

## Summary of recorded cetacean strandings in the Commonwealth of the Northern Mariana Islands

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**Abstract**—Documented strandings in the Commonwealth of the Northern Mariana Islands over the past 17 years are reviewed with recorded autopsy information provided. Most of the strandings occurred on the island of Saipan, although two whales were noted to have stranded during this period on Tinian, one identified as *Balaenoptera edeni*, the Byrdes whale, while the other was not identified. The planned expansion of military activities in the Marianas Archipelago, particularly the use of sonar and the potential impact on cetaceans, is noted.

### Introduction

The stranding of cetaceans is a worldwide phenomenon that has attracted increasing attention as links to seismic surveys (Engel et al. 2004) and military naval sonar, and the potential influence on cetacean strandings have been widely publicized (Balcomb & Claridge 2001; Jepson et al. 2003; Taylor et al. 2004; Parsons et al. 2008; D'Amico et al. 2009; Filadelfo 2009).

There have been a number of theories regarding the causes of cetacean strandings including; geomagnetic alterations (Brabyn & Frew 1994), poor health (Odell et al. 1989) excessive hydrocarbon exposure (Marsili & Focardi 1997), parasitic infection (Ridgeway & Dailey 1972), currents and bathymetry (Brabyn & McLean 1992), falling tides and topographical obstacles (Geraci & Lounsbury 1993), predation (Wapstra 1991), and large-scale climatic events (Evans et al. 2005). The causes of cetacean strandings are potentially highly complex, with Bradshaw et al. (2006) encouraging more rigorous scientific approaches in an effort to elucidate specific causes.

Published reports of strandings from the numerous islands and atolls of Micronesia have been limited to the Territory of Guam (Kami & Lujan 1976;

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Kami & Hosmer 1982; Eldredge 2003) and the Commonwealth of the Northern Mariana Islands (CNMI) by Trianni & Kessler (2002), who described a series of strandings of the Spinner dolphin, *Stenella longirostris*, in Saipan Lagoon during 1995. In addition to strandings of spinner dolphins, there have been other cetacean strandings in the CNMI over the past 20 years which have been archived by CNMI Division of Fish and Wildlife (DFW) staff; the Stripped Dolphin (*Stenella coeruleoalba*), the False Killer Whale (*Pseudorca crassidens*), Dwarf sperm whale (*Kogia simus*), Brydes whale (*Balaenoptera edeni*), and the Pygmy sperm whale (*Kogia breviceps*) (Fig. 1). This paper summarizes those archived cetacean strandings in the CNMI, with the addition of post-1995 spinner dolphin strandings.

