Online News Media Coverage of Sea Turtles and Their Conservation

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The media can be key in informing individuals around topics not easily observable, such as remote environmental issues and wildlife. Sea turtles are enigmatic animals that attract public attention, but they have faced severe population declines worldwide. Assessing how the news reports on sea turtle conservation is critical in evaluating how a concerned layperson may perceive threats affecting these animals and can provide insights on how experts can better engage with the media. We collected online articles about sea turtles from 2003 to 2019, recording the frequency by which various threats were mentioned as hazardous to sea turtles, the types of solutions noted in response to these threats, and common quoted messengers. We found that the media disproportionately reports on the threats of pollution and resource use. Importantly, this may not align with scientific consensus of top conservation concerns for these animals and can be problematic if it leads to a misinformed public.

Keywords: sea turtles, marine conservation, media analysis, news coverage

Sea turtles are charismatic marine animals whose enigmatic nature can pique public attention (Barney et al. 2005). Although sea turtles have existed over 100 million years (Hirayama 1998), several environmental and human-induced hazards have caused severe population declines over the past century and particularly in recent decades (Witherington et al. 2009, Tapilatu et al. 2013). Found worldwide, these captivating marine animals spend most of their lives at sea and can occasionally be spotted when foraging in coastal habitats or returning to nesting beaches. However, many people may never get to see a sea turtle in the wild and, instead, must rely on information from visits to aquariums or through the media.

The news media plays an influential role in focusing public attention to important issues (McCombs 2002, Takahashi and Tandoc 2016) and can shape broader understanding of societal problems (Bosk and Stephen 1988). It can be particularly vital for topics that are not part of a person's daily life, including remote environmental (Mikami et al. 1995) and wildlife concerns (Corbett 1995). The media can influence one's risk perception through the number of articles published on a given topic (Wahlberg and Lennart 2000). People tend to use information availability to estimate risk probability, so the number of publications is key to how the media shapes one's understanding of threats (Wahlberg and Lennart 2000). Disproportional news reporting on one topic can falsely lead individuals to believe that it is more important than all other issues. Shiffman and colleagues (2020) found this aggregate coverage bias problematic in media coverage of sharks; an overwhelmingly number of news articles have been published on shark finning in particular. They note that the amount of media coverage can ultimately bias public understanding of the threats these animals face (Shiffman et al. 2020).

The media determines what information to present and the frequency of coverage to dedicate to particular topics (Reese and Ballinger 2001), influencing public opinion on an issue's importance and relevance (McCombs and Shaw 1972). Therefore, assessing media coverage of endangered species is critical to understanding how public perceptions may be formed, which can ultimately prompt conservation advocacy and support. Media study analyses have been conducted on sharks (Muter et al. 2013, Sabatier and Huveneers 2018), panthers (Jacobson et al. 2012), and grizzly bears (Hughes et al. 2020), but to the best of our knowledge, there have been no studies conducted to date assessing media coverage on sea turtles. Sea turtles are a unique case study, given that their charismatic nature attracts public attention (Liordos et al. 2017) and that they are often used as a conservation icon (Tisdell and Wilson 2005). Furthermore, they have been recently linked to the antiplastic movement after a video of a sea turtle with a straw wedged up its nose (Figgener 2015) went viral and shaped recent public and media dialogue around ocean plastics (Chiu 2019). Given that the media can influence public discourse and shape how individuals think about a subject (McCombs and Shaw 1972), an evaluation of media coverage on sea turtles is critical to understanding how people might perceive information about these species.

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The news media is an important avenue in disseminating scientific information to the public (Takahashi and Tandoc 2016) and nearly 90% of the US public is reported to consume at least some of their news online (Pew Research Center 2019). Google News has become a global gateway for online news, aggregating and redistributing news items from other organizations. It has grown tremendously since its conception in 2002, serving approximately 150 million unique visitors a month, and together with Google Search, acts as the biggest driver of traffic to top news sites (Heimlich 2011, News Media Alliance 2019). Online news has opened new opportunities for news stories and knowledge to spread, given the ability of online information to go viral (Berger and Milkman 2016), as well as mass distribution and sharing within social media (Newman 2011).

