



An Overview of Increasing Incidents of Bottlenose Dolphin Harassment in the Gulf of Mexico and Possible Solutions

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The panhandle region of the Gulf of Mexico is known by scientists, regulatory agencies and conservation organizations as a “hotbed” area of dolphin harassment. Interactions between humans and wild dolphins routinely occur through close vessel approaches or through direct contact associated with commercial or recreational fisheries, swim-with, or feeding activities. Such interactions are of serious concern for wild dolphin welfare and conservation under the U.S. Marine Mammal Protection Act, as well as for human safety. In recent years, an alarming number of dolphins in this region have been fatally wounded by gunshot, hunting arrows, or sharp tools (i.e., screwdriver). The potential to mitigate the detrimental impacts resulting from these human-dolphin encounters requires a comprehensive outreach strategy to address increasing incidents of harassment and vandalism, as well as an evaluation of the serious trends and challenges hampering dolphin protection in this region. In addition to the identification and conviction of perpetrators through the application of existing law, voluntary outreach programs offer real potential to educate and reform public attitudes and behaviors through community-based stewardship initiatives, which can foster dolphin protection in areas of high human-dolphin conflict. The development of these types of programs underlines the potential for non-regulatory approaches to serve as an effective means to reach and activate the public on some of the most pressing local and regional marine conservation issues. In tandem with regulations and enforcement, voluntary stewardship programs can provide stakeholders an opportunity to engage in local dolphin conservation efforts through a positive approach aimed to inspire accountability.

Keywords: bottlenose dolphins, harassment, vandalism, Gulf of Mexico, human-dolphin interactions, law enforcement, regulations, US Marine Mammal Protection Act

The harassment or “take” of bottlenose dolphins (*Tursiops truncatus*) resulting from increasing opportunities to encounter this species in the wild through commercial or recreational activities which put humans in close proximity to wild populations is of growing concern within the United States. The take of marine mammals, including harassment and feeding, is illegal under the U.S. Marine Mammal Protection Act of 1972 (MMPA), and concern is growing over human-dolphin interactions concentrated in certain coastal areas in the Gulf of Mexico where injuries or fatalities to bottlenose dolphins, specifically, have been documented. These encounters, which bear great potential and risk for injury to the public and to individual dolphins and populations, may take

the form of interaction with recreational or commercial fishing vessels and gear (Wells et al., 1998; Powell and Wells, 2011), direct interaction with humans through feeding or swim-with activities (Colborn, 1999; Samuels and Bejder, 2004; Danil et al., 2005; Cunningham-Smith et al., 2006; Finn et al., 2008; Perrtree et al., 2014), or encounters with vessels during whale or dolphin viewing activities (Wells and Scott, 1997; Nowacek et al., 2001; Constantine et al., 2004; Goodwin and Cotton, 2004; Lusseau, 2006; Timmel et al., 2008). Impacts to wild dolphins from these activities include conditioning and alteration of normal foraging and resting behaviors; disturbance and ultimate dispersal of populations from preferred habitat; injury from vessel strikes or directed harm, and reduced reproductive success, all of which can threaten survival.

REGIONAL CONCERNS

Marine mammal scientists, regulatory authorities and charitable organizations have expressed, through a significant body of scientific literature, targeted outreach programs, and advocacy campaigns heightened concerns over the conservation and welfare impacts associated with increasing human-dolphin encounters in the wild (Figure 1). Dangers to wild marine mammals include injury or death from development of unnatural behaviors such as begging; dependence on human provisioning; vessel strikes; intentional and directed violence and vandalism; ingestion of harmful items; commercial exploitation; and intrusion into critical habitats (Samuels and Bejder, 2004; Cunningham-Smith et al., 2006). Dangers to humans include serious injuries or worse from wild animals that have been illegally fed or chronically harassed (Frohoff and Packard, 1995; Seideman, 1997; Cunningham-Smith et al., 2006).

Federal authorities continue to seek information relating to what appears to be a pattern of violence against dolphins along the coastlines of Florida, Texas, Alabama, Mississippi and Louisiana (NOAA, 2014b). The recent increase in incidents of shooting or directed harm toward individual dolphins in the wild necessitates a review of possible regulatory and non-regulatory approaches to this serious conservation issue. Management becomes crucial in these areas of the southeastern U.S. where viewing and swim-with activities are popular with tourists, concentrated in small geographic areas, and potentially target small, resident populations of *Tursiops truncatus*.

