NOAA FISHERIES

Office of Protected Resources

2020 and 2021 Combined Report of Marine Mammal Strandings in the United States

Executive Summary

There were 5,400 and 5,524 confirmed marine mammal strandings documented in the United States in 2020 and 2021, respectively, involving species under NOAA Fisheries' jurisdiction: cetaceans (whales, dolphins, and porpoises) and pinnipeds (seals and sea lions).

A "stranding" occurs when a marine mammal is either:

- Dead, whether found on the beach or floating in the water
- Alive, on a beach, but unable to return to the water
- Alive, on a beach, and in need of apparent medical attention
- Alive, in the water, and unable to return to its natural habitat without assistance

Marine mammals strand for a variety of reasons. Results from examinations and necropsies (animal autopsies) show common causes of strandings include:

- Infectious diseases due to parasites, bacteria, and viruses
- Harmful algal blooms and associated biotoxins
- Injuries due to vessel collisions, entanglement in active and derelict fishing gear and marine debris, ingestion of marine debris, or other human interaction such as gunshots
- Malnutrition
- Pollution exposure
- Some combination of these factors

Some strandings may also be related to unusual weather or oceanographic events. In many cases, the causes of a stranding remain undetermined, especially when carcasses are found in advanced states of decomposition. This report provides an overview of marine mammal stranding response activities in the United States for calendar years 2020 and 2021, a period that was also impacted by the COVID-19 pandemic in the human population.

Only confirmed stranding activities involving species under the jurisdiction of NOAA Fisheries (cetaceans and pinnipeds, except walrus) are included in this report. All data were obtained and analyzed from the NOAA Fisheries National Marine Mammal Stranding Database (data exported on April 12, 2023), and have been verified, though individual records may contain errors. Any duplicate events, and entries of free-swimming entangled large whales, were removed from the following analyses. All photographs were taken under Stranding Agreement, Section 109(h) authority, or NOAA Fisheries research permits.

MARINE MAMMAL HEALTH AND STRANDING RESPONSE

Photo (right): A male humpback whale calf stranded alive in Admiralty Inlet, Washington. The whale died on its own and a limited necropsy was conducted the following day. Credit: Port Townsend Marine Science Center

The U.S. Marine Mammal Stranding Response Network

A dead harbor porpoise is retrieved from the rocks at Odiorne Point State Park, New Hampshire. Credit: Seacoast Science Center

The U.S. Marine Mammal Stranding Response Network includes more than 120 organizations that provide first response capabilities for cetaceans and pinnipeds that are sick, injured, in distress, or dead. Some organizations also rehabilitate live stranded cetaceans and/or pinnipeds. The organizations that make up the National Stranding Network are authorized and overseen by the Marine Mammal Health and Stranding Response Program (MMHSRP), which is part of NOAA Fisheries Office of Protected Resources. The overarching goals of the National Stranding Network are to:

- Provide for the welfare of live stranded or otherwise distressed marine mammals
- Minimize risks to public health and safety from stranded marine mammals
- Collect data from stranded marine mammals as a resource for scientific information, management decisions, and/or law enforcement investigations
- Monitor, track, and investigate marine mammal health events (including mortality/morbidity events) and health trends over time, including the impacts of climate change
- Advance public education and engagement
- Enhance the conservation and management of wild marine mammal populations and, in turn, marine ecosystems

Every marine mammal stranding event is unique and poses different challenges. Organized stranding response by highly trained and authorized personnel best serves the well-being of the stranded animals, and helps manage risks to public health and safety.

Live animals that are rescued and rehabilitated provide valuable information on the biology, physiology, and health of those and related species. The National Stranding Network's primary goal is always to return live-stranded and rehabilitated animals to the wild when it is safe to do so for that individual animal and the wild populations. In some cases, such as when injuries are severe or the overall prognosis is poor, euthanasia is the most humane course of action to relieve their pain and suffering. The decision to euthanize an animal is never approached lightly and is an action of last resort after all other options are exhausted. The decision to euthanize is made by the responders in consultation with professional marine mammal biologists, veterinarians, and NOAA Fisheries staff. The euthanasia procedure is conducted humanely, respectfully, and efficiently by experienced and qualified personnel. It is done in accordance with nationally approved veterinary methods, in concurrence with the American Veterinary Medical Association guidelines.

Necropsies of dead animals provide insight into causes of mortality, life history (age and reproductive status), disease and contaminant exposure, physiology, and the population health of animals that cannot be readily observed in the wild. For some marine mammal species, the only information available about their biology and natural history has been gained from stranded specimens. Data collected from live or dead stranded animals can also provide important information regarding human impacts on marine mammals, such as interactions between marine mammals and fisheries, vessels, or marine debris, or the effects of pollution (oil spills, contaminants, and heavy metals) and can become important evidence in law enforcement cases. The National Stranding Network provides data to the MMHSRP using standardized reporting forms, and these data are stored in the National Stranding Database. Data collected from stranding responses help NOAA Fisheries monitor and understand wild marine mammal stocks and populations, as well as make informed decisions for their management and conservation.

