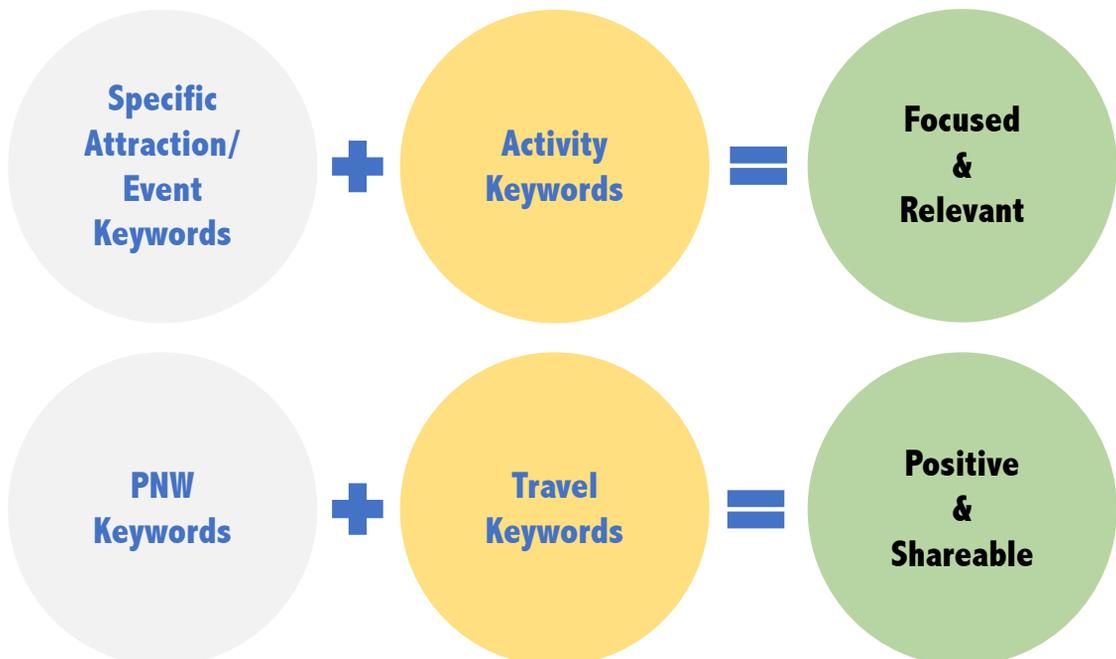
# Recommendation

## What we can do better

### Which Keyword?

In order for tourism stakeholders to effectively communicate tourism attractions, events, and activities on Twitter, we suggest the following tactics to ensure a focused, unique, relevant, and shareable communication strategy:

- Avoid using only location names (e.g., #tacoma)
- Use specific attraction or event hashtag/mention (e.g., #mtrainier, #tacomadome, #USopen)
- Mix in generic activity hashtags when appropriate (e.g., #hikimg, #neverstopexploring, #sunset) to reach specific tourist segments
- Mix in the Pacific Northwest hashtag (e.g., #northwestisbest, #pnwonderland, #upperleftusa) for virality and general positive appeal
- Create unique Pierce County tourism hashtags, similar to the PNW pride hashtags, to differentiate Pierce County from other PNW locations in general and Seattle in particular
- Mix in the well-known travel/tourism hashtag (e.g., #ttot) for virality and to target relevant tourism communities.



# Recommendation

## What we can do better

### Amplification

Tourism communication on Twitter in Pierce County is relatively small. Considering there are very active Twitter users using the same keywords (i.e., employment agencies and traffic officials), in addition to the smart use of keywords, it is important to amplify tourism communication on social media, to “turn up the volume” so tourism messages from Pierce County can be heard by target audience.

### Retweet and Retweet with comment

This study found that local attraction keywords are used in relevant tweets by relevant users. The first simple step to amplify local tourism communication on Twitter is to share these messages by retweeting tweets containing relevant experiences (from residents or tourists) or tourism campaign/promotion (from local businesses/attractions). We suggest following relevant hashtags to receive alerts when tweets are posted. For messages that can serve as either facilitator or detractor of travel motivation to Pierce County (such as traffic information), a comment should be added to ensure overall positive sentiment.

### Tag/Mention

Tagging specific Twitter accounts in a post will increase the likelihood for a tweet to reach a wider audience and to be shared (retweeted). Moreover, when tourism stakeholders mention each other in social media and use the same keywords, it demonstrates the cohesiveness of the local tourism industry in the eyes of potential visitors and residents alike.

