Short-finned pilot whale (*Globicephala macrorhynchus*):

Summary of review of AquaMaps predictions for WCR undertaken by Kristin Kaschner & Randall Reeves, December 2011

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

Mean depth of sightings from line transect surveys in the northern Gulf of Mexico indicated the species occurs mostly along the upper part of the continental slope in this region (Maze-Foley & Mullin 2006). This is also supported by my own analysis of mean depth values of cells associated with high encounter rates of this species (53 available occurrence records in 29 cells). I therefore adjusted the depth envelope to reflect this (Table 1). Available information on the occurrence of the species in the regional literature did not suggest any necessary changes with respect to the other environmental envelopes, except for a minor adjustment to the salinity envelope to capture documented occurrences from the Bahamas and an extension of the primary production envelope to capture occurrences around Trinidad and Tobago. 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 supported by recent validations for global predictions (Kaschner et al. 2011) (Figure 2).

Mapping parameters for Globicephala macrorhynchus (short-finned pilot whale)_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	200	2000	6000
SST (°C)	12.07	17.36	28.17	30
Salinity (psu)	30.27	32.61	36	38
Primary Production	0	288	2000	6000

Table 1: AquaMaps input parameter settings for revised map generation

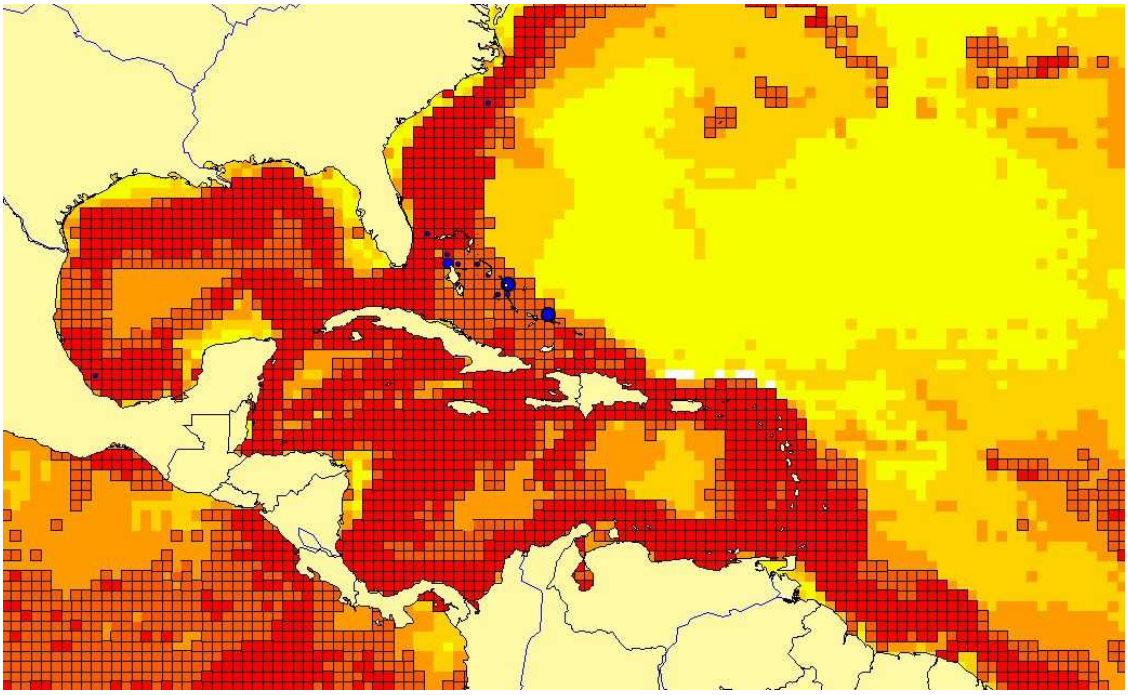

Fig 1. Predicted relative habitat suitability based on envelope settings in Table 1 and calculated relative encounter rates based on available sightings from OBIS (blue). Cells with probability values above the selected threshold are shown with boundaries. *Note that not all occurrences are available/accessible 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) raise the interesting possibility that pilot whales declined in the northern Gulf of Mexico "over the past few decades," and they cite some evidence for this. One possible explanation given by them is that "older literature" was misleading in that other "blackfish" species (e.g. false killer whales, melon-headed whales) were frequently misidentified as pilot whales. A more likely explanation, according to Jefferson and Schiro (1997), is that some change in ocean conditions, analogous to that observed in the Southern California Bight following a major El Niño event, occurred in the Gulf, affecting the availability of cephalopod prey preferred by pilot whales (cf. Shane 1994). The 2009 stock assessment report for pilot whales in the northern Gulf of Mexico (Waring et al. 2009), however, indicated that there was no basis for confirming such a trend: "The oceanography of the Gulf of Mexico is quite dynamic, and the spatial scale of the Gulf is small relative to the ability of most cetacean species to travel. Studies based on abundance and distribution surveys restricted to U.S. waters are unable to detect temporal shifts in distribution beyond U.S. waters that might account for any changes in abundance."