Our objectives in the present study were to assess Google News aggregated online text news coverage related to sea turtles and their conservation. We explored news coverage since 2003, shortly after Google News' formation, but we focused our analyses primarily on news reporting during the last decade (2010–2019). We specifically wanted to assess news coverage on various sea turtle threats by determining the frequency of articles published. In addition, we studied the different actions or solutions that were noted to minimize harm to these animals, as well as the messengers who were most often quoted in sea turtle media coverage. Overall, we aimed to evaluate how a concerned news consumer might obtain information about sea turtles and their hazards.

Article selection

Google News (www.news.google.com) was used in April 2020 to identify sea turtle related online text news articles published between 1 January 2003 through 31 December 2019 using the following Boolean search string: *"sea turtle*" OR "marine turtle*"*. We were interested in online news content that were primarily about sea turtles, rather than articles that mentioned them briefly but were not the core subject of the piece. Therefore, we screened all articles to select out those that contained the keyword *"sea turtle"* or *"marine turtle"* both in the title or subtitle and in the body of the article (similar to Muter et al. 2013). We also accepted articles that used the term *"honu"* or *"pawikan"* instead, both of which represent cultural terms for sea turtles. Articles with only the keyword *"turtle"* in the title or subtitle were included if the text indicated that the topic was about a sea turtle, rather than a terrestrial or freshwater turtle. We wished to focus on text news; therefore, articles that centered on a video or audio broadcast, podcast, or photo slideshow without an accompanying text article were also excluded. Finally, we also omitted articles that used the term or idea of a sea turtle as a marketing or advertising tool with no relation to the animal (e.g., sea turtle named running races, sea turtle named beverages or food).

We reviewed all identified articles on a yearly basis and omitted the irrelevant ones. Out of 2712 total results, we identified 1580 Google News aggregated text articles published from 2003 through 2019 that were primarily about sea turtles. Research has demonstrated that sampling news articles every other day is statistically comparable to sampling every day (Evans and Ulasevich 2005), with similar strategies used in other media analyses (Anastasio and Costa 2004, Smith and Wakefield 2006). So, articles for full-text analyses were systematically selected every other day from 1 January 2003 to 31 December 2019. After sorting, 777 articles remained for inclusion in the analysis; each was read and coded for full analysis.

Codebook. A codebook was developed (see the supplement material) on the basis of our research objectives and organized around four general categories: general article information, threats mentioned as hazardous to sea turtles, solutions mentioned in response to threats, and quoted messenger types. First, general article information was recorded, including article URL, title, authors, news outlet, publication date, primary geographic scope, primary article topic, and species mentioned. Second, we identified any mentions of threats facing sea turtles and classified them into seven categories (based largely on the hazard categories in Bolten et al. 2011). These threat categories included fishing bycatch (e.g., the unintentional capture of nontarget species during fishing), nonfisheries resource use (e.g., illegal or legal harvest, vessel strikes, human harassment), construction and development (e.g., coastal construction, beach renourishment, beach armoring), habitat alterations (e.g., beach erosion, water quality), species interactions (e.g., disease, predation), and climate-related threats (e.g., weather events, cold water). Third, we noted different solutions or actions that were mentioned in response to mitigating sea turtle threats. We coded these solutions around three broad categories, including policy, law, or regulation; behavioral change or individual action (e.g., reporting a sea turtle stranding, removing beach equipment and trash, not disturbing nests); and stated need for more science or research. Finally, we also assessed the types of messengers who were quoted directly as sources in these articles (e.g., university-affiliated professional, politician, nongovernmental organization, or advocacy representative).

Data collection and analysis. To verify intercoder reliability, two coders independently coded a subset of randomly selected articles representing approximately 10% of the corpus ($n = 82$). Cohen's kappa (Cohen 1960) was computed for each variable to assess intercoder reliability, and all elements were found to have a substantial level of agreement ($\kappa > .07$; Landis and Koch 1977). One coder then coded the remainder of the articles ($n = 695$). A list of all articles coded for this study is available in the supplemental material. The results were analyzed using RStudio.

News reporting frequencies and patterns

A total of 777 articles were coded in total across a 17-year period ranging from 2003 through the end of 2019, with an overall increase in news coverage over time (figure 1).

