

## A Review of the Aquatic Mammals of Belize

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### Abstract

Characterizing species occurrence, abundance, and distribution is critical to the management of natural resources and the conservation of biodiversity. In the Western Caribbean, little information exists on the occurrence of aquatic mammals along the Mesoamerican Barrier Reef System and adjacent aquatic ecosystems. Herein, we present the first comprehensive review of aquatic mammals encountered in the marine and freshwater habitats of Belize. To determine which aquatic mammal species occur in Belizean waters, we conducted an extensive review of published and unpublished reports of aquatic mammals. We located 163 unique reports from museum and animal collections, journal articles, theses, news reports, conference proceedings, institutional reports, and verified accounts from personal observations. Our review confirms the presence of 17 aquatic mammal species in Belize: 15 cetaceans (*Megaptera novaeangliae*, *Balaenoptera physalus*, *Ziphius cavirostris*, *Physeter macrocephalus*, *Kogia breviceps*, *Orcinus orca*, *Pseudorca crassidens*, *Globicephala macrorhynchus*, *Peponocephala electra*, *Stenella attenuata*, *S. clymene*, *S. frontalis*, *S. longirostris*, *Steno bredanensis*, and *Tursiops truncatus*), one sirenian (*Trichechus manatus manatus*), and one carnivore (*Lontra longicaudis annectens*). Our findings provide the most up-to-date list of aquatic mammal presence in Belize. Given the limited data points obtained for most identified species, we recommend that systematic studies be conducted to investigate the status of the variety of aquatic mammals

in the region to effectively monitor populations and devise strategies to mitigate the negative impacts of anthropogenic activity and climate change-related ecosystem shifts.

**Key Words:** aquatic mammals, Belize, Western Caribbean, marine mammals, species distribution

### Introduction

Human activities and the widespread effects of accelerated global climate change threaten most marine and freshwater ecosystems (Schipper et al., 2008; Estes et al., 2011; May-Collado & Agnarsson, 2011). An understanding of the composition and diversity of species in aquatic ecosystems is crucial to identifying the status of aquatic mammals and enacting effective regulatory measures for their protection. *Aquatic mammals* are defined as all mammals that spend the majority of their lives in water and are dependent on aquatic ecosystems to conduct activities critical to their survival and reproduction (e.g., foraging and breeding). This term includes marine mammals (most of which inhabit oceanic habitats but can also inhabit coasts and rivers) and freshwater dependent mammals that include, but are not limited to, more than 129 species from the following clades: Cetaceans (Suborders Mysticeti: baleen whales; Odontoceti: toothed whales), Sirenians (Trichechidae: manatees; Dugongidae: dugongs), Pinnipeds (Otoriidae: sea lions; Phocidae: seals; Odobenidae: walruses), and Carnivores (Mustelidae: otters; Ursidae: polar bears).

Aquatic mammals play key roles in their ecosystems, ranging from primary consumers to top predators to ecosystem engineers (Roman et al., 2014; Kiszka et al., 2015). Population declines and extinctions of top marine predators result in trophic cascades capable of impacting a broad range of ecological processes (Heithaus et al., 2008; Kiszka et al., 2015). Most aquatic mammal species have endured major exploitation by humans. In the past three centuries, a combination of hunting, habitat loss, and other anthropogenic impacts have resulted in major population declines; loss of genetic diversity (Chapin et al., 2000); and the extinction of the baiji (*Lipotes vexillifer*), Steller's sea cow (*Hydrodamalis gigas*), Japanese sea lion (*Zalophus japonicus*), Caribbean monk seal (*Monachus tropicalis*), Japanese river otter (*Lutra lutra whiteleyi*), and sea mink (*Neovision macrodon*) (International Union for Conservation of Nature [IUCN], 2015). Evidence from the fossil record coupled with projections of extinction risk indicates extinction rates for terrestrial and marine fauna has increased several-fold compared to historical rates (Ricciardi & Rasmussen, 1999; Davidson et al., 2012). Identifying the potential impacts of the loss of aquatic mammal species, their risk of extinction, and determining their functional roles within aquatic ecosystems requires baseline data on species presence and distribution that is often lacking in regions with limited resources to conduct wide-scale studies.

Information is limited on the status of aquatic mammals across the riverine systems, coastal habitats, and oceanic cayes and atolls in Belize, which form the heart of the Mesoamerican Barrier Reef System (MBRS). Reliable assessments of the status of populations of aquatic mammal species found in this region are currently infeasible due to the absence of data on their occurrence, demographics, abundance, and distribution. The Belizean government and a variety of national and international nongovernmental organizations (NGOs) are heavily invested in the conservation of Belizean biodiversity and natural resources. Almost a third of the Belizean territorial area is protected by 103 protected areas, including 17 forest reserves, four nature reserves, 18 national parks, nine marine reserves (MR), five natural monuments, 15 archaeological reserves, seven bird sanctuaries, 12 spawning aggregation reserves (National Protected Area System [NPAS], 2015), and two regions protected by the Ramsar Conventions on Wetlands (locations designated for the protection and effective management of wetlands) (Ramsar Convention Secretariat, 2013). Aquatic mammals are protected from extraction and hunting under the *Wildlife Protection Act of 1981*. However, despite nationwide effort to protect wildlife, systematic investigations of most

of the country's aquatic mammals have not been conducted due largely to limited resources and the absence of dedicated in-country research institutions for aquatic mammal research. The Antillean manatee (*Trichechus manatus manatus*) and certain populations of bottlenose dolphin (*Tursiops truncatus*) are well studied in the region, both having been the focus of numerous short- and long-term studies across the coastal and oceanic cayes of Belize. However, due to the diverse ecological requirements and life histories of aquatic mammals, managers and stakeholders should be cautious in generalizing potential threats and effective protection measures to other species based on these findings.

The aim of this study is to present the first comprehensive review of aquatic mammal occurrence in Belize and this region of the western Caribbean Sea. We conducted an extensive review of published and unpublished records of aquatic mammals, verifying unpublished accounts when possible; mapped occurrence records in relation to protected regions to provide the first cohesive record of aquatic mammals in Belize; and then discussed the extent of knowledge of each aquatic mammal species in this region.

## Methods

### *Study Region*

We investigated all occurrences of aquatic mammals throughout Belize from its northern border with Quintana Roo, Mexico (N 18° 29' 58", W 088° 13' 44") to its southern border with Guatemala (N 15° 38' 45", W 088° 11' 15"). Our study region extended to the maritime borders of Belize's Exclusive Economic Zone (EEZ) and included 313 km of coastline and 35,905 km<sup>2</sup> of territorial sea (Figure 1). Belize is comprised of six districts, numerous coastal and pelagic cayes, three oceanic atolls, and 35 river catchments or watersheds that drain into the Caribbean Sea. Its three oceanic atolls are separated from the mainland by deep water channels characterized by depths greater than 1,000 m (Stoddart, 1962; Stoddart et al., 1982).

