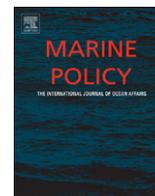




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Short Communication

Shark bites and public attitudes: Policy implications from the first before and after shark bite survey

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ABSTRACT

Public feelings toward sharks are expected to grow negatively following shark bites on humans. Media and government responses are often predicated on this presumptive emotional response; however, there have been no published data on attitudes toward sharks following shark bite incidents. This study shows that levels of “pride” in white shark populations in the absence of an incident remained steady after a shark bite occurred. This was consistent across response areas regarding other marine life and “confidence” in beach safety programs. Results are based on a pilot survey conducted in the Cape Town beach suburbs of Fish Hoek and Muizenberg before and after a shark bite at Fish Hoek beach. The study found no statistical significance between survey responses and the occurrence of the shark bite incident. The results indicate a previously undocumented level of public sophistication following these events. This data challenges the underlying basis of policy responses to shark bites and suggests that new considerations of public knowledge, endemic value and causal narratives should be incorporated into decision making.

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1. Introduction

Policy responses that kill sharks following shark bite incidents undermine the success of shark conservation campaigns. These responses reinforce negative stereotypes about sharks and are often based on efforts to avoid blame while responding to public outcry [1]. However, the evidence of concern about sharks following shark bites has largely been based on media accounts and tourism worries. This paper reports the results of the first survey conducted before and after a shark bite. Respondents in the beach communities of Fish Hoek and Muizenberg in Cape Town, South Africa, were surveyed in June and October 2011 following a shark bite in September. Based on the results of the data, this paper argues that shark bite policy response considerations should include the degree of public sophistication present, the value attributed to endemic shark populations and the important role of clear causal stories to inform the public.

Previous research has looked at public perceptions of sharks with regards to their wildlife value [2], shark finning [3] and media discourse of sharks over time [4]. Given the sensationalized portrayal of shark bites, public support in favor of sharks has been hindered [5]. A 1996 SeaWeb survey found that only 30 percent of

respondents “felt that killing sharks was a serious problem” [6]. Following the 2001 “Summer of the Shark,” [7] a 2003, a survey by the National Aquarium in Baltimore, found that “more than 80 percent said shark populations are ‘just right’ or ‘too high’” [8]. However, no study has surveyed public feelings toward sharks directly following a shark bite on humans.

The difficulties in collecting this data are clear. Predicting where a shark bite may occur, obtaining a baseline survey of that locality, and then repeating the survey following an incident are significant challenges. Yet such data has implications for shark conservation science since explanatory variables may prove effective at mitigating overreactions from the public or politicians and provide insights toward shark conservation education. A recent spike in fatal shark bite incidents highlights the value of such research as policy responses to several of these events included the increased application of lethal shark control methods. Shark bite incidents in 2010 and 2011 led to efforts to kill sharks through shark hunts (or long-line cullings) in Egypt in 2010 as well as Russia, the Seychelles, Mexico, and Reunion Island in 2011 [9]. In Western Australia, shark hunts took place in 2011 and 2012 following fatal shark bite incidents but did not result in any sharks being caught. Support for the use of shark nets on beaches to mitigate shark bites has also risen. Proposals to install nets in Vietnam (Quy Nhon Beach), Reunion Island, Russia (Primorye) and Australia (Belmont Baths) are being considered. The city of Cape Town endorsed the trial of non-lethal exclusion nets at Fish Hoek beach following a non-fatal incident in 2011.

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This paper reviews public sentiment before and after this incident.

2. Material and methods

Surveys were collected in the Cape Town beach communities of Fish Hoek and Muizenberg. Located in the biodiversity hot spot of False Bay [10], these beaches are approximately 14 km from Seal Island, which is home to a colony of “up to 75,000” [11] Cape fur seals *Arctocephalus pusillus* and seasonal populations of great white sharks [12], *Carcharodon carcharias*. Both beach locations have a history of shark bite incidents on humans. Since 2004, Fish Hoek has experienced three incidents that resulted in two fatalities and Muizenberg has had one serious incident.