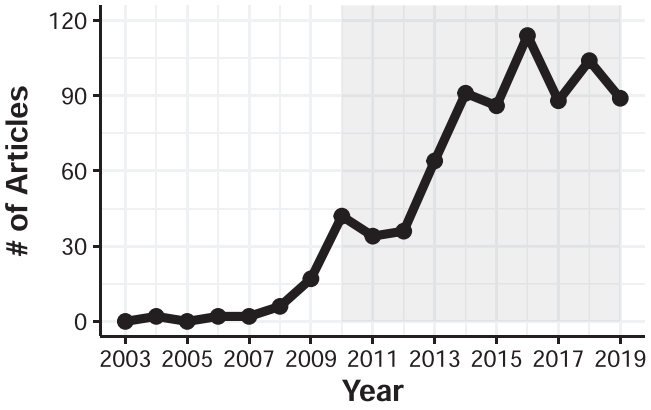

Figure 1. The number of Google News aggregated online text news articles about sea turtles published from 1 January 2003 through 31 December 2019, sampling every other day. The gray shading represents coverage encompassing the decade of 2010.

Although 2003 was included in the original search, there were no relevant articles published in 2003 or 2005 using our every other day sampling methodology. News coverage was low in the early and mid-2000s, but the number of sea turtle Google News aggregated articles increased relatively quickly throughout the late-2000s and early 2010s, reaching a peak in 2016 (n = 114). Despite some annual fluctuations, reporting appears to have remained relatively stable after the large growth observed between 2007 and 2014 and has averaged about 96 articles a year in the last 5 years (2015–2019). Given the very small number of articles published from 2003 to 2009, we focus our analyses on the past decade of news coverage (1 January 2010 through 31 December 2019; n = 748), for which the sample size was at least 30 articles a year.

Overall, a sea turtle conservation issue was the focus of most articles (61%, n = 460), followed by coverage of nonconservation aspects of sea turtle biology, ecology or evolution (19%, n = 146) and tourism or education focused coverage (15%, n = 115; table 1). Geographically, most coverage focused on the North Atlantic Ocean (66%, n = 492), followed by the North Pacific Ocean (16%, n = 122). A small number of articles reported on issues in the Atlantic (1%, n = 4) or Pacific Ocean (3%, n = 23) more generally, without specifying the northern or southern ocean basin. About 4% of articles (n = 33) did not specify a geographic location, discussing issues more broadly, whereas other locations were mentioned in just 2% (n = 13) of the news reports (e.g., landlocked aquariums, unspecifed laboratories). Green sea turtles (36%, n = 266) and loggerheads (35%, n = 263) were the most common species cited. Nearly a quarter of all articles (24%, n = 180) spoke about sea turtles in a general sense and did not identify a specific species.

Sea turtle threats. Most articles (74%, n = 577) mentioned at least one of the seven threat types we coded for. Over 40% discussed issues of resource use (43%, n = 247) and pollution (42%, n = 242; figure 2), followed by coverage on bycatch (31%, n = 179). About a quarter mentioned species interactions (26%, n = 150) and climate-related threats (24%, n = 140), whereas habitat alterations (12%, n = 66) and construction or development (10%, n = 55) were covered to a lesser extent. Coverage of the various threat types varied from year to year without many clear trends, but percent annual coverage of fishing bycatch seems to have decreased over the study period, whereas resource-use articles declined after a peak in 2014.

Pollution and resource-use threats were most discussed throughout the entire decade (figure 2). Of all articles that discussed pollution (n = 424), most mentioned plastic or trash debris (55%, n = 132), followed by light pollution (38%, n = 91), oil pollution (12%, n = 29), entanglement in derelict fishing gear (8%, n = 20), and other (e.g., noise and chemical pollution; 7%, n = 16). Discussion of oil pollution dropped dramatically over time after a peak in 2010, whereas coverage on the hazards of light and plastic or trash pollution to sea turtles appears to have increased steadily over the decade. Approximately 11% of articles (n = 27) did not specify the type of marine pollution, referring to the term more generally (e.g., *"pollution"* or *"marine pollution"*).

Resource-use articles largely focused on the harvest of sea turtle eggs, shells, or meat (57%, n = 142; figure 2). Reporting on these issues were particularly high in 2012–2014 but has gradually declined throughout the rest of the decade. A relatively smaller proportion of resource-use articles mentioned vessel strikes (20%, n = 48), recreational beach use (11%, n = 27), and human harassment or tampering (11%, n = 26).

