

# What's the Word on Monk Seals? How the Endangered Hawaiian Monk Seal is Portrayed in the Media



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## Table of Contents

List of Tables .....	iv
List of Figures .....	v
Executive Summary .....	vi
Introduction .....	1
Methods.....	2
Results.....	5
Overall News Trends: .....	5
Monthly News Trends: .....	10
Social Media Trends .....	16
Discussion.....	21
Conclusion: .....	24
Literature Cited .....	25
Appendix: Code Book and Example Quotes .....	27

## List of Tables

Table 1. Sources of articles analyzed, by type and location. ....	3
Table 2. Sentiments associated with statements about NOAA activities. ....	6
Table 3. Number of statements made about monk seals by media source, sentiment percentages, and percentages of facts versus opinions. ....	7
Table 4. Number of statements made about NOAA by media source and sentiment percentages. ....	8
Table 5. Number of statements and sentiment percentages for monk seals and NOAA for months analyzed. ....	15

## List of Figures

Figure 1. Percent of positive, neutral, and negative sentiments by topic (monk seals and NOAA). .....	5
Figure 2. Percent of positive, neutral, and negative statements about NOAA activities.....	6
Figure 3. Percent of positive, neutral, and negative statements about monk seals in print and TV media.....	7
Figure 4. Percent of positive, neutral, and negative statements about NOAA in print and TV media.....	8
Figure 5. Percent of positive, neutral, and negative statements about monk seals in print by island and nationally.....	9
Figure 6. Percent of positive, neutral, and negative statements about NOAA in print by island and nationally.....	10
Figure 7. Number of articles about monk seals per month, from TV and all sources. Blue line indicates cutoff for months included in data set, major events associated with each analyzed month are noted. ....	12
Figure 8. Number of print and TV articles by month. ....	13
Figure 9. Percent of positive, neutral, and negative statements about monk seals in print and TV media by month.....	14
Figure 10. Percent of positive, neutral, and negative statements about NOAA in print and TV media by month.....	14
Figure 11. Number of social media posts on Facebook and Twitter by month. ....	17
Figure 12. Number of social media interactions on Facebook and Twitter by month.....	17
Figure 13. Number of each type of Facebook post per month.....	18
Figure 14. Number of each type of Twitter post per month. ....	19
Figure 15. Number of Facebook posts by type of poster per month.....	20
Figure 16. Number of Twitter posts by type of poster per month. ....	20

## Executive Summary

The Hawaiian monk seal (*Neomonachus schauinslandi*) is one of only two endemic mammals in Hawai'i and one of the most endangered species in the world. While some celebrate and support monk seal conservation, others view monk seals as competition for fish or a symbol of the federal government and conservationists restricting activities. Communication scholars have shown repeatedly that the media sets the public agenda. Thus, how monk seals are portrayed in popular media can have significant effects on conservation efforts. NOAA Fisheries, the agency responsible for Hawaiian monk seal management, is interested in how media portrayal of monk seals may affect management efforts. This project reviews public interest in monk seals, reflected in traditional news and social media stories from 2007 to 2017. We used content analysis to identify common themes, language, and attitudes associated with monk seals and their management. Changes in sentiment were tracked against major events and changes in monk seal management. During this span, 60.1% of statements about monk seals were positive, 38.9% were neutral, and 1.0% were negative. In comparison, 33.7% of statements about NOAA were positive, 54.9% were neutral, and 11.5% were negative. Differences in sentiment were found by month, NOAA activity, and island of publication. For example, the most positive months were generally associated with stories about pups or NOAA interventions while the most negative were generally associated with stories about NOAA policy changes. Based on these trends, we suggest communication strategies that include improving distributed information about NOAA actions and policies, developing targeted outreach strategies beyond Oahu, and capitalizing on positive monk seal events.

## Introduction

Global marine biodiversity loss is negatively impacting the ecosystem services the ocean provides (Worm et al. 2006). This is especially true for the loss of native apex predators, which can cause top-down trophic degrading (Estes et al. 2011). One such apex predator is the Hawaiian monk seal (*Neomonachus schauinslandi*). In 2011, the total population of Hawaiian monk seals was estimated to be 1,209, indicating an estimated population decline of 21.8% across the previous two generations (Carretta et al. 2017). Although monk seals are found throughout the Hawaiian Archipelago, approximately 80% are found in the Northwestern Hawaiian Islands (Carretta et al. 2017). This can be partially explained by the extirpation of monk seals in the main islands when Polynesians first settled there (Kittinger et al. 2012). As of 2008, although the total monk seal population was still declining overall, the population of monk seals on the main Hawaiian Islands was estimated to be increasing at a rate of 6.5% per year (Baker et al. 2011).

Today, there is a lack of consensus about perceptions of monk seals in Hawaii. Many celebrate and support monk seal conservation. For example, the monk seal became the official state mammal in 2008. Further, the birth of a monk seal on Kaimana Beach in 2017 garnered widespread attention and support, including a 24-hour webcam. However, monk seals have also been criticized as competitors for fish, non-native species, and a means of government restriction (Kittinger et al. 2012, Madge 2016). The greatest threats to monk seals in the main Hawaiian Islands are human-caused, including interactions with fishing equipment and intentional killing and harassment (Littnan et al. 2015). From 2010 to 2014, there were at least 7 potentially intentional killings of monk seals on the main Hawaiian Islands (Carretta et al. 2017). It is because of this division that public perceptions of monk seals are so important to their conservation.

One means of influencing public perceptions is through news media (Muter et al. 2012). More specifically, news media has the ability to influence public attitudes of wildlife and conservation through the information and opinions it presents (Wolch et al. 1997). However, there are varying types of coverage and portrayal of wildlife issues (Muter et al. 2012). Thus, the framing of media may positively or negatively impact the public's support for conservation. For example, positive media coverage in South Africa has reduced misconceptions and broadened awareness of the endangered status of wild dogs among tourists (Gusset et al. 2008). However, Australian and U.S. news coverage is dominated by narratives of risks from, rather than to, sharks (Muter et al. 2012). Thus, the media may be thought of as both a reflection of public opinion on monk seal conservation and as a tool by which to influence that opinion.

This research seeks to examine how monk seals have been portrayed in Hawaiian news media from 2007 to 2017. To do so, we used content analysis of news media to identify common themes, language, and attitudes associated with monk seals. We then tracked changes in these factors against major events relating to monk seals within this span. Based on these trends, suggestions were made for strategies to improve communication with the public regarding monk seal conservation. Finally, the relationship between these factors and social media (specifically Facebook and Twitter) were also analyzed.

## Methods

Content analysis makes replicable and systematic inferences from the content of information in documents (like television news transcripts and newspaper articles) through careful reading, annotation, and coding of documents by researchers (Jacobson et al. 2011; Muter et al. 2012). It can be used to better understand media and its effect on the public, especially for conservation issues for which it can provide complex historical insight (Muter et al. 2012). To identify articles, the term “monk seal” was searched in NewsBank, Inc., an information provider that consolidates current and archived information from newspapers, newswires, and other news media sources. The search was limited to articles from 2007 to 2017 from Hawaii, USA, North America, providing a total of 2,961 articles containing this term. To reduce this data set to a manageable size for analysis and because we wanted to better understand what makes monk seals resonate with public audiences, we focused on the months with the most interest in monk seals, indicated by the number of articles per month. For each month, the total number of articles was determined. The average number of articles containing the term “monk seal” per month was 22.4 with a standard deviation of 17.8. For the purpose of this study, only the months with greater than one standard deviation worth of articles above the mean (more than 40.2 articles) were analyzed, as these months represent times with greater public attention to monk seals. These 16 months were April 2008, May 2008, December 2009, August 2011, December 2011, January 2012, May 2012, December 2014, November 2015, December 2015, April 2016, May 2016, March 2017, July 2017, August 2017, and October 2017.

For each of the 16 months of interest, all of the previously identified articles were downloaded from NewsBank, Inc. in chunks. These articles were then cleaned by separating them and removing extraneous material not involving monk seals or NOAA. This left a total of 935 articles from 32 sources. These 32 sources are described in Table 1. Each article was read by the primary author, and the major events discussed in the articles for each month were recorded. All types of articles aside from TV transcripts were classified as print for analysis.

Using NVivo 11, each statement in each article was coded for four types of facts and opinions (positive, sympathetic, negative, and neutral) regarding monk seals or NOAA and five NOAA activities (interventions, policy, research, law enforcement, and monitoring), following a code book developed by a team of social scientists and monk seal biologists and managers (Appendix). All statements across all articles were coded by one researcher to maintain consistency of coding. After all of the original coding was finished, the researcher randomly selected approximately 10% of the articles from each month to be coded again (for a total of 102 articles). These articles were then recoded by the researcher on blank copies without reference to the original coding to check for internal consistency. They were only coded for any statements about monk seals or NOAA to be positive, sympathetic, neutral, or negative, following definitions in the codebook. As an additional check, a second researcher coded blank copies of the same articles for the same criteria. These coding patterns were then compared to the original coding, using a coding comparison query in NVivo 11. The average percent agreement (the percentage of coding decisions on which the coders agree) and Cohen’s Kappa coefficients (a statistical measure which takes into account the amount of agreement that could be expected to occur through chance) were calculated (Cohen 1960). Kappa coefficients greater than 0.7 are generally considered strong (Muter et al. 2012). The researcher’s self-check resulted in a Kappa coefficient of 0.71 and 88.3% agreement. The check with the second researcher was lower, with



a Kappa coefficient of 0.46 and 81.2% agreement, primarily due to differences in coding the neutral and sympathetic categories. This is still within the range considered fair to good in a commonly used set of guidelines (Fleiss 1981). Further, there was high agreement for items coded as negative (Kappa coefficient = 0.86, 98.4% agreement), which would be most critical for NOAA to address.