### *Compilation and Review of Records*

We conducted an extensive search for sighting records within our study region. The source of each aquatic mammal record was classified into the following eight categories: (1) collection/museum (specimens held in museums, animal collections, or online databases), (2) peer-reviewed article, (3) book/book chapter, (4) personal observation (unpublished sightings cited here as personal communications), (5) dissertation/thesis, (6) institutional report (e.g., governmental, NGO, institutional), (7) conference proceedings, and (8) local news. In addition to the database search,



**Figure 1.** Map of the study region in Belize showing its districts, relevant locations, and the boundary of Belize's Exclusive Economic Zone

we conducted online searches, contacted NGOs and governmental organizations throughout Belize to acquire sighting and stranding records, and collected personal observations with accompanying data that were examined by the authors of this review before verifying species identifications. Reports from local news were only accepted if accompanied by images that could be used for verification. To find articles reporting occurrences of aquatic mammals in Belize, we examined a variety of scientific databases (e.g., Elsevier, Springerlink, Web of Science) and consulted various scientific collections and museums (e.g., Smithsonian Institution National Museum of Natural History) using numerous relevant key words and the scientific and common names of 33 aquatic mammal species previously reported in the Caribbean (e.g., Jefferson & Lynn, 1994; Ward et al., 2001; Platt & Rainwater, 2011).

When a confirmed occurrence of an aquatic mammal species was represented in more than one source (e.g., in an online database and as a specimen in a collection), we included only the original report if it was available. For unpublished accounts, we attempted to contact the authors to seek additional evidence of verification if the species in question could be easily misidentified (e.g., species of *Stenella*) or if the species is outside of its reported range (e.g., baleen whales). When animal photos accompanied occurrence records, we attempted to identify the species in question by

referring to marine mammal identification guides (e.g., Jefferson et al., 2008) and consulting with expert colleagues if species identification was challenging, especially when distinguishing between *Peponocephala electra* and *Pseudorca crassidens*.

### Mapping of Records

We mapped aquatic mammal occurrences where coordinates were available or if a description of the geographic sighting location was reported. If latitude and longitude were available, coordinates were plotted on a map using *ArcGIS 10.3* (ESRI, St. Charles, MO, USA). If coordinates were unavailable but data points were depicted on a map, we georeferenced points using *ArcGIS* by overlaying records with maps of Belize and identifying the approximate coordinates of each point. Records that lacked geographic data or were only associated with a broad region were not plotted in the map. When data were available, one point was generated for each reported sighting of groups and/or individuals; thus, each mapped point may represent the sighting of more than one animal. Aquatic mammal occurrence records were overlaid with the protected regions (NPAS, 2015) in Belize, and we calculated the percentage of reports that fell within these areas.

## Results

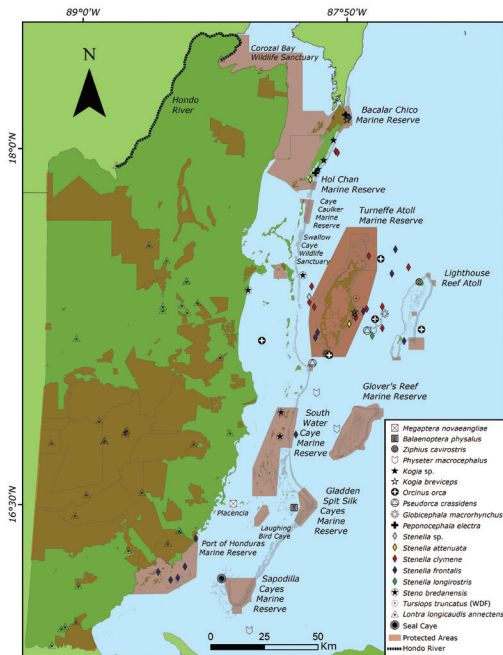
Following our review of thousands of sources and 203 potential records, we compiled 163 unique records of 17 aquatic mammal species in Belize. Identified species include 15 cetaceans (two mysticetes; 13 odontocetes), one sirenian, and one carnivore. Strandings consisted of 10.3% ( $n = 17$ ) of all reports, but this does not reflect actual stranding frequencies for species given we considered only individual reports of a stranding event and not the total number of stranded animals. In order from sources with the most to the least records, sources came from collections/museums, personal observations, institutional reports, peer-reviewed articles, theses, conference proceedings, local news, and no unique records from books/book chapters (Table 1). The Antillean manatee was the most commonly reported species, followed closely by the neotropical river otter (*Lontra longicaudis annectens*) and bottlenose dolphin (Table 1). Of the 17 verified species, eight are classified as *Data Deficient*, six of *Least Concern*, one is *Vulnerable*, and two are *Endangered* (IUCN, 2015).

All verified records of aquatic mammals with accompanying geographic data were mapped in relation to all protected regions in Belize as of 2016 (Figure 2). There are thousands of individual sighting records for coastal bottlenose dolphins and manatees that have been observed in many

**Table 1.** Number for each verified aquatic mammal species listed according to species common name, Latin name, IUCN status, source, and the percentage of reports for each species of all verified records. "Strandings" indicates the number of records from stranding events and WDF = worldwide distributed form.

Common name	Scientific name	IUCN status	Collection/ museum	Peer- reviewed article	Personal observation	Thesis	Institutional report	Conference proceedings	Local news	Total records	% of total	Strandings
Humpback whale	<i>Megaptera novaeangliae</i>	Least Concern			1					1	0.6	
Fin whale	<i>Balaenoptera physalus</i>	Endangered	1							1	0.6	1
Cuvier's beaked whale	<i>Ziphius cavirostris</i>	Least Concern				1				1	0.6	1
Sperm whale	<i>Physeter macrocephalus</i>	Vulnerable	1		5		1			7	4.3	
Pygmy or dwarf sperm whale	<i>Kogia sp.*</i>								3	3	1.8	3
Pygmy sperm whale	<i>Kogia breviceps</i>	Data Deficient				2				2	1.2	2
Killer whale	<i>Orcinus orca</i>	Data Deficient		2	2		1			5	3.1	
False killer whale	<i>Pseudorca crassidens</i>	Data Deficient			2					2	1.2	
Short-finned pilot whale	<i>Globicephala macrorhynchus</i>	Data Deficient	1		3					4	2.5	
Melon-headed whale	<i>Peponocephala electra</i>	Data Deficient				1			1	2	1.2	2
Unidentified stenellid	<i>Stenella sp.*</i>				4					4	2.5	
Pan-tropical spotted dolphin	<i>Stenella attenuata</i>	Least Concern		1	2		1			4	2.5	2
Clymene dolphin	<i>Stenella clymene</i>	Data Deficient		1			1			2	1.2	1
Atlantic spotted dolphin	<i>Stenella frontalis</i>	Data Deficient	1			1	2			4	2.5	1
Spinner dolphin	<i>Stenella longirostris</i>	Data Deficient			1					1	0.6	
Rough-toothed dolphin	<i>Steno bredanensis</i>	Least Concern	1	1	3					5	3.1	2
Bottlenose dolphin	<i>Tursiops truncatus</i> (coastal)	Least Concern	8	6		8	4	4		30	18.6	1
Bottlenose dolphin	<i>Tursiops truncatus</i> (WDF)	Least Concern			4		2			6	3.7	
Antillean manatee	<i>Trichechus manatus manatus</i>	Endangered	15	13	1	5	7	1	1	43	26.3	1
Neotropical river otter	<i>Lontra longicaudis annectens</i>	Data Deficient	31		1		3	1		36	21.6	
Totals			59	24	30	14	26	6	5	163		17

