# Fisherman Feedback: Spanish Mackerel
Response Summary
July 2023

The Gulf of Mexico Fishery Management Council (Council) asked fishermen, divers, and other federal fishery stakeholders what they've noticed about Spanish mackerel and Spanish mackerel fishing in recent years. Active fishermen are a rich source of information and may notice trends or phenomena that scientists and managers may not observe. This initiative expands the types of information gathered by fisheries scientists and managers to gain a better, more contemporary understanding of what is happening on-the-water.

Comments were collected using the Fisherman Feedback web-based tool that was advertised via press release, social media, and on the Council's website. As a result, 117 unique responses were received between April 14 – May 19, 2023.

Respondents self-selected their association with the fishery (Figure 1). Respondents were not limited to a singular category, and some identified with more than one sector. A majority of responses were received from anglers who identified with the private angling component of the recreational fishing sector. The single 'other' response was from a tackle manufacturer and the 3 unknown responses did not provide enough information for a sector category to be determined.
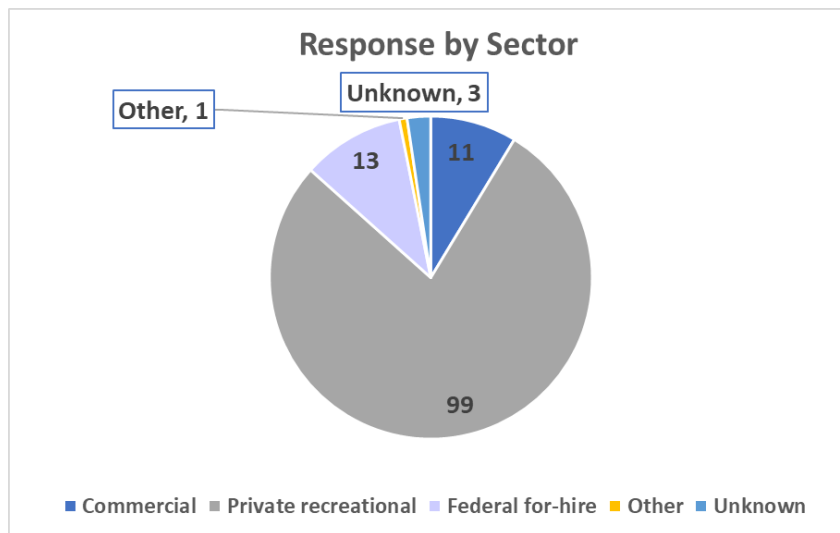
Figure 1: Results collected from the tool asking individuals to self-identify their fishing sector association. While 117 individuals answered the survey question, they were not limited to a singular response and some identified with more than one sector of the fishery, resulting in a total of 127 responses.

Respondents were provided a grid of 21 areas in the Gulf of Mexico (Gulf) where they were able to self-identify the general location(s) of their observation (Figure 2). Respondents were not limited to a single area, and many identified multiple areas. The area covering the

