Negative Human Interactions with Common Bottlenose Dolphins (*Tursiops truncatus*) in the Gulf of Mexico: Is This a Tourist Problem or a Fisheries Problem?

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Abstract

The data maintained by the National Oceanic and Atmospheric Administration (NOAA) on bottlenose dolphin strandings in the northern Gulf of Mexico indicate that there has been an apparent increase in the number of dolphins that have died and exhibited evidence of human interaction. The concern is legitimate due to the probable stress and suffering faced by individual dolphins in these situations, as well as the unknown impact on wild populations of dolphins as a whole. It is possible that the number of individuals who have been collected simply represents a small part of the overall number of animals that will never wash ashore, become stranded, or become available to recovery efforts. Human interaction data illustrates where conflicts between marine mammals and humans occur. When collected carefully and regularly, this data can be utilized to describe the types of interactions that occur (e.g., monofilament net, multifilament net, small or large vessel interactions, ingestion of debris, etc.), providing a sound scientific basis for policy and management decisions. Marine mammal strandings involving human interaction, whether ending in injury, acquisition of aberrant habits, or death, increase during periods of high tourist traffic throughout coastal cities along the Gulf of Mexico. Data collected from 118 stranding incidences showed 49 counts of human interaction. Correlation tests of each variable including year, season, county, and type of human interaction showed a statistical significance for each. The amount of negative human interaction incidents in the Gulf of Mexico necessitates legislative changes, measures to limit such events, and outreach initiatives to better inform tourists and residents.

Introduction

For marine mammals, the modern ocean is a perilous and dynamic habitat (Hoelzel, 2002). Marine mammals are facing new problems for survival as human use of vessel traffic and fishing gear increases (Gulland *et al.,* 2018; Hoelzel, 2002). Determining the threats causing mortalities or harassment to marine mammal species is one of the major objectives for analyzing the health and ecology of marine mammals in the world's oceans (Barco & Touhey, 2006). Some of these hazards are direct (killing or harming marine mammals), while others are indirect (causing harm to marine mammals or reducing their survival/reproduction but are more difficult to assess) (Gulland *et al.,* 2018). Anthropogenic influences on marine mammals and their surroundings are pervasive, ranging from chemical pollutants, marine debris, stock depletion of prey, noise pollution, and ocean acidification (Gulland *et al.,* 2018; Hoelzel, 2002). No marine mammal species is immune to impacts (Brakes & Dall, 2016; Hoelzel, 2002).

Human interactions are one of the primary hazards affecting *Tursiops truncatus* (Atlantic bottlenose dolphins) along the coastline of the Gulf of Mexico (Vail, 2016; Kovacs *et al.,* 2014). With the increased popularity of ecotourism activities such as dolphin cruises and whale watching, these animals are becoming more vulnerable to negative human interactions (Vail, 2016; Perrtree *et al.,* 2014; Kovacs *et al.,* 2013). Hand feeding, close vessel approaches, vessel strikes, gear entanglement, and swim-with activities are all examples of these interactions (Vail, 2016). Increased contact between wild marine mammals and humans in order to improve ecotourism has resulted in a rise in these animals acquiring aberrant habits, human reliance, and significant injuries (Collins *et al.,* 2019; Vail, 2016). There has also been a rise in the number of wild marine mammals harassed (Collins *et al.,* 2019; Vail, 2016). Data maintained by the National Oceanic and Atmospheric Administration (NOAA) on *T. truncatus* strandings throughout the entire northern Gulf of Mexico indicate an apparent increase in the number of deceased dolphins with signs of human interaction (Vail, 2016).

The National Marine Fisheries Service (NMFS) of NOAA has been recording human-animal encounters in the northern Gulf of Mexico in order to study trends in fisheries and ecotourism activities with injury (Collins *et al.,* 2019). Intentional harm to dolphins has been documented on multiple occasions, most notably in the Gulf of Mexico's fisheries sector (Collins *et al.,* 2019; Vail, 2016). Scientists, regulatory authorities, and conservation organizations view the Gulf of Mexico's panhandle as a "hotbed" of dolphin harassment (Collins *et al.,* 2019; Vail, 2016). Recent increases in events involving the shooting or intentional harming of individual dolphins in the wild need an assessment of potential regulatory and non-regulatory remedies to this critical conservation issue (Collins *et al.,* 2019). In parts of the southern United States where viewing and swim-with activities are popular with tourists and locals, are concentrated in small geographic areas, and may threaten small resident populations of bottlenose dolphins, management becomes vital (Collins *et al.,* 2019; Vail, 2016; Kovacs *et al.,* 2014). This project analyzes human interaction events in the response area of the Emerald Coast Wildlife Refuge from January 2017 to November 2022 to determine whether there is a correlation between such events and the year, seasons, tourism activities, and sectors.

Background

Tursiops truncatus

The Atlantic bottlenose dolphin (sometimes referred to as common bottlenose dolphin; Hoelzel, 2002) is a well-known member of the Family *Delphinidae* that inhabits numerous coastal regions across the globe, but is especially plentiful in the Gulf of Mexico (Hoelzel, 2002). Named from its small, thick rostrum, they usually have a grayish appearance (Gulland, *et al.,* 2018; Hoelzel, 2002). On top, near their dorsal fin, they are light gray to almost black, whereas their underside is light gray to nearly white (Hoelzel, 2002). Bottlenose dolphins that reside near the coast are often smaller and lighter in color than those who live offshore (Gulland, *et al.,* 2018; Hoelzel, 2002).

Atlantic bottlenose dolphins are found in both tropical and temperate areas (Gulland, *et al.,* 2018 Jefferson, *et al.,* 2015; Hoelzel, 2002). It is the most adaptable cetacean, living in a range of habitats (Jefferson, *et al.,* 2015). They inhabit all continents and most marine islands and atolls (Jefferson, *et al.,* 2015; Wells, *et al.,* 2019). In certain instances, they have been seen inhabiting bays, streams, and estuaries (BSEs) (Wells, *et al.,* 2019; Jefferson, *et al.,* 2015). Far offshore, in the Northern Atlantic Gulf Stream and eastern tropical Pacific, are pelagic populations (Jefferson, *et al.,* 2015). They inhabit Northern American waters with temperatures ranging from 50 to 90℉ (10 to 32℃) (Jefferson, *et al.,* 2015; Reeves, *et al.,* 2008). Population density appears to be higher nearshore than in deep pelagic waters in numerous oceanic areas (Jefferson, *et al.,* 2015).

T. truncatus are carnivores, consuming a diverse range of prey species, primarily fish- with a preference for *sciaenids, scombrids,* and *mugilids*- and squid (Jefferson, *et al.,* 2015; Hoelzel, 2002). They occasionally consume shrimp and other crustaceans (Hoelzel, 2002). They appear to take the most abundant or simplest prey available at the time in certain regions, but have evident preferences in others (Jefferson, *et al.,* 2015; Hoelzel, 2002). Their diverse feeding behaviors include cooperative feeding on schools of fish, pursuing fish onto mud banks, and feeding behind shrimp trawlers (Jefferson, *et al.,* 2015; Hoelzel, 2002).

This species of *delphinids* travels in groups or individually, and the groups frequently disperse and reunite (Hoelzel, 2002). Their migrational patterns are defined by their persistence in a single direction (Jefferson, *et al.,* 2015; Hoelzel, 2002). Rest is frequently defined by close group formations, slow movements, and pauses of deliberate breathings (Hoelzel, 2002). Breeding, playing, aggression, and gentle bodily touch, such as massages, are all examples of their observed social behavior (Hoelzel, 2002). Their life history has been investigated in a variety of regions, and reproductive factors vary considerably around the world (Jefferson, *et al.,* 2015). Females mature between the ages 13 and 15, whereas males mature between ages 9 and 13 (Jefferson, *et al.,* 2015; Hoelzel, 2002). Most populations have distinct spring and summer or spring and fall calving peaks (Hoelzel, 2002). Calves normally nurse for 1.5 to 2

years, however, nursing may last longer in some cases, particularly with a late-born calf (Hoelzel, 2002). Calves can be seen swimming in an echelon formation, which is the close proximity to their mother's mid-lateral flank near her dorsal fin (Jefferson, *et al.,* 2015; Hoelzel, 2002). When in the echelon position, the mother emerges first, followed by the calf, who emerges slightly behind and to the other side of its mother (Jefferson, *et al.,* 2015).

Tursiops truncatus History in the Gulf of Mexico

They are found in the northern Gulf of Mexico's bays, streams, and estuaries (BSEs), as well as coastal waters and offshore (Kovacs, *et al.,* 2014). The National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA NMFS) has established three coastal stocks along the northern Gulf of Mexico coast, including the Northern Coastal Stock, which extends from the Mississippi River Delta east to Florida's Big Bend, and the waters between the shore and the 20 m isobath (Balmer, *et al.,* 2016; Bearzi, *et al.,* 2012). Similarly, sixteen *T. truncatus* stocks in BSEs were established near the Northern Coastal Stock's east-west topographical limits (Balmer, *et al.,* 2016; Bearzi, *et al.,* 2012). While no extensive research has been conducted on all sixteen BSE stocks, multiple studies have provided critical data for stock assessment in the northern Gulf of Mexico's central coast region (Balmer, *et al.,* 2016).

Currently, there are no estimates of overall abundance, although abundance has been estimated for some parts of their range (Balmer, *et al.,* 2016). According to recent surveys conducted by NOAA NMFS, the Gulf of Mexico is home to 97,964 common bottlenose dolphins, including 5,806 in oceanic waters beyond the continental shelf edge, 51,192 on the outer continental shelf, 39,734 in coastal waters, and 1,232 in BSEs (Hayes, *et al.,* 2017). They are listed as least concern species on the IUCN Red List, however, anthropogenic activities threaten their survival (Jefferson, *et al.,* 2015).

The Marine Mammal Protection Act (1972) and Negative Human Interaction

On October 21, 1972, the Marine Mammal Protection Act (MMPA) came into effect. The MMPA (1972) established a national policy to stop the decline of marine mammal species and population stocks before they stop functioning as important components of the ecosystems in which they belong (*NOAA Fisheries,* n.d.). Implementing the MMPA (1972) is the joint responsibility of three government agencies including the NOAA NMFS, the U.S. Fish and Wildlife Service (FWS), and the Marine Mammal Commission (MMC) (Jefferson, *et al.,* 2015; Hoelzel, 2002; *NOAA Fisheries,* n.d.). Harassment, indicated by the MMPA (1972) and NOAA NMFS has two levels (*NOAA Fisheries,* n.d.):

1. **Level A Harassment** is any act of pursuit, torment, or annoyance that has the potential to harm a marine mammal or marine mammal stock in the wild (*NOAA Fisheries,* n.d.).
2. **Level B Harassment** is the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns (*NOAA Fisheries,* n.d.) including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering is considered harassment under the 1994 Amendments to the Marine Mammal Protection Act (Barco & Touhey, 2006; NOAA Fisheries, n.d.).

Through a considerable body of scientific research, focused communication programs, and advocacy efforts, marine mammal scientists, regulatory agencies, and philanthropic groups have raised heightened worries over the conservation and welfare implications of increased human interactions with wild dolphins (*NOAA Fisheries,* n.d.). The emergence of unnatural behaviors such as begging, reliance on human provisioning, vessel strikes, purposeful and targeted violence, consumption of hazardous substances, commercial exploitation, and encroachment on vital habitats are threats to these animals in the wild (Cunningham-Smith, *et al.,* 2006; Samuels & Bejder, 2004). Dangers to people include severe injuries or worse from illegally fed or frequently harassed wild dolphins (Cunningham-Smith, *et al.,* 2006; Seideman, 1997; Frohoff & Packard, 1995). NOAA NMFS has been recording human interactions with

coastal bottlenose dolphins in the northern Gulf of Mexico in order to study trends in fisheries and ecotourism activities with injury (Collins, *et al.,* 2020). Multiple instances of intentional harm to *T. truncatus* have been observed, most notably in the Gulf of Mexico's fisheries sector. Scientists, regulatory agencies, and environmental agencies see the panhandle of the Gulf of Mexico as a "hotspot" for dolphin harassment (Vail, 2016).