\* Indicates species could only be identified to the genus level.



**Figure 2.** Map of aquatic mammal reports throughout Belize. Records were mapped according to species name in Latin, alongside protected regions with relevant site locations named. All reports with accompanying geographic location data are depicted, with the exception of Antillean manatees and coastal bottlenose dolphins. WDF = worldwide distributed form.

coastal and oceanic protected areas, including the Port of Honduras MR, Glover's Reef MR, Swallow Caye Wildlife Sanctuary (WS), Bacalar Chico MR and National Park, and Turneffe Atoll MR. These records were not mapped. Of the 105 mapped records, 40% ( $n = 42$ ) fell within all protected areas, of which 16.2% ( $n = 17$ ) represent strandings. In the following section, we provide a brief overview of each species in the Wider Caribbean and discuss the occurrence records and extent of knowledge of each verified species in Belize according to their taxonomic order, genus (where relevant), and species classification.

#### *Order Cetacea, Suborder Mysticeti*

**Humpback Whale** (*Megaptera novaeangliae*; Gray, 1846)—Humpback whales are reported extensively throughout much of the Caribbean Sea (e.g., Winn et al., 1975; Levenson & Leapley, 1978; Mignucci-Giannoni, 1998; Swartz et al., 2003; Whitt et al., 2011); however, to the best of our knowledge, they have not been reported in the western Caribbean Sea. There is a single verified sighting of an emaciated lone individual, likely ill or disoriented, which was observed in the Victoria Channel near

Placencia in the south of Belize on 24 February 2016 (A. Hagan, pers. comm., 24 February 2016) (Figures 1 & 2) and for some weeks in Amatique Bay, Guatemala, according to local news reports. The animal was observed days later in the region, eventually stranding and dying in the Toledo District in southern Belize on 25 April 2016. Reports indicate the individual had a gillnet attached to it at the time of death but whether this was the cause of death is unclear. The necropsy performed by the Toledo Institute for Development and Environment (TIDE) did not reveal cause of death (J. R. Foley, pers. comm., 20 June 2016).

**Fin Whale** (*Balenoptera physalus*; Linnaeus, 1758)—Across the Caribbean, groups of free-ranging fin whales have been reported in Puerto Rico (Mignucci-Giannoni, 1998), and strandings have occurred near Venezuela (Lira et al., 1995) and the Colombian Caribbean (Muñoz-Hincapié et al., 1998), but they have not been observed in the western Caribbean Sea (Archer et al., 2013). On 28 April 1986, a single live adult female fin whale stranded in Placencia near Buttonwood Caye, but attempts to guide it into deep water were unsuccessful (Figure 2) (Sanders et al., 1997).

#### *Suborder Odontoceti*

**Cuvier's Beaked Whale** (*Ziphius cavirostris*; G. Cuvier, 1823)—Cuvier's beaked whales have been documented throughout the Caribbean (e.g., Caldwell et al., 1971a; Mignucci-Giannoni, 1998; Rinaldi et al., 2006; Whitt et al., 2011). Near Belize, the skeletal remains of several stranded *Z. cavirostris* have been recovered along the coast of the Mexican Caribbean (Niño-Torres et al., 2015). The only record of a beaked whale in Belizean waters is a single *Z. cavirostris* that stranded on Northern Cay on Lighthouse Reef Atoll (LHR) in 1988 (Figure 2) (Sanders et al., 1997). The specimen's skull and vertebrae were used to verify the species by D. Perrin (Sanders et al., 1997).

**Sperm Whale** (*Physeter macrocephalus*; Linnaeus, 1758)—Sperm whales are broadly distributed throughout most of the Caribbean (e.g., Watkins & Moore, 1982; Watkins et al., 1985; Carlson et al., 1995; Gordon et al., 1998; Cardona-Maldonado & Mignucci-Giannoni, 1999; Boisseau et al., 2000; Pardo et al., 2009b). In the Mexican Caribbean, there are six confirmed reports of stranded sperm whales, with the nearest stranding to Belize reported in the Yucatan Peninsula (Ortega-Argueta & Morales-Vela, 1998), near Cozumel and Isla Mujeres (Xacur Maiza et al., 1998; Niño-Torres et al., 2015), and Espíritu Santo Bay (Navarro et al., 1990). *P. macrocephalus* is the



















