INTER-AMERICAN TROPICAL TUNA COMMISSION

WORKING GROUP ON ECOSYSTEMS AND BYCATCH

4TH MEETING

La Jolla, California (USA)
01-02 June 2026

DOCUMENT EB-04-02

ALBATROSS AND PETREL OVERLAP WITH PELAGIC LONGLINE FISHERIES IN THE EASTERN PACIFIC OCEAN

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This document is an expansion of EB-03-02 focused on seabird distribution overlap with longline fisheries and has been prepared in response to the IATTC's EBWG Seabird Action Plan.

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SUMMARY

Bycatch in fisheries is a major threat to seabird populations worldwide, including in the eastern Pacific Ocean (EPO). Pelagic longline fisheries targeting tuna and swordfish globally account for tens of thousands of seabird mortalities annually. Yet, little is known about seabird–fisheries overlap in this region. To quantify spatial overlap with industrial and small-scale coastal longline fisheries in the EPO, we collated tracking data from 1993-2022 for albatrosses (12 species) and petrels (4 species) of high conservation concern. Utilization distributions (UDs) were calculated for each species split into breeding and non-breeding phases and according to age class and tag type, and overlaid with three pelagic longline effort datasets: industrial fisheries logbook data, Global Fishing Watch set-level data, and data on small-scale coastal fisheries. We also examined overlap of species UDs with the area where seabird bycatch mitigation is mandated by the Inter-American Tropical Tuna Commission (IATTC). Species with the highest fisheries-overlap included adult non-breeding black (*Procellaria parkinsoni*) and white-chinned petrels (*P. aequinoctialis*), Chatham (*Thalassarche eremita*), Buller's (*T. bulleri*), Antipodean (*Diomedea antipodensis antipodensis*), and Salvin's (*T. salvini*) albatrosses, and breeding waved albatrosses (*Phoebastria irrorata*). The IATTC mitigation area appears to encompass most core habitat in the EPO for seabird species considered, with the notable exception being more tropically foraging black petrels, which largely occur outside this area. Within this area, it is critical that mitigation measures follow the best available science, are updated as new science becomes available, and observer coverage is sufficient to monitor seabird bycatch rates and evaluate compliance.

1. INTRODUCTION

Seabirds are one of the most threatened groups of birds (Dias et al. 2019); therefore, quantifying and reducing drivers of population declines is a priority for their conservation. The top three threats affecting seabirds globally are fisheries bycatch, invasive species, and climate change, with almost 50% of species experiencing a declining population trend and being listed as Near Threatened, Vulnerable, Endangered, or Critically Endangered by the International Union for Conservation of Nature (IUCN) Red List (Dias et al. 2019). It is estimated that 100 seabird species are threatened by fisheries bycatch, including two of the most threatened seabird groups, albatrosses and petrels (Dias et al. 2019). Ninety percent of all albatross species are affected by fisheries bycatch, while over 50% of large petrel and shearwaters species are affected. For some species, the impacts of bycatch are consequential, as for example, bycatch is the greatest threat faced by the endangered Antipodean albatross (*Diomedea antipodensis antipodensis*) and is estimated to drive a 6% decline in their population per year (Richard et al. 2024).

Seabird bycatch in pelagic longline fisheries is particularly problematic, accounting for a large number of seabird mortalities globally, estimated in the order of tens of thousands of albatrosses and petrels annually (Anderson et al. 2011, Votier et al. 2023). Industrial pelagic longline fisheries are thought to have contributed to population declines in twice as many seabird species compared to small-scale coastal longline fisheries, although impacts from small-scale coastal longline fisheries are less known (Dias et al. 2019). In pelagic longline fisheries, seabird mortality occurs primarily during setting, when seabirds attack the baited hook, get hooked or entangled with the gear, and drown as the line sinks (Bell et al. 2025). Live captures also occur during hauls, but mortalities often result from injuries post release (Phillips and Wood 2020). Obtaining accurate estimates of seabird bycatch in pelagic longline fisheries is challenging due to a range of factors, including poor observer coverage and bycatch identification, but there have been concerted efforts to quantify bycatch. For example, Peatman et al. (2019) estimates ~16,000 seabirds are caught annually in the Western and Central Pacific Fisheries Commission (WCPFC), while CCSBT (2025) estimate ~16,000 seabirds are caught annually by six members of the Commission for the Conservation of the Southern Bluefin Tuna (CCSBT) fishing in the southern hemisphere.

The pelagic longline fishery targeting primarily tuna and swordfish is prevalent throughout the eastern Pacific Ocean (EPO) (Griffiths et al. 2017). The fishery in the EPO is managed by the Inter-American Tropical Tuna Commission (IATTC) from the coasts of Canada, south to Chile and west to 150°W. In addition, an area of overlap between the IATTC and WCPFC occurs in the southwest corner of the EPO. The region is fished by vessels flagged by countries along the EPO as well as some long distance nations like east Asian countries and the European Union (Griffiths et al. 2017). In 2011, the IATTC adopted Resolution C-11-02 on seabirds, which mandated the implementation of seabird mitigation methods, including tori lines, side setting with bird curtains and weighted branch lines, night setting, blue-dyed bait, and management of offal discharge, among others (IATTC 2011). The Resolution specifies that at least two mitigation methods must be used by vessels > 20 m in length if fishing in the mitigation area (north of 23°N, except in Mexican waters, and south of 30°S, plus the area bounded by the coastline at 2°N, west to 2°N-95°W, south to 15°S-95°W, east to 15°S-85°W, and south to 30°S; Fig. 1). This mitigation area was informed by seabird tracking data prior to 2010 (Small and Taylor 2006, IATTC 2011). Fishing vessels in areas outside the mitigation area are encouraged to voluntarily use at least one mitigation method. Resolution C-11-02 is obsolete and many of the mitigation methods (e.g., blue-dyed bait and management of offal discharge) and the specification of those methods that are included (e.g., branch line weighting), do not align with the best-practice advice of the Agreement on the Conservation of Albatrosses and Petrels (ACAP), a multilateral agreement that coordinates activities to mitigate threats to at-risk species and reviews the scientific evidence that underpins seabird bycatch mitigation methods to establish the best practice advice (Baker et al. 2024). Also, since a preliminary assessment of the distribution of albatrosses and petrels in the EPO was presented to the IATTC, based on data collected in the late 1990s and early 2000s (BirdLife International 2006), the quantity, quality and coverage of both seabird tracking and fishing vessel datasets have vastly improved. The IATTC's Seabird Action Plan (see Annex 1 in IATTC 2024) identified this, and as such, it is timely to reassess seabird–fisheries overlap in the EPO and identify hotspots of risk to guide potential updates to management measures (Santos et al. 2024).

Since the early 2000s, advances in animal tracking technology, including the miniaturization of devices, their enhanced battery longevity, and improved functionalities, have contributed to an increase in the number of species and life stages that have been tracked (Burger and Shaffer 2008, Carneiro et al. 2024). Concurrently, the Birdlife Seabird Tracking Database, founded in 2004, has been a repository for seabird tracking data, housing almost 40 million locations for 168 species, including albatrosses and petrels that are known to occur within the EPO. The database facilitates data sharing among researchers, allowing for collaborative region-wide analyses (Carneiro et al. 2024). This fishery-independent data is particularly useful for filling gaps in fishery dependent bycatch data, which are often limited by low observer coverage and poor quality of data collection (Anderson et al. 2011, Phillips 2013). Specifically, spatial risk assessments using tracking data can help identify areas of seabird overlap with fisheries (Žydelis et al. 2013, Clay et al. 2019, Reid et al. 2023, Rexer-Huber et al. 2025) and thus highlight where bycatch monitoring and mitigation efforts need to be focused. For example, Clay et al. (2019) used tracking data to identify that the areas of greatest risk from pelagic longline fisheries for black-browed (*Thalassarche melanophris*) and grey-headed (*T. chrysostoma*) albatrosses were along the southeast Atlantic Ocean. Similarly, the hotspots of overlap between pelagic longline fisheries and white-chinned petrels (*Procellaria aequinoctialis*) occurred in the southeast Atlantic Ocean and southwest Indian Ocean, and to a lesser extent the southeast Pacific Ocean and southwest Atlantic Ocean (Rexer-Huber et al. 2025).

In this study we quantify the spatial overlap of albatrosses (12 species) and petrels (4 species) with pelagic longline fisheries. Specifically, we used multiple longline fisheries datasets and seabird distributions generated from tracking data shared in the Seabird Tracking Database to measure species-specific overlap in the EPO. Overlap between seabird distributions and the current IATTC mitigation area was also

investigated. This work can inform where seabird-fishery interactions are more likely to occur and whether the current mitigation area in the EPO is still spatially appropriate.

2. METHODS

2.1. Seabird distribution data

Currently, 31 seabird species are covered by ACAP and are a high priority for conservation due to their ongoing interaction with fisheries (Phillips et al. 2016). We selected the following 16 ACAP-listed species that have been shown to interact with fisheries and occur within the IATTC Convention Area (i.e., EPO) for inclusion in our analyses: northern royal (*D. sanfordi*), wandering (*D. exulans*), waved (*Phoebastria irrorata*), black-footed (*Ph. nigripes*), Laysan (*Ph. immutabilis*), grey-headed, black-browed, Buller's (*T. bulleri*), Chatham (*T. eremita*), and Salvin's (*T. salvini*) albatrosses and northern giant (*Macronectes halli*), white-chinned, black (*Pr. parkinsoni*), Westland (*Pr. westlandica*), and grey (*Pr. cinerea*) petrels. Antipodean albatrosses were included and contained two subspecies, *D. antipodensis antipodensis* and *D. antipodensis gibsoni* (Gibson albatross) that have not yet formally been split, so we consider them both here for consistency among species. However, *D. antipodensis antipodensis* is the only subspecies that uses the EPO and is therefore the only subspecies considered in the risk analysis. We excluded southern royal albatrosses (*D. epomophora*), southern giant petrels (*M. giganteus*), and pink-footed shearwaters (*Ardenna creatopus*) due to a lack of data in the Seabird Tracking Database. We acknowledge that immature short-tailed albatrosses (*Ph. albatrus*) use the northeast Pacific Ocean (Orben et al. 2018), however they were not included as they are rarely sighted around pelagic longline vessels (NMFS 2024). Requests were made through the Seabird Tracking Database to use global spatial distributions previously created for the 2024 update of the ACAP Species Assessment generated from species tracking data (ACAP 2024b). For Laysan and black-footed albatrosses, more recent tracking data were also provided to supplement that acquired via the Seabird Tracking Database via direct correspondence with researchers.

As described in ACAP (2024b), the tracking data used to generate the global spatial distributions originated from a variety of tracking devices, including Global Positioning System (GPS), Platform Terminal Transmitters (PTTs), and Global Location Sensors (GLS) (which have different associated errors). For each species, tracking data were cleaned and standardized following protocols detailed in Carneiro et al. (2020). Briefly, to remove erroneous positions with speeds greater than 90 km/h, a speed filter was applied to the GPS and PTT data. PTT and GPS data were linearly interpolated to obtain regular hourly positions and any within 5 km and 15 km from the colony for GPS and PTT data respectively, were removed to exclude locations at the colony. GLS data are expected to be cleaned prior to uploading in the Seabird Tracking Database. However, in some instances, we removed locations around the equinoxes (March equinox: −21, +7 days; September equinox: −7, +21 days) as they are often unreliable, unless latitudes were estimated using additional information such as sea surface temperature prior to our analysis.

Data derived from each device type were classified into age class (adult/mature vs juvenile/immature) and phase of the annual cycle (breeding vs. non-breeding). Data were combined from GPS and PTT devices for each category (ACAP 2024b). Utilization distributions (UDs) were created using the 'adehabitatHR' package in R (Calenge 2006) for each species, population, device type (GPS/PTT or GLS), age class, and phase of the annual cycle (ACAP 2024b). A species' population was based on the breeding population defined as the proportion of individuals of each species found breeding at each island group. A fixed smoothing parameter (h) of 50 km was used for GPS and PTT data while 200 km was used for GLS data, both at a grid cell size of 10 km^2. To create global species UDs, the UDs from each population (while keeping device type, age class, and annual cycle separate) were weighted by the proportion of the global breeding population represented according to ACAP and then combined by summing across populations. If the sum of the species UD did not add up to 1, part of the global population was not represented in the

UD. For example, for adult black petrels, three UDs were created: breeding/GLS, non-breeding/GLS, and breeding/GPS/PTT. Each of the three UDs represented 100% of the global population and the sum of each UD was 1. Conversely, for adult wandering albatrosses, four UD categories were created, and the global population represented in breeding/GLS, non-breeding/GLS, breeding/GPS/PTT, and non-breeding/GPS/PTT UDs were 55%, 55%, 100% and 36%, respectively. This is because some populations were not represented in the tracking data for breeding/GLS, non-breeding/GLS, and non-breeding/GPS/PTT UDs, which resulted in those summed global UDs being 0.55, 0.55, and 0.36. It is important to note that missing data from major populations (see Table 1) may result in underestimating overlap with pelagic longline fisheries for some species. A summary of the tracking data and the proportion of the global population represented for each species are found in Table 1.

Prior to estimating overlap between seabird distributions and pelagic longline fishing effort datasets, each species' global UDs were cropped to the boundaries of the IATTC Convention Area, creating a cropped IATTC UD (Figure 1). If the sum of the global UD equaled 1, then the sum of the cropped IATTC UDs represented the proportion of the global population that uses the IATTC Convention Area. If the sum of the global UD was less than 1, then the sum of the cropped IATTC UDs represents only the proportion of tracked individuals that were recorded within the IATTC Convention Area. Alternatively, if it was assumed that the missing populations do not use the IATTC area, the sum of the cropped IATTC UDs would represent the proportion of the global population that does use the IATTC area. For the species distributions that overlapped with some part of the IATTC area, the cropped IATTC UD values were rescaled to sum to 1. When this was done to the Antipodean albatross, the distribution attributed to the Gibson albatross was excluded. From here on, Antipodean albatross refers to the subspecies *D. antipodensis antipodensis*. The 50, 75, and 95% isopleths were calculated from the cropped IATTC UDs to indicate different levels of intensity in area use. These isopleths were used for all overlap analyses only for species whose global UD represented more than 1% of the global population and cropped IATTC UD represented more than 3% of the total tracked population. These 'minimum use criteria' was set to prevent overestimating overlap when only a very small proportion of the global population was accounted for.

2.2. Pelagic longline effort data

Three datasets were used to represent pelagic longline fishing effort in the EPO. The first dataset included fishing effort data for industrial longline for the period 2000–2023 recorded by IATTC's individual Contracting Parties and Cooperating Non-Contracting Parties (CPCs) in logbooks and submitted annually to the Secretariat. These data consist of monthly fishing effort in total number of hooks at 5°x5° resolution, so the number of fishing sets and time of day that longlines are set are unknown.

The second dataset was derived by a model developed by Global Fishing Watch (GFW) using the Automatic Identification System (AIS), which is a vessel tracking system designed to prevent vessel collisions. GFW data have been used, among others, to develop proxies for fishing effort and activities (Kroodsma et al. 2023) and identify potential overlap with species of special interest, illegal fishing activities or unreported marine species interactions (McCauley et al. 2016, Welch et al. 2024). However, temporal and spatial gaps frequently exist in AIS data for several technical or behavioral reasons such as poor satellite coverage, or if vessels disable—legally or illegally—their onboard AIS devices while at sea. Hence, estimates of pelagic longline activity derived from AIS represent only a portion of total fishing activity. Developed using methods in Kroodsma et al. (2023), GFW estimated start and end times of pelagic longline fishing sets for IATTC registered vessels within the EPO from 2016 to 2023. Although these data do not account for all fishing effort, their inclusion allowed for a much finer spatial resolution (1°x1°) of effort than logbook data (i.e., 5°x5°) and more accurately reflect seabird bycatch risk, since most captures occur during line setting

(Brothers et al. 2010). To assess night-setting frequency and take advantage of the fine temporal resolution, the percentage of sets that occurred entirely at night (setting and hauling occurred after sunset and before sunrise) was calculated. Given the pros and cons of the two fishing effort datasets, separate analyses were conducted using the IATTC data and GFW data.

A third dataset was used to characterize a proxy for the spatial extent of fishing effort for small-scale coastal longline fisheries from Mexico to Chile. There is no program for collecting data from these fisheries in a harmonized systematic manner, and in some countries few, if any, data are collected. Data were collated from multiple sources by Griffiths et al. (2022), including artisanal longline effort data for Central America from IATTC's FAO Common Oceans ABNJ 1 and 2 shark data collection program for small scale fisheries (Griffiths et al. 2024), including IATTC observer data and Ecuadorian (Martínez-Ortiz et al. 2015), Peruvian (Ayala et al. 2008), and Chilean (Martínez et al. 2017) pelagic fisheries effort maps. Maps were digitized and geo-referenced at a 0.5° spatial resolution. Unlike the other two datasets, which show fishing effort as the number of hooks or fishing hours, cells were given just a presence or absence value as effort data was mostly unavailable.

2.3. Overlap analysis: Seabird distribution and fisheries data

2.3.1 Pelagic longline logbooks

To estimate the areal overlap between seabird distributions and the pelagic longline logbook data, the number of hooks was summed across CPCs for each 5° grid cell based on logbook data for 2000–2023. To estimate the extent of overlap between fishing effort and seabird distribution in the EPO, grid cells where any part of the grid overlapped with each of the isopleths (i.e., 50, 75, and 95%) were identified and the number of hooks from those grid cells summed. The proportion of total hooks in the EPO that occurred in these identified cells was calculated. The proportion of hooks was used as a proxy for pelagic longline fishing effort and does not indicate the potential number of hooks seabirds may have interacted with, since the years for which seabird distributions were estimated did not necessarily align with the years for which fishing effort data were available.

2.3.2 GFW sets

The areal overlap between seabird core habitat and GFW pelagic longline sets was calculated using a modified version of the equations from White et al. (2019). The 50% isopleth was selected to represent core habitat, which corresponds to the most frequently used areas by a species. The equations calculate the probability that sets and species core habitat may overlap in space relative to their probability of overlapping in all other cells, where *i* is an individual grid cell and *n* is the total number of grid cells in the IATTC Convention Area.

$$P_{rel}(core\ habitat)_i = \frac{density_i}{\sum_{i=1}^{n} density_i} \quad (1)$$

$$P_{rel}(fishing)_i = \frac{effort_i}{\sum_{i=1}^{n} effort_i} \quad (2)$$

$$P_{rel}(overlap)_i = \frac{P_{rel}(core\ habitat)_i \ x\ P_{rel}(fishing)_i}{\sum_{i=1}^{n}(P_{rel}(core\ habitat)_i \ x\ P_{rel}(fishing)_i)} \quad (3)$$

A grid cell size of 1°x1° was chosen as pelagic longline fishing sets can often cover tens to hundreds of km

and because selecting a spatial resolution finer than GFW's associated locations with the estimated start and end of sets was not desirable (Kroodsma et al. 2023). The number of sets that occurred in each cell from 2016–2023 represented general aggregated fishing effort in the area. The core habitat (50% isopleth) was converted into a raster at a resolution of 1°x1° to align with the GFW data. Relative overlap values were log transformed to generate values on a comparable scale. In addition to relative overlap, the percent of core habitat that overlapped with any cells where pelagic longlines were set over from 2016 to 2023, was also calculated. Lastly, to quantify overlap, the numerator of equation 3 was calculated for each grid cell and summed across grid cells to get an unitless overlap score which was standardized by a min-max normalization so that scores could be comparable across species (0–100).

2.3.3 Small-scale coastal longline fisheries

Overlap between seabird distribution and small-scale coastal longline fisheries was calculated as the percentage of each of the three isopleth polygons (i.e., 50, 75, and 95%) that overlapped with the 0.5°x0.5° grid cell fishing presence raster. It is well known that along the west coast of the Americas, seabirds interact with small-scale coastal longline fisheries (Awkerman et al. 2006, Suazo et al. 2014). The estimated fishing area likely underestimates the full spatial extent of small-scale coastal longline fishing effort from Mexico to Chile and therefore spatial overlap is likely underestimated.

2.4. Overlap analysis: Seabird distribution and IATTC seabird mitigation area

To evaluate the adequacy of the extent of IATTC's seabird mitigation area, overlap between seabird distributions and the mitigation area were calculated. Similar to the previous analyses, the percentage of the 95, 75, and 50% isopleths for each species that was covered by the IATTC seabird mitigation area was calculated. Additionally, the percentage of the relative overlap (summed to 1) from the GFW overlap analysis that occurred inside versus outside the mitigation area was also determined.

3. RESULTS

3.1. Seabird UDs in the EPO

The degree to which UDs overlapped with the IATTC Convention Area depended on tag type (e.g., GLS or GPS/PTT), stage of the annual cycle (e.g., breeding or non-breeding), and age class (e.g., adult or juvenile). Of the 57 UDs developed for the analyzed seabird species, 21 overlapped with the EPO and met the minimum use criteria (i.e., the global UD represented more than 1% of the global population and the cropped IATTC UD represented more than 3% of the total tracked populations (Table 1)). These 21 UDs represented 14 species: nine albatrosses and five petrels. In total, 86% of overlapping UDs were of species migrating to the EPO during the non-breeding period from the western and central Pacific. Three of the overlapping UDs represented juveniles, whereas the rest represented adults, but this is likely due to a lack of juvenile tracking datasets. The home-range sizes in km2 of the three isopleth levels (50, 75, and 95%) for each of the 21 UDs are shown in Table 2.

The global population UDs for adult non-breeding waved, Salvin's (GLS), and Chatham (GLS) albatrosses (Figures. 1a & b) and black petrels represented 100% of the global population and substantially overlapped with the IATTC Convention Area (range: 89–99%; Table 1). Other species that spent a large portion of their time within the IATTC Convention Area include adult non-breeding Buller's albatrosses (76%) and Westland petrels (67%). The species which used the IATTC Convention Area less, but still met the minimum use criteria, include the adult non-breeding black-footed (6%), wandering (6%) (Figure 1c & d), juvenile wandering (7% both GLS and GPS/PTT), and black-browed (6%) albatrosses and adult breeding black-footed (3%) and black-browed (4%) albatrosses. As a reminder, for many of these species, the percentages are based on the currently tracked individuals because 100% of the global population has not

been represented in tracks. All overlap percentages with the IATTC Convention Area are listed in Table 1 and the 21 global and cropped IATTC UDs can be found in Supplementary Material 1.

3.2. Overlap analysis: Seabird distribution and pelagic longline logbook data

The 5°x5° pelagic logbook longline effort aggregated across 2000–2023 was highest (50–200 million hooks) at 5°N–20°S and between 110°W–150°W (Figure 2a). The lowest effort (<1 million hooks) occurred primarily along the west coast of the Americas.

The non-breeding black petrels' 95, 75, and 50% isopleths overlapped with the area where a substantial percentage of logbook fishing effort occurred in the EPO (38%, 12%, and <1% areal overlap, respectively; Figures 3a & 4a; Table 2). Higher overlap for the 75% and 95% isopleths was due to the inclusion of some grid cells where high intensity fishing effort occurred (i.e., grid cells with > 50 million hooks). The 95, 75, and 50% isopleths of the non-breeding Chatham albatross overlapped with 7%, 4%, and 2% of the total pelagic longline fishing effort, respectively, within the IATTC Convention area (from GLS; Figures 3b & 4a; Table 2). Non-breeding Buller's (from GLS), Antipodean (from GPS/PTT), and Salvin's (from GLS) albatross' 95, 75, and 50% isopleths overlapped with 3%, 2%, and <1% (Figures 3c & 4a; Table 2), 6%, 4%, and 1% (Figures 3d & 4a; Table 2), and 4%, 2%, and 2% (Figure 4a; Table 2) of total logbook fishing effort, respectively, representing other species that had higher overlap with fishing effort. Figures for each species whose isopleths showed some degree of areal overlap with 5°x5° logbook effort are in Supplementary Material 2.

3.3. Overlap analysis: Seabird distribution and GFW pelagic longline sets

Of the over 350,000 GFW estimated pelagic longline sets between 2016–2023, only 2% occurred completely at night (between sunset and sunrise), below the global estimate of 3.1% (Kroodsma et al. 2023). All other sets overlapped with a portion of daylight. The highest number of sets in 1°x1° grid cells (2000–3000) occurred in the vicinity of 10°S and 145°W, while 500–2000 sets per grid cell occurred between 10°S–20°S and 90°W–135°W (Figure 2b). Between 100–1000 sets per grid cell also occurred along the western edge of the Convention Area just north of the equator between 20°–40°N.

Of the 21 UDs that overlapped with the IATTC Area, 12 had core habitats (rasterized 50% isopleths) that overlapped with GFW estimated longline set locations. For non-breeding Buller's albatross, 48% of the core habitat (Figures 4c & 5a) overlapped with GFW pelagic longline fishing effort (Table 2) and the standardized overlap score was 100. The highest relative overlap areas occurred from 18–25°S and 75–80°W (Figure 5b). Both Chatham and Salvin's albatrosses had the second (87) and third (66) highest standardized overlap score. For adult non-breeding white-chinned petrels, 20% of their core habitat (Figures 4c & 5c) overlapped with longline effort, the standardized overlap score was 19, and the highest relative overlap (Figure 5d) occurred in the same area as the Buller's albatross. Thirty-two percent, 15% (for GPS/PTT; 9% for GLS), 41% (for GLS; 16% for GPS/PTT), and 27% of core habitats for non-breeding Salvin's, Antipodean, Chatham albatrosses, and black petrels, respectively, overlapped with GFW estimated pelagic longline fishing effort (Figure 4c; Table 2). Overlap of core species habitat with GFW fishing effort generally occurred around the equator or in the Southern Hemisphere, apart from breeding and non-breeding black-footed albatrosses, for which 11 and 12% of core habitat, respectively, (Figures 4c & 5e; Table 2) overlapped with fishing effort along the U.S. west coast (Figure 5f). All species' core habitats and relative overlap maps can be found in Supplementary Material 3.

3.4. Overlap analysis: Seabird distribution and small-scale coastal longline fishing area

Small-scale longline fishing occurred primarily from Central America to Peru and out from the coastline to 95°W (Figure 2c). Effort was also concentrated around Baja California within the Gulf of California and along the Pacific coast, with some other areas of effort along the Chilean coastline (25°–45°S). Seabird

species that occupy neritic habitats tended to overlap with areas of small-scale coastal longline fishing. For non-breeding adult black petrels, 23%, 57%, and 98% of its 95, 75, and 50% isopleths, respectively, overlapped with grid cells where small-scale coastal longline fisheries were present (Figure 4b; Table 2). Similarly, for non-breeding adult Chatham albatrosses, 22%, 49%, and 69% (for GPS/PTT; 7%, 16%, 37% for GLS) of its 95, 75, and 50% isopleths, respectively, overlapped with fishing effort as well. Small-scale coastal longline fishing also overlapped significantly with the 95, 75, and 50% isopleths of breeding waved albatrosses (89%, 84%, 68%, respectively). Other species for which small-scale coastal longline fisheries overlapped with at least 10% of one of three isopleths, included breeding black-browed, non-breeding adult Buller's, non-breeding adult northern royal, and non-breeding adult Salvin's (GPS/PTT) albatrosses, as well as non-breeding adult Westland petrels, and non-breeding adult white-chinned petrels (Figure 4b; Table 2).

3.5. Overlap analysis: Seabird distribution and IATTC seabird mitigation area

The distribution of many seabird species that occurred in the EPO were covered by the IATTC seabird mitigation area (Table 2). For example, the entire 50% isopleth occurred inside the mitigation area for 93% (13 of 14) of the species and 95% (20 of 21) of the cropped IATTC UDs. Of those 21 cropped IATTC UDs, 15 had 100% of all three isopleths overlapping with the mitigation area (Table 2). Non-breeding black petrels were the only species for which none of three isopleths occurred 100% in the mitigation area. A large majority (77%) of the black petrel core area (50% isopleth) occurred inside the mitigation area, but the range of the species (95% isopleth) largely occurred outside of the mitigation area. A comparison of the isopleths relative to the mitigation area can be observed in Supplementary Material 2.

4. DISCUSSION

Seabird and pelagic longline fishing overlap in the IATTC Convention Area was quantified using kernel density analyses (isopleths), three pelagic longline fishing effort data sets (5°x5° aggregated industrial pelagic longline logbook data, 1°x1° GFW estimate for pelagic longline sets, and 0.5°x0.5° small-scale coastal longline effort area) to infer relative bycatch risk within the IATTC Convention Area in the EPO. Additionally, usage of the IATTC mitigation area by seabirds was also evaluated. Although studies have examined seabird-longline fishing overlap at a range of scales, from regional to ocean basin to global (Awkerman et al. 2006, Tuck et al. 2011, Žydelis et al. 2013, Clay et al. 2019, Rexer-Huber et al. 2025), a comprehensive multi-species analysis has been lacking in the EPO.

4.1. Industrial fishing impacts

Based on the results of overlap analyses of 5°x5° logbook pelagic longline effort and the GFW sets, this study reaffirmed the potential risk seabirds face from industrial fishing in the EPO. The most at-risk species include non-breeding adult black and white-chinned petrels and non-breeding adult Buller's, Chatham, Salvin's, and Antipodean albatrosses (Table 2) corroborating previous analyses for some of these species (Richard et al. 2024, Quiñones et al. 2025, Rexer-Huber et al. 2025). Although a small percent of its breeding population occurs in the EPO, it is important to note that black-footed albatrosses are at risk of bycatch from industrial pelagic longline fishing in the central Pacific Ocean as well (Gilman et al. 2014, Orben et al. 2021). Most of the highest seabird densities did not occur in areas of highest industrial pelagic longline fishing intensity, which are located primarily in the central and western parts of the EPO along and just south of the equator. Regardless, longline fishing does occur in seabird habitat, ranging from <1 million hooks to >50 million hooks per 5°x5° grid cell since 2000. It is well documented that bycatch is known to be a major threat to these species and a driver of population declines (Anderson et al. 2011, Dias et al. 2019). Given that overlap is a product of both seabird density and fishing intensity, considerable bycatch risks can occur at the fringes of seabird distributions with significant population consequences (Richard et al. 2024).

Some of the species that have high overlap with industrial longline fishing are also known to frequently interact with fisheries. For example, black-footed albatrosses were one of the two most frequently caught seabirds in the North Pacific by Chinese Taipei distant-water longline fisheries during 2002–2007, and Buller's albatrosses and white-chinned petrels were the mostly commonly caught seabirds around the eastern Tropical Pacific and Galápagos Islands, respectively (Huang and Yeh 2011). Similarly, the Hawaiian longline tuna fishery, which fishes in the North Pacific, also interacts mostly with Laysan and black-footed albatross (Gilman et al. 2016, Wren et al. 2019). We note that Laysan albatrosses did not meet the minimum use criteria for inclusion in the overlap analyses because the majority of global numbers do not use the IATTC Convention Area, not because they do not overlap with fisheries. Using observer program data and fishing effort data, it was estimated that along the southern hemisphere, mortality of medium-sized petrels in pelagic longline fisheries reporting to the CCSBT were highest in three locations, one being the southeast Pacific Ocean (CCSBT 2025). Further, of the species evaluated in this study, CCSBT (2025) estimated the total overlap with surface longline fisheries (hooks km^{-2}) were highest for Buller's albatrosses and black and Westland petrels. The Antipodean albatross, which has experienced annual population declines of 6%, has been shown to overlap substantially with fishing vessels in the Pacific Ocean (Richard et al. 2024). For example, 105 out of 153 tracked individuals in the Pacific Ocean from 2019–2022 overlapped with actively fishing pelagic longline vessels, which translated to 2.2% of all bird hours being in overlap (Rowley et al. 2024). Moreover, along the southern edge of pelagic longline fishing grounds, off Chile's oceanic islands (e.g., Desventuradas Islands), mortality in the Chilean industrial pelagic longliners has been recorded for a number of species including Salvin's and Buller's albatrosses and white-chinned petrels (Suazo et al. 2014).

4.2. Small-scale coastal longline fishery

Like the industrial fishing fleet, the small-scale coastal longline fishery appears to be a potential threat to seabird species in the EPO, based on the overlap analyses with the small-scale coastal longline fishing areas and the more coastal GFW sets. The most at-risk species include non-breeding adult black and white-chinned petrels, non-breeding adult Chatham albatrosses, and breeding waved albatrosses (Table 2). Given the lack of data on the spatial extent of longline fishing north of Central America and south of Peru, the overlap with small-scale coastal fisheries identified here is an underestimate. For example, non-breeding adult Antipodean, black-browed, Buller's, Chatham, northern royal, Salvin's, and wandering albatrosses, as well as northern giant, white-chinned, and Westland petrels all have core habitat along the coast of Chile, where minimal longline fishing data have been collected (Supplementary Material 3). Further, the species that were most at-risk were similar across the three fisheries datasets because grid cells with highest overlap scores for industrial fisheries occurred closer to the coasts of Central and South America in areas where small-scale fleets also operate.

Although there are not many studies investigating the impacts of small-scale coastal longline fisheries on seabirds, several have indicated their potential threat. According to Alfaro-Shigueto et al. (2016), fishers in Peru have been interacting with waved albatrosses since the late 1990s when offshore shark fishing began. Interactions occurred most often during the winter season (May–July) or when El Niño conditions occurred in their fishing areas. This led to fishers occasionally eating bycaught waved albatrosses and intentionally capturing them for food (Alfaro-Shigueto et al. 2016). Offshore of southern Peru, it is known that artisanal fisheries targeting blue (*Prionace glauca*) and shortfin mako (*Isurus oxyrhynchus*) sharks spatially overlap with albatross and petrels (Moreno and Quinones 2022). Further, a survey of mahi-mahi (*Coryphaena hippurus*) artisanal fishers across seven ports in Peru found that the percentage of vessels that reported seabird bycatch ranged from 4–83% (Ayala et al. 2019). On the other hand, a study quantifying overlap of black petrels with Peruvian domestic longline effort (i.e., not presence/absence) and industrial longline effort highlighted that overlap and therefore risk is mostly driven by industrial

fleets across the Pacific (Quiñones et al. 2025). Documenting pelagic longline interactions and bycatch rates from southern Peru to Chile and northward off Ecuador, Colombia, and Panama will require robust observer and data collection programs, especially for small-scale fleets.

4.3. IATTC seabird mitigation area

It has been 15 years since the IATTC seabird mitigation area was implemented in 2011, requiring vessels over 20 m to use at least two seabird mitigation methods (IATTC Resolution C-11-02). Since then, hundreds of seabirds across many species that use the EPO have been tracked, giving us better insights into their distributions and habitat use. The tracking data included in this study indicates that the mitigation area broadly encompasses most habitat in the EPO for the seabirds considered here. In the northern part of the mitigation area, black-footed albatross' habitat is covered, while many of the species that use areas offshore of the Galápagos Islands and south and closer to the Southern Ocean are also covered. However, the current IATTC seabird mitigation area does not adequately provide coverage for the more tropically foraging black petrels, which has also been highlighted by Quiñones et al. (2025). Similarly, Rexer-Huber et al. (2025) identified some areas just outside of the IATTC seabird mitigation area of high overlap with white-chinned petrels. Moreover, pink-footed shearwaters migrate through the current gap between the southern and northern and area of the IATTC mitigation area and thus are unprotected for parts of their annual cycle (Felis et al. 2019). Finally, despite accessing the most updated and completed coverage rate, our assessment is not exhaustive and data collection needs to continue to improve, including for example, for breeding waved albatrosses, which will likely forage outside of the IATTC mitigation area (Awkerman et al. 2014). Consequently, while most species appear adequately covered by the current IATTC seabird mitigation area, the areal overlap will need to be reviewed again in the future when data improves for certain species.

While it is critical that the IATTC seabird mitigation area does indeed cover the distribution of vulnerable seabirds, it is equally important that within these areas, vessels use the correct mitigation techniques. Of the mitigation methods required by the IATTC, some (e.g., blue dyed bait, line shooters, and management of offal discharge) are proven to be ineffective at reducing seabird interactions and are not included as the recommended mitigation methods by ACAP. For example, blue-dyed bait does not conclusively reduce seabird bycatch and is considered impractical by crew (Gilman et al. 2007, Gilman et al. 2008, Gilman et al. 2022). In addition, line shooters can cause hooks to sink more slowly, increasing, rather than reducing, bycatch risk (Robertson et al. 2010). Management of offal discharge is not proven as an effective primary mitigation method and when done poorly, can condition birds to attend vessels, further increasing risk (Cherel et al. 1996, Rexer-Huber and Parker 2019). Further, new research on effective specifications for key mitigation methods, like branch line weighting (Barrington et al. 2016), has demonstrated branch line weights at 3.5m or 4m from the hook (current IATTC specs) are far less effective at sinking baited hooks beyond the reach of seabirds than the currently recommended weights by ACAP. Thus, there are some methods vessels may be using that do not help them avoid seabird interactions (ACAP 2024a). After an extensive review of mitigation methods and ACAP's recommendations, the scientific staff of IATTC has recommended updates to the required mitigation methods include various combinations of weighted branch lines, night setting, bird scaring lines, hook shielding device, underwater bait setting, and side setting with a bird curtain and weighted branch lines (Hutchinson et al. 2025).

4.4. Caveats and limitations of the study

Although our approach and the datasets used proved to be suitable for describing seabird–fishery overlap, it is important to mention some of their limitations. Firstly, seabird distributions did not span the entire annual cycle either because sample sizes were too small, not all breeding stages have been tracked, or tracking data had not been uploaded into the Seabird Tracking Database. Additionally, this study only

calculated distributions and overlap for broad time periods (i.e., breeding and non-breeding); however, seabird and fishery distributions can change substantially from one month to the next, and therefore, future work should incorporate phenology and consider monthly distributions and associated overlap (Clay et al. 2019, Carneiro et al. 2020, Rexer-Huber et al. 2025). Our approach calculated temporally-broad species distributions but did not consider the effects of environmental change on species and fishery distributions and associated overlap. Species distribution modeling (SDM) is an approach that incorporates environmental variables to calculate species–environment relationships and uses these to estimate distribution over a surface of those environmental variables (Crear et al. 2021, Gasbarro et al. 2025) and could be further explored in the future to better understand seabird distribution with regards environmental changes, including climate change. Another limitation is the relatively coarse resolution of GLS tag data compared to GPS/PTT tags (Phillips et al. 2004, Shaffer et al. 2005), meaning that data had to be split resulting in separate distributions and that GLS distributions may overestimate habitat use area and overlap with longline fisheries. Conversely, GLS tags provide year-round data, while GPS/PTT generally do not, and as such, GPS/PTT datasets may be underestimations of distributions in their own way. Lastly, relative overlap was calculated between the number of GFW estimated pelagic longline sets and core seabird areas, and so we did not consider areas of lower usage (>50% UD). Although our analyses likely captured the main areas of highest risk, we may have missed high-risk areas that are important for seabirds at specific times of the year, such as migration or stopover that might co-occur with areas of high longline activity. This is particularly important as for some species, bycatch in the areas of lower usage can be the leading cause of their decline (Richard et al. 2024).

5. CONCLUSION

We identified some research gaps that could further refine information on seabird distribution in the EPO. For example, we encourage researchers with seabird tagging data not currently uploaded to the Seabird Tracking Database to do so, to facilitate data sharing and large-scale regional studies. This study, along with others (Young et al. 2020, Beal et al. 2021, Carneiro et al. 2024), has highlighted the benefit collaborative telemetry networks provide for the conservation of multiple species. Although this study focused on large, sub-Antarctic, temperate and subtropical seabird species that are generally more likely to interact with fisheries, smaller or tropical species, such as shearwaters, frigatebirds, terns, tropicbirds, and boobies, are also known to interact with longline vessels in the EPO, particularly with coastal longline fleets. Therefore, conducting similar studies with those species would significantly contribute to the information on the potential risk the longline fishery poses to seabirds, especially within the eastern tropical Pacific. This will allow future meaningful updates to the current work, and ultimately, improved scientific advice.