Solution types. About half of all articles mentioned a solution or action geared toward reducing threats (51%, n = 385); most mentioned a solution at the individual, behavioral level (51%, n = 197) or a policy or law (50%, n = 194; figure 3). Only 16% of the articles mentioned the need for more science or research as an avenue for mitigating hazards to sea turtles (n = 63). The relative proportion of all articles that mentioned an individual behavior or action appeared to increase throughout the decade, whereas the proportion of articles referencing a law or policy decreased. Percentage of articles that cited an explicit need for more science or research to better understand sea turtle stressors remained relatively low over time.

Quoted messengers. Overall, two-thirds of the articles (67%, n = 518) directly quoted a specific person in their reporting (figure 4). Representatives from nongovernmental organizations (NGOs) or advocacy groups served as quoted messengers in over half of the articles with a primary source (58%, n = 299), followed by government-affiliated (29%, n = 152) and university-affiliated (24%, n = 126) personnel. Other quoted messenger types included members of the public (9%, n = 45), medical professionals or veterinarians (4%, n = 23), industry or retail representatives (4%, n = 21), fishers

Table 1. Primary topic, geographic scope, and species mentioned for Google News aggregated online text articles about sea turtles published from 2010 to 2019.

Variable	Number of articles	Percentage of total
Primary article topic		
Sea turtle conservation issues	460	61
Sea turtle biology, ecology or evolution	146	19
Tourism or education	115	15
Sea turtle professionals	17	2
Other	10	1
Primary geographic scope		
Atlantic Ocean (generally)	4	1
North Atlantic	492	66
South Atlantic	9	1
Pacific Ocean (generally)	23	3
North Pacific	122	16
South Pacific	41	5
Indian Ocean	31	4
Mediterranean Sea	21	3
Other	33	4
Unspecified or unknown	17	2
Species common name		
Green sea turtle	266	36
Loggerhead sea turtle	263	35
Leatherback sea turtle	128	17
Kemp's ridley sea turtle	95	13
Hawksbill sea turtle	77	10
Olive ridley sea turtle	66	9
Flatback sea turtle	12	2
Unspecified or unknown	180	24

(1%, $n = 5$), politicians (1%, $n = 4$) and other (1%, $n = 7$). The use of representatives from NGOs or other advocacy groups as primary sources increased over the 10-year period, whereas quoted messages from university-affiliated professionals had an opposite trend and decreased. The number of articles citing government-affiliated personnel has remained relatively stable over the past decade.

Media emphasis may not align with scientific understanding

The news media can be an important source of information for the public, and our analyses highlight how interested individuals might come to understand key issues around sea turtle conservation on the basis of the frequency of news reporting. First, our results suggest that media consumers may run the risk of being misinformed about the types and intensity of threats that sea turtles face, given the disproportionate coverage on a few specific hazards (figure 2). Importantly, it is critical to consider the frequency of threat types mentioned in the media in the context of wider global hazards that have been emphasized as conservation priorities by experts (Hamann et al. 2010, Bolten et al. 2011). Threats facing sea turtles can be complex, varying spatially, temporally, and among species (Wallace et al. 2011). But there has been increased recognition within the scientific community on the overwhelming importance of protecting large juveniles and subadults that are not yet of reproductive age, given its large impact on driving population dynamics (Crouse et al. 1987). Sea turtles can face numerous threats at sea during these older life stages, but fishing bycatch has become well recognized as a top oceanic hazard facing populations (Donlan et al. 2010, Wallace et al. 2011) and kills thousands of sea turtles a year (Lewison et al. 2004). Although scientists identify bycatch as contributing to the decline of global sea turtle populations, particularly during the critical older life stages (Crowder et al. 1994), we found that not only has this issue received relatively moderate coverage in the news media, but reporting has decreased over the last decade (figure 2). Mentioned only third in frequency by total article count, our results show that most press coverage instead focused on the threats of resource use or pollution. This can be problematic if it mistakenly leads readers to believe that these are bigger threats to global sea turtle populations.