- De la Parra Venegas, R. (1998, April). *Registros se dos varamientos: Stenella clymene y Kogia breviceps en la costa de Cancún, Quintana Roo* [Stranding records: *Stenella clymene* and *Kogia breviceps* on the coast of Cancún, Quintana Roo]. XXIII Reunión Internacional para el Estudio de los Mamíferos Marinos, Xcarat, Quintana Roo, México.
- Delgado Estrella, A., López-Hernandez, I., & Vazques Maldonado, L. E. (1998, April). *Registro de varamientos en las costa sureste del golfo de México (estados de Veracruz, Tabasco, Campeche y Quintana Roo)* [Registration strandings on the southeast coast of the Gulf of Mexico (states of Veracruz, Tabasco, Campeche, and Quintana Roo)]. XXIII Reunión Internacional para el Estudio de los Mamíferos Marinos, Xcarat, Quintana Roo, México.
- Delgado Estrella, A., Ibarra, L., Romero-Tenorio, A., & De la Torre, A. (2004, May). *Varamiento de una hembra de delfín clymene Stenella clymene y una cría de Falsa Orca Pseudorca crassidens, en la Costa de Quintana Roo, México. Notas sobre la Biología reproductiva y salud* [Stranding of a female *Stenella clymene* and a False killer whale *Pseudorca crassidens* on the coast of Quintana Roo, México]. XXIX Reunión Internacional para el Estudio de los Mamíferos Marinos, La Paz, México.
- Delgado Estrella, A., Romero-Tenorio, A., Ibarra-Vargas, L., & Torres-Salcedo, R. (2002, May). *Rescate y rehabilitación de una hembra varada de delfín de dientes rugosos, Steno bredanensis, varada en la costa de Cancún, Quintana Roo* [Rescue and rehabilitation of a female rough-toothed dolphin, *Steno bredanensis*, stranded on the coast of Cancún]. XXVII Reunión Internacional para el Estudio de los Mamíferos Marinos, Veracruz, México.
- Dick, D. M., & Hines, E. M. (2011). Using distance sampling techniques to estimate bottlenose dolphin (*Tursiops truncatus*) abundance at Turneffe Atoll, Belize. *Marine Mammal Science*, 27(3), 606-621. <http://dx.doi.org/10.1111/j.1748-7692.2010.00435.x>
- Dudzinski, K. M., Frohoff, T. G., & Crane, N. L. (1995). Behavior of a lone female bottlenose dolphin (*Tursiops truncatus*) with humans off the coast of Belize. *Aquatic Mammals*, 21, 149-153.
- Edwards, H. H., Stone, S. B., Hines, E. M., Auil Gomez, N., & Winning, B. E. (2014). Documenting manatee (*Trichechus manatus manatus*) presence at Turneffe Atoll, Belize, Central America and its conservation significance. *Caribbean Journal of Science*, 48, 71-75. <http://dx.doi.org/10.18475/cjos.v48i1.a12>
- Eierman, L. E., & Connor, R. C. (2014). Foraging behavior, prey distribution, and microhabitat use by bottlenose dolphins *Tursiops truncatus* in a tropical atoll. *Marine Ecology Progress Series*, 503, 279-288. <http://dx.doi.org/10.3354/meps10721>
- Estes, J. A., Terborgh, J., Brashares, J. S., Power, M. E., Berger, J., Bond, W. J., . . . Wardle, D. A. (2011). Trophic downgrading of planet Earth. *Science*, 333(6040), 301-306. <http://dx.doi.org/10.1126/science.1205106>
- Fertl, D., Jefferson, T. A., Moreno, I. B., Zerbini, A. N., & Mulin, K. D. (2003). Distribution of the Clymene dolphin *Stenella clymene*. *Mammal Review*, 33(3-4), 253-271. <http://dx.doi.org/10.1046/j.1365-2907.2003.00033.x>
- Fertl, D., Schiro, A. J., Regan, G. T., Beck, C. A., Adimey, N., Price-May, L., . . . Crossland, R. (2005). Manatee occurrence in the northern Gulf of Mexico, west of Florida. *Gulf and Caribbean Research*, 17, 69-94. <http://dx.doi.org/10.18785/gcr.1701.07>
- Flores-Cascante, L., Morales-Vela, B., Castelblanco-Martínez, D. N., Padilla-Saldivar, J., & Auil Gomez, N. (2013). Elementos de la dieta del manatí *Trichechus manatus manatus* en tres sitios importantes para la especie en México y Belice [Dietary elements of the manatee *Trichechus manatus* in three important sites for the species in Mexico and Belize]. *Revista Ciencias Marinas y Costeras*, 5, 25-36.
- Forcada, J., Trathan, P., Reid, K., & Murray, E. (2005). The effects of global climate variability in pup production of Antarctic fur seals. *Ecology*, 86(9), 2408-2417. <http://dx.doi.org/10.1890/04-1153>
- Gallo-Reynoso, J. P. (1997). Situación y distribución de las nutrias en México, con énfasis en *Lontra longicaudis annectens* Major [Situation and distribution of river otters in Mexico, with an emphasis on *Lontra longicaudis annectens* Major]. *Revista Mexicana de Mastozoología*, 2, 10-32.
- Galves, J. (2012). *Manatee carcass stranding along the coastal zone of Belize – 2005-2010* (Report for Coastal Zone Management Authority & Institute/Sea to Shore Alliance). Belize: Belize Marine Mammal Stranding Network.
- Galvez, J., Clarke, C. J., & Rosado, S. K. (2013). *Ameliorating threats to manatees in the heart of Belize*. Report for Sea to Shore Alliance/Coastal Zone Management Authority & Institute/Swallow Caye Wildlife Sanctuary. Retrieved from [www.conservation-leadershipprogramme.org/media/2014/12/02107412\\_Belize\\_FinalReport\\_Manatees.pdf](http://www.conservation-leadershipprogramme.org/media/2014/12/02107412_Belize_FinalReport_Manatees.pdf)
- García-Rivas, M. del C. (1999, April). *Registro de nado con Orcas falsas Pseudorca crassidens en el Caribe Mexicano* [Sightings of false killer whales *Pseudorca crassidens* in the Mexican Caribbean]. XXIV Reunión Internacional para el Estudio de los Mamíferos Marinos, La Paz, Mexico.
- Gibson, J. (1995). *Managing manatees in Belize* (Master's thesis). University of Newcastle, NSW, Australia.
- González Solís, D. G., Vidal-Martínez, V. M., Antochiw-Alonso, D. M., & Ortega-Argueta, A. (2006). Anisakid nematodes from stranded pygmy sperm whales, *Kogia breviceps* (Kogiidae), in three localities of the Yucatan Peninsula, Mexico. *Journal of Parasitology*, 92(5), 1120-1122. <http://dx.doi.org/10.1645/GE-3553RN.1>
- Gordon, J., Moscrop, A., Carlson, C., Ingram, S., Leaper, R., Matthews, J., & Young, K. (1998). Distribution, movements and residency of sperm whales off the Commonwealth of Dominica, Eastern Caribbean: Implications for the development and regulation