This work has highlighted areas where seabird management at IATTC could be improved. Firstly, improvements to fisheries monitoring, including increases in observer coverage (both human and electronic) are necessary to adequately measure and understand seabird bycatch rates and verify compliance with mandated mitigation measures. Currently, IATTC requires 5% observer coverage on longline vessel sets (>20 m length overall), which is not enough for estimating bycatch or other important components of the fishery; however, coverage is sometimes lower than this for countries with observer programs. Moreover, many countries either do not have an observer program in place, do not always report observer data to the IATTC, and/or do not have a reporting form for seabird bycatch (unlike for other species, e.g. sharks). This has created limited and sporadic data and spatiotemporal inconsistencies, making it difficult to accurately quantify seabird bycatch rates, a problem that is not unique to the IATTC (Peatman et al. 2019). These problems can be more prominent in small-scale coastal longline fisheries, where resources are more limited, but the fisheries overlap with some species is higher compared to

further offshore industrial longlines. Therefore, it is desirable that the IATTC increases observer coverage and/or data collection for both the industrial and small-scale coastal longline fleets. Even though most species appear adequately covered by the current IATTC seabird mitigation area, future work should focus on evaluating risk to species either highlighted (black petrels) or not covered by this study (pink-footed shearwaters), guiding precautionary improvements to the geographical extent of the current area. Furthermore, within the IATTC seabird mitigation area, best practice bycatch mitigation methods as recommended by ACAP and the IATTC staff should be required (ACAP 2024a). Lastly, it is important for the IATTC to ensure countries fishing within the EPO to use the best handling and release practices for seabirds (Hutchinson et al. 2025), so that live caught seabirds have the best chance of survival post release.

6. ACKNOWLEDGEMENTS/FUNDING SOURCES

We would like to thank data contributors to this study including, Graeme Taylor, Graham Robertson, Javier Arata, Mike Bell, Paul Sagar, Henri Weimerskirch, Jose Pedro Granadeiro, Bindi Thomas, Paul Scofield, Rosemary Gales, Jim Watts, Matt Charteris, Kris Carlyon, Sharyn Broni, and William Montevecchi. Financial support for the seabird tracking work for this study include: Fundação para Ciencia e a Tecnologica (FCT Portugal), Agreement on the Conservation of Albatrosses and Petrels, Environmental Studies Budget of the Falkland Islands Government, Holocene Foundation, New Zealand Department of Conservation including the Conservation Services Programme (POP2008/01, POP2009/01, POP2017-03, POP2019-04, POP2021-03, POP2022-05, POP2022-06, 4067), Fisheries New Zealand, Live Ocean, Southern Seabirds, Albatross Research, National Science Foundation under Grant Nos. DEB 9629539, DEB 98–06606, and DEB 0235818 to D.J.A., World Wildlife Fund for Nature, Ian Potter Foundation, Falklands Conservation, an NSERC Discovery Grant (W.A.M), British Antarctic Survey, Wildlife Management International Ltd., New Zealand commercial fishing industry, Packard Foundation, Sloan Foundation, Moore Foundation, USFWS Migratory Bird program, Australian Research Council, Australian Nature Conservation Agency, Ian Potter Foundation, New Zealand longline fishing industry, W.V. Scott Estate, University of Auckland, and James Sharon Watson Conservation Trust.

7. TABLES

Table 1. Metadata from the seabird species global utilization distributions (UDs), including the common and scientific name, the annual cycle (breeding or non-breeding), age class (adult or juvenile), device type (GLS or GPS/PTT), the island groups where the breeding population is found, the number (N) of tracks that made up the global UD, the percent of the global population the global UD represents (after cropping out land), the percent of that global population that occurs inside the Inter-American Tropical Tuna Commission (IATTC) Convention Area, and the percent of the tracked populations that occur inside the Convention Area (CA). Overlap was calculated only for species where its global UD represented more than 1% of the global population and its overlapped UD with the IATTC area represented more than 3% of the total tracked populations. The species that met these criteria are bolded below and had overlap analyses conducted on them.

Tabla 1. Metadatos de las distribuciones de utilización (DU) globales de las especies de aves marinas, incluyendo el nombre común y científico, el ciclo anual (reproductor o no reproductor), la clase de edad (adulto o juvenil), el tipo de dispositivo (GLS o GPS/PTT), los grupos de islas donde se encuentra la población reproductora, el número (N) de registros que componen la DU global, el porcentaje de la población global que representa la DU global (tras recortar la tierra), el porcentaje de esa población global que se encuentra dentro del Área de la Convención de la CIAT, y el porcentaje de las poblaciones rastreadas que se encuentran dentro del Área de la Convención (AC). El traslape se calculó solo para las especies en las que su DU global representaba más del 1% de la población global y su DU traslapada con el área de la CIAT representaba más del 3% del total de las poblaciones rastreadas. Las especies que cumplían estos criterios se indican a continuación en negrita y se les realizaron análisis de traslape.

Common Name	Species Scientific Name	Annual Cycle	Age Class	Device Type	Island Groups	N tracks	% Global Pop	% Global Pop inside CA	% of Tracked Pops inside CA
Antipodean Albatross	*Diomedea antipodensis*	Breeding	Adult	GLS	Antipodes Is; Auckland Is	24	100*	1	1
Antipodean Albatross	*Diomedea antipodensis*	Breeding	Adult	GPS/PTT	Antipodes Is; Auckland Is	196	100*	1	1
Antipodean Albatross	*Diomedea antipodensis*	Non-breeding	Adult	GLS	Antipodes Is; Auckland Is	120	100*	17	17
Antipodean Albatross	*Diomedea antipodensis*	Non-breeding	Adult	GPS/PTT	Antipodes Is; Auckland Is	123	100*	13	13
Black Petrel	*Procellaria parkinsoni*	Breeding	Adult	GLS	New Zealand	63	100	0	0
Black Petrel	*Procellaria parkinsoni*	Breeding	Adult	GPS/PTT	New Zealand	33	100	0	0
Black Petrel	*Procellaria parkinsoni*	Non-breeding	Adult	GLS	New Zealand	15	100	89	89
Black-browed Albatross	*Thalassarche melanophris*	Non-breeding	Juv	GLS	Falkland Is	17	61	<1	<1
Black-browed Albatross	*Thalassarche melanophris*	Non-breeding	Juv	GPS/PTT	Falkland Is; South Georgia	273	64	0	0
Black-browed Albatross	*Thalassarche melanophris*	Breeding	Adult	GLS	Falkland Is; South Georgia; Kerguelen	384	79	0	0
Black-browed Albatross	*Thalassarche melanophris*	Breeding	Adult	GPS/PTT	Diego de Almagro; Falkland Is; Islas Diego Ramirez; Islas Ildefonso; Kerguelen; Macquarie Is; South Georgia	1548	99	4	4
Black-browed Albatross	*Thalassarche melanophris*	Non-breeding	Adult	GLS	Falkland Is; Islas Diego Ramirez; Kerguelen; South Georgia	451	88	5	6
Black-footed Albatross	*Phoebastria nigripes*	Non-breeding	Juv	GPS/PTT	Midway Atoll	10	94	0	0
Black-footed Albatross	*Phoebastria nigripes*	Breeding	Adult	GLS	Midway Atoll	23	36	1	3
Black-footed Albatross	*Phoebastria nigripes*	Breeding	Adult	GPS/PTT	French Frigate Shoals, Kure Atoll, Midway Atoll, Torishima	318	51	<1	1
Black-footed Albatross	*Phoebastria nigripes*	Non-breeding	Adult	GLS	French Frigate Shoals, Midway Atoll	84	41	3	7
Buller's Albatross	*Thalassarche bulleri*	Non-breeding	Juv	GPS/PTT	The Snares	68	23	0	0
Buller's Albatross	*Thalassarche bulleri*	Breeding	Adult	GLS	The Snares; Chatham Is	164	83	0	0
Buller's Albatross	*Thalassarche bulleri*	Breeding	Adult	GPS/PTT	Solander Is; The Snares	360	43	0	0

Buller's Albatross	*Thalassarche bulleri*	Non-breeding	Adult	GLS	The Snares; Chatham Is	132	83	76	92
Chatham Albatross	*Thalassarche eremita*	Breeding	Adult	GPS/PTT	Chatham Is	37	100	0	0
Chatham Albatross	*Thalassarche eremita*	Non-breeding	Adult	GLS	Chatham Is	15	99	90	91
Chatham Albatross	*Thalassarche eremita*	Non-breeding	Adult	GPS/PTT	Chatham Is	16	98	72	73
Grey Petrel	*Procellaria cinerea*	Breeding	Adult	GLS	Antipodes Is	25	66	1	1
Grey Petrel	*Procellaria cinerea*	Breeding	Adult	GPS/PTT	Gough; Kerguelen	22	26	0	0
Grey Petrel	*Procellaria cinerea*	Non-breeding	Adult	GLS	Antipodes Is	24	67	24	35
Grey-headed Albatross	*Thalassarche chrysostoma*	Non-breeding	Juv	GPS/PTT	South Georgia	28	42	<1	<1
Grey-headed Albatross	*Thalassarche chrysostoma*	Breeding	Adult	GPS/PTT	Campbell Is; Islas Diego Ramirez; Macquarie Is; Prince Edward Is; South Georgia	693	84	1	1
Grey-headed Albatross	*Thalassarche chrysostoma*	Non-breeding	Adult	GLS	Prince Edward Is; South Georgia	47	53	1	2
Laysan Albatross	*Phoebastria immutabilis*	Breeding	Adult	GLS	Kure Atoll, O'ahu, Midway Atoll	86	77	<1	1
Laysan Albatross	*Phoebastria immutabilis*	Breeding	Adult	GPS/PTT	French Frigate Shoals, Isla Guadalupe, Kaua'i, Midway Atoll, O'ahu	718	73	<1	<1
Laysan Albatross	*Phoebastria immutabilis*	Non-breeding	Adult	GLS	French Frigate Shoals, Kure Atoll, O'ahu, Midway Atoll	129	75	<1	1
Laysan Albatross	*Phoebastria immutabilis*	Non-breeding	Adult	GPS/PTT	French Frigate Shoals	38	<1	<1	24
Northern Giant Petrel	*Macronectes halli*	Non-breeding	Juv	GPS/PTT	Crozet; Kerguelen; Macquarie Is	15	37	6	16
Northern Giant Petrel	*Macronectes halli*	Breeding	Adult	GLS	Prince Edward Is; South Georgia	104	41	0	0
Northern Giant Petrel	*Macronectes halli*	Breeding	Adult	GPS/PTT	Prince Edward Is; South Georgia	153	41	0	0
Northern Giant Petrel	*Macronectes halli*	Non-breeding	Adult	GLS	Prince Edward Is; South Georgia	58	41	<1	<1
Northern Royal Albatross	*Diomedea sanfordi*	Non-breeding	Juv	GPS/PTT	New Zealand	5	1	<1	30
Northern Royal Albatross	*Diomedea sanfordi*	Non-breeding	Adult	GPS/PTT	Chatham Is	21	91	28	31
Salvin's Albatross	*Thalassarche salvini*	Breeding	Adult	GLS	Bounty Is; The Snares	76	100	0	0
Salvin's Albatross	*Thalassarche salvini*	Breeding	Adult	GPS/PTT	Bounty Is	29	92	<1	<1
Salvin's Albatross	*Thalassarche salvini*	Non-breeding	Adult	GLS	Bounty Is; The Snares	54	100	92	92
Salvin's Albatross	*Thalassarche salvini*	Non-breeding	Adult	GPS/PTT	Bounty Is	19	83	55	66
Wandering Albatross	*Diomedea exulans*	Non-breeding	Juv	GLS	South Georgia	86	11	1	7
Wandering Albatross	*Diomedea exulans*	Non-breeding	Juv	GPS/PTT	Crozet; Kerguelen; South Georgia	192	55	4	7
Wandering Albatross	*Diomedea exulans*	Breeding	Adult	GLS	Crozet; Kerguelen; South Georgia	183	55	<1	<1
Wandering Albatross	*Diomedea exulans*	Breeding	Adult	GPS/PTT	Crozet; Kerguelen; Prince Edward Is; South Georgia	1227	100	0	0
Wandering Albatross	*Diomedea exulans*	Non-breeding	Adult	GLS	Crozet; Kerguelen; South Georgia	228	55	3	6
Wandering Albatross	*Diomedea exulans*	Non-breeding	Adult	GPS/PTT	Crozet; Kerguelen; South Georgia	137	36	1	2
Waved Albatross	*Phoebastria irrorata*	Breeding	Adult	GPS/PTT	Galapagos Is	65	100	99	99
Westland Petrel	*Procellaria westlandica*	Breeding	Adult	GLS	New Zealand	8	100	0	0
Westland Petrel	*Procellaria westlandica*	Breeding	Adult	GPS/PTT	New Zealand	180	100	0	0
Westland Petrel	*Procellaria westlandica*	Non-breeding	Adult	GLS	New Zealand	8	100	67	67
White-chinned Petrel	*Procellaria aequinoctialis*	Non-breeding	Juv	GPS/PTT	Kerguelen; South Georgia	22	73	0	0
White-chinned Petrel	*Procellaria aequinoctialis*	Breeding	Adult	GLS	Antipodes Is; Auckland Is; Falkland Is; South Georgia	109	72	1	2
White-chinned Petrel	*Procellaria aequinoctialis*	Breeding	Adult	GPS/PTT	Crozet; Kerguelen; Prince Edward Is; South Georgia	101	80	0	0
White-chinned Petrel	*Procellaria aequinoctialis*	Non-breeding	Adult	GLS	Antipodes Is; Auckland Is; Falkland Is; South Georgia	111	72	22	31

*Indicates that the global population UDs for Antipodean albatross contained both subspecies; *Diomedea antipodensis antipodensis* and *Diomedea antipodensis gibsoni*.

Table 2. Species with overlap analyses done on utilization distributions (UDs) and associated overlap metrics: isopleth (95, 75, 50%) sizes in 100,000 km, percent of isopleth (95, 75, 50%) in the Inter-American Tropical Tuna Commission (IATTC) seabird mitigation area, percent of isopleth (95, 75, 50%) that overlapped with the small-scale coastal longline (LL) area, percent of IATTC pelagic longline (PLL) logbook effort that overlapped with each isopleth (95, 75, 50%), the percent of core habitat (50% isopleth) that overlaps with the Global Fishing Watch (GFW) PLL effort, and standardized GFW PLL overlap score. For adult Bullers's albatross non-breeding GPS/PTT, data are likely unrepresentative of the whole non-breeding period as tags stop transmitting before birds reached the Humboldt Current; therefore its UD was not analyzed further.

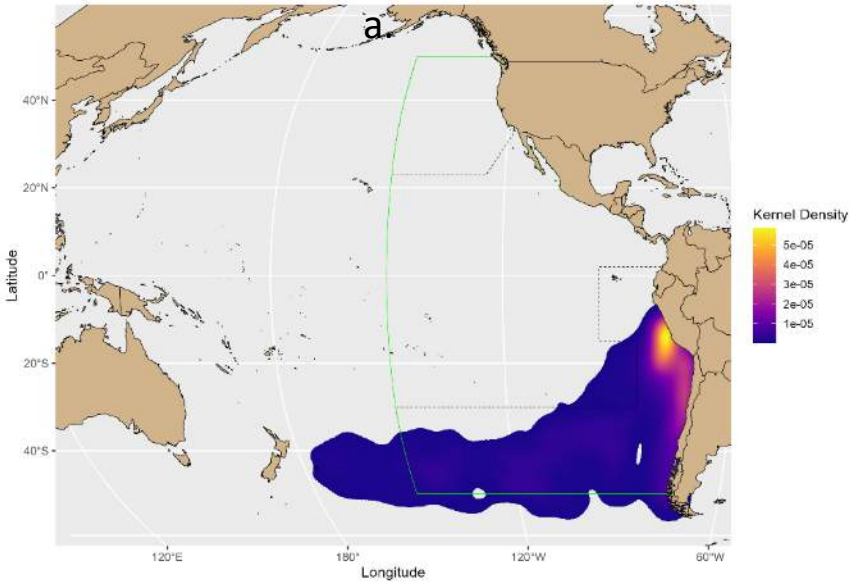
Tabla 2. Especies para las que se realizaron análisis de traslape sobre las distribuciones de utilización (DU) y métricas de traslape asociadas: tamaños de las isopletas (95, 75, 50%) en 100,000 km, porcentaje de las isopletas (95, 75, 50%) dentro del área de mitigación de aves marinas de la CIAT, porcentaje de las isopletas (95, 75, 50%) que se traslapaban con el área de las pesquerías palangreras (LL) costeras de pequeña escala, porcentaje del esfuerzo registrado en las bitácoras de las pesquerías palangreras pelágicas (PLL) de la CIAT que se traslapaba con cada isopleta (95, 75, 50%), el porcentaje de hábitat central (isopleta del 50%) que se traslapa con el esfuerzo de PLL de Global Fishing Watch (GFW), y la puntuación estandarizada de traslape de PLL de GFW. En el caso de los albatros de Bullers adultos no reproductores GPS/PTT, es probable que los datos no sean representativos de todo el periodo no reproductor, ya que las marcas dejaron de transmitir antes de que las aves llegaran a la corriente de Humboldt; por lo tanto, su DU no se analizó más a fondo.

Common Name	Annual Cycle	Age Class	Device Type	Isopleth size in 100,000 km2 (95, 75, 50%)	% Isopleth in Mitigation Area (95, 75, 50%)	% Isopleth Overlap w/ Small-Scale LL Area (95, 75, 50%)	% PLL Logbook Effort Overlap w/ Isopleths (95, 75, 50%)	% Core Habitat that Overlaps with GFW PLL Effort	Standardized GFW PLL Overlap Score
Antipodean Albatross*	Non-breeding	Adult	GLS	114, 58, 19	99, 100, 100	0.4, 0.7, 1.0	4.6, 1.8, 0.5	9.2	1.9
Antipodean Albatross*	Non-breeding	Adult	GPS/PTT	90, 35, 8.4	97, 98, 100	0.4, 0.7, 1.3	6.2, 3.8, 0.8	15	16
Black Petrel	Non-breeding	Adult	GLS	148, 47, 7.8	43, 52, 77	23, 57, 98	38, 12, 0.1	27	4.4
Black-browed Albatross	Breeding	Adult	GPS/PTT	3.3, 1.7, 0.9	100, 100, 100	14, 17, 12	<0.1, <0.1, 0.0	0	0
Black-browed Albatross	Non-breeding	Adult	GLS	21, 12, 6.7	100, 100, 100	3.6, 3.4, 2.8	0.8, 0.1, 0.1	13	5.8
Black-footed Albatross	Breeding	Adult	GLS	27, 14, 6.9	100, 100, 100	0, 0, 0	0.3, <0.1, <0.1	11	3.2
Black-footed Albatross	Non-breeding	Adult	GLS	42, 21, 9.4	100, 100, 100	0, 0, 0	1.5, 0.1, <0.1	12	1.6
Buller's Albatross	Non-breeding	Adult	GLS	78, 20, 9.7	99, 100, 100	12, 17, 9.8	3.3, 1.9, 0.4	48	100
Chatham Albatross	Non-breeding	Adult	GLS	131, 53, 17	92, 100, 100	7, 16, 37	7.4, 4.4, 1.7	41	87
Chatham Albatross	Non-breeding	Adult	GPS/PTT	36, 11, 4.5	100, 100, 100	22, 49, 69	2.7, 0.8, 0.2	16	7.5
Grey Petrel	Non-breeding	Adult	GLS	51, 19, 8.0	100, 100, 100	0, 0, 0	1.4, 0.2, <0.1	0	0
Northern Giant Petrel	Non-breeding	Juv	GPS/PTT	36, 17, 6.1	100, 100, 100	1.4, 1.4, 3.5	0.3, 0.2, 0.1	0	0
Northern Royal Albatross	Non-breeding	Adult	GPS/PTT	20, 1.7, 0.8	100, 100, 100	2.7, 23, 36	0.2, <0.1, <0.1	0	0
Salvin's Albatross	Non-breeding	Adult	GLS	52, 27, 15	96, 100, 100	4.2, 0.9, 0	3.5, 1.8, 1.6	32	66
Salvin's Albatross	Non-breeding	Adult	GPS/PTT	25, 4.0, 1.4	100, 100, 100	12, 33, 33	0.2, 0.1, 0.1	0	0

Wandering Albatross	Non-breeding	Juv	GLS	83, 40, 12	100, 100, 100	0.5, 0.7, 1.5	1.9, 1.4, 0.2	4.1	0.1
Wandering Albatross	Non-breeding	Juv	GPS/PTT	18, 1.9, 0.5	100, 100, 100	0.2, 2.3, 9.0	1.0, 0.2, 0.0	0	0
Wandering Albatross	Non-breeding	Adult	GLS	49, 25, 8.8	100, 100, 100	0.9, 1.6, 2.6	0.4, 0.2, 0.1	0	0
Waved Albatross	Breeding	Adult	GPS/PTT	6.5, 3.4, 1.4	100, 100, 100	89, 84, 68	0.1, 0.1, <0.1	0	0
Westland Petrel	Non-breeding	Adult	GLS	11, 4.6, 2.2	100, 100, 100	4.8, 9.6, 10	0.1, <0.1, <0.1	0	0
White-chinned Petrel	Non-breeding	Adult	GLS	49, 26, 13	100, 100, 100	25, 21, 10	2.2, 0.5, 0.4	20	19

*Indicates that the risk analysis for Antipodean albatross only was considered for subspecies *Diomedea antipodensis antipodensis*.

8. FIGURES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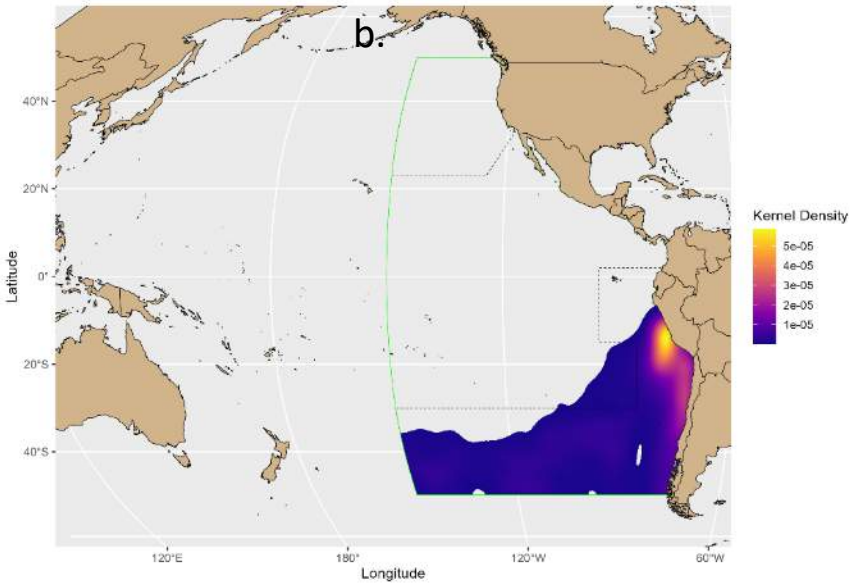
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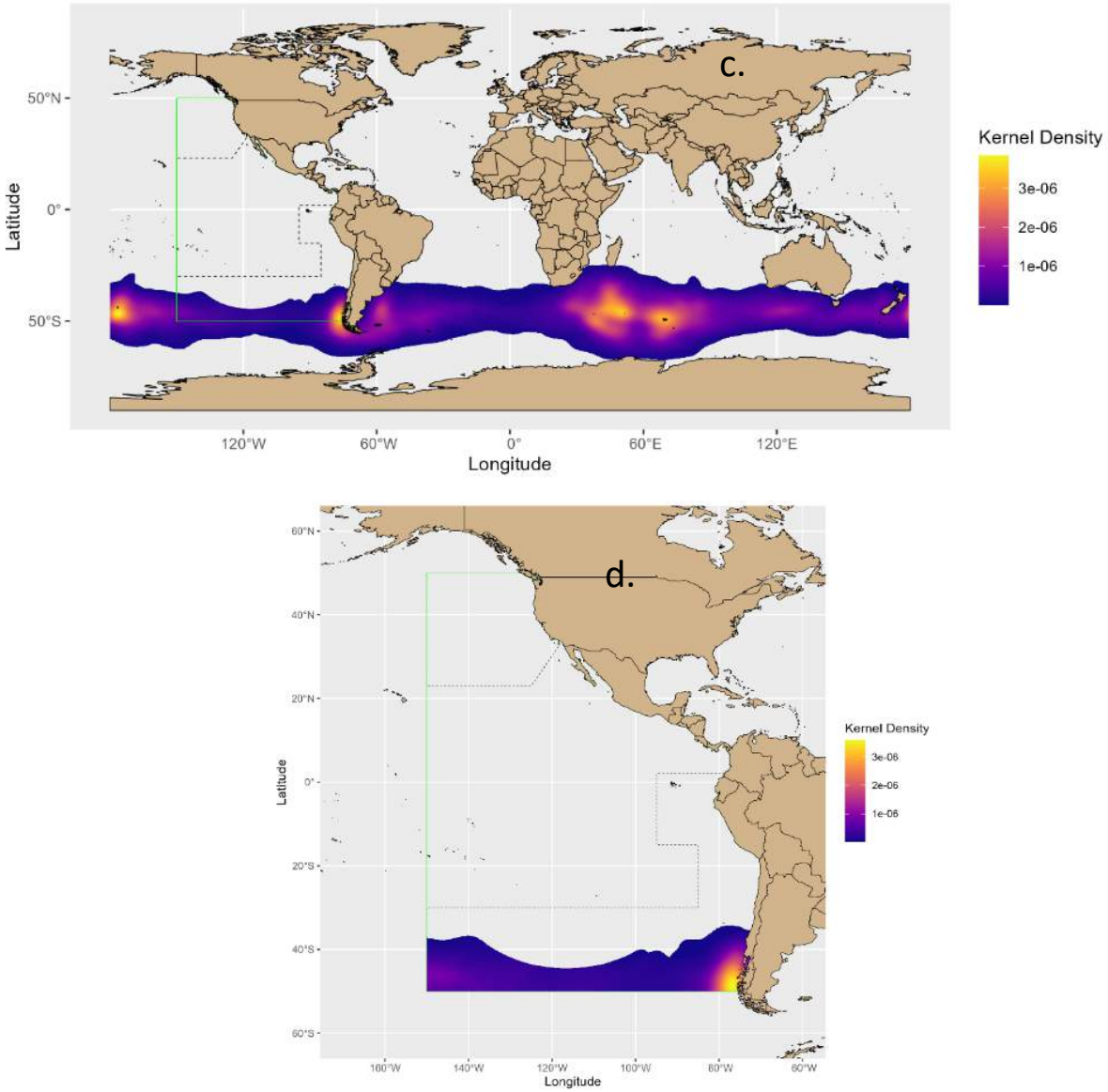


FIGURE 1. Two representative global (a, c) and cropped Inter-American Tropical Tuna Commission (IATTC) (b, d) utilization distributions (UDs) for the adult non-breeding Chatham albatrosses (*Thalassarche eremita*) (a, b) and wandering albatrosses (*Diomedea exulans*) (c, d) from the GLS tag type. The density scales will likely differ between the global and cropped IATTC UDs because the range of density values likely changes after cropping to the IATTC Convention Area. Green line outlines the IATTC Convention Area, while the areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required by the IATTC.

FIGURA 1. Dos distribuciones de utilización (DU) representativas globales (a, c) y recortadas de la Comisión Interamericana del Atún Tropical (CIAT) (b, d) para los albatros de Chatham (*Thalassarche eremita*) adultos no reproductores (a, b) y los albatros errantes (*Diomedea exulans*) (c, d) a partir de marcas GLS. Es probable que las escalas de densidad difieran entre las DU globales y las recortadas de la CIAT, ya que el rango de valores de densidad probablemente cambie tras el recorte del Área de la Convención de la CIAT. La línea verde delimita el Área de la Convención de la CIAT, mientras que las áreas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde la CIAT exige dos métodos de mitigación.

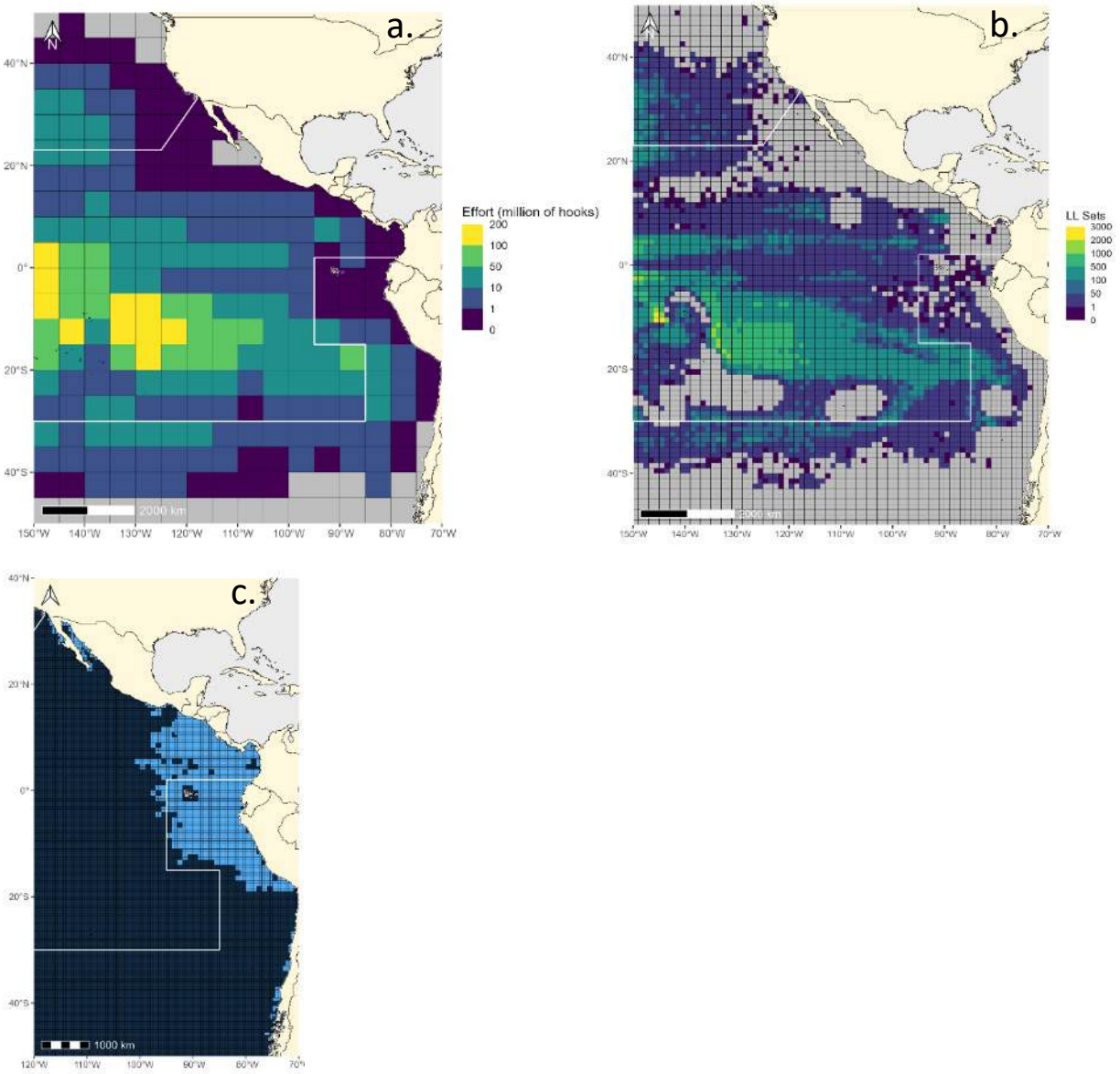


FIGURE 2. a) Pelagic longline fishing effort data (in number of hooks) from logbooks reported in 5°x5° grid cells by CPCs from 2000–2023. b) The sum of Global Fishing Watch estimated pelagic longline fishing sets in 1°x1° grid cells that occurred from 2016–2023. C) Small-scale coastal longline fisheries presence (blue) and absence (dark grey) based on resource review, described in Section 2.1.2., at 0.5°x0.5° grid cells. The areas north of the northern white line and south of the southern white line represent where two mitigation methods are required.

FIGURA 2. a) Datos de esfuerzo de pesca de palangre pelágico (en número de anzuelos) procedentes de bitácoras, notificados en celdas de 5°x5° por los CPC entre 2000 y 2023. b) Suma de los lances de palangre pelágico estimados por Global Fishing Watch en celdas de 1°x1° que tuvieron lugar entre 2016 y 2023. C) Presencia (azul) y ausencia (gris oscuro) de pesquerías palangreras costeras de pequeña escala, según la revisión de recursos descrita en la Sección 2.1.2., en celdas de 0.5° x 0.5°. Las áreas al norte de la línea blanca norte y al sur de la línea blanca sur representan los lugares donde se requieren dos métodos de mitigación.

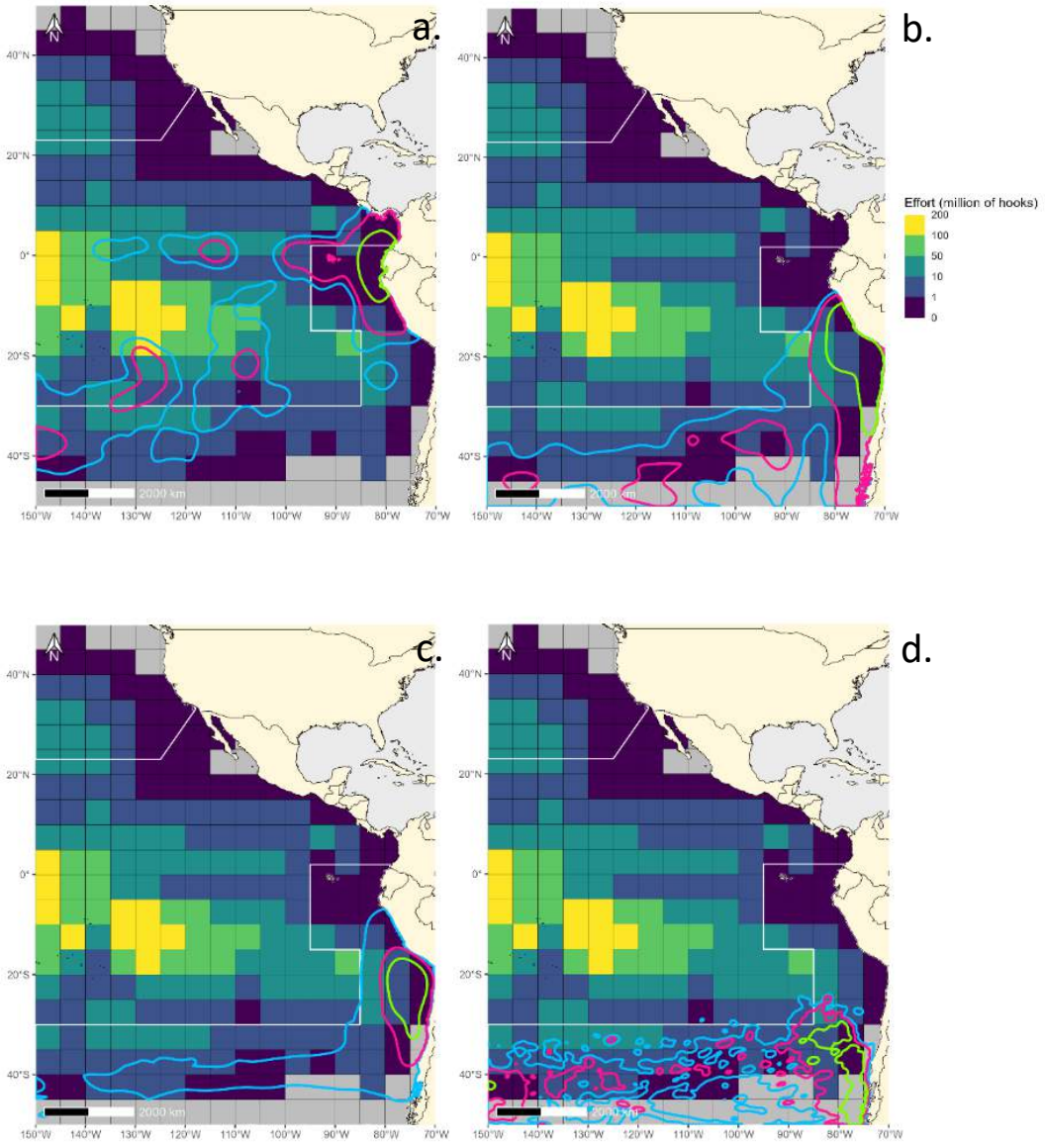
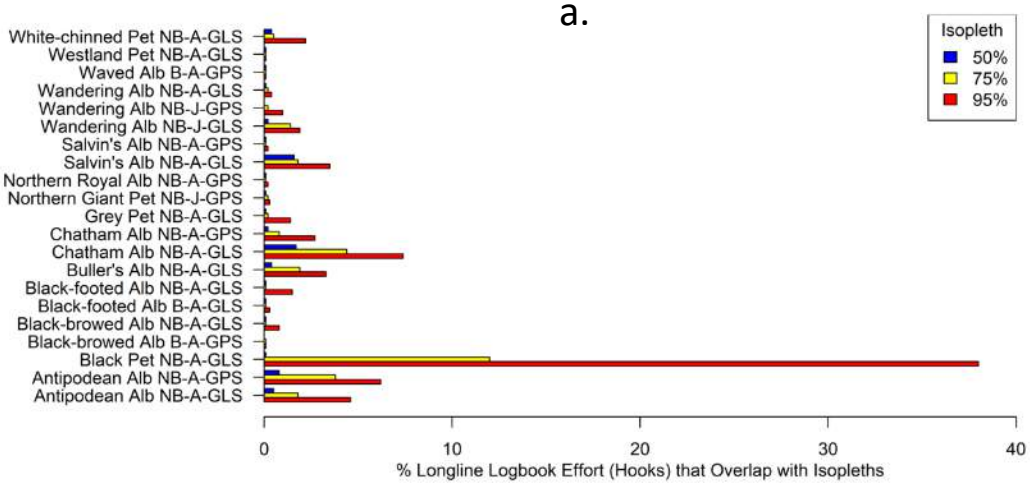


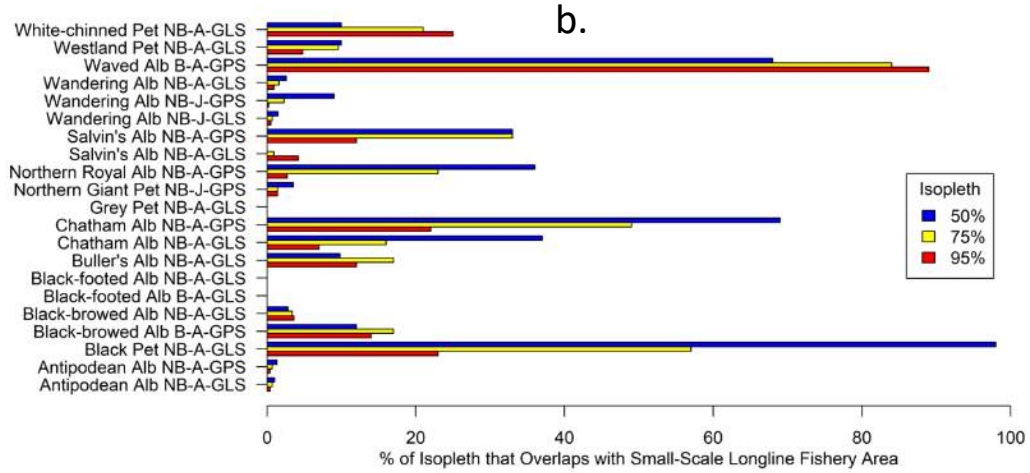
FIGURE 3. Overlapping 95% (blue line), 75% (pink line), and 50% (light green line) isopleths of a) adult non-breeding black petrels (*Procellaria parkinsoni*), b) Chatham albatrosses (*Thalassarche eremita*), c) Buller's albatrosses (*Thalassarche bulleri*), and d) Antipodean albatrosses (*Diomedea antipodensis antipodensis*), with pelagic longline fishing effort data (in number of hooks) from logbooks reported in 5°x5° grid cells by CPCs from 2000–2023. The areas north of the northern white line and south of the southern white line represent where two mitigation methods are required.