Bottlenose dolphin stranding data maintained by the National Oceanic and Atmospheric Administration (NOAA) show an apparent increase in the number of dolphins stranding dead with evidence of a gunshot wound in the northern Gulf of Mexico. From 2003 to 2016, at least 20 dolphins have stranded with gunshot wounds, with 65% of those occurring since 2011 (Table 1). These incidents are cause for concern considering the potential trauma and suffering experienced by individual dolphins in these cases, and also total unknown impacts on wild populations. The numbers of individuals recovered may only represent a fraction of total numbers of animals that may never wash to shore, strand, or become available to recovery efforts (Williams et al., 2011; Peltier et al., 2012; Wells et al.,

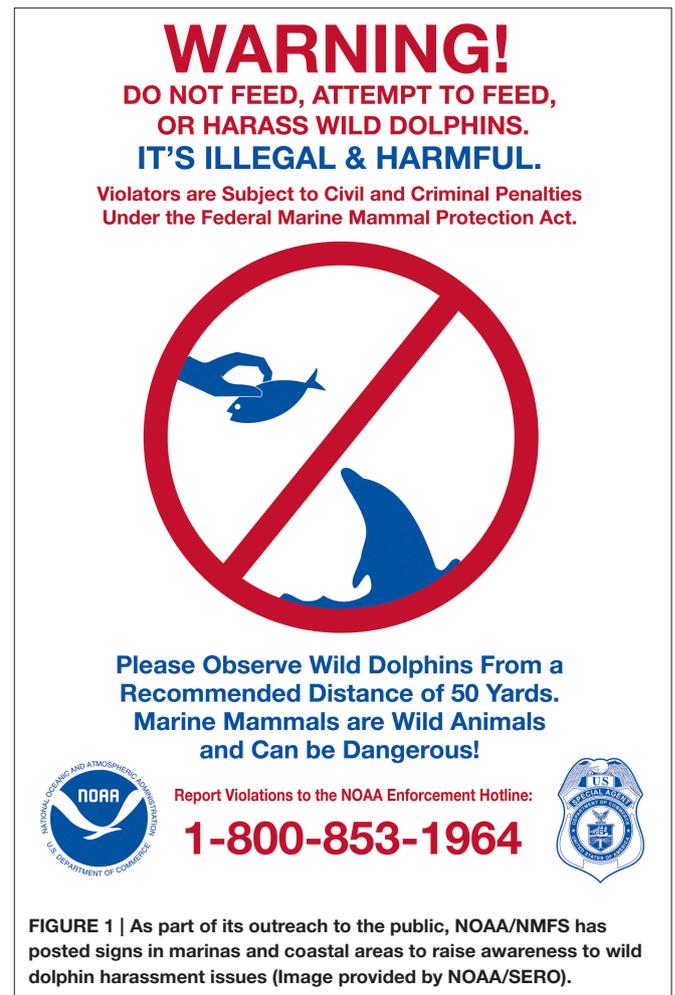


FIGURE 1 | As part of its outreach to the public, NOAA/NMFS has posted signs in marinas and coastal areas to raise awareness to wild dolphin harassment issues (Image provided by NOAA/SERO).

2015). For example, three cases of fishermen shooting at dolphins in the northern Gulf of Mexico were federally prosecuted but the carcasses were not found, and hence, not reflected in stranded animals shown in Table 1 (DOJ, 2006, 2007, 2013). Furthermore, some of these individuals may be pregnant when wounded or killed, exacting a larger toll on wild populations than accounted for. For instance, a bottlenose dolphin found dead from a gunshot wound on Miramar Beach in the area of Destin, Florida in November 2014 was just weeks from giving birth (NOAA, 2014a).

Not included in Table 1 are those dolphin fatalities resulting from other forms of directed violence (e.g., arrows, explosives, other sharp objects). Unfortunately, other types of vandalism are also occurring in this region. NOAA's Fisheries Service's Office of Law Enforcement is receiving increased reports of people taking extraordinary actions against dolphins including shooting, throwing cherry bombs, and pipe bombs (NOAA, 2009). In July 2014, a bottlenose dolphin in Cow Bayou, Texas was fatally shot by two brothers with a compound bow (DOJ, 2015). In November 2014, another dolphin was shot with a hunting bow in Orange Beach, Alabama and died approximately 5 days later from a secondary infection from the wound (NOAA, 2014b,c).

TABLE 1 | NOAA National Marine Mammal Health and Stranding Response Database (previously unpublished data).