**Table 1. Sources of articles analyzed, by type and location.**

<b>Source</b>	<b>Type</b>	<b>Location</b>
Associated Press State Wire: Hawaii	News wire	National
Associated Press: Honolulu Metro Area	News wire	National
Big Island Weekly	Newspaper	Big Island
The Garden Island	Newspaper	Kauai
Hawaii Army Weekly	Newspaper	Oahu
Hawaii Business	Journal	Oahu
The Hawaii Independent	Web-Only Source	Oahu
Hawaii Reporter	Web-Only Source	Oahu
Hawaii Tribune-Herald	Newspaper	Oahu
Ho'okele	Newspaper	Oahu
The Honolulu Advertiser	Newspaper	Oahu
Honolulu Examiner	Web-Only Source	Oahu
Honolulu Magazine	Magazine	Oahu
Honolulu Star-Advertiser	Newspaper	Oahu
Honolulu Star-Advertiser: Blogs	Blog	Oahu
Honolulu Star-Bulletin	Newspaper	Oahu
Honolulu Weekly	Newspaper	Oahu
Ka La: Honolulu Community College	College Newspaper	Oahu
Ka Leo O Hawai'i: University of Hawaii – Manoa	College Newspaper	Oahu
Kalamalama: Hawaii Pacific University	College Newspaper	Oahu
Maui Time Weekly	Newspaper	Maui
Maui Time Weekly: Blogs	Blog	Maui
MidWeek Kauai Weekly	Newspaper	Kauai
MidWeek Magazine	Magazine	Oahu
The Molokai Dispatch	Newspaper	Molokai
North Hawaii News	Newspaper	Big Island
West Hawaii Today	Newspaper	Big Island
ABC – 6 KITV	TV Transcript	Oahu
CBS – 7 KGMB	TV Transcript	Oahu
FOX – 3 KHON	TV Transcript	Oahu
NBC – 8 KHNL	TV Transcript	Oahu
WBN – 5 KFVE	TV Transcript	Oahu

In terms of social media analysis, Facebook and Twitter posts were analyzed. Facebook posts were collected by searching for “monk seal,” limiting the search to all public posts, and the months selected for news media analysis. Twitter posts were collected using the Twitter advanced search and searching by the exact phrase “monk seal” from the first day of the month to the last for the month of interest. For each post for each month, information was taken on the

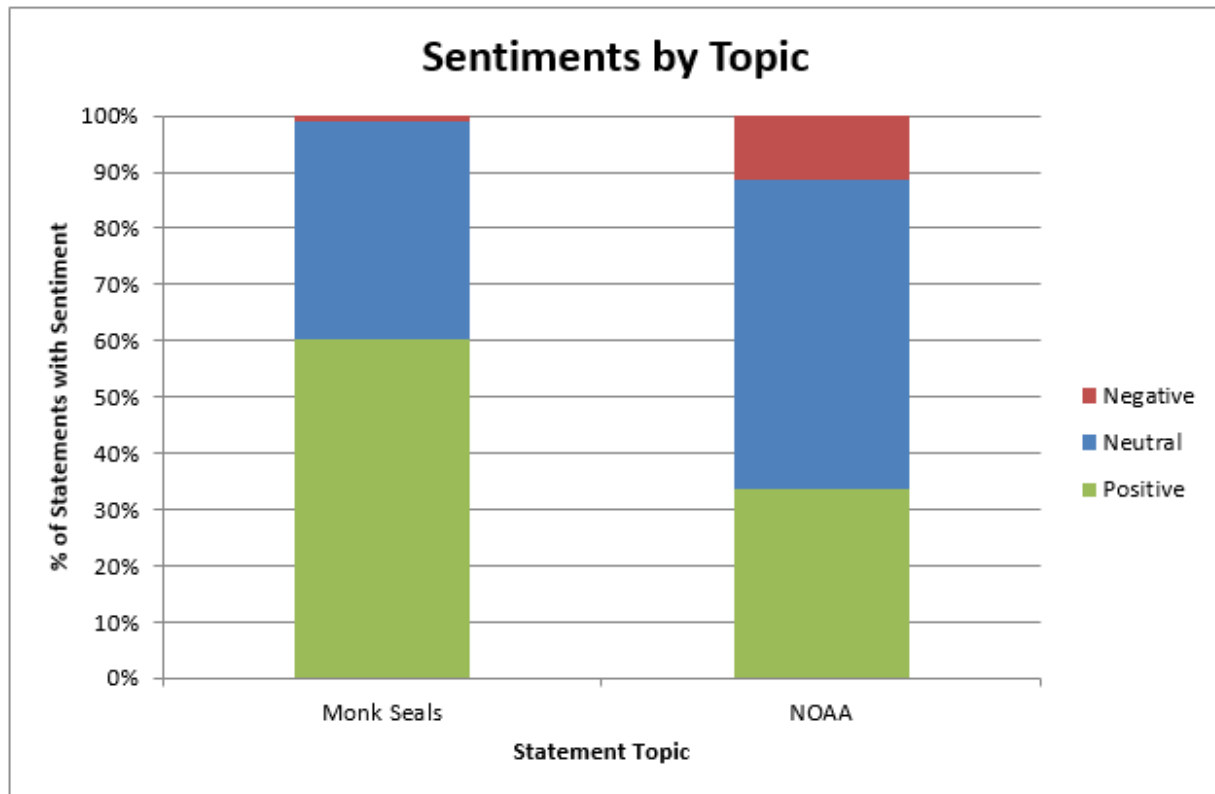
poster, the type of poster, the type of post, the numbers of interactions for the post, the date and time of the post, and the general subject of the post, to identify key sociotechnical affordances, that is, properties related to how the post could be used for social relations (Bucher and Helmond 2018). Types of posters were classified as government, nonprofit/community, news, business, or an individual. Types of posts were classified as predominantly links, videos/GIFs, pictures, or text. The number of interactions for a post was defined as the combined number of reactions, comments, and shares on Facebook or the combined number of favorites, replies, and retweets on Twitter.

All analysis was conducted in NVivo 11 or Microsoft Excel. Metadata for this project is available through NOAA's InPort enterprise management system (PIFSC, 2019).

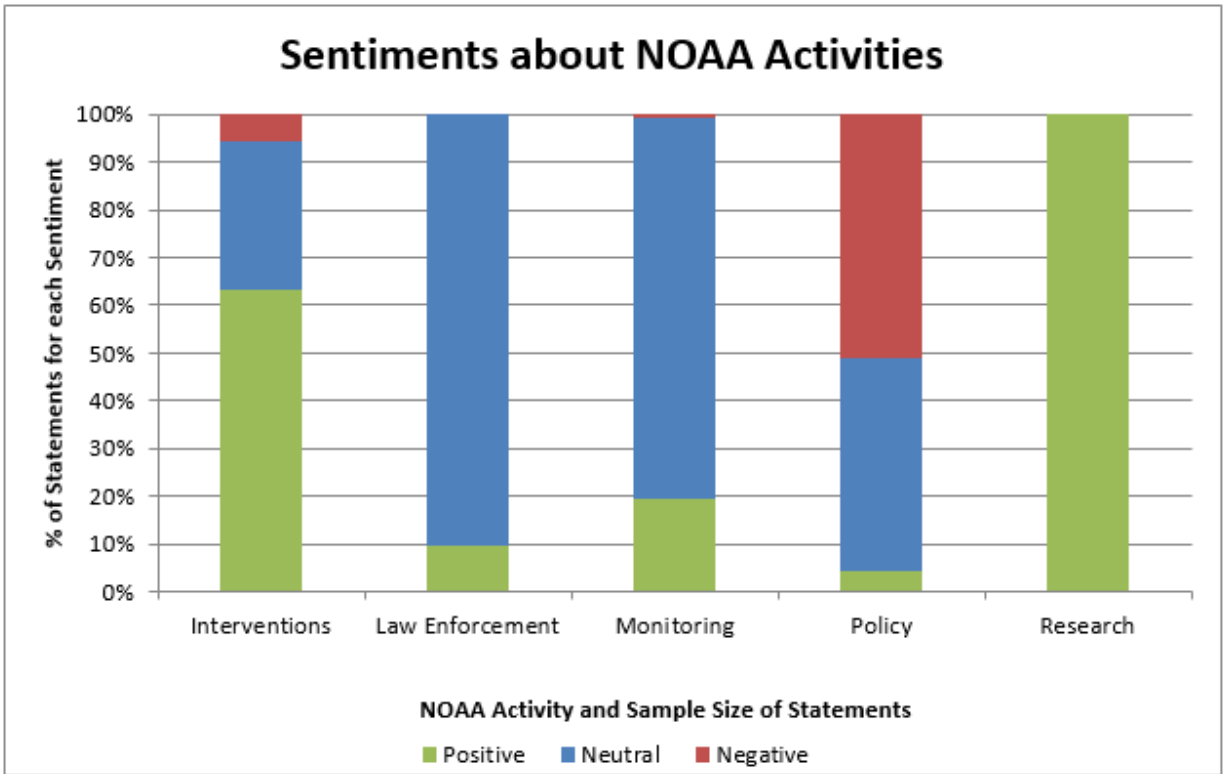
## Results

### Overall News Trends:

Across the 935 articles, there were 3,347 statements about monk seals. Of these statements, 60.1% were positive, 38.9% were neutral, and 1.0% were negative (Figure 1). Of the positive statements, 44.3% were directly positive and 55.7% were sympathetic. There were a total of 882 statements about NOAA. Of these, 33.7% were positive, 54.9% were neutral, and 11.5% were negative (Figure 1). Of these 882 statements, 672 were specifically talking about one of the five defined categories of NOAA activities. Figure 2 and Table 2 show the distribution of sentiments associated with each category of NOAA activity.



**Figure 1. Percent of positive, neutral, and negative sentiments by topic (monk seals and NOAA).**

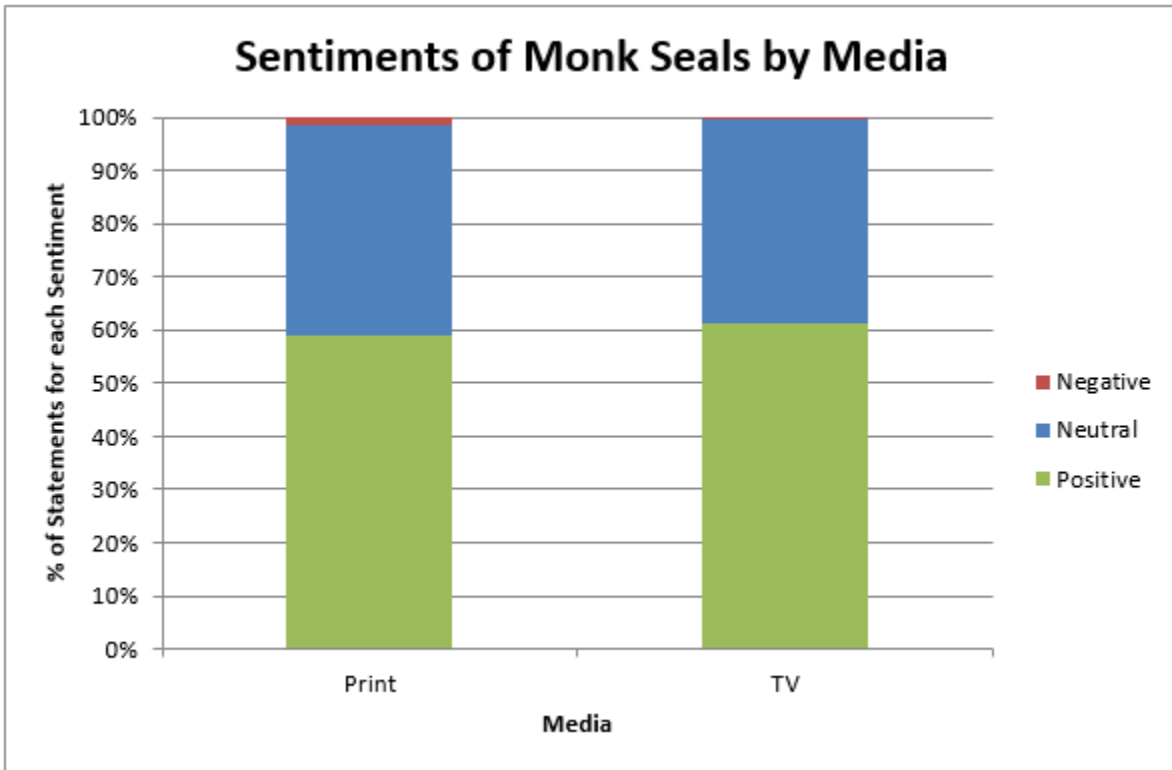


**Figure 2. Percent of positive, neutral, and negative statements about NOAA activities.**

**Table 2. Sentiments associated with statements about NOAA activities.**

NOAA Activity	# of Articles Discussed in	% Positive	% Neutral	% Negative
Interventions	330	63.3	30.9	5.8
Law Enforcement	133	9.8	90.2	0.0
Monitoring	114	19.3	79.8	0.9
Policy	92	4.3	44.6	51.1
Research	3	100.0	0.0	0.0

Of the 935 articles, 526 were TV transcripts, and 409 were print. Figure 3 and Table 3 show the distribution of sentiments for statements about monk seals, including the proportion of facts vs. opinions. Figure 4 and Table 4 show the distribution of sentiments for statements about NOAA.