FIGURA 3. Isopletas que se traslapan el 95% (línea azul), 75% (línea rosa) y 50% (línea verde claro) de a) pardelas de Parkinson (*Procellaria parkinsoni*) adultas no reproductoras, b) albatros de Chatham (*Thalassarche eremita*), c) albatros de Buller (*Thalassarche bulleri*) y d) albatros de las Antípodas (*Diomedea antipodensis antipodensis*), con datos de esfuerzo de pesca de palangre pelágico (en número de anzuelos) notificados en celdas de 5°x5° por los CPC entre 2000 y 2023. Los áreas al norte de la línea blanca norte y al sur de la línea blanca sur representan los lugares donde se requieren dos métodos de mitigación.

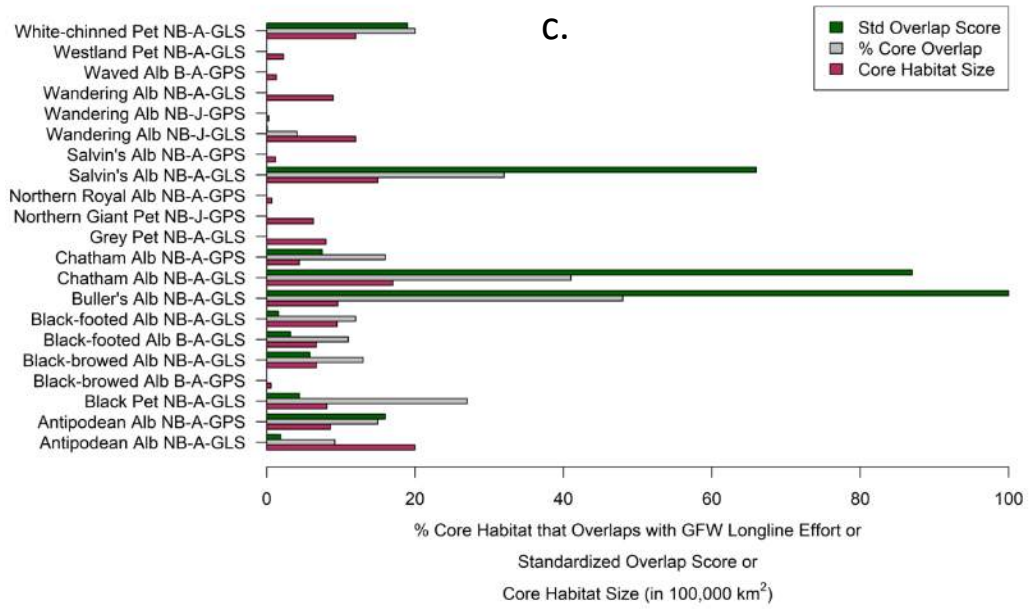
a.


White-chinned Pet NB-A-GLS
Westland Pet NB-A-GLS
Waved Alb B-A-GPS
Wandering Alb NB-A-GLS
Wandering Alb NB-J-GPS
Wandering Alb NB-J-GLS
Salvin's Alb NB-A-GPS
Salvin's Alb NB-A-GLS
Northern Royal Alb NB-A-GPS
Northern Giant Pet NB-J-GPS
Grey Pet NB-A-GLS
Chatham Alb NB-A-GPS
Chatham Alb NB-A-GLS
Buller's Alb NB-A-GLS
Black-footed Alb NB-A-GLS
Black-footed Alb B-A-GLS
Black-browed Alb NB-A-GLS
Black-browed Alb B-A-GPS
Black Pet NB-A-GLS
Antipodean Alb NB-A-GPS
Antipodean Alb NB-A-GLS
Isopleth
50%
75%
95%
0
10
20
30
40
% Longline Logbook Effort (Hooks) that Overlap with Isopleths

b.


White-chinned Pet NB-A-GLS
Westland Pet NB-A-GLS
Waved Alb B-A-GPS
Wandering Alb NB-A-GLS
Wandering Alb NB-J-GPS
Wandering Alb NB-J-GLS
Salvin's Alb NB-A-GPS
Salvin's Alb NB-A-GLS
Northern Royal Alb NB-A-GPS
Northern Giant Pet NB-J-GPS
Grey Pet NB-A-GLS
Chatham Alb NB-A-GPS
Chatham Alb NB-A-GLS
Buller's Alb NB-A-GLS
Black-footed Alb NB-A-GLS
Black-footed Alb B-A-GLS
Black-browed Alb NB-A-GLS
Black-browed Alb B-A-GPS
Black Pet NB-A-GLS
Antipodean Alb NB-A-GPS
Antipodean Alb NB-A-GLS
Isopleth
50%
75%
95%
0
20
40
60
80
100
% of Isopleth that Overlaps with Small-Scale Longline Fishery Area

c.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Wandering Alb NB-J-GPS
Wandering Alb NB-J-GLS
Salvin's Alb NB-A-GPS
Salvin's Alb NB-A-GLS
Northern Royal Alb NB-A-GPS
Northern Giant Pet NB-J-GPS
Grey Pet NB-A-GLS
Chatham Alb NB-A-GPS
Chatham Alb NB-A-GLS
Buller's Alb NB-A-GLS
Black-footed Alb NB-A-GLS
Black-footed Alb B-A-GLS
Black-browed Alb NB-A-GLS
Black-browed Alb B-A-GPS
Black Pet NB-A-GLS
Antipodean Alb NB-A-GPS
Antipodean Alb NB-A-GLS
Std Overlap Score
% Core Overlap
Core Habitat Size
0
20
40
60
80
100
% Core Habitat that Overlaps with GFW Longline Effort or
Standardized Overlap Score or
Core Habitat Size (in 100,000 km^2)

FIGURE 4. Seabird-fishery overlap metrics for 21 utilization distributions (UDs) representing albatrosses (Alb) and petrels (Pet) that are either breeding (B) or non-breeding (NB), adult (A) or juvenile (J), and tagged with GLS or GPS/PTT (GPS) devices. Percent pelagic longline logbook effort that overlaps with seabird 50, 75, and 95% isopleths (a). Percent of 50, 75, and 95% isopleths that overlap with the small-scale coastal longline area (b). The size of the seabird core habitat in 100,000 km2, percent of core habitat that overlaps with Global Fishing Watch (GFW) estimated pelagic longline effort (# sets), and standardized overlap score where the higher the score the greater overlap between better core habitat and more fishing sets (c).

FIGURA 4. Métricas de traslape entre aves marinas y la pesca para 21 distribuciones de utilización (DU) que representan a albatros (Alb) y petreles (Pet) que son reproductores (B) o no reproductores (NB), adultos (A) o juveniles (J), y marcados con dispositivos GLS o GPS/PTT (GPS). Porcentaje del esfuerzo de pesca de palangre pelágico registrado en bitácoras que se traslapa con las isopletas del 50, 75 y 95% de las aves marinas (a). Porcentaje de las isopletas del 50, 75 y 95% que se traslapan con el área de las pesquerías palangreras costeras de pequeña escala (b). El tamaño del hábitat central de las aves marinas en 100,000 km², porcentaje del hábitat central que se traslapa con el esfuerzo de pesca de palangre pelágico estimado por Global Fishing Watch (GFW) (núm. de lances), y puntuación de traslape estandarizada, donde cuanto mayor sea la puntuación, mayor será el traslape entre un mejor hábitat central y un mayor número de lances de pesca (c).

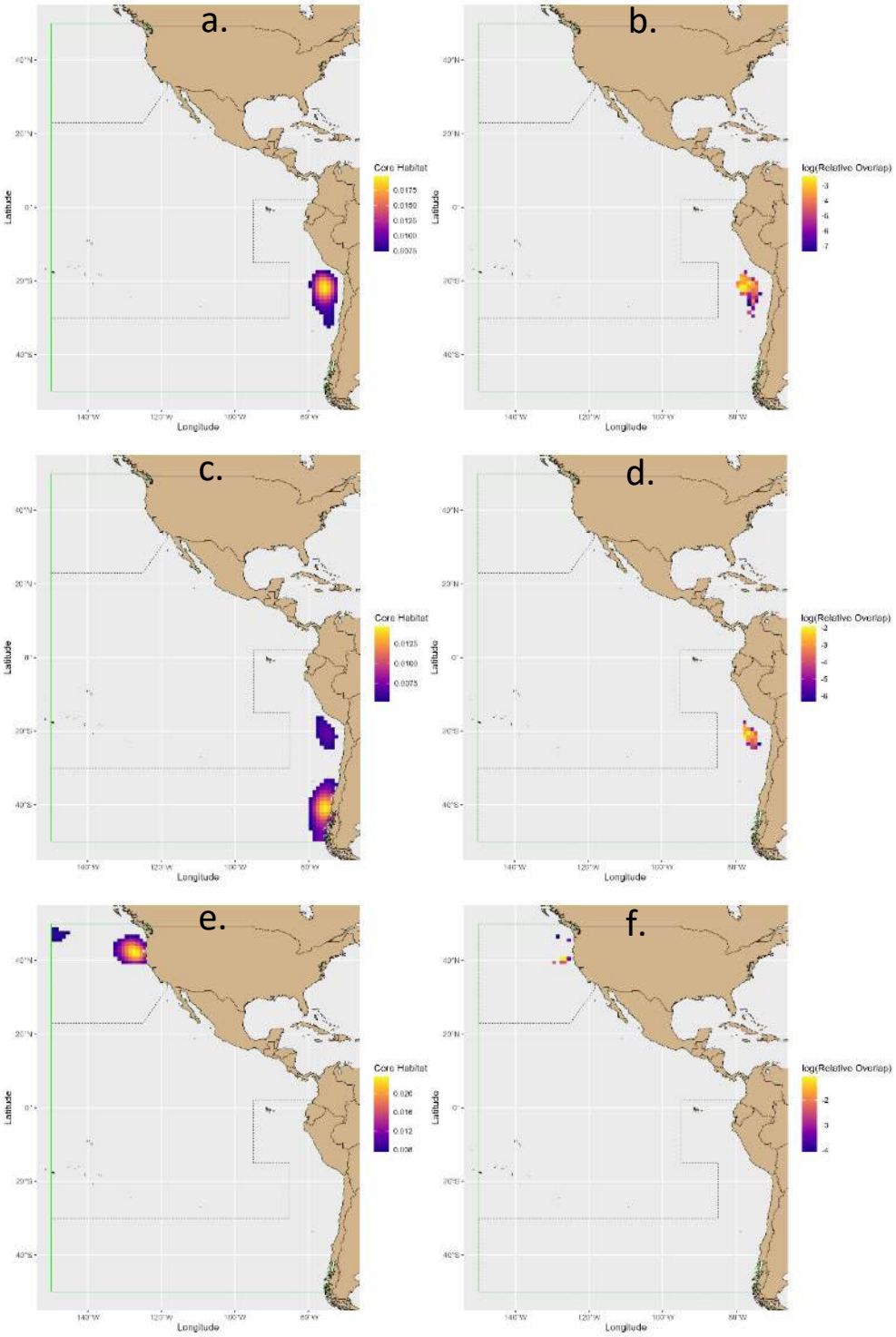
a.
b.
c.
d.
e.
f.
Core Habitat
log(Relative Overlap)
Latitude
Longitude

FIGURE 5. Core habitat (a, c, e) and associated relative overlap (b, d, f) with Global Fishing Watch estimated pelagic longline fishing effort for adult non-breeding Buller's albatrosses (*Thalassarche bulleri*), (a, b), adult non-breeding white-chinned petrels (*Procellaria aequinoctialis*), (c, d), and breeding black-footed albatrosses (*Phoebastria nigripes*), (e, f). The highest relative overlap are areas in yellow. Relative overlap values were log transformed to put the values on a comparable scale. The areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required.

FIGURA 5. Hábitat central (a, c, e) y traslape relativo asociado (b, d, f) con el esfuerzo de pesca de palangre pelágico estimado por Global Fishing Watch para albatros de Buller (*Thalassarche bulleri*) adultos no reproductores (a, b), pardelas gorgiblancas (*Procellaria aequinoctialis*) adultas no reproductoras (c, d), y albatros de patas negras (*Phoebastria nigripes*) reproductores (e, f). Las áreas de mayor traslape relativo son las que aparecen en amarillo. Los valores de traslape relativo se transformaron logarítmicamente para situarlos en una escala comparable. Las áreas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación.

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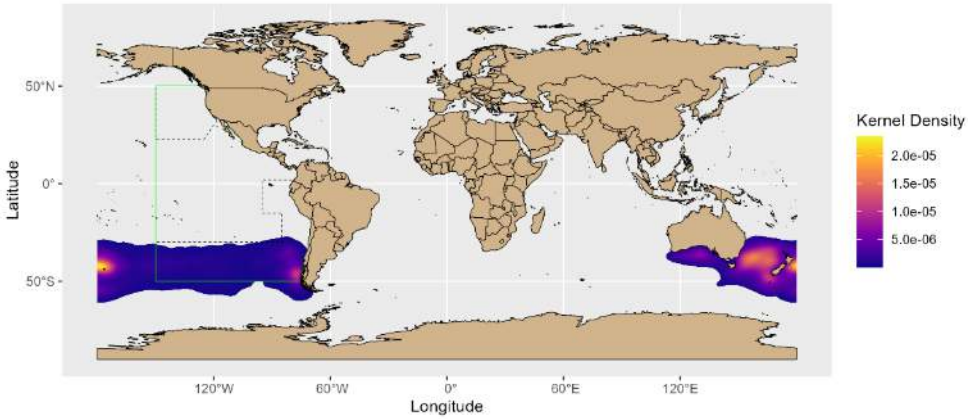
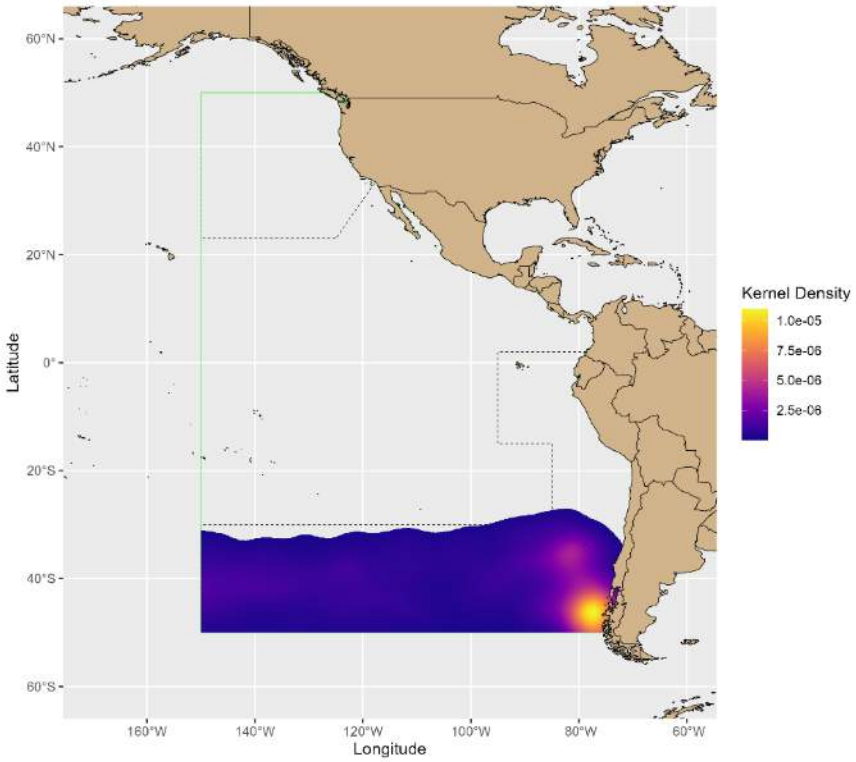
10. SUPPLEMENTAL MATERIAL 1

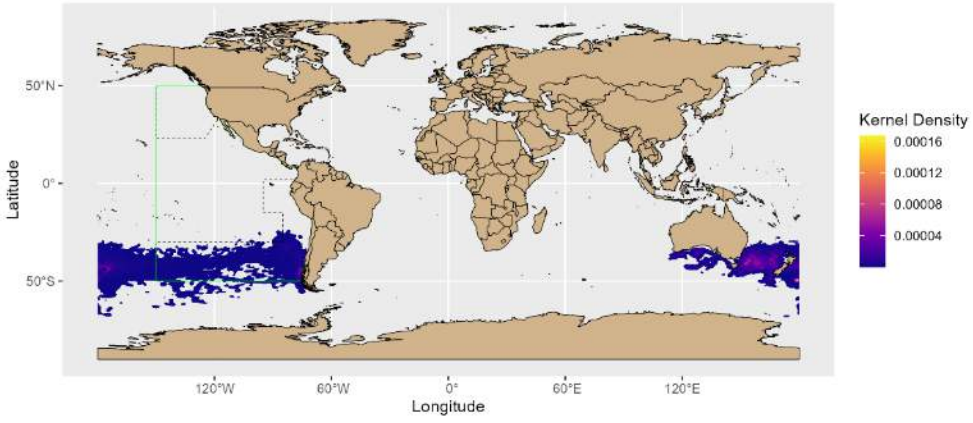
Species utilization distributions (UDs) overlapped only with the Eastern Pacific Ocean (EPO) (i.e., IATTC Convention area) depending on tag type (e.g., GLS or GPS/PTT), annual cycle (e.g., breeding or non-breeding), and age category (e.g., adult or juvenile). The 21 of 58 UDs and corresponding cropped IATTC UDs that overlapped with the EPO that also had the global UD represented more than 1% of the global population and the cropped IATTC UD represented more than 3% of the total tracked populations are mapped below.

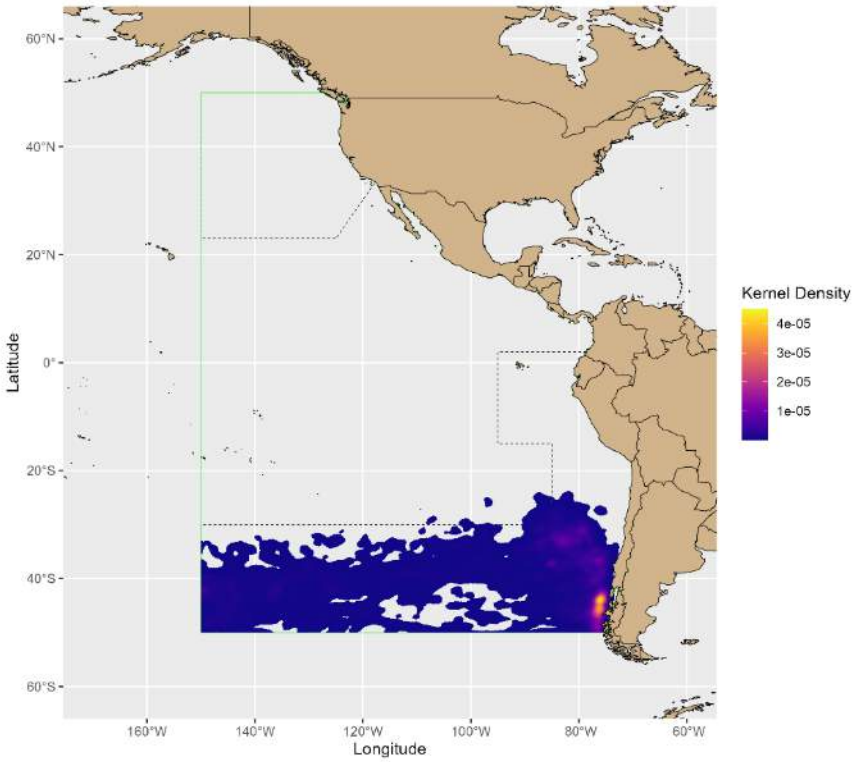




SUPPLEMENTAL 1 FIGURE 1. Global (top map) and cropped (bottom map) utilization distributions (UDs) for the adult non-breeding Antipodean Albatross (*Diomedea antipodensis*) based on GLS tracks. The global UD consists of both subspecies *D. antipodensis antipodensis* and *D. antipodensis gibsoni*, while the cropped UD only considers *D. antipodensis antipodensis*. Green line outlines the IATTC Convention Area, while the areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

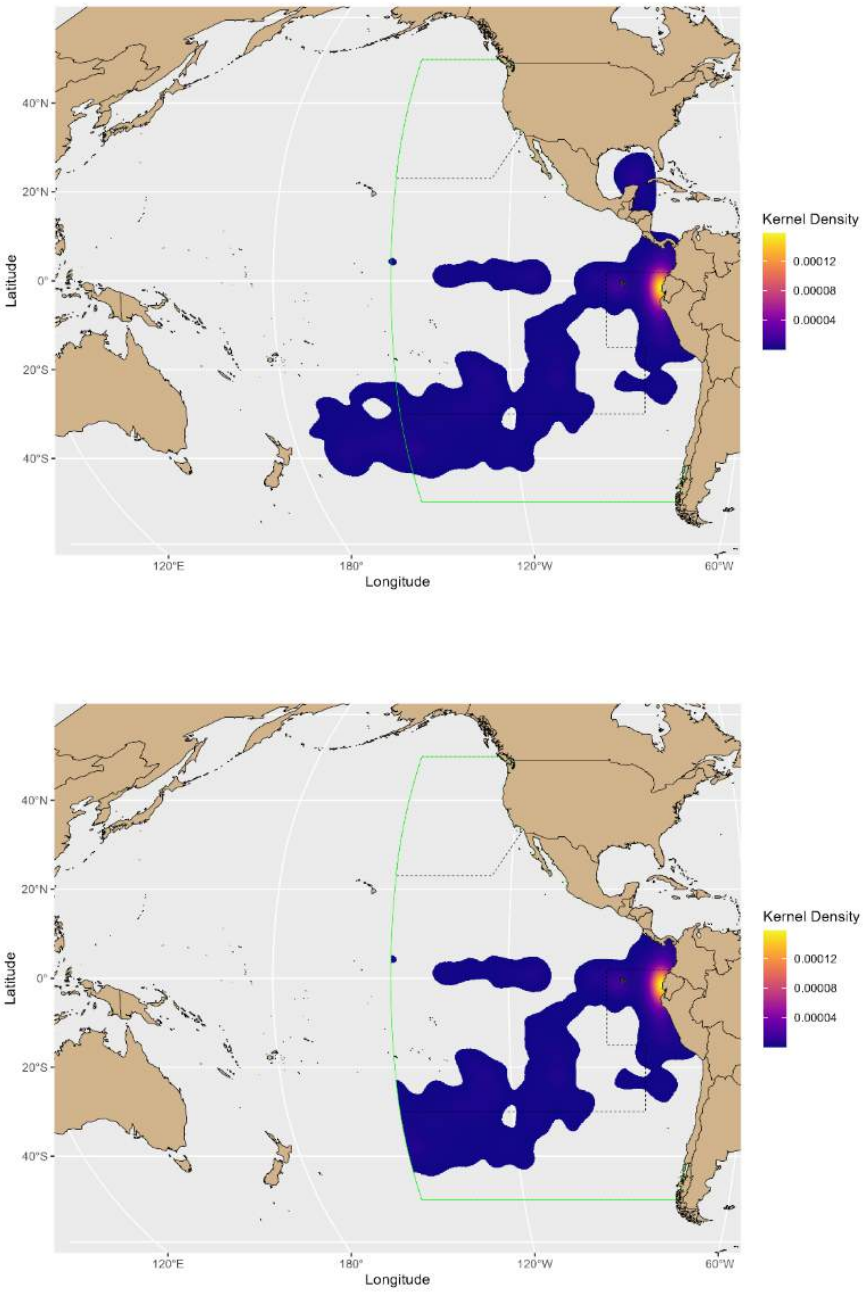
SUPLEMENTO 1, FIGURA 1. Distribuciones de utilización (DU) globales (mapa superior) y recortadas (mapa inferior) para el albatros de las Antípodas (*Diomedea antipodensis*) adulto no reproductor basadas en registros GLS. La DU global incluye ambas subespecies, *D. antipodensis antipodensis* y *D. antipodensis gibsoni*, mientras que la DU recortada solo tiene en cuenta a *D. antipodensis antipodensis*. La línea verde delimita el Área de la Convención de la CIAT, mientras que las zonas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.





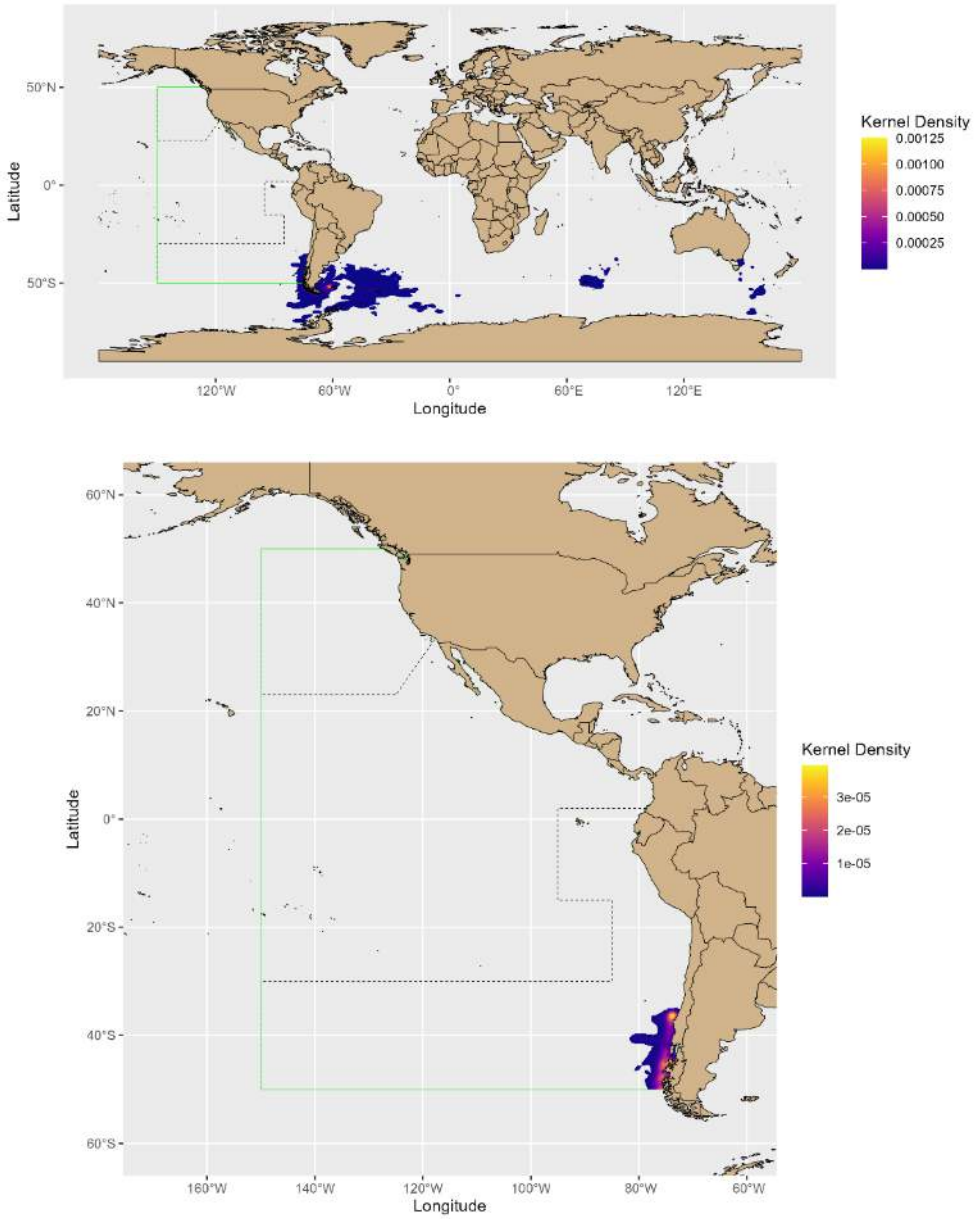
SUPPLEMENTAL 1 FIGURE 2. Global (top map) and cropped (bottom map) utilization distributions (UDs) for the adult non-breeding Antipodean Albatross (*Diomedea antipodensis*) based on GPS/PTT tracks. The global UD consists of both subspecies *D. antipodensis antipodensis* and *D. antipodensis gibsoni*, while the cropped UD only considers *D. antipodensis antipodensis*. Green line outlines the IATTC Convention Area, while the areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 1, FIGURA 2. Distribuciones de utilización (DU) globales (mapa superior) y recortadas (mapa inferior) para el albatros de las Antípodas (*Diomedea antipodensis*) adulto no reproductor basadas en registros GPS/PTT. La DU global incluye ambas subespecies, *D. antipodensis antipodensis* y *D. antipodensis gibsoni*, mientras que la DU recortada solo tiene en cuenta a *D. antipodensis antipodensis*. La línea verde delimita el Área de la Convención de la CIAT, mientras que las zonas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



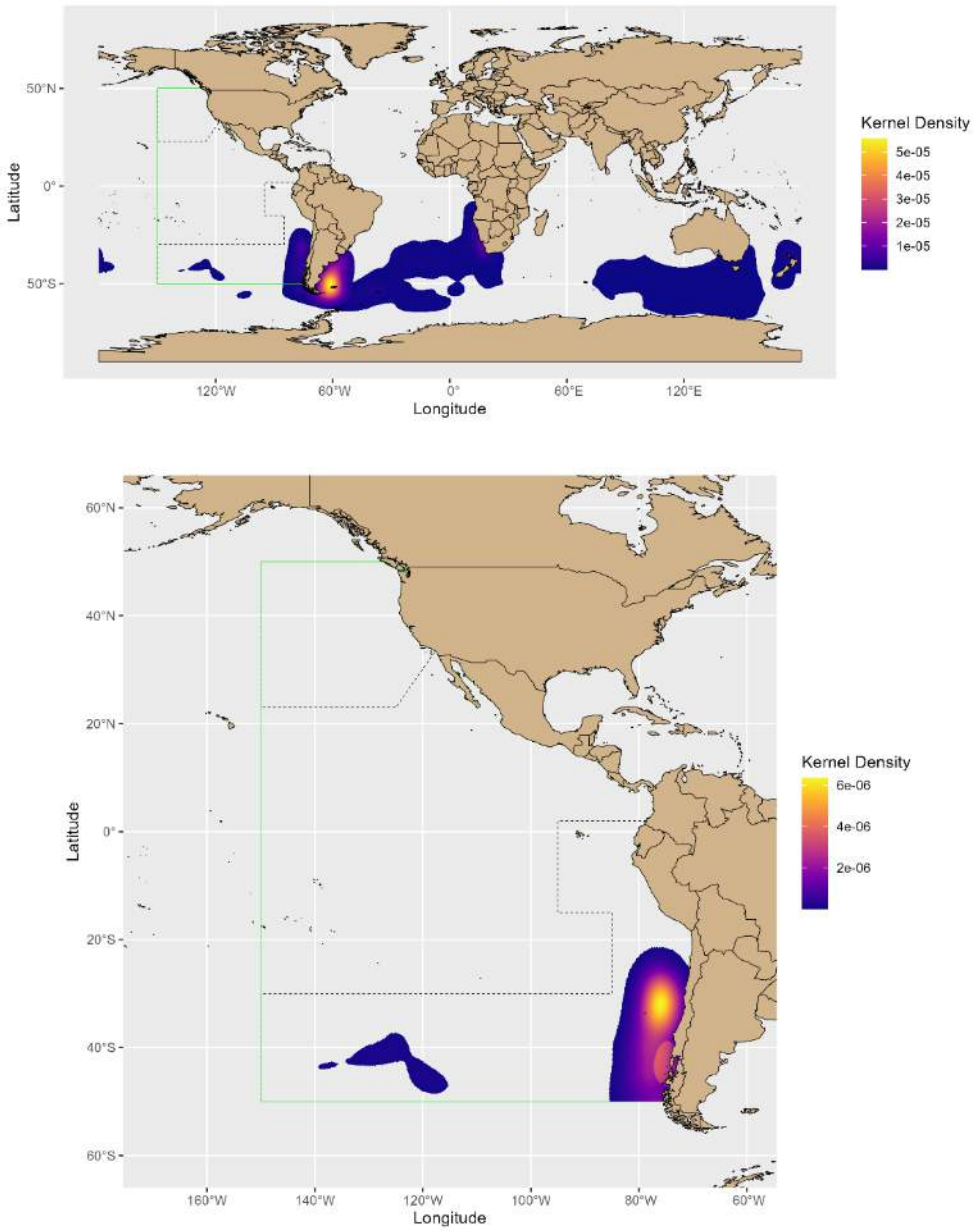
SUPPLEMENTAL 1 FIGURE 3. Global (top map) and cropped (bottom map) utilization distributions (UDs) for the adult non-breeding Black Petrel (*Procellaria parkinsoni*) based on GLS tracks. Green line outlines the IATTC Convention Area, while the areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 1, FIGURA 3. Distribuciones de utilización (DU) globales (mapa superior) y recortadas (mapa inferior) para la pardela de Parkinson (*Procellaria parkinsoni*) adulta no reproductora, basadas en registros GLS. La línea verde delimita el Área de la Convención de la CIAT, mientras que las zonas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



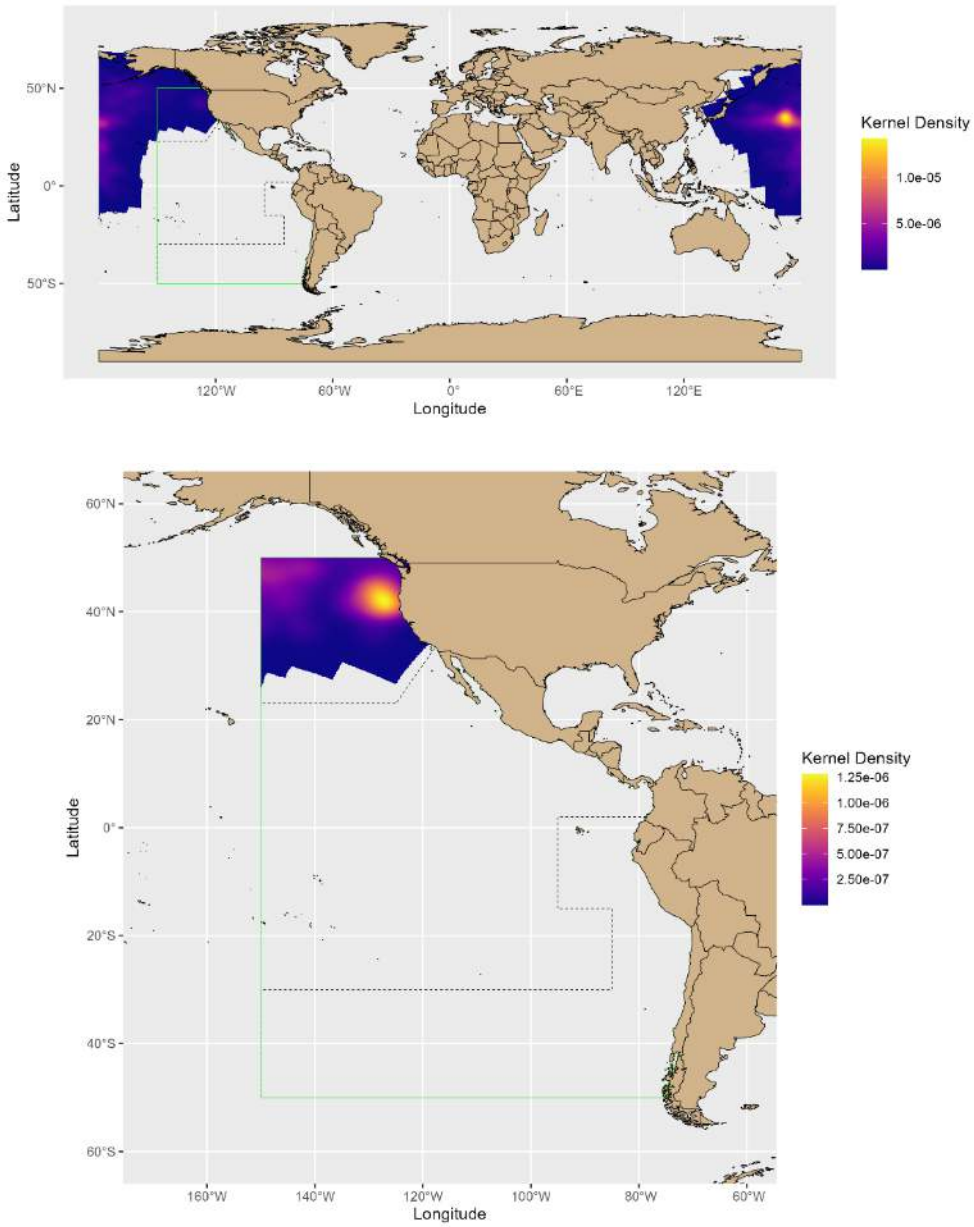
SUPPLEMENTAL 1 FIGURE 4. Global (top map) and cropped (bottom map) utilization distributions (UDs) for the breeding Black-browed Albatross (*Thalassarche melanophris*) based on GPS/PTT tracks. Green line outlines the IATTC Convention Area, while the areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 1, FIGURA 4. Distribuciones de utilización (DU) globales (mapa superior) y recortadas (mapa inferior) para el albatros ceja negra (*Thalassarche melanophris*) reproductor, basadas en registros GPS/PTT. La línea verde delimita el Área de la Convención de la CIAT, mientras que las zonas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.

