Something's Fishy with Gag
Response Summary
February 2021

The Gulf of Mexico Fishery Management Council (Council) asked fishermen, divers, and other stakeholders if they have noticed anything "fishy" about gag or gag fishing in the Gulf of Mexico in recent years. Recognizing that active fishermen may notice trends or unusual occurrences that scientists and managers may not observe, this initiative expands the type of information gathered by the Council to gain a better understanding of what is happening on the water. Comments were collected using a web-based tool that was advertised via press release, social media, and on the Council's website. Four hundred and twenty-three responses were received between December 10, 2020 and January 10, 2021. Five comments were dropped because they were not related to gag or they were duplicate comments, and 418 comments were analyzed.

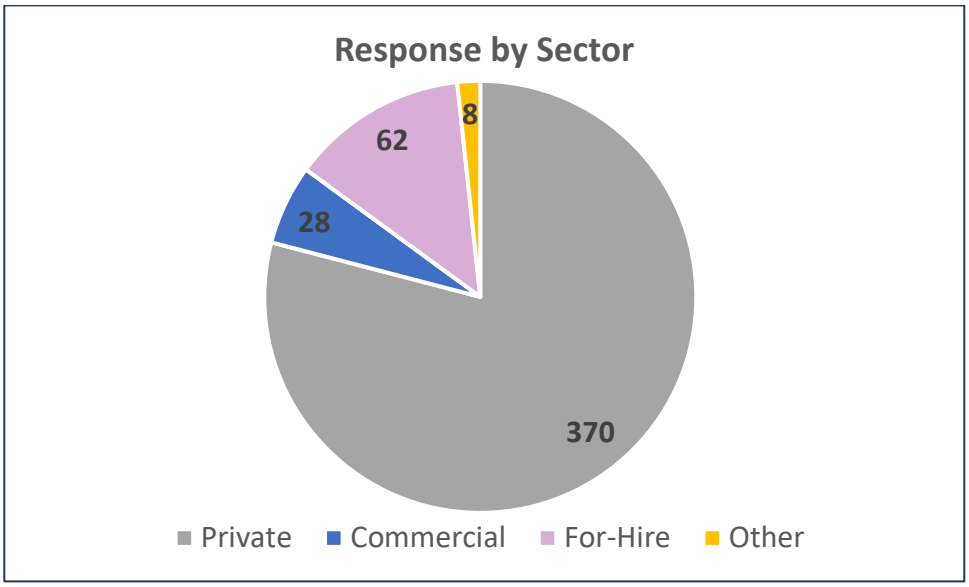

Figure 1: Self-identified sector designation from responses to the survey tool . (n=468). Individual respondents (n=418) were not limited to a singular sector designation response and some identified with more than one sector of the fishery.

Respondents self-identified their association with the fishery (Figure 1). Respondents were not limited to a singular category; some identified with more than one sector in the fishery. Most respondents identified as private anglers. In cases where respondents chose more than one association, a response was counted towards each selected sector. Anglers who identified as state charters were categorized as 'for-hire.' The 'other' category was used for respondents who identified as divers, unclassified spearfishermen, researchers, and/or fishing journalists.

Observations were spatially explicit. Respondents were not limited to a single grid area and many identified multiple grids for observation reporting. Responses were gathered for each

grid. A majority of responses originated from the areas off the central coast of Florida and the greatest number of responses within one area immediately adjacent to Pasco, Hernando, and Citrus Counties of Florida. Few comments were received west of Alabama.