Alabama/Florida state line received the most responses. The fewest comments were received in the Western Gulf.
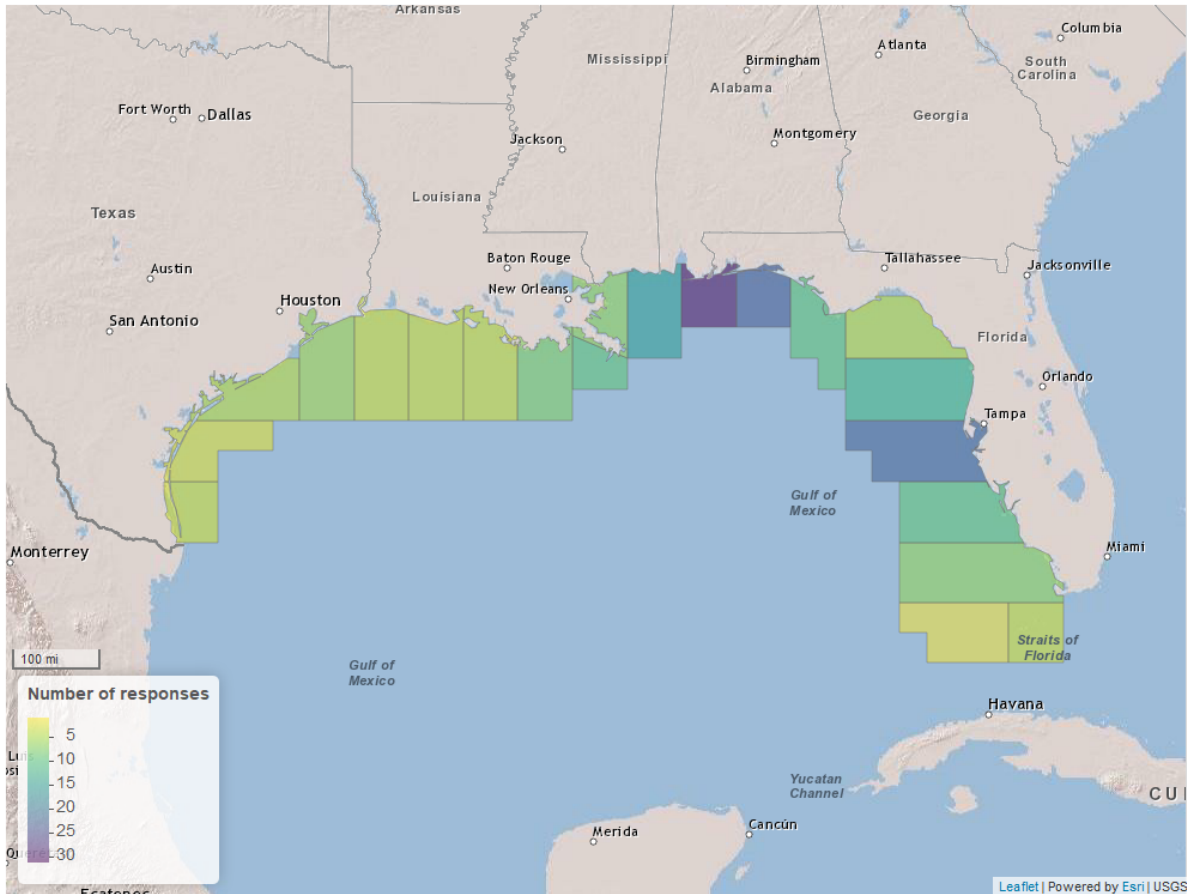
Figure 2: Number of responses received in each of 21 areas in the Gulf. Respondents could select more than one area so the total number illustrated in the map (n=181) exceeds the number of individual responses.

The overall sentiment of each response was classified as positive, negative, or neutral through manual analysis. The analysis showed that the greatest proportion of comments were negative in nature. Negative comments almost always noted a decline in the population. Some negative comments were associated with concern about the amount of mortality occurring from other sectors or from depredation. Positive comments indicated that the Spanish mackerel stock is healthy. Primarily, neutral comments were observational in nature and sentiment was absent or hard to discern. When performing the manual analysis, any comments that contained a mix of positive and negative sentiments were considered to have an overall neutral sentiment, unless there was a greater proportion of the comment that was considered positive or negative in nature.
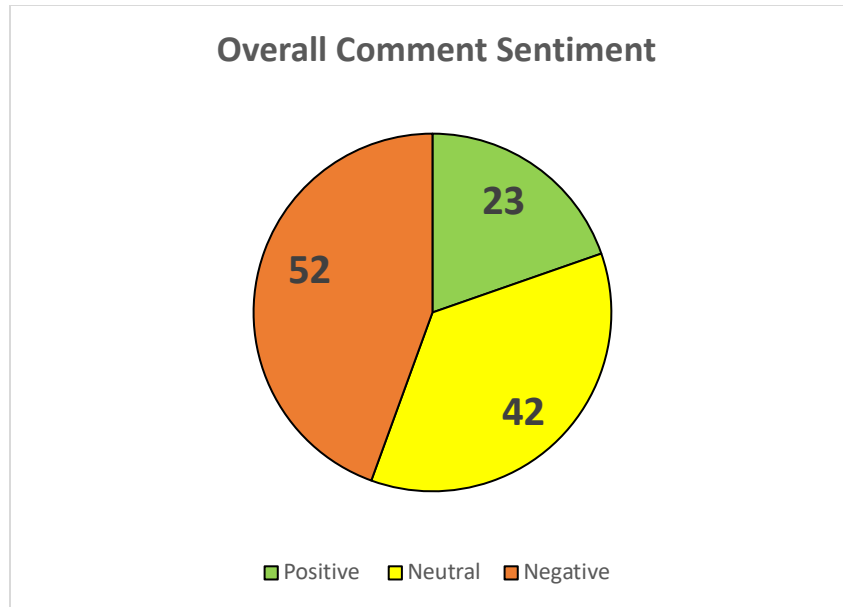
Figure 3: *Number of responses indicating positive, negative, or neutral sentiment (n=117) classified by manual analysis.*