Stranding Response

For the purpose of coordinating responses to stranded marine mammals across a country or region, marine mammal stranding response networks have been developed by NOAA NMFS (Gulland, *et al.,* 2018; Jefferson, *et al.,* 2015; Hoelzel, 2002). In order to coordinate and carry out emergency responses to stranded or entangled marine mammals, the Marine Mammal Health and Stranding Response Program (MMHSRP) collaborates with volunteer stranding and entanglement networks as well as local, tribal, state, and federal government organizations (Gulland, *et al.,* 2018; Geraci & Lounsbury, 1993). The program provides network members with a Stranding Agreement from the regional offices of NOAA NMFS to guarantee that all operations carried out are risk-free for both the responders and the animals involved (Gulland, *et al.,* 2018; Geraci & Lounsbury, 1993). The majority of the network's expenses are covered by the member's individual fund-raising efforts, which allow them to pay for employees and local response capabilities (Gulland, *et al.,* 2018; Geraci & Lounsbury, 1993). Stranding and entanglement networks also play an essential part in biosurveillance, as they are frequently the first to identify potential dangers to marine mammal populations (Gulland, *et al.,* 2018). This makes them an extremely useful resource.

A marine mammal that is stranded is essentially one that is deceased, or is presently in a situation in which it cannot cope (beached, tidally stranded, or entangled) (Gulland, *et al.,* 2018; Geraci & Lounsbury, 1993). Concern for the welfare of individual animals led to the development of marine mammal stranding response and rehabilitation in various regions of the world (Geraci & Lounsbury,

1993). The mitigation of human interactions, marine mammal research, conservation of rare or endangered species, post-release tracking to elucidate poorly understood wild population ranges or to monitor post-release survival and behavior, and opportunities to educate the public about marine ecosystem health and marine mammal conservation are just a few of the additional reasons that have since been given for marine mammal stranding responses (Gulland, *et al.,* 2018).

In recent years, the development of trained stranding response networks and developments in technology have led to a clearer knowledge of the numerous reasons for strandings, notwithstanding the fact that the majority of strandings remain unexplained (Gulland, *et al.,* 2018). Marine mammals can become stranded as a result of both natural and anthropogenic causes, but the distinction between the two can be difficult to discern (Gulland, *et al.,* 2018; Geraci & Lounsbury, 1993). Natural causes include malnutrition-related diseases, trauma, predation, parental separation, poor navigation (due to weather, sound pollution, geography and topographical characteristics, etc.), and biotoxin exposure (Gulland, *et al.,* 2018). Entanglement (e.g., in fishing gear or marine debris), entrapment (e.g., in fishing weirs or irrigation canals), entrainment (e.g., in a power plant intake), exposure to noise (e.g., seismic surveys, mid-frequency/low-frequency active sonar, vessel noise), consumption of marine debris, vessel strikes, gunshot or other weapon wounds, and chemical/oil spills can cause direct, human-induced strandings (Gulland, *et al.,* 2018).

It can be challenging to determine the definitive cause of mortality or stranding, as numerous variables are often at play. The information acquired by live and deceased animal sampling and necropsies assists in determining the reasons for individual stranding or mortality and enhances knowledge of the health of marine mammal populations (Gulland, *et al.,* 2018). When possible and permitted, necropsies are completed methodically and suitable samples are gathered (Gulland, *et al.,* 2018; Geraci & Loundsbury, 1993). This data can and has been used to aid in the implementation of mitigation strategies to prevent or minimize mortality and strandings (Gulland, *et al.,* 2018; Geraci & Lounsbury, 1993).

Human Interaction Reports and Necropsies

Human interaction (HI) data reveals where marine mammal-human conflicts occur. These data, when collected carefully and consistently, can be used to describe the types of interactions occurring (e.g., monofilament net, multifilament net, small or large vessel interaction, ingestion of debris, etc.), thereby providing a solid scientific basis for policy and management decisions (see Appendix D. for HI Report; see Appendix F. for Cetacean Necropsy Report).

In order to accomplish data collection and analysis within the MMHSRP, stranding networks contribute information to the MMHSRP by way of the Level A Data Collection (Barco & Touhey, n.d.). This information is then saved in the National Stranding Database (NOAA Fisheries, n.d.). GulfMAP, a prototype database for Health MAP data, has been established in the Gulf of Mexico, and the first of five nationally planned data diplomats for Health MAP and is used to support this initiative (NOAA Fisheries, n.d.). GulfMAP provides statistics on the health of stranded marine mammals in the Gulf of Mexico (NOAA Fisheries, n.d.). GulfMAP was created in collaboration with NMFS, the National Fish and Wildlife Foundation's (NFWF) Gulf Environmental Benefit Fund (GEBF), and the Gulf of Mexico Marine Mammal Stranding Network (NOAA Fisheries, n.d.). GulfMAP began transitioning from an access-based system to an online system in 2021, and will eventually be included into the CETACEAN Gulf Restoration project (NOAA Fisheries, n.d.).

The various types of HI that can be observed during strandings are lesions, blunt force trauma, vessel strikes, fisheries interactions & other human interactions via hand-feeding, swim-with activities, pursuit, collection of parts, and unauthorized transportation of parts.

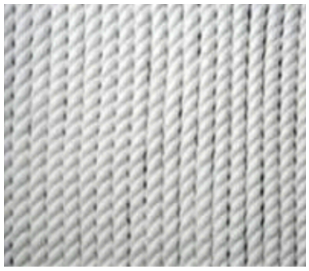
<u>Lesions</u>

There are various types of lesions that can be observed with human interactions. These lesions include impressions, lacerations, penetrating wounds, healed HI scars, abrasions, and wounds from fishery interactions.

- Impressions- A line or net produces an impression without lacerating or abrading the skin (Barco & Touhey, 2006). Net or line impressions wrap around a fin's leading and/or trailing edges (Barco & Touhey, 2006). Leading edge impressions may also match trailing edge marks (Barco & Touhey, 2006).
- Lacerations- A cut into the skin is referred to as a laceration (Barco & Touhey, 2006). In most cases, a net or line can leave behind linear lacerations (Barco & Touhey, 2006). Lacerations and impressions may be present along an appendage, and the lacerations may be observed as evenly distributed along the appendage. They can also be caused by blades such as knives, propellers, and other blades (Barco & Touhey, 2006).
- Penetrating wounds- A penetrating wound occurs when a foreign item punctures or deeply penetrates the body, causing a small surface wound and a deep wound tract that often extends into the body cavity (Barco & Touhey, 2006). Gaff, knife thrust, spear, arrow, gunshot (especially bullet), etc. cause penetrating wounds (Barco & Touhey, 2006).
- Healed HI scars- A healed HI scar is pigmented like a natural scar, but has other characteristics of these lesions (e.g. linear scars on leading edges of appendages consistent with entanglement) (Barco & Touhey, 2006). Both healed and unhealed HI scars are noted on the HI report (see Appendix D.) (Barco & Touhey, 2006).
- Abrasions- Abrasions occur when gear or debris irritates the skin without causing a wound (Barco & Touhey, 2006). This happens with a heavy line or twine entanglement or when loose gear/debris abrades the body (Barco & Touhey, 2006).
- Wounds from fishery interactions- Fishery interactions are subtle and varied (Barco & Touhey, 2006). Because of skin marks, it's simpler to spot in cetaceans than other marine mammals (Barco & Touhey, 2006). Without gear on or in other marine mammals, it's hard to tell if a fishery interaction has occurred (Barco & Touhey, 2006). Examiners are expected to know various words to adequately comprehend fisheries interactions (Barco & Touhey, 2006).

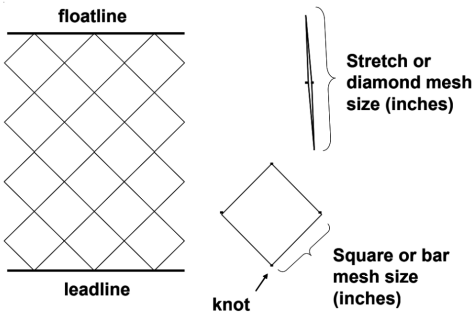
- Gear: Any commercial or recreational fishing gear (nets, buoys, line, hooks, lures, pots, traps, etc.).
- Line: A multi-stranded material (e.g. hemp, cotton, nylon, polypropylene) (Barco & Touhey, 2006). Line can create an impression similar to twine, however, it usually leaves abrasions (Barco & Touhey, 2006). It's utilized for moorings, towing, net floats and leads, buoys, and anchors (Barco & Touhey, 2006). Pot and trap fisheries use mostly line (Barco & Touhey, 2006). Seawater line can sink (nylon), float (polypropylene), or be neutrally buoyant (Barco & Touhey, 2006).
- Twine: Twine is a small-diameter multifilament or monofilament line (Barco & Touhey, 2006). Some fishing gear is composed of NET, which is made up of one or multiple types of twine (Barco & Touhey, 2006).
    - Monofilament Twine- A single, smooth nylon thread that leaves a straight, narrow wound (Barco & Touhey, 2006). Heavy monofilament twine leaves impressions, whereas lighter twine cuts and lacerates (Barco & Touhey, 2006).

    - Multifilament Twine- Consists of twisted or braided strands (Barco & Touhey, 2006). Multifilament twine leaves parallel, angled lines or ovals (Barco & Touhey, 2006).

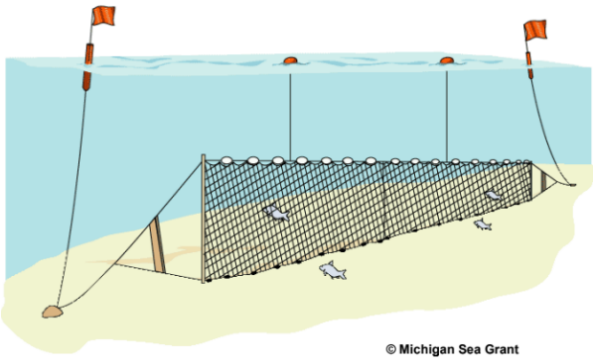


<u>Nets</u>

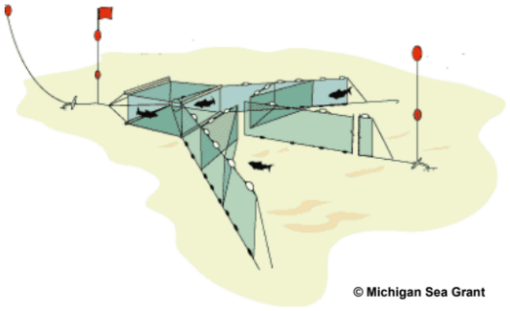
Made of monofilament or multifilament twine with varying diameter, square mesh size (knot to knot), and stretch mesh size (diagonal between opposite knots of mesh with one knot between) (Barco & Touhey, 2006).



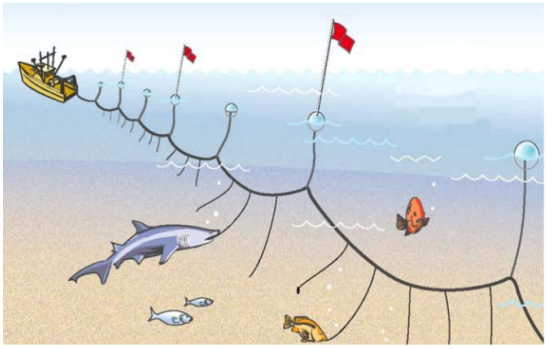
- Gill Net- One or more monofilament net panels with a buoyant and weighted line (Barco & Touhey, 2006). Mesh/twine size varies by target species and environment (Barco & Touhey, 2006). Gill nets can be adjusted high, mid or low (Barco & Touhey, 2006). Many gill nets are fixed using cement, cable, or an anchor (Barco & Touhey, 2006). Driftnets are non-anchored gill nets with both ends having buoys (Barco & Touhey, 2006). Animals can get tangled in the net, anchoring system, vertical line, or surface line (Barco & Touhey, 2006).



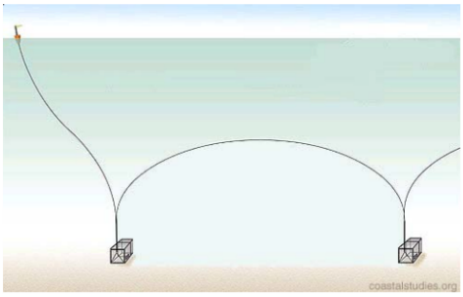
- Fixed Net- Often called fish traps including pound nets, weirs, etc. (Barco & Touhey, 2006). Fixed nets are affixed, moored, or anchored (Barco & Touhey, 2006). Straight leader lines direct fish to the net's trap (Barco & Touhey, 2006). These nets are made of thick twisted twine, and mesh sizes vary (Barco & Touhey, 2006). Leader lines, anchoring systems, and fish traps are capable of entangling animals (Barco & Touhey, 2006).