Because stranded marine mammals are large, wild, and unpredictable animals that might have been exposed to disease or contaminants, all stranding responses prioritize human safety to ensure National Stranding Network members and the public avoid illness and injuries. Over the past several decades, the MMHSRP has worked with the National Stranding Network to develop and update Best Practices to follow in the field based on lessons learned and in line with advancing husbandry techniques.

A Northern fur seal seen with a neck entanglement on the Pribilof Islands, Alaska. Pinnipeds can become entangled in active and derelict fishing gear as well as marine debris such as plastic packing bands, large rubber bands, and garbage. Credit: NOAA Fisheries/Lydia Kleine

National Overview

Marine Mammal Health Threats

Environmental Degradation and Ecosystem Change

- Climate and ecosystem change
- Habitat degradation, including contaminants (e.g., toxic chemicals, heavy metals, etc.)

Ocean Noise and Disturbance

- Acoustic disturbance
- Energy development
- Ocean and vessel noise

Fisheries Impacts

- Direct interactions/competition with fisheries
- Effects of fisheries on prey
- Entanglement in active or derelict fishing gear (i.e., "bycatch")

Disease

- Biotoxins
- Pathogens (e.g., viruses, bacteria, parasites)

Predator-Prey Dynamics

- Predation
- Prey availability

Pollution

- Chemical contaminants
- Oil spills
- Marine debris

Vessel Interactions

- Vessel harassment
- Vessel strikes

Direct Human Take

- Illegal feeding, harassment, and disturbance
- Illegal human-caused mortality (including illegal shooting)

What Type of Marine Mammals Strand in the United States?

There are 66 species of marine mammals found in the jurisdictional waters of the United States, all of which are covered by the Marine Mammal Protection Act (MMPA), and all of which may strand. Marine mammals are classified into four different taxonomic groups: cetaceans (whales, dolphins, and porpoises); pinnipeds (seals, fur seals, sea lions, and walruses); sirenians (manatees); and marine fissipeds (polar bears and sea otters). NOAA Fisheries is responsible for the protection and conservation of all cetaceans and pinnipeds, with the exception of walrus. The U.S. Fish and Wildlife Service oversees the management of manatees, sea otters, walruses, and polar bears. This report only includes data for species under the jurisdiction of NOAA Fisheries (cetaceans and pinnipeds excluding walrus).

Pinnipeds

All pinnipeds come ashore (on land or ice) to rest, breed, nurse and rear pups, molt, or avoid predators. When pinnipeds are observed sick, injured, in distress, or dead, the National Stranding Network responds to provide care, including rehabilitation in some cases, or to examine the carcass. In 2020 and 2021, up to 14 species of pinniped stranded in the United States. The three most frequently stranded pinniped species nationwide in 2020 and 2021 (Table 1) were the California sea lion (*Zalophus californianus*), harbor seal (*Phoca vitulina*), and gray seal (*Halichoerus grypus*).

Table 1. Most common pinniped species to strand nationally in 2020 and 2021.

Species	Confirmed Stranding Reports in 2020	Confirmed Stranding Reports in 2021	2006–2019 Average ± Standard Deviation[1]
California Sea Lion	1,322	1,414	2,299 ± 1,118
Harbor Seal	1,165	1,056	1,247 ± 296
Gray Seal	416	380	240 ± 161

Small Cetaceans

Small cetaceans are dolphins, porpoises, and toothed species of whales (except sperm whales, *Physeter macrocephalus*). In 2020 and 2021, up to 29 species of small cetaceans stranded in the United States. The three most frequently stranded small cetaceans nationally in 2020 and 2021 (Table 2) were the common bottlenose dolphin (*Tursiops truncatus*), short-beaked common dolphin (*Delphinus delphis*), and harbor porpoise (*Phocoena phocoena*).

Table 2. Most common small cetacean species to strand nationally in 2020 and 2021.

Species	Confirmed Stranding Reports in 2020	Confirmed Stranding Reports in 2021	2006–2019 Average ± Standard Deviation
Bottlenose Dolphin	740	875	828 ± 309
Short-beaked Common Dolphin	185	198	136 ± 82
Harbor Porpoise	146	150	201 ± 40

Large Whales

Large whales are all of the baleen whales and the largest toothed whale, the sperm whale. In 2020 and 2021, up to eight species of large whale stranded in the United States. Nationally, the three most frequently stranded large whales in 2020 and 2021 (Table 3) were the gray whale (*Eschrichtius robustus*), humpback whale (*Megaptera novaeangliae*), and minke whale (*Balaenoptera acutorostrata*).