Although coverage of the threats of resource use and pollution dominated over the past decade, our results reveal that news attention in recent years is driven primarily by a few specific hazards within these categories (figure 2). First, the high coverage on resource-use hazards appears to be influenced nearly entirely by increased attention on sea turtle harvest from 2012 to 2014, potentially related to publicized conflict with illegal harvesters and the death of a turtle researcher in Costa Rica during this time (Martin 2013, Wallace 2013). But news reporting on sea turtle harvest and overall resource use decreased in the second half of the decade. Similarly, certain components of pollution have also decreased over time. Reporting on oil pollution as a sea turtle threat peaked in 2010, likely reflecting coverage related to the highly publicized 2010 BP *Deepwater Horizon* oil spill in the Gulf of Mexico, which was reported to dominate mainstream news coverage after the spill (Pew Research Center 2010) and had severe, widespread impacts on sea turtles and their habitats (Frasier et al. 2020). The number of articles mentioning the impacts of oil pollution on sea turtles has dropped dramatically since, and instead, the high coverage of pollution in recent years appears to be driven primarily by increased reporting on the impacts of light and plastic or trash pollution (figure 2). Light pollution has been shown to affect turtles by deterring nesting females or disorienting emerging hatchlings (Witherington and Martin 2000). Coupled with the strong focus on North Atlantic issues (table 1), reporting on this threat may be driven by increased efforts to raise awareness and curb the impacts of light pollution on major US nesting beaches (Brei et al. 2020).

However, the disproportionally large coverage of plastic and trash pollution as a sea turtle threat (figure 2) and the