Overall sentiment was also categorized by fishing sector (Figure 4). Respondents self-selected their fishing sector and were not limited to a singular response. The commercial and for-hire sectors expressed a higher portion of negative comments. The private sector expressed a similar portion of negative and neutral comments.
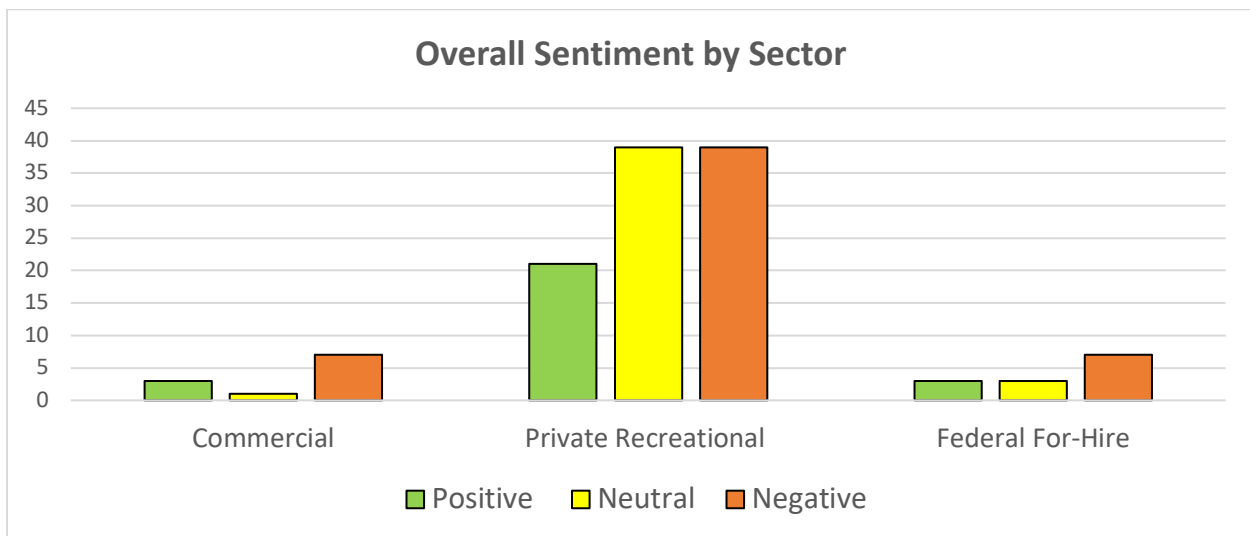
Figure 4: *Number of responses indicating positive, negative, or neutral sentiment sorted by commercial, private recreational, and federal for-hire fishing sector. Sentiment was classified and sector was self-selected by each respondent. Respondents were not limited to a singular sector declaration in their response (n=123). Comments that were not associated with the three primary fishing sectors were not analyzed.*