Table 3. Most common large whale species to strand nationally in 2020 and 2021.

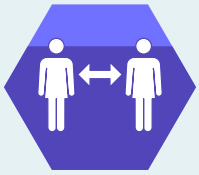
Species	Confirmed Stranding Reports in 2020	Confirmed Stranding Reports in 2021	2006–2019 Average ± Standard Deviation
Gray Whale	82	57	40 ± 26
Humpback Whale	63	51	52 ± 19
Minke Whale	25	25	17 ± 10

1 A standard deviation is a measure used to quantify the amount of variation within a set of values.

Containment Measures

Stay at Home

Restricted Travel



Social Distancing

Limited Group Size

Mask Mandates

Impacts of the COVID-19 Pandemic on Stranding Response and Reporting

In early 2020, the World Health Organization declared the global COVID-19 pandemic. The United States declared a national emergency on March 13, 2020, which triggered several containment measures to protect human health and safety. These measures varied by state and geographic area, and included: issuance of stay-at-home orders, restricted travel (i.e., closed borders), social distancing, limitations on group size, and mask mandates. In some parts of the country, scientific field work (e.g., surveys and other assessments) were halted for months, or in some cases the entire year, and most public places (e.g., beaches and national parks) were closed. Similarly, marine activities such as fishing and tour operations were reduced, and some colleges and businesses did not operate. These measures impacted the Stranding Network, as most partners rely on reports of stranded marine mammals from members of the public, local authorities, and other ocean users. These restrictions also affected the level of response (documentation, confirmation, and sampling) to stranded marine mammals as stranding events often require many hands (e.g., staff, interns, volunteers, and law enforcement), working in relatively close proximity to others, and access to public lands. Facility closures and budget cuts in response to COVID-19 also limited the intake of potential rehabilitation candidates.

However, beginning in summer 2020—and continuing through 2021—many states temporarily (and in some cases permanently) lifted or eased mandates in response to vaccine availability, downward trends in positive COVID-19 cases, and changing human attitudes. The timing and manner of lifting COVID-19 restrictions was not consistent across the United States, and some states reinstated restrictions as new variants of the virus emerged. This inconsistent patchwork of "back to business" across the nation continued to impact regional marine mammal stranding response and reporting.

Volunteers mask up for the release of a rehabilitated gray seal in Assateague State Park, Maryland. Mask wearing requirements and other measures were in place in Maryland during most of 2020 and 2021. Access to most public spaces in the state resumed during 2021. Credit: National Aquarium

Comparing Confirmed Stranding Reports to Past Years

In most cases, a stranded marine mammal is observed by a member of the public who reports it to a member of the National Stranding Network via a hotline call (or by notifying local emergency services). When logistically feasible and safe to do so, a National Stranding Network member then responds to confirm, document, and take the appropriate actions (as resources allow). There were 5,400 and 5,524 confirmed marine mammal strandings documented nationwide in 2020 and 2021 respectively.

The high number of strandings reported in Figure 1 for 2009 (pinnipeds), 2013 (small cetaceans), 2015 (pinnipeds), 2018 (pinnipeds), and 2019 (pinnipeds, small cetaceans, and large whales) can generally be attributed to increased strandings of live and dead animals connected with oceanographic changes or Unusual Mortality Events (UMEs) that occurred in these years.

The numbers of confirmed strandings for pinnipeds and small cetaceans in 2020 and 2021 are lower than the 2006–2019 average. Although there were fewer confirmed reports of stranded large whales in 2020 and 2021 compared to 2019, the numbers remain higher than the 2006–2019 average (Figure 1). 2006–2019 represents a period during which national effort remained relatively consistent. In contrast, reporting and response to marine mammals was impacted in 2020 and 2021 by national, regional, and local restrictions imposed during the global COVID-19 pandemic. Given this, it is unclear whether the lower numbers of confirmed stranded animals in 2020 and 2021 represent fewer stranded animals, fewer observations/reports by the public due to limited access to beaches or other activities, and/or capacity by the Stranding Network to respond.