DEAD STRANDED BOTTLENOSE DOLPHINS WITH EVIDENCE OF GUNSHOT IN THE GULF OF MEXICO: 2003–2016			
YEAR	DATE	STATE	LOCATION
2016	May 9	FL	Okaloosa Island
2014	November 13	FL	Miramar
2014	February 3	LA	Port Sulphur
2013	April 5	MS	Pass Christian
2013	January 13	LA	Houma
2013	January 11	LA	Grand Isle
2012	November 9	MS	Ocean Springs
2012	September 22	LA	Grand Isle
2012	January 1	MS	Deer Island
2011	July 6	LA	Dularge
2011	February 22	LA	Grand Isle
2011	January 28	LA	Grand Isle
2011	January 11	LA	Grand Terre
2007	June 24	TX	Corpus Christi
2006	December 22	FL	Pensacola Beach
2006	April 15	FL	Bradenton
2004	May 22	LA	Grand Terre
2004	March 16	TX	Matagorda
2004	March 8	TX	San Jose Island
2003	April 13	TX	Crystal Beach

In June 2012 off Dupont Point, Alabama, a bottlenose dolphin was sighted alive with a screwdriver lodged in its head and then later found dead near the Florida-Alabama state line in Perdido Bay (NOAA, 2012).

The contributing causes to this general increase in violence toward bottlenose dolphins in the Gulf of Mexico are partially informed by some of the cases that have been successfully prosecuted to date and existing literature. In several instances, fishermen reportedly became irritated at dolphins trying to take bait and catch from fishing lines or trawl nets and shot or threw pipe bombs at the dolphins to keep them away from their gear and/or catch (DOJ, 2006, 2007, 2013; NOAA, 2009). Provisioning dolphins conditions them to approaching humans and boats for food where they may then attempt to aggressively prey on hooked bait and catches, creating conflicts with fishermen (Zollett and Read, 2006; Read, 2008). Depredation of both commercial and recreational fisheries is a growing problem globally (Noke and Odell, 2002; Brotons et al., 2008; Powell and Wells, 2011). In addition, activities that bring dolphins into close proximity with fishing gear have the potential to seriously injure or kill the animals through ingestion, entanglement, or even vessel strikes (Zollett and Read, 2006; Read, 2008; Wells et al., 2008; Barco et al., 2010; Powell and Wells, 2011; Stolen et al., 2013). As more people locate to coastal areas and participate in recreational activities, the chances for close encounters increase, making local populations susceptible to disturbance, harassment, or direct attack (Samuels and Bejder, 2004; Mattson et al., 2005; Cunningham-Smith et al., 2006; Zollett and Read, 2006). As

a result, it is possible to suggest that a byproduct of dolphin conditioning to human interaction in the region, including activities to swim with or feed these animals, is resulting in closer proximity and access to wild dolphins, exposing them to directed harm and violence (Waring et al., 2015; NOAA, 2016). Finally, it is also possible that increasing awareness and publicity surrounding these events, in addition to expanding stranding response in the region due to Deepwater Horizon oil spill remediation and research efforts, may also be contributing factors toward the growing perception of an apparent increase in the occurrence of violent incidents through enhanced reporting of cases or recovery of carcasses.

POSSIBLE SOLUTIONS

In response to increasing numbers of reports of cases of dolphin abuse and vandalism in this specific area, a variety of approaches have historically been implemented. Some are discussed below, suggesting that other measures may be required.

Non-Regulatory Approaches Protect Wild Dolphins Campaign

Aside from this more recent upsurge in dolphin fatalities, concerns over the feeding and harassment of wild dolphins by the public has a long history. In response to a general trend of increasing interactions between the public and wild dolphins, including swimming with and feeding wild dolphins which bear the potential for injury to both humans and dolphins, NOAA's National Marine Fisheries Service (NMFS) launched its "Protect Wild Dolphins" Campaign in the late 1990s¹. With a focus on recreational activities in coastal waters, NMFS' campaign focused its messaging on the risks associated with close interactions with wild dolphins, harm to the health and welfare of individual dolphins and populations, and the potential illegality of these activities under the MMPA (Spradlin et al., 1999).

Various public outreach materials including brochures, signs, billboards, aerial banners, press releases², social media, and media articles have been produced to inform the public that feeding wild dolphins is illegal, and that recreational swim activities may cause disturbance to wild populations and be considered harassment under the protective provisions of the MMPA. This campaign continues to run in tandem with other public information and outreach initiatives relating to marine mammal protection within NOAA's NMFS³.