Overall comment sentiment was also sorted by location (Figure 5). Negative comments were most frequent in the southeastern Gulf of Mexico and seem to graduate to more neutral
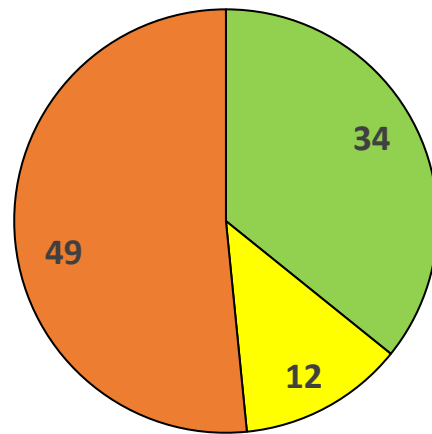
sentiment in the western Gulf. The highest proportion of positive comments were found in the Florida panhandle and extending to eastern Louisiana.
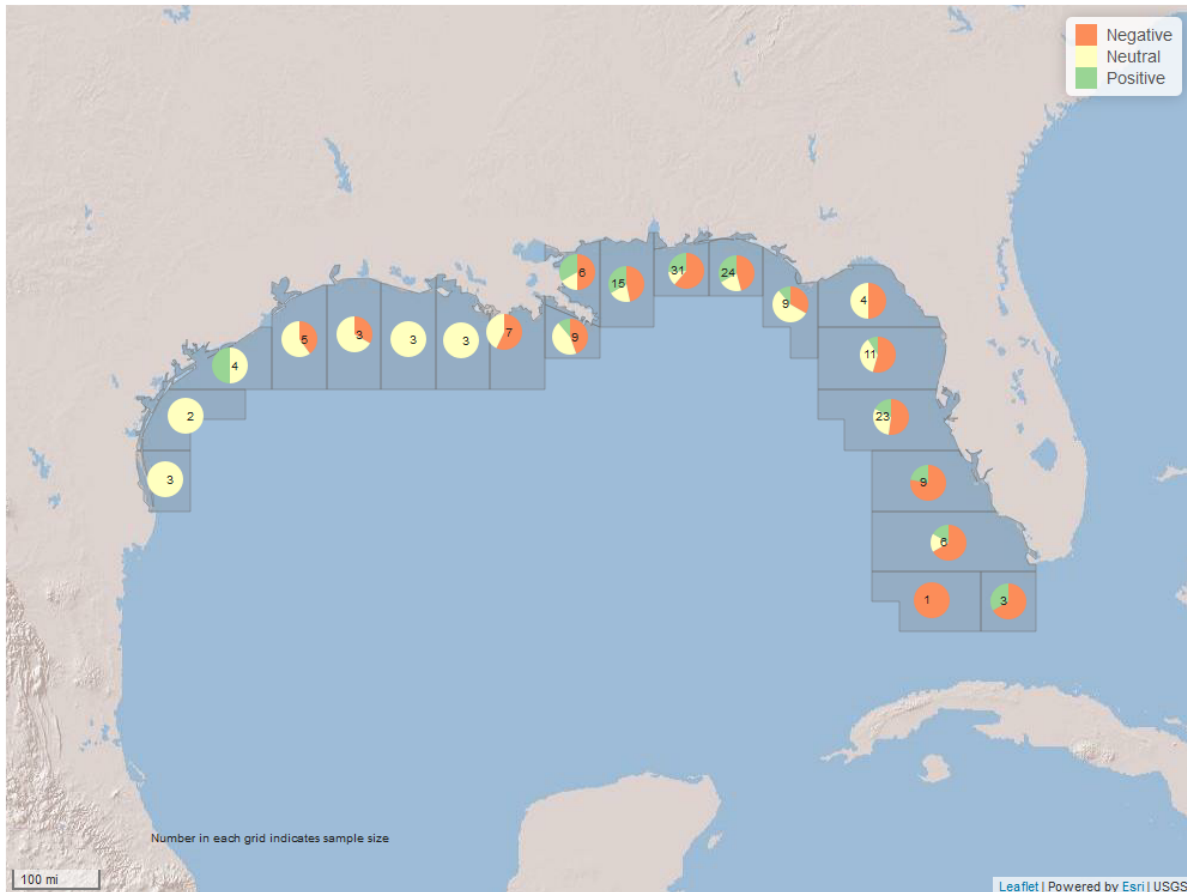
Figure 5: Sentiment analysis for each area. Each comment (n=117) was characterized as positive, negative, or neutral based on independent review of each comment by two reviewers. Each comment was then linked to one or more areas based on the self-reported locations. Respondents could select more than one area so the total number illustrated in the map (n=181) exceeds the number of individual responses.