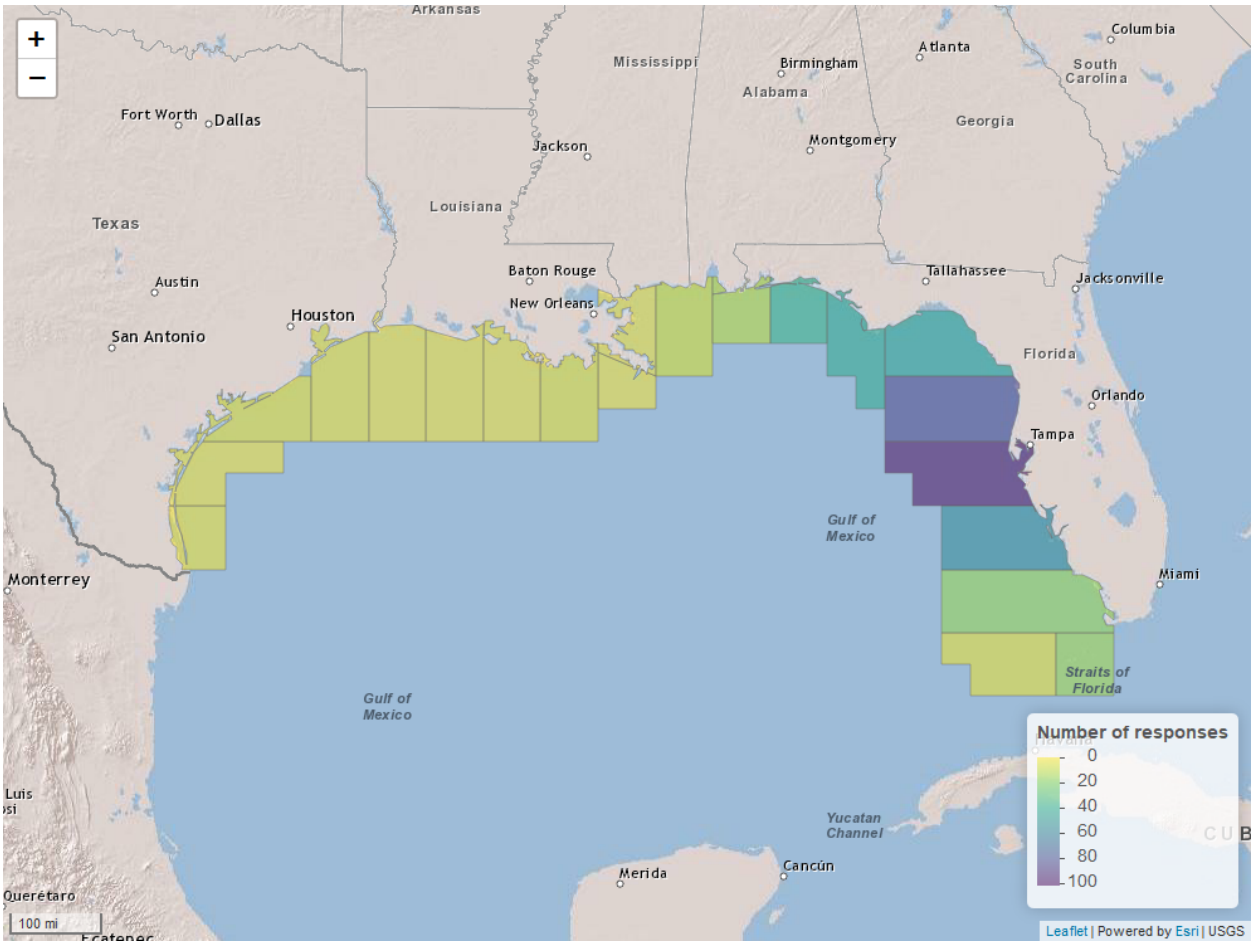

Figure 2: Number of responses by self-Identified location where observations were made (n=659). Respondents (n=418) were able to report observations for one or more grids, thus the number of responses is greater than the number of respondents.

Responses were analyzed by both manual and automated analysis to determine if the comment indicated an overall positive, neutral, or negative sentiment. Responses were also classified through manual analysis based on whether or not they indicated something about stock condition.

Manual sentiment analysis of all responses showed that a slight majority of respondents reported a positive or neutral sentiment (Figure 3). Automated analysis showed that nearly half of the respondents reported a positive sentiment (Figure 4). Automated analysis showed a greater proportion of positive responses than manual analysis. Both manual and automated analysis showed similar proportions of neutral and negative comments.

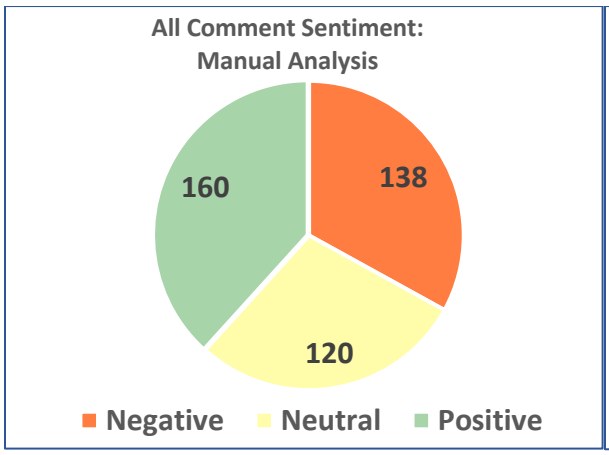

Figure 3: Number of total responses indicating positive, negative, or neutral sentiment classified using manual analysis (n=418)