**Figure 3. Percent of positive, neutral, and negative statements about monk seals in print and TV media.**

**Table 3. Number of statements made about monk seals by media source, sentiment percentages, and percentages of facts versus opinions.**

Number of Statements about Monk Seals	Type of Source	Sentiment Percentages			Fact vs. Opinion	
		% Positive	% Neutral	% Negative	% Fact	% Opinion
1,700	TV Transcripts	61.4	38.2	0.4	83.4	16.6
1,647	Print	58.9	39.5	1.6	83.3	16.7

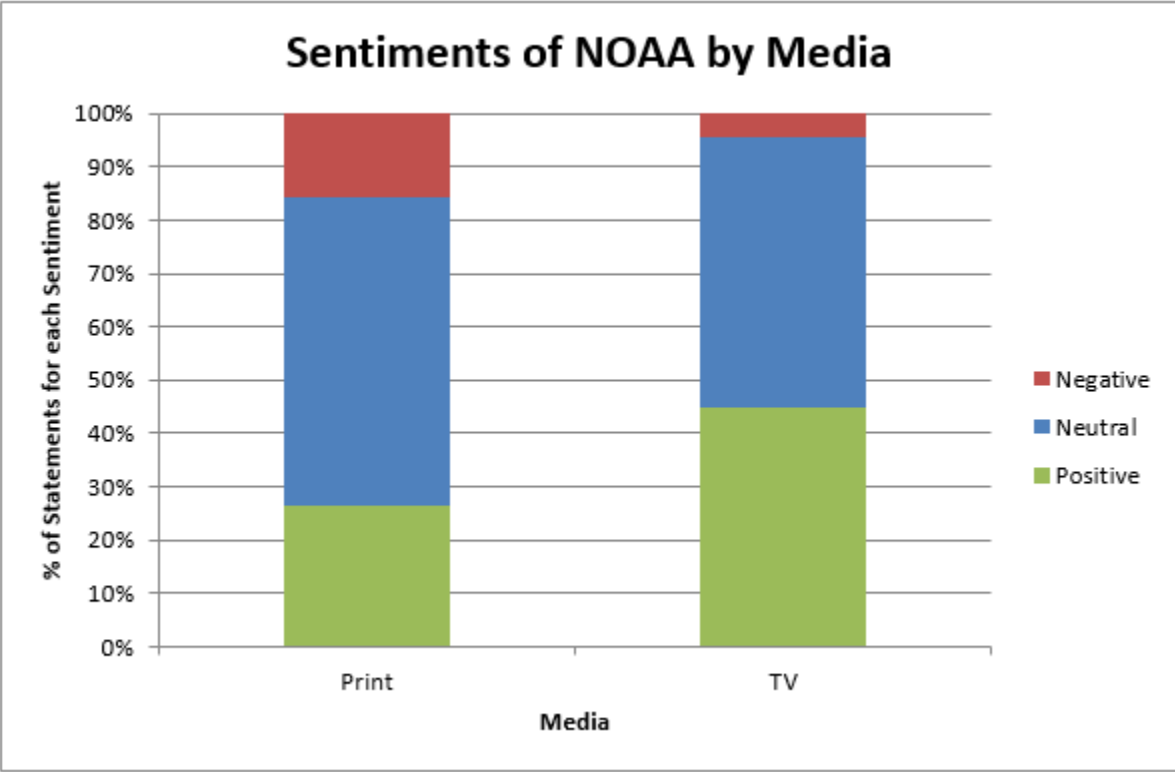
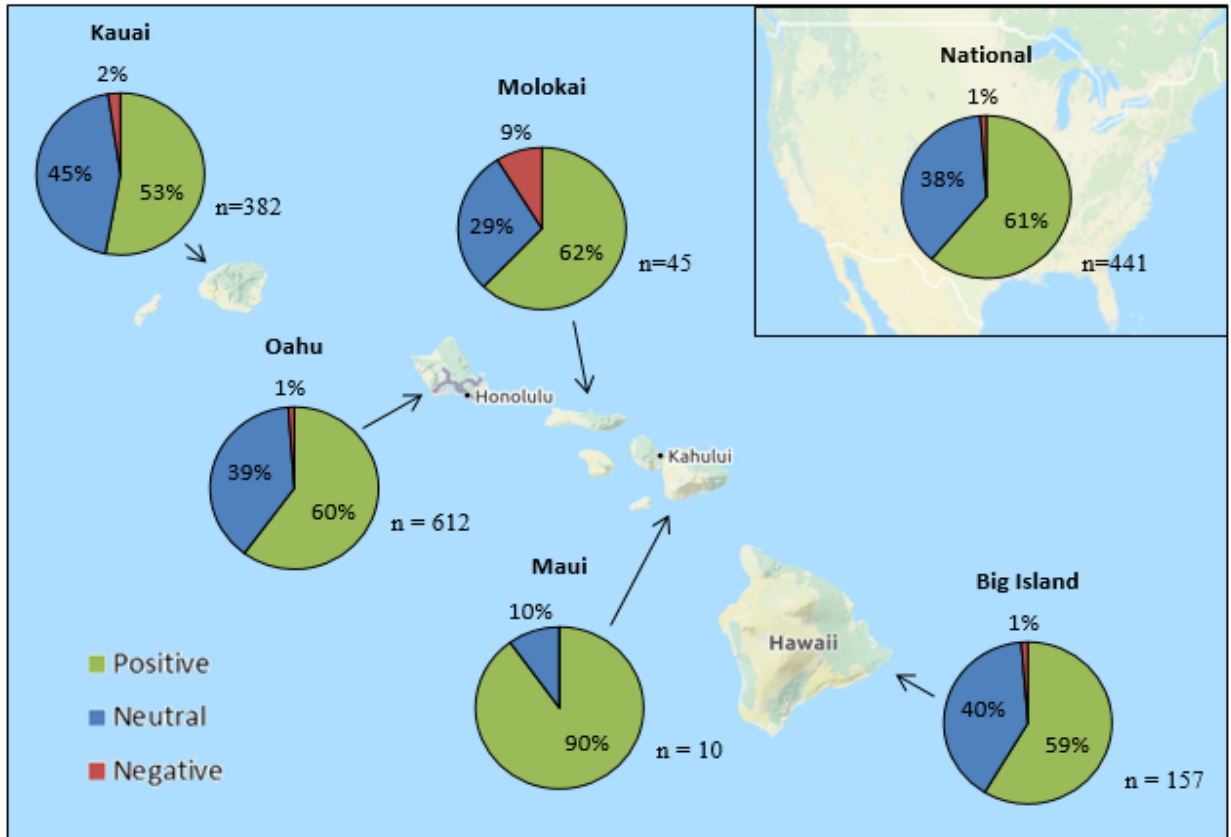


Figure 4. Percent of positive, neutral, and negative statements about NOAA in print and TV media.

Table 4. Number of statements made about NOAA by media source and sentiment percentages.

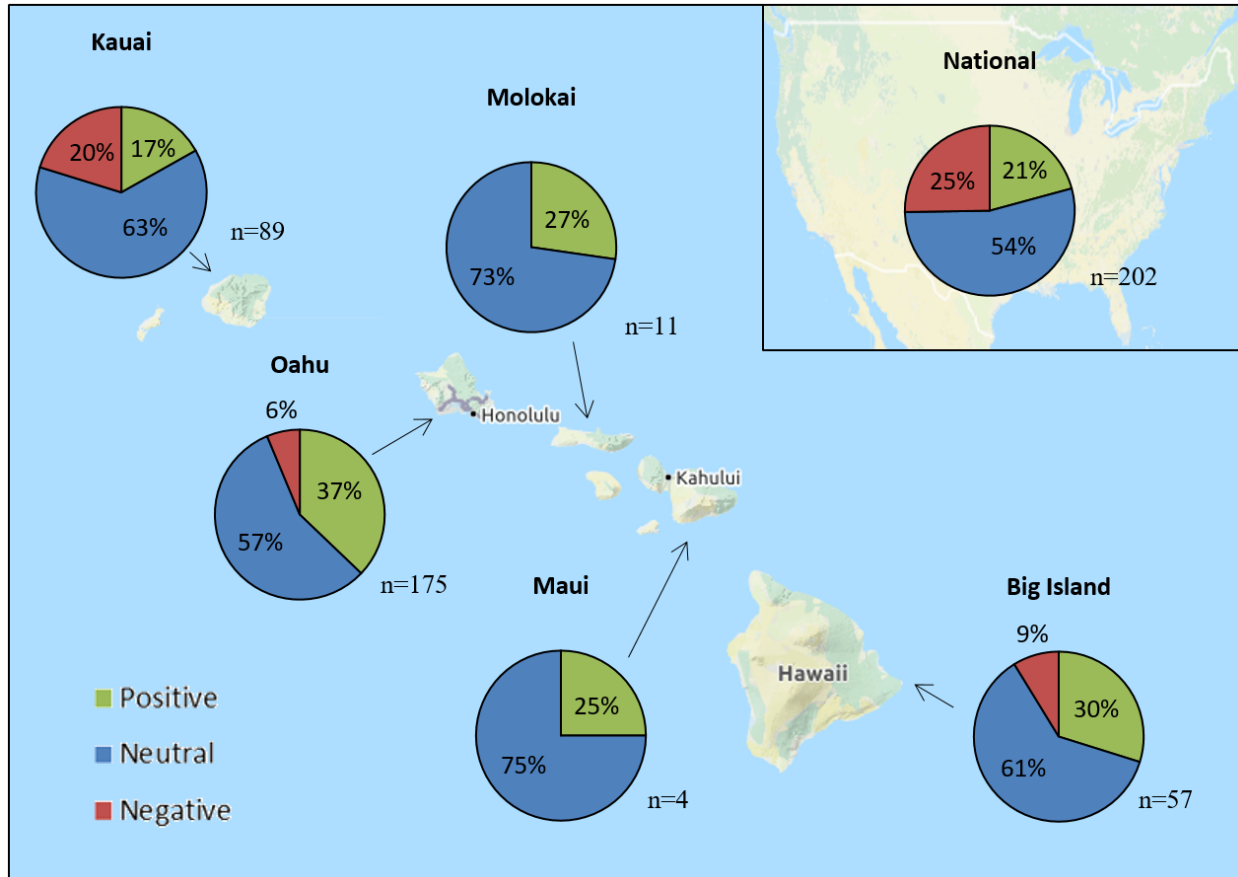
Number of Statements about NOAA	Type of Source	Sentiment Percentages		
		% Positive	% Neutral	% Negative
334	TV Transcripts	44.8	50.6	4.7
538	Print	26.6	57.6	15.8

Of the 935 articles, all 526 of the TV transcripts were from Oahu. Of the remaining 409 print articles, 170 were from Oahu, 71 from Kauai, 40 from the Big Island, 10 from Molokai, 5 from Maui, and 113 from national sources. Because all of the TV transcript sources were based on Oahu, only print sources were used to compare sentiments between the islands and nationally. The majority of statements about monk seals were positive for all islands and nationally, and almost all statements were positive or neutral (Figure 5). The highest percentages of negative statements were on Molokai, and Kauai had slightly higher negative statements than Oahu or the Big Island. There were no negative statements from Maui.