Next, comments that were determined to be related to the condition, health, or abundance of the stock (n=95) were analyzed again, in relation to how the comment characterized stock condition. Those comments were classified based on whether they indicated that the stock was in good, negative, or neutral health (Figure 6). A majority of comments indicated something negative about the stock condition. Results were also analyzed by sector (Figure 7). Respondents from both commercial and federal for-hire sectors expressed slightly more positive perceptions of the stock condition. Conversely, the private recreational sector expressed a higher proportion of negative perceptions of stock condition.
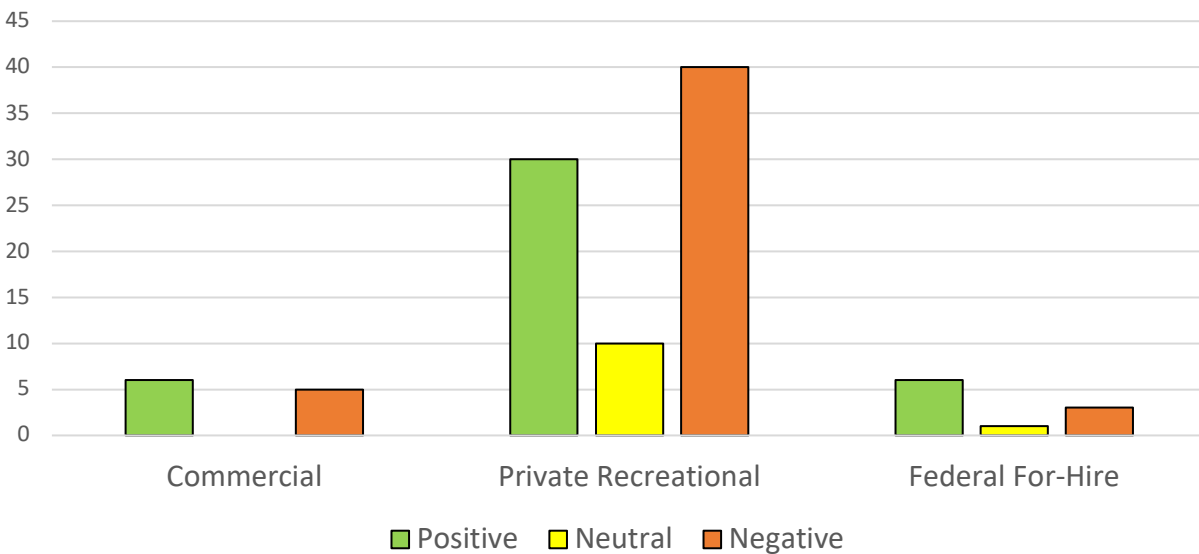
Figure 6: *Number of comments indicating positive, negative, or neutral sentiment regarding stock condition (n=95)*

*Figure 7*: *Number of responses related to stock condition (n=95) that indicate positive, negative, or neutral sentiment and sorted by commercial, private recreational, and federal for-hire fishing sector. Sector was self-selected by each respondent. Respondents were not limited to a single sector so the total number of responses depicted in this figure (n=101) exceeds the number of responses related to stock condition that were received. Comments that were not associated with the three primary fishing sectors were not analyzed.*