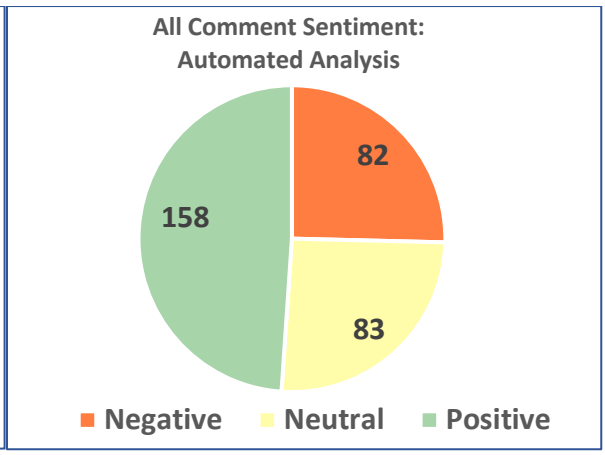

Figure 4: Number of total responses indicating positive, negative, or neutral sentiment classified using automated analysis (n=323)

Comments indicating something about stock condition were separated out using manual analysis. Of the total 418 comments received, 365 comments were classified as relating to stock condition (i.e. abundance, fish size, fish health, etc.). Sentiment analyses of the comments related to stock condition were performed both manually and automatically. Manual analysis showed a smaller proportion of neutral sentiment expressed in comments related to stock condition vs. all the comments (Figure 5). For automated analysis, the proportion of neutral comments increased slightly for comments related to stock condition (Figure 6).

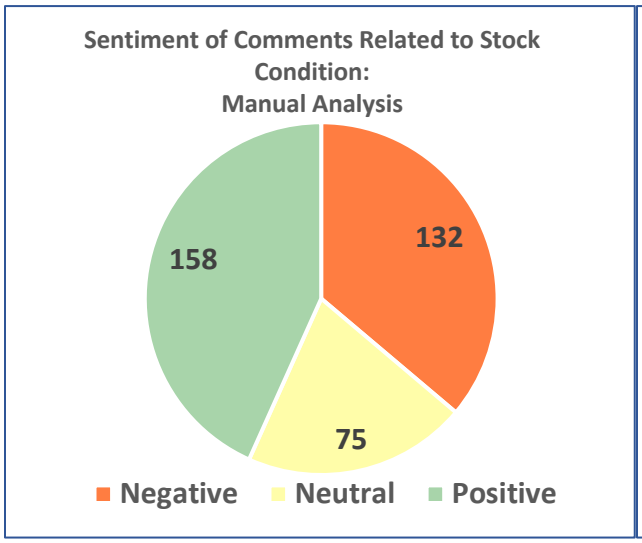

Figure 5: Number of responses related to stock condition indicating positive, negative, or neutral sentiment classified using manual analysis (n=365)

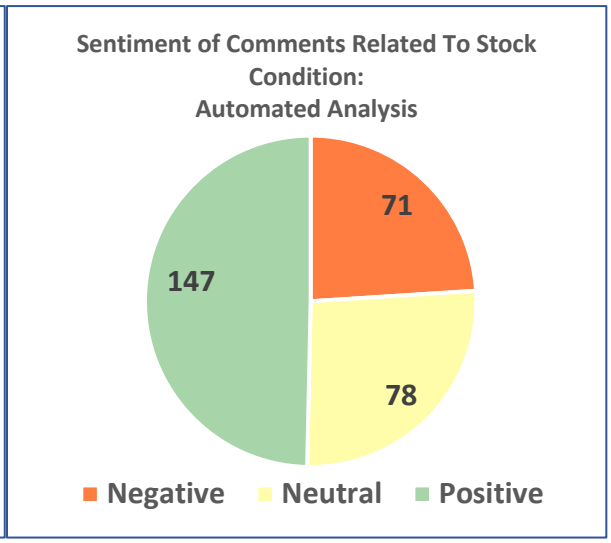

Figure 6: Number of responses related to stock condition indicating positive, negative, or neutral sentiment classified using automated analysis (n=296)