Don't Feed Wild Dolphins Campaign

Building upon the "Protect Wild Dolphins" platform, this complementary campaign focused its messaging specifically on the problem of the public's provisioning of wild dolphins, its illegality, and detrimental consequences for both dolphins and humans alike. The initiative was spawned through the collaboration of NMFS and partners within the nonprofit,

¹<http://www.nmfs.noaa.gov/pr/education/protectdolphins.htm>

²For example see: http://www.nmfs.noaa.gov/pr/pdfs/education/dolphin_press.pdf

³http://sero.nmfs.noaa.gov/protected_resources/outreach_and_education/index.html

scientific, and aquaria community to expand public messaging opportunities. In the form of a compelling and engaging Public Service Announcement and informational website⁴, this campaign was designed to illustrate the serious health and welfare impacts associated with feeding wild dolphins, and provide recommendations for fishermen seeking to minimize depredation and conflict with “begging” bottlenose dolphins, especially in regional areas of high human-dolphin interactions.

As part of this campaign, educational materials addressing the problems associated with the discarding of fishing bait and bycatch have also been produced in order to educate the public about the hazards to wild dolphins associated with recreational and commercial fishing⁵. These guidelines are designed to prevent serious injuries to dolphins from fishing gear and boats, and offer recommendations relating to how to act if dolphins are present in the fishing area, how bait should be discarded, and what types of gear and tackle can be used to reduce hazards to dolphins.

Dolphin SMART Program

Dolphin SMART is a voluntary recognition and education program for commercial businesses conducting dolphin watching tours. The program was established in 2007 through a multi-stakeholder engagement process that was convened initially to address the very real problem of dolphin feeding and harassment near Key West, Florida⁶. Within Key West, a very discrete population of resident dolphins is targeted by the commercial dolphin watching community in a very concentrated area (WDCS, 2008).

Currently being implemented in Florida and Hawaii, this stewardship program was developed to provide dolphin tour operators with an incentive program to minimize the disturbance of wild dolphin populations, educational materials for the public, and baseline field research to measure program outcomes. This incentive program requires operators to participate in annual trainings and follow certain viewing and advertising guidelines. These guidelines require adherence to best practices, such as a 50-yard approach distance, not promoting or allowing swim-with activities during a dolphin-watching excursion, and providing an on-board briefing about the program. Operators participating in the program are able to fly a flag that designates them as “Dolphin SMART” and that signals to the public that they contribute to dolphin conservation. Environmentally-conscious consumers, theoretically, would favor an operator that adheres to Dolphin SMART program guidelines and procedures (Cone, 2010).

Although the program has enjoyed some initial success in expanding to various locations in the southeastern U.S., and to three islands in Hawaii, it is challenged by a general lack of resources to fully implement and realize the benefits of this voluntary incentive program.

⁴<http://www.dontfeedwilddolphins.org/>

⁵http://www.dontfeedwilddolphins.org/brochure/dolphin_interaction_card.pdf

⁶www.dolphinmart.org

Regulatory Approaches

Law Enforcement

Law enforcement efforts to prosecute the “take” of bottlenose dolphins are hampered by a general lack of agency resources, difficulty in documenting detrimental human-dolphin encounters, and competing agency priorities. However, more recent action in the courts against fishermen and other individuals in violation of the MMPA may be sending a strong message to the public that NMFS and the Department of Justice (DOJ) are taking these crimes seriously, which may eventually have a dampening effect on these activities in the wild.

In October 2006, a Panama City, Florida charter boat captain was sentenced for knowingly and unlawfully shooting at dolphins as they grabbed his hooked fish (DOJ, 2006). Similarly, in January 2007, an Orange Beach, Alabama charter boat captain was convicted for illegally shooting a dolphin that was approaching his charter fishing vessel (DOJ, 2007). In yet another case of harassment, in March 2009, a federal judge sentenced a Panama City, Florida boat captain to 2 years in prison, 3 years of supervised probation, and \$125 special assessment for attempting to intentionally harm bottlenose dolphins with pipe bombs (NOAA, 2009). Two other cases have been successfully prosecuted, including a shrimper who was convicted of shooting at dolphins (DOJ, 2013) and two brothers found guilty for killing a dolphin with a compound arrow (DOJ, 2015). Additionally, NOAA’s Office of Law Enforcement has successfully investigated cases of illegal feeding of wild dolphins resulting in multiple successful charges against individuals brought by NOAA’s Office of General Counsel⁷.

Bottlenose dolphins are protected under the MMPA. Harassing, harming, killing, or feeding wild dolphins is prohibited. Violations can be prosecuted either civilly or criminally and are punishable by up to \$100,000 in fines and up to 1 year in jail per violation. Unfortunately, these penalties are not necessarily an overt deterrent to these types of activities, as evidenced by the more recent record of fatal incidents involving intentional harm to dolphins in the Gulf region (see **Table 1**).