- of the local whalewatching industry. *Report of the International Whaling Commission*, 48, 551-558.
- Grigg, E., & Markowitz, H. (1997). Habitat use by bottlenose dolphins (*Tursiops truncatus*) at Turneffe Atoll, Belize. *Aquatic Mammals*, 23(3), 163-170.
- Hancock, B. L. (2007). *Group characteristics, site fidelity, and social affiliation patterns of bottlenose dolphins (Tursiops truncatus) in Turneffe Atoll, Belize* (Master's thesis). San Diego State University, San Diego, CA.
- Hancock, B. L., & Oliver, G. W. (2001). *The social and behavioral ecology of bottlenose dolphins (Tursiops truncatus) in the coastal waters of Belize* (Oceanic Society Institutional Report). San Francisco: Oceanic Society. Retrieved from <http://eprints.uberibz.org/1199/1/doc20101210152021.pdf>
- Harr, K., Harvey, J., Bonde, R., Murphy, D., Lowe, M., Menchaca, M., . . . Francis-Floyd, R. (2006). Comparison of methods used to diagnose generalized inflammatory disease in manatees (*Trichechus manatus latirostris*). *Journal of Zoological Wildlife Medicine*, 37, 151-159. <http://dx.doi.org/10.1638/05-023.1>
- Harvell, C. D., Kim, K., Burkholder, J. M., Colwell, R. R., Epstein, P. R., Grimes, D. J., . . . Porter, J. W. (1999). Emerging marine diseases—Climate links and anthropogenic factors. *Science*, 285(5433), 1505-1510. <http://dx.doi.org/10.1126/science.285.5433.1505>
- Heithaus, M. R., Frid, A., Wirsing, A. J., & Worm, B. (2008). Predicting ecological consequences of marine top predator declines. *Trends in Ecology and Evolution*, 23, 202-210. <http://dx.doi.org/10.1016/j.tree.2008.01.003>
- Hinderstein, L. M. (1998). *The feeding ecology of the bottlenose dolphins (Tursiops truncatus) off the coast of Belize* (Master's thesis). San Francisco State University, San Francisco, CA.
- Hines, E. M. (2011). Threats to coastal dolphins from oil exploration, drilling and spills off the coast of Belize. In M. L. D. Palomares & D. Pauly (Eds.), *Too precious to drill: The marine biodiversity of Belize* (pp. 14-18). Vancouver: Fisheries Centre, University of British Columbia. Retrieved from [http://aerl06.aerl.ubc.ca/conference/belize/FCRR\\_Belize.pdf#page=118](http://aerl06.aerl.ubc.ca/conference/belize/FCRR_Belize.pdf#page=118)
- Holguin, S. B. P. (2004). *Contextual conservation: Antillean manatees (Trichechus manatus manatus) of Turneffe Atoll, Belize* (Master's thesis). San Francisco State University, San Francisco, CA. Retrieved from [www.turneffeatollmarinereserve.org/app/webroot/userfiles/214/File/Science/Holguin.pdf](http://www.turneffeatollmarinereserve.org/app/webroot/userfiles/214/File/Science/Holguin.pdf)
- Hunter, M. E., Auil Gomez, N. E., Tucker, K. P., Bonde, R. K., Powell, J., & McGuire, P. M. (2010). Low genetic variation and evidence of limited dispersal in the regionally important Belize manatee. *Animal Conservation*, 13, 592-602. <http://dx.doi.org/10.1111/j.1469-1795.2010.00383.x>
- Husar, S. L. (1977). *The West Indian manatee (Trichechus manatus)*. *Wildlife Research Report*, 7. Washington, DC: U.S. Department of Interior, Fish and Wildlife Service.
- International Union for Conservation of Nature (IUCN). (2015). *2015 IUCN red list of threatened species*. Retrieved from [www.iucnredlist.org](http://www.iucnredlist.org)
- International Whaling Commission (IWC). (1997). Report of the IWC workshop on climate change and cetaceans. *Report of the International Whaling Commission*, 47, 293-313.
- Jefferson, T. A., & Curry, B. E. (2003). *Stenella clymene*. *Mammalian Species*, 726, 1-5. <http://dx.doi.org/10.1644/726>
- Jefferson, T. A., & Lynn, S. K. (1994). Marine mammal sightings in the Caribbean Sea and Gulf of Mexico, summer 1991. *Caribbean Journal of Sciences*, 83-89.
- Jefferson, T. A., Webber, M. A., & Pitman, R. L. (2008). *Marine mammals of the world: A comprehensive guide to their identification*. San Diego: Academic Press/Elsevier.
- Jefferson, T. A., Fertl, D., Bolaños-Jiménez, J., & Zerbini, A. N. (2009). Distribution of common dolphins (*Delphinus* spp.) in the western Atlantic Ocean: A critical re-examination. *Marine Biology*, 156, 1109-1124. <http://dx.doi.org/10.1007/s00227-009-1152-y>
- Jenko, K., Castelblanco-Martínez, N., Chapman, J., & Gough, C. (2014, December). *Preliminary analysis of opportunistic sightings data shows year-round presence and seasonality in habitat use by manatees in Bacalar Chico, Belize*. Proceedings of the IV Congreso Colombiano de Zoología, Cartagena, Colombia.
- Jérémie, S. (2005, July). *Synthesis of cetaceans off the island of Martinique, French West Indies (UNEP/DEC)/CAR WG.27/REF.7*. Presented at the United Nations Environment Programme Regional Workshop of Experts on the Development of the Marine Mammal Action Plan for the Wider Caribbean Region, United Nations Environment Programme, Bridgetown, Barbados. Retrieved from [www.cep.unep.org/pubs/meetingreports/MMAP](http://www.cep.unep.org/pubs/meetingreports/MMAP)
- Kerr, K. A., Campbell, C. G., & Defran, R. H. (2005). Bottlenose dolphins (*Tursiops truncatus*) in the Drowned Cayes, Belize: Group size, site fidelity and abundance. *Caribbean Journal of Science*, 411, 172-177.
- Kiszka, J. J., Heithaus, M. R., & Wirsing, A. J. (2015). Behavioural drives of the ecological roles and importance of marine mammals. *Marine Ecology Progress Series*, 523, 267-281. <http://dx.doi.org/10.3354/meps11180>
- Kovacs, K. (2008). *Monachus tropicalis*. In International Union for Conservation of Nature (Ed.), *2011 IUCN red list of threatened species, Version 2011.2*. Retrieved from [www.iucnredlist.org](http://www.iucnredlist.org)
- Kuczaj II, S. A., & Yeater, D. B. (2007). Observations of rough-toothed dolphins (*Steno bredanensis*) off the coast of Utila, Honduras. *Journal of the Marine Biological Association of the United Kingdom*, 87(01), 141-148. <http://dx.doi.org/10.1017/S0025315407054999>
- LaCommare, K. S., Self-Sullivan, C., & Brault, S. (2008). Distribution and habitat use of Antillean manatees (*Trichechus manatus manatus*) in the Drowned

