**Supplementary Material**

Preliminary survival and movement data for a declining population of Flesh-footed Shearwater *Ardenna carneipes* in Western Australia provides insights into marine threats

JENNIFER L. LAVERS, SIMEON LISOVSKI and ALEXANDER L. BOND

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Table S2.Published estimates of apparent annual adult survival (*ϕ*) from Flesh-footed Shearwaters, and other shearwater species.

References



Figure S1. Map of Shelter (Muttonbird) Island in Torbay, Western Australia. The approximate boundaries of the three Flesh-footed Shearwater sub-colonies monitored during 2011-2015 (using capture-mark-recapture) are shown in yellow. Additional sub-colonies (no monitoring) are shown in red.

Table S1.Models to estimate apparent annual survival (*ϕ*) and encounter probability (*p*) of Flesh-footed Shearwaters ranked by quasi-Akaike Information Criteria adjusted for small sample size (QAICc). K: number of parameters, ΔQAICc: difference in QAICc from the top-ranked model; wi: Akaike weight. Models include time-varying (t) and constant (.) parameters.

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| --- | --- | --- | --- | --- | --- | --- |
| Model | K | QAICc | ΔQAICc | wi | Likelihood | Deviance |
| *ϕ*(t) *p*(.) | 6 | 223.76 | 0.00 | 0.46 | 1.00 | 19.314 |
| *ϕ*(.) p(t) | 6 | 224.92 | 1.16 | 0.26 | 0.56 | 18.286 |
| *ϕ*(.) p(.) | 3 | 225.17 | 1.40 | 0.23 | 0.50 | 24.969 |
| *ϕ*(t) p(t) | 9 | 228.15 | 4.39 | 0.05 | 0.11 | 17.032 |

Table S2.Published estimates of apparent annual adult survival (*ϕ*) from Flesh-footed Shearwaters, and other shearwater species.

|  |  |  |  |
| --- | --- | --- | --- |
| Species | Location | *ϕ* ± | Reference |
| Flesh-footed Shearwater *A. c. carneipes* | Western Australia | 0.634 ± 0.130 to 0.835 ± 0.164 | This study |
| Flesh-footed Shearwater *A. c. hullianus* | New Zealand | 0.756 ± 0.027 to 0.940 ± 0.087 | Waugh and Taylor (2012); Barbraud et al. (2014) |
| Short-tailed Shearwater *Ardenna tenuirostris* | Tasmania | 0.878 ± 0.021 | Bradley et al. (1989) |
| Sooty Shearwater *Ardenna griseus* | New Zealand | 0.917 to 0.966 | Clucas et al. (2008) |
| Balearic Shearwater *Puffinus mauritanicus* | Balearic Islands | 0.780 ± 0.020 | Oro et al. (2004) |
| Manx Shearwater *Puffinus puffinus* | Wales | 0.861 ± 0.103 | Brown et al. (2004) |
| Hutton's Shearwater *Puffinus huttoni* | New Zealand | 0.931 ± 0.013 | Cuthbert and Davis (2002) |
| Christmas Shearwater *Puffinus nativitatis* | Hawaii | 0.864 ± 0.034 | VanderWerf et al. (2015) |
| Cory’s Shearwater *Calonectris diomedea* | Italy | 0.85 ± 0.02 to 0.92 ± 0.02 | Boano et al. (2010) |
| Cory’s Shearwater *Calonectris diomedea* | Selvagem Grande | 0.914 ± 0.022 | Ramos et al. (2012) |

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