Figure 8 in Reeves et al. (2011) shows the distribution of sightings recorded as "blackfish" in logbooks of 19th century American whalers whaling in the Gulf of Mexico. Even though some of these almost certainly would have been records of "blackfish" other than pilot whales, it is interesting that the pattern is generally consistent with the consensus map of current known and probable occurrence in the Gulf.

In the Caribbean, regular observations around Puerto Rico and the Virgin Islands (Mignucci-Giannoni et al. 1999, Roden & Mullin 2000, Swartz et al. 2002) Dominica (Gero and Whitehead 2006), and Guadeloupe (Rinaldi et al. 2006; Gandilhon and Girou 2009) as well as the longstanding pilot whale fisheries at St. Vincent (Caldwell & Caldwell 1975) and St. Lucia (Reeves 1988) confirm that pilot whales are relatively common in both the Greater and Lesser Antilles. Also, Romero et al. (2001) provide evidence supporting occurrence off Venezuela, as indicated on the consensus map. I am a bit concerned that the consensus map does not point to occurrence around Trinidad and Tobago, where I'm quite sure they occur although I haven't been able to locate a good reference.

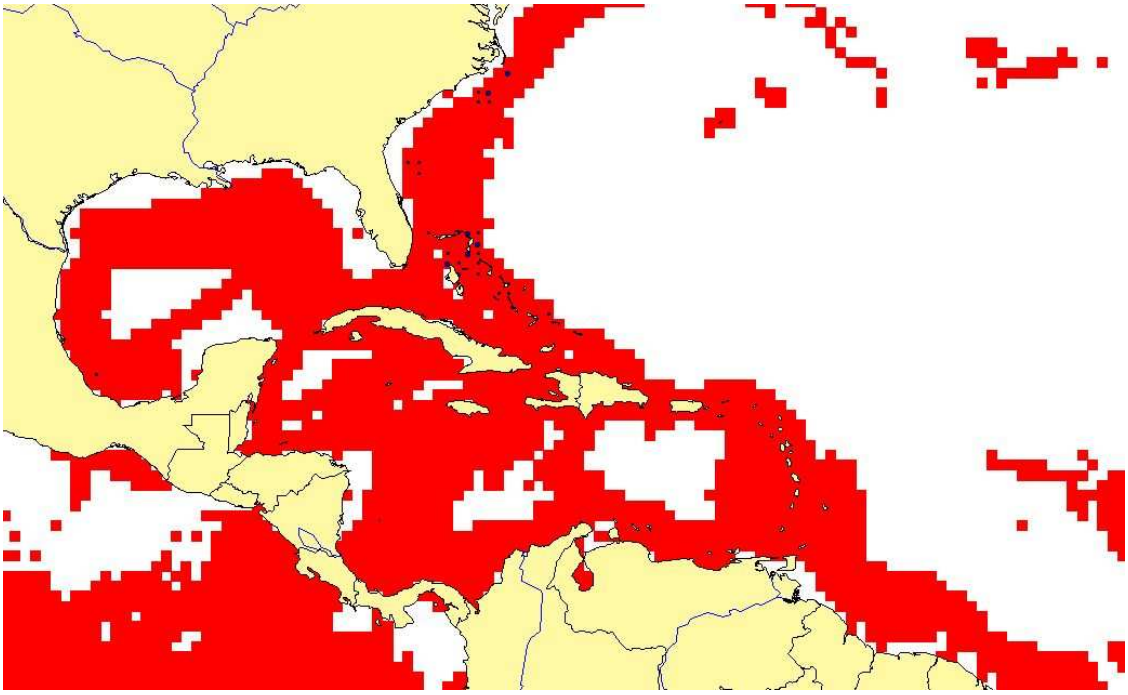

Fig 2: Consensus map of known and probable occurrence of species in WCR plus sightings available through OBIS shown in blue. *Note that not all occurrences are available/accessible through online data repositories, such as OBIS (www.iobis.org), and

records shown on the map do not necessarily represent the whole extent of documented species occurrence!

Quality of outputs: ★★★

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