Tragic coincidences allowed for a small-*N* pilot survey that included a baseline and follow-up survey of these beach

Table 1

Shark “pride” survey responses. Columns 2 and 3 show levels of “pride” for sharks before and after the shark bite incident, respectively. The *p*-value 0.311 indicates the acceptance of the null hypothesis that the two variables “level of pride” and “shark bite” are independent.

Levels of “pride” in sharks	Before shark bite	After shark bite (28 September)
Little pride	<i>n</i> = 19	<i>n</i> = 17
Average pride	<i>n</i> = 5	<i>n</i> = 11
A lot of pride	<i>n</i> = 26	<i>n</i> = 22

Table 2

Seal “pride” survey responses. Columns 2 and 3 show levels of “pride” for seals before and after the shark bite incident respectively. The last row highlights “a lot of pride” responses among males (M) and females (F). The quantitative analysis (*p*-value=0.259) suggests that the two variables “level of pride” and “shark bite” are independent.

Levels of “pride” in seals	Before shark bite	After shark bite (28 September)
Little pride	<i>n</i> = 3	<i>n</i> = 5
Average pride	<i>n</i> = 6	<i>n</i> = 11
A lot of pride	<i>n</i> = 41 (M = 23, F = 18)	<i>n</i> = 34 (M = 15, F = 19)

communities. On June 22, 2011 a survey of respondents in Fish Hoek (*n* = 25) and Muizenberg (*n* = 25) was conducted regarding their level of “pride in the local marine life,” including seals, dolphins and sharks. The term “pride” was selected to build upon existing literature which notes the importance of endemic value to species conservation [13]. The survey also measured levels of “confidence” in beach safety efforts offered by Surf Lifesavers, Shark Spotters and the National Sea Rescue Institute (NSRI). A Likert-type scale was used and responses were entered into SPSS for initial processing and later into *R* for statistical analysis. *P*-values for Tables 1 and 2 are calculated using Fisher Exact test. On September 28, 2011, the most recent shark bite took place at Fish Hoek on an adult male, which caused the loss of parts of both legs. This took place after a shark was spotted and the beach was closed; however, a rotating power blackout prohibited a shark alarm from being sounded [14]. Following the incident, this survey was repeated on October 13, 2011 in both locations to the same number of respondents (*n* = 50).

To assess public attitudes, one-on-one surveys took place at grocery stores adjacent to the beaches (the Shoprite in Fish Hoek and Checkers in Muizenberg). The demographic breakdown of respondents included 49 males and 51 females, 43 white respondents, 33 Black-South African respondents and 24 people of color. The age breakdown included 36 respondents (ages 18–25), 40 respondents (ages 26–40), and 24 respondents (ages 40–75). Those surveyed were asked, “On a scale of 1–10, how much pride do you have in the local marine life?”, and “how confident are you in local beach safety?” Pride levels were identified and coded as “little pride” (1–3), “average pride” (4–6) and “a lot of pride” (7–10). The same distribution was used for confidence levels “not confident” (1–3), “somewhat confident” (4–6) and “very confident” (7–10). Analysis of borderline numbers “4” and “7” showed minimal use. If respondents asked what “pride” referred to, the word “support” was used to convey the point.

3. Results

This study utilized qualitative and quantitative measurements. The qualitative data indicate that levels of pride for sharks are unchanged following the shark bite incident, as seen in Table 1. This consistency is also seen in responses for dolphins (Fig. 1). In addition, degrees of confidence in Surf Lifesavers, Shark Spotters