# Recommendation

## What we can do better

### Listening and Conversation

The ultimate goals of social media communication on Twitter for tourism in Pierce County are (1) to provide content that is shareable and relevant to target audience and (2) to create and sustain engaged communities around travel and tourism. As this study found that most tweets are most likely originated from marketers (i.e. professional Twitter users), it is important to engage residents and visitors in the conversation. Some destinations approach prominent Twitter users with many followers (high reach social media influencers) that are relevant for their market to use a specific hashtag to highlight the beauty of the destination. This in turn encourages Twitter users to use the same hashtag and retweet messages with these hashtags. It is furthermore important to listen to these followers and initiate conversations around tourism activities, events, and attractions.

Images used in this report were sourced from [TravelTacoma.com](https://www.traveltacoma.com)



# APPENDIX – Sentiment 2015 Quarter 4

## Sentiment Scores | Query Stream Data

Keyword	Sentiment	Keyword	Sentiment	Keyword	Sentiment
@ismtrainierout	7.47	#pnw	6.52	buckley	6.23
#rainier	6.92	#glassblowing	6.52	@tacomadome	6.21
#familyfun	6.87	neverstopexploring	6.50	#washington	6.16
@visitmtrainier	6.82	#exploremore	6.50	#summer	6.13
#nationalparks	6.77	#usopen2015	6.50	#fife	6.08
highland games	6.76	#tacomadome	6.50	@rainiersland	6.06
#mtrainier	6.75	mountrainiernps	6.49	@donruiztnt	5.95
metparkstacoma	6.75	#carshows	6.48	@southtacoma	5.94
@traveltacoma	6.75	#pugetsound	6.47	#jblm	5.91
#ttot	6.74	@crystalmt	6.47	#dupont	5.83
#liveauthentic	6.74	tacomaartmuseum	6.47	#tacomawa	5.79
fantasy lights	6.74	#gigharbor	6.46		
#usopen	6.72	zoo lights	6.45		
outdoorwomen	6.72	#sportsevents	6.42		
#golfisgreat	6.71	universityplace	6.41		
crystalmountain	6.69	@theredhot	6.38		
#findyourpark	6.62	#nps	6.32		
farmersmarkets	6.62	@cityoftacoma	6.28		
chambersbaygolf	6.62	@tacomacc	6.28		
#sprayground	6.59	#tacoma	6.27		
#upperleftusa	6.58	gondola	6.26		
#railfan	6.58	#puyallup	6.26		
#thatpnwlife	6.56	mountain climbing	6.26		Green = positive (>= 6)
tacomacomedy	6.54	#lakewood	6.25		Grey = neutral (>=4 and < 6)
northwestisbest	6.53	@jblm_pao	6.25		Red = negative (<4)

# APPENDIX – Sentiment

## 2015 Quarter 4

### Sentiment Scores | Pacific Northwest Data

Keyword	Sentiment	Keyword	Sentiment
#traveltacoma	6.95	#sumner	5.93
fantasy lights	6.86	#lakewood	5.88
@traveltacoma	6.80	buckley	5.85
#chambersbay	6.77	@southtacoma	5.80
@metparkstacoma	6.72	#dupont	5.63
#mtrainier	6.65	#fife	5.32
#tacomawa	6.63	#jblm	4.29
#pugetsound	6.57		
#pnw	6.57		
@crystalmt	6.54		
#upperleftusa	6.52		
#rainier	6.46		
zoo lights	6.37		
#washington	6.37		
#universityplace	6.36		
@tacomacomedy	6.36		
@oddotterbrewing	6.34		
@theredhot	6.31		
#puyallup	6.31		
#tacomadome	6.28		
#pointdefiance	6.25		
@northtacoma	6.23		
#gigharbor	6.21	<b>Green = positive (&gt;= 6)</b>	
#tacoma	6.20	<b>Grey = neutral (&gt;=4 and &lt; 6)</b>	
@cityoftacoma	6.18	<b>Red = negative (&lt;4)</b>	