The sentiment of comments related to the condition, health, or abundance of the stock were also sorted by location (Figure 8). A pocket of primarily positive indications of stock abundance was located off the Florida panhandle. Negative indications of stock abundance were concentrated off the coast of Louisiana, Alabama, South Florida and along peninsular Florida to a lesser degree.
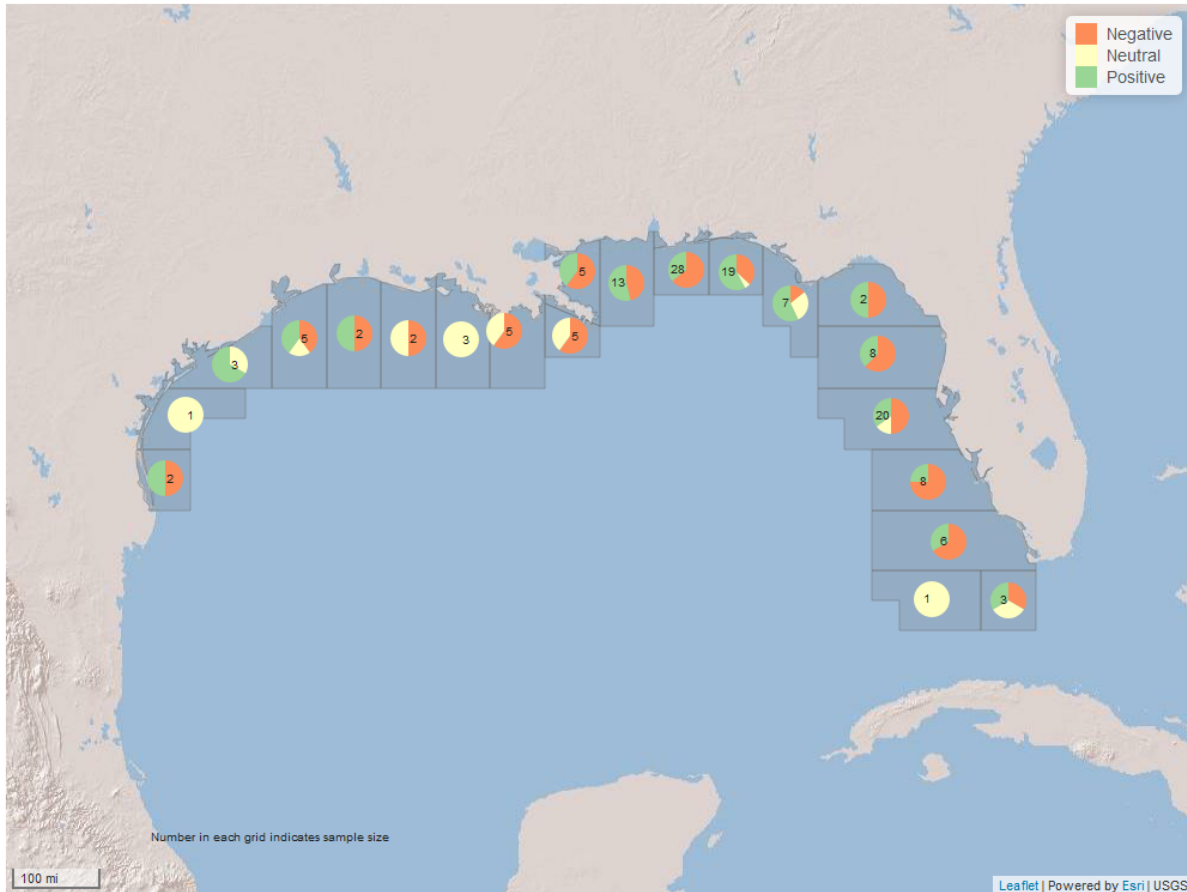
Figure 8: *Sentiment analysis of the perception of stock condition by location. Each comment related to the health, condition, and/or abundance of the stock was characterized based on whether it indicated something positive, negative, or neutral about the stock (n =101). Each comment was then linked to one or more areas based on the self-reported locations. Respondents could select more than one area so the total number illustrated in the map (n=140) exceeds the number of individual responses related to stock condition.*

Comments were analyzed for the words most frequently used to contribute to either positive or negative sentiment through automated analysis (Figures 9 and 10). The words that occurred most frequently in comments with a positive sentiment were: like, plentiful, increase, larger, good, and plenty. This seems to indicate that most of the positive sentiment expressed was based on a positive perception of the abundance or condition of Spanish mackerel. The words that occurred most frequently in comments with a negative sentiment were: shark, fewer, less decline, smaller, limits. The word 'shark' contributed to negative sentiment twice as frequently as any of the other words that contributed to negative sentiment. This indicates that much of the negative sentiment expressed in response to the tool was directed towards shark depredation. The appearance of the word 'limits' indicates that there is negative sentiment