- Longline- Is a commercial hook and line gear with multiple baited hooks on gangions linked to a central main line (Barco & Touhey, 2006). The central line is sometimes a line, and the gangions are normally thick monofilament (Barco & Touhey, 2006). Light sticks lure fish to some longlines (Barco & Touhey, 2006). Animals can consume a hook or light stick or become entangled in the central line, buoy lines, or ganglion and hook system (Barco & Touhey, 2006).



- Pot Trawl- Used for crabs, lobsters, whelks, and various fish and invertebrates (Barco & Touhey, 2006). Groundlines connect pots and the trawl might also have buoy lines (Barco & Touhey, 2006). Animals can become entangled in the groundline, vertical line, or pot (usually going after bait) (Barco & Touhey, 2006).

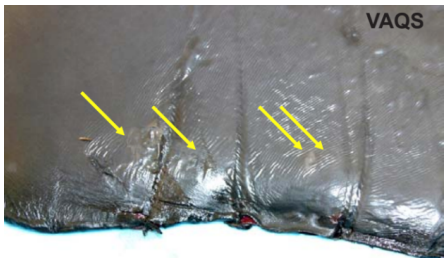


Fishery Interaction Wounds

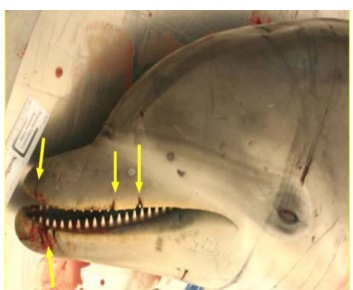
Marine mammals that become entangled in fishing gear can sustain a wide variety of wounds (Barco & Touhey, 2006). These marks are most commonly the edges of the head, appendages, and peduncle and can be classified as impressions, lacerations, or abrasions, depending on the severity of the damage (Gulland *et al.,* 2018; Barco & Touhey, 2006).

- Impressions- Similar to all entanglement injuries, head, leading and trailing appendages commonly show impressions (Gulland *et al.,* 2018; Barco & Touhey, 2006). An impression on a lateral surface (such as the thorax, head, flukes, or flippers) without a comparable mark on a leading and/or trailing edge is rare (Barco & Touhey, 2006). Diameter of the line, animal struggle, and body part shape determine whether monofilament twine or net leaves an impression or laceration (Barco & Touhey, 2006).

    - To the upper right, you can see a monofilament line left a straight, narrow impression or laceration along the rostrum of a bottlenose dolphin (Barco & Touhey, 2006).
    - Multifilament twine can be seen leaving parallel, angled lines or ovals (right) (Barco & Touhey, 2006).

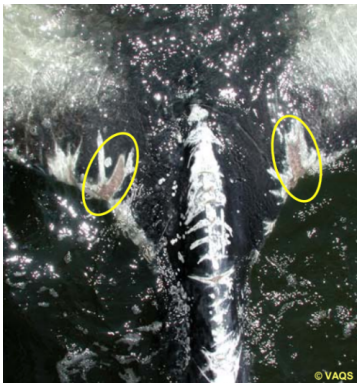


- Lacerations- Line and nets can leave linear lacerations (Barco & Touhey, 2006). Evenly spaced lacerations (indicating net) may be accompanied



with impressions (Barco & Touhey, 2006). Lacerations from entanglement HI in cetaceans occur on appendages, the rostrum, and the mandible (Gulland *et al.,* 2018; Barco & Touhey, 2006).

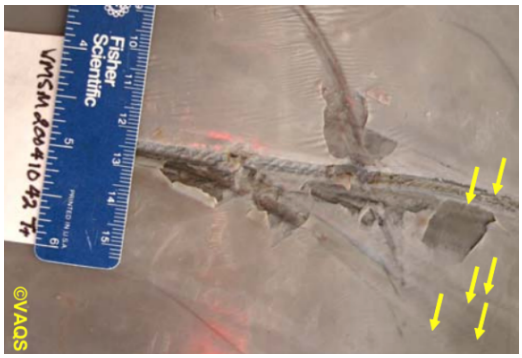
- Abrasions- HI related abrasions develop when thick twine or line is involved in the entanglement (Barco & Touhey, 2006). They can also occur when trailing gear scrapes against an animal's body (Barco & Touhey, 2006). Abrasions on cetaceans usually affect appendages or a lateral body surface (Barco & Touhey, 2006).



Signs of Entanglement

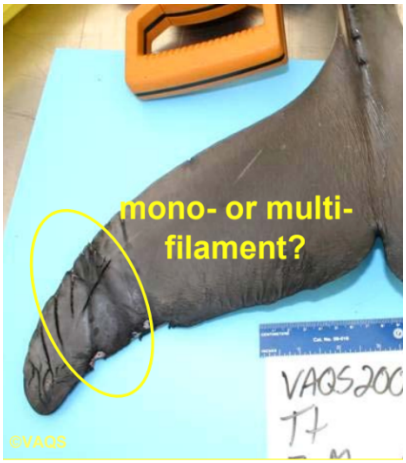
Here are some frequent examples of entanglement injuries. Note that the entanglement evidence varies by gear type, species, location and nature of the entanglement (Barco & Touhey, 2006).

- Multifilament net impressions



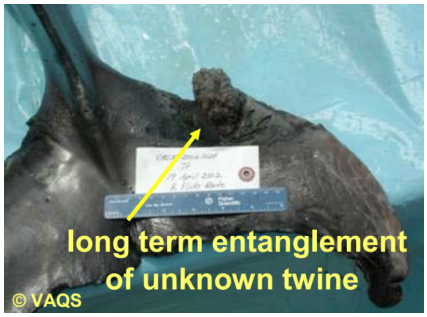
- Monofilament net impressions

- Gear impressions



- Gear impression/scar (unknown)

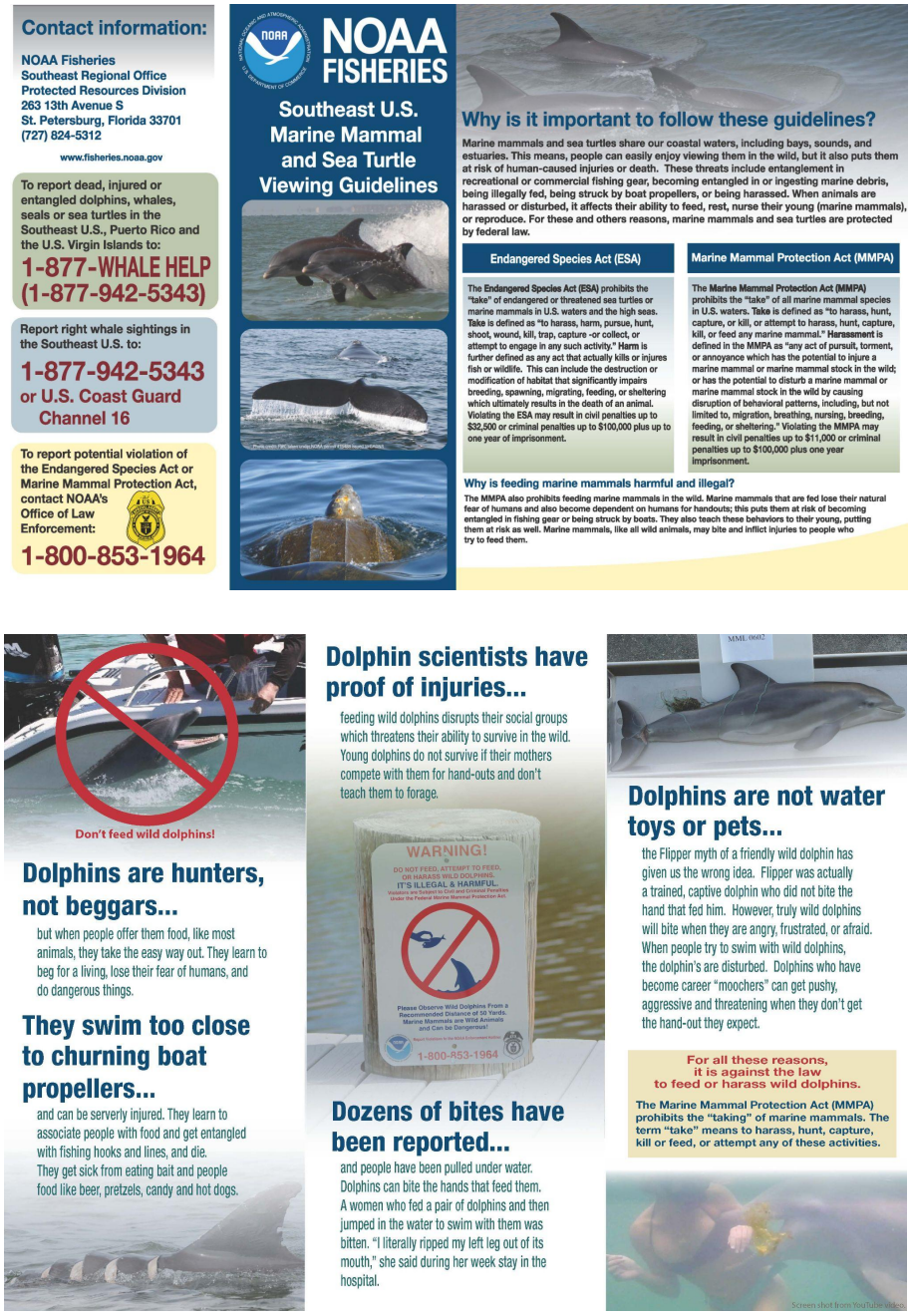
- Gear laceration (unknown)



- Line, healed scars

Current Regulations

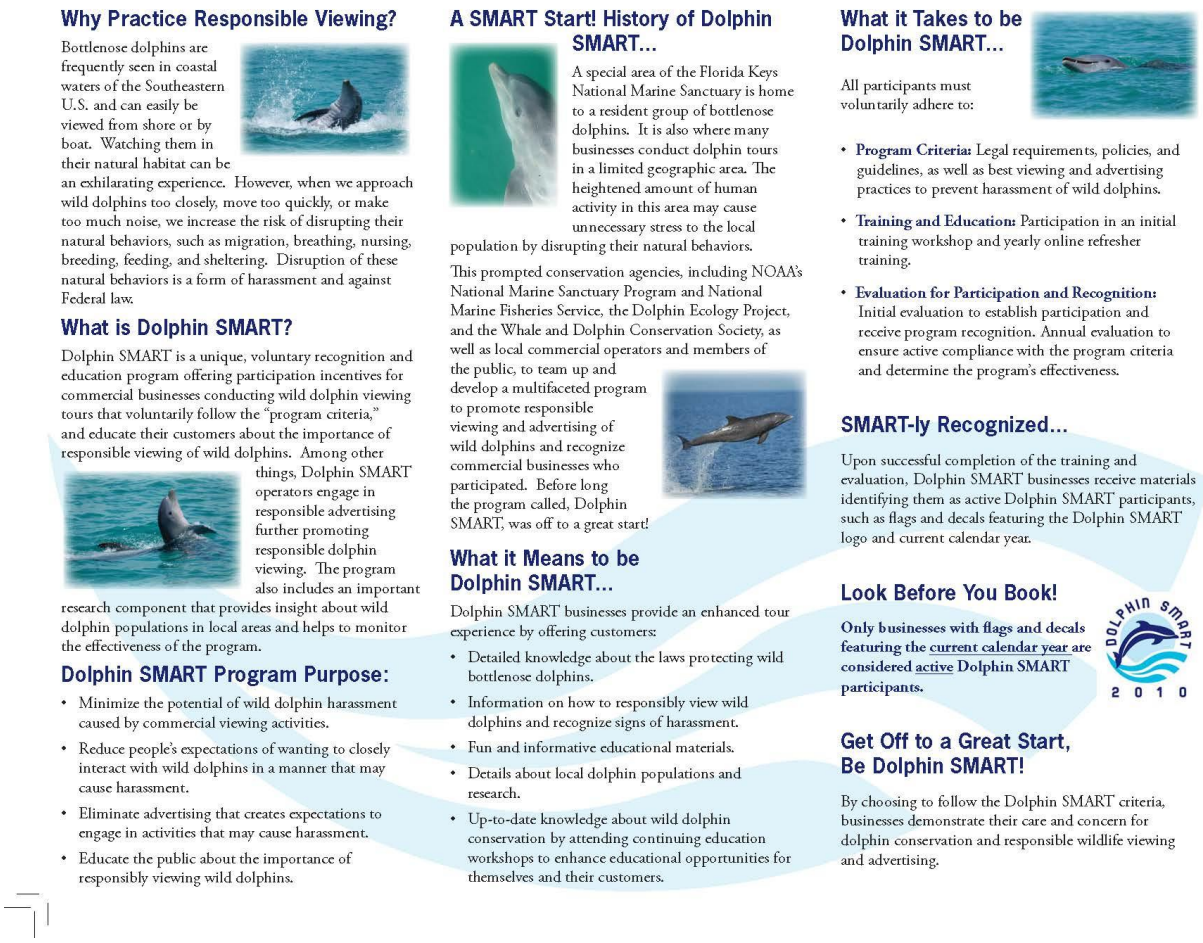
The public is prohibited from harassing, injuring, pursuing, wounding, killing, capturing, or collecting marine mammals (Gulland *et al.,* 2018; Vail, 2016; Kovacs *et al.,* 2014; Barco & Touhey, 2006). NOAA recommends people to view marine mammals from a safe distance and to not approach or touch them (NOAA Fisheries, n.d.; Gulland *et al.,* 2018; Vail, 2016; Kovacs *et al.,* 2014). Watching these animals in their natural environment can be exhilarating, but for their safety and human safety, marine mammal viewing guidelines were created (NOAA Fisheries, n.d.). Specific recommendations and distances have been devised for observing marine mammals.



