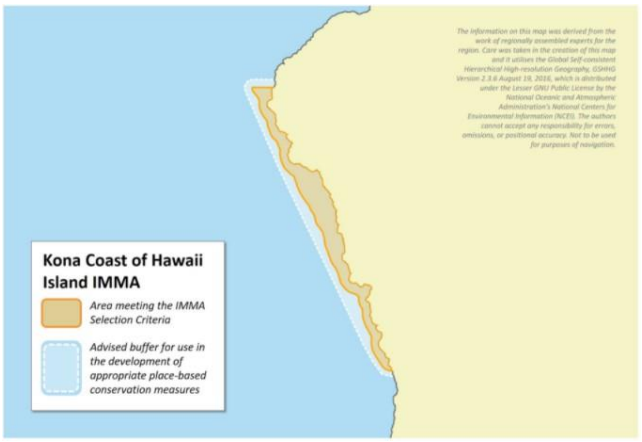

Area Size

97 km²

Qualifying Species and Criteria

Spinner dolphin – *Stenella longirostris*

Criteria B1, B2, D1

Figure 1: A spinner dolphin leaping from the water off the coast of Kona, Hawaii. Photo: Julian Tyne

Summary

The Kona Coast of Hawaii is home to a small, resident population of Hawaii Island spinner dolphins, which are genetically distinct and exhibit predictable daytime occupancy in Makako, Kealakekua, Honaunau and Kauhakō Bays. Recent research indicates that Hawaii Island spinner dolphin abundance is relatively small, and that population size may be declining. Hawaii spinner dolphins are less likely to rest outside of their preferred resting bays, indicating the importance of these areas to the species. This constrained behavioural schedule may make them less resilient to disturbance, yet they are exposed to human activities (<100m) for 82.7% of daytime hours within their resting bays.

Kona Coast of Hawaii Island IMMA

Description

Hawaii Island is the largest, youngest, and most southerly of the main Hawaiian Islands. On the leeward side of the island is the Kona Coast, which includes four sheltered bays : Makako, Kealakekua, Honaunau and Kauhakō. After foraging offshore overnight (Beniot-Bird and Au, 2003; Benoit-Bird and Au, 2009), the Hawaii Island spinner dolphins use these bays as their preferred resting areas during the daytime (Norris et al., 1994; Thorne et al., 2012; Tyne et al., 2015). The small group of resident Kona coast spinner dolphins (Fig. 1 and 2) (Tyne et al., 2014b; 2016) are the most genetically isolated population in the Hawaiian archipelago (Andrews et al., 2010). These sheltered habitats are essential, because the spinner dolphins are less likely to rest in adjacent waters (Tyne et al., 2015), and the bays are proximal to productive night-time foraging grounds (Thorne et al., 2012). Their constrained daytime range helps them maximise foraging efficiency and minimize predation risk during vulnerable resting periods (Tyne et al., 2017). However, during their resting periods, the spinner dolphins are targeted on a daily basis by people looking for close-up dolphin encounters (Timmel et al., 2008; Heenehan et al., 2015; Tyne et al., 2015; Heenehan et al., 2016; 2017a). Recent research has shown that the dolphins are approached within 100m by humans 82.7% of the time during the daytime (Tyne, 2015), with a median time of only 10 mins between interactions (Tyne, 2015).

In the 1970s, Norris et al. (1994) suggested that spinner dolphins are acoustically silent during daytime resting periods. Recently, however, the dolphins have been shown to be acoustically active during resting periods when human activities are present in the same bay (Heenehan et al., 2017a), indicating that their resting behaviour may be disturbed. The cumulative effect of this repeated disturbance, in combination with the small population size, genetic isolation, restricted resting habitats, and the constrained nature of the daily behavioural schedule of the spinner dolphins, is likely to make them less resilient to human disturbance (Tyne et al., 2017).

Figure 2: Spinner dolphins surfacing along the Kona Coast of Hawaii. Photo: Julian Tyne

Criterion B: Distribution and Abundance Sub-criterion B1: Small and Resident Populations

Genetic analyses have shown that the spinner dolphins of Hawaii are distinct from other spinner dolphin subspecies in the Pacific region (Andrews, 2009), and the Hawaii Island spinner population is the most genetically isolated population in the Hawaiian archipelago (Andrews et al., 2010). Recent research on the Hawaii Island spinner dolphins consisted of a rigorous and systematic sampling regime that collected photo-ID data on the animals and clearly demonstrated that the spinner dolphins using the bays in the IMMA are present in small, resident populations. Using POPAN mark-recapture models, two consecutive annual abundance estimates were generated (Tyne et al., 2014b; 2016), of 631 (95% CI: 524-761 – Tyne et al., 2014) and 668 (95% CI: 556-801 – Tyne et al., 2016). These estimates are lower than any previous published estimates, 960 (Norris et al., 1994), 2,334 (Ostman, 1994) and 855 – 1,001 individuals (Ostman-Lind et al., 2004), which may be an indication of a possible long-term impact.