associated with fishing regulations such as size and bag limits. The remaining words seem to indicate a negative perception of the abundance or condition of Spanish mackerel.
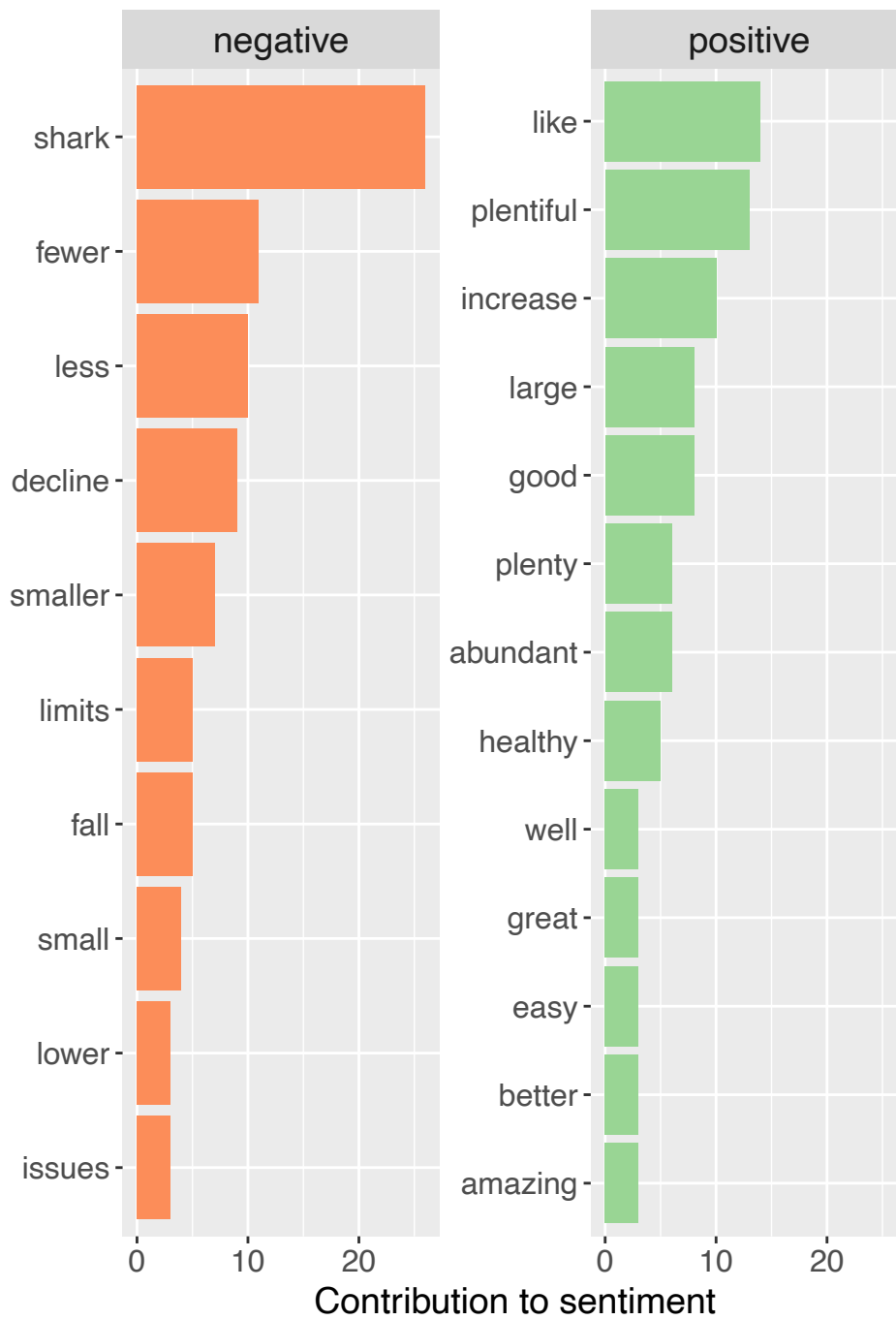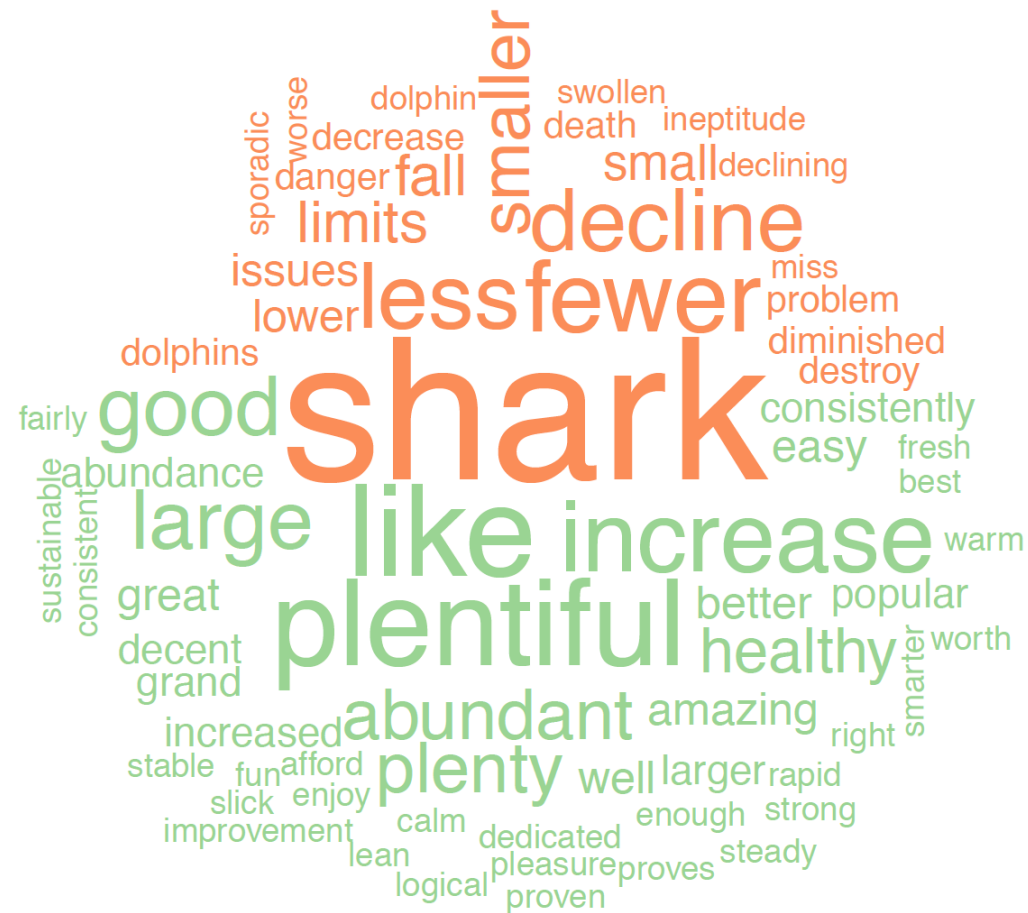