# APPENDIX – Sentiment 2015 Quarter 4

## Sentiment Scores | Pierce County Data

Keyword	Sentiment	Keyword	Sentiment
fantasy lights	6.86	@oddotterbrewing	6.34
@traveltacoma	6.80	#puyallup	6.31
#chambersbay	6.77	@theredhot	6.31
#ttot	6.76	#tacomadome	6.28
@metparkstacoma	6.72	#pointdefiance	6.25
#neverstopexploring	6.71	@northtacoma	6.23
#findyourpark	6.70	#gigharbor	6.21
#glassblowing	6.68	#tacoma	6.20
#liveauthentic	6.68	@cityoftacoma	6.18
@mountrainiernps	6.66	@chambersbaygolf	6.12
#mtrainier	6.65	@donruiztnt	6.06
#tacomawa	6.63	@tacomadome	6.05
#pnw	6.57	#sumner	5.93
#pugetsound	6.57	#lakewood	5.88
@crystalmt	6.54	joint base lewis-mcchord	5.88
#upperleftusa	6.52	buckley	5.85
@tacomaartmuseum	6.51	@southtacoma	5.80
#rainier	6.46	#dupont	5.63
gondola	6.43	#fife	5.32
#thatpnwlife	6.42	#jblm	4.29
#exploremore	6.39		
#washington	6.37		
zoo lights	6.37	<b>Green = positive (&gt;= 6)</b>	
#universityplace	6.36	<b>Grey = neutral (&gt;=4 and &lt; 6)</b>	
@tacomacomedy	6.36	<b>Red = negative (&lt;4)</b>	

# APPENDIX – Sentiment 2016 Quarter 1

## Sentiment Scores | Query Data Stream

Keyword	Sentiment	Keyword	Sentiment	Keyword	Sentiment
@visitmtrainier	7.10	@metparkstacoma	6.57	#tacoma	6.25
#mtrainier	7.08	@crystalmountain	6.57	#lakewood	6.22
@ismtrainierout	7.06	#sprayground	6.55	@tacomadome	6.20
highland games	6.85	@oddotterbrewing	6.54	#universityplace	6.18
#familyfun	6.83	#thatpnwife	6.53	zoo lights	6.15
#findyourpark	6.75	#carshows	6.52	#washington	6.13
#rainier	6.75	@museumofglass	6.52	@southtacoma	6.10
#outdoorwomen	6.72	#glassblowing	6.51	buckley	6.09
#ttot	6.71	@grandcinema	6.51	@donruiztnt	6.06
#golfisgreat	6.70	@crystalmt	6.49	@cityoftacoma	6.05
#liveauthentic	6.70	@rainiersland	6.46	#sumner	6.05
#nationalparks	6.68	@theredhot	6.43	#life	6.02
#choosmountains	6.67	#sportsevents	6.43	#jblm	5.78
#upperleftusa	6.66	#tacomadome	6.39	#dupont	5.67
#usopen	6.65	mountain climbing	6.35		
@traveltacoma	6.64	#nps	6.34		
@mountrainiernps	6.64	#gigharbor	6.32		
#exploremore	6.63	@tacomagame	6.32		
#neverstopexploring	6.63	#pugetsound	6.30		
#farmersmarkets	6.61	#tacomawa	6.29		
@chambersbaygolf	6.61	#puyallup	6.28		
#northwestisbest	6.60	#usopen2015	6.27		
#railfan	6.59	@tacomacomedy	6.27	Green = positive (>= 6)	
@tacomaartmuseum	6.58	@jblm_pao	6.27	Grey = neutral (>=4 and < 6)	
#pnw	6.57	gondola	6.26	Red = negative (<4)	

# APPENDIX – Sentiment 2016 Quarter 1

## Sentiment Scores | Pacific Northwest Data

Keyword	Sentiment	Keyword	Sentiment
#liveauthentic	7.01	#washington	6.33
@tacomacomedy	7.00	@oddotterbrewing	6.28
#findyourpark	6.82	#puyallup	6.27
#familyfun	6.79	zoo lights	6.26
#pointdefiance	6.77	@theredhot	6.22
#exploremore	6.73	#gigharbor	6.14
#tacomadome	6.73	#tacoma	6.12
gondola	6.73	@donruiztnt	6.10
#nationalparks	6.72	@cityoftacoma	6.08
#neverstopexploring	6.72	buckley	5.86
@mountrainiernps	6.67	#lakewood	5.60
#thatpnwife	6.66	@southtacoma	5.54
#ttot	6.65	#fife	5.48
@tacomadome	6.62	#sumner	5.35
#pnw	6.60	#dupont	5.26
#northwestisbest	6.59	joint base lewis-mcchord	4.31
#pugetsound	6.58	#jblm	4.20
#pnwwonderland	6.55		
#mtrainier	6.55		
#tacomawa	6.54		
#upperleftusa	6.53		
#railfan	6.50		
@crystalmt	6.48	<b>Green = positive (&gt;= 6)</b>	
#rainier	6.46	<b>Grey = neutral (&gt;=4 and &lt; 6)</b>	
#universityplace	6.33	<b>Red = negative (&lt;4)</b>	