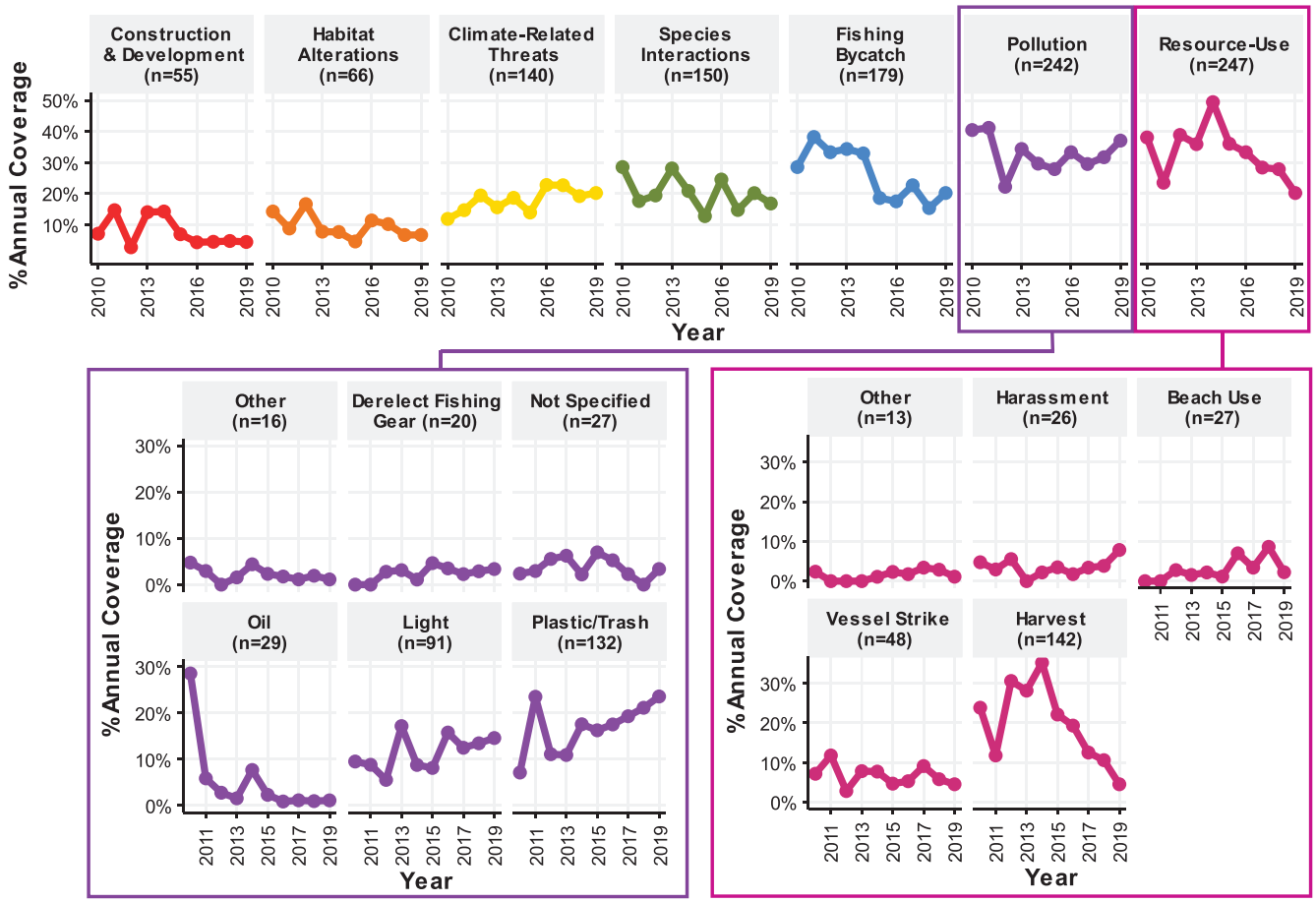

Figure 2. Google News aggregated coverage of sea turtle–related news from 2010 to 2019 (n = 748) by threat type (top panel). Data is represented as percent annual coverage and is calculated relative to the total number of sea turtle articles published each year. Resource use and pollution, together representing the majority of threat types covered by the news (65%, n = 489), are further broken down into their respective components in the lower panels.

apparent increase in recent years are unsurprising but potentially concerning if they misguide individuals about their relative impact to sea turtle populations. Environmental literature on plastic pollution has expanded rapidly since the 1990s, with a majority focused specifically on plastics in the marine environment (Nielsen et al. 2020). In addition, there has been increased public awareness and concern in recent years on the environmental impacts of plastic, leading to widespread antiplastic movements throughout the world (Arkesteyn 2020). The plastic straw in particular became a well-known public issue after a video of a sea turtle with a straw stuck up its nose went viral in 2015 (Figgener 2015, Robinson et al. 2015), bringing sea turtles to the forefront of the antiplastic movement (Chiu 2019). Arkesteyn (2020) suggests that plastic straws were a successful antiplastic focus because of the relatability of the cause, as something that people could see reflected in their daily lives, as well as the ease in refusing plastic straws at dining establishments. Since then, sea turtles have been used as an empathetic symbol and marketing icon for antistraw campaigns (Chiu 2019), which may have had profound impacts on shaping public perceptions of the impacts of plastic on sea turtle populations. Although research has shown that plastics can indeed pose harm to sea turtles, such as through ingestion of plastic debris (Schuyler et al. 2012, Wilcox et al. 2018), it is likely just a piece of the larger conservation problem. Therefore, the increasing focus of press coverage on trash and plastic pollution can be problematic if it prompts individuals to believe that plastic is of upmost sea turtle conservation concern. Research has shown how individuals already tend to perceive pollution as one of the top threats facing the marine environment, which may misalign with scientific priorities and understanding (Ressurreição et al. 2012, Lotze et al. 2018). It is possible that this increased media attention on plastic pollution as a sea turtle risk, at the expense of coverage on other threats, will lead the public to be misinformed about the variety of other hazards these animals face.

The other four threat categories received comparatively less media coverage. Reporting of climate-related threats, which included mentions of climate change and its impacts,

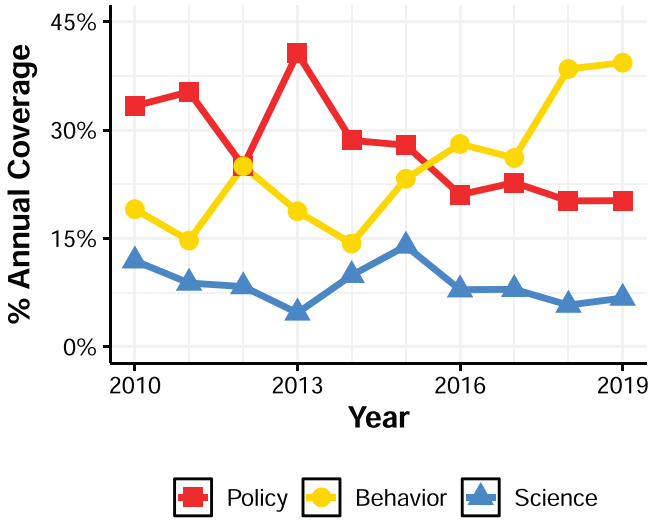

Figure 3. Google News aggregated coverage of sea turtle–related news from 2010 to 2019 (n = 748) by type of solutions mentioned, including policy or law, individual behavioral action, or need for more science or research. Data is represented as percent annual coverage and is calculated relative to the total number of sea turtle articles published each year.