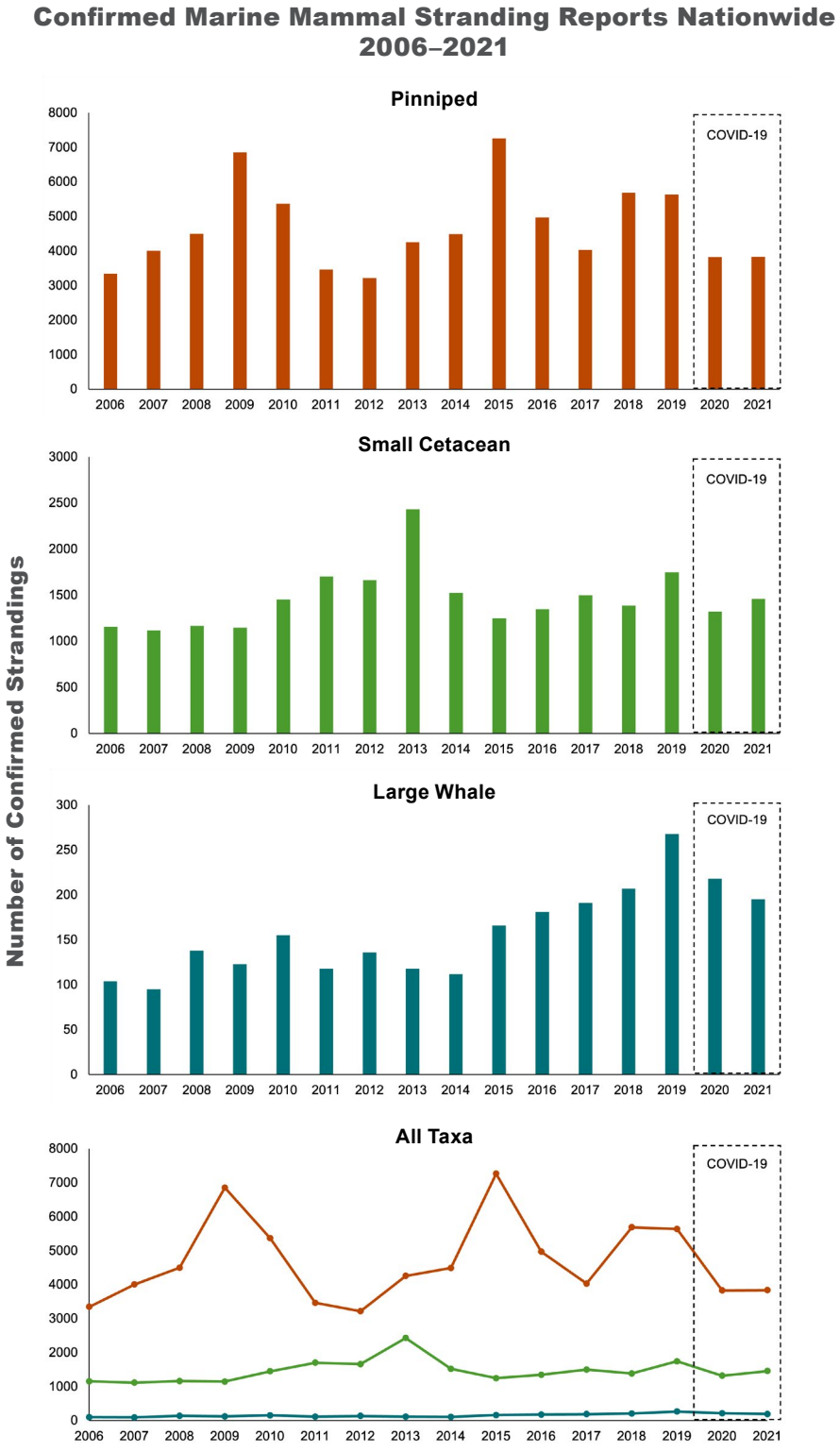


Figure 1. Confirmed marine mammal stranding reports nationwide by taxonomic group, 2006–2021. The gray dashed area represents the stranding years impacted by the COVID-19 pandemic. In 2020 and 2021, an additional 29 and 30 dead stranded marine mammals, not shown, were classified as an "unknown cetacean," as they were too decomposed to be assigned to "small cetacean" or "large whale" categories. Note: Scale of the Y-axis varies relative to the number of confirmed strandings for each taxon.

Unusual Mortality Events

The MMPA defines UMEs as marine mammal strandings that are "unexpected, involve a significant die-off of any marine mammal population, and demand immediate response." There are seven criteria that define when a mortality event is "unusual." The Working Group on Marine Mammal Unusual Mortality Events determines if the event meets at least one UME criterion, after which NOAA Fisheries may formally declare the event as an official UME. Understanding and investigating marine mammal UMEs is crucial, as they can serve as indicators of ocean health, giving insight into larger environmental or anthropogenic issues. Since 1991, NOAA Fisheries has documented UMEs along the U.S. coasts of the Atlantic and Pacific oceans, including the Gulf of Mexico, Alaska, and Hawaii. In recent years, increased efforts to examine carcasses and live-stranded animals have improved the knowledge of mortality rates and causes, allowing a better understanding of population threats and stressors, and the ability to determine when a situation is "unusual."