- Cayes area of Belize, Central America. *Aquatic Mammals*, 34(1), 35-43. <http://dx.doi.org/10.1578/AM.34.1.2008.35>
- Learmonth, J. A., MacLeod, C. D., Santos, M. B., Pierce, G. J., Crick, H. Q. P., & Robinson, R. A. (2006). Potential effects of climate change on marine mammals. *Oceanography and Marine Biology: An Annual Review*, 44, 431-464. <http://dx.doi.org/10.1201/9781420006391.ch8>
- Lefebvre, L. W., O'Shea, T. J., Rathbun, G. B., & Best, R. C. (1989). Distribution, status, and biogeography of the West Indian manatee. In C. A. Wood (Ed.), *Biogeography of the West Indies* (pp. 567-610). Gainesville, FL: Sandhill Crane Press.
- Levenson, C., & Leapley, W. T. (1978). Distribution of humpback whales (*Megaptera novaeangliae*) in the Caribbean determined by a rapid acoustic method. *Journal of the Fisheries Board of Canada*, 35(8), 1150-1152. <http://dx.doi.org/10.1139/f78-180>
- Lira, C., Bolaños, J., & Mondolfi, E. (1995, December). *On two strandings of fin whale (Balaenoptera physalus) and its presence in Venezuelan waters*. Proceedings of the Eleventh Biennial Conference on the Biology of Marine Mammals, Orlando, FL.
- Marques, T. A., Thomas, L., Ward, J., DiMarzio, N., & Tyack, P. L. (2009). Estimating cetacean population density using fixed passive acoustic sensors: An example with Blainville's beaked whales. *The Journal of the Acoustical Society of America*, 125(4), 1982-1994. <http://dx.doi.org/10.1121/1.3089590>
- Mattila, D. K., & Clapham, P. J. (1989). Humpback whales, *Megaptera novaeangliae*, and other cetaceans on Virgin Bank and in the northern Leeward Islands, 1985 and 1986. *Canadian Journal of Zoology*, 67, 2201-2211. <http://dx.doi.org/10.1139/z89-31>
- May-Collado, L. J., & Agnarsson, I. (2011). Phylogenetic analysis of conservation priorities for aquatic mammals and their terrestrial relatives, with a comparison of methods. *PLOS ONE*, 6(7), e22562. <http://dx.doi.org/10.1371/journal.pone.0022562>
- McCarthy, T. J. (1986). The gentle giants of Belize. Part II: Distribution of manatees. *Belize Audubon Society Bulletin*, 18(7), 1-4.
- Mignucci-Giannoni, A. A. (1998). Zoogeography of cetaceans off Puerto Rico and the Virgin Islands. *Caribbean Journal of Science*, 34(3-4), 173-190.
- Mignucci-Giannoni, A. A., Rodríguez-López, M. A., Perez-Zayas, J. J., Montoya-Ospina, R. A., & Williams, E. H., Jr. (1998). First record of the melonhead whale (*Peponocephala electra*) for Puerto Rico. *Mammalia*, 62(3), 452-457.
- Mignucci-Giannoni, A., Swartz, S. L., Martínez, A., Burks, C. M., & Watkins, W. A. (2003). First records of the pantropical spotted dolphin (*Stenella attenuata*) for the Puerto Rican Bank, with a review of the species in the Caribbean. *Caribbean Journal of Science*, 39(3), 381-391.
- Minty, C. D., Sutton, D. A., Rogers, A. D. F., Bateman, R. M., Penn, M. G., Stafford, P. J., & Sanders, L. M. (2001). *Preliminary report on the scientific and biodiversity value of the Macal and Raspaculo Catchment, Belize: A wildlife impact assessment for the proposed Macal River Upper storage facility*. London: Natural History Museum. Retrieved from [http://eprints.uberibz.org/784/1/NHM9\\_05\\_01Wia15.pdf.m](http://eprints.uberibz.org/784/1/NHM9_05_01Wia15.pdf.m)
- Morales-Vela, B., & Olivera-Gómez, L. D. (1993). Varamiento de calderones *Globicephala macrorhynchus* (Cetacea: Delphinidae) en la Isla de Cozumel, Quintana Roo, México [Strandings of short-finned pilot whales *Globicephala macrorhynchus* (Cetacea: Delphinidae) at Cozumel Island, Quintana Roo, Mexico]. *Anales del Instituto de Biología Serie Zoológica*, 64, 177-180.
- Morales-Vela, B., & Olivera-Gómez, L. D. (1994). Mamíferos acuáticos y su protección en la zona fronteriza México-Belice [Aquatic mammals and their protection in the border zone between Mexico and Belize]. In E. Suárez-Morales (Ed.), *Estudio integral de la frontera México-Belice: Recursos naturales* [Comprehensive study of the Mexico-Belize border: Natural resources]. Chetumal, Quintana Roo, México: CIQRO.
- Morales-Vela, B., Olivera-Gómez, D., Reynolds III, J. E., & Rathbun, G. B. (2000). Distribution and habitat use by manatees (*Trichechus manatus manatus*) in Belize and Chetumal Bay, Mexico. *Biological Conservation*, 95, 67-75. [http://dx.doi.org/10.1016/S0006-3207\(00\)00009-4](http://dx.doi.org/10.1016/S0006-3207(00)00009-4)
- Morales-Vela, B., Padilla-Saldívar, J. A., Reid, J., & Butler, S. (2007). First records of long-distance manatee movements between Mexico and Belize. *Sirenews*, 47, 12-14.
- Mörzer Bruyns, W. F. J. (1969). Sight records and notes on the false killer whale, *Pseudorca crassidens* (Owen, 1846). *Säugetierkundliche Mitteilungen*, 17(4), 351-356.
- Muñoz-Hincapié, M. F., Mora-Pinto, D. M., Montoya-Ospina, R. A., & Mignucci-Giannoni, A. A. (1998, January). *Records of cetacean mortality and strandings from the Colombian Caribbean*. Proceedings of the World Marine Mammal Science Conference, Monte Carlo, Monaco.
- National Protected Area System (NPAS). (2015). *National Protected Areas Secretariat Ministry of Forestry Fisheries and Sustainable Development*. Retrieved from <http://protectedareas.gov.bz/us>
- Navarro, D., Jimenez, A., & Juárez, J. (1990). Los mamíferos de Quintana Roo [Mammals of Quintana Roo]. In *Diversidad biológica en la biosfera de Sian ka'an Quintana Roo* [Biological diversity in the biosphere of Sian Ka'an Quintana Roo] (pp. 371-450). Chetumal, Quintana Roo, México: Centro de Investigaciones de Quintana Roo/University of Florida.
- Niño-Torres, C. A., García-Rivas, M. del C., Castelblanco-Martínez, D. N., Padilla-Saldívar, J. A., Blanco-Parra, M. del P., & de la Parra-Venegas, R. (2015). Aquatic mammals from the Mexican Caribbean: A review. *Hidrobiologica*, 25(1), 143-154.