**Figure 5. Percent of positive, neutral, and negative statements about monk seals in print by island and nationally.**

To note, the majority of statements about NOAA were neutral, with only 17% to 37% positive statements (Figure 6). National sources and those from Kauai had the largest percentage of negative statements about NOAA.



**Figure 6. Percent of positive, neutral, and negative statements about NOAA in print by island and nationally.**

### Monthly News Trends:

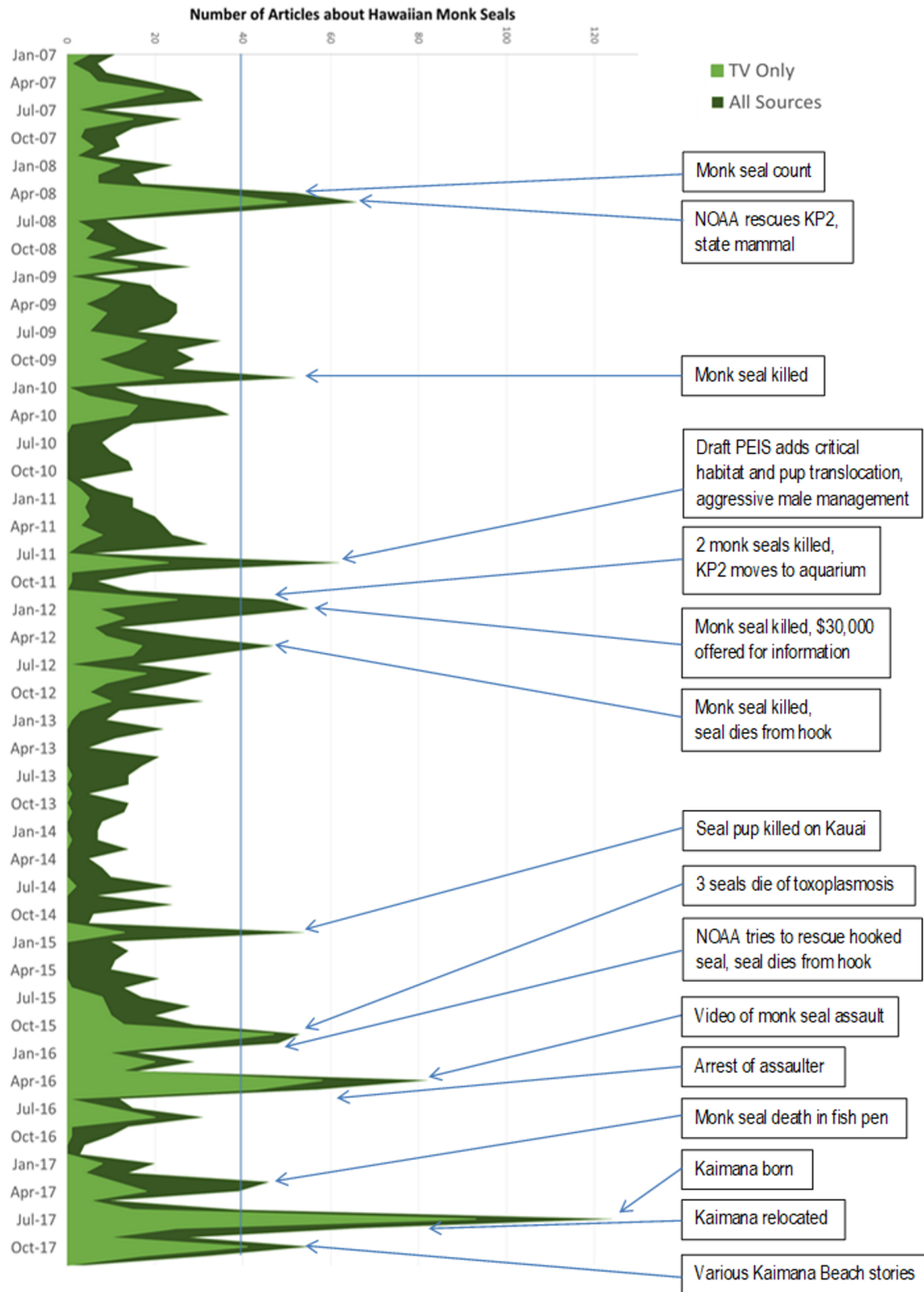
Figures 7–10 and Table 5 summarize monthly news trends in graphical form. Figure 7 shows the total number of articles per month for the entire data set, as well as notable events for each month analyzed.

Months with unusually high interest in monk seals were selected for further analysis. For each of these months, major events were noted. In April 2008, the largest events in the news were an annual, volunteer monk seal count and an interview with a well-known volunteer referred to as the “Monk seal man.” In May 2008, NOAA rescued KP2 (the youngest monk seal ever rescued), two pups were born, and monk seals became the official state mammal of Hawaii. In December 2009, a monk seal was intentionally killed on Kauai, and a monk seal attacked a swimmer. In August 2011, the following occurred: NOAA announced a plan to euthanize aggressive male monk seals that were harming pups in Northwestern Hawaiian Islands; monk seals were rescued from marine debris; and the Draft Programmatic Environmental Impact Statement (PEIS) by NOAA was announced. The PEIS would designate the waters around the main Hawaiian Islands as critical habitat for the monk seal and temporarily relocate monk seal pups from the Northwestern Hawaiian Islands to the main Hawaiian Islands. In December 2011, two monk



seals were killed on Molokai, and KP2 was permanently moved to the Waikiki Aquarium after it became too accustomed to humans. In January 2012, a monk seal was killed on Kauai, the Hawai'i Department of Land and Natural Resources (DLNR) and animal protection groups offered up to \$30,000 for information leading to the arrest and conviction of suspects involved in recent killings of monk seals, and a study showed that NOAA had saved 30% of the surviving monk seals. In May 2012, another monk seal was killed on Kauai, at least three seals were hooked by fishing gear, and one of those seals died from that hook. In December 2014, a seal pup was killed on Kauai and graphic photos of the dead seal were included in many news stories. In November 2015, three monk seals died, and toxoplasmosis was found as the reason. Toxoplasmosis comes from house cat feces and can affect human health as well. In December 2015, NOAA attempted to rescue a hooked seal, but it still died. Also, a police officer made news for hurting a man that was chanting at a monk seal. In April 2016, a man assaulted a monk seal and was recorded on video on Kauai. This video went viral and made the news throughout the month. In May 2016, the man from the video was arrested and tried for assaulting the seal in the previous month. In March 2017, a monk seal was killed and another monk seal died caught in an aquaculture fish pen. It was mistakenly reported that this fish pen was funded by NOAA. In July 2017, a monk seal pup was born on Kaimana Beach (a popular tourist beach) in Waikiki. Rocky (the mother) and Kaimana (the pup named after the beach) quickly garnered massive amounts of local, national, and even international attention in the news and on social media. There was even a 24-hour camera covering the pair. In August 2017, Kaimana weaned, so Rocky left. Then, NOAA decided to move Kaimana to an undisclosed location so that she would not become too accustomed to humans. She was relocated during this month. In October 2017, a number of smaller stories made the news. First, a fishing vessel ran aground and caught on fire in Waikiki that was mentioned as a possible danger to monk seals. Second, Rocky was spotted at Kaimana Beach for the first time since Kaimana weaned. Finally, two tourists were arrested for harassing a monk seal.

Figure 8 compares the number of print vs. TV articles per month for each analyzed month. Figure 9, Figure 10, and Table 5 summarize the percentage of positive, neutral, and negative statements about monk seals and NOAA by month.



**Figure 7. Number of articles about monk seals per month, from TV and all sources. Blue line indicates cutoff for months included in data set, major events associated with each analyzed month are noted.**