In 2020 and 2021, there were seven ongoing UMEs from previous declarations, involving:

- North Atlantic right whales
- Humpback whales
- Minke whales
- Gray whales
- Ice seals (bearded, ringed, and spotted seals)
- Harbor and gray seals
- Guadalupe and northern fur seals

Contribute to the UME Fund:

The U.S. Fish and Wildlife Service declared a new UME for Florida Manatees in 2021; manatees are a U.S. Fish and Wildlife Service trust species.

More information about UMEs is available at: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-unusual-mortality-events

A vessel-struck North Atlantic right whale calf (calf of NARW #3230 "Infinity") stranded dead in Florida in 2021. Vessel strikes are one of the primary threats facing the species and have been identified as a leading cause of the ongoing North Atlantic right whale UME. Credit: Florida Fish and Wildlife Conservation Commission/Tucker Joenz

Evidence of Human Interaction

Although animals may strand due to natural causes, some strandings are caused by human interactions. These interactions can be accidental or deliberate, can inflict severe pain and suffering on individual animals, and in some cases can lead to death. This can have detrimental impacts on marine mammal populations, especially for species listed as threatened or endangered under the Endangered Species Act. In some cases, animals have evidence of past human interactions, which may or may not have played a role in the immediate stranding event. Entanglements in fishing gear or marine debris (including ingestion), interactions with vessels (including vessel strikes), excessive underwater noise, direct harm (e.g., gunshots), general harassment by people (e.g., feeding, touching, interacting with, and moving animals including pushing stranded animals back into the water), and close proximity to—and interactions with—pets are common examples of human-caused threats.

In 2020, there were 668 documented cases of human interaction across 620 confirmed stranding events for all species (some stranded animals had more than one type of human interaction identified). This accounts for roughly 11 percent of all reported stranding events in 2020. Similarly, in 2021 roughly 10 percent of all confirmed stranding cases had at least one type of human interaction identified (582 documented cases of human interaction across 575 confirmed stranding events). Of the individuals documented with evidence of human interaction, some pinnipeds were affected by fishery interactions (e.g., entanglement in gear or scars, ingested gear; 30 percent in 2020 and 22 percent in 2021), and a number of individuals were found with gunshot wounds (17 percent in 2020 and 11 percent in 2021). Other forms of human interaction, including harassment and disturbance, were documented for several pinnipeds. Similar to pinnipeds, a large proportion of small cetaceans had injuries consistent with fishery interactions (45 percent in 2020 and 44 percent in 2021), and some presented evidence of vessel strike (7 percent in 2020 and 8 percent in 2021). Large whales had wounds consistent with both fishery interactions and vessel strikes (e.g., propeller scars, bruising, fractures, and/or internal bleeding). Note that for the data in this report, presence of human interaction does not necessarily mean that the interaction was the cause of stranding or death; these interactions could have been incidental to the stranding or from the past (such as healed scars).

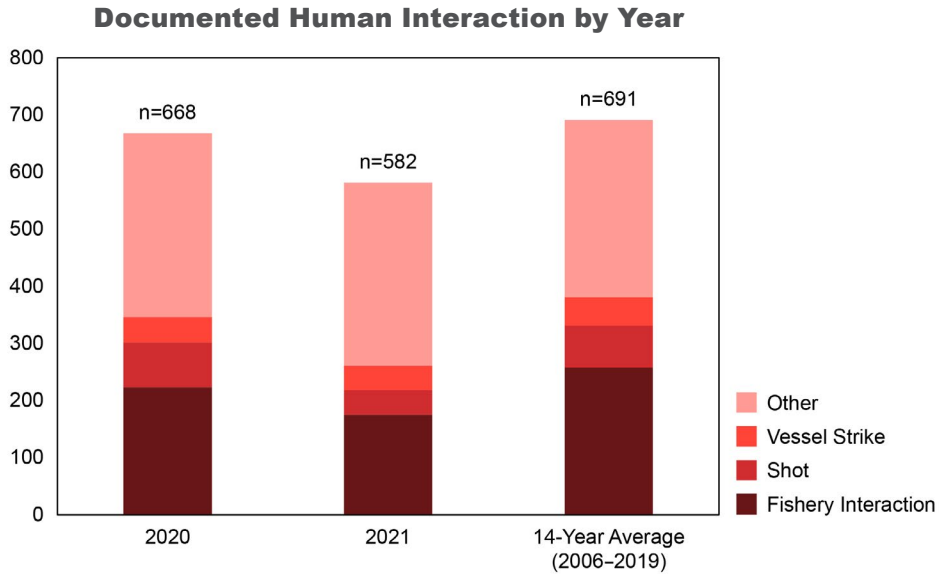


Figure 2. **Number of human interaction cases, for all species, identified in 2020 and 2021 compared to a 14-year (2006–2019) average.**