# APPENDIX – Sentiment 2016 Quarter 1

## Sentiment Scores | Pierce County Data

Keyword	Sentiment	Keyword	Sentiment
@metparkstacoma	7.01	@northtacoma	5.92
#tacomadome	6.82	@southtacoma	5.84
#pointdefiance	6.81	#lakewood	5.68
#pnw	6.69	#fife	5.54
#pugetsound	6.68	@donruiztnt	5.37
#pnwwonderland	6.61	#sumner	5.01
#thatpnwlife	6.60	#dupont	4.81
#tacomawa	6.56	#jblm	3.57
#northwestisbest	6.53	joint base lewis-mchord	3.48
@crystalmt	6.53		
zoo lights	6.52		
#mtrainier	6.52		
#washington	6.50		
#chambersbay	6.49		
@cityoftacoma	6.39		
@tacomacomedy	6.38		
#universityplace	6.36		
@tacomadome	6.33		
#upperleftusa	6.32		
#rainier	6.31		
#puyallup	6.22		
@theredhot	6.18		
#tacoma	6.13	<b>Green = positive (&gt;= 6)</b>	
#gigharbor	6.04	<b>Grey = neutral (&gt;=4 and &lt; 6)</b>	
@oddotterbrewing	6.03	<b>Red = negative (&lt;4)</b>	

# APPENDIX – Sentiment 2016 Quarter 2

## Sentiment Scores | Query Stream Data

Keyword	Sentiment	Keyword	Sentiment	Keyword	Sentiment
@traveltacoma	6.96	#pnw	6.61	#universityplace	6.39
highland games	6.94	#thatpnwlife	6.60	gondola	6.38
#familyfun	6.88	#farmersmarkets	6.57	#pugetsound	6.38
@mountrainernps	6.83	#outdoorwomen	6.57	@theredhot	6.38
#pnwwonderland	6.83	@crystalmt	6.56	@tacomagame	6.36
#npscentennial	6.82	#wastate	6.56	#nps	6.35
#trainsarecool	6.82	#carshows	6.55	mountain climbing	6.35
#wildflowers	6.82	#railfan	6.55	#lakewood	6.30
#findyourpark	6.77	#usopen2015	6.54	#puyallup	6.29
#liveauthentic	6.76	@oddotterbrewing	6.51	#tacoma	6.25
@northwesttrek	6.73	#lemayacm	6.50	@cityoftacoma	6.24
#mtrainier	6.71	#rainier	6.49	@jblm_pao	6.20
#ttot	6.71	#tacomawa	6.49	buckley	6.20
#nationalparks	6.70	#glassblowing	6.48	#ffe	6.16
@metparkstacoma	6.70	#chambersbay	6.47	#sumner	6.15
@kingsbooks	6.69	@tacomaartmuseum	6.47	#washington	6.14
#golfisgreat	6.68	@tacomadome	6.46	@donruiztnt	5.95
tall ships	6.68	#usopen	6.45	#dupont	5.88
#choosmountains	6.67	#sprayground	6.44	@southtacoma	5.81
@visitmtrainier	6.64	@tacomacomedy	6.44	@sonicsguy	5.73
#neverstopexploring	6.64	#sportsevents	6.43	#jblm	5.48
#upperleftusa	6.64	@chambersbaygolf	6.43		
#exploremore	6.64	#collectorcars	6.43	Green = positive (>= 6)	
@grandcinema	6.63	@rainiersland	6.41	Grey = neutral (>=4 and < 6)	
#northwestisbest	6.61	#gigharbor	6.39	Red = negative (<4)	