- Orozco-Meyer, A. (1998). *Tendencia de la distribución y abundancia de la nutria de río* (*Lontra longicaudis annectens Major, 1897*), en la ribera del Río Hondo [Distribution and abundance trends of neotropical river otters (*Lontra longicaudis annectens Major, 1897*), in the basin of the River Hondo] (Master's thesis). Instituto Tecnológico de Chetumal, Quintana Roo, México.
- Ortega-Argueta, A., & Morales-Vela, B. (1998). *Registro de cetáceos en Campeche, Yucatan y Quintana Roo, México* [Strandings of cetaceans in Campeche, Yucatan and Quintana Roo, Mexico] (Informe Técnico MM-03).
- O'Shea, T. J., & Salisbury, C. A. (1991). Belize: A last stronghold for manatees in the Caribbean. *Oryx*, 25(3), 156-164.
- Pardo, M., Jiménez-Pinedo, C., & Palacios, D. (2009a). The false killer whale (*Pseudorca crassidens*) in the south-western Caribbean: First stranding record in Colombian waters. *Latin American Journal of Aquatic Mammals*, 7(1-2), 63-67. <http://dx.doi.org/10.5597/lajam00136>
- Pardo, M. A., Mejía-Fajardo, A., Beltrán-Pedrerros, S., Trujillo, F., Kerr, I., & Palacios, D. M. (2009b). Odontocete sightings collected during offshore cruises in the western and southwestern Caribbean Sea. *Latin American Journal of Aquatic Mammals*, 7(1-2), 57-62. <http://dx.doi.org/10.5597/lajam00135>
- Perkins, J. S., & Miller, G. W. (1983). Mass stranding of *Steno bredanensis* in Belize. *Biotropica*, 15(3), 235-236. <http://dx.doi.org/10.2307/2387835>
- Perrin, W. F., & Mead, J. G. (1994). Clymene dolphin – *Stenella clymene* (Gray, 1846). In S. H. Ridgeway & R. Harrison (Eds.), *Handbook of marine mammals: Volume 5. First book of dolphins* (pp. 161-171). San Diego: Academic Press.
- Perrin, W. F., Mitchell, E. D., Mead, J. G., Caldwell, D. K., & van Bree, P. J. H. (1981). *Stenella clymene*, a rediscovered tropical dolphin of the Atlantic. *Journal of Mammalogy*, 62, 583-598. <http://dx.doi.org/10.2307/1380405>
- Petersen, H. (2001). *Habitat use and behavior of the bottlenose dolphin (Tursiops truncatus) in the Drowned Cayes, Belize* (Master's thesis). San Francisco State University, San Francisco, CA.
- Platt, S. G., & Rainwater, T. R. (2011). Predation by neotropical otters (*Lontra longicaudis*) on turtles in Belize. *IUCN Otter Specialist Group Bulletin*, 28(1). Retrieved from [www.otterspecialistgroup.org/Bulletin/Volume28/Platt\\_Rainwater\\_2011.pdf](http://www.otterspecialistgroup.org/Bulletin/Volume28/Platt_Rainwater_2011.pdf)
- Platt, S. G., Rainwater, T. R., Miller, B. W., & Miller, C. M. (2000). Notes on the mammals of Turneffe Atoll, Belize. *Caribbean Journal of Science*, 36(1-2), 166-168.
- Prieto-Rodríguez, M. (1988). Reporte de algunos cetáceos del Caribe Colombiano [Report on cetaceans in the Colombian Caribbean]. *Boletín de Facultad de Biología Marina*, 8, 30-40.
- Ramey, T. L. (2010). *Trace element concentrations in red blood cells of Antillean manatees (Trichechus manatus manatus) in Belize* (Master's thesis). New York: Columbia University.
- Ramos, E. A. (2014). *Foraging-related calls produced by bottlenose dolphins (Tursiops truncatus) at Turneffe Atoll, Belize* (Master's thesis). New York: Hunter College, The City University of New York.
- Ramsar Convention Secretariat. (2013). *The Ramsar Convention manual: A guide to the Convention on Wetlands (Ramsar, Iran, 1971)* (6th ed.). Gland, Switzerland: Ramsar Convention Secretariat.
- Ricciardi, A., & Rasmussen, J. B. (1999). Extinction rates of North American freshwater fauna. *Conservation Biology*, 13(5), 1220-1222. <http://dx.doi.org/10.1046/j.1523-1739.1999.98380.x>
- Rinaldi, C., Rinaldi, R., & Sahagian, P. (2006). *Report of surveys conducted on small cetaceans off Guadeloupe 1998 to 2005* (Working document SC/58/SM17). Presented to the International Whaling Commission Scientific Committee, St. Kitts and Nevis.
- Risch, D., Clark, C. W., Dugan, P. J., Popescu, M., Siebert, U., & Van Parijs, S. M. (2013). Minke whale acoustic behavior and multi-year seasonal and diel vocalization patterns in Massachusetts Bay, USA. *Marine Ecology Progress Series*, 489, 279-295. <http://dx.doi.org/10.3354/meps10426>
- Roden, C. L., & Mullin, K. D. (2000). Sightings of cetaceans in the northern Caribbean Sea and adjacent waters, winter 1995. *Caribbean Journal of Science*, 36(3-4), 280-288.
- Rojas-Arias, J. (2013). *Establecimiento de la línea de información de base para la especie Tursiops truncatus en la reserva marina de Puerto Honduras, Belice* [Establishing a baseline for the species *Tursiops truncatus* in the Port of Honduras Marine Reserve in Belize] (Master's thesis). The College of the Southern Border, Chetumal, México.
- Roman, J., Estes, J. A., Morissette, L., Smith, C., Costa, D., McCarthy, J., . . . Smetacek, V. (2014). Whales as marine ecosystem engineers. *Frontiers in Ecology and the Environment*, 12(7), 377-385. <http://dx.doi.org/10.1890/130220>
- Romero, A., Agudo, A. I., Green, S. M., & Notarbartolo di Sciara, G. (2001). *Cetaceans of Venezuela: Their distribution and conservation status* (NOAA Technical Report NMFS 151). Washington, DC: National Oceanic and Atmospheric Administration.
- Sánchez-Okruky, R. (1997, April). *Atención de mamíferos marinos varados en las costas de Quintana Roo* [Care of marine mammals stranded on the coast of Quintana Roo]. XXIII Reunion International para el Estudio de los Mammíferos Marinos, Xcarat, Quintana Roo, México.
- Sanders, A. M. (1999). *Behavioral patterns and group size dynamics of bottlenose dolphins (Tursiops truncatus) in Belize, Central America* (Master's thesis). San Francisco State University, San Francisco, CA.
- Sanders, A. M., & Grigg, E. K. (1998, January). *Behavioral patterns of bottlenose dolphins (Tursiops truncatus) at Turneffe Atoll, Belize*. Proceedings of the World Marine Mammal Science Conference, Monte Carlo, Monaco.
- Sanders, A. M., Bilgic, B. A., & Markowitz, H. (1997). *Annotated checklist of cetaceans in Belize, Central*