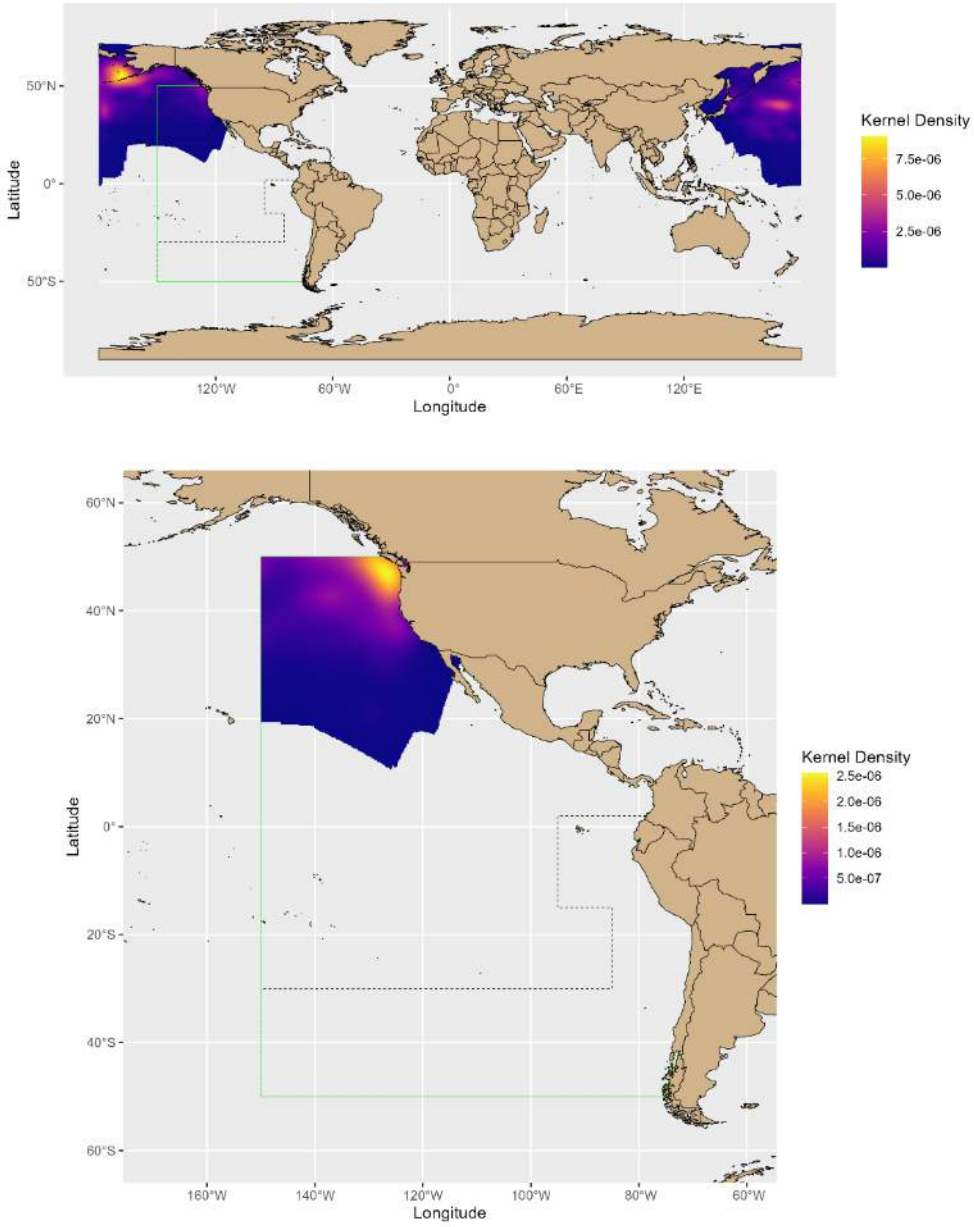


SUPPLEMENTAL 1 FIGURE 5. Global (top map) and cropped (bottom map) utilization distributions (UDs) for the adult non-breeding Black-browed Albatross (*Thalassarche melanophris*) based on GLS tracks. Green line outlines the IATTC Convention Area, while the areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 1, FIGURA 5. Distribuciones de utilización (DU) globales (mapa superior) y recortadas (mapa inferior) para el albatros ceja negra (*Thalassarche melanophris*) adulto no reproductor, basadas en registros GLS. La línea verde delimita el Área de la Convención de la CIAT, mientras que las zonas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.

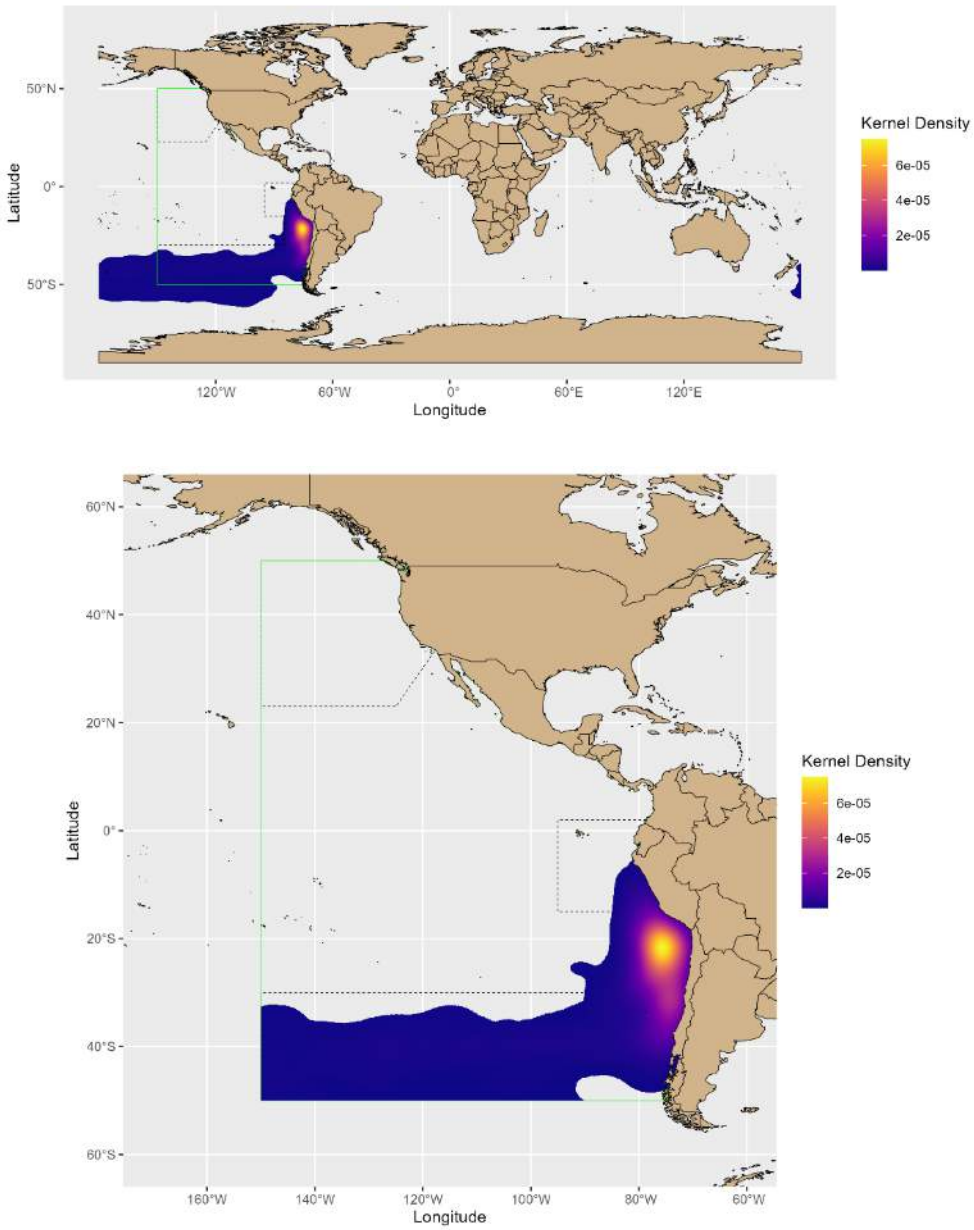


SUPPLEMENTAL 1 FIGURE 6. Global (top map) and cropped (bottom map) utilization distributions (UDs) for the adult breeding Black-footed Albatross (*Phoebastria nigripes*) based on GLS tracks. Green line outlines the IATTC Convention Area, while the areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.
SUPLEMENTO 1, FIGURA 6. Distribuciones de utilización (DU) globales (mapa superior) y recortadas (mapa inferior) para el albatros de patas negras (*Phoebastria nigripes*) adulto reproductor, basadas en registros GLS. La línea verde delimita el Área de la Convención de la CIAT, mientras que las zonas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



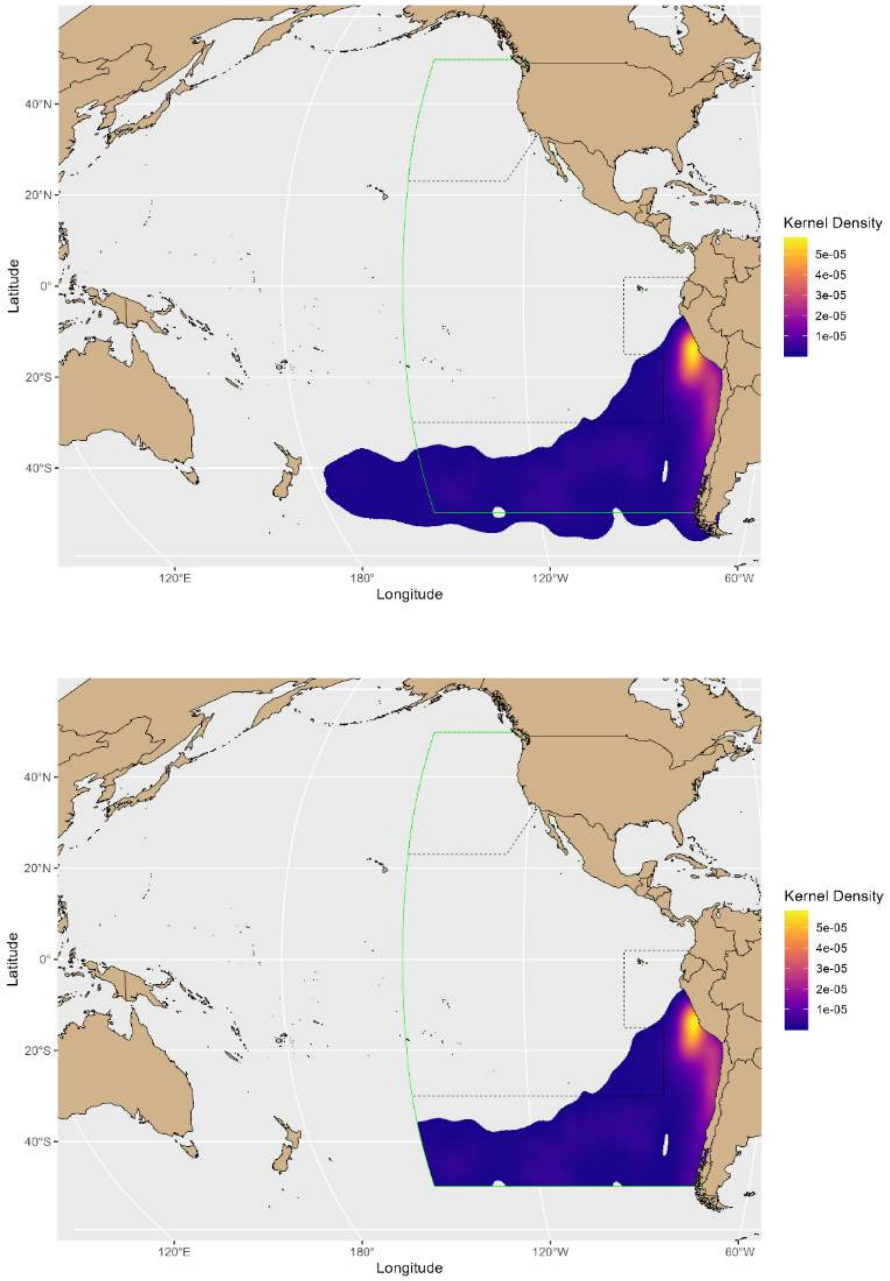
SUPPLEMENTAL 1 FIGURE 7. Global (top map) and cropped (bottom map) utilization distributions (UDs) for the adult non-breeding Black-footed Albatross (*Phoebastria nigripes*) based on GLS tracks. Green line outlines the IATTC Convention Area, while the areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 1, FIGURA 7. Distribuciones de utilización (DU) globales (mapa superior) y recortadas (mapa inferior) para el albatros de patas negras (*Phoebastria nigripes*) adulto no reproductor, basadas en registros GLS. La línea verde delimita el Área de la Convención de la CIAT, mientras que las zonas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.

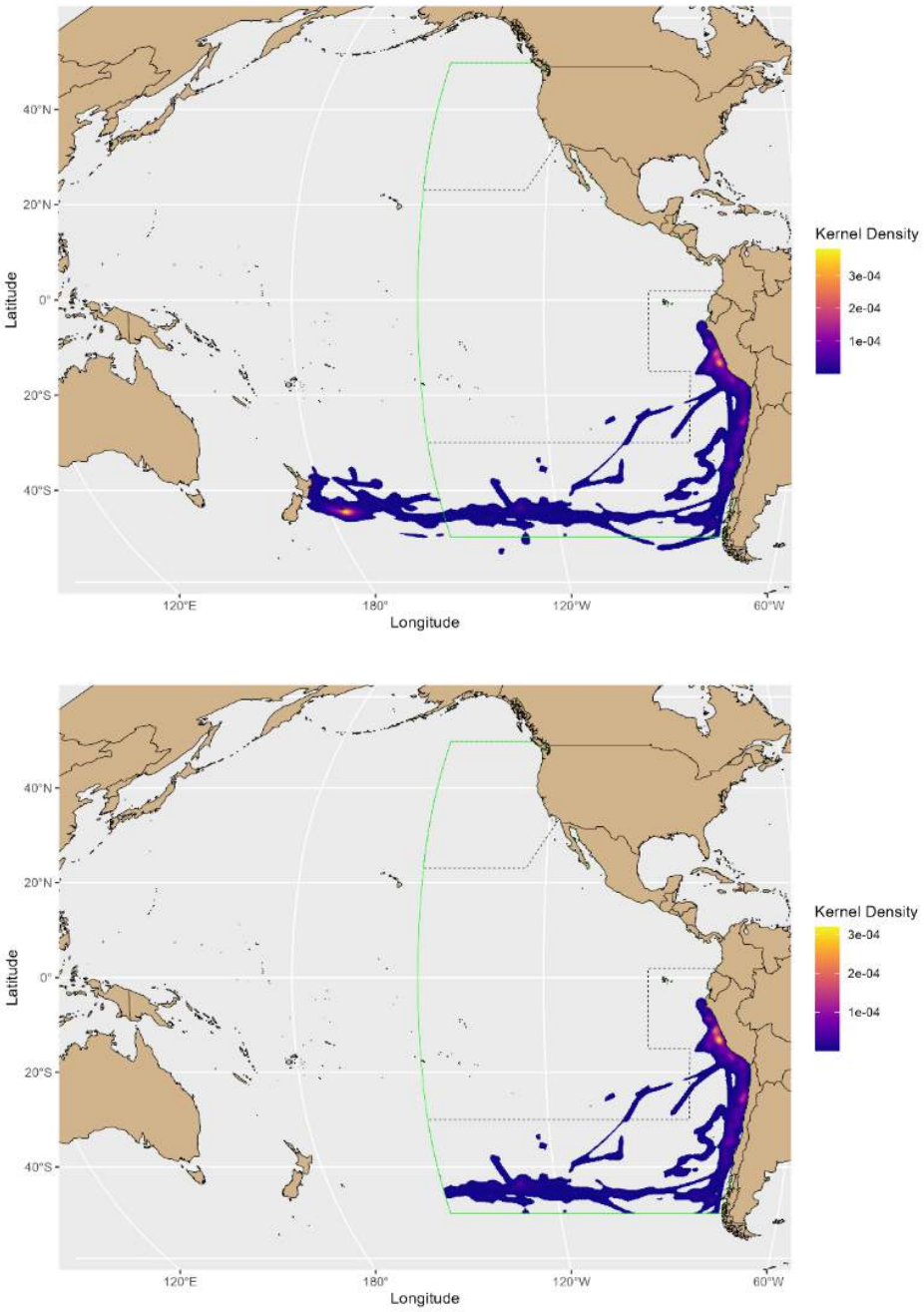


SUPPLEMENTAL 1 FIGURE 8. Global (top map) and cropped (bottom map) utilization distributions (UDs) for the adult non-breeding Buller's Albatross (*Thalassarche bulleri*) based on GLS tracks. Green line outlines the IATTC Convention Area, while the areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

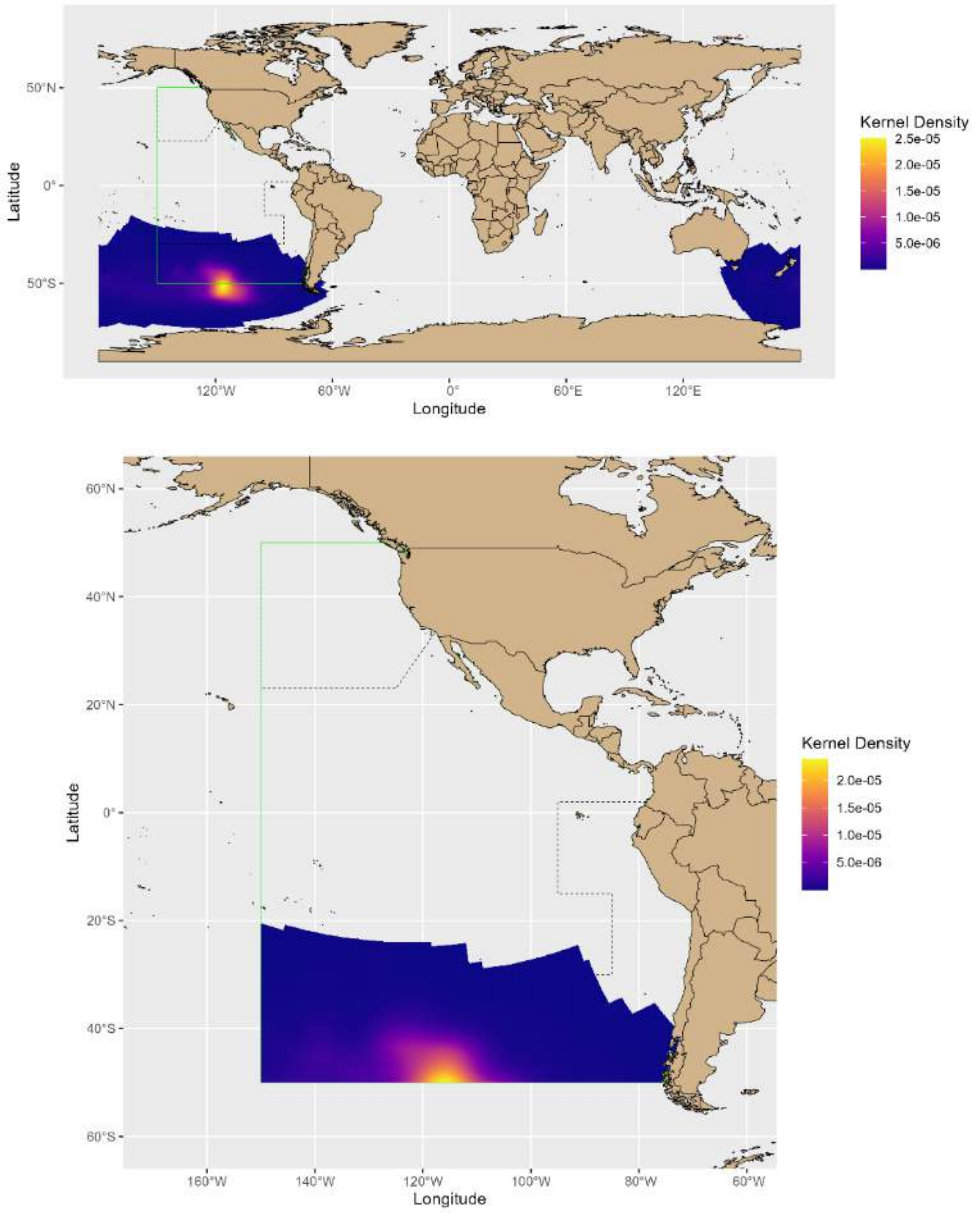
SUPLEMENTO 1, FIGURA 8. Distribuciones de utilización (DU) globales (mapa superior) y recortadas (mapa inferior) para el albatros de Buller (*Thalassarche bulleri*) adulto no reproductor, basadas en registros GLS. La línea verde delimita el Área de la Convención de la CIAT, mientras que las zonas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



SUPPLEMENTAL 1 FIGURE 9. Global (top map) and cropped (bottom map) utilization distributions (UDs) for the adult non-breeding Chatham Albatross (*Thalassarche eremita*) based on GLS tracks. Green line outlines the IATTC Convention Area, while the areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.
SUPLEMENTO 1, FIGURA 9. Distribuciones de utilización (DU) globales (mapa superior) y recortadas (mapa inferior) para el albatros de Chatham (*Thalassarche eremita*) adulto no reproductor, basadas en registros GLS. La línea verde delimita el Área de la Convención de la CIAT, mientras que las zonas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.

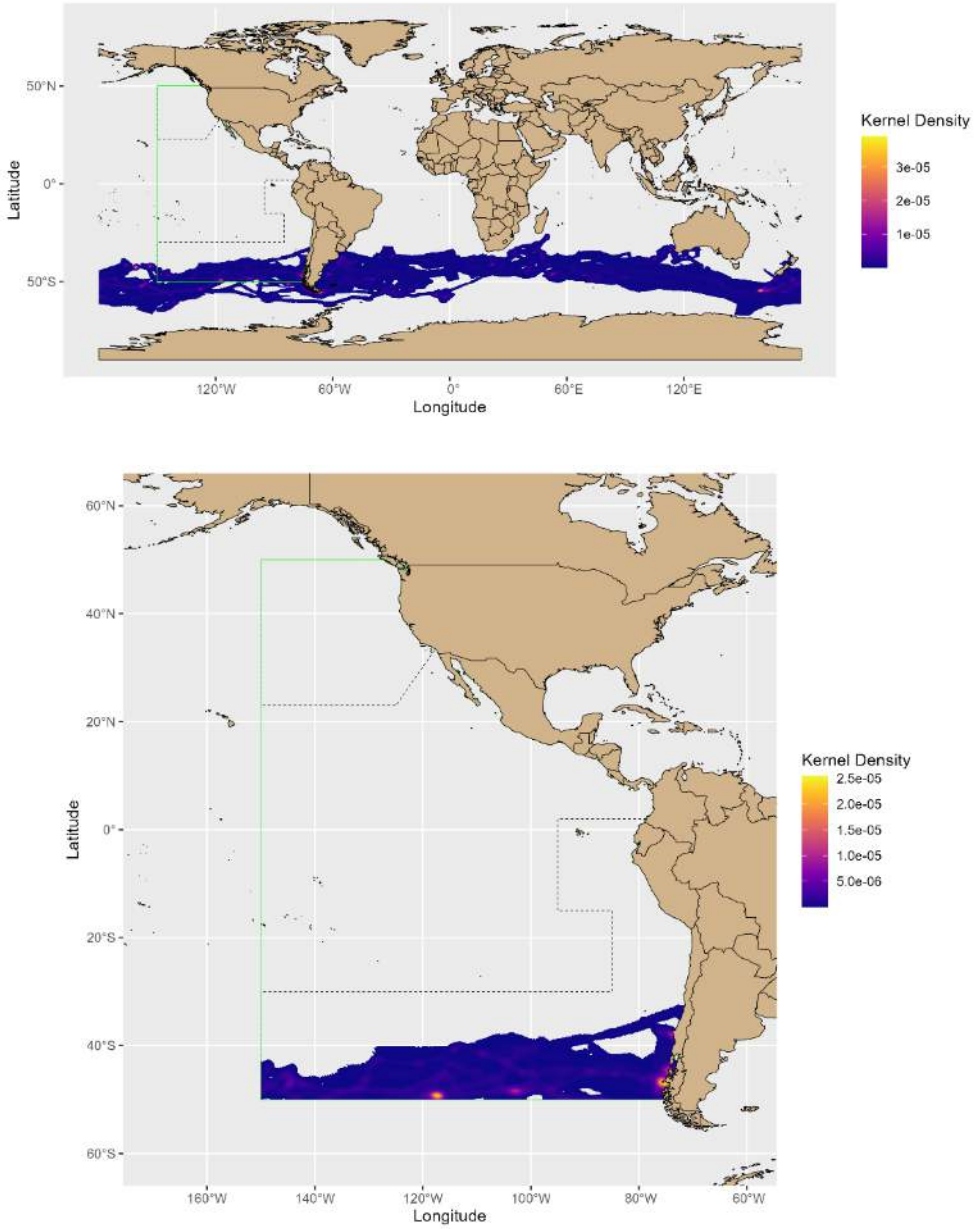


SUPPLEMENTAL 1 FIGURE 10. Global (top map) and cropped (bottom map) utilization distributions (UDs) for the adult non-breeding Chatham Albatross (*Thalassarche eremita*) based on GPS/PTT tracks. Green line outlines the IATTC Convention Area, while the areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.
SUPLEMENTO 1, FIGURA 10. Distribuciones de utilización (DU) globales (mapa superior) y recortadas (mapa inferior) para el albatros de Chatham (*Thalassarche eremita*) adulto no reproductor, basadas en registros GPS/PTT. La línea verde delimita el Área de la Convención de la CIAT, mientras que las zonas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



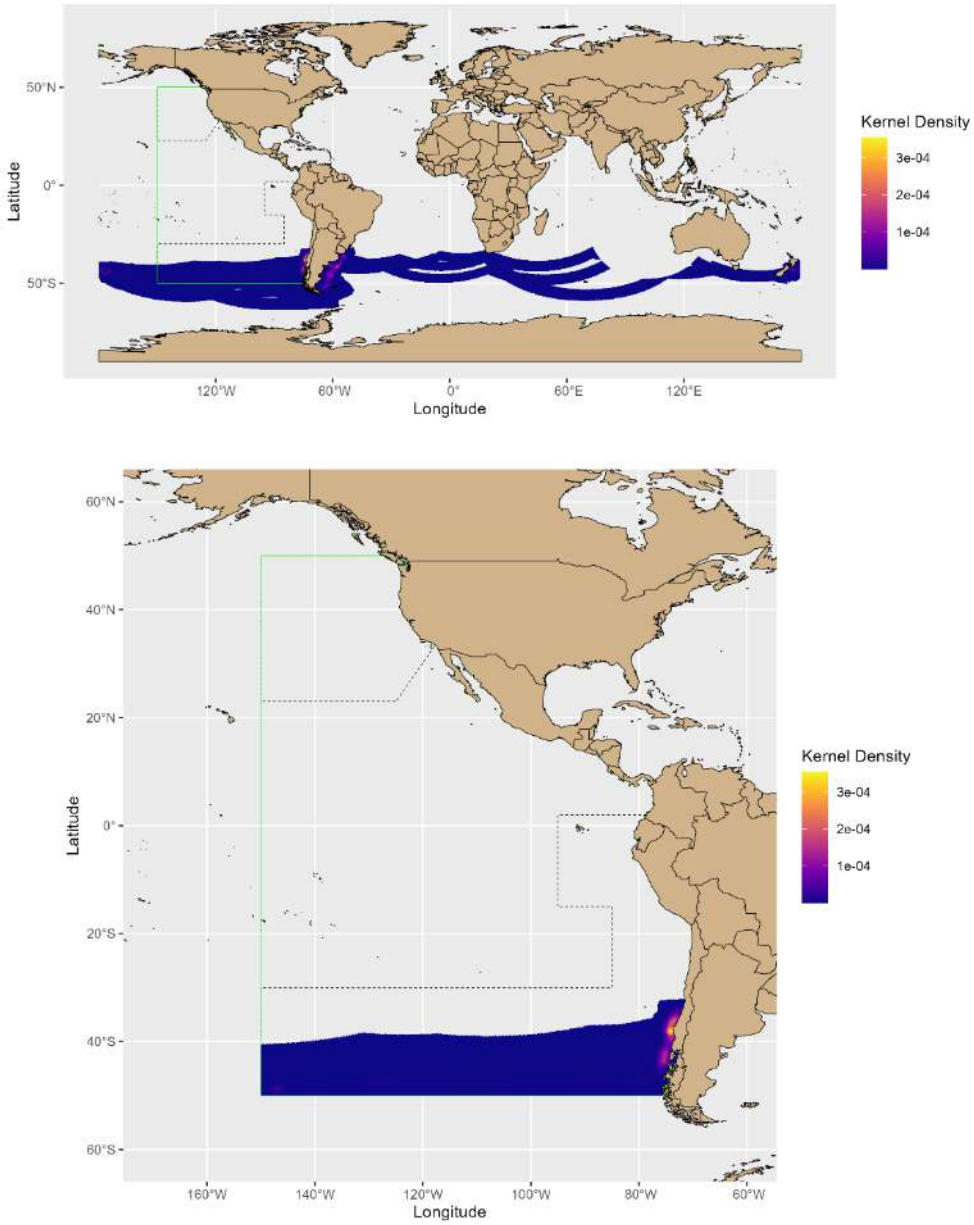
SUPPLEMENTAL 1 FIGURE 11. Global (top map) and cropped (bottom map) utilization distributions (UDs) for the adult non-breeding Grey Petrel (*Procellaria cinerea*) based on GLS tracks. Green line outlines the IATTC Convention Area, while the areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 1, FIGURA 11. Distribuciones de utilización (DU) globales (mapa superior) y recortadas (mapa inferior) para la pardela gris (*Procellaria cinerea*) adulta no reproductora, basadas en registros GLS. La línea verde delimita el Área de la Convención de la CIAT, mientras que las zonas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.

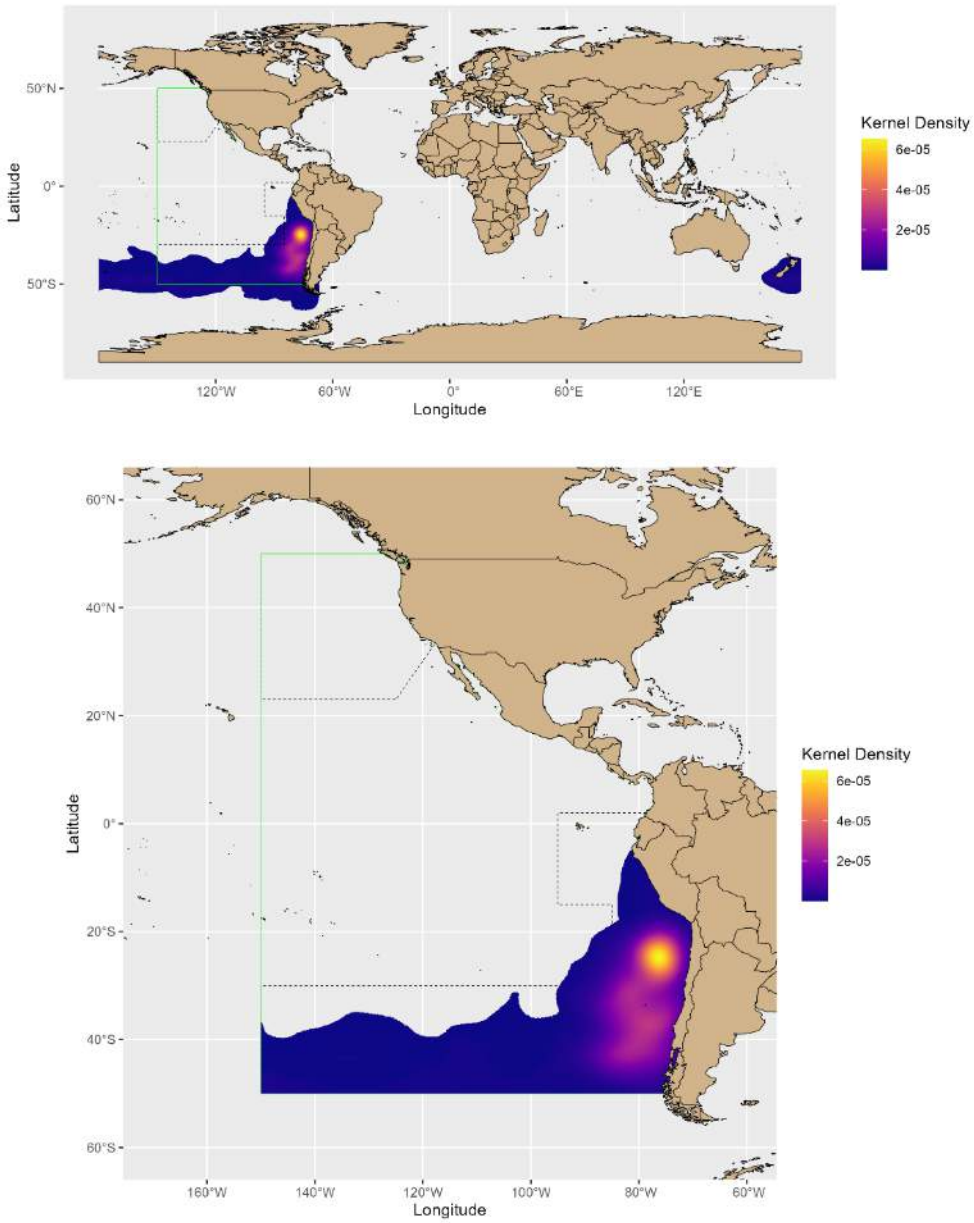


SUPPLEMENTAL 1 FIGURE 12. Global (top map) and cropped (bottom map) utilization distributions (UDs) for the juvenile Northern Giant Petrel (*Macronectes halli*) based on GPS/PTT tracks. Green line outlines the IATTC Convention Area, while the areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 1, FIGURA 12. Distribuciones de utilización (DU) globales (mapa superior) y recortadas (mapa inferior) para el petrel gigante de Hall (*Macronectes halli*) juvenil, basadas en registros GPS/PTT. La línea verde delimita el Área de la Convención de la CIAT, mientras que las zonas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.

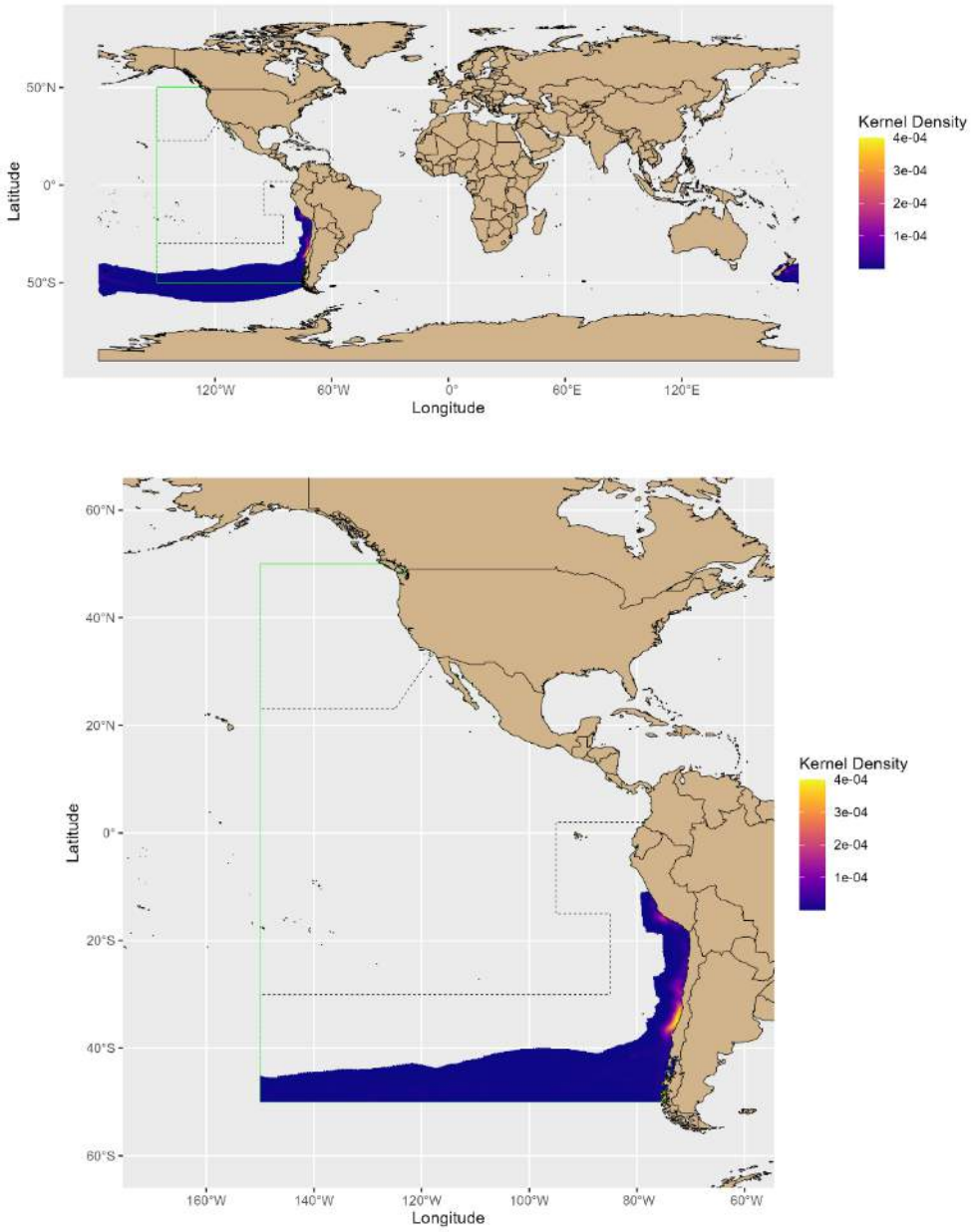


SUPPLEMENTAL 1 FIGURE 13. Global (top map) and cropped (bottom map) utilization distributions (UDs) for the adult non-breeding Northern Royal Albatross (*Diomedea sanfordi*) based on GPS/PTT tracks. Green line outlines the IATTC Convention Area, while the areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.
SUPLEMENTO 1, FIGURA 13. Distribuciones de utilización (DU) globales (mapa superior) y recortadas (mapa inferior) para el albatros real del norte (*Diomedea sanfordi*) adulto no reproductor, basadas en registros GPS/PTT. La línea verde delimita el Área de la Convención de la CIAT, mientras que las zonas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



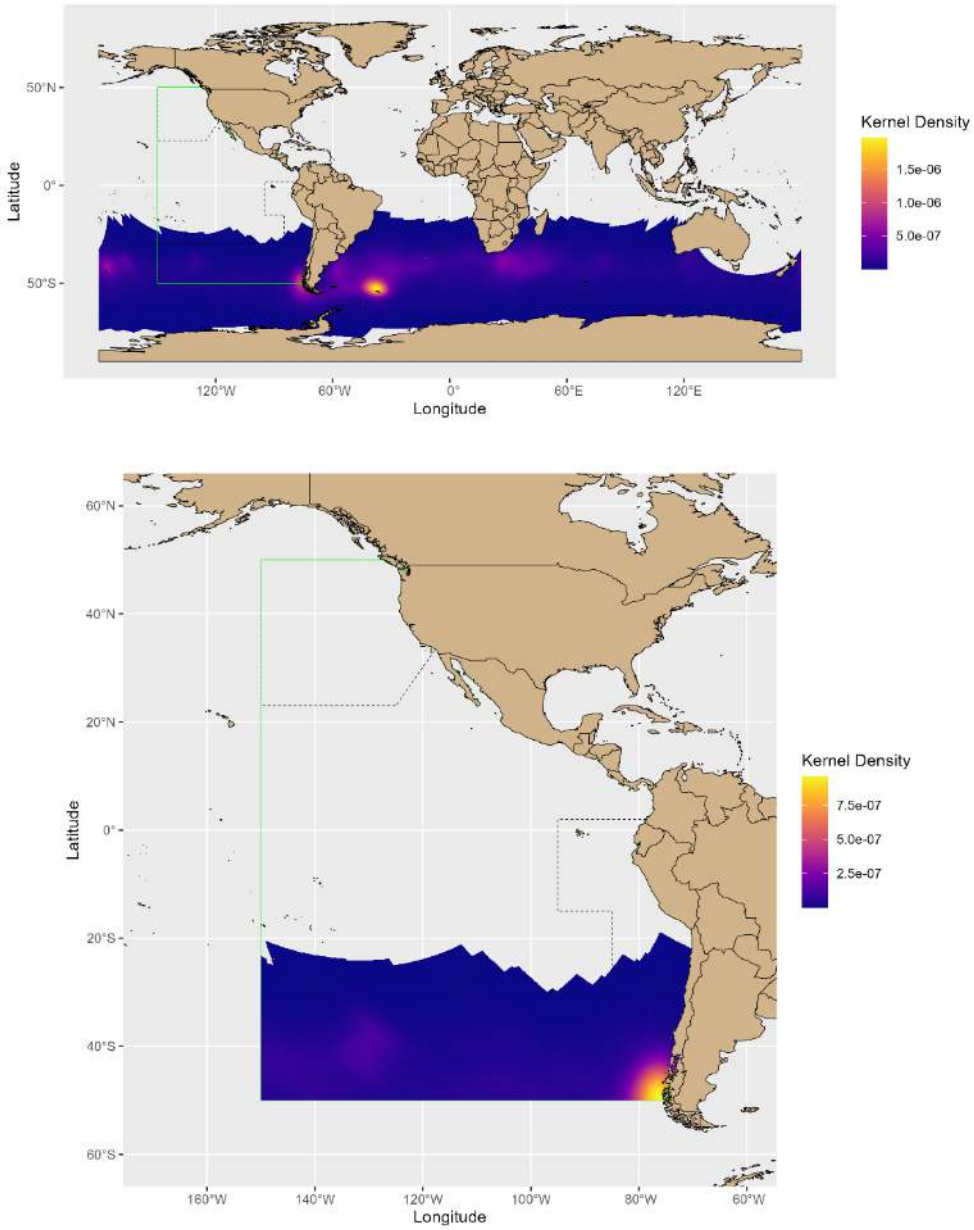
SUPPLEMENTAL 1 FIGURE 14. Global (top map) and cropped (bottom map) utilization distributions (UDs) for the adult non-breeding Salvin's Albatross (*Thalassarche salvini*) based on GLS tracks. Green line outlines the IATTC Convention Area, while the areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 1, FIGURA 14. Distribuciones de utilización (DU) globales (mapa superior) y recortadas (mapa inferior) para el albatros de Salvin (*Thalassarche salvini*) adulto no reproductor, basadas en registros GLS. La línea verde delimita el Área de la Convención de la CIAT, mientras que las zonas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