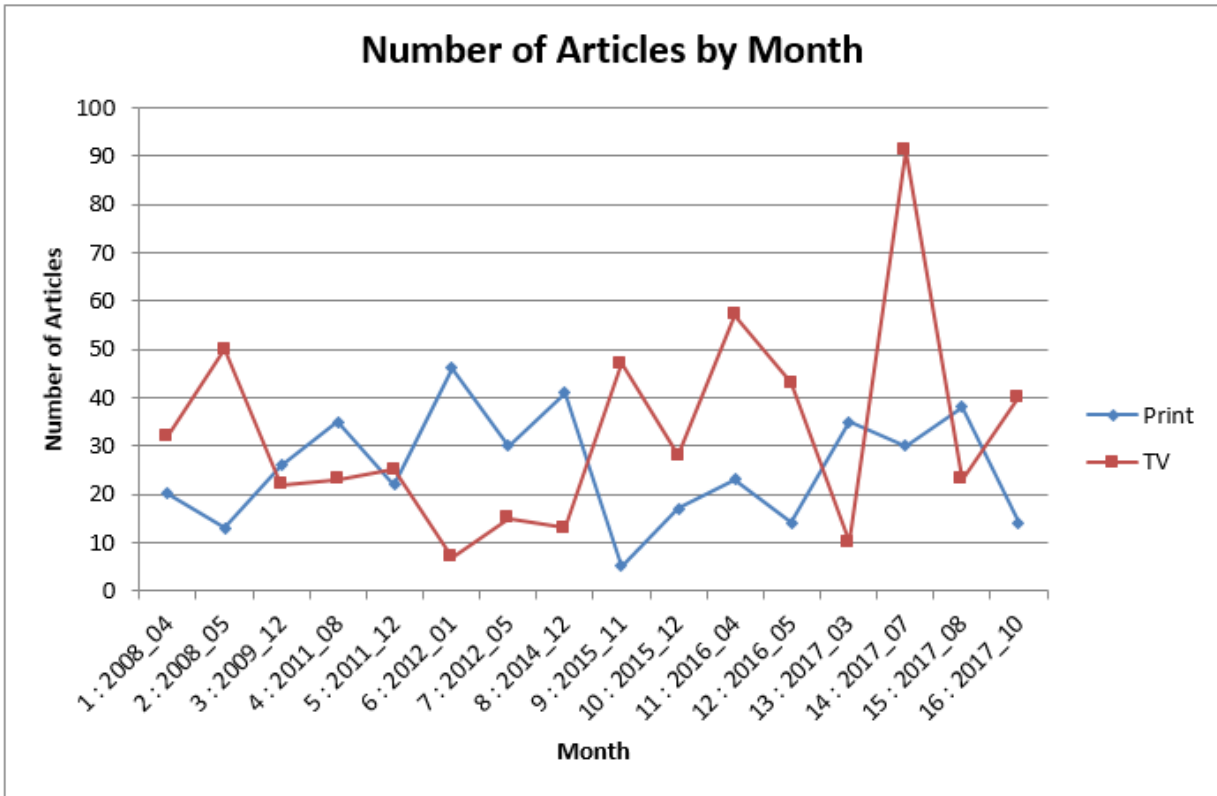
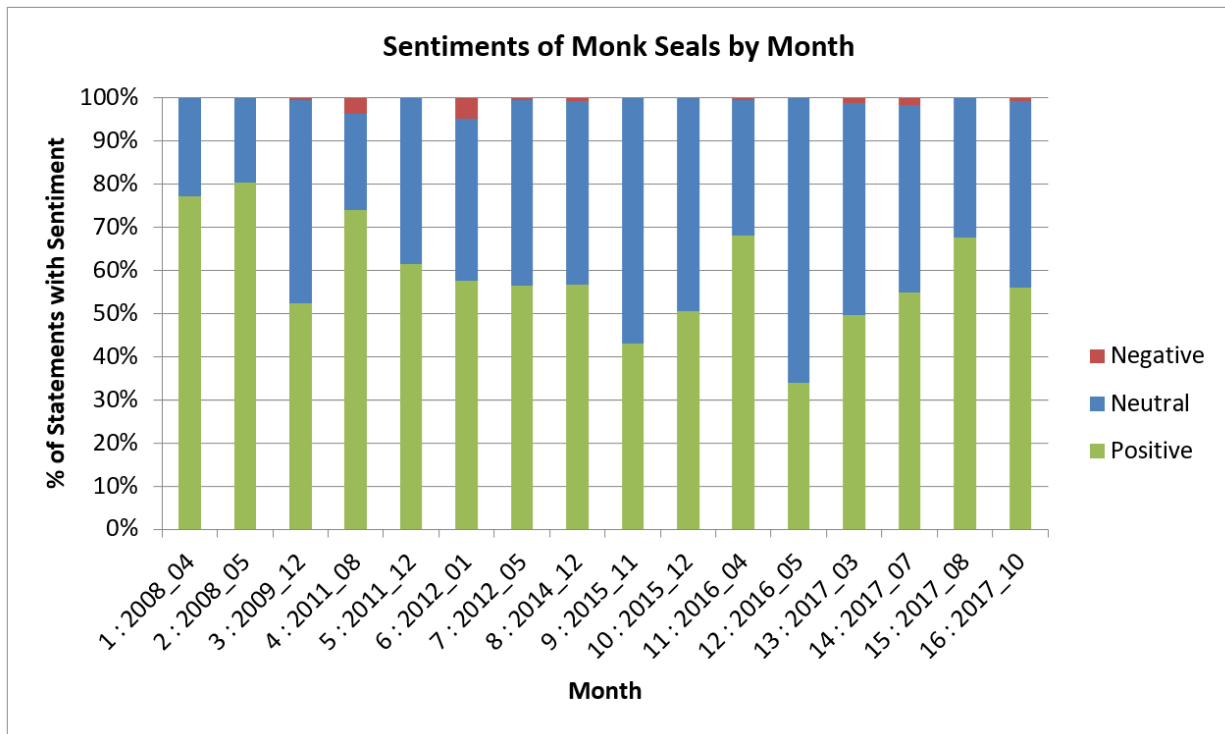
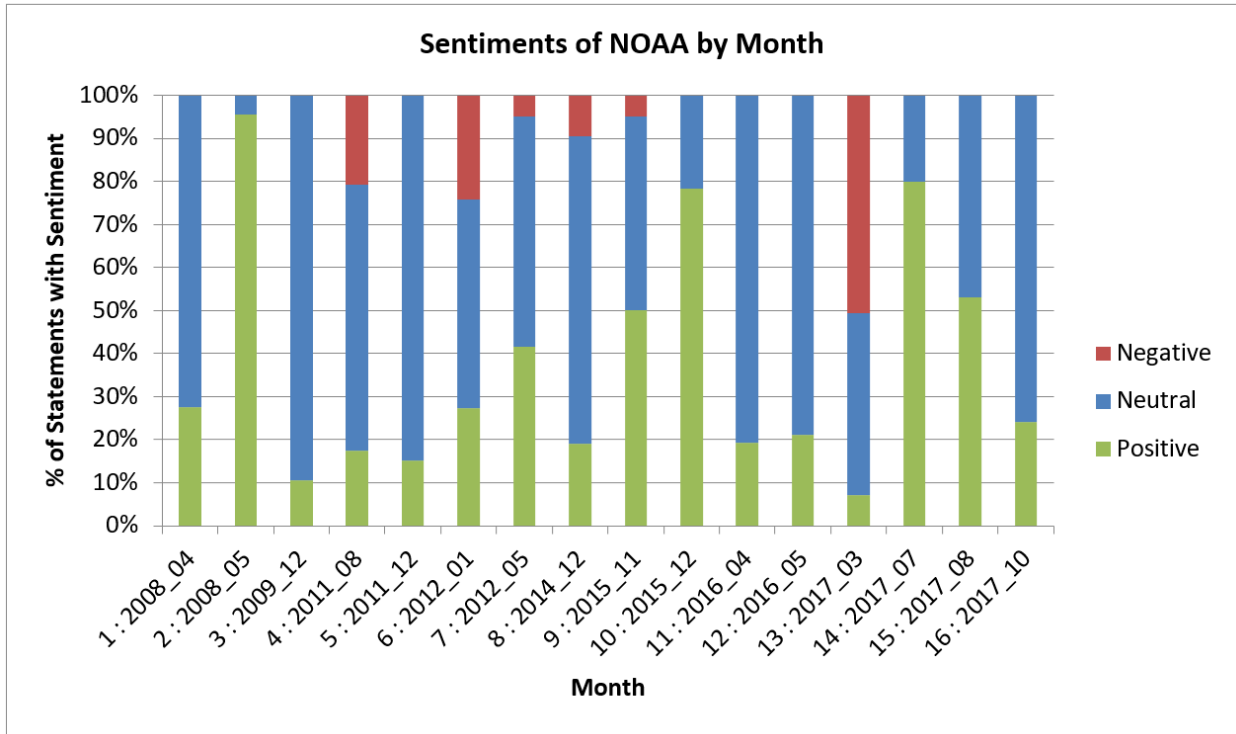


Figure 8. Number of print and TV articles by month.



**Figure 9. Percent of positive, neutral, and negative statements about monk seals in print and TV media by month.**



**Figure 10. Percent of positive, neutral, and negative statements about NOAA in print and TV media by month.**

**Table 5. Number of statements and sentiment percentages for monk seals and NOAA for months analyzed.**

<b>Month</b>	<b># of Statements about Monk seals</b>	<b>% Positive</b>	<b>% Neutral</b>	<b>% Negative</b>	<b># of Statements about NOAA</b>	<b>% Positive</b>	<b>% Neutral</b>	<b>% Negative</b>
04/2008	162	77.2	22.8	0.0	29	27.6	72.4	0.0
05/2008	239	80.3	19.7	0.0	46	95.7	4.3	0.0
12/2009	170	52.4	47.1	0.6	38	10.5	89.5	0.0
08/2011	165	73.9	22.4	3.6	144	17.4	61.8	20.8
12/2011	192	61.5	38.5	0.0	33	15.2	84.8	0.0
01/2012	266	57.5	37.6	4.9	66	27.3	48.5	24.2
05/2012	195	56.4	43.1	0.5	41	41.5	53.7	4.9
12/2014	302	56.6	42.7	0.7	21	19.0	71.4	9.5
11/2015	130	43.1	56.9	0.0	20	50.0	45.0	5.0
12/2015	95	50.5	49.5	0.0	23	78.3	21.7	0.0
04/2016	439	68.1	31.4	0.5	125	19.2	80.8	0.0
05/2016	159	34.0	66.0	0.0	19	21.1	78.9	0.0
03/2017	167	49.7	49.1	1.2	99	7.1	43.4	50.5
07/2017	342	55.0	43.3	1.8	85	80.0	20.0	0.0
08/2017	192	67.7	32.3	0.0	64	53.1	46.9	0.0
10/2017	132	56.1	43.2	0.8	29	24.1	75.9	0.0

## Social Media Trends

Trends in Facebook and Twitter posts and interactions are summarized in Figure 11 and Figure 12, respectively.

For Facebook, the number of posts about monk seals and the number of interactions those posts generally increase over time. The largest months for both posts and interactions were July and August 2017. There was also an unusual spike in interactions in April 2016. The primary foci of the posts in July and August 2017 were Rocky and Kaimana, much like in the traditional news media. The primary focus of the posts in April 2016 is the video of the monk seal assault, which is also similar to the focus of the traditional news articles.

For Twitter, the number of posts about monk seals was relatively consistent from December 2009 on. The largest month for posts was August 2011. This coincides with the string of NOAA policy changes regarding monk seals at that time. In contrast, the number of interactions with Twitter posts generally increases over time. The largest months for interactions were May 2016 and July 2017.

However, unlike with Facebook, the primary foci of these months differs from the stories in the news. For April 2016, for example, while 19 out of the 38 posts are about the monk seal assault and arrest, only 286 of the 3,036 interactions are on these posts. However, four posts are about suspicions that a new Pokémon was based on the Hawaiian monk seal, and these garnered 65 interactions. Thus, these Pokémon posts had more interactions per post than the arrest of the monk seal assaulter that was the focus of the news. Further, while Rocky and Kaimana were the foci of both Facebook posts and the news for July 2017, 4,900 out of the 7,150 interactions on Twitter for July 2017 were on one post by a popular YouTuber about seeing a monk seal. Finally, it is worth noting that while April 2014 is excluded from this study because there were not enough news articles about monk seals, Steven Tyler (lead singer of Aerosmith) posted a selfie with a monk seal on Twitter during this month that garnered 1,877 interactions. Thus, if this month was included within the study sample, that month would have the third most interactions from that post alone.