Federal Regulations Addressing Marine Mammal Harassment

In January 2002, NMFS published an Advanced Notice of Proposed Rulemaking (ANPR) regarding the issue of human harassment that threatens the health and welfare of marine mammals in the wild⁸. At the time, NMFS considered proposing regulations to protect marine mammals in the wild from directed human activities that have the potential to harass the animals. Some of these activities of concern included feeding wild marine mammals (subsequently included within MMPA implementing regulations), “swim-with” activities, vessel-based interactions, and land-based interactions. Although regulations were not proposed or finalized, this notice opened the possibility for evaluation of those activities encompassing the spectrum of human-dolphin interactions that bear significant potential to

⁷http://www.nmfs.noaa.gov/ole/slider_stories/2014/12_031214_dolphin_harassment.html; See also http://www.nmfs.noaa.gov/ole/slider_stories/2014/19_081914_panama_city_dolphin_harassment.html

⁸50 CFR Part 216; Docket No. 020103001-2001-01; I.D. 122001B; RIN: 0648AN43

harm or injure wild dolphins, including the operation of personal watercraft, swim encounters, and touching or petting marine mammals in the wild.

Currently, a proposed rule is pending that will specifically address the harassment of spinner dolphins in Hawaii. Scientific research has revealed the real impact that human activities are having on local spinner dolphin populations (Courbis and Timmel, 2009; Tyne et al., 2014). A proposed rule has been in the pipeline since an ANPR was issued by NMFS in December 2005 (NOAA, 2005). The proposed rule may include regulatory measures that will restrict human activities that bear the potential to disturb or harm spinner dolphins in Hawaii.

DISCUSSION

Education and outreach programs are important mechanisms to inform stakeholders about protection of dolphins in the wild. With the advent of social media, messaging can be compelling, accessible, and rapidly distributed among networks of consumers, recreationalists, and tourists. However, more attention could be focused on engaging a critical class of stakeholders—the fishing community. Obtaining a better understanding of the dynamics between wild dolphins and fishing activities, the emergence and transmission of begging or predation behavior in dolphins, and fishermen perceptions and attitudes toward dolphins may enlighten focused solutions.

However, voluntary education and outreach programs, no matter how sophisticated and on their own, may not be enough to reduce the types of take that have been documented in the Gulf Region, and cited within this article. Regulatory approaches may also be a necessary part of any solutions targeting the growing problem of dolphin harassment in the wild. Regulations to reduce harassment would provide an additional framework within which to identify specific activities that threaten the conservation and welfare of wild dolphin populations, while raising the profile of human-dolphin interactions. Such regulations would also empower law enforcement to proactively address these activities, while offering policymakers an enhanced toolkit of strategies to target activities that have the potential to cause harassment (i.e., area closures and other space or temporal restrictions). Finally, regulations could serve to complement existing education and outreach programs.

The difficulties in enforcing even the most egregious violations of the MMPA is evidenced by the increasing incidents of targeted shootings and other directed violence against dolphins in the Gulf of Mexico region in the United States. Of the at least 20 documented strandings of dolphins with evidence of gunshot wounds and other known intentional harm cases mentioned above (i.e., defined as “takes” under the MMPA) since 2003, just six have involved the identification or legal conviction of the perpetrators of these crimes. Further challenging the identification and conviction of perpetrators of these directed acts against dolphins is the fact that oftentimes a carcass is not available as evidence in a case; the determination of a cause of death is not possible for various reasons; or investigators are

unable to conduct ballistics on certain types of bullets found in the carcass (i.e., buckshot).

In 2012, in response to the large number of dolphin shooting deaths over the period of just a few months, several conservation, animal welfare, and civic organizations established multiple monetary rewards requesting information leading to the identification, arrest, and conviction of the person or persons responsible for these illegal and cruel acts. These standing rewards are meant to assist ongoing and longer-term efforts to prosecute violations of the MMPA and support the continuing need for public informants to come forward with information to support law enforcement efforts in these types of crimes that sometimes only become visible when an animal washes ashore.

Although challenging to assemble and manage, monetary rewards have proven useful in encouraging the public to come forward with information aiding the identification of a perpetrator in at least one of these cases⁹. It is hoped that these outstanding¹⁰ and future financial rewards will contribute to additional successful and high-profile prosecutions that will ultimately reduce the targeted harassment of dolphins in this region.