NOAA Fisheries Southeast U.S. Marine Mammal and Sea Turtle Viewing Guidelines

Dolphin SMART is a collaboration between NOAA's Office of National Marine Sanctuaries and NMFS, as well as the Whale and Dolphin Conservation and the Dolphin Ecology Project (NOAA Fisheries, n.d.). It is a unique voluntary recognition and education program and participation in the program is open to commercial businesses offering wild dolphin and whale tours, or commercial vessels

that may encounter wild dolphins and whales (NOAA Fisheries, n.d.). The Dolphin SMART initiative rewards businesses who adhere to the program's guidelines and educate their customers on the significance of reducing marine mammal harassment. It also offers vital studies concerning the daily life of marine mammals (NOAA, n.d.).



Why Practice Responsible Viewing?

Bottlenose dolphins are frequently seen in coastal waters of the Southeastern U.S. and can easily be viewed from shore or by boat. Watching them in their natural habitat can be an exhilarating experience. However, when we approach wild dolphins too closely, move too quickly, or make too much noise, we increase the risk of disrupting their natural behaviors, such as migration, breathing, nursing, breeding, feeding, and sheltering. Disruption of these natural behaviors is a form of harassment and against Federal law.

What is Dolphin SMART?

Dolphin SMART is a unique, voluntary recognition and education program offering participation incentives for commercial businesses conducting wild dolphin viewing tours that voluntarily follow the "program criteria," and educate their customers about the importance of responsible viewing of wild dolphins. Among other things, Dolphin SMART operators engage in responsible advertising further promoting responsible dolphin viewing. The program also includes an important research component that provides insight about wild dolphin populations in local areas and helps to monitor the effectiveness of the program.

Dolphin SMART Program Purpose:

- Minimize the potential of wild dolphin harassment caused by commercial viewing activities.
- Reduce people's expectations of wanting to closely interact with wild dolphins in a manner that may cause harassment.
- Eliminate advertising that creates expectations to engage in activities that may cause harassment.
- Educate the public about the importance of responsibly viewing wild dolphins.

A SMART Start! History of Dolphin SMART...

A special area of the Florida Keys National Marine Sanctuary is home to a resident group of bottlenose dolphins. It is also where many businesses conduct dolphin tours in a limited geographic area. The heightened amount of human activity in this area may cause unnecessary stress to the local population by disrupting their natural behaviors.

This prompted conservation agencies, including NOAA's National Marine Sanctuary Program and National Marine Fisheries Service, the Dolphin Ecology Project, and the Whale and Dolphin Conservation Society, as well as local commercial operators and members of the public, to team up and develop a multifaceted program to promote responsible viewing and advertising of wild dolphins and recognize commercial businesses who participated. Before long the program called, Dolphin SMART, was off to a great start!

What it Means to be Dolphin SMART...

Dolphin SMART businesses provide an enhanced tour experience by offering customers:

- Detailed knowledge about the laws protecting wild bottlenose dolphins.
- Information on how to responsibly view wild dolphins and recognize signs of harassment.
- Fun and informative educational materials.
- Details about local dolphin populations and research.
- Up-to-date knowledge about wild dolphin conservation by attending continuing education workshops to enhance educational opportunities for themselves and their customers.

What it Takes to be Dolphin SMART...

All participants must voluntarily adhere to:

- **Program Criteria:** Legal requirements, policies, and guidelines, as well as best viewing and advertising practices to prevent harassment of wild dolphins.
- **Training and Education:** Participation in an initial training workshop and yearly online refresher training.
- **Evaluation for Participation and Recognition:** Initial evaluation to establish participation and receive program recognition. Annual evaluation to ensure active compliance with the program criteria and determine the program's effectiveness.

SMART-ly Recognized...

Upon successful completion of the training and evaluation, Dolphin SMART businesses receive materials identifying them as active Dolphin SMART participants, such as flags and decals featuring the Dolphin SMART logo and current calendar year.

Look Before You Book!

Only businesses with flags and decals featuring the current calendar year are considered active Dolphin SMART participants.

DOLPHIN SMART 2010

Get Off to a Great Start, Be Dolphin SMART!

By choosing to follow the Dolphin SMART criteria, businesses demonstrate their care and concern for dolphin conservation and responsible wildlife viewing and advertising.

Dolphin Smart Responsible Viewing Pamphlet

Implications of the Problem, Social Impacts, and Addressing the Problem

The data on bottlenose dolphin strandings in the northern Gulf of Mexico that are maintained by NOAA indicate that there has been an apparent increase in the number of deceased dolphins that show signs of having been in contact with humans (Vail, 2016; Kovacs *et al.,* 2014). Concern is warranted due to the probable stress and suffering encountered by individual dolphins in these circumstances, as well as the unknown impact on wild populations of dolphins as a whole (Vail, 2016). There is a possibility that the number of individuals who have been recovered is merely a small fraction of the overall number of individuals that may never wash ashore, become stranded, or become accessible to recovery efforts (Vail, 2016).

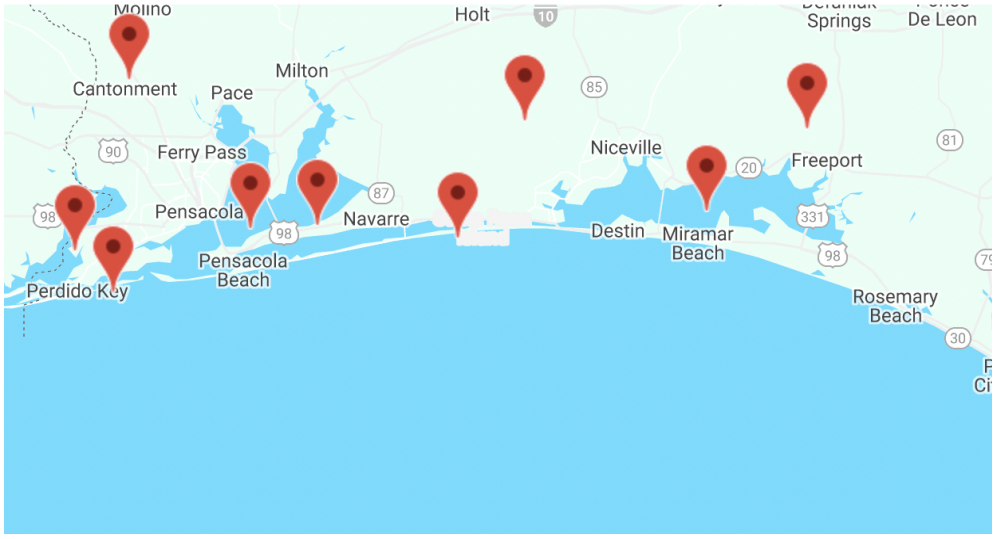
The potential to reduce the negative effects of these human-dolphin encounters necessitates a thorough outreach approach to address the rising incidences of harassment and vandalism, as well as an assessment of the alarming trends and obstacles impeding dolphin conservation in this region (Vail, 2016). In addition to identifying and convicting perpetrators through the application of existing law, voluntary outreach programs have the potential to educate and restructure public perceptions and behaviors through community-based stewardship initiatives, thereby promoting dolphin protection in regions with high human-dolphin conflict. The emergence of these types of programs demonstrates the potential for non-regulatory techniques to reach and engage the public on some of the most urgent local and regional marine conservation challenges (Vail, 2016). In conjunction with rules and enforcement, voluntary stewardship programs can give an opportunity for stakeholders to participate in local dolphin conservation efforts through a proactive strategy designed to inspire accountability (Vail, 2016).

Emerald Coast Wildlife Refuge Marine Mammal Stranding Team Information

From a single volunteer responding to a stranded dolphin in 1994, the Emerald Coast Wildlife Refuge (ECWR) has developed into a nationally known state and federally licensed wildlife rehabilitation institution. The ECWR Stranding Team is composed of professional marine wildlife specialists that operate under the NOAA Stranding Agreement and FWC sea turtle permits. The refuge's staff and volunteer Stranding Team respond to stranded marine mammals and sea turtles 365 days a year, under the direction of a Coordinator and Veterinarian. The stranding team collects critical data that is utilized to learn what affects these species in their natural habitats, to examine potential human impacts, and to preserve them for future generations. ECWR responds to about 20 stranded dolphins and 10 sea turtles annually, on average. However, this year (2022) ECWR has responded to 28 stranded dolphins and 13 sea turtles. The team responds to live and deceased strandings of marine mammal species in the following locations totaling over 85 miles of Gulf of Mexico beaches and 350 miles of inner coastline:

- Perdido Bay
- Big Lagoon

- Pensacola and East Bay
- Santa Rosa Sound
- Choctawhatchee Bay
- Escambia County
- Santa Rosa County
- Okaloosa County
- Walton County



Map 1. Map of ECWR Stranding Range

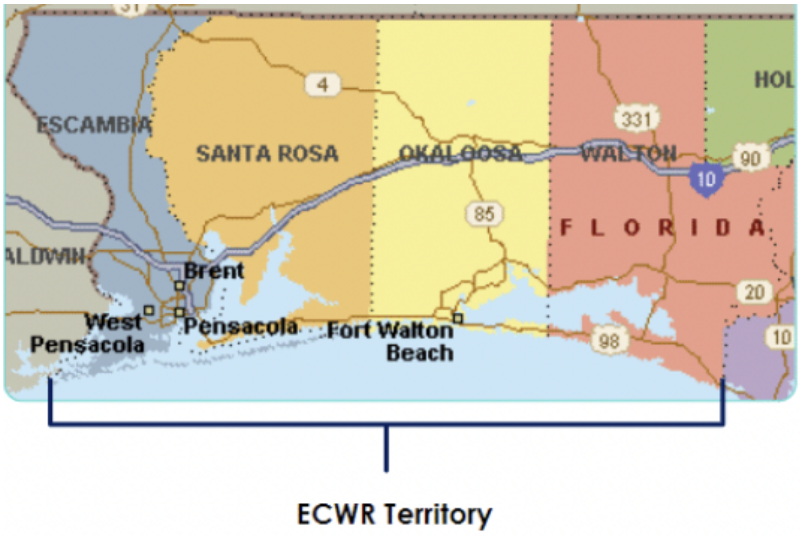
As members of the stranding response network, we are able to organize and build a research study incorporating data collection within the refuge's history. We are not a research establishment. We do not undertake surveys, collect large quantities of samples, or conduct research on themes pertinent to the Gulf of Mexico and its marine mammal species. However, the information collected through this project regarding human interactions may indicate a need to begin such research initiatives, performing educational outreach involving this topic, and the potential to revise the legislation imposed in this region to restrict these interactions.

It is strongly recommended that the efforts be directed on reducing the recognized adverse effects of anthropogenic activity. The majority of the threats that are currently facing the environment of the Gulf of Mexico and these species are the direct result of interactions with humans (Vail, 2016). Cooperation and agreement on methods of species protection are essential in order to ensure the survival of this species. The reduction of human interaction is a challenging task to undertake, especially when one

considers the significance of tourism and fishing within the region of study. But how can we be sure that the presence of this problem is a consequence of fishing and tourism? This project analyzes the correlation between HI events throughout the northwest Florida region of the northern Gulf of Mexico and both fisheries and ecotourism sectors. The collected data demonstrating the association should further demonstrate the necessity for education initiatives and regulatory reform (Barco & Touhey, 2006).