- America (Oceanic Society Institutional Report). Ross, CA: Oceanic Society.
- Santiago-Plata, V. M., Lloyd, A., Walker, P., & Walker, Z. (2014, August). *Predicting the occurrence of the neotropical otter (Lontra longicaudis) in Belize*. Proceedings of XIII IUCN OSG International Otter Congress, Quintana Roo, México.
- Schipper, J., Chanson, J. S., Chiozza, F., Cox, N. A., Hoffmann, M., Katariya, V., . . . Young, B. E. (2008). The status of the world's land and marine mammals: Diversity, threat, and knowledge. *Science*, 322, 225-230. <http://dx.doi.org/10.1126/science.1165115>
- Scholín, C. A., Gulland, F. M. D., Doucette, G. J., Benson, S., Busman, M., Chavez, F. P., . . . Haulena, M. (2000). Mortality of sea lions along the central California coast linked to a toxic diatom bloom. *Nature*, 403(6765), 80-84. <http://dx.doi.org/10.1038/47481>
- Self-Sullivan, C. (2007). Non-lethal boat scars on manatees in Belize as a tool for evaluation of a Marine Protected Area – Preliminary results. *Gulf and Caribbean Fisheries Institute*, 59, 465-470.
- Self-Sullivan, C., Smith, G. W., Packard, J. M., & LaCommare, K. S. (2003). Seasonal occurrence of male Antillean manatees (*Trichechus manatus manatus*) on the Belize barrier reef. *Aquatic Mammals*, 29(3), 342-354. <http://dx.doi.org/10.1578/01675420360736514>
- Siegal-Willott, J., Estrada, A., Bonde, R., Wong, A., Estrada, D. J., & Harr, K. (2006). Electrocardiography in two subspecies of manatee (*Trichechus manatus latirostris* and *T. m. manatus*). *Journal of Zoological Wildlife Medicine*, 37, 447-453. <http://dx.doi.org/10.1638/05-086.1>
- Stoddart, D. R. (1962). Three Caribbean atolls: Turneffe Islands, Lighthouse Reef, and Glover's Reef, British Honduras. *Atoll Research Bulletin*, 87, 1-147. <http://dx.doi.org/10.5479/si.00775630.87.1>
- Stoddart, D. R., Fosberg, F. R., & Spellman, D. L. (1982). Cays of the Belize barrier reef and lagoon. *Atoll Research Bulletin*, 256, 1-75. <http://dx.doi.org/10.5479/si.00775630.257.1>
- Swartz, S. L., Cole, T., McDonald, M. A., Hildebrand, J. A., Oleson, E. M., Martinez, A., . . . Jones, M. L. (2003). Acoustic and visual survey of humpback whale (*Megaptera novaeangliae*) distribution in the eastern and southeastern Caribbean Sea. *Caribbean Journal of Science*, 39(2), 195-208.
- Szczepaniak, I., & Cure, K. (2009). *First record of a pygmy sperm whale (Kogia breviceps) in Belize* (Oceanic Society Institutional Report). Ross, CA: Oceanic Society.
- Thorne, L. H., Johnston, D. W., Urban, D. L., Tyne, J., Bejder, L., Baird, R. W., . . . Chapla Hill, M. (2012). Predictive modeling of spinner dolphin (*Stenella longirostris*) resting habitat in the main Hawaiian Islands. *PLOS ONE*, 7(8), e43167. <http://dx.doi.org/10.1371/journal.pone.0043167>
- Timm, R. M., Salazar, R. M., & Peterson, A. T. (1997). Historical distribution of the extinct tropical seal, *Monachus tropicalis* (Carnivora: Phocidae). *Conservation Biology*, 11, 549-551. <http://dx.doi.org/10.1046/j.1523-1739.1997.96035.x>
- Todd, V. L., Todd, I. B., Gardiner, J. C., Morrin, E. C., MacPherson, N. A., DiMarzio, N. A., & Thomsen, F. (2015). A review of impacts of marine dredging activities on marine mammals. *ICES Journal of Marine Science: Journal du Conseil*, 72(2), 328-340. <http://dx.doi.org/10.1093/icesjms/fsu187>
- U.S. National Museum (USNM). (2015). *Smithsonian Institution, National Museum of Natural History*. Retrieved from <http://collections.mnh.si.edu/search>
- Vianna, J. A., Bonde, R. K., Caballero, S., Giraldo, J. P., Lima, R. P., Clark, A., . . . Santos, F. R. (2006). Phylogeography, phylogeny and hybridization in trichechid sirenians: Implications for manatee conservation. *Molecular Ecology*, 15, 433-447. <http://dx.doi.org/10.1111/j.1365-294X.2005.02771.x>
- Ward, N., Moscrop, A., & Carlson, C. (2001). *Elements for the development of a marine mammal action plan for the Wider Caribbean: A review of marine mammal distribution*. Havana, Cuba: United Nations Environment Programme.
- Watkins, W. A., & Moore, K. E. (1982). An underwater acoustic survey for sperm whales (*Physeter catodon*) and other cetaceans in the southeast Caribbean. *Cetology*, 46, 1-7.
- Watkins, W. A., Moore, K. E., & Tyack, P. (1985). Sperm whale acoustic behaviours in the southeast Caribbean. *Cetology*, 49, 1-15.
- Watkins, W. A., Daher, M. A., Samuels, A., & Gannon, D. P. (1997). Observations of *Peponocephala electra*, the melon-headed whale, in the southeastern Caribbean. *Caribbean Journal of Science*, 33(1-2), 34-40.
- Whitt, A. D., Jefferson, T. A., Blanco, M., Fertl, D., & Rees, D. (2011). A review of marine mammal records of Cuba. *Latin American Journal of Aquatic Mammals*, 9(2), 65-122. <http://dx.doi.org/10.5597/lajam00175>
- Winn, H. E., Edell, R. K., & Taruski, A. G. (1975). Population estimate of the humpback whale (*Megaptera novaeangliae*) in the West Indies by visual and acoustic techniques. *Journal of the Fisheries Research Board of Canada*, 32(4), 499-506. <http://dx.doi.org/10.1139/f75-061>
- Wong, A. W., Bonde, R. K., Siegal-Willott, J., Stamper, M. A., Colee, J., Powell, J. A., . . . Harr, K. E. (2012). Monitoring oral temperature, heart rate, and respiration rate of West Indian manatees during capture and handling in the field. *Aquatic Mammals*, 38(1), 1-16. <http://dx.doi.org/10.1578/AM.38.1.2012.1>
- Xacur Maiza, J. Á., Torres, M. C. L., Carlos, E. V., Vélez, L. C. V., & Viliesid, L. C. (1998). *Enciclopedia de Quintana Roo* [Encyclopedia of Quintana Roo], 7. Verdehalago, México.