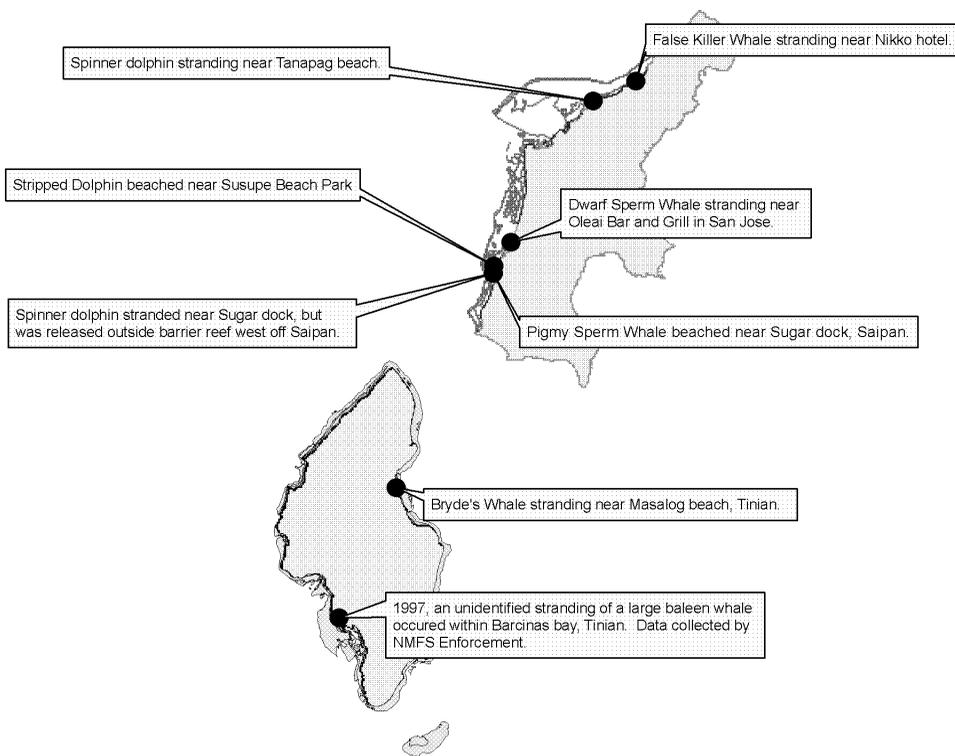


Figure 1. The islands of Saipan and Tinian with associated strandings.

## Methods

Files containing historical documentation of cetacean strandings stored at the CNMI DFW were reviewed, and identifications confirmed, where necessary, using the guidebook by Leatherwood et al. (1982) and the stranding field guide by Geraci & Lounsbury (1993). Where present, photographs of stranded cetaceans were scanned for electronic storage, providing magnification of identifying characteristics, observed trauma and documentation of rescue procedures. Additionally, more

recent strandings were identified using the same guidebooks, with observations aided both by digital photographs. The strandings data constituted observations consequential to specific cetacean strandings that were responded to by DFW staff.

## Results

### Odontoceti Delphinidae

#### *Stenella coeruleoalba* (Meyen, 1833) Striped Dolphin

The striped dolphin, *Stenella coeruleoalba*, has a cosmopolitan distribution in tropical, subtropical, and warm temperate waters (Leatherwood et al. 1982). Strandings in Pacific jurisdictions that have been previously documented include the Galapagos (Palacios et al 2004) and Hawaii (Maldini et al. 2005).

A striped dolphin stranding was recorded in 1993 from the Susupe Beach area of Saipan Lagoon (Fig. 1). On the evening of September 22, 1993 at about 18:30 DFW staff biologists were called to Susupe Beach (Fig. 2). A striped dolphin (*Stenella coeruleoalba*) was observed swimming towards the beach, and after several attempts to re-direct the mammal, it finally swam into deeper water at 20:00 and disappeared from sight. Observations recorded the tip of the dolphins' lower jaw to have been split with several teeth on either side missing. No other injuries were observed. The following day a dead dolphin was reported and picked up at the San Jose beach in the morning. It was further determined that the dolphin had



Figure 2. DFW Staff Biologist attending to a stranded striped dolphin, *Stenella coeruleoalba*, at Susupe Beach, Saipan, September 22, 1993.

beached the night before. DFW staff performed an autopsy, and the dolphin was identified as a mature male with a snout to fluke notch length of 2.06 m. The stomach of the dolphin was empty. The upper jaw tooth count was 40(+4) and the lower jaw tooth count was 45(+/-2).

*Stenella longirostris* (Gray, 1828) Pantropical Spinner Dolphin

Strandings of the pantropical whitebelly spinner dolphin in the Pacific Region have been documented from Hawaii (Maldini et al. 2005) and the CNMI (Trianni & Kessler 2002).

On October 3, 2005, DFW biologists responded to a call from Tanapag Village. Upon arrival at the caller's residence a juvenile spinner dolphin was retrieved from a small boat. It was stated that the dolphin was found floating in shallow water in Tanapag Lagoon (Fig. 1). There were no external markings on the dolphin. The length of the dolphin was recorded as 1.1 m, identified as a male by relative placement of the genital slit to the anus and lack of mammary slits. No further information was obtained from the dolphin as subsequent refrigeration followed by refrigeration failure resulted in rapid and advanced decomposition.