Methods

This project was conducted in the northern Gulf of Mexico (Map 2.) where we analyzed Human Interaction (HI) events on *Tursiops truncatus.* The range of this project only includes Northwest Florida from Escambia County to Walton County (see Map 2.), where the Emerald Coast Wildlife Refuge conducts stranding responses.



Map 2. ECWR stranding response region; ~ 30.279544, -87.518273 in Perdido Key, Florida to ~ 30.324618, -87.159001 in Santa Rosa Beach, Florida

Map 3. ECWR (Green) and Gulf World Marine Institute (GWMI, purple) response range.

Human Interaction reports are descriptive in the type of interaction, which body part was affected, and whether necropsy was performed to potentially determine the specimen's stranding cause (Barco & Touhey, 2006; NOAA Fisheries, n.d.). We collected descriptions and photographs of these incidents, in addition to all Level A, B, & C data (See appendices C through F; Barco & Touhey, 2006). Past stranding records involving HI were reviewed from January 2017-November 2022 to determine if, when, where, and how HI was involved in the stranding event. These records were retrieved from both the Emerald Coast Wildlife Refuge shared database and GulfMAPS.

For this project, we made an emphasis on animals that have stranded specifically due to HI (see Appendix C. HI Report). It's important to note that this is extensive work due to the fact that the majority of HI reports are responded with CBD (Could Not Be Determined). CBD is primarily listed due to inability to answer "Yes" a type of human interaction occurred, and unwillingness to say "No" human interaction did not occur (Barco & Touhey, 2006). This is because policymakers could suspect that HI is not occurring and saying "No" can convince legislators to lessen limits (Barco & Touhey, 2006).

Data Collection

We reviewed the stranding records from before COVID-19 (2017-2019), during COVID-19 (2020), and after COVID-19 (2021-2022) to determine if there was a difference in the number of HI incidents that occured during each of these three time periods. This could have been a result of the quarantine and travel restrictions imposed at the start of the lockdown period. Out of 118 stranding cases, this study examined 49 instances of human interaction with *T. truncatus* in northwest Florida throughout

the ECWR stranding response range from 2017 to November 25, 2022. Through analysis, a correlation test was used to observe stranding occurrences between counties (Escambia, Santa Rosa, Okaloosa, and Walton), season (Winter, Spring, Summer, and Fall), and HI type. The HI that was noted in each HI report included Mutilation, Gunshot Wounds, CBD/Other, Fisheries Interaction, Human Interference/Harassment, and Vessel Trauma. A correlation test was used for each variable examined to determine statistical significance.

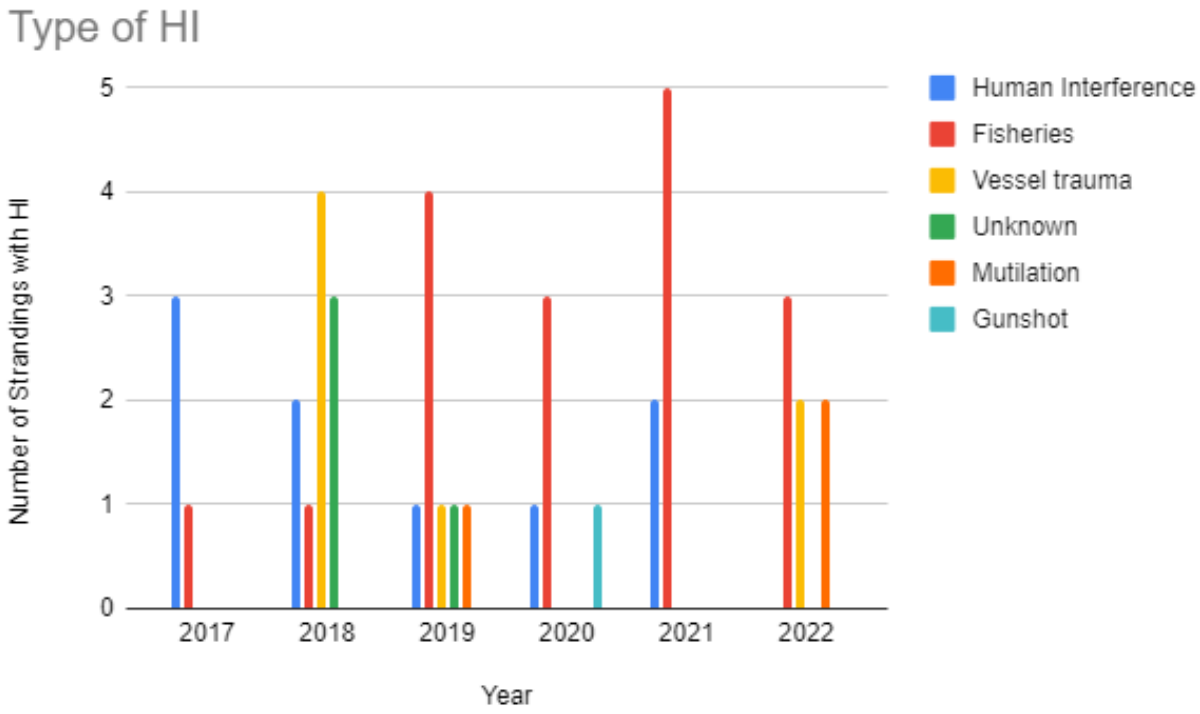
Results

Year	County	Season	Type of HI	Cause of Stranding?
2017	Walton	Spring	Human Interference	CBD
2017	Okaloosa	Summer	Fisheries	Yes
2018	Escambia	Spring	Vessel trauma	CBD
2018	Escambia	Spring	Vessel trauma	CBD
2018	Escambia	Spring	Unknown	CBD
2018	Walton	Spring	Unknown	CBD
2018	Escambia	Spring	Vessel trauma	CBD
2018	Okaloosa	Spring	Vessel trauma	CBD
2018	Escambia	Spring	Unknown	CBD
2018	Walton	Summer	Human Interference	CBD
2018	Escambia	Fall	Fisheries	Yes
2018	Escambia	Fall	Human Interference	CBD
2019	Escambia	Spring	Mutilation	CBD
2019	Okaloosa	Spring	Unknown	CBD
2019	Okaloosa	Spring	Fisheries	CBD
2019	Walton	Spring	Vessel trauma	CBD
2019	Escambia	Spring	Human Interference	CBD
2019	Escambia	Spring	Fisheries	Yes
2019	Okaloosa	Spring	Fisheries	Yes
2019	Okaloosa	Summer	Fisheries	Yes
2020	Escambia	Spring	Gunshot	Yes
2020	Okaloosa	Spring	Fisheries	Yes
2020	Santa Rosa	Fall	Human Interference	CBD
2020	Okaloosa	Fall	Fisheries	CBD
2020	Santa Rosa	Fall	Fisheries	CBD
2021	Okaloosa	Spring	Fisheries	Yes
2021	Escambia	Spring	Fisheries	Yes
2021	Santa Rosa	Spring	Fisheries	Yes
2021	Okaloosa	Summer	Human Interference	Yes
2021	Okaloosa	Summer	Human Interference	Yes
2021	Okaloosa	Summer	Fisheries	CBD
2021	Escambia	Summer	Fisheries	Yes
2022	Okaloosa	Spring	Fisheries	Yes
2022	Escambia	Spring	Mutilation	CBD
2022	Okaloosa	Spring	Fisheries	Yes
2022	Escambia	Summer	Vessel trauma	Yes
2022	Escambia	Summer	Fisheries	Yes
2022	Okaloosa	Summer	Vessel trauma	Yes
2022	Escambia	Summer	Mutilation	Yes

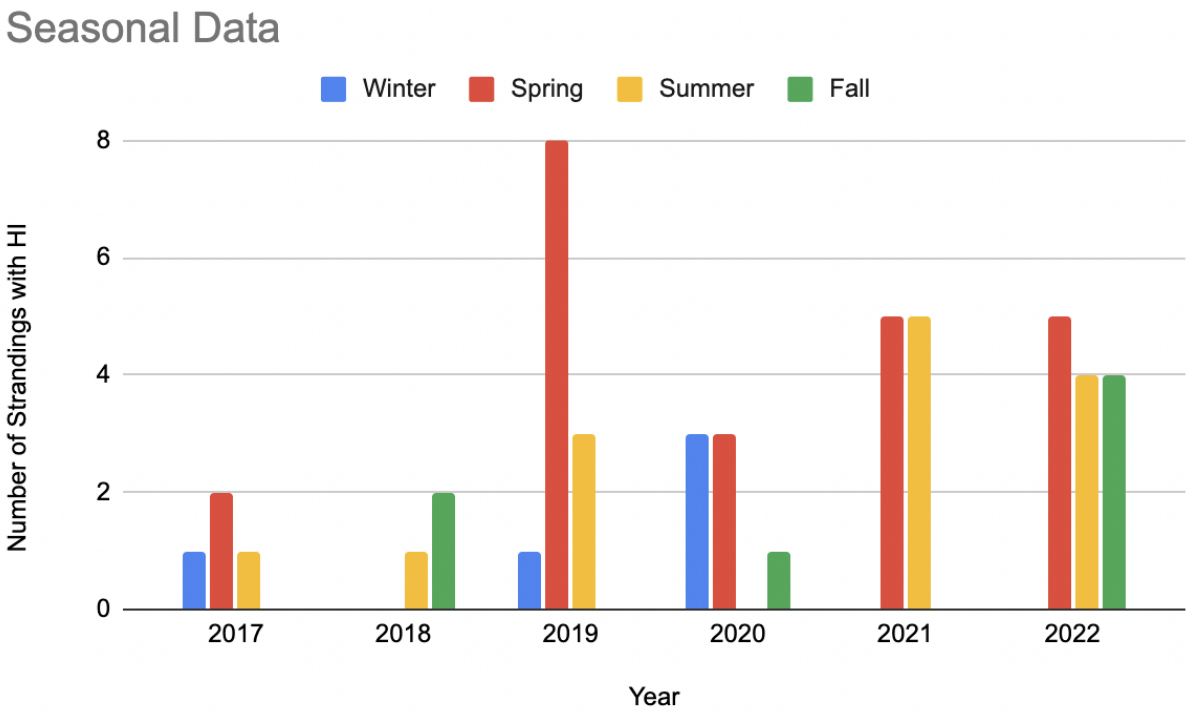
Data within the Emerald Coast Wildlife Refuge response region from January 2017 to the current day.

HI was examined for 49 of 118 stranding occurrences. The year 2022 saw a total of 13 stranding occurrences involving HI, making it the year with the highest number of stranding events involving HI.

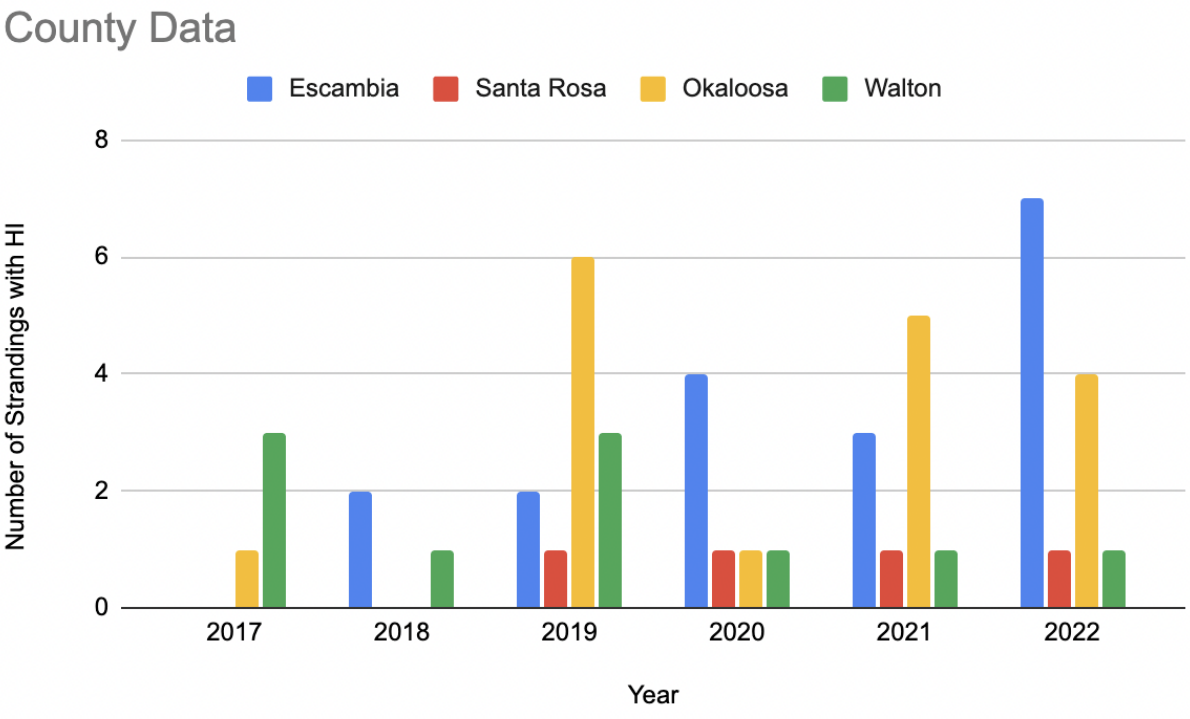
Escambia County, Florida, was the county with the most HI incidents, 18. The spring season (February to May) saw the highest number of HI stranding events with 23 total events. The spring season included the month of February due to some region's spring break dates falling within the month. With 16 stranding instances, Human Interference/Harassment was observed the most out of all HI types. The results for 2017 and 2018 were skewed as a result of limited access to data that was available for these years. Nevertheless, it is essential to keep in mind omitting 2017 and 2018 data, the number of strandings that occurred in the year 2020 was the lowest with a total of 5 HI stranding incidents.