Documented human interaction cases were lower in 2020 and 2021 compared to the 2006–2019 average. This could be for several reasons, including the underreporting of cases and reduced capacity to respond to stranded marine mammals over the course of the COVID-19 pandemic. Determining that an animal has been impacted by human interaction is rarely straightforward, especially when a carcass is recovered in an advanced state of decomposition. Necropsies are often required to fully assess an animal for human interaction, and collected samples are usually processed in specialized laboratories. The restrictions implemented to reduce the spread of COVID-19—such as limits on groups and restricted travel—made sample collection challenging. Further, several businesses and institutions closed or ran reduced services during the height of the pandemic, which impacted sample analysis.

Rehabilitation and Release of Stranded Marine Mammals

Some National Stranding Network organizations are authorized to rehabilitate live-stranded marine mammals with the primary goal of returning the animals to the wild once healthy. Pinnipeds are the most common candidates for rehabilitation because they are relatively small and live partially on land, making them easier to care for than cetaceans, and there are facilities on both the East and West coasts that specialize in pinniped care and treatment. Because cetaceans live entirely in water, fewer facilities nationwide can accommodate them, and none are equipped to provide care for adult large whales. Regulations require that a marine mammal in rehabilitation be released within 6 months unless an attending veterinarian determines the release is unlikely to be successful due to the physical condition and behavior of the animal, more time is needed for assessment and medical treatment, or the release might adversely affect wild populations.

During 2020 and 2021, rehabilitation facilities throughout the United States were impacted by the COVID-19 pandemic. Some rehabilitation facilities had a reduced workforce (e.g., staff furloughed, employee sickness, and/or fewer volunteers), were forced to make tough choices amid budget cuts, had to adapt to changing state mandates, and some even closed their doors to new patients. There were 1,082 marine mammals that entered rehabilitation nationwide in 2020 (pinniped = 1,072; small cetacean = 10) and 1,116 in 2021 (pinniped = 1,105; small cetacean = 11). The numbers of rehabilitated animals in 2020 and 2021 are lower than the 2006–2019 average (pinniped = 2,247 ± 892; small cetacean = 21 ± 6). In both years, 58 percent of marine mammals cared for at authorized rehabilitation facilities were released. This is slightly higher than the average number of animals released from rehabilitation facilities between 2006–2019 (51 percent). Stranded animals in poor health sometimes die on their own or are euthanized in rehabilitation, depending on the seriousness of their medical condition. Occasionally, a rehabilitated marine mammal might be deemed non-releasable due to age, behavioral, ecological, and/or medical concerns that make them unlikely to survive in the wild. The MMHSRP and NOAA Fisheries' Permits and Conservation Division work with marine mammal public display or research facilities to place non-releasable animals in permanent managed care for the individual animal's continued welfare.

An emaciated and abandoned harbor seal pup is examined during his admittance to the Alaska SeaLife Center Wildlife Response Program. Credit: Alaska SeaLife Center/Kaiti Grant