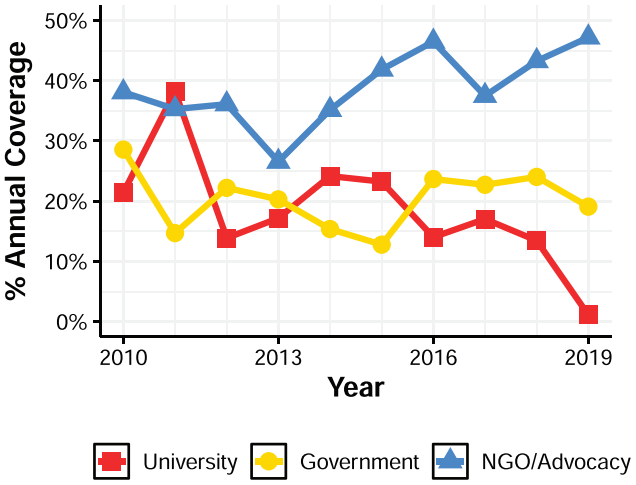

Figure 4. The top three messenger types directly quoted in Google News aggregated coverage of sea turtle–related news from 2010 to 2019 (n = 748). Data is represented as percent annual coverage and is calculated relative to the total number of sea turtle articles published each year.

were low throughout the decade but may be slightly increasing in recent years. Climate change impacts on sea turtle populations are likely to be complex and directly affect all life stages (Poloczanska et al. 2009), although major research gaps exist in understanding its full potential effects (Hamann et al. 2010, Wallace et al. 2011). Other threats that received relatively less media attention included species interactions, habitat alterations, and construction and development. Bolten and colleagues (2011) highlighted how these threats have a greater impact on the terrestrial life stages of sea turtles, principally affecting sea turtle eggs and hatchlings. This may have a smaller impact on overall population dynamics than activities that target older age classes, such as fishing bycatch (Crouse et al. 1987, Crowder et al. 1994). But we recognize that the impacts of threats can vary tremendously, with certain hazard types prioritized differently by local conservation experts depending on location and circumstance (Donlan et al. 2010).

In addition to informing readers about threats facing sea turtles, about half of all reporting offered some discussion of actions or solutions to minimize these hazards. The solutions were primarily driven by policies or laws in the early half of the decade but were surpassed by discussion of changing individual behaviors and actions to minimize sea turtle harm after 2015 (figure 3). The increasing number of articles that mention individual behavioral actions to minimize threats is appropriate, given that for common pool resources, such as the marine environment, an important agent of change are everyday citizens whose choices, behaviors, and actions can amass to have significant impacts. But it is worth considering which threats these actions are aimed to reduce. We note that many articles that discussed behavioral changes were framed around individual actions related to recreational beach use, such as minimizing pollution and not tampering with nests. However, this may lead readers to have more limited awareness of other actions they can take, such as choosing sustainably harvest seafood products, which better resolve the impacts of harmful fishing interactions on sea turtles. Although information alone may not result in proenvironmental behavior (Staats et al. 1996), prompting information of actions in line with scientific understanding of top threats facing sea turtles is nonetheless important. Furthermore, it is worth considering that behaviors with the largest potential benefits for the environment often require political engagement, and the effects of individual actions can be limited without the combination for collective public change (Chawla and Cushing 2007). Therefore, increased media discourse on ways that individuals can support sea turtle conservation efforts politically or through an advocacy lens can also be useful.

Another key result from our study is the decrease in university-affiliated professionals as sources in sea turtle media coverage. We found that advocacy representatives, such as individuals from NGOs or aquariums, were the sources most often directly quoted in all sea turtle related news coverage (figure 4). This is unsurprising, given that environmental advocacy groups tend to focus extensively on public communication and outreach. Furthermore, Google News picks up NGO press releases and publications in their aggregation, which may be more agenda driven and therefore help explain the greater presence of quoted NGO sources. On the other hand, we found that less than a quarter of all sea turtle

news coverage used information quoted from university affiliated professionals, despite the notion that scientists are typically viewed as highly trusted sources of environmental knowledge (Hamilton 2014). Although we recognize that scientists can also be employed in other sectors, such as advocacy and government, our results highlight the notion that challenges still exist in encouraging academics to engage in communication and outreach (Andrews et al. 2005, Ecklund et al. 2012). Importantly, these university-affiliated sea turtle scientists may think about issues differently than other groups, but their voices do not tend to be dominant in the media.