# APPENDIX – Sentiment

## 2016 Quarter 2

### Sentiment Scores | Pacific Northwest Data

Keyword	Sentiment	Keyword	Sentiment	Keyword	Sentiment
#thatpnwife	6.97	@oddotterbrewing	6.48	#usopen	5.84
#pointdefiance	6.85	#liveauthentic	6.47	#tacomadome	5.72
#ttot	6.82	#northwestisbest	6.45	#dupont	5.71
@metparkstacoma	6.80	#tacomawa	6.45	joint base lewis-mcchord	4.47
#wildflowers	6.79	@jblm_pao	6.44	#jblm	4.44
@grandcinema	6.77	@rainiersland	6.44		
#familyfun	6.75	#rainier	6.43		
#pnwwonderland	6.72	#glassblowing	6.42		
#findyourpark	6.72	#washington	6.38		
#farmersmarkets	6.70	#universityplace	6.35		
highland games	6.69	#puyallup	6.33		
#nationalparks	6.68	@tacomadome	6.30		
@chambersbaygolf	6.67	#gigharbor	6.29		
@kingsbooks	6.67	@theredhot	6.28		
#pugetsound	6.65	#tacoma	6.25		
gondola	6.64	#exploremore	6.21		
#pnw	6.63	@donruiztnt	6.21		
#chambersbay	6.61	#lakewood	6.21		
#wastate	6.60	@cityoftacoma	6.20		
#upperleftusa	6.59	#sumner	6.19		
#mtrainier	6.59	buckley	6.15		
#neverstopexploring	6.54	#fife	5.96		
#nps	6.52	@northtacoma	5.95	Green = positive ( $\geq 6$ )	
#washingtontrails	6.52	@sonicsguy	5.93	Grey = neutral ( $\geq 4$ and $< 6$ )	
@mountrainiernps	6.51	@southtacoma	5.86	Red = negative ( $< 4$ )	

# APPENDIX – Sentiment 2016 Quarter 2

## Sentiment Scores | Pierce County Data

Keyword	Sentiment	Keyword	Sentiment	Keyword	Sentiment
#familyfun	6.92	@sonicguy	6.42	#jblm	4.43
#pointdefiance	6.84	#tacomarainiers	6.41		
#wildflowers	6.83	@donruiztnt	6.38		
@metparkstacoma	6.77	#universityplace	6.38		
@grandcinema	6.77	#walk253	6.37		
#nps	6.76	@rainiersland	6.34		
#pugetsound	6.75	#rainier	6.34		
#upperleftusa	6.69	#washington	6.33		
@tacomacc	6.69	#puyallup	6.31		
#findyourpark	6.69	@jblm_pao	6.30		
#chambersbay	6.68	@theredhot	6.30		
#nationalparks	6.67	buckley	6.29		
#ttot	6.66	@northtacoma	6.29		
@chambersbaygolf	6.65	#golfisgreat	6.27		
#pnw	6.65	#gigharbor	6.26		
@kingsbooks	6.62	#wastate	6.24		
#mtrainier	6.62	#tacoma	6.23		
#tacomawa	6.57	#lakewood	6.19		
#thatpnwife	6.56	@cityoftacoma	6.19		
#northwestisbest	6.54	#sumner	6.13		
#washingtontrails	6.51	#fife	6.05		
@tacomadome	6.49	#tacomadome	5.98		
#pnwwonderland	6.49	@southtacoma	5.90	Green = positive (>= 6)	
@mountrainiernps	6.48	#dupont	5.68	Grey = neutral (>=4 and < 6)	
@oddotterbrewing	6.43	joint base lewis-mcchord	4.43	Red = negative (<4)	

# APPENDIX – Sentiment

## 2016 Quarter 3

### Sentiment Scores | Query Data Stream

Keyword	Sentiment	Keyword	Sentiment	Keyword	Sentiment
#npscentennial	6.95	tall ships	6.59	#livewashington	6.30
#wildflowers	6.86	#outdoorwomen	6.58	@tacomadome	6.30
#choosmountains	6.85	#tacomawa	6.55	#lakewood	6.27
#familyfun	6.84	#nps	6.55	#tacoma	6.24
#golfisgreat	6.80	@crystalmt	6.54	@jblm_pao	6.24
#nationalparks	6.77	#thatpnwife	6.54	#usopen	6.23
highland games	6.76	#carshows	6.53	#sumner	6.22
@traveltacoma	6.74	#sharethefair	6.53	#puyallup	6.22
#findyourpark	6.73	#railfan	6.51	#fife	6.19
@metparkstacoma	6.70	@chambersbaygolf	6.50	@cityoftacoma	6.18
#ttot	6.68	#puyallupfair	6.49	buckley	6.14
#chambersbay	6.68	#rainier	6.48	@sonicsguy	6.12
#liveauthentic	6.68	@tacomagame	6.48	#universityplace	6.04
#mtrainier	6.67	#partybigwa	6.46	#washington	6.03
#upperleftusa	6.66	@rainiersland	6.45	#sprayground	6.02
#farmersmarkets	6.66	#outdoornation	6.44	@donruiztnt	5.96
@mountrainiernps	6.64	#wastatefair	6.44	@southtacoma	5.90
#wastate	6.63	#usopen2015	6.43	#dupont	5.89
#exploremore	6.62	@oddotterbrewing	6.42	#jblm	5.65
#pnwwonderland	6.62	#trainsarecool	6.42	#tacomadome	5.57
@visitmtrainier	6.62	@theredhot	6.41	#pugetsound	5.23
#neverstopexploring	6.61	@tacomacomedy	6.41		
#pnw	6.61	#sportsevents	6.36	<b>Green = positive (&gt;= 6)</b>	
#northwestisbest	6.60	gondola	6.33	<b>Grey = neutral (&gt;=4 and &lt; 6)</b>	
#glassblowing	6.60	#gigharbor	6.32	<b>Red = negative (&lt;4)</b>	