Figure 9: *Most frequently used words contributing to comment sentiment identified using automated sentiment analysis.*

Figure 10: Most frequently used words contributing to comment sentiment identified using automated sentiment analysis.

Seemingly confounding themes emerged in the comments received. Many respondents indicated that the population is healthy and that Spanish mackerel are big and abundant. Conversely, a large number of respondents indicated that the population is in decline. Respondents attributed the decline to commercial netting, porgy fishermen, shark depredation, and overharvest by both commercial and recreational anglers. Some anglers asserted that there have been no significant changes to the stock, while others noticed that there were less fish but the individual fish were bigger overall. Some respondents also postulated that their migration

habits had changed due to factors including red tide. It was also noted repeatedly that management measures are appropriate and do not need to be changed.

The results of Fisherman Feedback for Spanish mackerel will be submitted to the NOAA Southeast Fisheries Science Center and shared with the Council and it's Scientific and Statistical Committee as SEDAR 81: Gulf of Mexico Migratory Group Spanish Mackerel Operational Stock Assessment is completed and reviewed. The information collected through the tool is not intended to be considered as an index of abundance for direct incorporation into the 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.

Methods
Manual sentiment analysis was conducted by two independent readers and overall comment sentiment was broadly characterized as positive, neutral, or negative. Readers also determined whether comments were related to the condition, health, or abundance of the stock. Those comments were analyzed again and classified based on whether they indicated that the stock was in good, negative, or neutral health. Readers then compared characterizations and resolved any disagreements in interpretation so that both readers agreed.

Automated sentiment analysis characterized each response using the 'tidytext' package in R. For this analysis, the words in each comment were compared to a revised version of the 'Bing' lexicon library which has been amended with characterizations for words commonly used in reporting fishery information. The library categorizes words into positive, negative, or neutral sentiment and scores every word in each comment accordingly. This was used to identify the most common words associated with a positive and negative sentiment.