On August 8, 2007 DFW staff biologist was called to Sugar Dock regarding a dolphin observed to be trapped in shallow water (Fig. 1). Upon arrival at the site, the dolphin was observed swimming in circles south of the pier in a meter of water. DFW staff restrained the dolphin to calm it down and assess for any injuries, before transporting it out to sea. The estimated length of the spinner dolphin was 1.2 m from snout to fluke. No serious lacerations or puncture wounds were observed on the dolphin. A slight abrasion was noticed on the left side of the head, near the eye. The dolphin also exhibited the ability to swim without assistance. A make shift stretcher was used to load the dolphin onto the DFW vessel and was released at approximately one mile west of Sugar dock. Upon release, the dolphin proceeded to swim south towards the island of Tinian.

*Pseudorca crassidens* (Reinhardt, 1862) False Killer Whale.

Found worldwide in temperate and tropical waters, the false killer whale has demonstrated a propensity for mass stranding events (Odell 1980; Andrade et al. 2001; Chambers & James 2005). In the Pacific region, false killer whales have been stranded in Canada (Baird et al. 1989), Northwest United States (Norman et al 2004), the Galapagos (Palacios et al 2004), Australia (Nicol 1987; Phillips 1988; Chatto & Warneke 2000), New Zealand (Brabyn & McLean 1992), and Hawaii (Maldini et al 2005).

A stranding of a neonate female occurred in May 13, 2000 in the Pau Pau Beach area of Saipan Lagoon, following typhoon conditions (Fig. 1). Upon arrival the whale was swimming near shore of sandy beach in about three feet of water. Numerous tourists and local residents were taking pictures and petting the whale. The whale would raise its head so that its eye was above the water line when breathing. The breathing appeared labored. As it was apparent that the whale was separated from its mother it was decided to transport the whale outside the reef in an effort to locate its mother or pod. It was surmised that rough seas had caused

the separation, as the juvenile was probably not a strong swimmer. As the whale was lifted out of the water into the transport boat it began making rapid clicking sounds. In the boat it squirmed excessively at first but calmed down after water was continually poured over it to keep it cool. About halfway toward the channel entrance the whale had expired, its blowhole closed tight. The whale was then brought back to the Fisheries warehouse in lower base for autopsy (Fig. 3). The tip of snout to fluke notch was 161.29 cm, tip of snout to dorsal fin insertion 73.66 cm, pectoral fin length 21.84 cm, blowhole width 3.81 cm, fluke width 30.48 cm, girth in front of dorsal 70.49 cm, fat layer below front of dorsal fin on belly 0.64 cm. Teeth were not emergent. Teeth 'ridges' under the gum were counted: mandible 9 left, 8 right, maxilla 8 left, 8 right. A shark bite impression was visible on the left fluke, although the fluke was not bleeding or broken. Numerous scrapes and cuts from snout (Fig. 4) to, and including the ventral thoracic region. Whale was identified as female by relative locations of anus and genital opening, and presence of mammary slits, and presence of uterus and ovarian tissue upon dissection. Internally, genital slit directed in anterior direction.



Figure 3. Carcass of juvenile false killer whale, *Pseudorca crassidens*, stranded in Saipan Lagoon, May 13, 2000.

### Physeteridae Sperm Whales

#### *Kogia simus* (Owen, 1866) Dwarf sperm whale

Strandings of *Kogia simus* in the Pacific have been documented in published accounts from British Columbia (Nagorsen & Stewart 1984), Pacific Coast of Colombia (Mora-Pinto et al. 1995), Ecuador (Felix et al. 1995), New Zealand (Baker & Van-Helden 1990), Australia (Chatto & Warneke 2000), New Caledonia (Borsa 2006), Vietnam (Smith et al. 1997), Galapagos (Palacios et al. 2004), Hawaii (Maldini et al. 2005), and Guam (Kami & Lujan 1976).



Figure 4. Close-up of view of head of juvenile false killer whale, *Pseudorca crassidens*, stranded in Saipan Lagoon, May 13, 2000.