The increasing proximity and encouragement of direct interaction and close encounters with wild dolphins through commercial and recreational activities has had a profound effect on eroding the protective barriers that once existed between wild dolphins and the general public. Increasingly, as they are seen as less-than-wild animals, either through habitual interaction with fisheries or ocean-goers seeking to swim with or feed them, wild dolphins are increasingly at risk of targeted harassment and even violence. As coastal communities deal with the influx of tourists or locals who are eager for close dolphin encounters, they must also bear the responsibility of educating consumers about keeping a necessary and respectful distance from this vulnerable species.

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The author confirms being the sole contributor of this work and approved it for publication.

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⁹Orange Beach, Alabama incident involving dolphin shot with an arrow. Multiple entities provided reward totaling \$24,000. Reward was claimed. Here is story link: http://sero.nmfs.noaa.gov/news_room/press_releases/2014/tips_lead_to_break_in_the_case_of_a_dolphin_shot_with_a_hunting_arrow.pdf
¹⁰http://sero.nmfs.noaa.gov/news_room/press_releases/2012/la_dolphin_shot_sept_2012_final.pdf

REFERENCES

- Barco, S., D'Eri, L. R., Woodward, B. L., Winn, J. P., and Rotstein, D. S. (2010). Spectra fishing twine entanglement of a bottlenose dolphin: a case study and experimental modeling. *Mar. Pollut. Bull.* 60, 1477–1481. doi: 10.1016/j.marpolbul.2010.05.005
- Brotos, J. M., Grau, A. M., and Rendell, L. (2008). Estimating the impact of interactions between bottlenose dolphins and artisanal fisheries around the Balearic Islands. *Mar. Mamm. Sci.* 24, 112–127. doi: 10.1111/j.1748-7692.2007.00164.x
- Colborn, K. (1999). *Interactions Between Humans and Bottlenose Dolphins, Tursiops truncatus, near Panama City, Florida*. MS Thesis for Duke University, North Carolina, 45.
- Cone, Inc. (2010). *Cone Cause Evolution Study*. Boston, MA: Cone, LLC. Available online at: http://ppqy.com/2010_Cone_Study.pdf
- Constantine, R., Brunton, D. H., and Dennis, T. (2004). Dolphin-watching tour boats change bottlenose dolphin (*Tursiops truncatus*) behaviour. *Biol. Conserv.* 117, 299–307. doi: 10.1016/j.biocon.2003.12.009
- Courbis, S., and Timmel, G. (2009). Effects of vessels and swimmers on behavior of Hawaiian spinner dolphins (*Stenella longirostris*) in Kealakekua, Honaunau, and Kauhako bays, Hawaii. *Mar. Mamm. Sci.* 25, 430–440. doi: 10.1111/j.1748-7692.2008.00254.x
- Cunningham-Smith, P., Colbert, D. E., Wells, R. S., and Speakman, T. (2006). Evaluation of human interactions with a provisioned wild bottlenose dolphin (*Tursiops truncatus*) near Sarasota Bay, Florida, and efforts to curtail the interactions. *Aquat. Mamm.* 32, 346–356. doi: 10.1578/AM.32.3.2006.346
- Danil, K., Maldini, D., and Marten, K. (2005). Patterns of use of Maku'a Beach, O'ahu, Hawaii, by Spinner Dolphins (*Stenella longirostris*) and potential effects of swimmers on their behavior. *Aquat. Mamm.* 31, 403–412. doi: 10.1578/AM.31.4.2005.403
- Department of Justice (DOJ) (2006). *Florida Charter Boat Captain Pleads Guilty to Shooting at Dolphins*. Media Release. Available online at: https://www.justice.gov/archive/opa/pr/2006/October/06_enrd_691.html
- Department of Justice (DOJ) (2007). *Shooting of Dolphin Leads to Federal Charges*. Media release. Available online at: http://uk.whales.org/sites/default/files/doj_dolphin_shooting_prosecution_alabama_2007.pdf
- Department of Justice (DOJ) (2013). *Media Release*. Available online at: <https://www.justice.gov/opa/pr/alabama-shrimper-convicted-shooting-dolphin>
- Department of Justice (DOJ) (2015). *Orange County Brothers Guilty of Killing Bottlenose Dolphin in Cow Bayou*. Media release. Available online at: http://sero.nmfs.noaa.gov/news_room/press_releases/2015/edtx_enviro_moseley_021815_1.pdf
- Finn, H., Donaldson, B., and Calver, M. (2008). Feeding flipper: a case study of human-dolphin interaction. *Pac. Conserv. Biol.* 14, 215–225. doi: 10.1071/PC080215
- Frohoff, T. G., and Packard, J. M. (1995). Human interactions with free-ranging and captive bottlenose dolphins. *Anthrozoos* 8, 44–53. doi: 10.2752/089279395787156527
- Goodwin, L., and Cotton, P. A. (2004). Effects of boat traffic on the behaviour of bottlenose dolphins (*Tursiops truncatus*). *Aquat. Mamm.* 30, 279–283. doi: 10.1578/AM.30.2.2004.279
- Lusseau, D. (2006). The short-term behavioral reactions of bottlenose dolphins to interactions with boats in Doubtful Sound, New Zealand. *Mar. Mamm. Sci.* 22, 802–818. doi: 10.1111/j.1748-7692.2006.00052.x
- Mattson, M. C., Thomas, J., and St. Aubin, D. (2005). Effects of boat activity on the behavior of bottlenose dolphins (*Tursiops truncatus*) in waters surrounding Hilton Head Island, South Carolina. *Aquat. Mamm.* 3, 133–140. doi: 10.1578/AM.31.1.2005.133