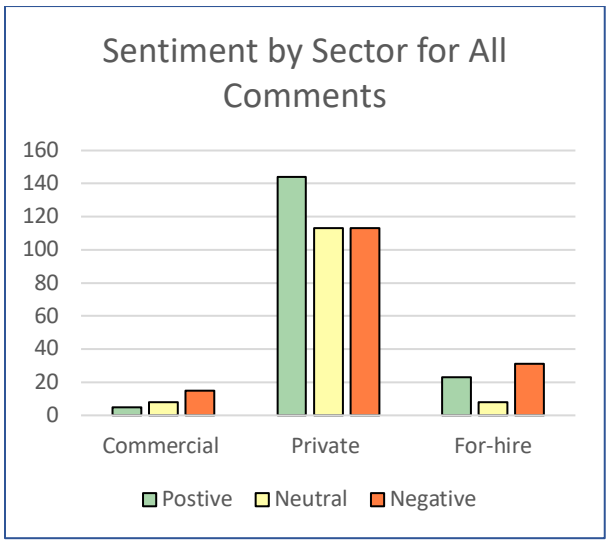

Figure 7: Number of responses from commercial, for-hire, and private recreational respondents indicating positive, negative, or neutral sentiment classified using manual analysis (n=460)

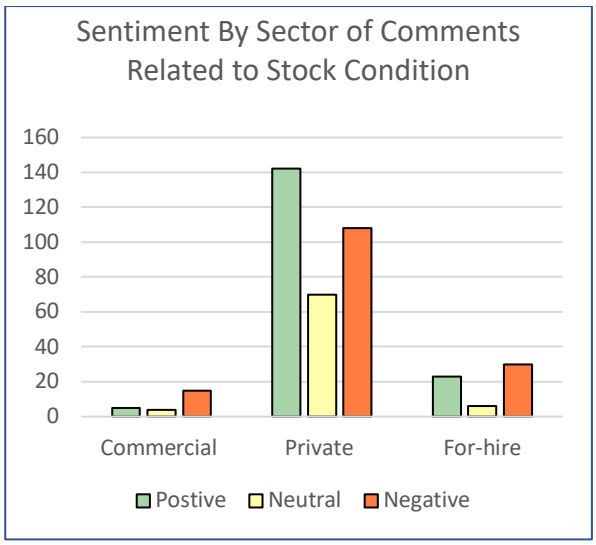

Figure 8: Number of responses related to stock condition from commercial, for-hire, and private recreational respondents indicating positive, negative, or neutral sentiment classified using manual analysis (n=403)

Sector-specific comment sentiment was manually analyzed for all comments and also for comments only related to stock condition to compare sentiment reported by private, commercial, and for-hire respondents (Figures 7 and 8). Responses classified as belonging to the 'other' category were dropped. In cases where respondents identified with more than one association with the fishery, their comments were counted towards each sector selected. Private anglers made proportionately more postiive comments than other sectors and for-hire respondents made proportionately less neutral comments than other sectors. Comments related to stock condition were more likely categorized as postive or negative and the proportion of neutral comments was reduced.

Sentiment results based on manual analysis of comments indicating something about stock condition were sorted by location (Figure 9). The majority of comments gathered for areas off

the central, northern coast of Florida indicated a positive sentiment. Fewer comments were gathered in the western Gulf and those comments generally expressed a negative sentiment.