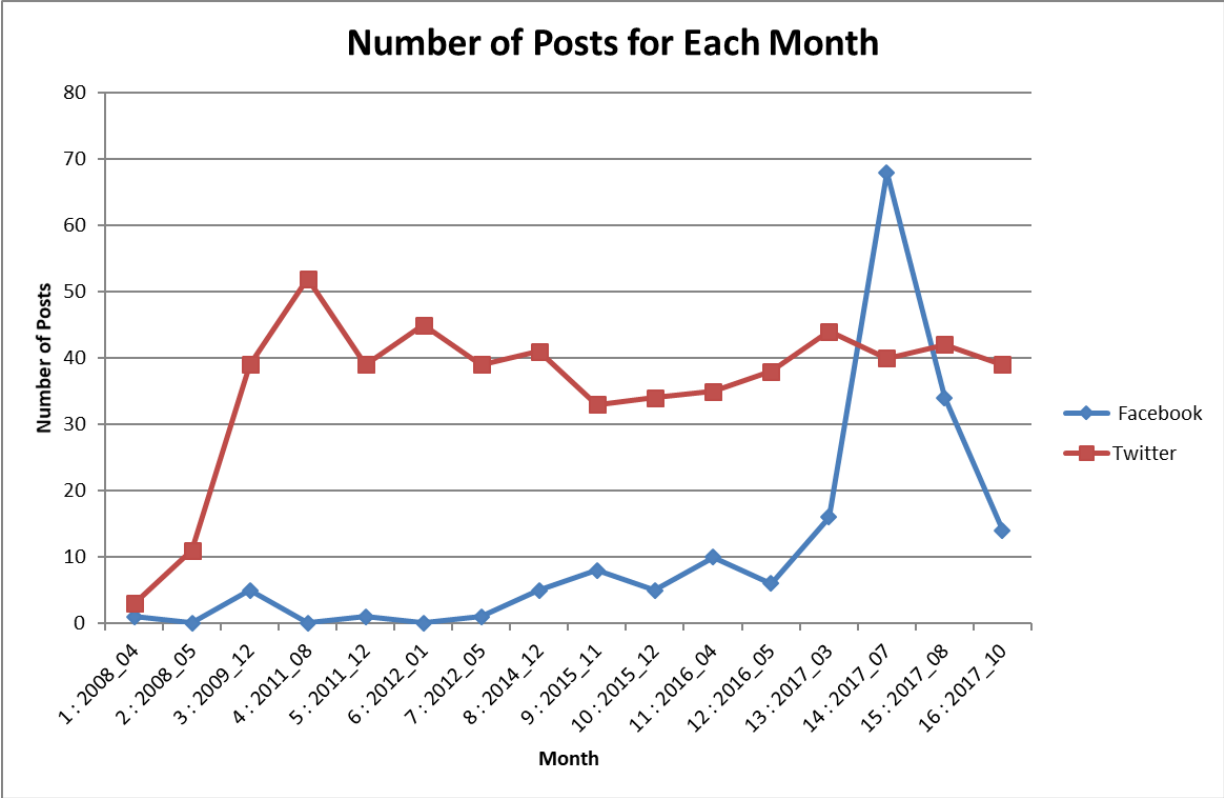


Figure 11. Number of social media posts on Facebook and Twitter by month.

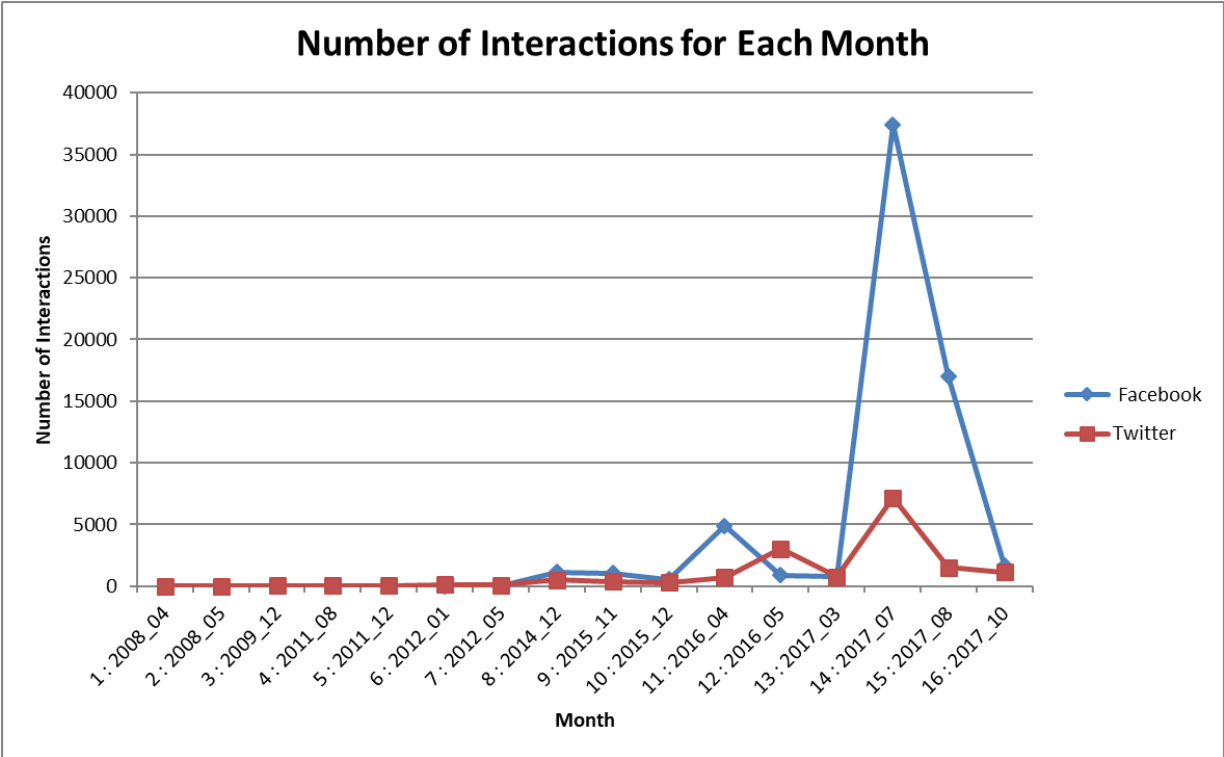


Figure 12. Number of social media interactions on Facebook and Twitter by month.

There were also differences in the most common types of posts made between months and between Facebook (Figure 13) and Twitter (Figure 14). For Facebook, videos and GIFs have consistently been the primary type of public post made about monk seals. Pictures are the second most common type of post for Facebook, increasing after March 2017. For Twitter, text was the predominant type of post until May 2016 when pictures overtook it. This can be at least partially explained by the inability to post pictures and videos in the early years of Twitter. After posting pictures became possible, it steadily increased for monk seal posts and text steadily decreased.

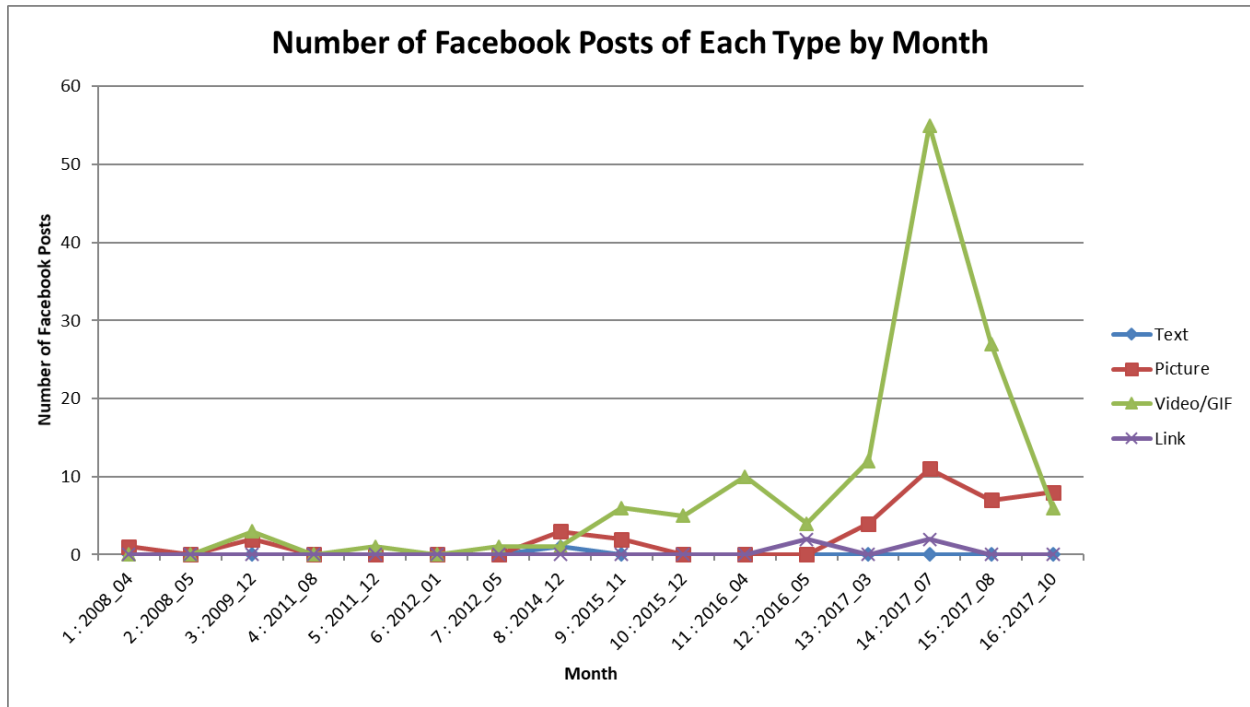
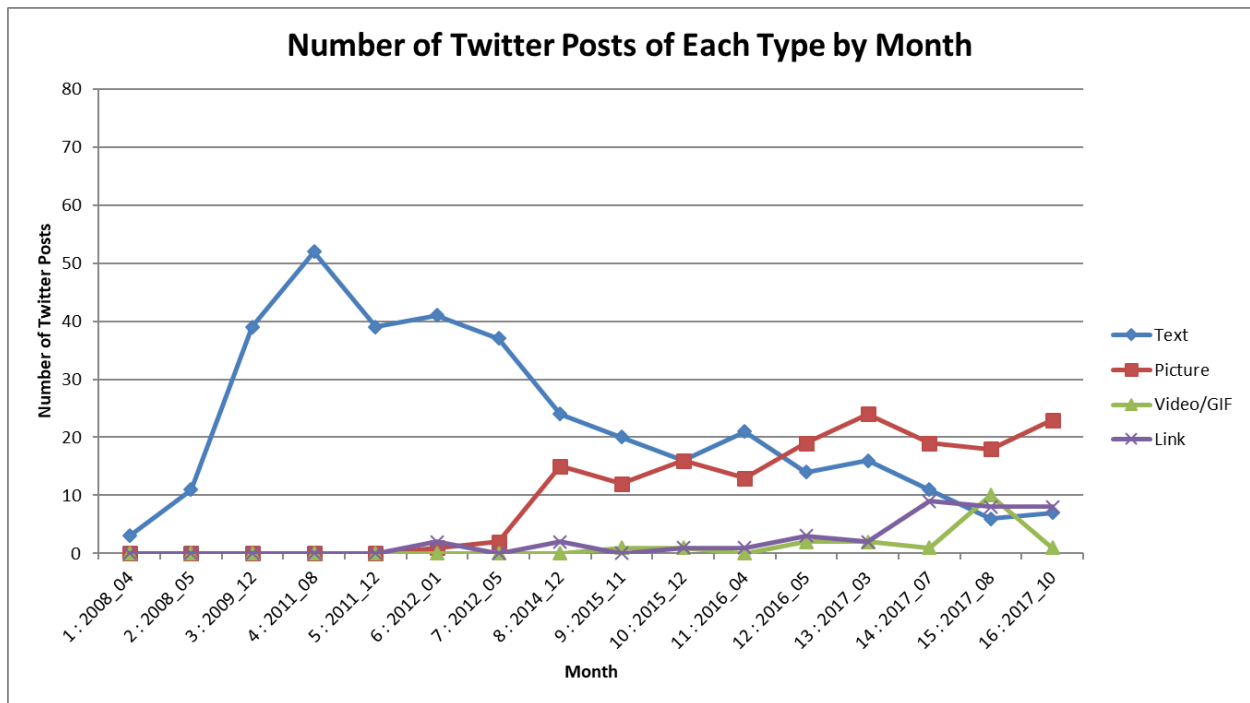