On August 24, 1993 a dwarf sperm whale was found stranded at San Jose beach (Fig. 1). Personnel from the DFW recorded the following observations. The length from the tip of the snout to the origin of dorsal fin was 59 cm, and the length from the tip of snout to the fluke notch was recorded as 127 cm. The relative placement of the dorsal fin near or forward the midpoint of the back is characteristic of this species. The length of the individual indicated that it was a sub-adult. A tooth count was not obtained. An autopsy revealed no external wounds that appeared to be fatal, and the external surface was described as having extensive lacerations, presumably from coral rock (Fig. 5). The sex of the animal was listed as undetermined, although one staff documented that they observed possible ovaries.



Figure 5. View of anterior portion of stranded dwarf sperm whale, *Kogia simus*, from San Jose Beach on August 24, 1993

*Kogia breviceps* (de Blainville, 1838) Pygmy sperm whale

The stranding of *Kogia breviceps* in the Pacific Region has been documented in published accounts from Pacific coast U.S. (Eliason, & Houck 1986), New Caledonia (Borsa 2006), Australia (Sedlak-Weinstein 1992), New Zealand (Beatson 2007), Japan (Thomas et al. 1990), and Hawaii (Maldini et al. 2005).

On December 4, 1997 DFW staff were called to Sugar Dock (Fig. 1) at 1400 after a whale was reported stranded. Upon arrival DFW biologist identified a dead pygmy sperm whale. Fishermen at the beach reported that the whale was alive less than an hour before, as it was sighted caught up in a group of limestone rocks south of Sugar Dock in 1 m of water and less than 4 m from shore. It was noted that this group of rocks are only covered at mean high water. The fishermen reported that the whale was observed thrashing about in the rocks, attempting to escape. The fishermen pulled the whale from the rocks by the flukes, moving it south over a shallow sandy area, where it apparently died shortly thereafter. The whale was on its right side upon initial observation by DFW staff. The blowhole of the whale was closed tight, and the fishermen reported seeing small 'air bubbles' coming from the blowhole while the whale was on its side. During the course of conversation it was noted that the fishermen were probably unaware of the mechanics of cetacean breathing. An autopsy by DFW staff recorded the following observations. The whale had severe lacerations on the anterior-ventral surface, encompassing the entire left side of the lower jaw, the ventral surface of the snout, and extending dorsally to the top of the snout (Figs. 6 & 7). The whale had numerous cuts and scrapes along its lateral surface, along both sides of the body extending onto the entire caudal area. The anterior edges of both the fins and flukes were extensively lacerated. Blood was observed seeping from the mouth. A round concentric scar was observed on the right side of the head midway between the eye and the end of



Figure 6. Carcass of pygmy sperm whale, *Kogia breviceps*, stranded at Sugar Dock in Saipan Lagoon on December 4, 1997.



Figure 7. Close up of head of pygmy sperm whale, *Kogia breviceps*, stranded at Sugar Dock in Saipan Lagoon on December 4, 1997, showing severe lacerations.

the mouth line, which was identified as a scar from a cookie cutter shark, *Isistius brasiliensis*. The length of the specimen from the tip of the snout to the fluke notch was recorded as 2.78 m. The girth of the specimen immediately in front of the dorsal fin was recorded as 1.01 m. The dorsal fin was falcate, low in height and more than 60% along the dorsal surface. The tooth count was 0/14 both sides, and no damage to the teeth was observed. The stomach was observed to be empty with intestines containing some digested material that was not sampled. The specimen was identified as a mature male by the presence of mature gonads, penis, as well as body length. No apparent internal abnormalities were observed. The lower jaw was excised, cleaned and dried by DFW and subsequently sent to the U.S. National Marine Fisheries Services' Southwest Fisheries Science Center in La Jolla, CA.