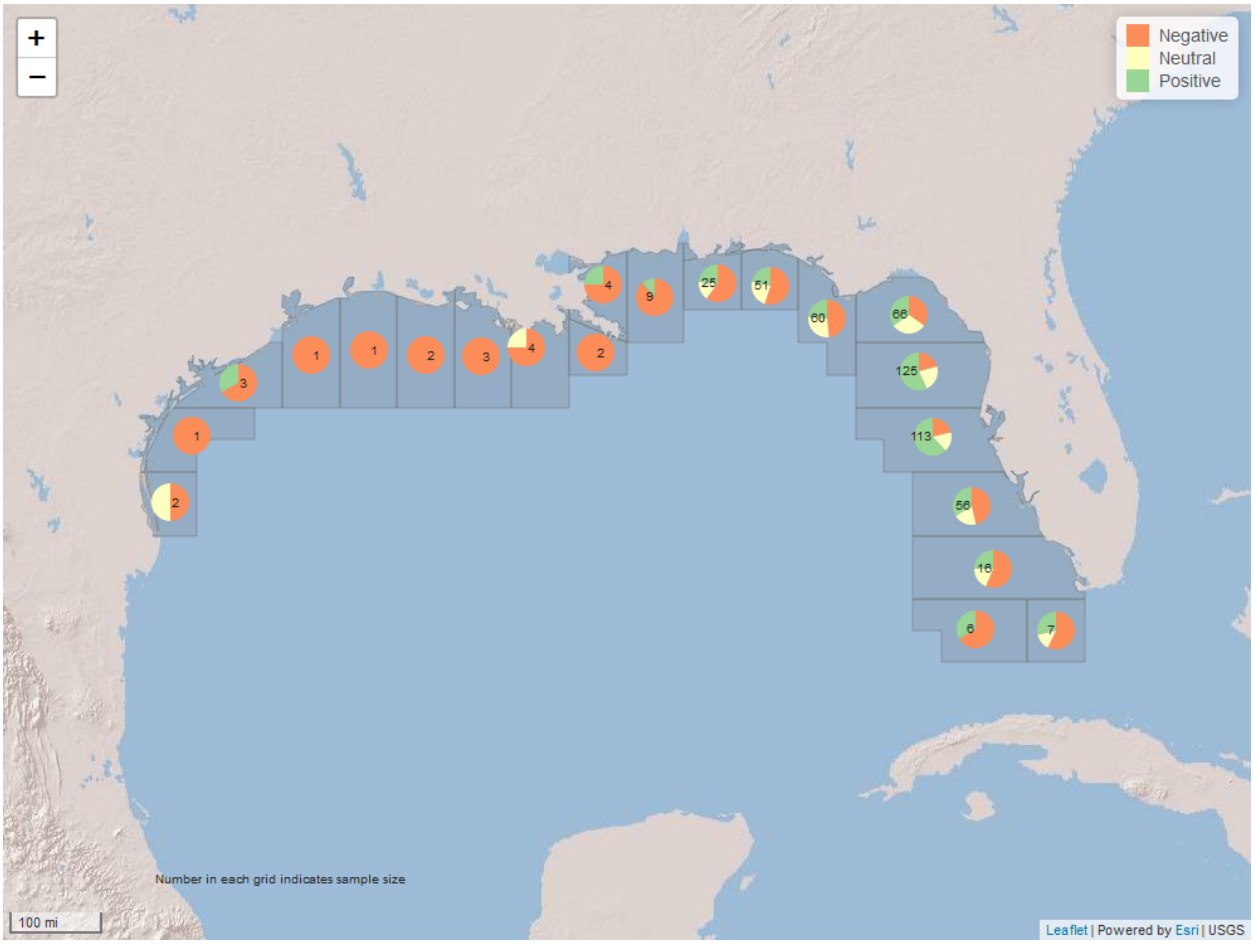

Figure 9: Manual analysis of responses related to stock condition showing sentiment by location. Each comment related to stock condition (n=365) was characterized into one of three categories based on independent review of each comment by two reviewers. Each comment was linked to one or more grids based on the self-reported locations (n=557) from the respondent that was part of the survey.

Manual analysis was conducted by two independent readers and sentiment was broadly characterized as positive, neutral, or negative. Readers then compared characterizations and resolved any disagreements in interpretation so that both readers were in agreement as to comment sentiment. Manual analysis found that a slight majority of all the comments were positive in nature. There was a smaller proportion of neutral sentiment expressed in comments related to stock condition. The positive comments indicated that there were a lot of juvenile fish and that fish look healthy and vibrant. Positive comments also indicated that there are a lot of big fish and many of them noted they were close to shore and easy to catch when the water cools. The neutral comments said that males are displaying spawning behavior in summer and that the population is shifting to shallow water. Respondents also indicated that more fish hang out over sand bottom to avoid divers. Negative comments indicated that depredation by goliath grouper, sharks, and dolphin is a serious issue. They also indicated that the gag population is being outcompeted by red snapper. It was also noted that fishing pressure

is greater than usual and that commercial fishing during the spawn is a detriment to the stock. Negative comments also mentioned that gag look skinny and unhealthy.