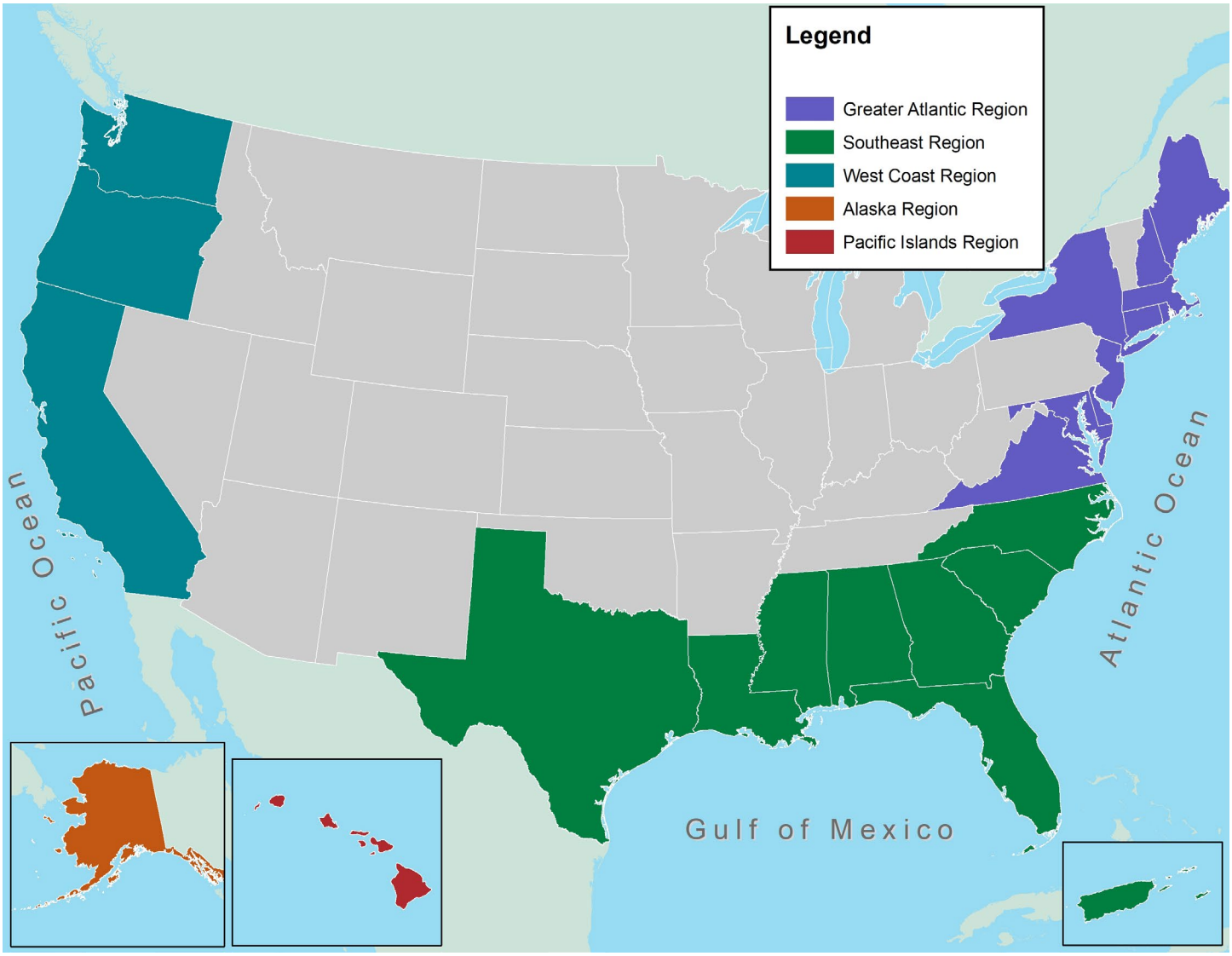


Figure 3. **Map of the United States with NOAA Fisheries' five jurisdictional regions highlighted.**

Regional Differences and National Standards

The National Stranding Network is composed of highly skilled and trained individuals from professional organizations, including aquaria, government agencies, higher education institutions, museums, non-profits, and tribes. These organizations are authorized under the MMPA to respond to and rehabilitate stranded marine mammals, either through Stranding Agreements issued by NOAA Fisheries or in their capacity as federal, state, tribal, or local government employees. Trained National Stranding Network members conduct the on-the-ground activities required to safely respond to marine mammal strandings and they are committed to animal welfare and education. Often faced with challenging circumstances, trained National Stranding Network members are responsible for making decisions that ensure appropriate care is provided to stranded animals.

Each of NOAA Fisheries' five jurisdictional regions (Figure 3) has a Regional Stranding Coordinator and/or Regional Stranding Administrator, who processes and administers Stranding Agreements and coordinates stranding response within their region: Alaska Region (AKR; Alaska), Greater Atlantic Region (GAR; Maine through Virginia), Pacific Islands Region (PIR; Hawaii, Guam, the Commonwealth of the Northern Mariana Islands, and American Samoa), Southeast Region (SER; North Carolina through Texas, Puerto Rico, and U.S. Virgin Islands), and West Coast Region (WCR; California, Oregon, and Washington).

Marine mammal stranding rates vary widely across the United States (Table 4), and can fluctuate within the same geographical area between years (Figure 4). There are regional differences in the species, abundance, and distribution of marine mammals most likely to strand, in the frequency and seasonality of stranding events, and in the likelihood of detection and reporting of stranding events. In light of these regional differences, national standards and protocols have built-in flexibility to enable local and nuanced implementation.

Table 4. Nationwide marine mammal stranding summary by region in 2020 and 2021.

	West Coast Region		Greater Atlantic Region		Southeast Region		Alaska Region		Pacific Islands Region	
	2020	2021	2020	2021	2020	2021	2020	2021	2020	2021
Pinniped	2,716	2,791	980	895	2	5	105	128	28	20
Small Cetacean	216	212	371	378	677	816	47	38	11	16
Large Whale	57	69	54	38	11	9	90	73	6	6
Unknown Cetacean	3	2	16	12	8	7	2	9	0	0
Total Stranding	**2,992**	**3,074**	**1,421**	**1,323**	**698**	**837**	**244**	**248**	**45**	**42**
(% of National Total)	**(55%)**	**(56%)**	**(26%)**	**(24%)**	**(13%)**	**(15%)**	**(5%)**	**(4%)**	**(1%)**	**(1%)**