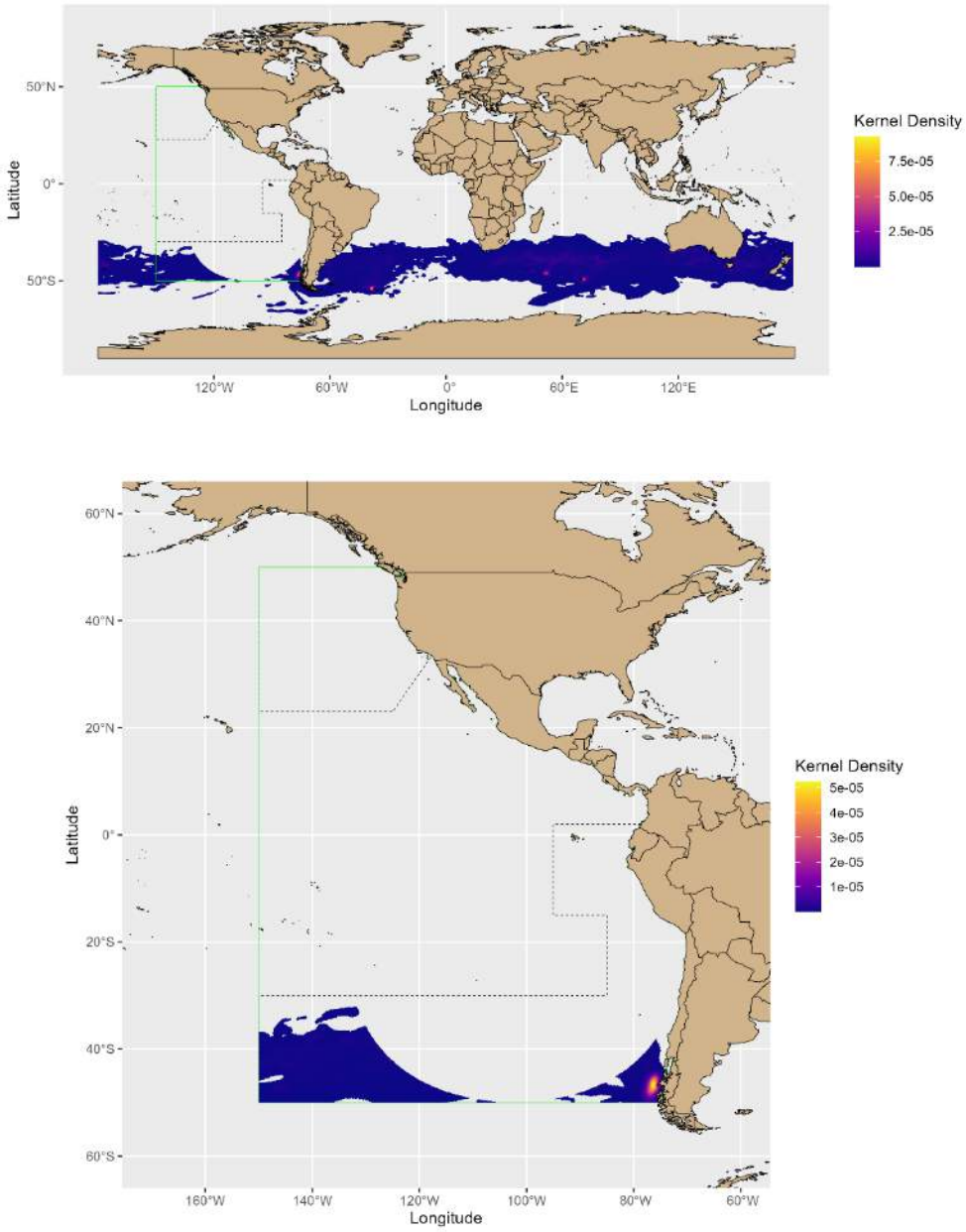
SUPPLEMENTAL 1 FIGURE 15. Global (top map) and cropped (bottom map) utilization distributions (UDs) for the adult non-breeding Salvin's Albatross (*Thalassarche salvini*) based on GPS/PTT tracks. Green line outlines the IATTC Convention Area, while the areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 1, FIGURA 15. Distribuciones de utilización (DU) globales (mapa superior) y recortadas (mapa inferior) para el albatros de Salvin (*Thalassarche salvini*) adulto no reproductor, basadas en registros GPS/PTT. La línea verde delimita el Área de la Convención de la CIAT, mientras que las zonas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



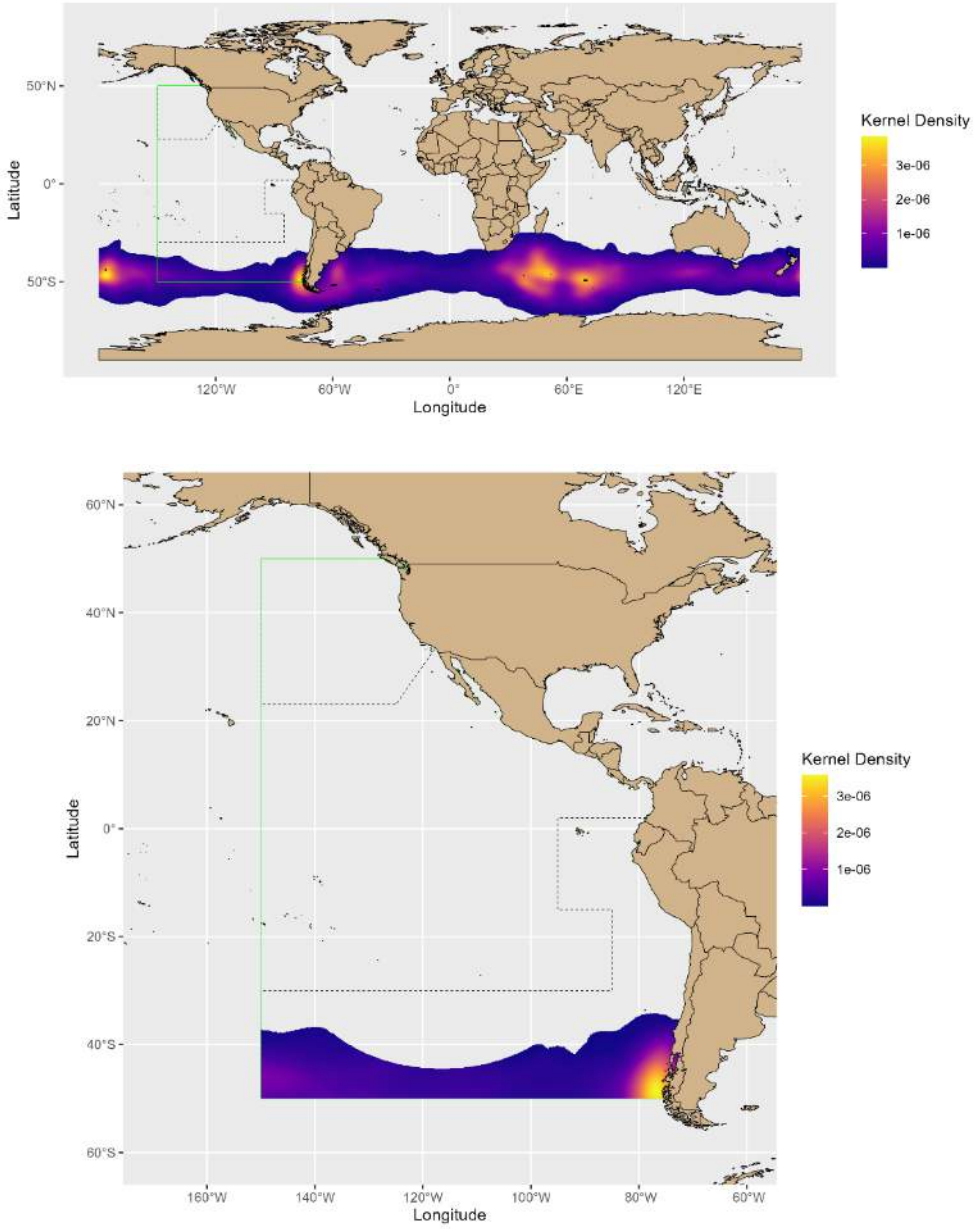
SUPPLEMENTAL 1 FIGURE 16. Global (top map) and cropped (bottom map) utilization distributions (UDs) for the juvenile Wandering Albatross (*Diomedea exulans*) based on GLS tracks. Green line outlines the IATTC Convention Area, while the areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 1, FIGURA 16. Distribuciones de utilización (DU) globales (mapa superior) y recortadas (mapa inferior) para el albatros errante (*Diomedea exulans*) juvenil, basadas en registros GLS. La línea verde delimita el Área de la Convención de la CIAT, mientras que las zonas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



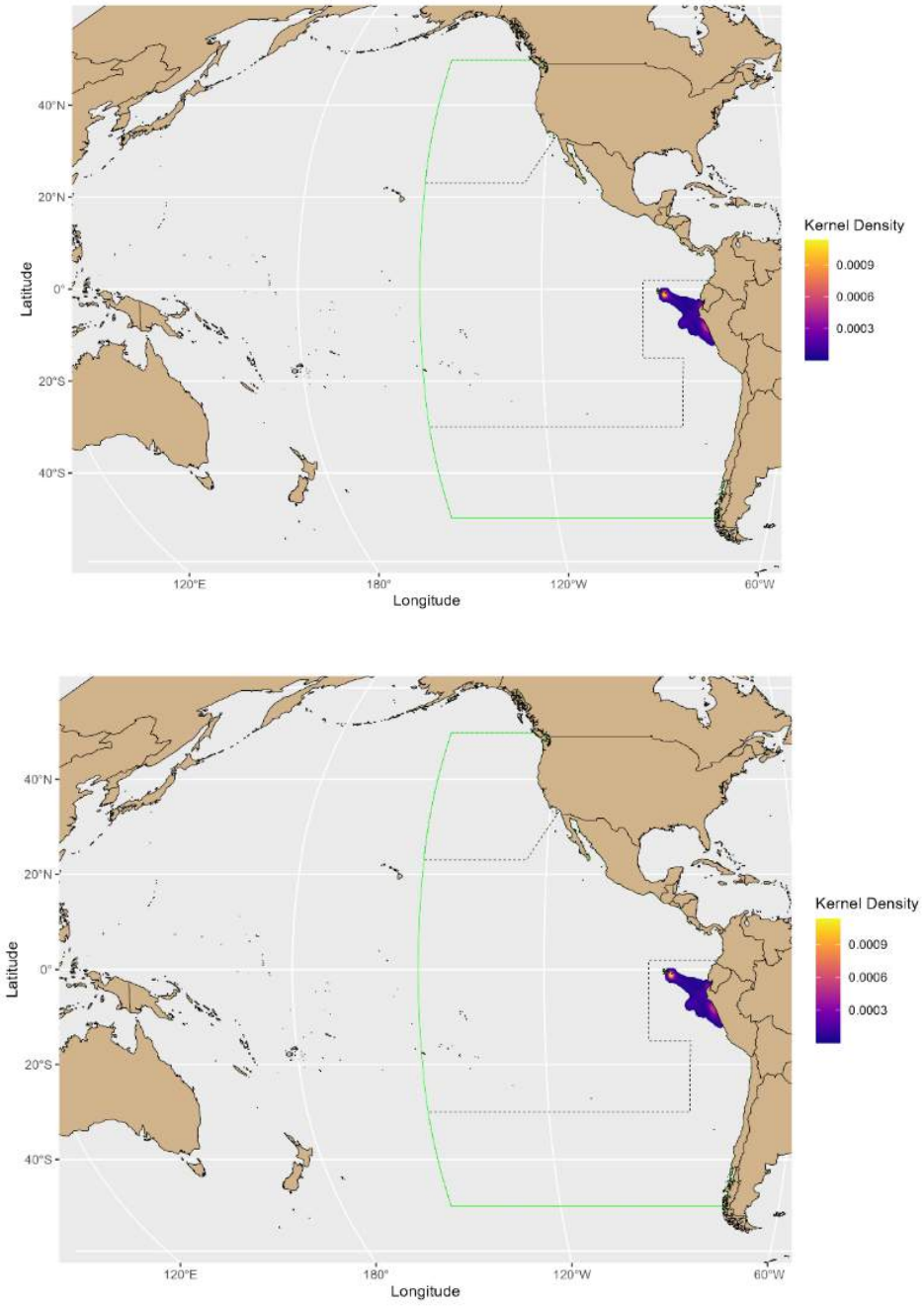
SUPPLEMENTAL 1 FIGURE 17. Global (top map) and cropped (bottom map) utilization distributions (UDs) for the juvenile Wandering Albatross (*Diomedea exulans*) based on GPS/PTT tracks. Green line outlines the IATTC Convention Area, while the areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 1, FIGURA 17. Distribuciones de utilización (DU) globales (mapa superior) y recortadas (mapa inferior) para el albatros errante (*Diomedea exulans*) juvenil, basadas en registros GPS/PTT. La línea verde delimita el Área de la Convención de la CIAT, mientras que las zonas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



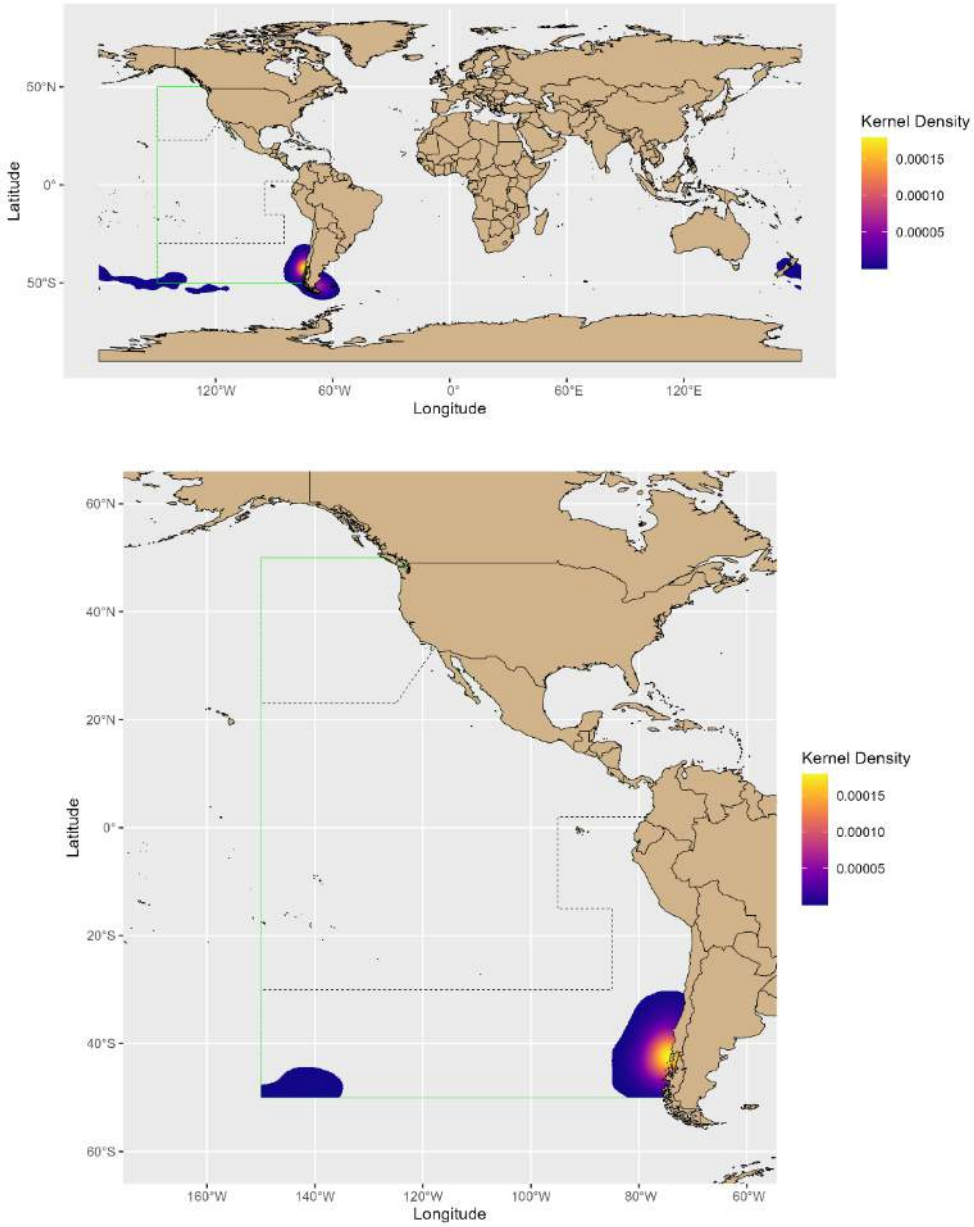
SUPPLEMENTAL 1 FIGURE 18. Global (top map) and cropped (bottom map) utilization distributions (UDs) for the adult non-breeding Wandering Albatross (*Diomedea exulans*) based on GLS tracks. Green line outlines the IATTC Convention Area, while the areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 1, FIGURA 18. Distribuciones de utilización (DU) globales (mapa superior) y recortadas (mapa inferior) para el albatros errante (*Diomedea exulans*) adulto no reproductor, basadas en registros GLS. La línea verde delimita el Área de la Convención de la CIAT, mientras que las zonas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



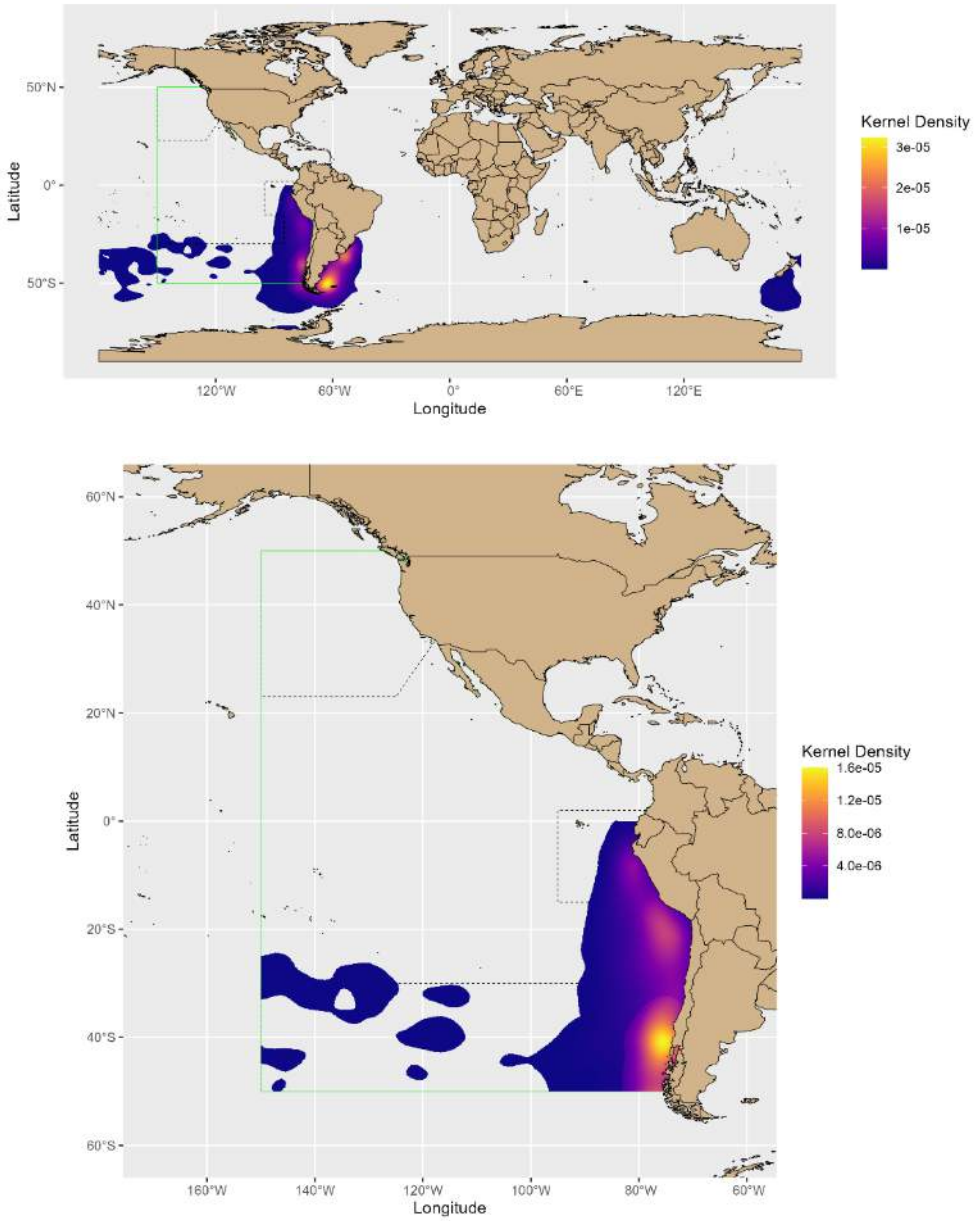
SUPPLEMENTAL 1 FIGURE 19. Global (top map) and cropped (bottom map) utilization distributions (UDs) for the breeding Waved Albatross (*Phoebastria irrorata*) based on GPS/PTT tracks. Green line outlines the IATTC Convention Area, while the areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 1, FIGURA 19. Distribuciones de utilización (DU) globales (mapa superior) y recortadas (mapa inferior) para el albatros de las Galápagos (*Phoebastria irrorata*) reproductor, basadas en registros GPS/PTT. La línea verde delimita el Área de la Convención de la CIAT, mientras que las zonas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



SUPPLEMENTAL 1 FIGURE 20. Global (top map) and cropped (bottom map) utilization distributions (UDs) for the adult non-breeding Westland Petrel (*Procellaria westlandica*) based on GLS tracks. Green line outlines the IATTC Convention Area, while the areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

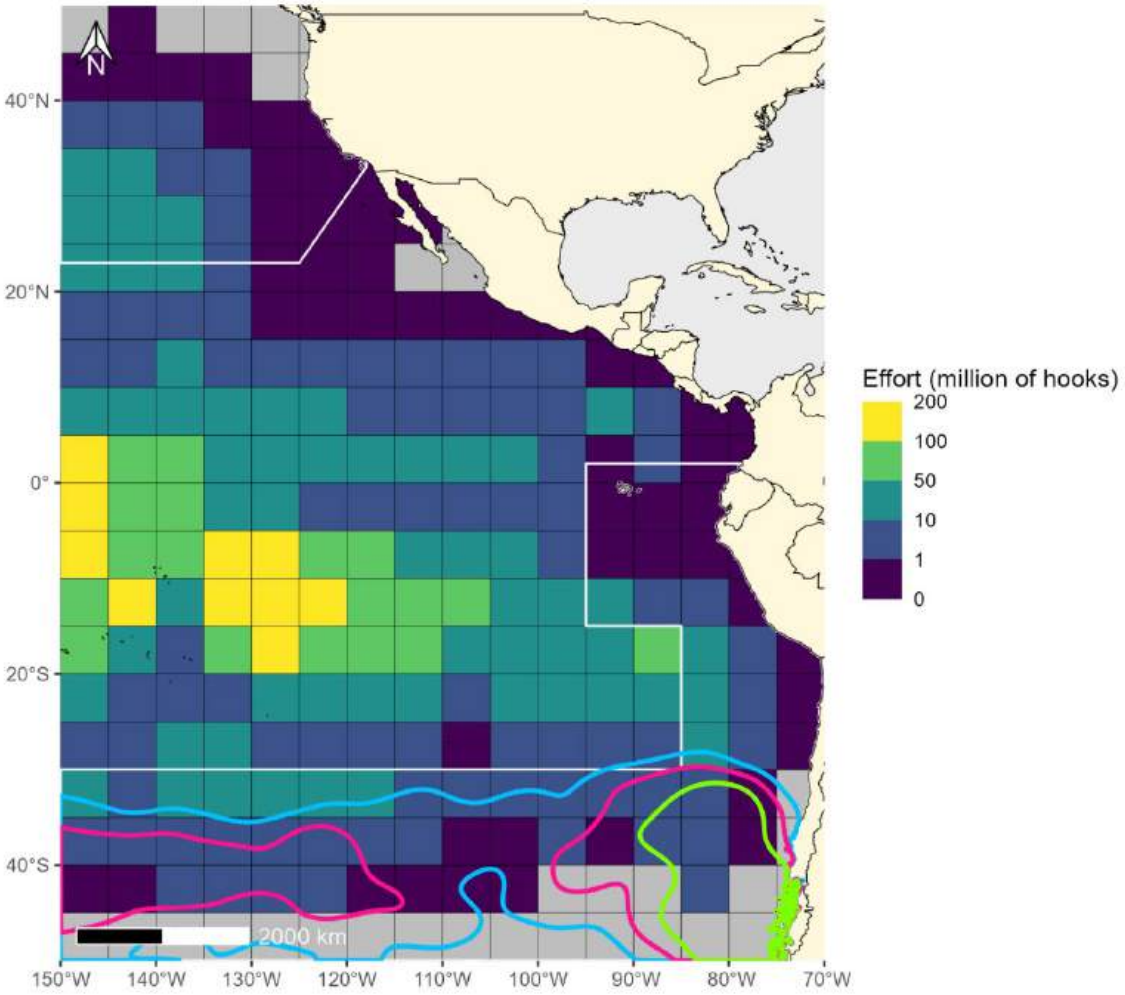
SUPLEMENTO 1, FIGURA 20. Distribuciones de utilización (DU) globales (mapa superior) y recortadas (mapa inferior) para la pardela de Westland (*Procellaria westlandica*) adulta no reproductora, basadas en registros GLS. La línea verde delimita el Área de la Convención de la CIAT, mientras que las zonas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



SUPPLEMENTAL 1 FIGURE 21. Global (top map) and cropped (bottom map) utilization distributions (UDs) for the adult non-breeding White-chinned Petrel (*Procellaria aequinoctialis*) based on GLS tracks. Green line outlines the IATTC Convention Area, while the areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.
SUPLEMENTO 1, FIGURA 21. Distribuciones de utilización (DU) globales (mapa superior) y recortadas (mapa inferior) para la pardela gorgiblanca (*Procellaria aequinoctialis*) adulta no reproductora, basadas en registros GLS. La línea verde delimita el Área de la Convención de la CIAT, mientras que las zonas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.

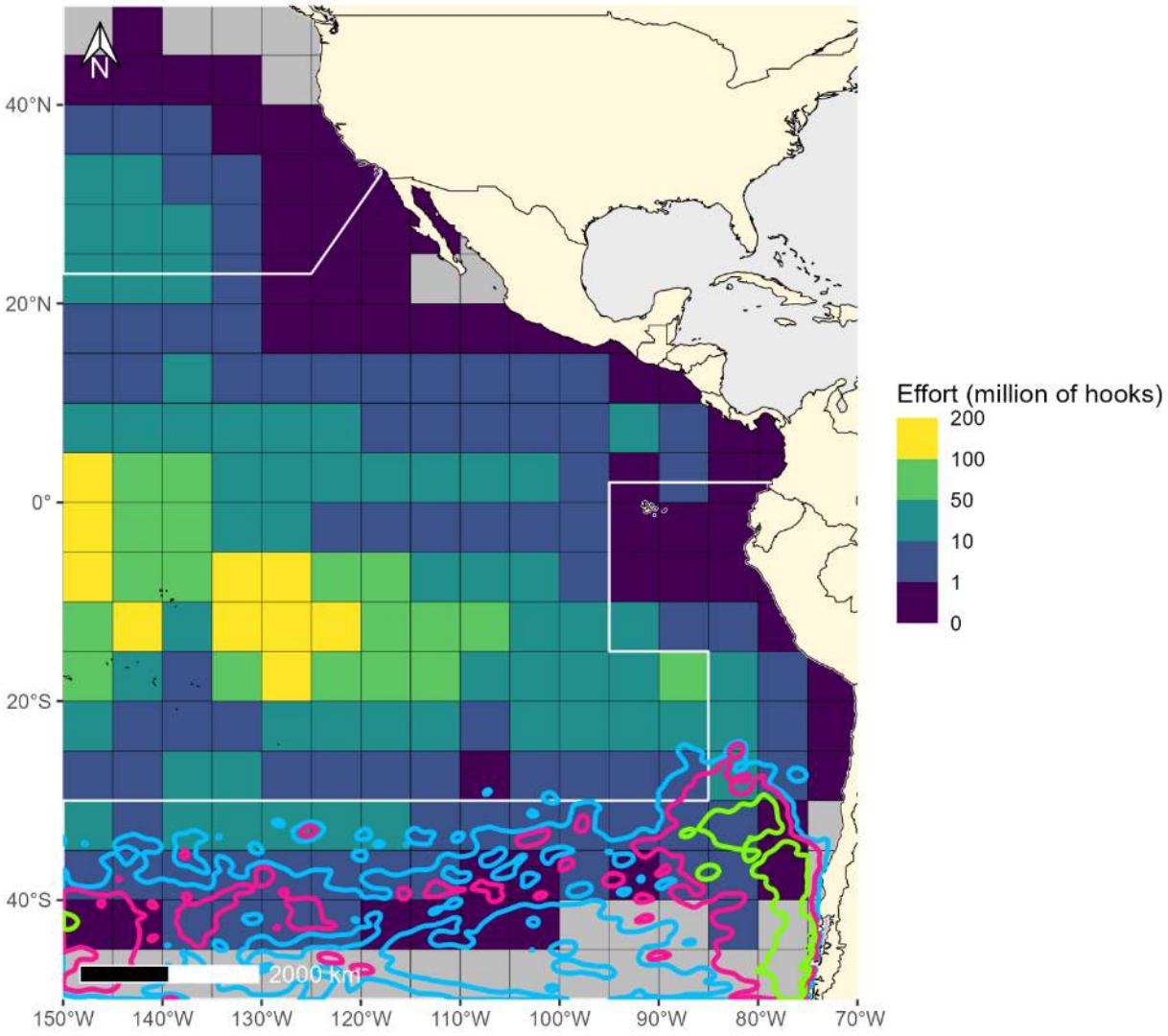
11. SUPPLEMENTAL MATERIAL 2

The 50, 75, and 95% isopleths were calculated from the cropped IATTC UDs (n=21) to indicate different levels of intensity in area use. Overlap was calculated only for species whose global UD represented more than 1% of the global population and cropped IATTC UD represented more than 3% of the total tracked populations. Pelagic longline fishing effort data (in number of hooks) from logbooks were reported in 5°x5° grid cells by CPCs from 2000–2023.



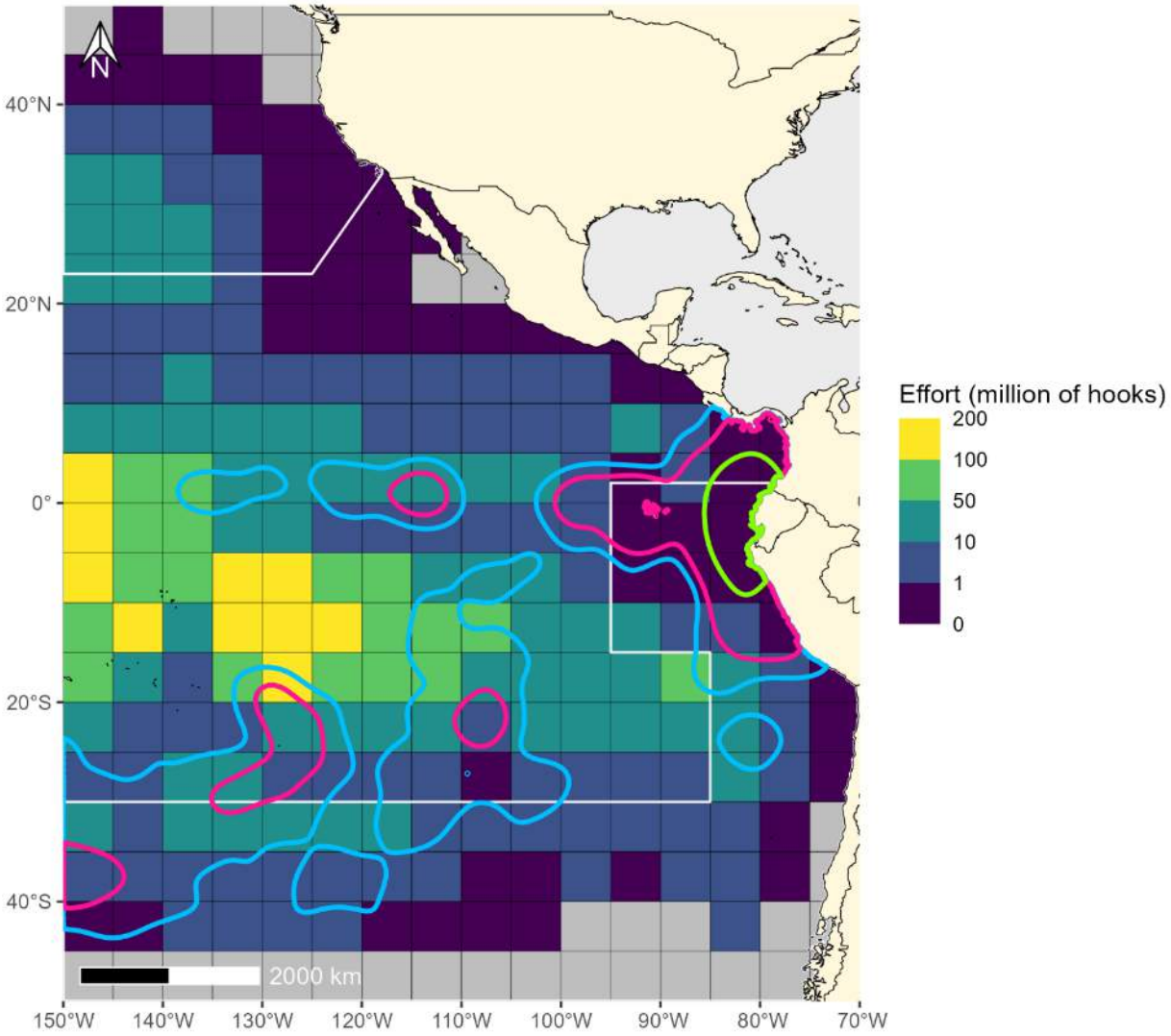
SUPPLEMENTAL 2 FIGURE 1. Overlapping 95% (blue line), 75% (pink line), and 50% (light green line) isopleths of adult non-breeding Antipodean Albatross (*Diomedea antipodensis antipodensis*) based on GLS tracks with pelagic longline fishing effort data (in number of hooks) from logbooks reported in 5°x5° grid cells by CPCs from 2000–2023. The areas north of the northern white line and south of the southern white line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 2, FIGURA 1. Isopletas que se traslapan el 95% (línea azul), 75% (línea rosa) y 50% (línea verde claro) de albatros de las Antípodas (*Diomedea antipodensis antipodensis*) adultos no reproductores, basadas en registros GLS, con datos de esfuerzo de pesca de palangre pelágico (en número de anzuelos) notificados en celdas de 5°x5° por los CPC entre 2000 y 2023. Las zonas al norte de la línea blanca del norte y al sur de la línea blanca del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



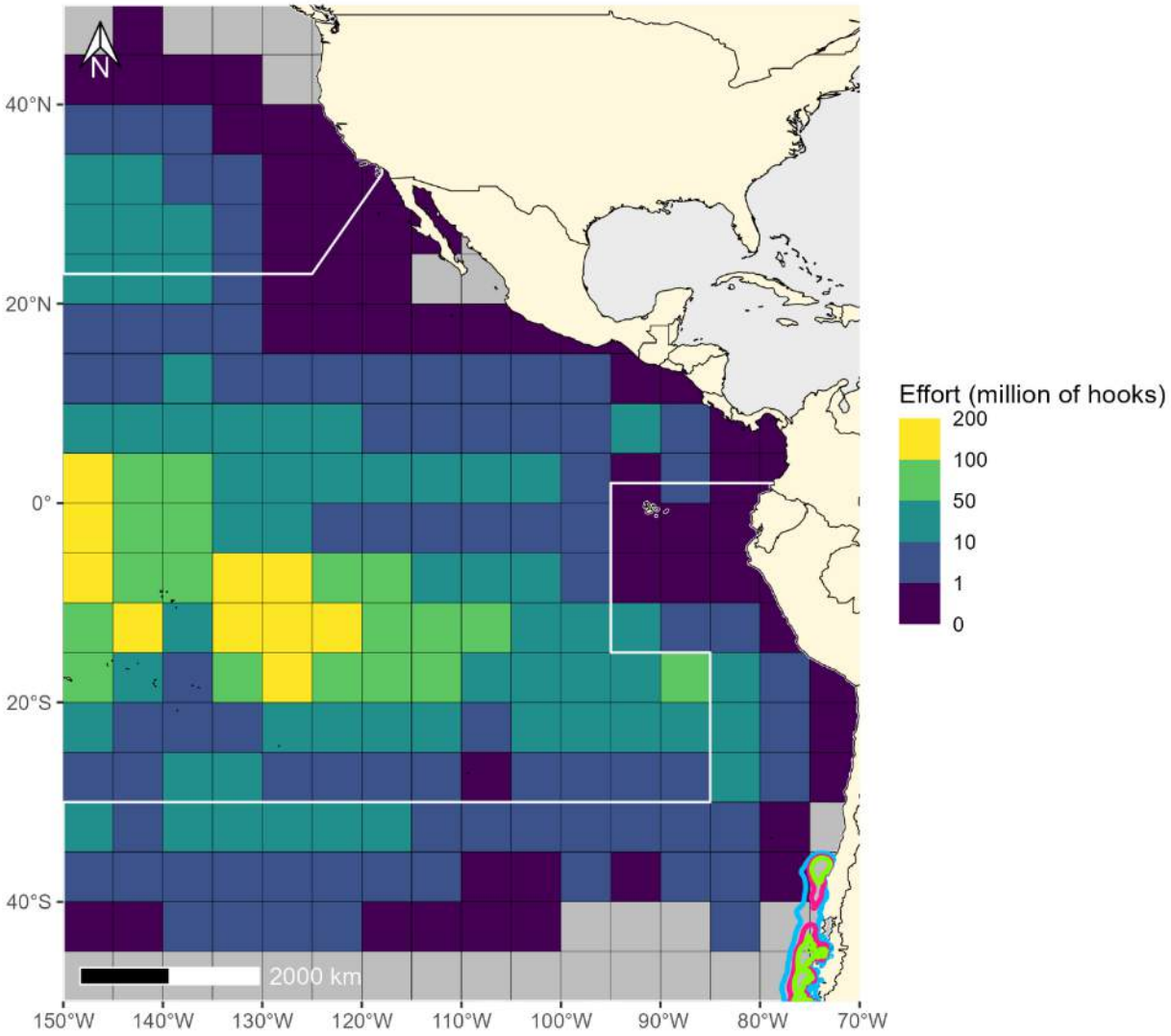
SUPPLEMENTAL 2 FIGURE 2. Overlapping 95% (blue line), 75% (pink line), and 50% (light green line) isopleths of adult non-breeding Antipodean Albatross (*Diomedea antipodensis antipodensis*) based on GPS/PTT tracks with pelagic longline fishing effort data (in number of hooks) from logbooks reported in 5°x5° grid cells by CPCs from 2000–2023. The areas north of the northern white line and south of the southern white line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 2, FIGURA 2. Isopletas que se traslapan el 95% (línea azul), 75% (línea rosa) y 50% (línea verde claro) de albatros de las Antípodas (*Diomedea antipodensis antipodensis*) adultos no reproductores, basadas en registros GPS/PTT, con datos de esfuerzo de pesca de palangre pelágico (en número de anzuelos) notificados en celdas de 5°x5° por los CPC entre 2000 y 2023. Las zonas al norte de la línea blanca del norte y al sur de la línea blanca del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