- NOAA (2005). *Advanced Notice of Proposed Rulemaking. Protecting Spinner Dolphins in the Main Hawaiian Islands From Human Activities that Cause "Take," as Defined in the Marine Mammal Protection Act and Its Implementing Regulations, or To Otherwise Adversely Affect the Dolphins*. Available online at: <http://www.fpir.noaa.gov/Library/PRD/Spinner%20Dolphin/ANPR.pdf>
- NOAA (2009). *Experts Worried More Dolphins Hurt by Guns and Explosives*. Available online at: http://sero.nmfs.noaa.gov/protected_resources/bottlenose_dolphins/guns_and_explosives/index.html
- NOAA (2012). *NOAA Seeks Information on Dead Dolphin Found Off Dupont Point, Alabama*. Media release. Available online at: http://sero.nmfs.noaa.gov/news_room/press_releases/2012/perdido_dolphin_alert_june_22_2012_final_with_pics_1.pdf
- NOAA (2014a). *NOAA Seeks Information on Pregnant Dolphin Found Dead on Miramar Beach, Florida*. Media release. Available online at: http://sero.nmfs.noaa.gov/news_room/press_releases/2014/sero_final_20141120_destin_shot_dolphin_media_advisory_final_1.pdf
- NOAA (2014b). *Tips Lead to Break in the Case of Dolphin Found Dead, Shot with a Hunting Arrow in Northern Gulf of Mexico*. Media release. Available online at: http://sero.nmfs.noaa.gov/news_room/press_releases/2014/tips_lead_to_break_in_the_case_of_a_dolphin_shot_with_a_hunting_arrow.pdf
- NOAA (2014c). *NOAA Seeks Tip on Dolphin Killed with Hunting Arrow in Orange Beach, Alabama*. Media release. Available online at: http://sero.nmfs.noaa.gov/news_room/press_releases/2014/news_advisory_noaa_seeks_tips_on_dolphin_killed_with_hunting_arrow_in_orange_beach.pdf
- NOAA (2016). *Deepwater Horizon Oil Spill Final Programmatic Damage Assessment and Restoration Plan and Final Programmatic Environmental Impact Statement*. 289–308. Available online at: http://www.gulfspillrestoration.noaa.gov/wp-content/uploads/Chapter-5_Restoring-Natural-Resources_508.pdf
- Noke, W. D., and Odell, D. K. (2002). Interactions between the Indian River Lagoon blue crab fishery and the bottlenose dolphin, *Tursiops truncatus*. *Mar. Mamm. Sci.* 18, 819–832. doi: 10.1111/j.1748-7692.2002.tb01075.x
- Nowacek, S. M., Wells, R. S., and Solow, A. R. (2001). Short-term effects of boat traffic on bottlenose dolphins, *Tursiops truncatus*, in Sarasota Bay, Florida. *Mar. Mamm. Sci.* 17, 673–688. doi: 10.1111/j.1748-7692.2001.tb01292.x
- Peltier, H., Dabin, W., Daniel, P., Van Canneyt, O., Dorémus, G., Huon, M., et al. (2012). The significance of stranding data as indicators of cetacean populations at sea: modelling the drift of cetacean carcasses. *Ecol. Indic.* 18, 278–290. doi: 10.1016/j.ecolind.2011.11.014
- Perrtree, R., Kovacs, C. J., and Cox, T. (2014). Standardization and application of metrics to quantify human-interaction behaviors by the bottlenose dolphin (*Tursiops* spp.). *Mar. Mamm. Sci.* 30, 1320–1334. doi: 10.1111/mms.12114
- Powell, J. R., and Wells, R. S. (2011). Recreational fishing depredation and associated behaviors involving common bottlenose dolphins (*Tursiops truncatus*) in Sarasota Bay, Florida. *Mar. Mamm. Sci.* 27, 111–129. doi: 10.1111/j.1748-7692.2010.00401.x
- Read, A. J. (2008). The looming crisis: interactions between marine mammals and fisheries. *J. Mamm.* 89, 541–548. doi: 10.1644/07-MAMM-S-315R1.1
- Samuels, A., and Bejder, L. (2004). Chronic interaction between humans and free-ranging bottlenose dolphins near Panama City Beach, Florida, USA. *J. Cetacean Res. Manage.* 6, 69–77. Available online at: <http://researchrepository.murdoch.edu.au/3007/>
- Seideman, D. (1997). Swimming with trouble. *Audubon* 99, 76–82.
- Spradlin, T. R., Drevenak, J. K., Terbush, A. D., and Nitta, E. T. (1999). "Interactions between the public and wild dolphins in the United States: biological concerns and the Marine Mammal Protection Act," in *Presented at the "Wild Dolphin Swim Program Workshop" Held in Conjunction with the 13th Biennial Conference on the Biology of Marine Mammals, November 28 (Maui, HI)*.
- Stolen, M., Noke Durden, W., Mazza, T., Barros, N., and St. Leger, J. (2013). Effects of fishing gear on bottlenose dolphins (*Tursiops truncatus*) in the Indian River Lagoon system, Florida. *Mar. Mamm. Sci.* 29, 356–364. doi: 10.1111/j.1748-7692.2012.00575.x
- Timmel, G., Courbis, S., Sargeant-Green, H., and Markowitz, H. (2008). Effects of human traffic on the movement patterns of Hawaiian spinner dolphins (*Stenella longirostris*) in Kealakekua Bay, Hawaii. *Aquat. Mamm.* 34, 402–411. doi: 10.1578/AM.34.4.2008.402
- Tyne, J. A., Pollock, K. H., Johnston, D. W., and Bejder, L. (2014). Abundance and survival rates of the Hawaii Island associated spinner dolphin (*Stenella longirostris*) stock. *PLoS ONE* 9:e86132. doi: 10.1371/journal.pone.0086132
- Waring, G. T., Josephson, E., Maze-Foley, K., and Rosel, P. E., (Eds.). (2015). *U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments-2014*. (NOAA Tech Memo NMFS NE 231). Woods Hole, MA: NOAA, National Marine Fisheries Service, Northeast Fisheries Science Center.