Our study highlights opportunities for sea turtle experts from universities and other research institutions to take a more proactive role in communicating information to the media. Scientists can inquire about existing media outreach and communications opportunities within their institution, but can also cultivate relationships with local journalists independently, offering to jointly craft media messages about their research. Scientists may also consider proactively pitching article ideas to journalists when their research projects are nearing completion, as well as pursuing opportunities to write editorials or opinion pieces for local newspapers. Although increased and targeted media messaging is not necessarily a remedy for setting priorities on sea turtle conservation issues, crafting the news narrative in a way that is best aligned with scientific conclusions can be key in shifting public perceptions and action.

Limitations. Although our study focused on online news as an information gateway, we recognize that sea turtle news can be disseminated to the public through other avenues, such as television, radio, or newspaper, and that coverage from these other outlets were not captured in our study. However, we chose to focus on online news given the increasingly reliance on online sources of news (Pew Research Center 2019). Furthermore, using a news aggregator site such as Google News, which automatically complies information from over 25,000 outlets (Cohen 2009), allowed us to incorporate coverage from a large scope of sources, rather than solely focusing on just a few traditional news organizations or websites.

It is also worthwhile to note that sampling every other day may have influenced the results, because it is possible that the articles that were not considered could have presented different information. For example, some stories with great impact or public interest could have received disproportionate coverage or were picked up by certain outlets on certain days, which may bias the results. Although other media studies have similarly sampled every other day (Anastasio and Costa 2004, Evans and Ulasevich 2005, Smith and Wakefield 2006), other types of methods, including constructive week sampling, have also been shown to reliable estimate online news content with large sample sizes (Hester and Dougall 2007). Therefore, it is worth considering that slightly different trends might have been observed using other sampling methods. Moreover, it is also important to recognize the ways that the media has changed over time, which may have also concurrently influenced results. News media coverage and presentation has evolved; articles across a broad range of news categories, including science, have been noted to be treated in a sensationalized way to gain consumer attention (Kilgo et al. 2018). Changes in the way the media frames news could have introduced unrecognizable trends into the data and may simultaneously influence the way consumers perceive news.

In addition, it is likely that the scope of this study is skewed toward North American news given that we used the US version of Google News (https://news.google.com) to search for articles. We found a strong geographical skew of the data (table 1) toward articles covering issues in the North Atlantic and North Pacific. Furthermore, Google News tends to reinforce a United States–centric view, partly because American news dominates the English media (Segev 2008). Therefore, our study likely does not capture the full picture of sea turtle news coverage, particularly in non-Western and non-English-speaking countries.

Importantly, this assessment of online media coverage only tells us one part of the story. Although the news media has been shown to focus public attention (McCombs 2002, Takahashi and Tandoc 2016) and influence understanding around wildlife and conservation (Wolch et al. 1997, Shiffman et al. 2020), people may acquire information through a variety of sources. Individuals with a more active interest in sea turtles may not just rely on the media coverage to shape their knowledge. Nonetheless, our study provides an important starting point for understanding how the casual news reader may form knowledge and perceptions of sea turtles. We did not directly evaluate public opinions; future investigations could focus specifically on understanding public perception of sea turtles and their conservation needs to better assess the role that media consumption can play in forming individual risk perceptions.

Conclusions

Sea turtle conservation is much more complex than the simplified form that news media offers, but our results suggest that news coverage on sea turtle threats may be disproportionately focused on just a few hazard types, such as pollution and resource use. Importantly, this could bias public opinion, so we argue that greater effort must be taken to communicate the impacts of other pressing hazards, including bycatch, to the wider public. Furthermore, increased proactive engagement of university scientists in media communication efforts could also serve a significant role in shifting the media dialog about these enigmatic species and ways the public could support conservation efforts. Given that the news can influence public knowledge, unbalanced coverage on key conservation issues can lead to a much more limited awareness in areas in which increased publicity could be most worthwhile. Although sea turtle conservation success stories have emerged from various populations around the globe, shifting media discourse can be essential to ensuring

the long-term population persistence of sea turtle populations worldwide.

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Supplemental material

Supplemental data are available at *BIOSCI* online.

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