Criterion B: Distribution and Abundance Sub-criterion B2: Aggregations

Each of the resting bays in the IMMA can have aggregations of resting Hawaii Island spinner dolphins present on a daily basis throughout the year (Fig. 3) (Norris et al., 1994; Thorne et al., 2012; Tyne et al., 2015).

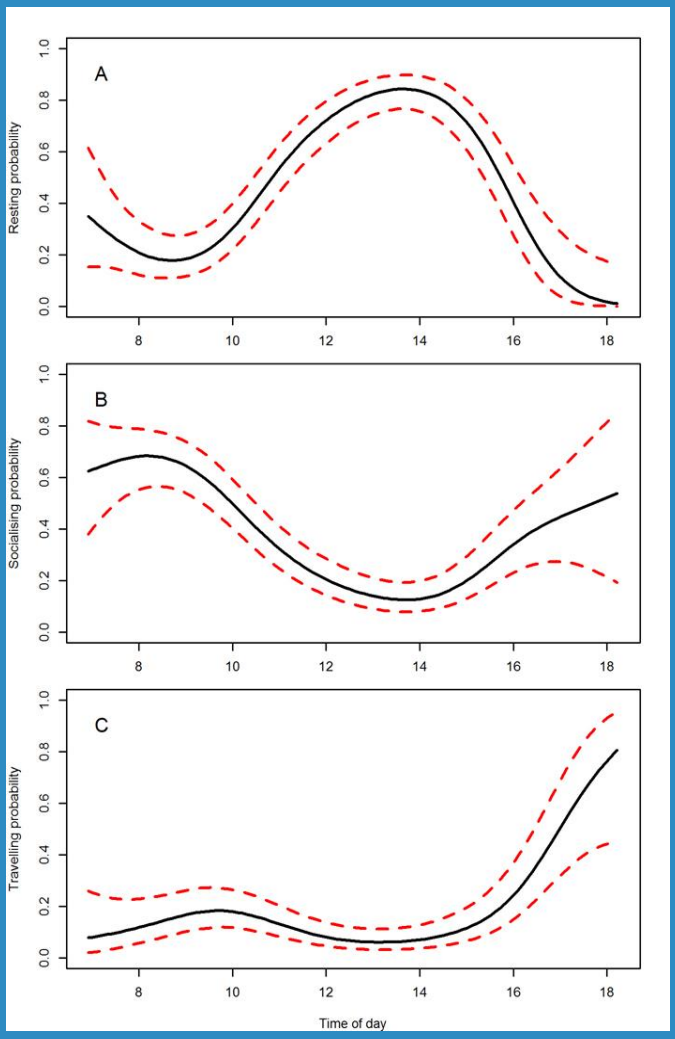

Figure 3: Diurnal probability of a) resting, b) socializing, and c) travelling as a function of time-of-day estimated from the 428 hours of focal-follow observations. The solid black line represents the fitted values of the GAMMs and the dashed red lines represent the 95% confidence intervals'. Adapted from Tyne et al., 2017.

Criterion D: Special Attributes
Sub-criterion D1: Distinctiveness

Genetic analyses have shown that the spinner dolphins of Hawaii are distinct from other spinner dolphin subspecies in the Pacific region (Andrews, 2009), and that there are genetic distinctions throughout the Hawaiian archipelago (Andrews et al., 2010). The Hawaii Island spinner dolphin population is the most genetically isolated population in the Hawaiian archipelago (Andrews et al., 2010). As a consequence, spinner dolphins in Hawaii have been divided into five different island/island-group management units under the US Marine Mammal Protection Act 1972 (MMPA, 1972) by the National Marine Fisheries Service (NMFS) that correspond with two broad geographical regions: 1.) three in the Mainland Hawaiian Islands: Hawaii Island, Oahu/4-Islands area, Kauai/Niihau, and 2.) two in the Northwest Hawaiian Islands: Pearl & Hermes Reef and Kure/Midway.

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Acknowledgements

We would like to thank the participants of the 2017 IMMA Regional Expert Workshop held in Apia, Samoa for the identification of IMMAs in the Pacific Islands Region. Funding for the identification of this IMMA was provided to the Global Ocean Biodiversity Initiative by the International Climate Initiative (IKI). The German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) supports this initiative on the basis of a decision adopted by the German Bundestag. Support was also provided by SPREP, the French Biodiversity Agency, Whale and Dolphin Conservation and the Tethys Research Institute.

Suggested Citation: IUCN-Marine Mammal Protected Areas Task Force, 2021. Kona Coast of Hawaii Island IMMA Factsheet. https://www.marinemammalhabitat.org/wp- content/uploads/imma-factsheets/PacificIslands/kona-coast-hawaii-island-PacificIslands.pdf. Downloaded on (day month year).

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