Figure 13. Number of each type of Facebook post per month.





**Figure 14. Number of each type of Twitter post per month.**

The predominant types of posters about monk seals also appear to vary by month and between Facebook (Figure 15) and Twitter (Figure 16). In general, news organizations are the most common Facebook posters, followed by individuals, then businesses, nonprofits/communities, and governments. However, this is strongly affected by the increase in posts by news, people, and businesses during July and August 2017 because of Kaimana. The Honolulu Civil Beat 24-hour camera on Kaimana especially increased the number of posts by news organizations. For Twitter, individuals are the most common posters, followed by news, then nonprofit/communities, businesses, and government agencies. For both social media platforms, government agencies were the least common poster about monk seals. There appears to be a decline in news, non-profit/community, and business posts from May 2012 to July 2017 on Twitter, but there is an increase in individuals posting about monk seals during this time. This coincides with the long pattern of seal deaths in the news during that time and ends with the birth of Kaimana. However, this decline is not apparent for Facebook posts.

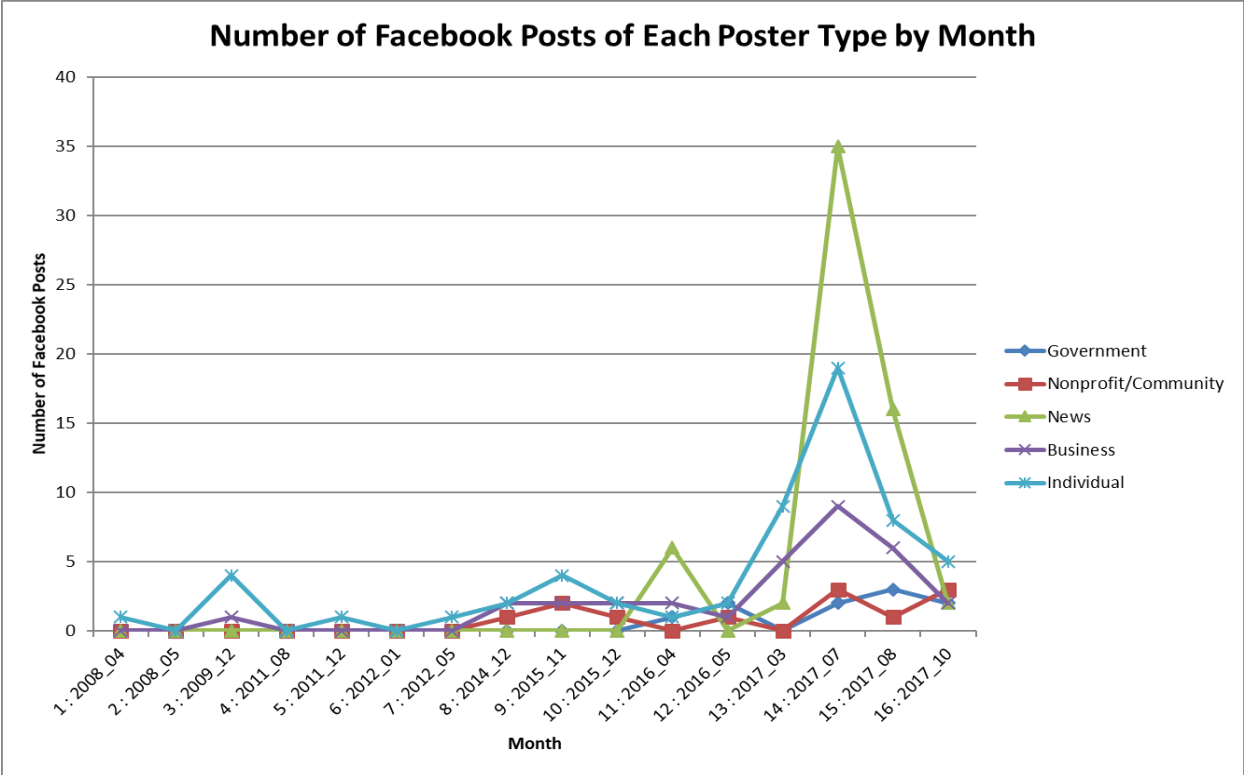


Figure 15. Number of Facebook posts by type of poster per month.

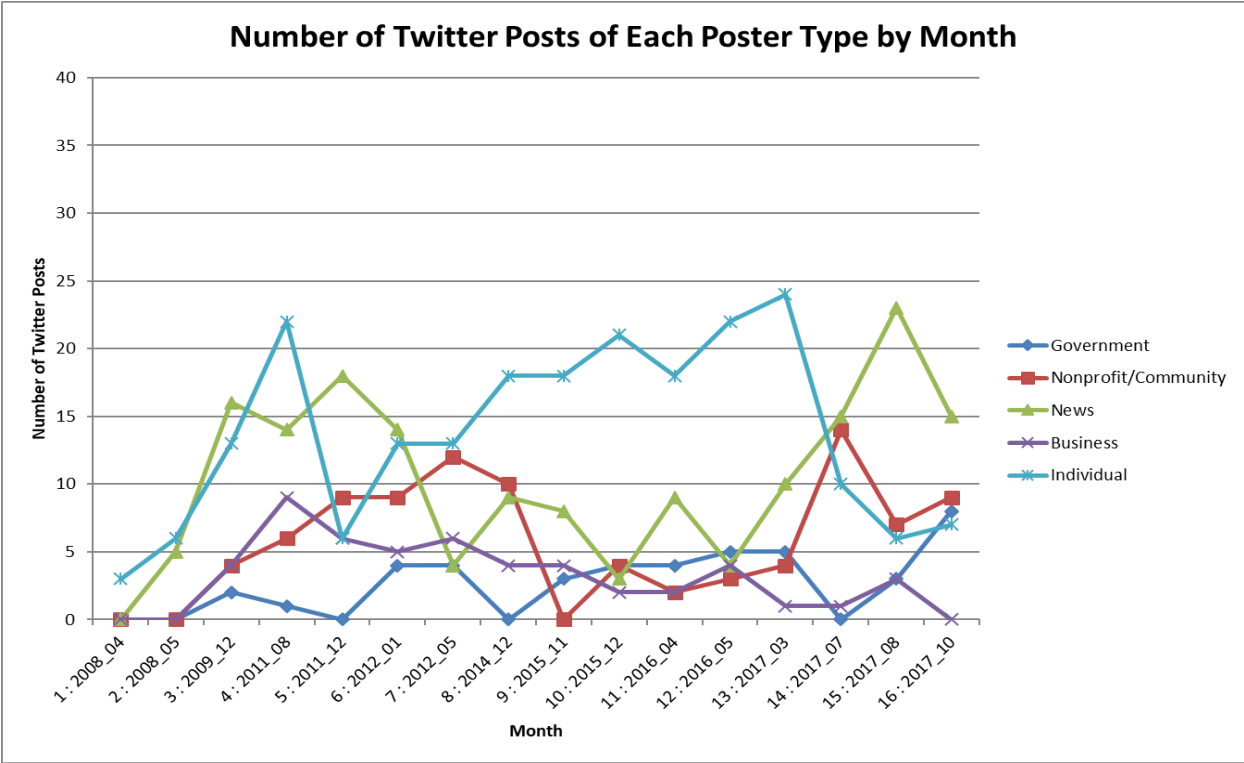


Figure 16. Number of Twitter posts by type of poster per month.

## Discussion

In general, Hawaiian monk seals are described very positively in the news and are rarely depicted negatively. This finding echoes results from a previous study that examined the social media platform Instagram (Sullivan et al. 2019). When monk seals are described positively, it is most often in a sympathetic manner, which makes sense given the precarious state of the species and the pattern of intentional killings. In contrast, NOAA is portrayed much less positively and more negatively than monk seals, although the majority of comments about NOAA were neutral. Additionally, NOAA is discussed less than monk seals in general, with approximately a fourth of the number of total statements as monk seals. In terms of NOAA activities, research is technically the activity portrayed most positively but is also the one mentioned the least frequently, with only three statements. Interventions are the next most positive activity and the one discussed the most. Monitoring and law enforcement appear in similar quantities and largely neutrally by the news. Finally, when policy is addressed in the news, it is mostly negative and rarely positive.

Comparing TV and print news, monk seals are portrayed similarly in feeling, with slightly fewer positive and more negative statements in print. However, NOAA is portrayed much less positively and more negatively in print news than on TV. It is worth noting that all of the television stations examined for this study were based on Oahu. This is especially pertinent because, in print media, there are differences in the sentiments expressed about both monk seals and NOAA between islands. For example, Oahu, the Big Island, and national news portrayed monk seals similarly in feeling, but Molokai portrayed monk seals more negatively and Kauai portrayed them less positively. In these areas, monk seals may be seen as symbols of outside forces, such as conservation (Madge 2016, Mooallem 2013). Statements about monk seals were extremely positive in Maui news outlets, but the sample size is relatively small, and there is very a limited presence of monk seals on Maui at all. For statements about NOAA, Molokai and Maui reported on NOAA in a largely neutral manner with no negative statements, but the sample sizes are low again on these islands. Articles from Oahu and the Big Island were mostly neutral with respect to NOAA but also included the largest percentage of positive statements and had relatively few negative statements. Finally, Kauai and national news included more negative than positive statements about NOAA while still maintaining mostly neutral statements. Again, this may be related to NOAA's role in monk seal protection (Madge 2016).