- WDACS, Whale and Dolphin Conservation Society (2008). *Dolphin SMART: Dolphin Tour Operator Education and Recognition Program in the Florida Keys*. Final Technical Report, October 31, 2008.
- Wells, R. S., Allen, J. B., Gorzelany, J., Delynn, R. E., Fauquier, D. A., and Barros, N. B. (2015). Carcass-recovery rates for resident bottlenose dolphins in Sarasota Bay, Florida. *Mar. Mamm. Sci.* 31, 355–368. doi: 10.1111/mms.12142
- Wells, R. S., Allen, J. B., Hofmann, S., Fauquier, D. A., and Scott, M. D. (2008). Consequences of injuries on survival and reproduction of common bottlenose dolphins (*Tursiops truncatus*) along the west coast of Florida. *Mar. Mamm. Sci.* 24, 774–794. doi: 10.1111/j.1748-7692.2008.00212.x
- Wells, R. S., Hofmann, S., and Moors, T. L. (1998). Entanglement and mortality of bottlenose dolphins, *Tursiops truncatus*, in recreational fishing gear in Florida. *Fish. Bull.* 96, 647–650.
- Wells, R. S., and Scott, M. D. (1997). Seasonal incidence of boat strikes on bottlenose dolphins near Sarasota, Florida. *Mar. Mamm. Sci.* 13, 475–480. doi: 10.1111/j.1748-7692.1997.tb00654.x
- Williams, R., Gero, S., Bejder, L., Calambokidis, J., Kraus, S. D., Lusseau, D., et al. (2011). Underestimating the damage: interpreting cetacean carcass recoveries in the context of the Deepwater Horizon/BP incident. *Conserv. Lett.* 4, 228–233. doi: 10.1111/j.1755-263X.2011.00168.x
- Zollett, E. A., and Read, A. J. (2006). Depredation of catch by bottlenose dolphins (*Tursiops truncatus*) in the Florida king mackerel (*Scomberomorus cavalla*) troll fishery. *Fish. Bull.* 104, 343–349. Available online at: <http://aquaticcommons.org/8971/>

Conflict of Interest Statement: The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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