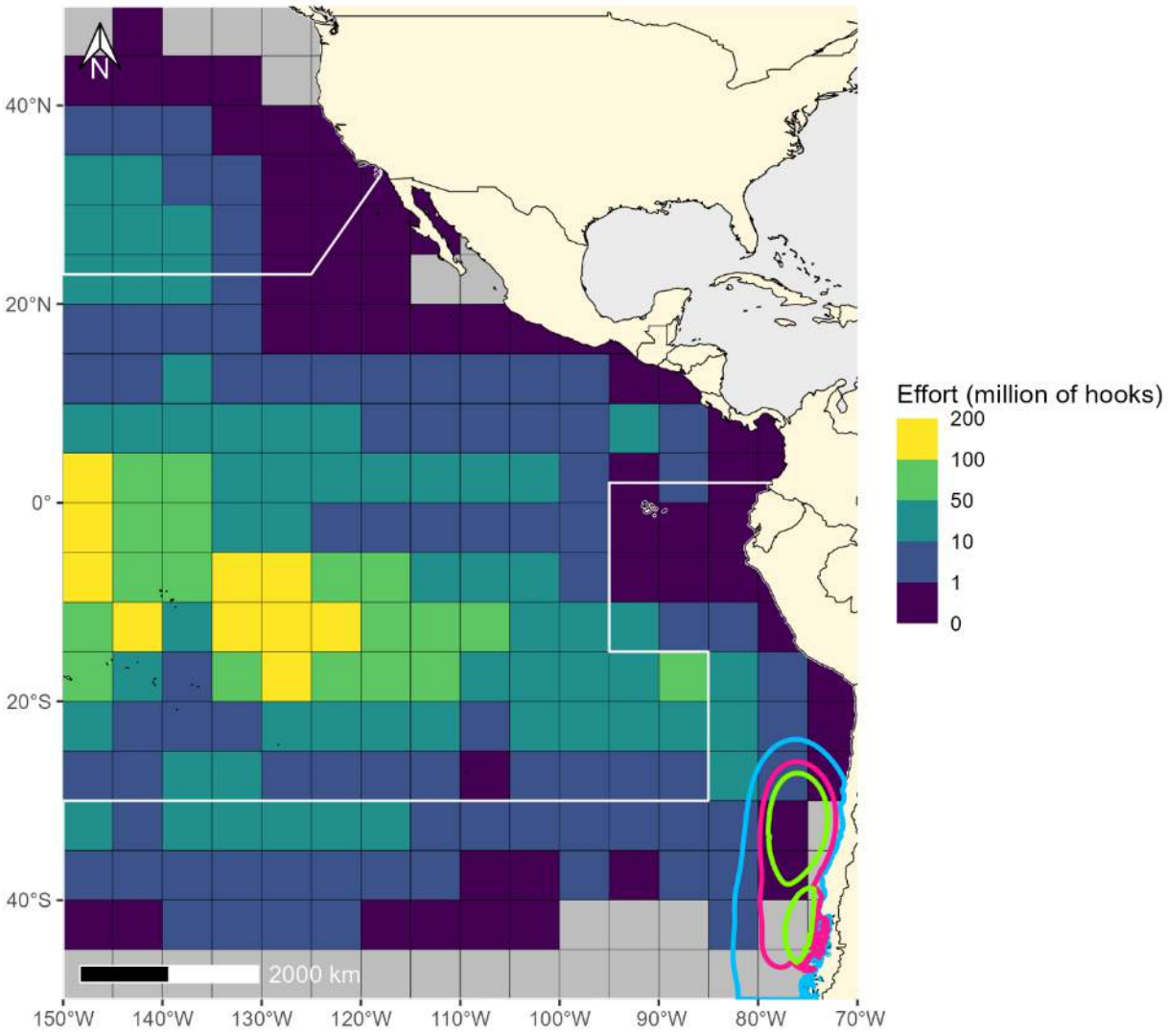
SUPPLEMENTAL 2 FIGURE 3. Overlapping 95% (blue line), 75% (pink line), and 50% (light green line) isopleths of adult non-breeding Black Petrel (*Procellaria parkinsoni*) based on GLS tracks with pelagic longline fishing effort data (in number of hooks) from logbooks reported in 5°x5° grid cells by CPCs from 2000–2023. The areas north of the northern white line and south of the southern white line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 2, FIGURA 3. Isopletas que se traslapan el 95% (línea azul), 75% (línea rosa) y 50% (línea verde claro) de pardelas de Parkinson (*Procellaria parkinsoni*) adultas no reproductoras, basadas en registros GLS, con datos de esfuerzo de pesca de palangre pelágico (en número de anzuelos) notificados en celdas de 5°x5° por los CPC entre 2000 y 2023. Las zonas al norte de la línea blanca del norte y al sur de la línea blanca del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



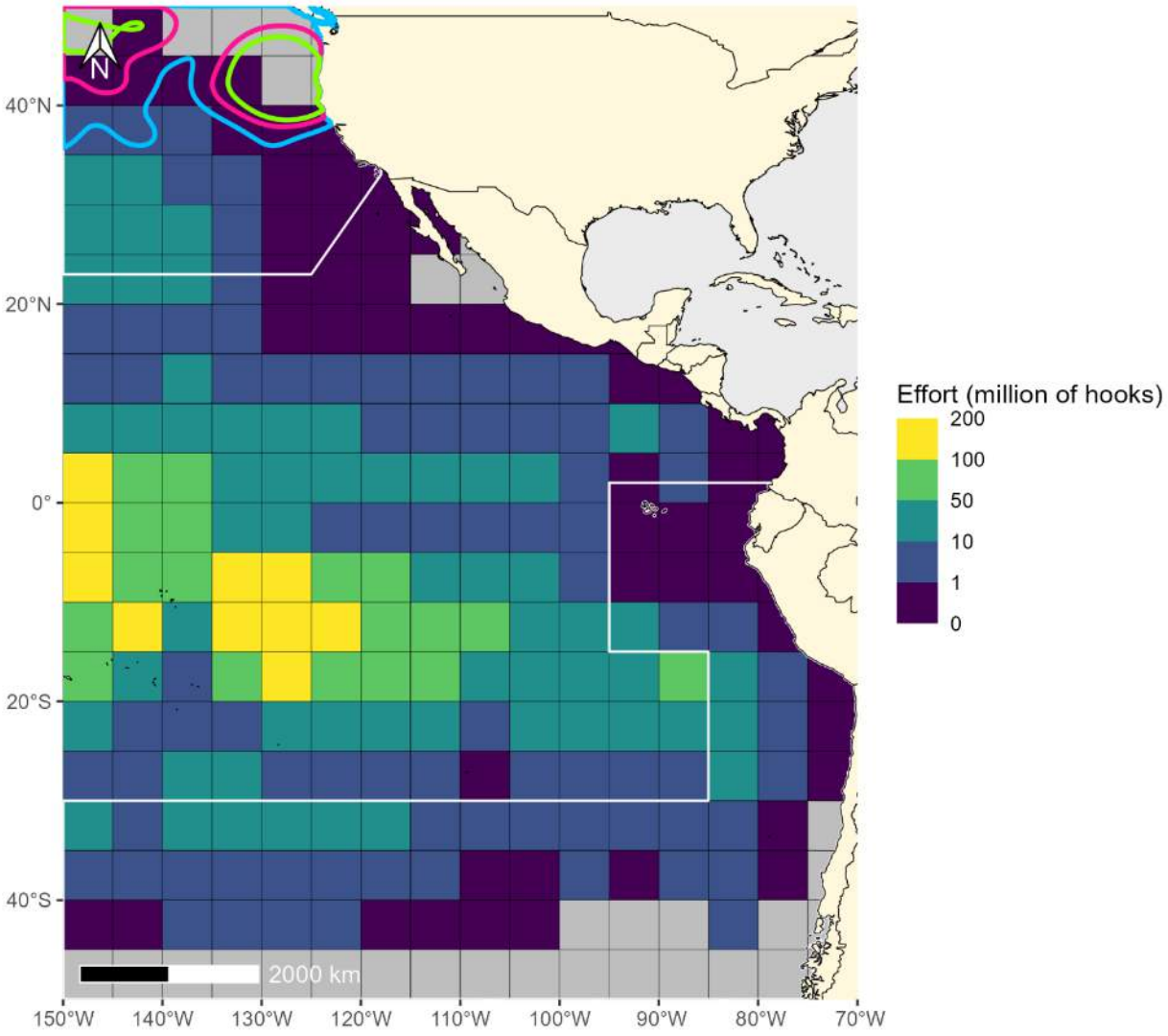
SUPPLEMENTAL 2 FIGURE 4. Overlapping 95% (blue line), 75% (pink line), and 50% (light green line) isopleths of breeding Black-browed Albatross (*Thalassarche melanophris*) based on GPS/PTT tracks with pelagic longline fishing effort data (in number of hooks) from logbooks reported in 5°x5° grid cells by CPCs from 2000–2023. The areas north of the northern white line and south of the southern white line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 2, FIGURA 4. Isopletas que se traslapan el 95% (línea azul), 75% (línea rosa) y 50% (línea verde claro) de albatros ceja negra (*Thalassarche melanophris*) reproductor, basadas en registros GPS/PTT, con datos de esfuerzo de pesca de palangre pelágico (en número de anzuelos) notificados en celdas de 5°x5° por los CPC entre 2000 y 2023. Las zonas al norte de la línea blanca del norte y al sur de la línea blanca del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



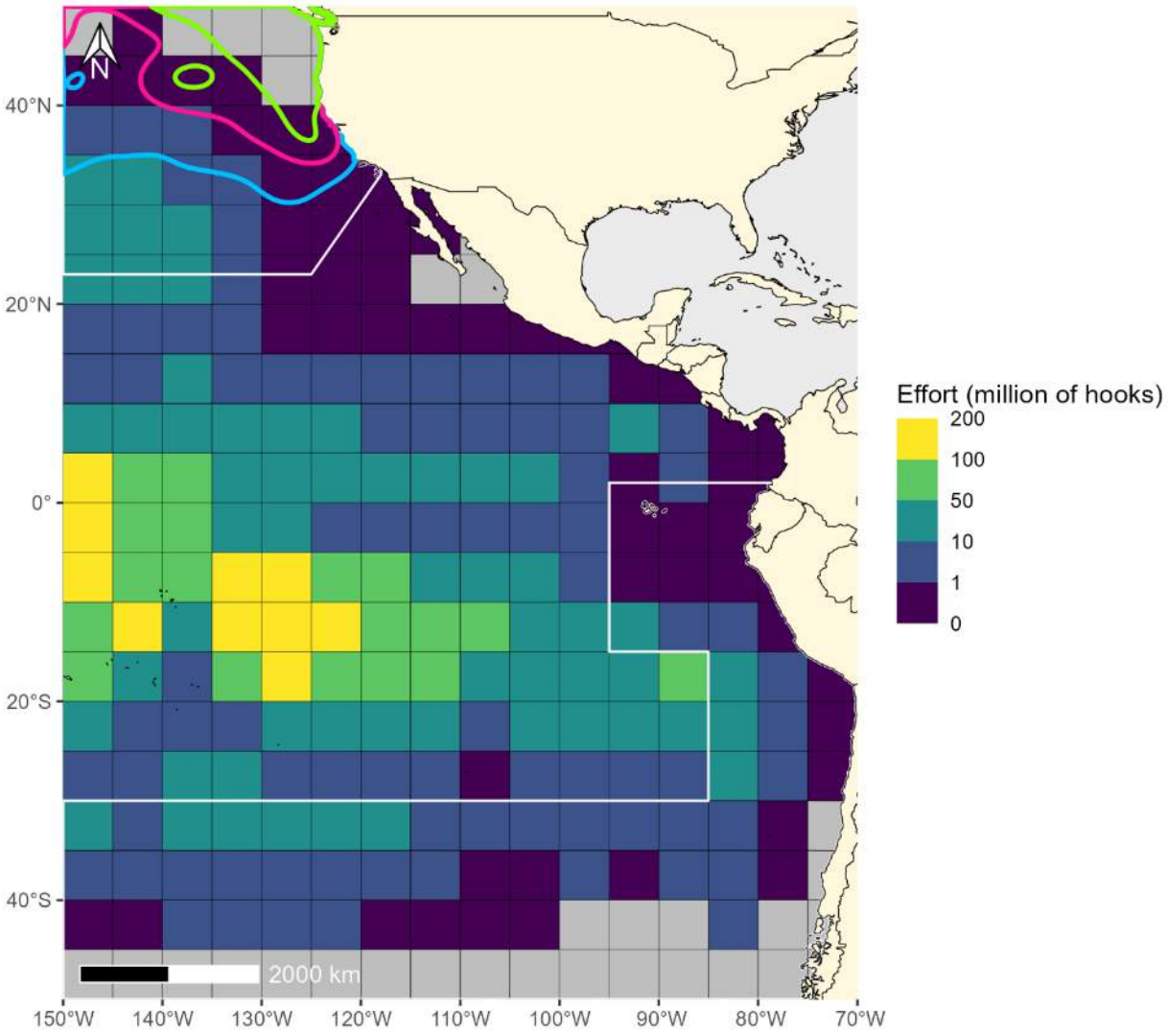
SUPPLEMENTAL 2 FIGURE 5. Overlapping 95% (blue line), 75% (pink line), and 50% (light green line) isopleths of adult non-breeding Black-browed Albatross (*Thalassarche melanophris*) based on GLS tracks with pelagic longline fishing effort data (in number of hooks) from logbooks reported in 5°x5° grid cells by CPCs from 2000–2023. The areas north of the northern white line and south of the southern white line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 2, FIGURA 5. Isopletas que se traslapan el 95% (línea azul), 75% (línea rosa) y 50% (línea verde claro) de albatros ceja negra (*Thalassarche melanophris*) adultos no reproductores, basadas en registros GLS, con datos de esfuerzo de pesca de palangre pelágico (en número de anzuelos) notificados en celdas de 5°x5° por los CPC entre 2000 y 2023. Las zonas al norte de la línea blanca del norte y al sur de la línea blanca del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



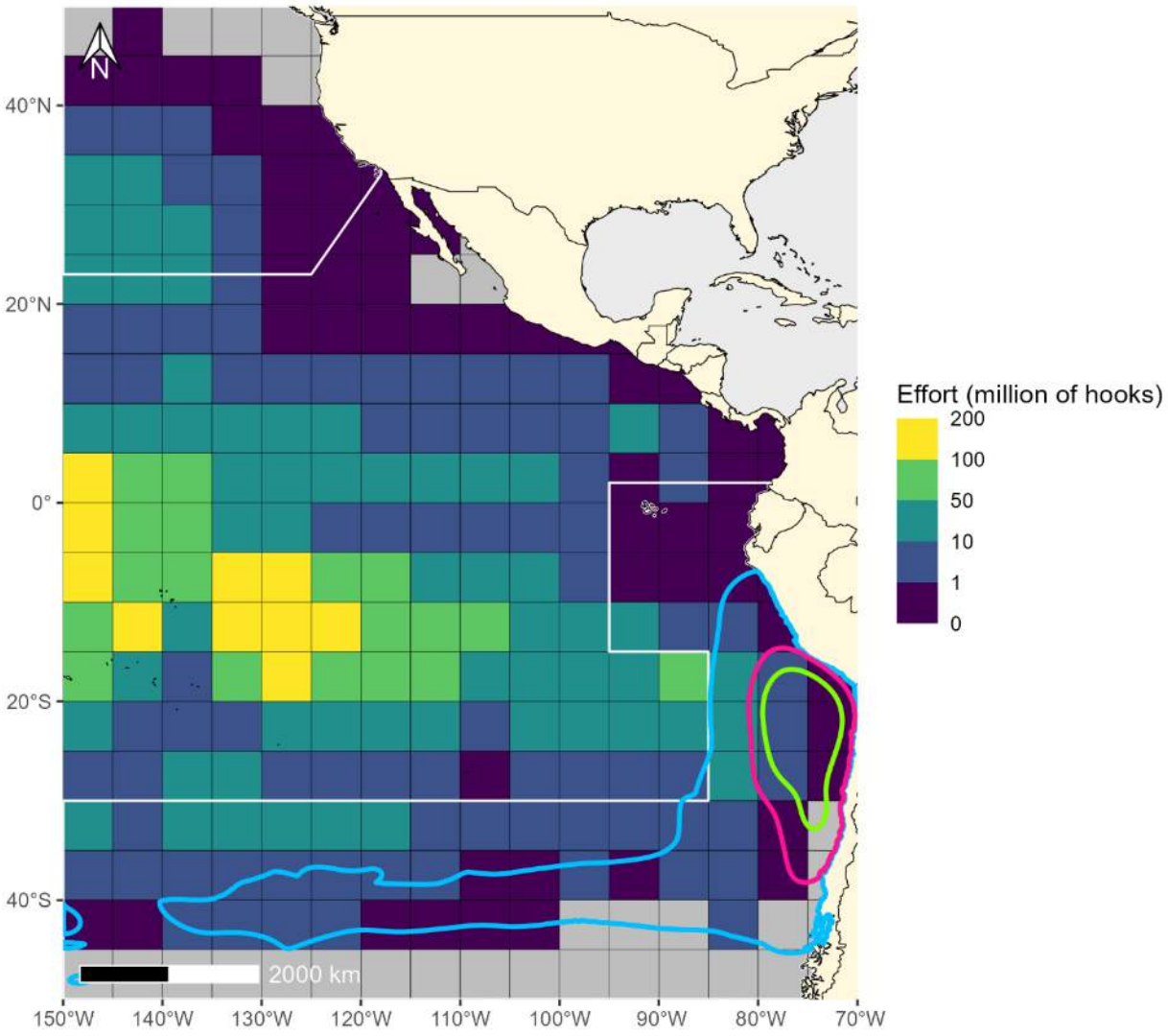
SUPPLEMENTAL 2 FIGURE 6. Overlapping 95% (blue line), 75% (pink line), and 50% (light green line) isopleths of adult breeding Black-footed Albatross (*Phoebastria nigripes*) based on GLS tracks with pelagic longline fishing effort data (in number of hooks) from logbooks reported in 5°x5° grid cells by CPCs from 2000–2023. The areas north of the northern white line and south of the southern white line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 2, FIGURA 6. Isopletas que se traslapan el 95% (línea azul), 75% (línea rosa) y 50% (línea verde claro) de albatros de patas negras (*Phoebastria nigripes*) adultos reproductores, basadas en registros GLS, con datos de esfuerzo de pesca de palangre pelágico (en número de anzuelos) notificados en celdas de 5°x5° por los CPC entre 2000 y 2023. Las zonas al norte de la línea blanca del norte y al sur de la línea blanca del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



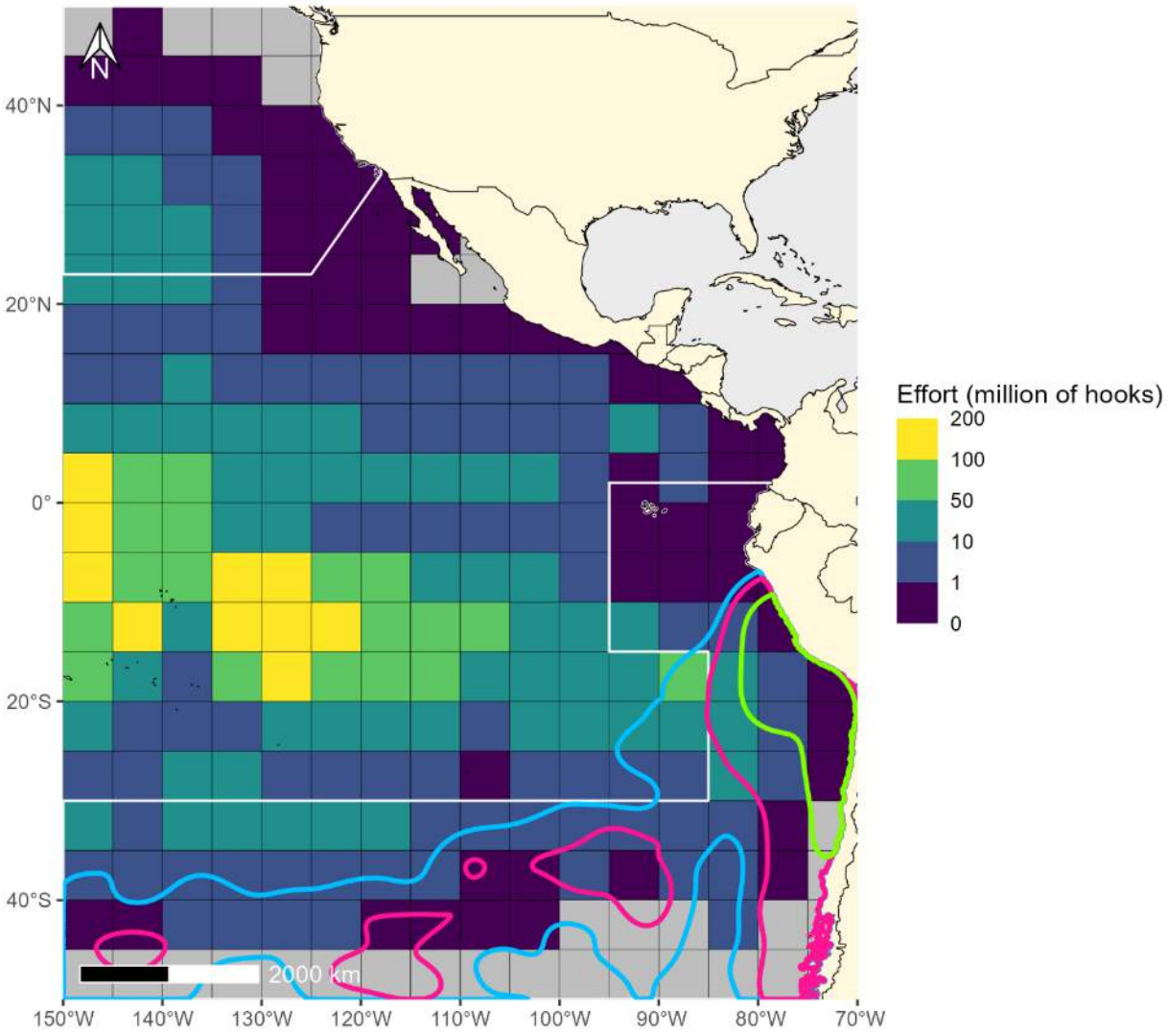
SUPPLEMENTAL 2 FIGURE 7. Overlapping 95% (blue line), 75% (pink line), and 50% (light green line) isopleths of non-adult breeding Black-footed Albatross (*Phoebastria nigripes*) based on GLS tracks with pelagic longline fishing effort data (in number of hooks) from logbooks reported in 5°x5° grid cells by CPCs from 2000–2023. The areas north of the northern white line and south of the southern white line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 2, FIGURA 7. Isopletas que se traslapan el 95% (línea azul), 75% (línea rosa) y 50% (línea verde claro) de albatros de patas negras (*Phoebastria nigripes*) no adultos reproductores, basadas en registros GLS, con datos de esfuerzo de pesca de palangre pelágico (en número de anzuelos) notificados en celdas de 5°x5° por los CPC entre 2000 y 2023. Las zonas al norte de la línea blanca del norte y al sur de la línea blanca del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



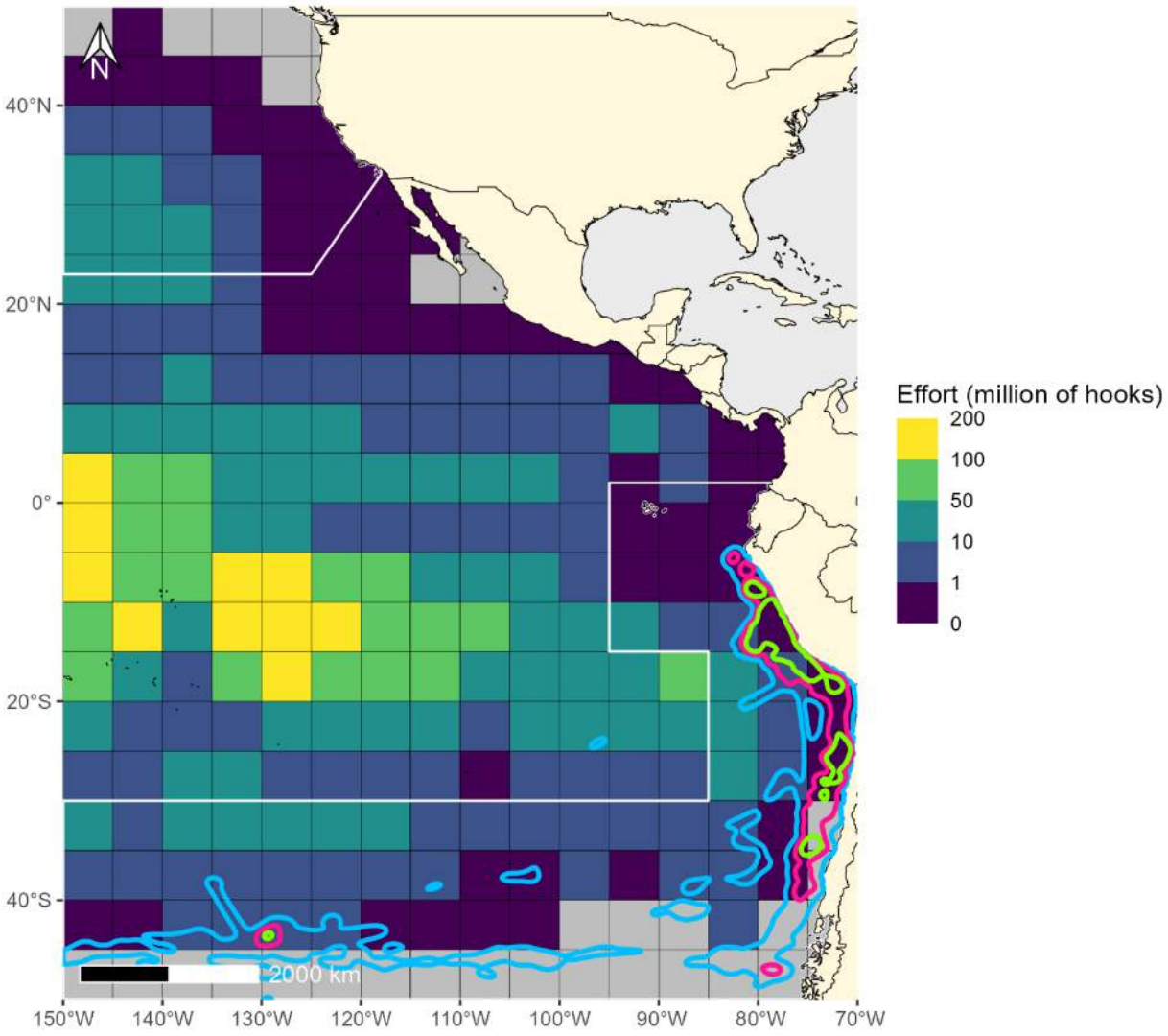
SUPPLEMENTAL 2 FIGURE 8. Overlapping 95% (blue line), 75% (pink line), and 50% (light green line) isopleths of adult non-breeding Buller's Albatross (*Thalassarche bulleri*) based on GLS tracks with pelagic longline fishing effort data (in number of hooks) from logbooks reported in 5°x5° grid cells by CPCs from 2000–2023. The areas north of the northern white line and south of the southern white line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 2, FIGURA 8. Isopletas que se traslapan el 95% (línea azul), 75% (línea rosa) y 50% (línea verde claro) de albatros de Buller (*Thalassarche bulleri*) adultos no reproductores, basadas en registros GLS, con datos de esfuerzo de pesca de palangre pelágico (en número de anzuelos) notificados en celdas de 5°x5° por los CPC entre 2000 y 2023. Las zonas al norte de la línea blanca del norte y al sur de la línea blanca del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



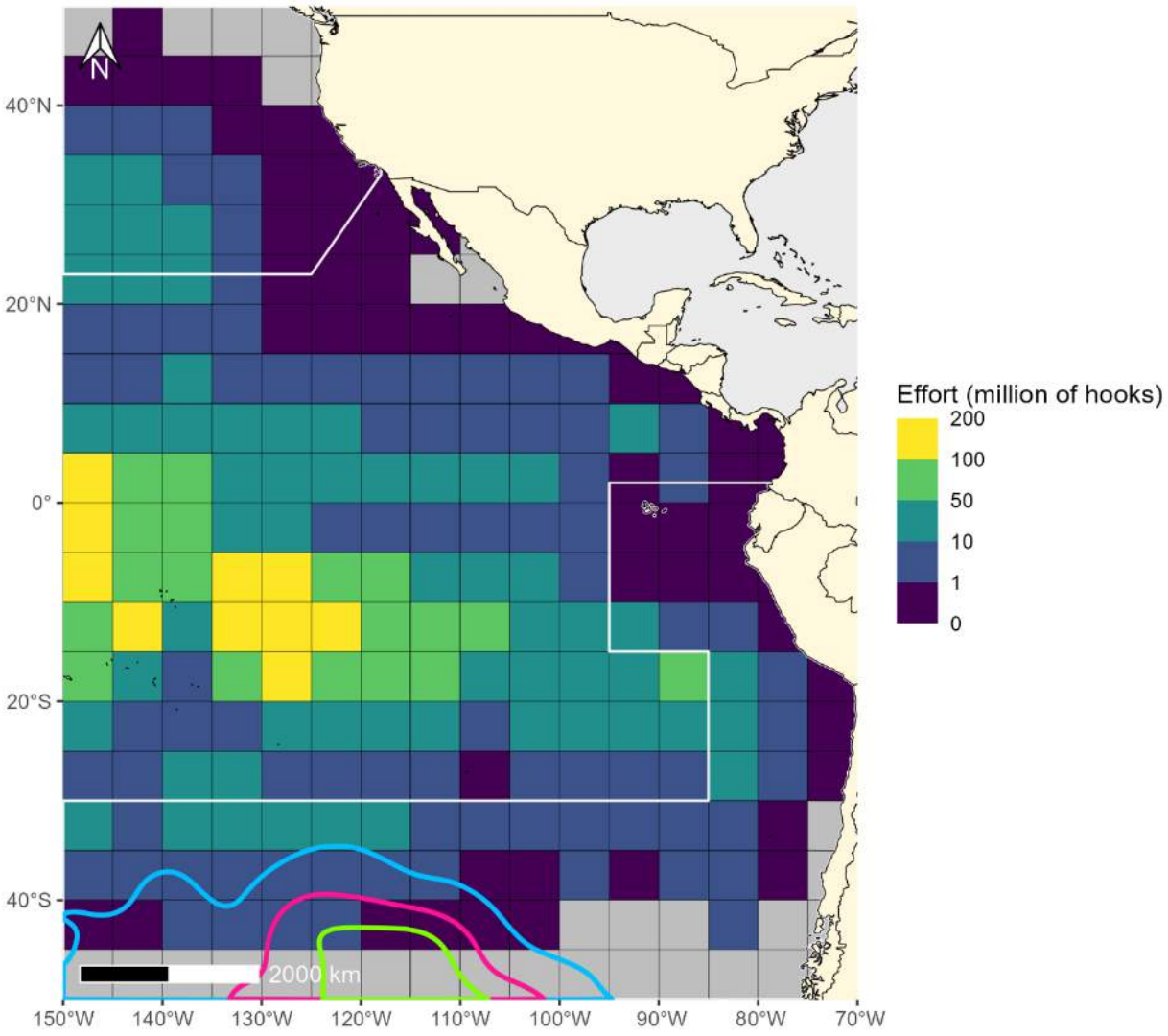
SUPPLEMENTAL 2 FIGURE 9. Overlapping 95% (blue line), 75% (pink line), and 50% (light green line) isopleths of adult non-breeding Chatham Albatross (*Thalassarche eremita*) based on GLS tracks with pelagic longline fishing effort data (in number of hooks) from logbooks reported in 5°x5° grid cells by CPCs from 2000–2023. The areas north of the northern white line and south of the southern white line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 2, FIGURA 9. Isopletas que se traslapan el 95% (línea azul), 75% (línea rosa) y 50% (línea verde claro) de albatros de Chatham (*Thalassarche eremita*) adultos no reproductores, basadas en registros GLS, con datos de esfuerzo de pesca de palangre pelágico (en número de anzuelos) notificados en celdas de 5°x5° por los CPC entre 2000 y 2023. Las zonas al norte de la línea blanca del norte y al sur de la línea blanca del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



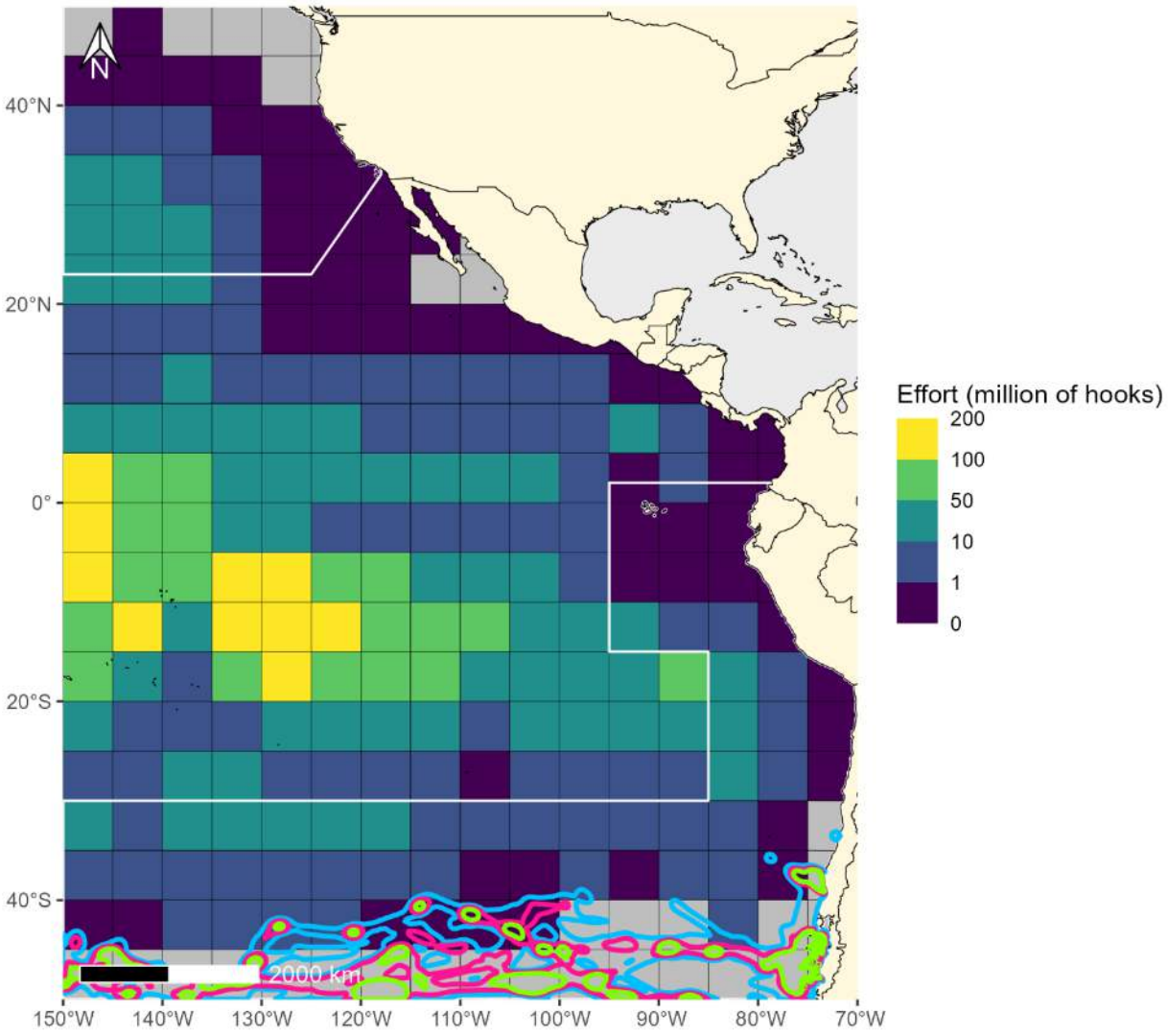
SUPPLEMENTAL 2 FIGURE 10. Overlapping 95% (blue line), 75% (pink line), and 50% (light green line) isopleths of adult non-breeding Chatham Albatross (*Thalassarche eremita*) based on GPS/PTT tracks with pelagic longline fishing effort data (in number of hooks) from logbooks reported in 5°x5° grid cells by CPCs from 2000–2023. The areas north of the northern white line and south of the southern white line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 2, FIGURA 10. Isopletas que se traslapan el 95% (línea azul), 75% (línea rosa) y 50% (línea verde claro) de isopletas de albatros de Chatham (*Thalassarche eremita*) adultos no reproductores, basadas en registros GPS/PTT, con datos de esfuerzo de pesca de palangre pelágico (en número de anzuelos) notificados en celdas de 5°x5° por los CPC entre 2000 y 2023. Las zonas al norte de la línea blanca del norte y al sur de la línea blanca del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



