**SUPPORTING INFORMATION**

**Appendix S4**

**A framework for mapping the distribution seabirds by integrating tracking, demography and phenology**

More details can be found at <https://github.com/anacarneiro/DensityMaps>

*Kernel analysis*

Utilization distributions (UDs) using kernel analysis in the adehabitatHR package (Calenge, 2006) were estimated for each data group which consisted of unique combinations of species, breeding site (using the same definition as in ACAP breeding site database; Phillips et al., 2016), device type, age and stage of the annual cycle. Tracking data derived from GPS and PTT were combined before the kernel analysis. To control for differences in the number of trips or years of tracking per individual, UDs were generated for each bird and then averaged so that each individual had equal weighting (Carneiro et al., 2016; Clay et al., 2016, 2019). A fixed smoothing parameter (*h*) of 50 km was used for PTT and GPS data, and 200 km for GLS data (BirdLife International, 2004). Tracking data for black-browed and white-capped albatrosses were available for several breeding sites within the same island or island group, therefore, the final UD represented the combination of sites based on the percentage of the total population involved. For the incubation period, the final UD for black-browed albatross was the combination of UDs created for Saunders Island, New Island and Steeple Jason, representing each 6%, 7% and 87% of the Falkland Islands (Islas Malvinas) population, while during the brood-guard stage, data was available for New Island (8%) and Steeple Jason (92%) and for Saunders Island (45%) and New Island (55%) for the non-breeding distribution. For the white-capped albatross UDs for both brood-guard and post-guard were the combination of UDs from Auckland Island (5%) and Disappointment Island (95%). The UDs created for each data group were used as surrogates for the population-level distributions (i.e. island or island groups when using the same definition as ACAP). The final UDs were cropped by a land mass polygon so that they only included marine areas.

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