Graph 1: Bar graph showing the frequencies of each type of HI involved in stranding events each year.



Graph 2: Bar graph showing the frequencies of HI involved strandings through each season each year.



Graph 3: Bar graph showing the frequencies of HI involved strandings within each county each year.

In the correlation test we looked at p-values obtained to determine significance. This tested our null hypothesis that there is no significance between year, county, season, and type of HI involved in stranding records from 2017 to 2022. The p-values in each statistical breakdown (HI Type, Seasonal Data, and County HI Data) indicates that there is statistical significance for each variable at $p<0.05$, rejecting the null hypothesis.

HI Type						
Total	Mean	Stdv	Std. Error	z-value	p-value	Significance
16	2.666666667	1.366260102	0.557773351	9.759000729	<0.00001	Yes
15	2.5	1.870828693	0.7637626158	6.681531048	<0.00001	Yes
1	0.1666666667	0.4082482905	0.1666666667	2.041241452	0.020675	Yes
12	2	1.414213562	0.5773502692	7.071067812	<0.00001	Yes
1	0.1666666667	0.4082482905	0.1666666667	2.041241452	0.020675	Yes
4	0.6666666667	0.5163977795	0.2108185107	6.454972244	<0.00001	Yes

Table 1: Summary of results of a correlation with 0.05 significance level for HI type.

Seasonal Data						
Total	Mean	Stdv	Std. Error	z-value	p-value	Significance
5	0.8333333333	1.169045194	0.4772607021	3.564162178	0.000185	Yes
23	3.833333333	2.786873995	1.137736544	6.877478744	<0.00001	Yes
14	2.333333333	1.966384161	0.8027729719	5.933055657	<0.00001	Yes
7	1.166666667	1.602081979	0.654047229	3.641095406	0.000136	Yes

Table 2: Summary of results of a correlation test with 0.05 significance level for seasonal data.

County HI Data						
Total	Mean	Stdv	Std. Error	z-value	p-value	Significance
18	3	2.366431913	0.9660917831	6.33865691	<0.00001	Yes
4	0.6666666667	0.5163977795	0.2108185107	6.454972244	<0.00001	Yes
17	2.833333333	2.483277404	1.013793755	5.704826469	<0.00001	Yes
10	1.666666667	1.032795559	0.4216370214	8.068715305	<0.00001	Yes

Table 3: Summary of results of correlation with 0.05 significance level for County HI data.

Discussion

Data maintained by the National Oceanic and Atmospheric Administration (NOAA) on *T. truncatus* strandings throughout the entire northern Gulf of Mexico indicate an apparent increase in the number of deceased dolphins with signs of human interaction (Vail, 2016). This study evaluated stranding data involving human interaction (HI) from 2017 to 2022 and found an increase in the number of dolphins

in the northern Gulf of Mexico exhibiting HI characteristics. This study determined the region, season, year, and type of HI with the highest number of stranding instances involving HI. In 49 out of 118 instances of stranding, HI was observed. In the HI reports gathered and examined, Mutilation, Bullet Wounds, Fisheries, Human Interference/Harassment, Vessel Trauma, and CBD/Other were all identified as examples of HI. The results of the correlation test suggested that each variable under consideration was statistically significant. Due to a lack of knowledge regarding handling stranded individuals, human interference/harassment may be substantially more prevalent than other forms of HI. The majority of incidents involving this type of HI involved unauthorized transportation of parts, indicating that citizens moved stranded individuals without Stranding Network's approval, and harassment, indicating that individuals repeatedly attempted to push back stranded individuals without authorization.

Due to statistical significance, this study could be expanded to include the entire northwest Gulf of Mexico to evaluate if this region is prone to HI strandings (Vail, 2016). This research could also include all marine mammal species inhabiting the Gulf of Mexico, as well as sea turtles. The ability to lessen the negative effects of these human-dolphin interactions requires a comprehensive outreach strategy to address the increased rates of harassment and vandalism, as well as an evaluation of the worrying trends and obstacles impeding dolphin conservation in this region (Vail, 2016; Kovacs et al., 2014). In regions with high human-dolphin conflict, in addition to identifying and convicting perpetrators through the application of existing law, voluntary outreach programs may educate and restructure public perceptions and behaviors via community-based stewardship initiatives, thereby promoting dolphin protection. The advent of these types of programs indicates the potential for non-regulatory approaches to reach and engage the public in addressing some of the most pressing local and regional marine conservation issues (Vail, 2016).

In conjunction with regulations and enforcement, voluntary stewardship initiatives can provide stakeholders with an opportunity to participate in local dolphin conservation efforts through a proactive method aimed to promote accountability. It is recommended to concentrate efforts on minimizing known detrimental anthropogenic effects. The primary hazard affecting Gulf of Mexico *T. truncatus* populations

is human interaction. While reducing human interaction is a difficult challenge considering the importance of both tourism and fishing within our region, cooperation and agreement on mitigation strategies are critical to protecting this species. It is preferable that moving forward, educational initiatives within the outreach efforts of Emerald Coast Wildlife Refuge incorporate the significance of marine mammal viewing standards and the Marine Mammal Protection Act (1972). We must continue to educate our visitors, tourists, and residents on the value of watching these animals in the wild safely and on how to safeguard them from anthropogenic harm.

Acknowledgments

I would like to express my gratitude to the Emerald Coast Wildlife Refuge for providing the information on stranding events in this part of the northern Gulf of Mexico that involved human interactions. I would like to express my gratitude to the Marine Mammal Health and Stranding Response Program for the tireless effort that they have put into preserving and protecting the marine mammal species that live in our coastal and offshore waters. This project would not have been successfully completed if it had not been possible to retrieve data from both the Stranding Network and GulfMAPS. We are able to safeguard these species from danger and detrimental effects by devoting a significant amount of effort and bringing about regulatory shifts along this stretch of the Gulf of Mexico coastline. I would like to express my gratitude to the municipalities of Perdido Key, Pensacola Beach, Gulf Breeze, Navarre, Fort Walton Beach, Shalimar, Niceville, Destin, Sandestin, Miramar, and Santa Rosa Beach for supporting our work and conservation efforts. In conclusion, I would like to express my gratitude to Unity College for granting me the opportunity to contribute my personal work to a meaningful project such as this one.

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Appendix A. ECWR Stranding Incident Report Form

Stranding Program Incident Report Form ECWR Field ID_____

Emerald Coast Wildlife Refuge

FWCC Field ID_____

Date Reported: _____ **Time:** _____ **Reported:** Hotline Refuge Email/Text

DO NOT LET ANYONE PUSH ANIMAL BACK

Caller Name/Phone Number:

_____ **Descriptive**

Location/Address: _____

_____

Call Received by/Title: _____ **Follow Up by:** _____

Species: Manatee Cetacean Sea Turtle Other

Condition: Dead Live Unknown

Reported: Deceased Sick Injured Entangled Boat Strike Sighting Other **Status:** Swimming Floating Beached Surf Entrapped/Caught

Scale: Alone Mass Pod Nearby

Size/Age:_____ **Description:** _____

_____

_ **Photos Sent to Stranding Personnel:** YES NO

ECWR Initiating Response? YES NO* *Skip to "Other Agencies Notified" ***CAN THEY STAY UNTIL RESPONDERS ARRIVE?*** YES NO **Date and Time of Arrival:** _____

Time Elapsed: _____ **Actual:** Deceased Sick Injured Entangled Boat Strike Sighting Info **Status:** Swimming Floating Beached Surf Entrapped/Caught

Time Loaded: _____ **Time Arrival to Lab:** _____ **Iced Overnight:** YES NO

Other Agencies Notified: • NOAA/NMFS • FWC • Other _____

Outcome:

• Rescued; Conducted by: _____ Transported to: _____
• Recovered • Not Found/Gone on Arrival • Mating Herd • Unresolved Entanglement • Disentangled • Info Passed • Documented/Photos • No Response

Comments: _____

_____

Appendix B. Near Real Time Report

Near Real-Time Marine Mammal Stranding Report

Please email report within 24hrs of stranding to: blair.mase@noaa.gov, elizabeth.stratton@noaa.gov, and secmammalreports@noaa.gov
Please include dorsal fin photo and whole body photo when possible.

****This form does not replace the Level A Marine Mammal Stranding Report Form, which should be submitted no later than 30 days following stranding event.****

Field Number:

Date of Stranding:

Examiner, Organization:

State, County:

City, Location:

Latitude: Longitude: ☐ Actual ☐ Estimate

Species:

Condition:

Length: ☐ Actual ☐ Estimate

Sex:

Human Interaction: ☐ Y ☐ N ☐ CBD

Status: ☐ Recovered ☐ Not Recovered ☐ Response Pending
Note:

Comments:

Appendix C. Level A Report

MARINE MAMMAL STRANDING REPORT - LEVEL A DATA

FIELD #: NMFS REGIONAL #: NATIONAL DATABASE#:

(NMFS USE) (NMFS USE)

COMMON NAME: GENUS: SPECIES:

EXAMINER Name: Affiliation:

Address: Phone:

Stranding Agreement or Authority:

CONFIDENCE CODE (Check ONE): ☐ Unconfirmed - Low ☐ Confirmed - Minimum ☐Confirmed - Medium ☐ Confirmed – High

INITIAL OBSERVATION ☐ Same Information for Level A Examination

DATE: Year: Month: Day:

First Observed: ☐ Beach/Land/Ice ☐ Floating ☐ Swimming

LOCATION: State: County: City:
Body of Water:
Locality Details:
Lat (DD): . N
Long (DD): . W

☐ Actual ☐ Estimated

How Determined: (check ONE)

☐ GPS ☐ Map ☐ Internet/Software ☐Other_____

CONDITION AT INITIAL OBSERVATION (Check ONE)

☐ 1. Alive ☐ 4. Advanced Decomposition ☐ 2. Fresh Dead ☐ 5. Mummified/Skeletal

☐ 3. Moderate Decomposition ☐ 6. Condition Unknown

LEVEL A EXAMINATION Examined? ☐ YES ☐ NO

DATE: Year: Month: Day:

First Examined: ☐ Beach/Land/Ice ☐ Floating ☐ Swimming

LOCATION: State: County: City:
Body of Water:
Locality Details:
Lat (DD): . N
Long (DD): . W

☐ Actual ☐ Estimated

How Determined: (check ONE)

☐ GPS ☐ Map ☐ Internet/Software ☐Other_____

CONDITION AT EXAMINATION (Check ONE)

☐ 1. Alive ☐ 4. Advanced Decomposition

☐ 2. Fresh Dead ☐ 5. Mummified/Skeletal

☐ 3. Moderate Decomposition

LIVE ANIMAL INFORMATION

INITIAL LIVE ANIMAL DISPOSITION (Check one or more)

☐ 1. Left at Site ☐ 5. Died at Site

☐ 2. Immediate Release at Site ☐ 6. Died During Transport ☐

3. Relocated and Released ☐ 7. Euthanized

4. Disentangled ☐ 8. Transferred to Rehabilitation: ☐ a. Partially

Date: Year: _____Month: _____Day:_____
Facility:_____

☐ b. Completely

☐ 9. Other:_____

CONDITION/DETERMINATION (Check one or more)