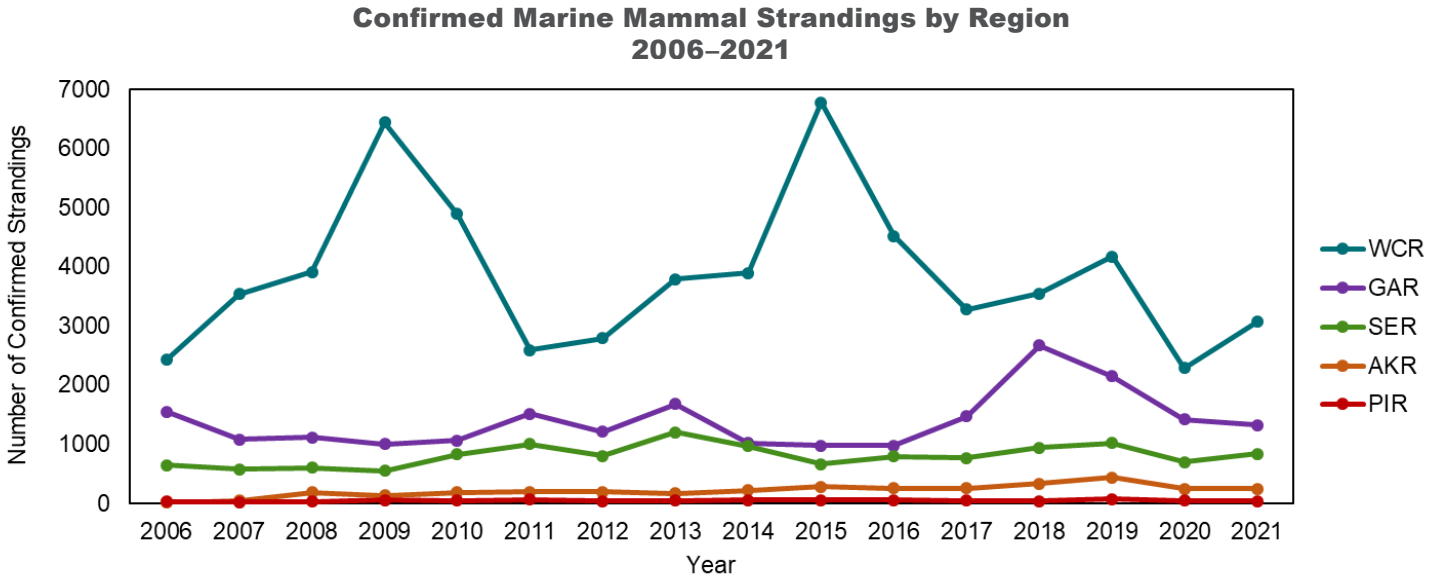


Figure 4. Confirmed marine mammal strandings (all taxa) by region from 2006 to 2021. In 2020, the number of confirmed strandings decreased in all regions. In 2021, strandings rose in the WCR and SER compared to 2020, but remained lower than the historical average.

What Can Members of the Public Do?

Report a Stranding

When reporting a stranded marine mammal, please include the following information:

- Date
- Location of stranding (including latitude and longitude)
- Number of animals
- Condition of the animal (alive or dead)
- Species (if known)

Photos or videos from a safe and legal distance (note that regulations apply to certain species and areas) can also provide valuable information to Stranding Network responders. Only trained and permitted responders should approach or pick up a stranded marine mammal. You can also download the Dolphin & Whale 911 Stranding App in the Apple Store to help report a stranding.

Get Involved

The National Stranding Network relies on government, private, and public support to conduct its vital work to save animals in distress and understand causes of injuries and mortalities. You can make a difference by contacting your local Stranding Network to see how you can get involved.

Trained Stranding Network responders perform a health examination on a live-stranded common dolphin. Credit: Virginia Aquarium

Regional 24/7 Hotline

The Marine Mammal Health and Stranding Response Program relies on reports of stranded marine mammals by the public. If you come across a stranded marine mammal, please report it to your regional 24/7 hotline and await further guidance from trained responders.

Alaska: (877) 925-7773

Greater Atlantic: (866) 755-6622

Pacific Islands: (888) 256-9840

Southeast: (877) 942-5343

West Coast: (866) 767-6114

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Marine Mammal Health and Stranding Response Program
Marine Mammal and Sea Turtle Conservation Division
Office of Protected Resources

Acknowledgements

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A trained staff member holds himself above "Mele," a young female Hawaiian monk seal to restrain her movement while an admit exam is conducted. This approved technique promotes the safety of both responder and animal. Credit: The Marine Mammal Center/Sophie Whoriskey.

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