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Recreational shark fishing in Florida: How research and strategic science communication helped to change policy

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Abstract

Sharks are taxa of significant conservation concern, and while commercial overfishing is the leading cause of population declines, recreational angling poses an increasing threat to some coastal shark populations. Here, I present a detailed case study of my role in a multi-stakeholder process to improve policy surrounding recreational fishing for threatened sharks in Florida. While many other people including other scientists, concerned citizens, responsible conservation-minded anglers, and environmental activists played key roles throughout this process, my scientific research and public engagement contributed significantly, and is the focus of this case study. Over the course of several years, my research documented the scope of several unnecessary angler practices that were harmful to threatened shark species. As a result of my research and stakeholder interactions, I was able to propose science-based politically feasible policy solutions, and I strategically communicated the problem and possible solutions to policymakers, journalists, environmental activists, scientific professional societies, and the public. In July of 2019, the Florida Fish and Wildlife Conservation Commission enacted new rules for land-based shark fishing in Florida waters, incorporating several of my proposed solutions. This case study demonstrates that through careful planning, understanding policy, developing a strategic communication plan, and networking with key stakeholders, even early career researchers can successfully help to change policy and help protect threatened species. Supplementary materials (Data S1) contain detailed background information, a timeline of events, and a diverse set of examples of my science communication.

KEYWORDS
fisheries, fishing, policy change, recreational fishing, science communication, sharks, species at risk, threatened species

1 | INTRODUCTION AND OVERVIEW

After nearly a decade of trying to improve public policy surrounding recreational shark angling in Florida, including sometimes acrimonious public discourse involving competing stakeholder groups, the Florida Fish and Wildlife Conservation Commission (FWC) in July 2019 enacted policies to further protect threatened shark species from unnecessary and harmful handling practices. This decision was made by FWC with critical input from a diverse set of stakeholders (including other scientists, environmental activists, and concerned citizens) and informed by science. Research was conducted when I was a graduate student played an important role in this process, as did my strategic communication of my key results. In this case study, I outline my role in this multi-stakeholder process, showing that through scientific research, strategic planning, learning important communications and policy skills, and networking with key stakeholders, even early career researchers can help change policies and help to protect threatened species. It is my goal for this case study to aid early career researchers who want their research to make a difference by describing general tips and tricks and highlighting specifics from my involvement in this issue.

2 | THE PROBLEM

The largest threat facing sharks as a group is commercial overfishing. However, a growing body of evidence shows that for some particularly threatened species of fishes (Coleman, Figueira, Ueland, & Crowder, 2004; Cooke & Cowx, 2004) and sharks specifically (e.g., Kyne & Feutry, 2017), recreational angling can pose a conservation threat. In Florida, some common recreational shark angling practices were resulting in the deaths of threatened shark species (Data S1: "The Problem").

For example, hammerhead sharks, especially great and scalloped hammerheads which are assessed as Critically Endangered by the IUCN Red List, are physiologically vulnerable to angling stress, and often die even if they are released by anglers (Gallagher, Serafy, Cooke, & Hammerschlag, 2014). This means that hammerhead sharks are poor candidates for catch and release fishing. Hammerhead sharks are a popular target of Florida recreational anglers (Shiffman & Hammerschlag, 2014), and there are even hammerhead shark focused fishing tournaments (Shiffman, Macdonald, Ganz, & Hammerschlag, 2017). Land-based shark anglers commonly engage in unnecessarily rough angling and handling practices prior to releasing the sharks they catch (Shiffman et al., 2017). These practices likely result in post-release mortality

(indeed, dead hammerhead sharks wash up on beaches shortly after land-based fishing occurs) or sublethal effects. These harmful practices include dragging sharks fully out of the water, onto sandy beaches or wood or concrete piers. Dragging across rough terrain like this causes bleeding abrasion injuries, air exposure can cause permanent gill damage, and while out of the water these large animals' internal organs lack the buoyant support of the water. Other threatened shark species are also commonly targeted, caught, and (sometimes) killed by recreational anglers, taking advantage of loopholes in existing regulations. Harmful practices like long fight times and air exposure can also occur with boat-based recreational fishing.

Although the earlier policy actions by FWC prohibiting harvest of large-bodied shark species in state waters were a big step in preserving these vulnerable species, pre-existing best practices for anglers were not sufficient to resolve the problem of continuing mortality of prohibited shark species along Florida's beaches. This led to stakeholder calls to change the regulations.

3 | AN ACHIEVABLE SOLUTION

While merely publishing a paper in an academic journal is insufficient to inspire policy change, it is often a first step. By speaking with policymakers and policy experts, I developed an understanding of where the key data gaps preventing policy change were, and designed scientific research projects to fill those gaps. After researching the problem (Shiffman et al., 2014, 2017; Shiffman & Hammerschlag, 2014) and consulting with stakeholders, decision makers, law enforcement officers, and other scientists, I recommended a set of policy solutions to the managing authorities (FWC) that would reduce mortality for threatened shark species without infringing on the rights of rule-following conservation-minded anglers in the form of a detailed policy brief (Data S1: "An Achievable Solution" and "Policy Brief"). The solution I proposed focused on restricting harmful and unnecessary angling practices without attempting to ban all fishing, and specifically focused on avoiding prolonged air exposure, long fight times, abrasions from dragging, and injuries from specific gear types (e.g., Kerstetter & Graves, 2006).

