

Spinner dolphin (*Stenella longirostris*):

Summary of review of AquaMaps predictions for WCR undertaken by Kristin Kaschner
& Randall Reeves, February 2012

Revision of AquaMaps predictions based on available regional data (KK)

Mean depth of the 40 sightings from line transect surveys in the northern Gulf of Mexico suggests the species is closely associated with upper slope waters (Maze-Foley & Mullin 2006). This was supported by the analysis of mean depth values of cells of documented presence for this species (61 available occurrence records from OBIS in 35 cells). Regional habitat use information summarized in available publications also suggests this is a primarily oceanic species (Jefferson & Schiro 1997, Davis et al. 2002). Spinner dolphins are considered mostly tropical. In the eastern tropical Pacific (ETP) they are closely associated with waters underlain by a sharp thermocline and surface temperatures above 25 °C and surface salinities below 34 pss (Au & Perryman, Ballance et al. 2006). Although mean temperatures associated with sightings in the northern Gulf of Mexico were also around 25°C, they extended down to 22°C (Maze-Foley & Mullin 2006), which I therefore used as the lower temperature threshold. Similarly, the environmental envelope for salinity derived from regional data suggested that, unlike in the ETP, the species occurs frequently in waters > 34 pss in the northern Gulf of Mexico and I therefore extended the salinity envelope accordingly and also set the primary production envelope to values calculated from regional sightings. Final input parameter settings can be seen in Table 1 and resulting gradient predictions, generated using the AquaMaps model (Kaschner et al. 2008), are shown in Figure 1. To show the most likely representation of known and probable occurrence of the species in the WCR I applied a presence threshold of 0.6 as suggested by recent validation analyses (Kaschner et al. 2011)

The resulting distribution matches existing information about spinner dolphin occurrence in the Wider Caribbean Region, as summarized by Jefferson & Lynn (1994, Jefferson & Schiro (1997), Ward et al. (2001) and e.g. Davis et al. (2002), Debrot et al. (2011) relatively well. However, US northern Gulf surveys have consistently seen the species

primarily in the eastern Gulf, suggesting that the map overemphasizes the occurrence of the species in western Gulf. Moreover, there is also no indication that the species is regularly seen in offshore waters along the southern US Atlantic coast, which are regularly covered by surveys. Overall, it is thought that the spinner dolphin densities are much lower throughout the study area than other offshore *Stenella* dolphins e.g. Atlantic or pantropical spotted dolphins (Jefferson & Schiro 1997).

Mapping parameters for *Stenella longirostris* (spinner dolphin)_5

FAOAreas: 21 | 27 | 31 | 34 | 41 | 47 | 51 | 57 | 61 | 67 | 71 | 77 | 81 | 87

Pelagic: True

Bounding Box (NSWE):	90	-90	-180	180
	Min	Pref Min (10th)	Pref Max (90th)	Max
Depth (m)	0	500	1500	3000
SST (°C)	22	25	30	32.71
Salinity (psu)	29	33.57	35.5	37
Primary Production	99	350	900	2136