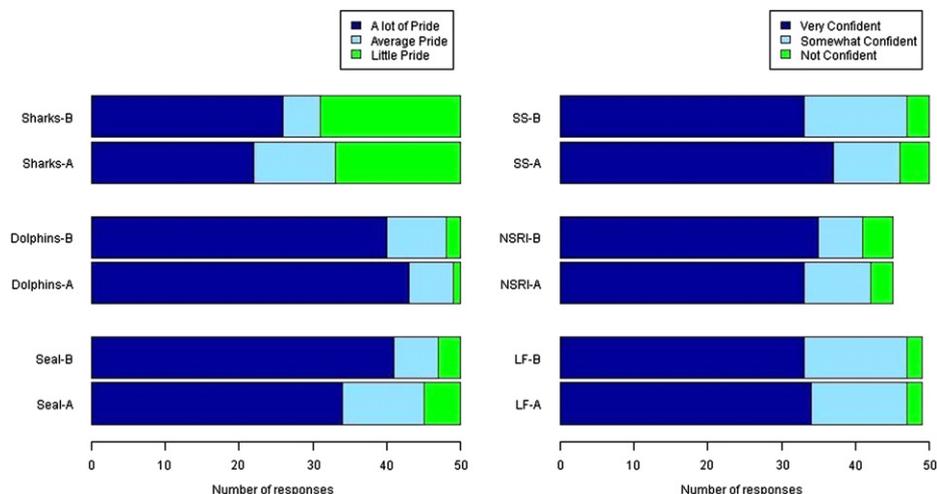


Fig. 1. Shark bite “before and after” survey responses to “pride” among animal species and “confidence” of beach safety measures. Left panel: variables are noted to indicate survey responses to sharks, dolphins and seals “B” (before) and “A” (after). These include “a lot of pride” (black), “average pride” (light gray) and “little pride” (dark gray). Right frame: variables are noted to indicate survey responses to Shark Spotters (SS), National Sea Rescue Institute (NSRI) and Fish Hoek Surf Lifesaving (LF). These include “very confident” (black), “somewhat confident” (light gray) and “not confident” (dark gray).

and NSRI are also unchanged. While levels of support for sharks are lower than those for dolphins or seals, they go no lower and levels of pride for dolphins are high and stay high. One exception is noted regarding the level of pride in seals. Empirically, there appears to be an increase in negative indicators for seals, including more “little pride,” more “average pride” and fewer “a lot of pride” responses (Table 2); in particular, males were less supportive of seals in the “a lot of pride” category.

The observed quantitative data implies that there is no statistically significant connection based on Fisher exact test between the levels of “pride” or levels of “confidence” and the occurrence of the shark bite incident (p -value=0.311). It was expected that there would be a strong negative relationship between pride in local shark populations and the frequency or proximity of shark bite incidents; however, these results do not support that expectation.

4. Discussion

The results demonstrate that public attitudes toward sharks should be considered more sophisticated than previously thought and that attitudes toward sharks may be independent of the occurrence of shark bite incidents. The limited sample sizes involved may be a factor in the lack of statistical significance; however, the insignificance across all variables and the qualitative consistency observed supports the independence of shark bites as a variable. Clearly, the use of larger sample sizes in future research will provide valuable information in testing these results.

There are cases where shark bites may result in decreased support for sharks and public outrage. However, this study shows that this is not always the case and may offer assistance to governments responding to tragic shark fatalities. Several points are instructive for considering future responses to shark bites. First, local respondents did not appear to hold sharks or government-funded beach safety programs (such as the Shark Spotters) responsible for the incident. Research that argues that incumbent politicians may irrationally be blamed by the public for shark bites [15] and that policy over-reactions are required to protect governments from potential blame [16] are offered an alternative perspective by this research. Secondly, the decline in support for seals offers a snapshot of public attribution of blame based on alternatively adequate causation. As a result, new considerations regarding responses to shark bites may include public understanding, local experience with sharks and the details of an incident. Together these offer a holistic view of shark bites that acknowledge the ecological totality required to bring humans and sharks together. Finally, additional attention from scientists and policymakers toward the investigation and explanation of shark bites may give new meaning to these events and place them in qualified categories in the future.

5. Conclusion

This research suggests that shark bites do not always produce negative emotional responses toward sharks or governments

when an adequate causal story is present. As a result, the politics of shark bites and the selection of policy responses should consider methods of shark bite prevention and beach safety that inform the public before and after these incidents occur. Public sophistication of the dynamic nature of beach ecosystems makes communicating these narratives possible. Greater study is needed, yet this survey affirms the key role that the endemic value toward sharks plays, even following shark bites on humans. This data may provide valuable insight for the direction of broader shark conservation education.

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