4 | MY SCIENCE COMMUNICATION STRATEGY

Like any scientist, I needed to know the literature and main ideas in my field, design and conduct rigorous research and submit it for peer review, and identify critical results. But as a scientist who was motivated to have

my research inform policy, I *also* needed to educate myself on how research can influence policy change (Moore et al., 2018; Phillis et al., 2013). This also involved using principles from the field of science communication (Burns, O'Connor, & Stocklmayer, 2003), which focuses on translating technical scientific results into formats that non-experts can understand and value. When done correctly, fisheries regulations can be influenced using social media (Shiffman, 2018) by educating and motivating stakeholders and concerned citizens to speak in favor of change. Over the course of 7 years (Data S1: "Timeline"), I developed and enacted a strategic communications plan to share key results and arguments.

The overall goal of my science communication strategy was to provide information I had learned through my research to key audiences, including concerned citizens, decisionmakers, and other stakeholders. Specifically, I set to effectively and broadly communicate three key points: (a) Several current recreational shark angling practices were causing harm to IUCN Red List Endangered species of sharks; (b) relatively simple policy solutions were available that were backed by science and did not infringe on the rights of conservation-minded anglers; and (c) enacting these proposed policy changes required public support.

Carrying out this plan involved a long-term commitment to write multiple times across a diverse suite of outlets including blogs, an op-ed, and formal statements by professional societies (Data S1: "Blog Post," "Op Ed. Florida's Chance to Protect Threatened Sharks," "Professional Society Letter of Support"), as well as speaking to the popular press (Data S1: "Selected Media Coverage"). Communicating science should not be thought of as a "one off" process, but requires a commitment to seek diverse opportunities to correct with a broad array of people using diverse communication tools. I also spoke to thousands of Florida citizens and posted regular updates via social media (especially on my Twitter and Facebook pages Twitter.com/WhySharksMatter and Facebook.com/WhySharksMatter). Importantly, each audience needed to hear a similar message, but with different levels of technical detail and requested actions for each; a key principle of science communication is to know and understand your audience's values and levels of understanding of the issues, and to tailor a message to that audience without compromising the integrity of the science.

5 | INTERACTIONS WITH JOURNALISTS, STAKEHOLDERS, AND DECISIONMAKERS

Identifying good science and environmental reporters and developing relationships with them is not typically a skillset taught to early career researchers, but it was critical to the success of my communications strategy. I subscribe to dozens of science and environmental news sites using RSS ("really simple syndication") software called Feedly, which allows me to easily and efficiently get updates when any news source of interest publishes a new article, and I have signed up for dozens of Google News alerts for keywords of interest. By being a strategic consumer of these relevant news topics, I was able to keep my thumb on the pulse of this issue.

After thoroughly reading news coverage of these topics, I identified a list of journalists who do a good job reporting on these issues. I proactively reached out to each to introduce myself as an expert source for future stories on topics of interest, and offered to give them a background briefing about this issue even if they had no immediate plans to cover this story. Social media conversations were also useful for developing and maintaining relationships with journalists. After I had given several interviews on this topic, other journalists who I had not originally identified began to approach me. I also received professional development training focusing on how to speak to science journalists, and I recommend this to any scientist interested in emulating my strategies here, but the key strategy for interacting with journalists to communicate an important message to their readers is to carefully craft that message and focus your interview on that message without getting distracted by needless detail, nuance, and caveats (save that for formal scientific papers).

By following media coverage and associated social media interactions of these issues and by performing my own independent searches, I was also able to identify a thorough list of nonprofit activist groups involved in this issue, law enforcement officers with relevant expertise, concerned citizen activists, and decisionmakers who would be involved in any final policy change. I proactively reached out to each, listening to their perspectives and concerns while sharing my own, and I maintained many of these relationships over the course of several years. Conversations with wildlife law enforcement officers were particularly critical to my understanding of how loopholes in current regulations were being exploited, and how to close those loopholes. Conversations with decisionmakers and environmental nonprofit activists were particularly critical to my understanding of the process by which laws and regulations are changed.

Developing and implementing strategies for science to inform policy change are not typical skills that most early career scientists learn in graduate school (but Chapman et al., 2015 mentions this skillset). Nevertheless, each of these skills was necessary in this case to ensure that my research helped to inform policy.

Deficiencies in one or more of these skillsets can be overcome by building a team of people with complementary skills. Additionally, each of these skillsets can be developed through formal professional development training, which is often available (or can be requested) through your university, professional society, or non-profit partners. It can also be developed through hands-on experiences available to early career researchers such as serving on professional society committees or graduate school leadership positions.

6 | CONCLUSION

It is difficult to know the full extent to which my, or anyone else's, efforts made the difference in the policy changes announced by FWC. It was, in the end, a broad-based effort supported by many stakeholders and organizations. What I do know is that I engaged in a broad, data-driven science communication strategy that reached policymakers, stakeholders, and thousands of concerned members of the public. I would like to think that I encouraged many people to become active stakeholders, encouraged scientists to become more actively engaged, and encouraged policymakers to consider change, and I would like to think that my efforts made a difference. I know that my perceived credibility in this science communication was grounded by the fact that I was a researcher with experience relevant to this issue, and by the fact that I had made such a thorough effort to understand the nuances of policy. Being invited to (remotely) provide expert testimony in public hearings held by FWC support this view that my actions made a difference in the outcome, and I was happy to note that many people shared public comments based on the talking points I distributed via social media. Once FWC agreed to revise regulations, my proposed policy changes were widely distributed and discussed, and formed a key part of the eventual (July 2019) final policy.

The world has many conservation challenges, and it can be daunting as an early career scientist to know where to start if you want to affect change. However, this case study is an example of how through applicable scientific research, thorough understanding of policy, and extensive, strategic science communication, it is possible for an early career researcher to play an important role in achieving conservation policy change.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.