# APPENDIX – Sentiment

## 2016 Quarter 3

### Sentiment Scores | Pacific Northwest Data

Keyword	Sentiment	Keyword	Sent.	Keyword	Sent.
#npscentennial	6.99	@tacomacomedy	6.50	@donruiztnt	5.67
#nationalparks	6.94	#neverstopexploring	6.49	#jblm	4.16
#pointdefiance	6.88	#partybigwa	6.46	#tacomadome	3.98
#chambersbay	6.86	#wastatefair	6.46	joint base lewis-mcchord	3.82
#findyourpark	6.84	#livewashington	6.44		
#nps	6.83	gondola	6.43		
#familyfun	6.79	#liveauthentic	6.42		
#tacomawa	6.77	#washington	6.39		
#wildflowers	6.75	#thatprnlife	6.39		
#tacoma_wa	6.72	#exploremore	6.38		
#wastate	6.71	#sharethefair	6.37		
@mountrainiernps	6.69	#dupont	6.36		
#ttot	6.68	buckley	6.35		
#mtrainier	6.68	@oddotterbrewing	6.34		
#pnwwonderland	6.67	@theredhot	6.32		
#walk253	6.67	#puyallup	6.31		
@rainiersland	6.65	#gigharbor	6.29		
#pnw	6.63	#universityplace	6.28		
#rainier	6.63	#usopen	6.23		
#pugetsound	6.62	@jblm_pao	6.20		
#rustonway	6.58	#tacoma	6.20		
#upperleftusa	6.57	#lakewood	6.09		
#northwestisbest	6.56	#sumner	5.94	Green = positive (>= 6)	
#puyallupfair	6.55	#fife	5.88	Grey = neutral (>=4 and < 6)	
@chambersbaygolf	6.51	@cityoftacoma	5.79	Red = negative (<4)	

# APPENDIX – Sentiment 2016 Quarter 3

## Sentiment Scores | Pierce County Data

Keyword	Sentiment	Keyword	Sentiment	Keyword	Sentiment
#chambersbay	7.00	gondola	6.47		
#pointdefiance	6.88	#partybigwa	6.46		
#rainier	6.82	#wastatefair	6.45		
#nationalparks	6.81	#washington	6.42		
#tacomawa	6.77	#washingtontrails	6.41		
#findyourpark	6.75	@oddotterbrewing	6.41		
#upperleftusa	6.74	#livewashington	6.41		
#tacoma_wa	6.72	#neverstopexploring	6.39		
@mountrainiernps	6.70	#sharethefair	6.36		
#mtrainier	6.69	#dupont	6.36		
#ttot	6.69	@theredhot	6.32		
#walk253	6.67	#puyallup	6.31		
@tacomacomedy	6.66	#gigharbor	6.30		
@rainiersland	6.66	#universityplace	6.29		
#northwestisbest	6.64	#tacoma	6.20		
#thatpnlife	6.64	buckley	6.18		
#pnw	6.61	@jblm_pao	6.12		
@chambersbaygolf	6.60	#lakewood	6.10		
#usopen	6.59	#sumner	5.94		
#pugetsound	6.58	#fife	5.84		
#rustonway	6.54	@cityoftacoma	5.80		
#pnwwonderland	6.53	#jblm	3.99		
#puyallupfair	6.53	#tacomadome	3.93		Green = positive (>= 6)
#wastate	6.53	joint base lewis-mcchord	3.93		Grey = neutral (>=4 and < 6)
#familyfun	6.47				Red = negative (<4)