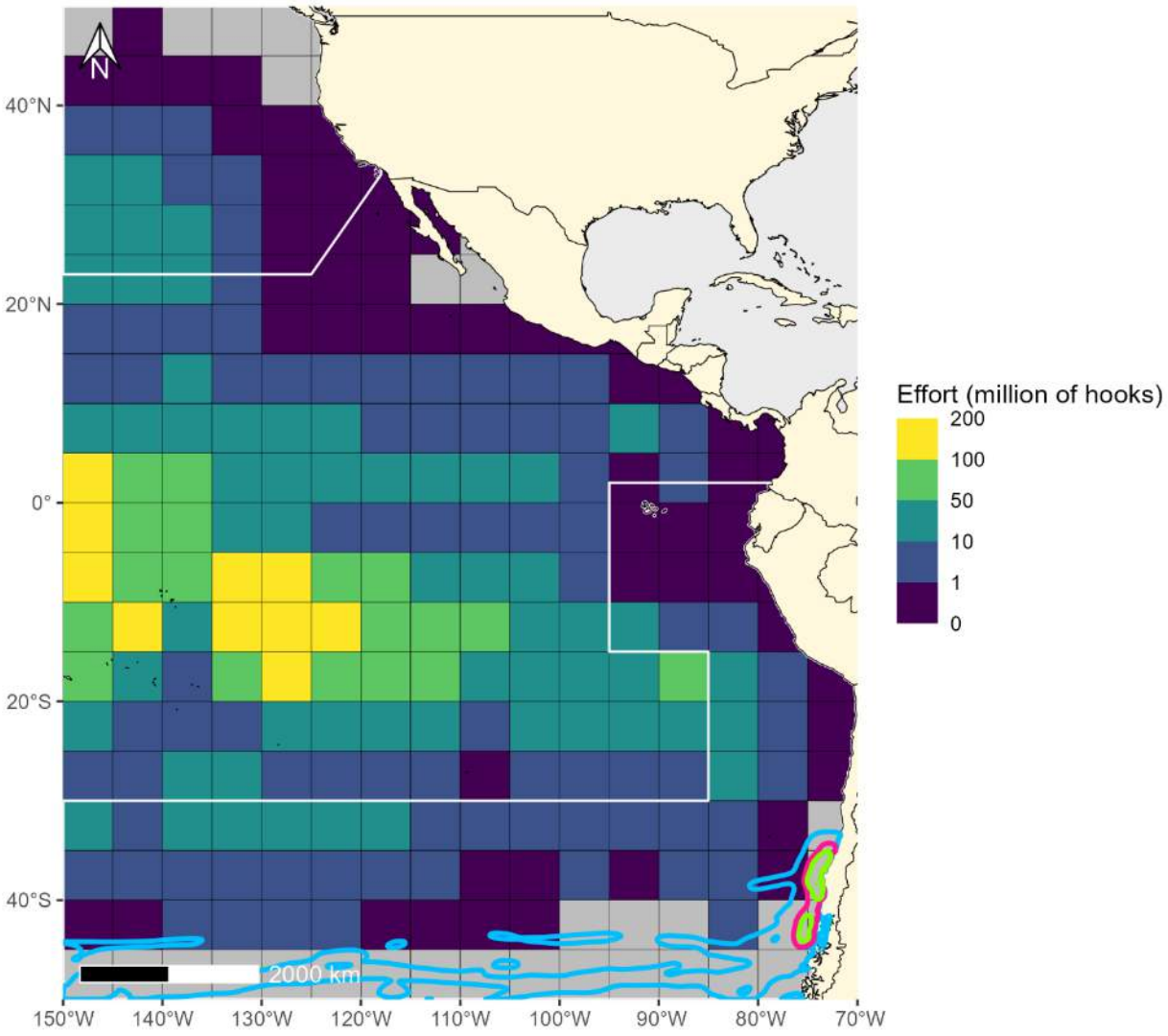
SUPPLEMENTAL 2 FIGURE 11. Overlapping 95% (blue line), 75% (pink line), and 50% (light green line) isopleths of non-breeding Grey Petrel (*Procellaria cinerea*) based on GLS tracks with pelagic longline fishing effort data (in number of hooks) from logbooks reported in 5°x5° grid cells by CPCs from 2000–2023. The areas north of the northern white line and south of the southern white line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 2, FIGURA 11. Isopletas que se traslapan el 95% (línea azul), 75% (línea rosa) y 50% (línea verde claro) de pardelas grises (*Procellaria cinerea*) no reproductores, basadas en las registros GLS, con datos de esfuerzo de pesca de palangre pelágico (en número de anzuelos) notificados en celdas de 5°x5° por los CPC entre 2000 y 2023. Las zonas al norte de la línea blanca del norte y al sur de la línea blanca del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



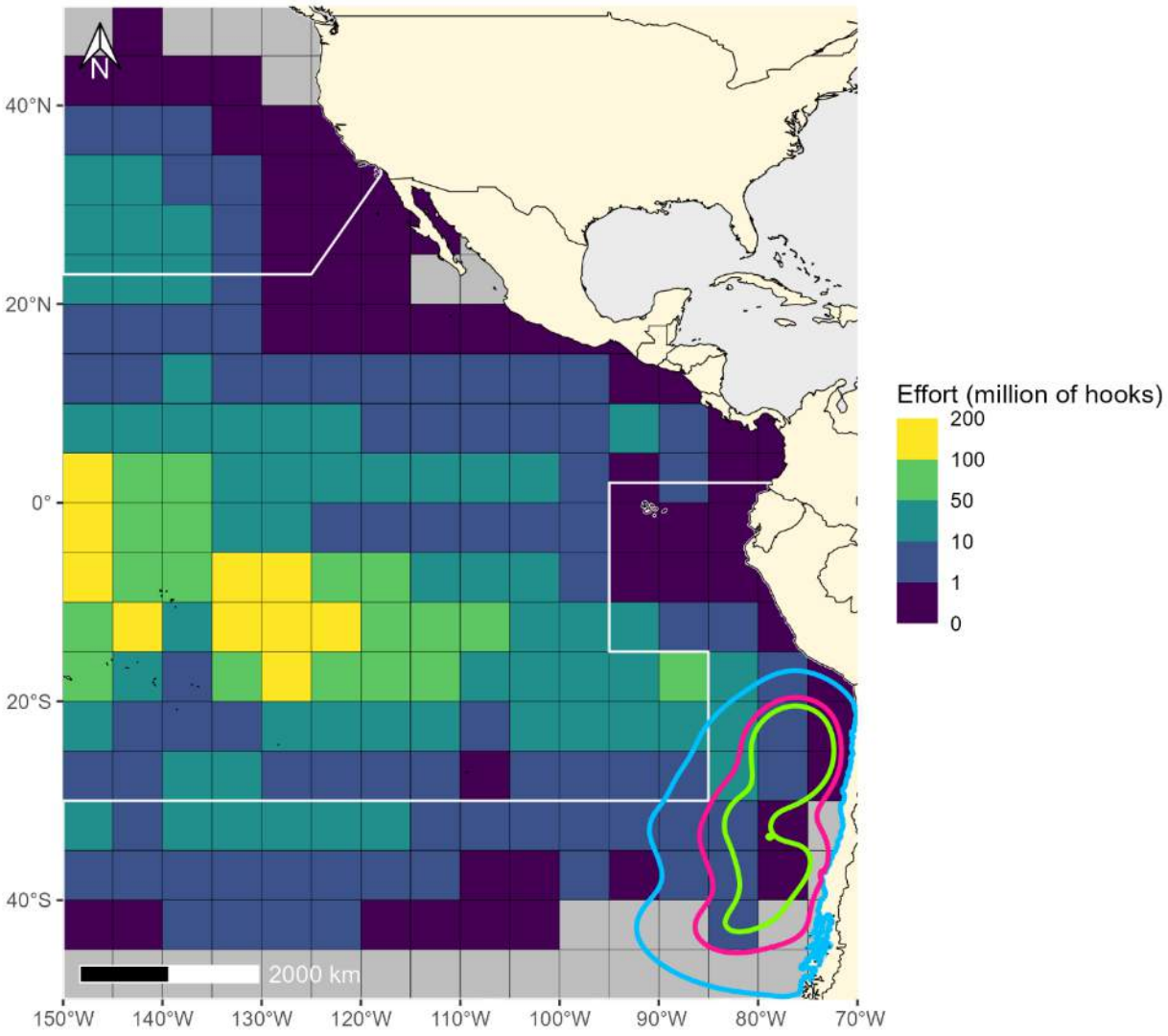
SUPPLEMENTAL 2 FIGURE 12. Overlapping 95% (blue line), 75% (pink line), and 50% (light green line) isopleths of juvenile Northern Giant Petrel (*Macronectes halli*) based on GPS/PTT tracks with pelagic longline fishing effort data (in number of hooks) from logbooks reported in 5°x5° grid cells by CPCs from 2000–2023. The areas north of the northern white line and south of the southern white line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 2, FIGURA 12. Isopletas que se traslapan el 95% (línea azul), 75% (línea rosa) y 50% (línea verde claro) de petreles gigantes de Hall (*Macronectes halli*) juveniles, basadas en registros GPS/PTT, con datos de esfuerzo de pesca de palangre pelágico (en número de anzuelos) notificados en celdas de 5°x5° por los CPC entre 2000 y 2023. Las zonas al norte de la línea blanca del norte y al sur de la línea blanca del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



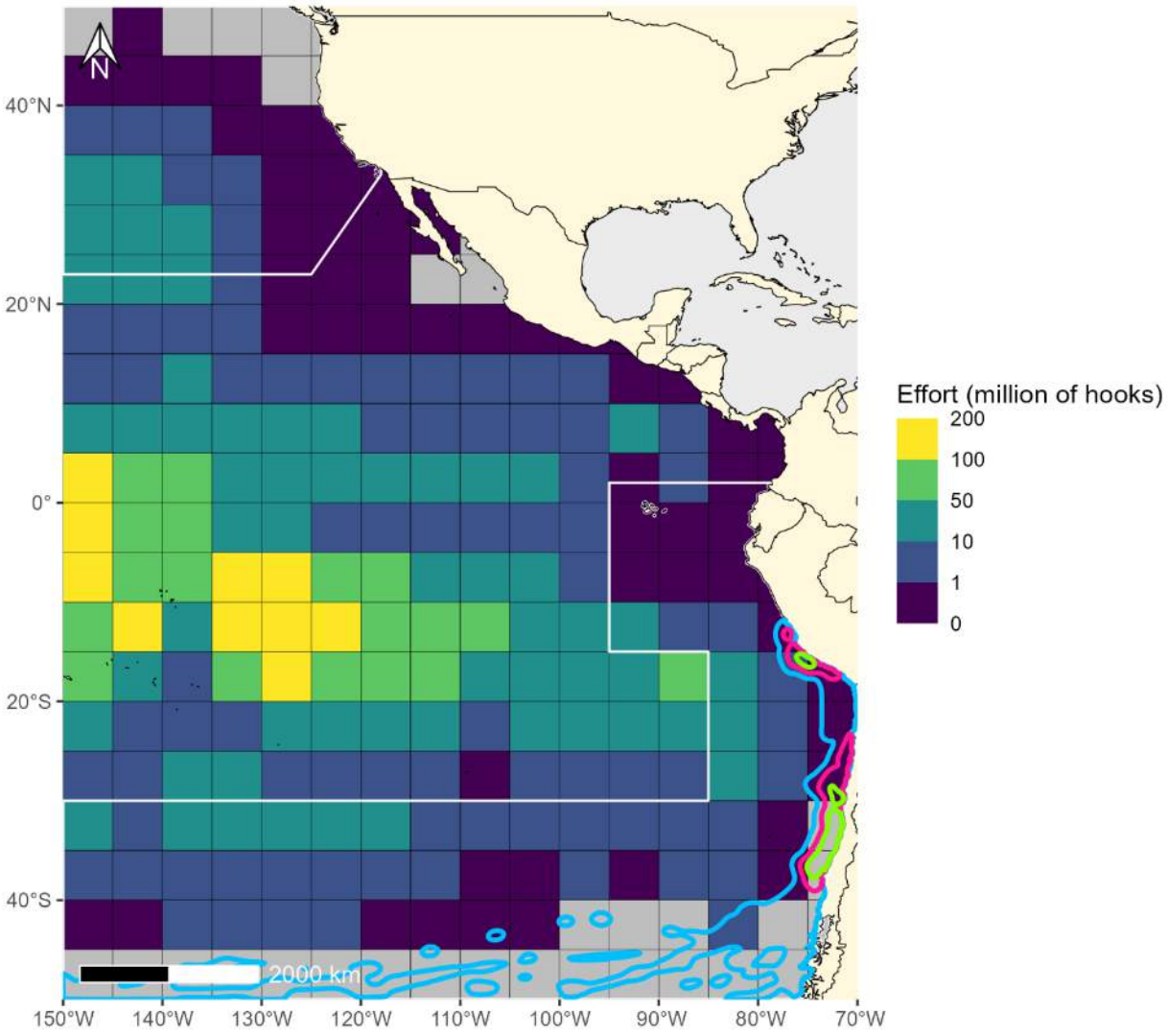
SUPPLEMENTAL 2 FIGURE 13. Overlapping 95% (blue line), 75% (pink line), and 50% (light green line) isopleths of adult non-breeding Northern Royal Albatross (*Diomedea sanfordi*) based on GPS/PTT tracks with pelagic longline fishing effort data (in number of hooks) from logbooks reported in 5°x5° grid cells by CPCs from 2000–2023. The areas north of the northern white line and south of the southern white line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 2, FIGURA 13. Isopletas que se traslapan el 95% (línea azul), 75% (línea rosa) y 50% (línea verde claro) de albatros real del norte (*Diomedea sanfordi*) adultos no reproductores, basadas en registros de GPS/PTT, con datos de esfuerzo de pesca de palangre pelágico (en número de anzuelos) notificados en celdas de 5°x5° por los CPC entre 2000 y 2023. Las zonas al norte de la línea blanca del norte y al sur de la línea blanca del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



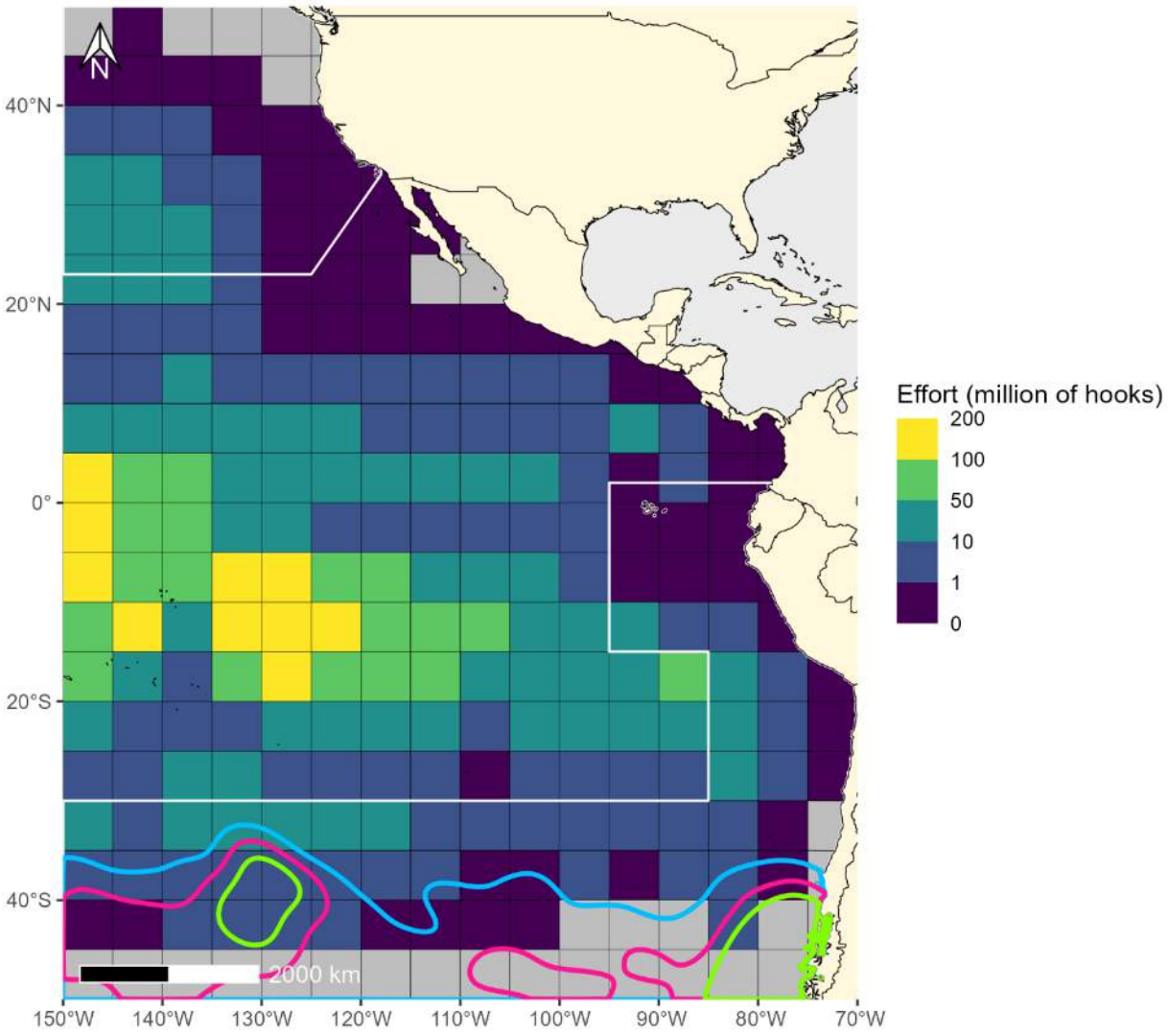
SUPPLEMENTAL 2 FIGURE 14. Overlapping 95% (blue line), 75% (pink line), and 50% (light green line) isopleths of adult non-breeding Salvin's Albatross (*Thalassarche salvini*) based on GLS tracks with pelagic longline fishing effort data (in number of hooks) from logbooks reported in 5°x5° grid cells by CPCs from 2000–2023. The areas north of the northern white line and south of the southern white line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 2, FIGURA 14. Isopletas que se traslapan el 95% (línea azul), 75% (línea rosa) y 50% (línea verde claro) de albatros de Salvin (*Thalassarche salvini*) adultos no reproductores, basadas en registros GLS, con datos de esfuerzo de pesca de palangre pelágico (en número de anzuelos) notificados en celdas de 5°x5° por los CPC entre 2000 y 2023. Las zonas al norte de la línea blanca del norte y al sur de la línea blanca del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



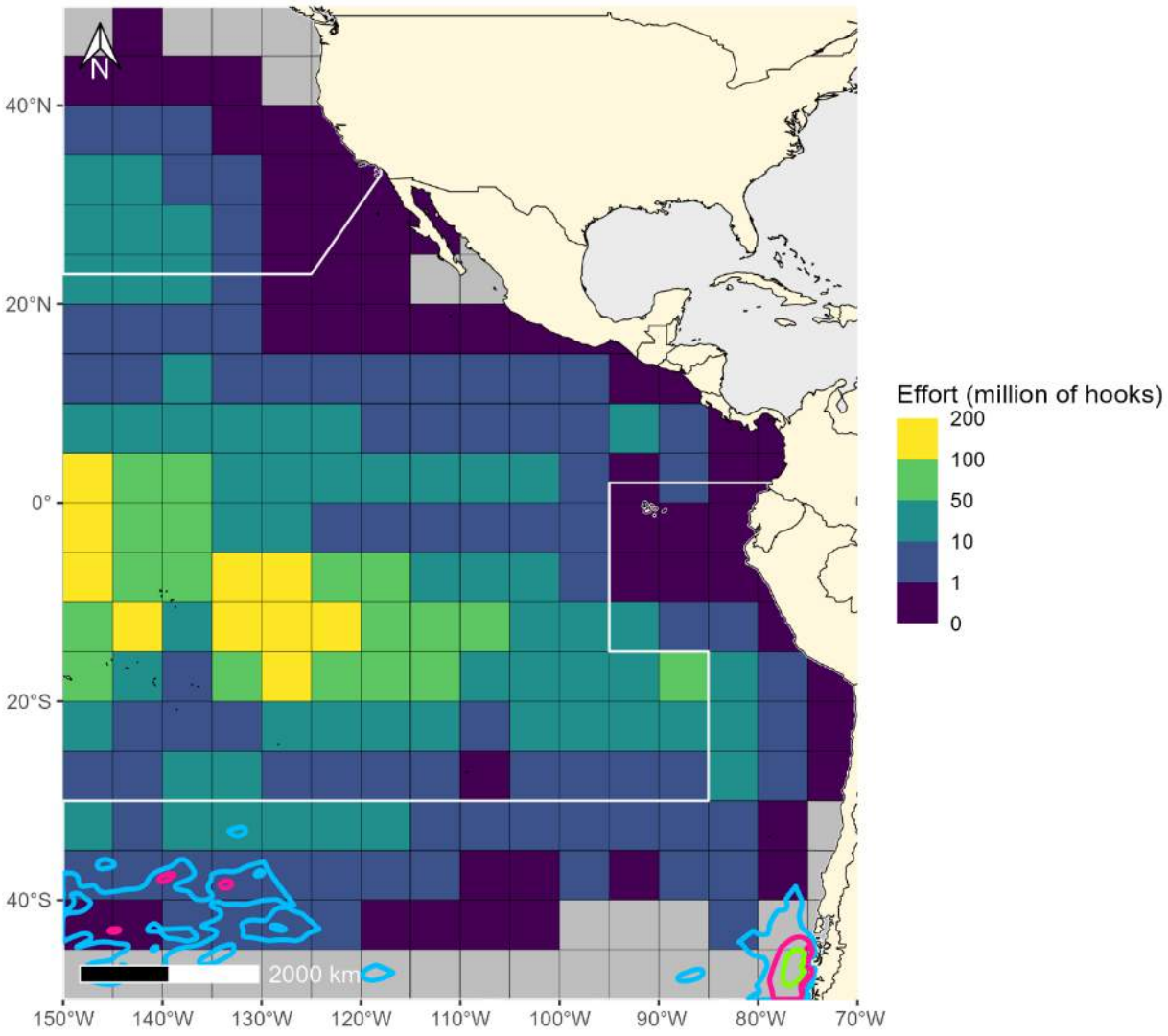
SUPPLEMENTAL 2 FIGURE 15. Overlapping 95% (blue line), 75% (pink line), and 50% (light green line) isopleths of adult non-breeding Salvin's Albatross (*Thalassarche salvini*) based on GPS/PTT tracks with pelagic longline fishing effort data (in number of hooks) from logbooks reported in 5°x5° grid cells by CPCs from 2000–2023. The areas north of the northern white line and south of the southern white line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 2, FIGURA 15. Isopletas que se traslapan el 95% (línea azul), 75% (línea rosa) y 50% (línea verde claro) de albatros de Salvin (*Thalassarche salvini*) adultos no reproductores, basadas en registros GPS/PTT, con datos de esfuerzo de pesca de palangre pelágico (en número de anzuelos) notificados en celdas de 5°x5° por los CPC entre 2000 y 2023. Las zonas al norte de la línea blanca del norte y al sur de la línea blanca del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



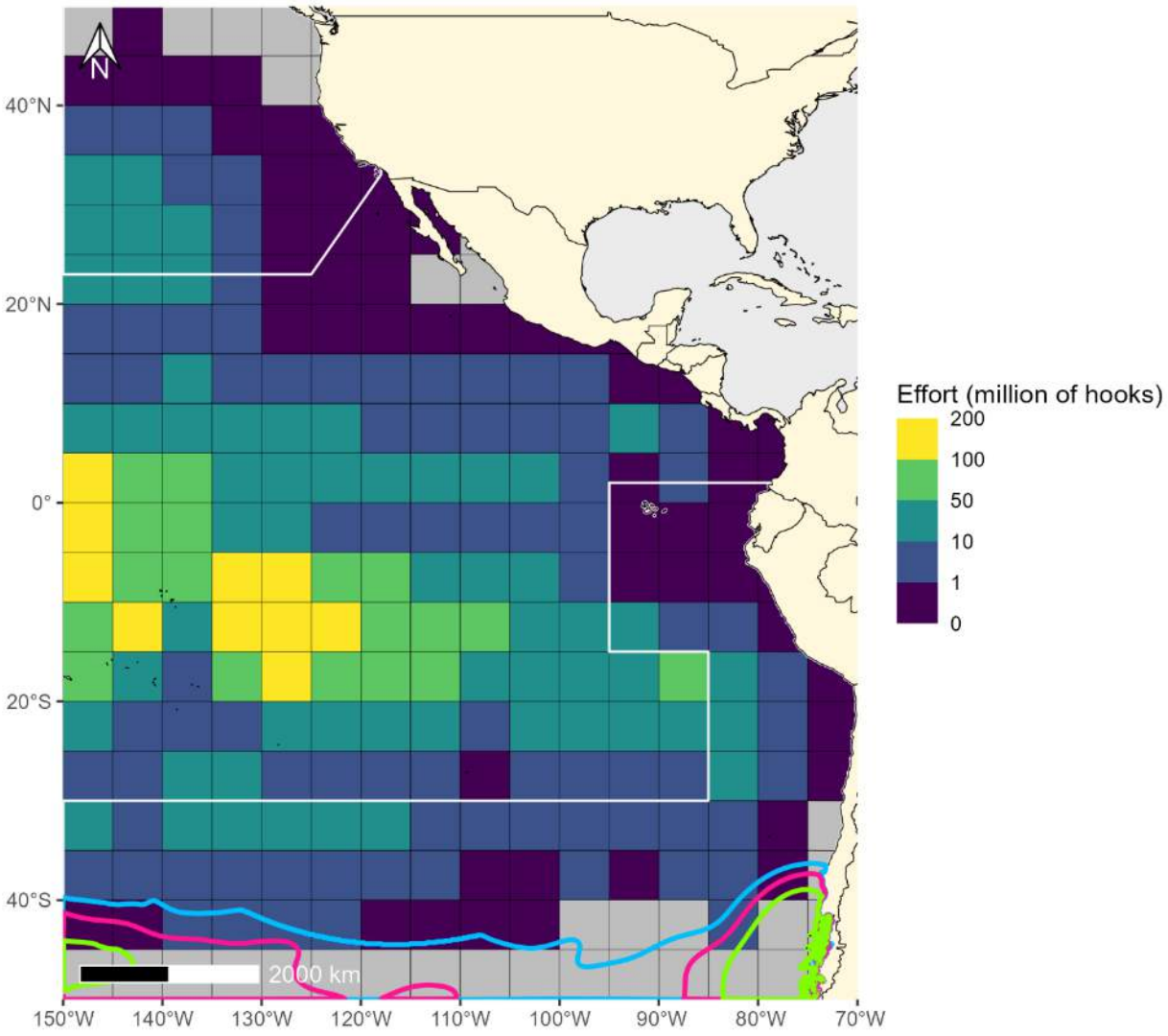
SUPPLEMENTAL 2 FIGURE 16. Overlapping 95% (blue line), 75% (pink line), and 50% (light green line) isopleths of juvenile Wandering Albatross (*Diomedea exulans*) based on GLS tracks with pelagic longline fishing effort data (in number of hooks) from logbooks reported in 5°x5° grid cells by CPCs from 2000–2023. The areas north of the northern white line and south of the southern white line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 2, FIGURA 16. Isopletas que se traslapan el 95% (línea azul), 75% (línea rosa) y 50% (línea verde claro) de albatros errantes (*Diomedea exulans*) juveniles, basadas en registros GLS, con datos de esfuerzo de pesca de palangre pelágico (en número de anzuelos) notificados en celdas de 5°x5° por los CPC entre 2000 y 2023. Las zonas al norte de la línea blanca del norte y al sur de la línea blanca del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



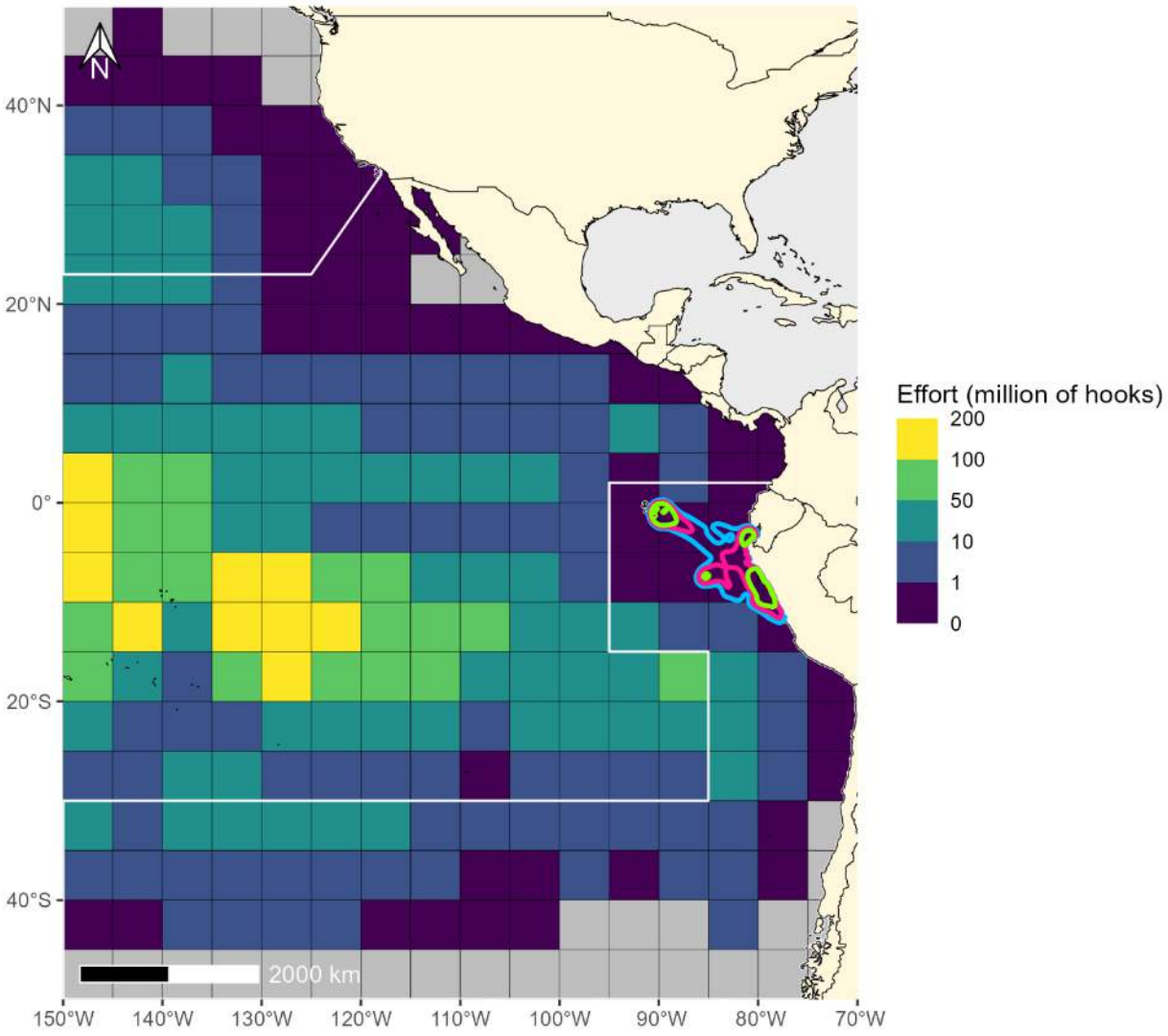
SUPPLEMENTAL 2 FIGURE 17. Overlapping 95% (blue line), 75% (pink line), and 50% (light green line) isopleths of juvenile Wandering Albatross (*Diomedea exulans*) based on GPS/PTT tracks with pelagic longline fishing effort data (in number of hooks) from logbooks reported in 5°x5° grid cells by CPCs from 2000–2023. The areas north of the northern white line and south of the southern white line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 2, FIGURA 17. Isopletas que se traslapan el 95% (línea azul), 75% (línea rosa) y 50% (línea verde claro) de albatros errantes (*Diomedea exulans*) juveniles, basadas en registros GPS/PTT, con datos de esfuerzo de pesca de palangre pelágico (en número de anzuelos) notificados en celdas de 5°x5° por los CPC entre 2000 y 2023. Las zonas al norte de la línea blanca del norte y al sur de la línea blanca del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



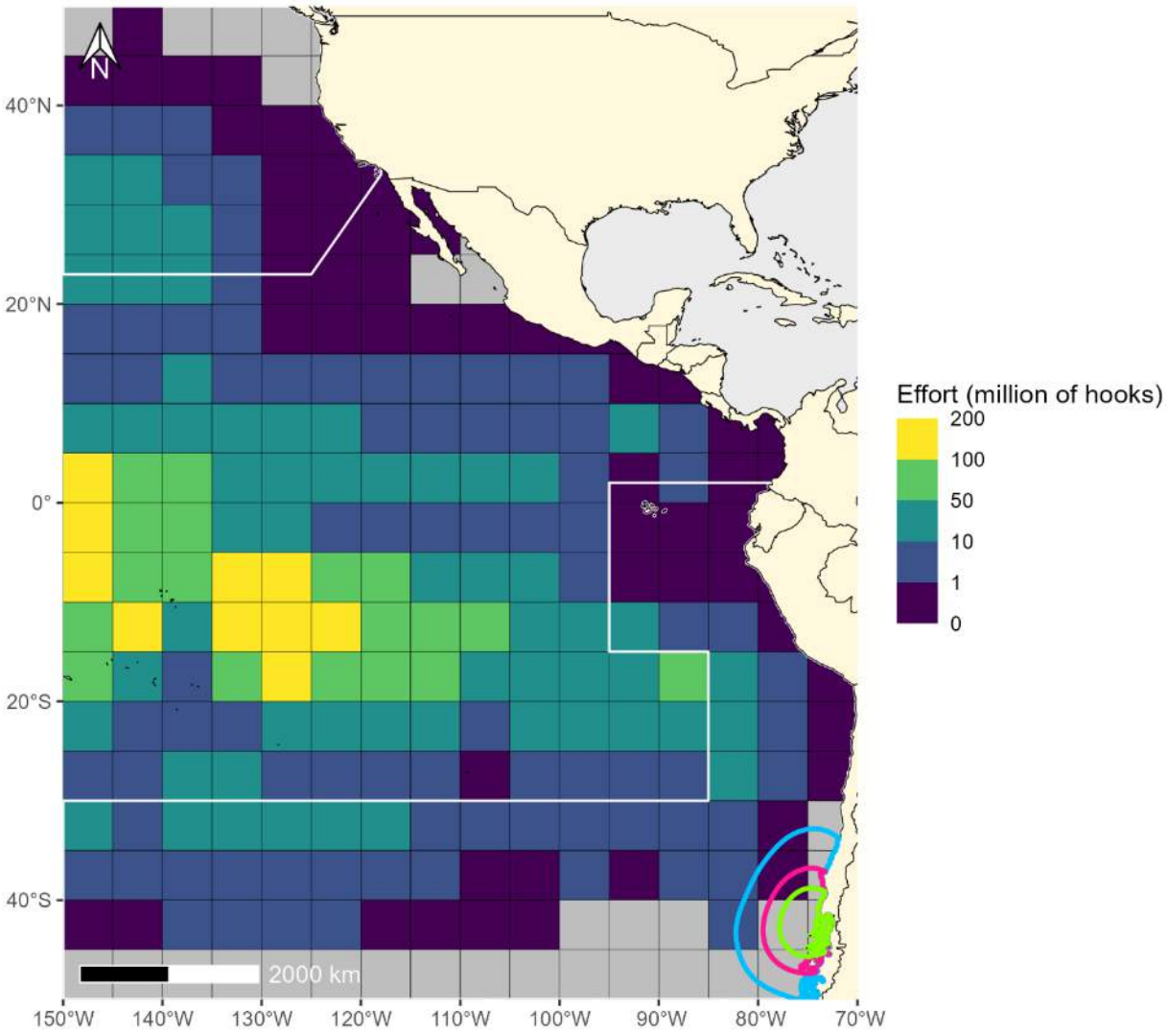
SUPPLEMENTAL 2 FIGURE 18. Overlapping 95% (blue line), 75% (pink line), and 50% (light green line) isopleths of adult non-breeding Wandering Albatross (*Diomedea exulans*) based on GLS tracks with pelagic longline fishing effort data (in number of hooks) from logbooks reported in 5°x5° grid cells by CPCs from 2000–2023. The areas north of the northern white line and south of the southern white line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 2, FIGURA 18. Isopletas que se traslapan el 95% (línea azul), 75% (línea rosa) y 50% (línea verde claro) de albatros errantes (*Diomedea exulans*) adultos no reproductores, basadas en registros GLS, con datos de esfuerzo de pesca de palangre pelágico (en número de anzuelos) notificados en celdas de 5°x5° por los CPC entre 2000 y 2023. Las zonas al norte de la línea blanca del norte y al sur de la línea blanca del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



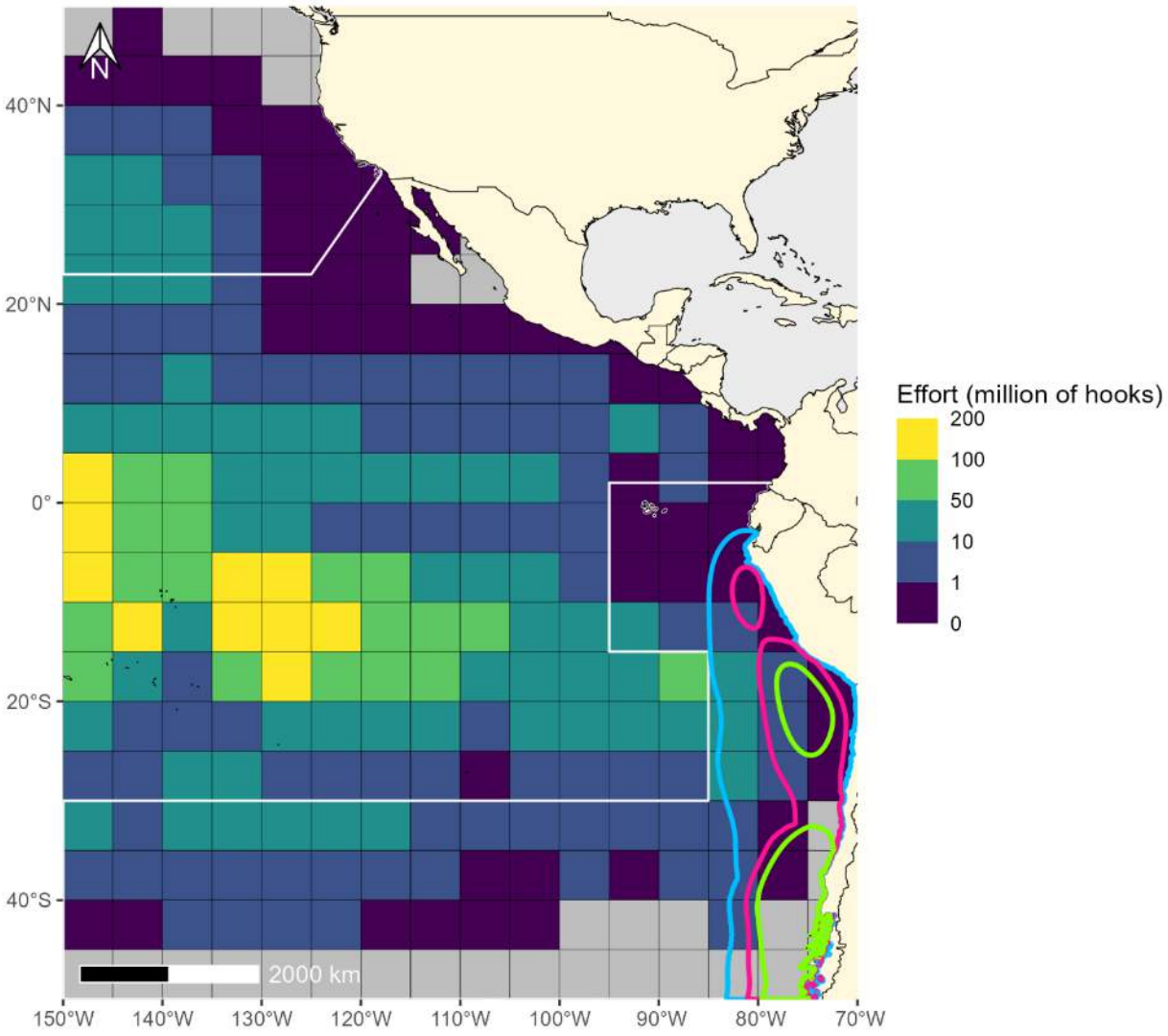
SUPPLEMENTAL 2 FIGURE 19. Overlapping 95% (blue line), 75% (pink line), and 50% (light green line) isopleths of breeding Waved Albatross (*Phoebastria irrorata*) based on GPS/PTT tracks with pelagic longline fishing effort data (in number of hooks) from logbooks reported in 5°x5° grid cells by CPCs from 2000–2023. The areas north of the northern white line and south of the southern white line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 2, FIGURA 19. Isopletas que se traslapan el 95% (línea azul), 75% (línea rosa) y 50% (línea verde claro) de albatros de las Galápagos (*Phoebastria irrorata*) reproductores, basadas en registros GPS/PTT, con datos de esfuerzo de pesca de palangre pelágico (en número de anzuelos) notificados en celdas de 5°x5° por los CPC entre 2000 y 2023. Las zonas al norte de la línea blanca del norte y al sur de la línea blanca del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



SUPPLEMENTAL 2 FIGURE 20. Overlapping 95% (blue line), 75% (pink line), and 50% (light green line) isopleths of adult non-breeding Westland Petrel (*Procellaria westlandica*) based on GLS tracks with pelagic longline fishing effort data (in number of hooks) from logbooks reported in 5°x5° grid cells by CPCs from 2000–2023. The areas north of the northern white line and south of the southern white line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 2, FIGURA 20. Isopletas que se traslapan el 95% (línea azul), 75% (línea rosa) y 50% (línea verde claro) de pardelas de Westland (*Procellaria westlandica*) adultas no reproductoras, basadas en registros GLS, con datos de esfuerzo de pesca de palangre pelágico (en número de anzuelos) notificados en celdas de 5°x5° por los CPC entre 2000 y 2023. Las zonas al norte de la línea blanca del norte y al sur de la línea blanca del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.