The automated sentiment analysis characterized responses using the 'tidytext' (Robinson 2016) package built for the R statistical software (R Core Team 2017). Words in each comment were compared to a revised version of the 'Bing' lexicon library. This library categorizes words into positive, negative, or neutral sentiment. Positive words get a score of +1, negative words get a score of -1, and neutral words get a score of zero. The analysis scores every word in each comment and then averages those word scores for the individual comment to standardize the score by comment length. This revised library amends characterizations for words commonly used in reporting fishery information. Comments that have an average sentiment above 0.33 were considered a positive comment, neutral comments were scored between -0.33 and 0.33, and negative comments had a sentiment score less than -0.33. If a comment did not include any words contained in the lexicon library the comment was not assigned a sentiment characterization and dropped. Ninety-five of 418 responses analyzed using automated analysis were not included in the automated sentiment analysis, therefore the sample size of comments differs between analysis methods (Figures 3-6). The negative words that occurred most frequently were small, less, limits, hard, fall. The positive words that occurred most frequently were good, large, healthy, increase, and well (Figures 10 and 11). This could indicate that anglers with negative perceptions of the gag stock were seeing less fish and these fish were smaller. They might also indicate that they are hard to catch and that anglers are dissatisfied with the regulations for gag and for other species that compete with gag (i.e., red snapper and goliath). The positive comments likely indicate that the stock is in good condition and that anglers are seeing good numbers of healthy fish.

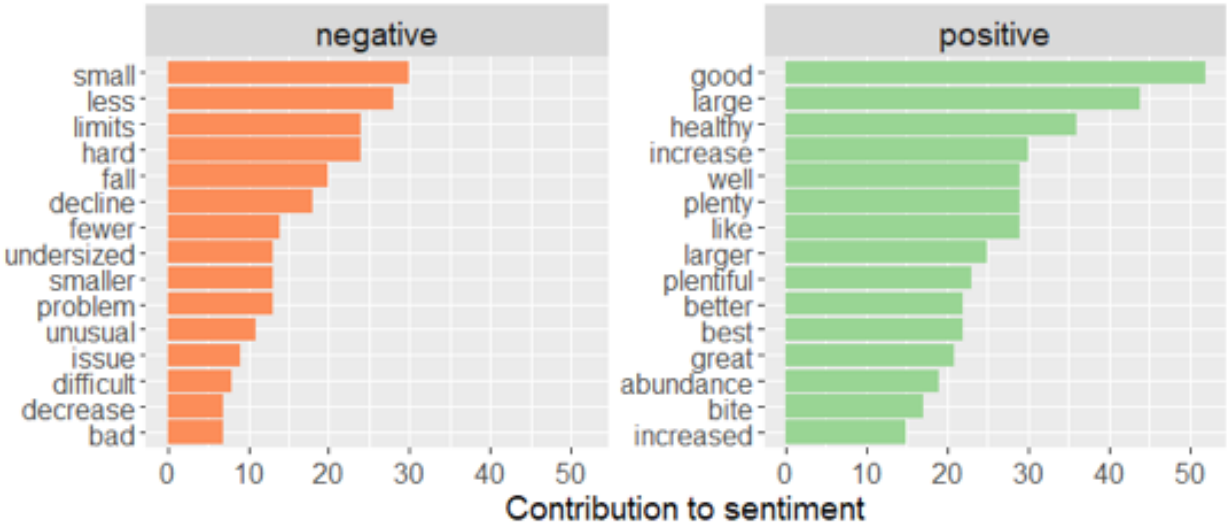

Figure 10: Most frequent words contributing to comment sentiment identified by automated sentiment analysis.

Figure 11: Most frequent words contributing to comment sentiment identified by automated sentiment analysis.

These results of Something's Fishy with Gag will be submitted to the NOAA Southeastern Fishery Science Center as it develops SEDAR 72: Gulf of Mexico Gag Stock Assessment. The information collected through the tool is not intended to be considered as an index of abundance for direct incorporation into a stock assessment model. Instead, results of this effort are meant to supplement the role played by fisheries observers to the stock assessment process. The on-the-water perspective offered by respondents to this tool should be used to ground truth the science and enhance our understanding of the stock.

References

R Core Team (2017). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL https://www.R-project.org/

Silge J, Robinson D (2016). "tidytext: Text Mining and Analysis Using Tidy Data Principles in R." *JOSS*, **1**(3). doi: 10.21105/joss.00037, http://dx.doi.org/10.21105/joss.00037