Examining the relationship between sentiments about monk seals and NOAA and the concurrent events, there appear to be some general patterns. For example, some of the most directly positive months for monk seal coverage involve pups. These include May 2008 when NOAA rescued KP2, the youngest pup to ever be rescued. They also include July and August 2017 when Kaimana was born in Waikiki. Some of the most sympathetic months involve intentional seal attacks and killings. These include January 2012 when a monk seal was killed on Kauai, December 2014 when a pup was killed on Kauai and a graphic photo of the body circulated, and April 2016 when the video of the monk seal assault on Kauai went viral. It is worth noting that all of the intentional monk seal deaths contained within these 16 months occurred either on Kauai or Molokai. Other especially sympathetic months were August 2011 and December 2015. For August 2011, that sympathy was usually related to either the need for the new critical habitat plan because of the state of monk seal populations or was used to argue against the NOAA plan to euthanize the aggressive adult male seals in the Northwest Hawaiian Islands. For December

2015, most of this sympathy was related to the death of the hooked monk seal after NOAA tried to rescue it. In terms of negative coverage for monk seals, there was relatively little with no month ever surpassing 5% of statements being negative. That said, the most negative months were August 2011, when the draft PEIS was announced and January 2012 when \$30,000 was offered for information about recent monk seal killings. During this time, seals were especially criticized as being non-native and harmful for fishing, and they were described as a conspiracy by which the government could gain greater control of the waters around Hawaii.

Similar patterns of sentiments and events appear for NOAA-related statements. For example, the most positive months of NOAA coverage generally involve seal rescues and other interventions. These include May 2008 when NOAA rescued KP2, December 2015 when NOAA attempted to rescue a hooked monk seal, and July 2017 when NOAA rescued Kaimana from the Natatorium in Waikiki. In contrast, the months with the most negative coverage for NOAA generally involved policy changes and seal deaths. For example, just like for monk seals themselves, August 2011 and January 2012 are two of the most negative months for NOAA. Again, these coincide with the announcement of the Draft PEIS and reward for information offered by DLNR, respectively. Additionally, August 2011 included the NOAA plan to euthanize aggressive males in the northwest Hawaiian Islands, which garnered some negative coverage. However, March 2017 is the most negative month for NOAA with a slight majority of negative statements. During this month, news media largely associated NOAA with and blamed it for the death of the monk seal in the fish pen.

An important aspect of these negative coverage months for both monk seals and NOAA is misinformation represented in news media. When monk seals are discussed negatively, it is common to see them described as non-native to the main Hawaiian Islands. These viewpoints are evident in editorials and quotes from the most negative coverage months for monk seals. However, research states that this claim is unfounded and that monk seals were present in the main Hawaiian Islands long before humans were (Kittinger et al., 2011; Nordtvedt-Reeve et al., 2013; Scheel et al., 2014). Similarly, during discussions about the critical habitat plan, members of the public expressed concern that the plan would limit subsistence fishing around the Hawaiian Islands. However, this was not the case, as the activities of state and local governments as well as private citizens, including recreational and subsistence fishers, are unaffected by critical habitat designations unless they receive federal funding or require federal permits or authorizations to undertake those activities. Finally, when the monk seal died in the fish pen, it was first reported that it was a NOAA-funded fishery. In actuality, the fishery had no affiliation with NOAA. While this was corrected in articles later in that month, NOAA was nevertheless criticized for the event.

However, attention on social media to monk seals appears to differ from that of news media and between platforms. For example, the most posts and interactions on Facebook for monk seals were during April 2016, July 2017, and August 2017. These coincide with visually and narratively powerful stories. They also coincide with stories that rely heavily on videos, which are far away the most common type of post on Facebook. Videos of the monk seal assault and the birth of a cute pup elicit immediate emotional reactions, either negatively or positively respectively, and are made easily shareable by social media. Thus, it is reasonable that these months would have both the most posts and interactions on Facebook. These are also both stories that heavily involve news organizations (especially with the 24-hour pup cam by Honolulu Civil

Beat), and that is reflected in news organizations being the main posters during these months. These patterns are less defined for Twitter, however. August 2011, the month with the most Twitter posts, had concurrent news stories on policy which were less visually accessible stories. At this point, it was not possible to post pictures or videos on Twitter, so it is reasonable that a text-heavy and controversial month of news would receive many Twitter posts. However, the most interactions on Twitter were during May 2016 and July 2017. While posts during these months did relate to the stories being discussed in the news and on Facebook, there were also stories that were unique to Twitter, like the monk seal Pokémon and the YouTuber's account of seeing a monk seal. It is important to consider the different ways that audiences create and consume media from different sources and tailor outreach materials accordingly.

That said, the context in which this research was conducted created some limitations. First, by focusing only on months with high public interest in traditional news media, our sample may not be representative of how monk seals and NOAA are portrayed on average. In addition, of the 27 print publications included in this study, 11 are owned by the same company: Oahu Publications Inc. Similarly, three out of the five TV news publications are produced by Raycom Media. Thus, the perspectives of these companies may be overrepresented within this data set. Further, while the NewsBank, Inc. database has a substantial collection of publications, there are still articles written during these months that are not included in this study because they are not included in the database. For social media, it is important to note that only public posts were available and used for this study. Many accounts are private, and it is likely that many posts by individuals would not be represented in public datasets like the one used in this study. Even so, our limited social media analysis illustrates that different types of information are relevant to social media vs. traditional news media. More in-depth analyses of social media posts that include patterns across the entire 2007-2017 time period are necessary to understand how best to design outreach materials relevant to those platforms. Finally, it is also possible that critics of monk seals and NOAA are underrepresented in the news media and on social media. For example, there may be harsher criticism of monk seals and NOAA in certain communities and in private than would be picked up by the general, largely Oahu-based news.

## Conclusion

This study has led to three general suggestions for NOAA communications going forward to try to improve public sentiment of both Hawaiian monk seals and NOAA. First, NOAA could improve the information it provides the public about its actions and policies. From the 16 months analyzed, NOAA policy changes were associated with greater negative sentiments for both NOAA and monk seals. Further, misinformation has been present in the news regarding NOAA policies, specifically related to the critical habitat plan changes in the Draft PEIS and the fish pen seal death. Thus, strengthening relationships with the press, being proactive in sharing information, and using plain language to explain science for public audiences could be helpful in better conveying NOAA messages.

Second, NOAA should consider tailoring outreach to the Hawaiian Islands beyond Oahu. Six out of the 16 months of interest in this study involved suspicious deaths or attacks on monk seals. All of these deaths and attacks occurred on either Kauai or Molokai. Additionally, Kauai had the lowest proportion of positive statements towards monk seals, and Molokai had the greatest proportion of negative statements towards monk seals in their news. Thus, it is of great importance to improve perspectives of monk seals on these two islands especially. Although the majority of NOAA staff engaged in outreach and education about monk seals are located on Oahu, it is important to expand these opportunities to the other islands as much as possible, as well as tailor them based on understanding the unique situations faced by residents on other islands.

Finally, NOAA should continue to and further capitalize on positive events and tailor outreach to different types of media. Rescues and pups have been discussed very positively in the news media for both monk seals and NOAA. This is especially true for Kaimana, who created widespread media attention across the news, Facebook, and Twitter. NOAA-conducted “pupdates” during Kaimana’s weaning allowed NOAA to spread its messages effectively and positively. Although such events cannot be controlled by NOAA, they are an opportunity for NOAA to connect with and inform the public directly.

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## Appendix: Code Book and Example Quotes

### Metadata:

Header – Titles and other article metadata

### Sentiment:

Positive fact – Facts that describe the benefits monk seals provide or that describe good news for monk seals. Example quote: “There are signs of improvement in the abandoned monk seal pup...now being cared for by NOAA scientists on Oahu.”

Sympathetic fact – Facts that describe bad news for monk seals that encourage people to try to help or save them. Example quote: “Experts say pretty soon these playful creatures could become extinct...if measures aren’t taken to protect their population.”

Negative fact- Facts that describe the problems monk seals cause or that describe news that makes monk seals look bad. Example quote: “Many fishermen don’t like them because seals sometimes take fish from lines, stringers and nets.”

Neutral fact – Facts without any emotional connotation about monk seals. Example quote: “Hawaiian monk seals are protected under the Endangered Species Act of 1973. About 1,200 are estimated to be alive today.”

Positive opinion- Opinions that describe the benefits monk seals provide or that describe good news for monk seals. Example quote: “The monk seal and honu are among Hawaii's most treasured native species.”

Sympathetic opinion- Opinions that describe bad news for monk seals that encourage people to try to help or save them. Example quote: “Anyone who would kill a defenseless animal is a potential threat to the community so we really need the community to step up and share any information.”

Negative opinion- Opinions that describe the problems monk seals cause or that describe news that makes monk seals look bad. Example quote: “...the seals are no good and they eat all the fish...”

NOAA Positive – Any statements that describe the benefits NOAA provides or that describe good news for NOAA. Example quote: “Marine biologists have been successful in relocating weaned pups to areas where sharks are not as great a threat.”

NOAA Negative - Any statements that describe the problems NOAA causes or that describe news that makes NOAA look bad. Example quote: “To make this bad idea easier, NOAA has already declared all the waters around all the Hawaiian Islands to be critical habitat for the monk seal...”

NOAA Neutral – Any statements without any emotional connotation about NOAA. Example quote: “NOAA will conduct its twice yearly monk seal count island-wide. On that day, they’re asking volunteers to contact them when they spot a monk seal on any of Oahu’s beaches.”

### **NOAA Activities:**

NOAA Interventions – Any statement regarding one of NOAA’s interventions for monk seals (i.e. disentanglements, rescues, and dehookings). Example quote: “A NOAA Fisheries team is currently caring for an abandoned monk seal pup here on Oahu.”

NOAA Policy – Any statement regarding NOAA related rules and regulations for monk seals. Example quote: “The Draft Hawaiian Monk Seal Recovery Actions Programmatic Environmental Impact Statement (PEIS) is now available to the public, and community hearings will be held around the state to get public input on the issue.”

NOAA Research – Any statement regarding NOAA research activities for monk seals (i.e. critter cam). Example quote: “‘We have a very solid basic research program that does a lot of the critical things,’ such as population and disease monitoring and working on techniques to increase female survival.”

NOAA Law Enforcement – Any statement regarding activities related to NOAA law enforcement for monk seals. Example quote: “NOAA Office of Law Enforcement is offering up to \$5,000 for information leading to the arrest and conviction of those responsible for killing this seal.”

NOAA Monitoring – Any statement regarding activities related to NOAA monitoring of monk seals. Example quote: “Four of the seals will be tagged and tracked...as NOAA continues to monitor a recent increase in the monk seal population.”