☐ 1. Sick 7. Location Hazardous ☐ 2. Injured ☐ a. To animal

☐ 3. Out of Habitat ☐ b. To public

☐ 4. Deemed Releasable ☐ 8. Unknown/CBD ☐ 5. Abandoned/Orphaned ☐ 9. No Rehabilitation Options ☐ 6. Inaccessible ☐ 10. Other: _____

DEAD ANIMAL INFORMATION

CARCASS STATUS (Check one or more)

☐ 1. Frozen for Later Examination/Necropsy Pending

☐ 2. Left at Site ☐ 5. Landfill ☐ 8. Towed: Lat_____Long_____ ☐ 3. Buried ☐ 6. Incinerated ☐ 9. Sunk: Lat_____Long_____ ☐ 4. Rendered ☐ 7. Composted ☐ 10. Unknown/Other_____

NECROPSIED ☐ YES ☐ NO ☐ Limited ☐ Complete

☐ Carcass Fresh ☐ Carcass Frozen/Thawed

CARCASS CODE AT NECROPSY ☐ Code 2 ☐ Code 3 ☐ Code 4

NECROPSIED BY:
Date: Year: Month: Day:

PHOTOS/VIDEOS TAKEN: ☐ YES ☐ NO
Photo/Video Disposition: _____

MORPHOLOGICAL INFORMATION

SEX (Check ONE) **ESTIMATED AGE CLASS** (Check ONE)
☐ 1. Male ☐ 1. Adult ☐ 4. Pup/Calf ☐ 2. Female ☐ 2. Subadult ☐ 5. Unknown ☐ 3. Unknown ☐ 3. Yearling

☐ Whole Animal ☐ Partial Animal
Straight Length:_____ ☐ cm ☐ in
☐ Actual ☐ Estimated ☐ Not Measured

Weight:_____ ☐ kg ☐ lb
☐ Actual ☐ Estimated ☐ Not Weighed

SAMPLES COLLECTED (Check one or more)
☐ 1. Histology ☐ 2. Other Diagnostics ☐ 3. Life History ☐ 4. Skeletal ☐ 5. Other _____

PARTS TRACKING (Check one or more)
☐ 1. Scientific Collection ☐ 2. Educational Collection ☐ 3. Other:
_____

OCCURRENCE DETAILS ☐ Restrand GE# _____ (NMFS Use)
Group Event: ☐ YES ☐ NO
If Yes, Type: ☐ Cow/Calf Pair ☐ Mass Stranding ☐ UME # Animals:_____☐ Actual ☐ Estimated

Was the Marine Mammal Human Interaction Report completed? ☐ YES ☐ NO

Findings of Human Interaction: ☐ YES ☐ NO ☐ Could Not Be Determined (CBD) If YES evidence of: 1. Vessel Interaction ☐ YES ☐ NO ☐ CBD
2. Shot ☐ YES ☐ NO ☐ CBD
3. Fishery Interaction ☐ YES ☐ NO ☐ CBD
4. Other Human Interaction: _____
_____

If YES, what was the likelihood that the human interaction contributed to the stranding event? ☐ Uncertain (CBD) ☐ Improbable ☐ Suspect ☐ Probable

Gear/HI Items Collected? ☐ YES ☐ NO Gear Disposition:
_____ **Other Findings Upon Level A**: ☐ YES ☐ NO ☐ Could Not Be Determined (CBD) If Yes, Choose one or more: ☐ 1. Illness ☐ 2. Injury ☐ 3. Pregnant ☐ 4.Other: _____ How Determined (Check one or more): ☐ External Exam ☐ Internal Exam ☐ Necropsy ☐ Other:
_____

NOAA Form 89-864; OMB Control No.0648-0178; Expiration Date 03/31/2020

TAG DATA

	ID#	Color	Type	Placement*	Applied	Present	Removed
Tags Were: (Circle ONE)							
				D DF L R	☐	☐	☐
Present at Time of Stranding (Pre-existing): ☐ YES ☐ NO							
	_____	_____		LF LR RF RR			
Applied during Stranding Response/Release: ☐ YES ☐ NO							
				D DF L R	☐	☐	☐
Applied during Rehabilitation/Release: ☐ YES ☐ NO							
	_____			LF LR RF RR			
Absent but Suspect Prior Tag: ☐ YES ☐ NO							
				D DF L R	☐	☐	☐
	_____			LF LR RF RR			

* D= Dorsal; DF= Dorsal Fin; L= Left Lateral Body R= Right Lateral Body LF= Left Front; LR= Left Rear; RF= Right Front; RR= Right Rear

ADDITIONAL IDENTIFIER: _____ (If animal is restranded, please indicate any previous field numbers here)

ADDITIONAL REMARKS:

_____
_____
_____
_____
_____
_____
_____

Appendix D. HI Report

MARINE MAMMAL HUMAN INTERACTION REPORT

Exam Information *(fill in or circle most appropriate)*

1 Field #: _____ Species: _____

2 Examiner: _____ Recorder: _____

3 Date of exam:_____ Condition code (at exam): 1 2 3 CBD

4 Preservation: alive fresh frozen frozen/thawed Body condition: emaciated not emaciated CBD

5 Documentation: digital print slide video Image disposition:_____

6 Integument : normal abnormal decomposed % Skin missing: <10% 10-25% 25-50% >50%

7

Explanation of terms:
YES = I have examined the area and/or found signs of this pathology, natural marking, or human interaction
NO = I have examined the area and/or did not find signs of this pathology, natural marking, or human interaction
CBD = I have examined the area and could not determine whether there were signs of human interaction (*i.e.* the part was missing, degraded, or signs were ambiguous)
NE = I did not examine the area
NA = this animal doesn't normally have that part (*i.e.* seals have no dorsal, dolphins have no rear flippers)

	WHOLE BODY EXAM	YES	NO	CBD	NE	NA	Image taken
8	External pathology *(pox, tattoo lesion, abscess, fungal patches)*						
9	Natural markings *(scars, tooth rakes, unusual pigmentation)*						
10	Appendage(s) removed / Mutilation *(with instrument)*						
11	Pelt removed / Mutilation *(with instrument)*						
12	Body sliced / Mutilation *(with instrument)*						
13	Gear / Debris present on animal *(including tags)*						
14	Gear / Debris retained *(name & contact info in Comments)*						
15	HI lesions *(fishery, gunshot, propeller, healed HI scar, brand)*						

16 Predation / scavenger damage *(circle all anatomical areas where damage hinders evaluation; numbers coincide with anatomical areas below)*: 17 18 19 20 21 22 23 24 25 26 27 28 29 NONE

FILL IN TABLE FOR **ALL POSSIBLE FINDINGS OF HI**
Do not use for natural markings/pathology.

						Type of Lesion					Origin of Lesion									
											Gear- Line			Gear/Debris			Other			
	DETAILED EXAM OF ANATOMICAL AREAS	YES	NO	CBD	NE/NA	Impression/ Laceration	Penetrating wound	Healed HI scar	Abrasion	Other / CBD	Twine / line	Net	MO/MU/CBD*	Hook	Packing Band	Other / CBD	Propeller	Gunshot	Other / CBD	Image taken?
17	Rostrum/snout																			
18	Mandible																			
19	Head and/or neck																			
20	L Front appendage																			
21	R Front appendage																			
22	L Body																			
23	R Body																			
24	Dorsum/dorsal fin																			
25	Ventrum																			
26	Peduncle																			
27	L Rear appendage																			
28	R Rear appendage																			
29	Flukes/tail																			

* If Gear-Line is the lesion origin, mark the MO/MU/CBD column: "MO" for monofilament, "MU" for multifilament, and "CBD" if the type of line cannot be determined.

Field #:_____

	INTERNAL EXAM Date _____	YES	NO	Partial	CBD	Image taken	Detailed Info *(circle all that apply)*
30	Internal exam conducted						*Details in Comments section -use line number*
31	Bruising/blunt trauma						*Details in Comments section -use line number*
32	Skeleton examined						*Details in Comments section -use line number*
33	Broken bones present						*Associated tissue reaction: YES NO CBD*
34	Mouth/GI tract examined *(circle contents)*						*intact prey partially digested hard parts only* ***debris/gear*** *empty other*
35	Lungs/bronchi examined						*Details in Comments section -use line number*
36	Lung/bronchi contents						*froth fluid air* (color:)
37	Bullet/projectile found						*found using: CT X-ray dissection (collected? Y N)*
38	Other lesions noted						*Details in Comments section -use line number*

39 **Comments** (*note line number from left margin before each comment*):

40 **Findings of Human Interaction:** ☐YES ☐NO ☐CBD (Exam Type: external__ internal__ both __)
(transfer to Level A Datasheet)

41 Type of HI: (provide details in comments)

☐ Entanglement (gear__ debris__ CBD__) ☐ Vessel trauma (sharp__ blunt__ both__)
☐ Hooking (recreational__ commercial__ CBD__) ☐ Gunshot ☐ Mutilation
☐ Ingestion (gear__ debris__ CBD__) ☐ Harassment ☐CBD/Other_____

42 **Stranding Event History/Circumstances:**

43 **INITIAL HUMAN INTERACTION EVALUATION:** If you marked YES above (line 40) evaluate the external exam, necropsy, carcass condition and circumstances surrounding the stranding event to answer the question below. *Remember to be conservative in your subjective evaluation.*
What is the likelihood that the finding of human interaction (line 40), contributed to the stranding event?

0: Uncertain (CBD) | 1: Improbable | 2: Suspect | 3: Probable

44 **Justification:**

Final human interaction evaluation requires additional data from level B and C analyses as well as review by experts (e.g. a veterinary pathologist)

Appendix E. Examiner's Guide

Matrices

Matrix to Determine When the Level A Marine Mammal Stranding Form Should Be Completed by a Stranding Network Participant

✓----------YES

X.....NO

Description	Guidance	Additional Info
Single or multiple marine mammals that meet(s) one of the following criteria and responded to by the stranding network: • Dead and on a beach • Dead and floating • Alive, onshore, and unable to return to the water • Alive, onshore, and able to return to the water but in need of medical attention	✓	One form per animal
Single marine mammal that meets one of the following criteria and is confirmed (e.g., photos, video, eyewitness report by reliable source) but either no response effort is undertaken by the network or a response effort is undertaken but the animal is not located or has already returned to the water (either under its own power or via public intervention) • Dead and on a beach • Dead and floating • Alive, onshore, and unable to return to the water • Alive, onshore, and able to return to the water but in need of medical attention	✓	

Mass Strandings and Near-Mass Strandings (nearshore milling)

Animals handled, either by the stranding network as part of a response or members of the public (i.e., pushed back out)	✓	One form per animal; additional data captured in Group Event. Public intervention without Network response can be captured as "Unconfirmed/Confirmed Public Report"
Animals not touched (note, if confirmed via photos or videos, could receive a Level A per the criteria above)	X	Data captured in Group Event
Nearshore free-swimming animals herded under NMFS authorization	X	Data captured in Group Event
Nearshore free-swimming animals with no response under NMFS authorization	X	Data captured in Group Event

Entangled Large Whale

Anchored	✓	Check the live entangled, in water box under report type, as well as the anchored box under

		first observed. Detailed entanglement data captured in Regional/National Entanglement DB
Free-swimming, no response deemed necessary	X	Data captured in Regional/National Entanglement DB
Free-swimming, response deemed necessary (whether or not response is conducted)	✓	Check the live entangled, in water box under report type. Detailed entanglement data captured in Regional/National Entanglement DB

Live, Entangled Small Cetacean

Anchored	✓	Check the live entangled, in water box under report type and anchored box under first observed field.
Free-swimming; no response deemed necessary	X	Data may be captured in regional databases.
Free-swimming; response deemed necessary (whether or not response is conducted)	✓	Check the live entangled under report type, in water box under first observed field.