Table 1: AquaMaps input parameter settings for revised map generation

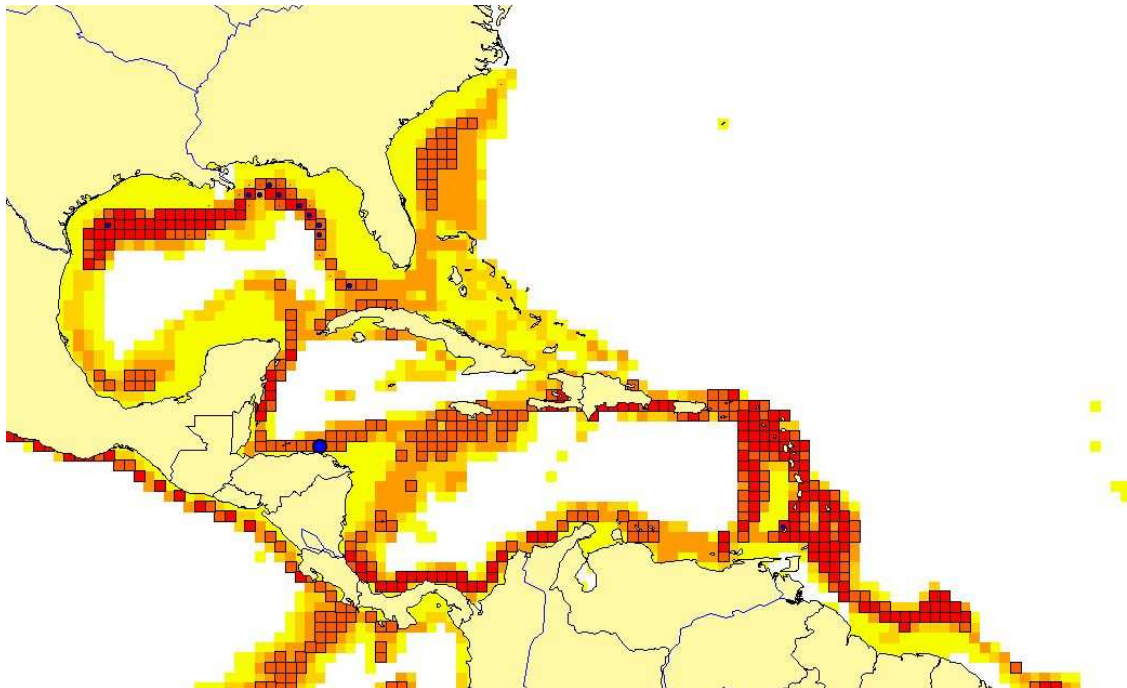


Fig 1. Predicted relative habitat suitability based on envelope settings in Table 1 and calculated relative encounter rates based on available sightings from OBIS (blue). Cells

with probability values above the selected threshold are shown with boundaries. *Note that not all occurrences are available/accessible through online data repositories, such as OBIS (www.iobis.org), and records shown on the map do not necessarily represent the whole extent of documented species occurrence!

Review of outputs by independent expert (Randall Reeves)

Jefferson and Schiro (1997) surmised that the distribution of spinner dolphins in the Atlantic portion of their range was mainly oceanic and warned that reports from near-shore and shelf waters should be subjected to close scrutiny because of possible misidentifications. Nevertheless, there seems to be a clear pattern of spinner dolphins living in much shallower waters than the other three species of offshore *Stenella* dolphins (*S. clymene*, *S. attenuata* and *S. coeruleoalba*)

Particularly striking in the sightings data from the northern Gulf of Mexico is the extent to which spinner dolphins occur almost exclusively in the eastern Gulf (east of the Mississippi delta) on the upper continental slope (between 200 and 2000m depth) (and possibly in shelf waters directly west of peninsular Florida; Jefferson and Schiro 1997: Fig. 26) while clymene dolphins occur almost exclusively on the upper slope west of the delta and far offshore (abyssal depths) (Maze-Foley and Mullin 2006, Fig. 2b). It is uncertain whether these two species are similarly parapatric (or even allopatric) elsewhere in the WCR. It is interesting that a mixed school of spinner and clymene dolphins stranded in early July at Key West, Florida (Jefferson et al. 1995).

Although present more or less throughout the Antilles, spinner dolphins appear to be relatively uncommon in most areas (Ward et al. 2001, Rinaldi et al. 2006, Debrot et al. 2011). Of particular interest is the reference in Perrin et al. (Perrin et al. 1981) to large groups (150-400 animals of spinner dolphins seen and photographed by Giuseppe Notarbartolo di Sciara near Isla Margarita, Venezuela in November 1979. This suggests they may be relatively abundant in that area at least seasonally.