#### Mysteceti

##### Balaenopteridae Rorquals

##### *Balaenoptera edeni* (Anderson, 1879) Byrdes whale

The Byrdes whale favors temperate and topical waters, typically between 40°N and 40°S (Kato 2002). Pacific Region strandings have been documented in Australia (Paterson 1984), Pacific coast of Colombia (Mora-Pinto et al. 1995), Boreno (Beasley & Jefferson 1997), Ecuador (Chiluiza 1998), Galapagos (Palacios et al. 2004), Indonesia (Mustika et al. 2009), Vietnam (Smith et al. 1997), and Guam (Eldredge 2003).

On February 16, 2005 DFW staff received a call regarding the stranding of a whale at Masalog Beach on the windward aspect of Tinian Island (Fig. 1). The whale was identified as a male Brydes Whale. The whale measured approximately

10 m in length from snout to fluke notch. Decomposition had begun, as the whale's skin was discolored (Fig. 8) and the dorsal fin decomposed. There were no signs of bite marks or any other trauma. Three distinct longitudinal ridges were observed from the tip of the snout posterior to the blowhole. Tinian Department of Lands and Natural Resources Enforcement Section noted that the whale had originally been observed beached at Long Beach. The skeleton of the whale was recovered by staff from the following CNMI agencies and institutions; Division of Fish and Wildlife, Northern Marianas College, Coastal Resources Management, and Division of Environmental Quality. The skeleton was eventually transported to Saipan, and the location for the future display of the skeleton has yet to be determined.

An unidentified baleen whale was reported from Barcinas Bay in Tinian in 1997. Anecdotal reports stated that the whale came ashore in a wounded condition accompanied by several tiger sharks (*Galeocerdo cuvier*) that were feeding on it. No additional information exists from this stranding.



Figure 8. Anterior view of a stranded Byrdes Whale, *Balaenoptera edeni*, at Masalog Beach on February 16, 2005.

## Discussion

There have been few documented strandings of cetaceans in the CNMI over the past 17 years. Nearly all of these strandings have occurred on the island of Saipan. The history of strandings on the populated islands of Tinian and Rota is poorly known, although anecdotal information suggests they have been less frequent than in Saipan. No stranding information exists from the islands north of Saipan, although the islands of Agrihan, Pagan, Alamagan, and Anatahan have

been lightly and intermittently populated since WWII, and whales and dolphins have been observed in nearshore waters from Saipan north to Uracas (Trianni & Kessler 2002; NAVFAC 2007).

The recent proposal to increase military presence in the Marianas along with increased training activities has raised some marine resource issues. The potential impact of military training activities around Tinian and Saipan to what appears to be a resident pod of spinner dolphins around Saipan and Tinian (Trianni & Kessler 2002) remains unclear. Additionally, the planned use of sonar in the Marianas Exclusive Economic Zone may be detrimental to cetaceans in the area. Although quantitatively demonstrating actual damage to cetaceans from sonar requires further research (Bradshaw et al 2006; D'Amico et al 2009; Filadelfo 2009), there appears to be a rather strong correlation with sonar activities and the injury and stranding of beaked whales, in particular Cuvier's beaked whale (*Ziphius cavirostris*), although other cetacean strandings have also been correlated to naval sonar activities (Balcomb & Claridge 2001; Jepson et al. 2003; Taylor et al. 2004; Parsons et al. 2008).

The recent creation of the new Western Pacific Region under NOAA Fisheries has resulted in immediate benefits to the U.S. insular island areas, including the CNMI. Under the NMFS Pacific Islands Fishery Science Center workshops and materials support has been provided to collect at sea observations of marine mammals. Additionally, the NMFS Pacific Islands Regional Office of Protected Resources has provided support in applying for funding under the John H. Prescott Marine Mammal Rescue Assistance Grant Program, to create a local stranding network.

With these additional resources and support, it can be expected that more thorough coverage, along with more detailed autopsies, of cetacean strandings in the CNMI will be observed and reported. An increased focus on cetacean strandings will be important when the US military relocates to Guam and commences increased training activities in the Marianas Archipelago.

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