Entangled Pinniped

Anchored	✓	
Free-swimming; no response deemed necessary	X	
Free-swimming; confirmed entanglement; response deemed necessary but not conducted, or animal eluded capture	X	
Free-swimming; response conducted, and animal in-hand	✓	Note: if animal has been previously observed, first confirmed date may be used for "Initial Observation"

Vessel Strike

Impinged (animal stuck on bow)	✓	
Captain's Report received by NMFS or Network with no stranded animal	X	Data captured in separate Regional/ National database

Out of Habitat

Includes animals outside of their typical geographic range, such as belugas in the Lower 48 and animals up rivers or inland

Intervention deemed necessary	✓	
No intervention deemed necessary (documentation only, "wait and see")	X	

Other Situations

Free-swimming, sick/injured, no response deemed necessary	X	
Free-swimming, sick/injured, response deemed necessary (whether or not response is conducted)	✓	
Dead animals observed within a rookery, no response conducted	X	
Dead animals observed within a rookery, response conducted	✓	Note: responding within a rookery requires NMFS pre-authorization
Animals incidentally taken and collected during a research survey (any researchers, NMFS or external)	✓	
"False alarm" - call from the public that did not result in a response by the network because the animal was not determined to be stranded (fitting within one of the criteria listed above)	X	
Seals in molt but otherwise not in need of medical attention	X	
Relocation of healthy animal out of hazardous situation	✓	
Dead fetus found inside female, (during necropsy) or partially expelled	X	No separate Level A form, but indicate on female's form
Aborted fetus (found on beach alone or external to a female)	✓	
Pinniped pup or cetacean calf aborted or born dead in rehabilitation	X	No separate Level A form, but indicate on female's form
Pinniped pup or cetacean calf born alive in rehabilitation	X	No Level A form, Yes "Pup/Calf born in Rehab" Disposition form
Live oiled animal, no response deemed necessary or logistically possible	X	Data captured in Group Event
Live oiled animal, response conducted (hazed, herded, etc.)	✓	Additional data captured in Group Event
Hazed (due to hazardous situation other than oil spill)	X	Data captured in Group Event

Appendix F. ECWR Cetacean Necropsy Report

Emerald Coast Wildlife Refuge's Marine Mammal Stranding Team
CETACEAN NECROPSY REPORT FORM

FIELD I.D.:
RECOVERY DATE:
SEX SL cm **WT** kg
SPECIES: *Genus species* (common name)
NECROPSY DATE:
CONDITION:

HISTORY:

EXTERNAL SIGNIFICANT FINDINGS:
This was a AGE CLASS (SL= cm), SEX COMMON NAME in ___ body condition (BCS __/5) MIN/MOD/SIGNIFICANT signs of decomposition at time of necropsy.

INTERNAL EXAM: No significant findings
Blubber thickness (cm):
Dorsal:
Lateral:
Ventral:

MUSCULOSKELETAL: No significant findings

ORAL CAVITY, HEAD, AND NECK: No significant findings

BRAIN: No significant findings

THORACIC CAVITY: No significant findings

RESPIRATORY SYSTEM: No significant findings

HEART: No significant findings
Ventricular wall thickness (cm):

Left:	Ventral=	Lateral=	Dorsal=
Right:	Ventral=	Lateral=	Dorsal=

ABDOMINAL CAVITY: No significant findings

ESOPHAGUS, STOMACH, INTESTINES: No significant findings

PANCREAS: No significant findings

LIVER: No significant findings

SPLEEN: No significant findings

ADRENAL GLANDS: No significant findings
Adrenal measurements (cm):

Left:	L=	W=	H=	Corticomedullary ratio:
Right:	L=	W=	H=	Corticomedullary ratio:

KIDNEYS: No significant findings

URINARY BLADDER: No significant findings

REPRODUCTIVE SYSTEM: No significant findings
Gonad measurements (cm):

Left:	L=	W=	H=
Right:	L=	W=	H=

The following organs/organ systems were not examined due to autolysis and field sampling:

COMMENTS:

SIGNIFICANT FINDINGS

1.

PROBABLE CAUSE OF DEATH

NECROPSY CONDUCTED BY

Kennady Brinley (ECWR Stranding Response Technician)
Michelle Pettis (ECWR Director of Animal Care, Interim Stranding Coordinator)

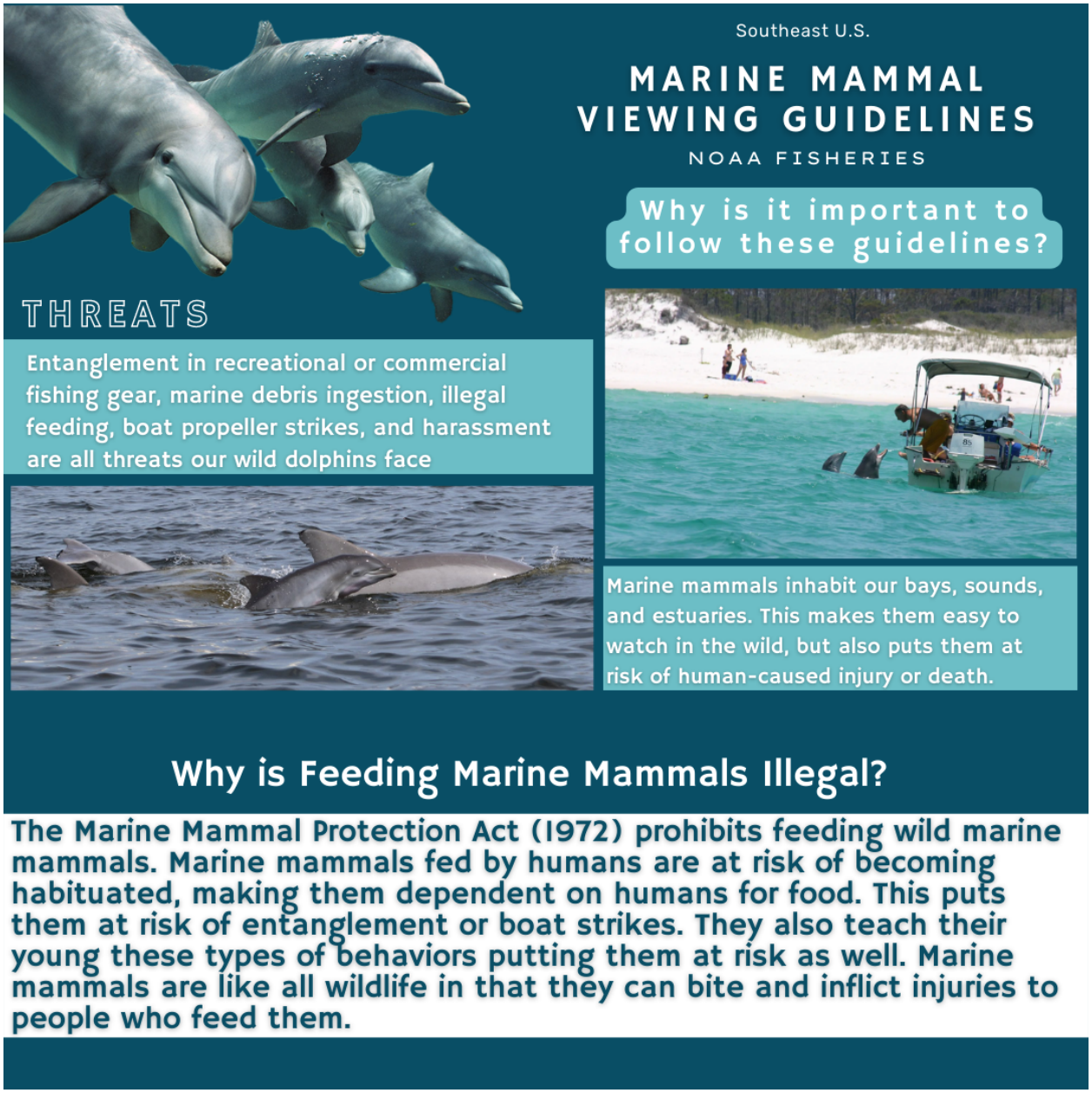
PREPARED AND WRITTEN BY

Kennady Brinley (ECWR Stranding Response Technician)

PHOTOS

Appendix G. Public Communication Infographics

These infographics were included in a #MarineMammalMonday post created for the Emerald Coast Wildlife Refuge's Instagram and Facebook pages. This post highlighted the importance of marine mammal viewing guidelines and why our marine mammals are federally protected.



FOLLOW THESE GUIDELINES

to prevent harassment and injury to marine mammals in the wild:

- The minimum recommended viewing distances are
  a. Dolphins= 50 yards
  b. Whales= 100 yards
- NEVER feed or ATTEMPT to feed wild marine mammals- it's prohibited by law!
- DO NOT swim with, ride, pet, touch, or attempt to interact with wild marine mammals!

To report potential violation of the Endangered Species Act or Marine Mammal Protection Act, contact NOAA's Office of Law Enforcement:

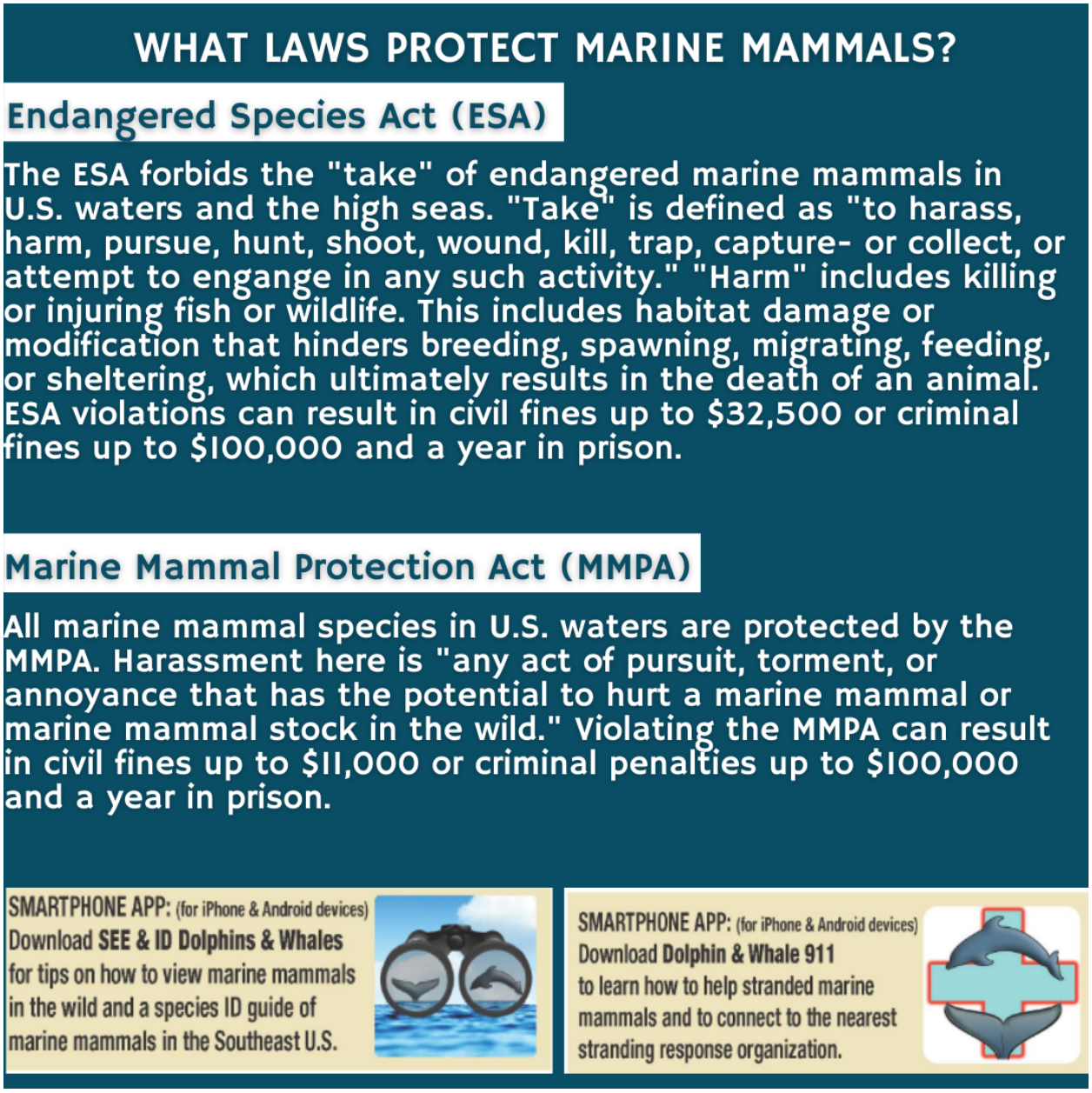
1-800-853-1964

ECWR

- Limit viewing time to 30 minutes or less! Prolonged exposure increases likelihood of marine mammals becoming disturbed.
- Avoid approaching animals when another vessel is near.
- NEVER pursue or follow marine life! Pursuit, torment, or harassment of marine mammals that has the potential to disturb or disrupt natural behaviors is prohibited by Federal Law.

Report dead, injured or entangled marine mammals and sea turtles to:

1-855-787-2631



Appendix H. The Society for Marine Mammalogy Guide for Authors

https://marinemammalscience.org/journal/guide-for-authors/

Appendix I. Partner Information

Michelle Pettis, CVT, CWR

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