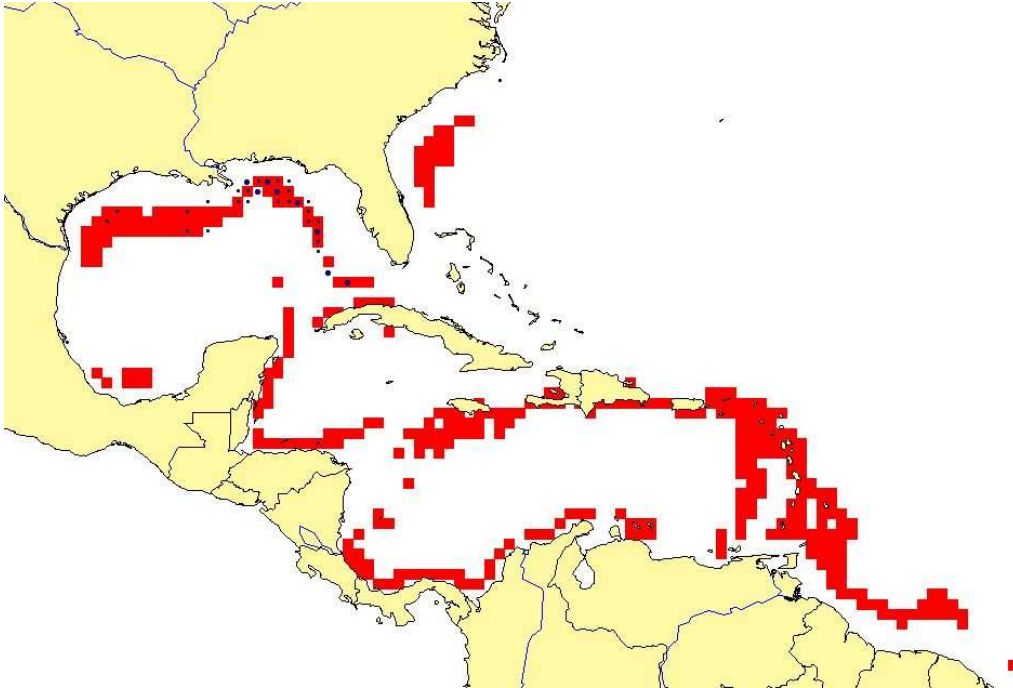


Fig 2. Consensus map of known and probable occurrence of species in the WCR (including available sightings from OBIS (blue)). *Note that not all records of occurrence are available/accessible through online data repositories, such as OBIS (www.iobis.org), and therefore the records shown on the map do not necessarily represent the whole extent of documented species occurrence.

Quality of outputs: ★★

References

- Au DWK, Perryman WL (1985) Dolphin habitats in the Eastern Tropical Pacific. *Fishery Bulletin* 83:623-644
- Ballance LT, Pitman RL, Fiedler PC (2006) Oceanographic influences on seabirds and cetaceans of the eastern tropical Pacific: A review. *Prog Oceanogr* 69:360-390
- Davis RW, Ortega-Ortiz JG, Ribic CA, Evans WE, Biggs DC, Ressler PH, Cady RB, Leben RR, Mullin KD, Würsig B (2002) Cetacean habitat in the northern oceanic Gulf of Mexico. *Deep Sea Research (Part I): Oceanographic Research Papers* 49:121-142
- Debrot AO, Witte RH, Scheidat M, Lucke K, Adolphe O. Debrot RHW, Meike Scheidat and, Lucke K (2011) A Proposal towards a Dutch Caribbean marine mammal sanctuary, IMARES Wageningen UR
- Jefferson TA, Lynn SK (1994) Marine mammal sightings in the Caribbean Sea and Gulf of Mexico, Summer 1991. *Caribbean Journal of Science* 30:83-89

- Jefferson TA, Odell DK, Prunier KT (1995) Notes on the biology of the clymene dolphin (*Stenella clymene*) in the Northern Gulf of Mexico. *Marine Mammal Science* 11:564-573
- Jefferson TA, Schiro AJ (1997) Distribution of cetaceans in the offshore Gulf of Mexico. *Mammal Review* 27:27-50
- Kaschner K, Ready JS, Agbayani E, Rius J, Kesner-Reyes K, Eastwood PD, South AB, Kullander SO, Rees T, Close CH, Watson R, Pauly D, Froese R (2008) AquaMaps: Predicted range maps for aquatic species. World wide web electronic publication, www.aquamaps.org, Version 08/2010
- Kaschner K, Tittensor DP, Ready J, Gerrodette T, Worm B (2011) Current and future patterns of global marine mammal biodiversity. *Plos One* 6:e19653
- Maze-Foley K, Mullin KD (2006) Cetaceans of the oceanic northern Gulf of Mexico: Distributions, group sizes and interspecific associations. *Journal of Cetacean Research and Management* 8:203-213
- Perrin WF, Mitchell ED, Mead JG, Caldwell DK, van Bree PJH (1981) *Stenella clymene*, a rediscovered tropical dolphin of the Atlantic. *Journal of Mammalogy* 62:583-598
- Rinaldi C, Rinaldi R, Sahagian P (2006) Report of surveys conducted on small cetaceans off Guadeloupe 1998 to 2005 (SC/58/SM17) International Whaling Commission - Scientific Committee Meeting. (unpublished), p 4
- Ward N, Moscrop A, Carlson CA (2001) Elements for the development of a marine mammal action plan for the wider Caribbean: A review of marine mammal distribution First Meeting of the Contracting Parties (COP) to the Protocol Concerning Specially Protected Areas and Wildlife (SPA) in the Wider Caribbean Region. United Nations Environment Programme, Havana, Cuba, 24-25 September 2001, p 83