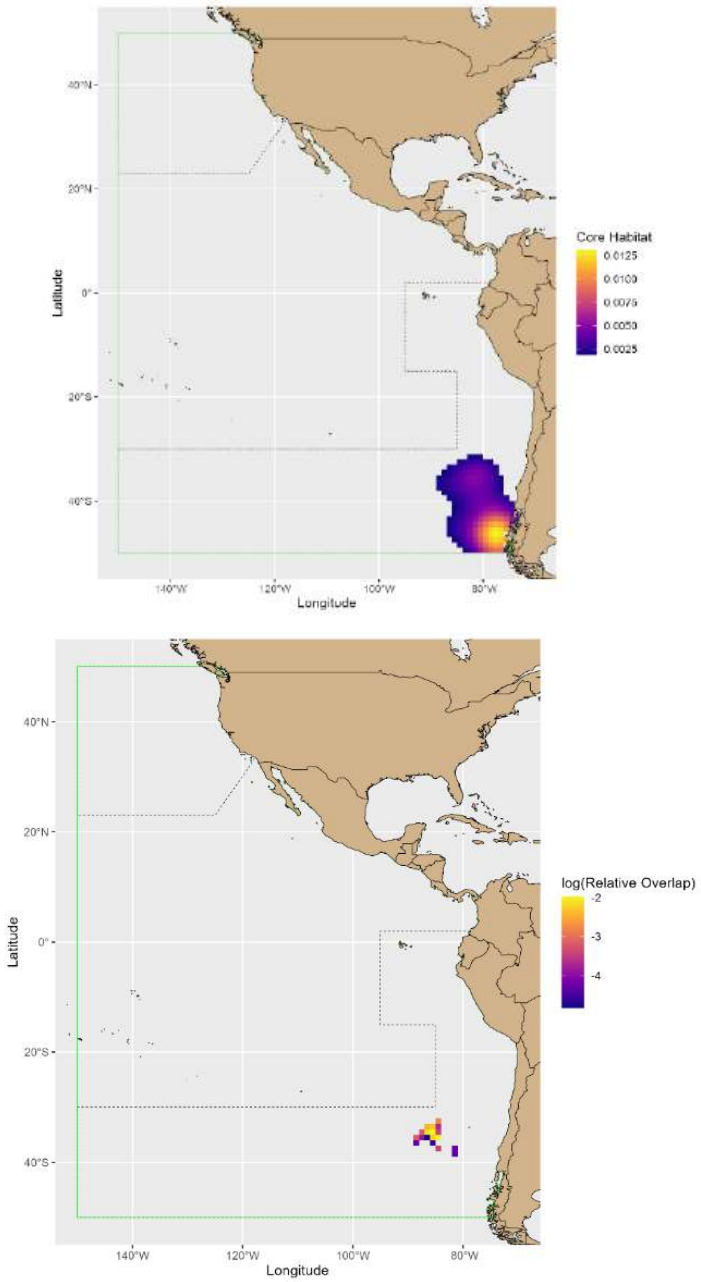


SUPPLEMENTAL 2 FIGURE 21. Overlapping 95% (blue line), 75% (pink line), and 50% (light green line) isopleths of adult non-breeding White-chinned Petrel (*Procellaria aequinoctialis*) based on GLS tracks with pelagic longline fishing effort data (in number of hooks) from logbooks reported in 5°x5° grid cells by CPCs from 2000–2023. The areas north of the northern white line and south of the southern white line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 2, FIGURA 21. Isopletas que se traslapan el 95% (línea azul), 75% (línea rosa) y 50% (línea verde claro) de pardelas gorgiblancas (*Procellaria aequinoctialis*) adultas no reproductoras, basadas en registros GLS, con datos de esfuerzo de pesca de palangre pelágico (en número de anzuelos) notificados en celdas de 5°x5° por los CPC entre 2000 y 2023. Las zonas al norte de la línea blanca del norte y al sur de la línea blanca del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.

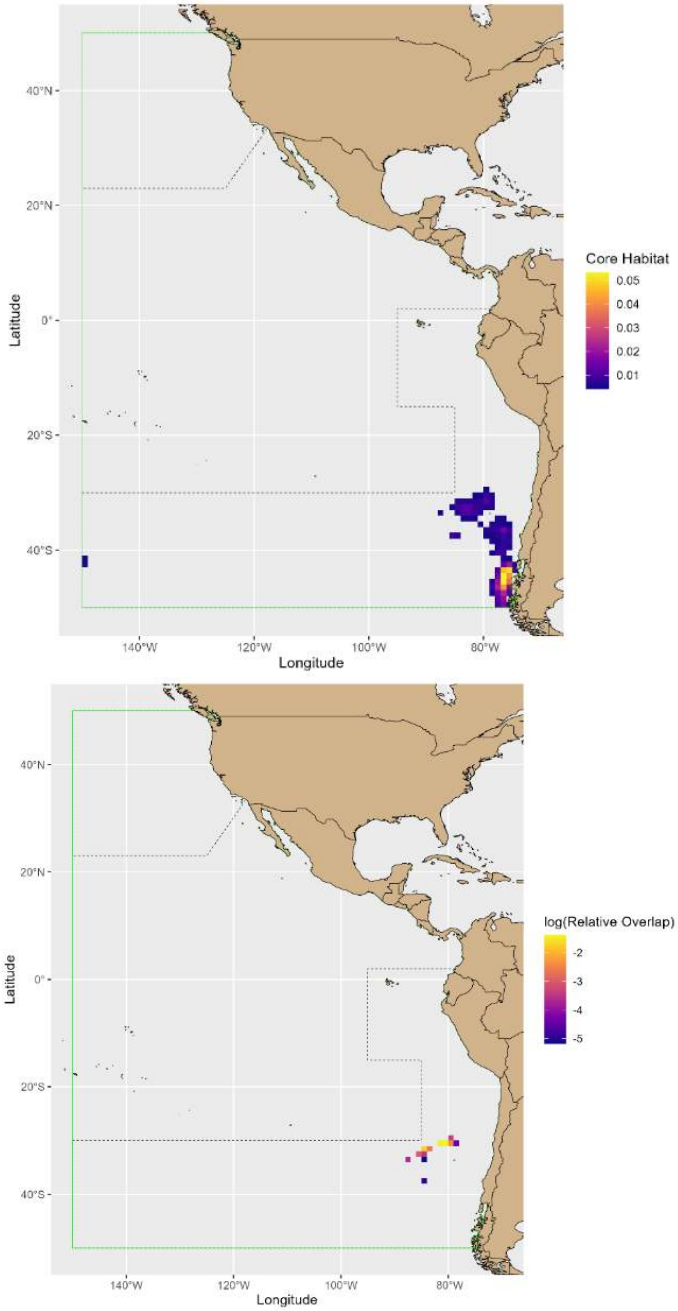
12. SUPPLEMENTAL MATERIAL 3

Relative overlap between species core habitat and Global Fishing Watch (GFW) estimated pelagic longline sets. Core habitat was represented by the 50% isopleth. To align with the GFW data the 50% isopleth polygon was converted into a raster at a resolution of 1°x1°. Relative overlap was calculated using a series of equations modified by White et al. 2019.



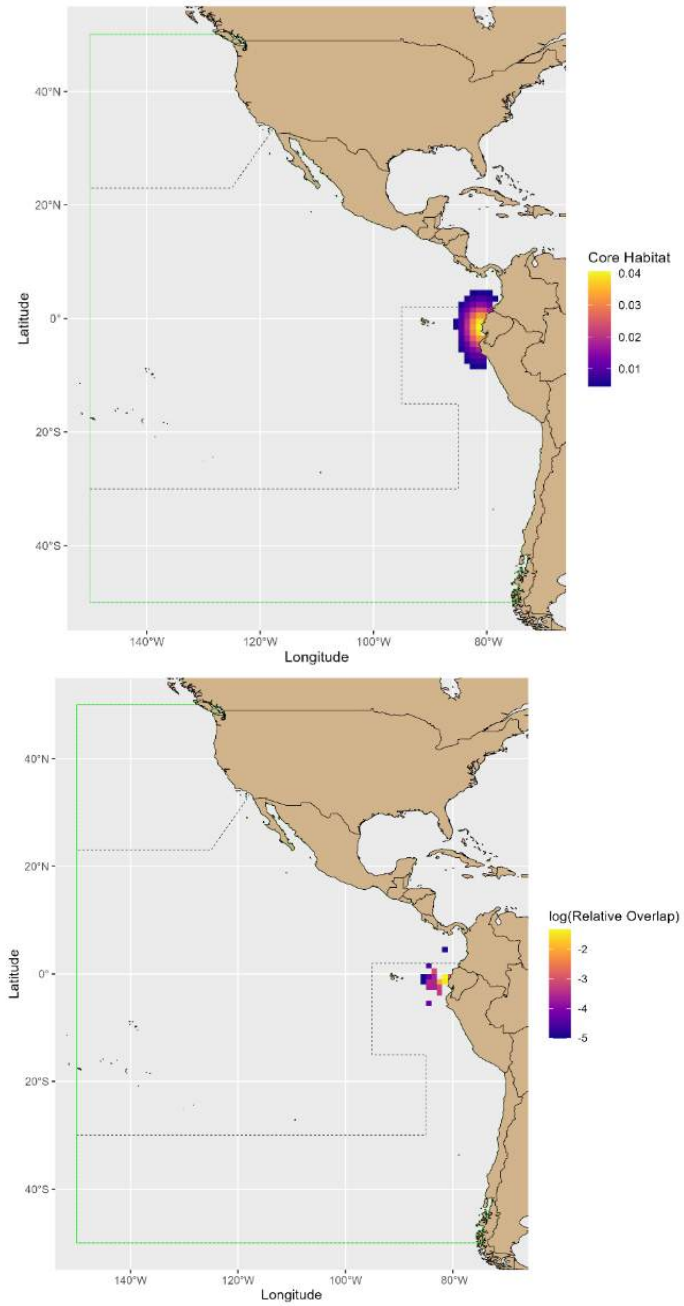
SUPPLEMENTAL 3 FIGURE 1. Core habitat (top) and associated relative overlap (bottom) with Global Fishing Watch estimated pelagic longline fishing effort for adult non-breeding Antipodean Albatross (*Diomedea antipodensis antipodensis*; GLS tracks). The highest relative overlap are areas in yellow. The areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 3, FIGURA 1. Hábitat central (arriba) y traslape relativo asociado (abajo) con el esfuerzo de pesca estimado por Global Fishing Watch de la pesquería palangrera pelágica para albatros de las Antípodas (*Diomedea antipodensis antipodensis)* adultos no reproductores (registros GLS). Las áreas de mayor traslape relativo son las que aparecen en amarillo. Las áreas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



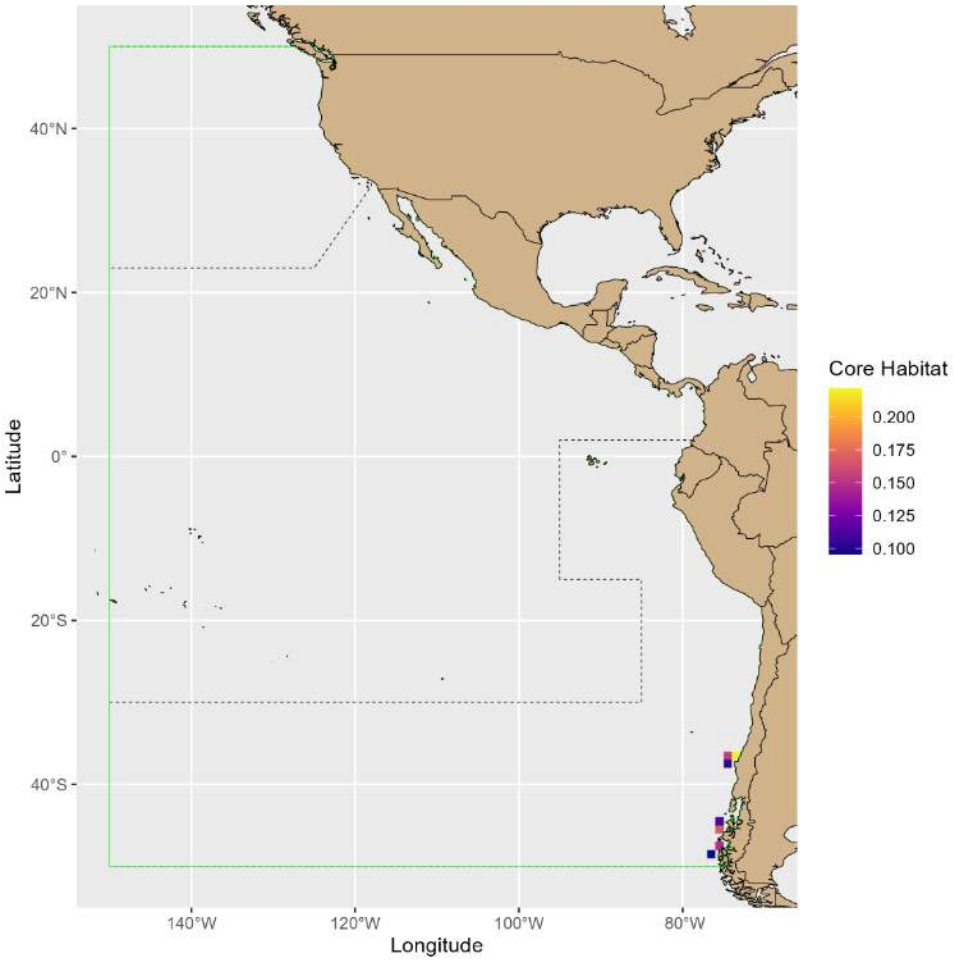
SUPPLEMENTAL 3 FIGURE 2. Core habitat (top) and associated relative overlap (bottom) with Global Fishing Watch estimated pelagic longline fishing effort for adult non-breeding Antipodean Albatross (*Diomedea antipodensis antipodensis*; GPS/PTT tracks). The highest relative overlap are areas in yellow. The areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 3, FIGURA 2. Hábitat central (arriba) y traslape relativo asociado (abajo) con el esfuerzo de pesca estimado por Global Fishing Watch de la pesquería palangrera pelágica para albatros de las Antípodas (*Diomedea antipodensis antipodensis*) adultos no reproductores (registros GPS/PTT). Las áreas de mayor traslape relativo son las que aparecen en amarillo. Las áreas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



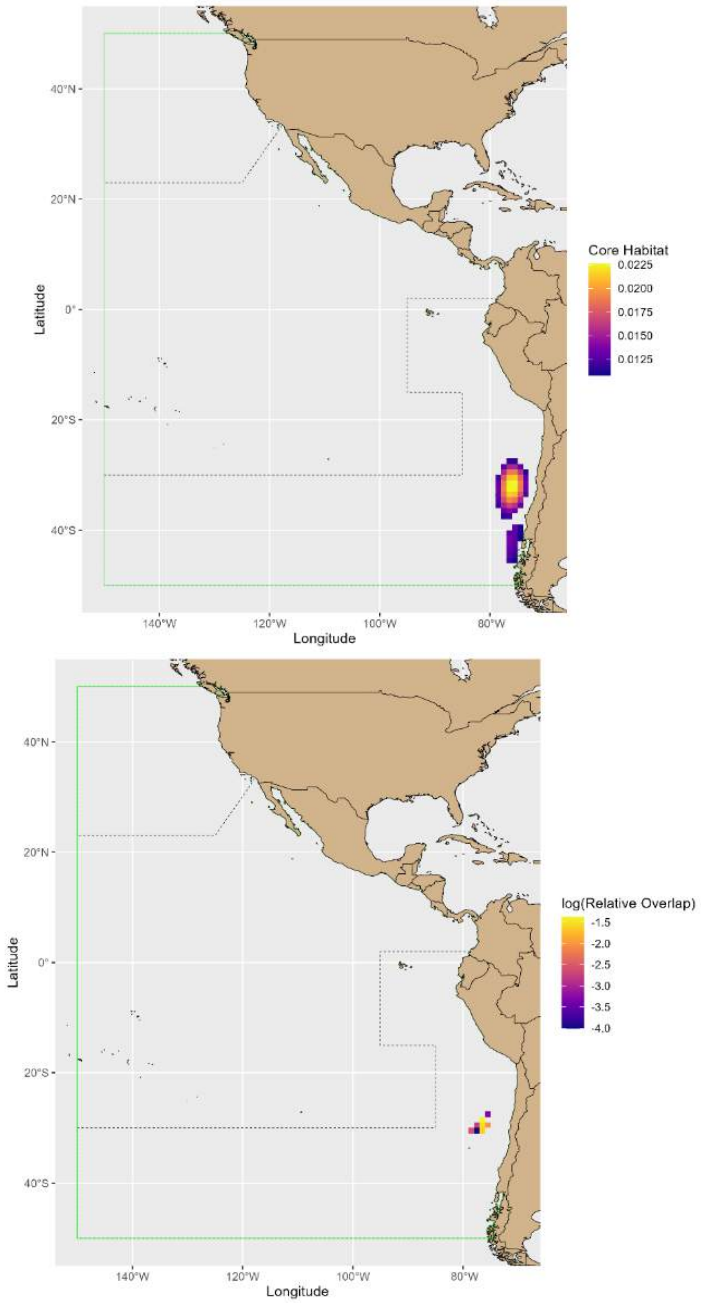
SUPPLEMENTAL 3 FIGURE 3. Core habitat (top) and associated relative overlap (bottom) with Global Fishing Watch estimated pelagic longline fishing effort for adult non-breeding Black Petrel (*Procellaria parkinsoni*; GLS tracks). The highest relative overlap are areas in yellow. The areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 3, FIGURA 3. Hábitat central (arriba) y traslape relativo asociado (abajo) con el esfuerzo de pesca estimado por Global Fishing Watch de la pesquería palangrera pelágica para la pardela de Parkinson (*Procellaria parkinsoni*) adulta no reproductora (registros GLS). Las áreas de mayor traslape relativo son las que aparecen en amarillo. Las áreas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



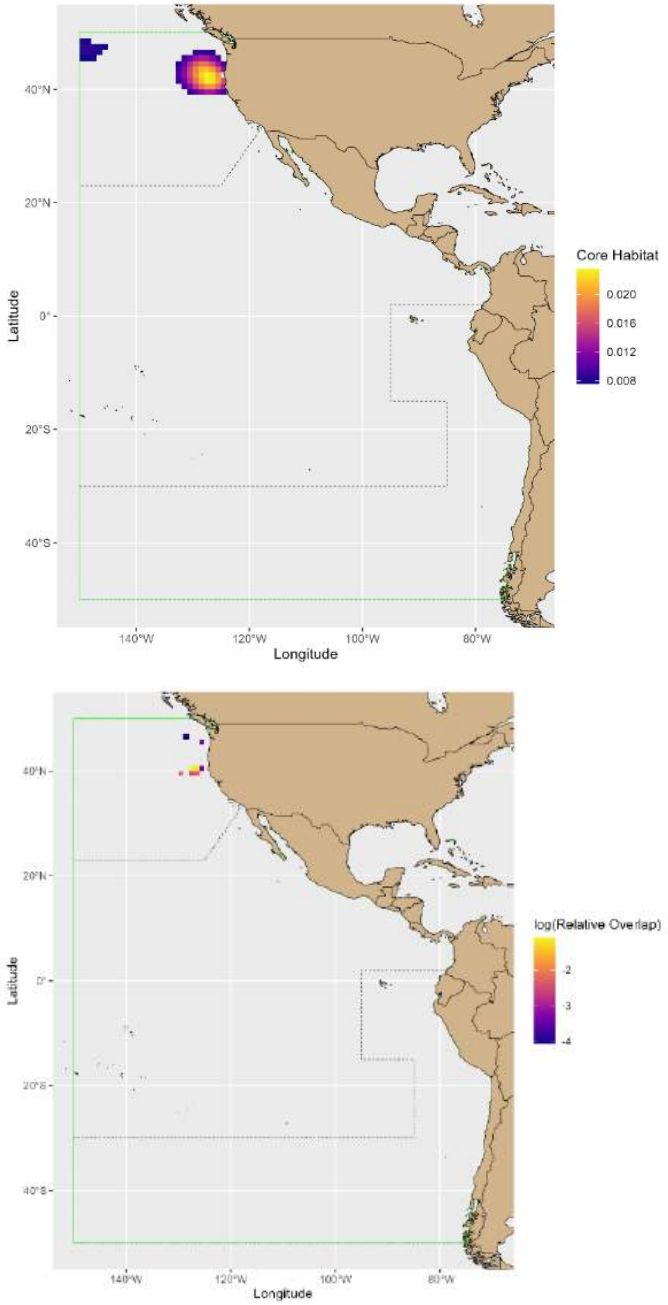
SUPPLEMENTAL 3 FIGURE 4. Core habitat for breeding Black-browed Albatross (*Thalassarche melanophris*; GPS/PTT tracks). There is no overlap between core habitat and Global Fishing Watch estimated pelagic longline fishing effort. The areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 3, FIGURA 4. Hábitat central del albatros ceja negra (*Thalassarche melanophris*) reproductor (registros GPS/PTT). No hay traslape entre el hábitat central y el esfuerzo de la pesquería palangrera pelágica estimado por Global Fishing Watch. Las áreas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



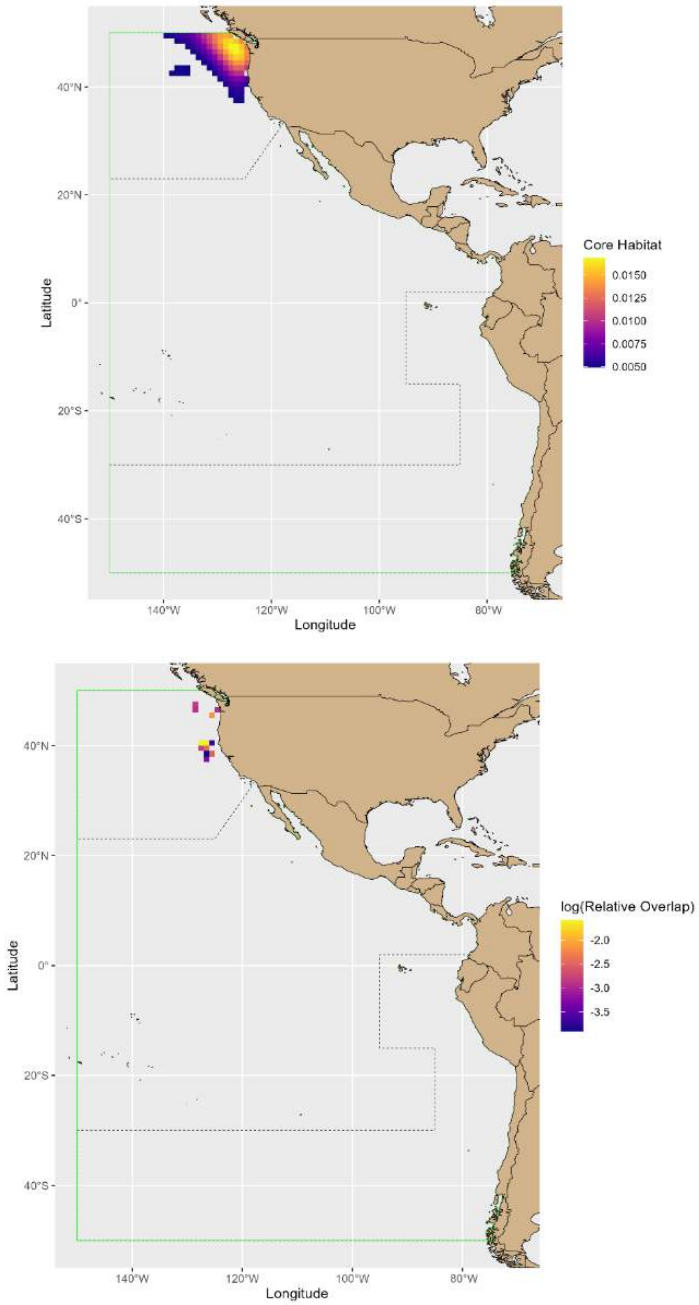
SUPPLEMENTAL 3 FIGURE 5. Core habitat (top) and associated relative overlap (bottom) with Global Fishing Watch estimated pelagic longline fishing effort for adult non-breeding Black-browed Albatross (*Thalassarche melanophris*; GLS tracks). The highest relative overlap are areas in yellow. The areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 3, FIGURA 5. Hábitat central (arriba) y traslape relativo asociado (abajo) con el esfuerzo de pesca estimado por Global Fishing Watch de la pesquería palangrera pelágica para albatros ceja negra (*Thalassarche melanophris)* adultos no reproductores (registros GLS). Las áreas de mayor traslape relativo son las que aparecen en amarillo. Las áreas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



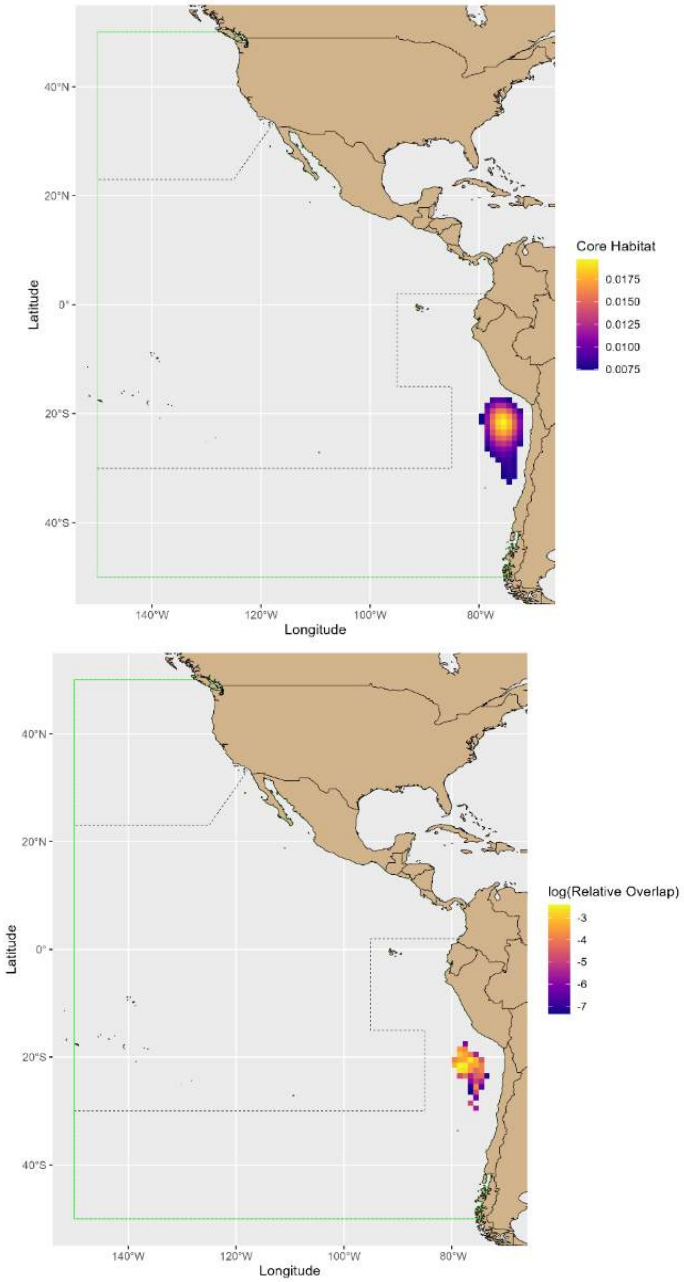
SUPPLEMENTAL 3 FIGURE 6. Core habitat (top) and associated relative overlap (bottom) with Global Fishing Watch estimated pelagic longline fishing effort for adult breeding Black-footed Albatross (*Phoebastria nigripes*; GLS tracks). The highest relative overlap are areas in yellow. The areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 3, FIGURA 6. Hábitat central (arriba) y traslape relativo asociado (abajo) con el esfuerzo de pesca estimado por Global Fishing Watch de la pesquería palangrera pelágica para los albatros de patas negras (*Phoebastria nigripes)* adultos reproductores (registros GLS). Las áreas de mayor traslape relativo son las que aparecen en amarillo. Las áreas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



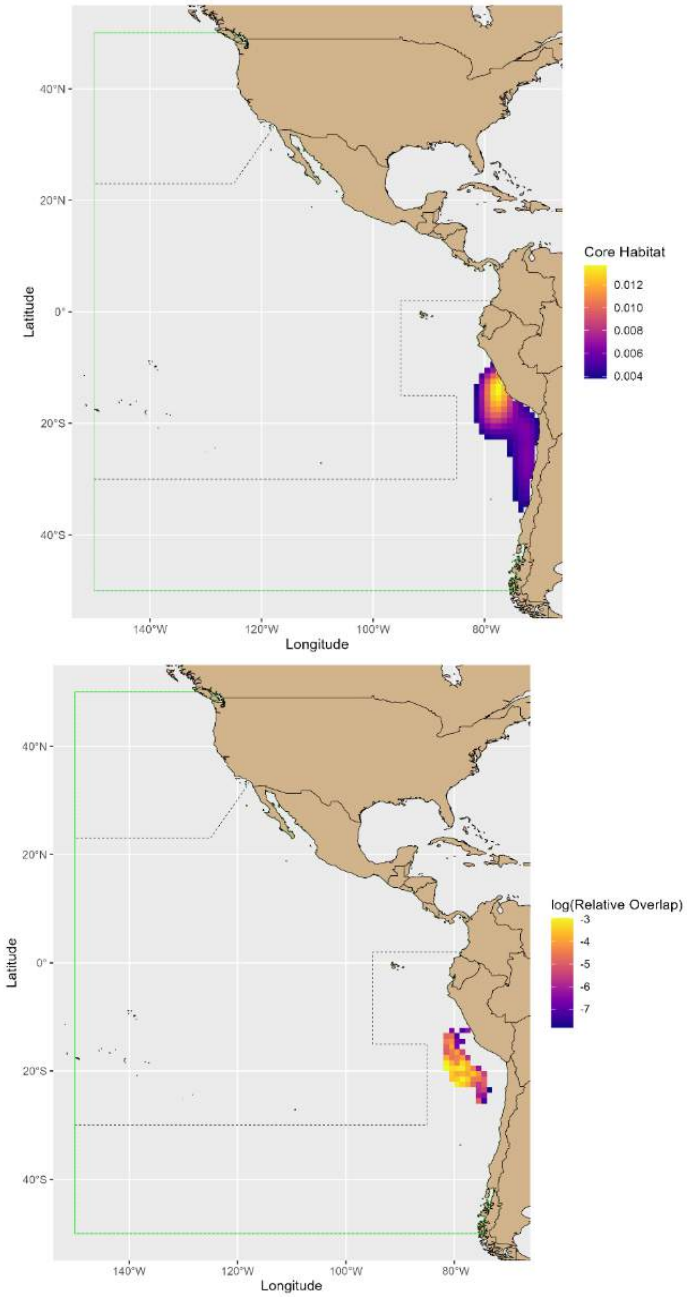
SUPPLEMENTAL 3 FIGURE 7. Core habitat (top) and associated relative overlap (bottom) with Global Fishing Watch estimated pelagic longline fishing effort for adult non-breeding Black-footed Albatross (*Phoebastria nigripes*; GLS tracks). The highest relative overlap are areas in yellow. The areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 3, FIGURA 7. Hábitat central (arriba) y traslape relativo asociado (abajo) con el esfuerzo de pesca estimado por Global Fishing Watch de la pesquería palangrera pelágica para albatros de patas negras (*Phoebastria nigripes)* adultos no reproductores (registros GLS). Las áreas de mayor traslape relativo son las que aparecen en amarillo. Las áreas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



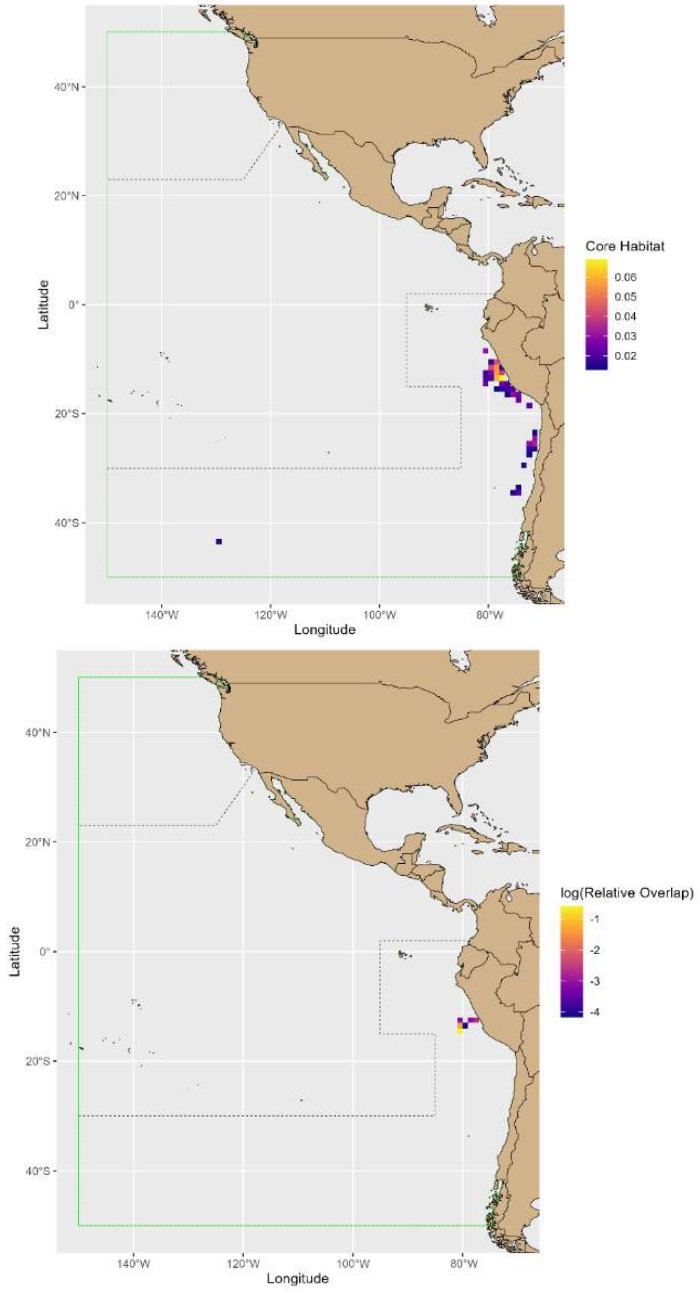
SUPPLEMENTAL 3 FIGURE 8. Core habitat (top) and associated relative overlap (bottom) with Global Fishing Watch estimated pelagic longline fishing effort for adult non-breeding Buller's Albatross (*Thalassarche bulleri*; GLS tracks). The highest relative overlap are areas in yellow. The areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 3, FIGURA 8. Hábitat central (arriba) y traslape relativo asociado (abajo) con el esfuerzo de pesca estimado por Global Fishing Watch de la pesquería palangrera pelágica para albatros de Buller (*Thalassarche bulleri*) adultos no reproductores (registros GLS). Las áreas de mayor traslape relativo son las que aparecen en amarillo. Las áreas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



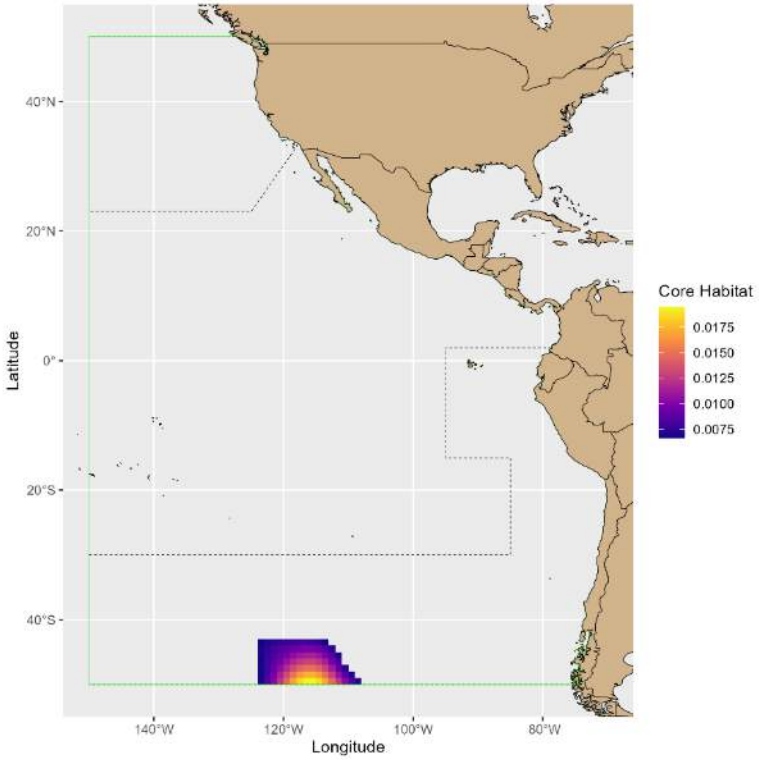
SUPPLEMENTAL 3 FIGURE 9. Core habitat (top) and associated relative overlap (bottom) with Global Fishing Watch estimated pelagic longline fishing effort for adult non-breeding Chatham Albatross (*Thalassarche eremita*; GLS tracks). The highest relative overlap are areas in yellow. The areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 3, FIGURA 9. Hábitat central (arriba) y traslape relativo asociado (abajo) con el esfuerzo de pesca estimado por Global Fishing Watch de la pesquería palangrera pelágica para albatros de Chatham (*Thalassarche eremita*) adultos no reproductores (registros GLS). Las áreas de mayor traslape relativo son las que aparecen en amarillo. Las áreas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



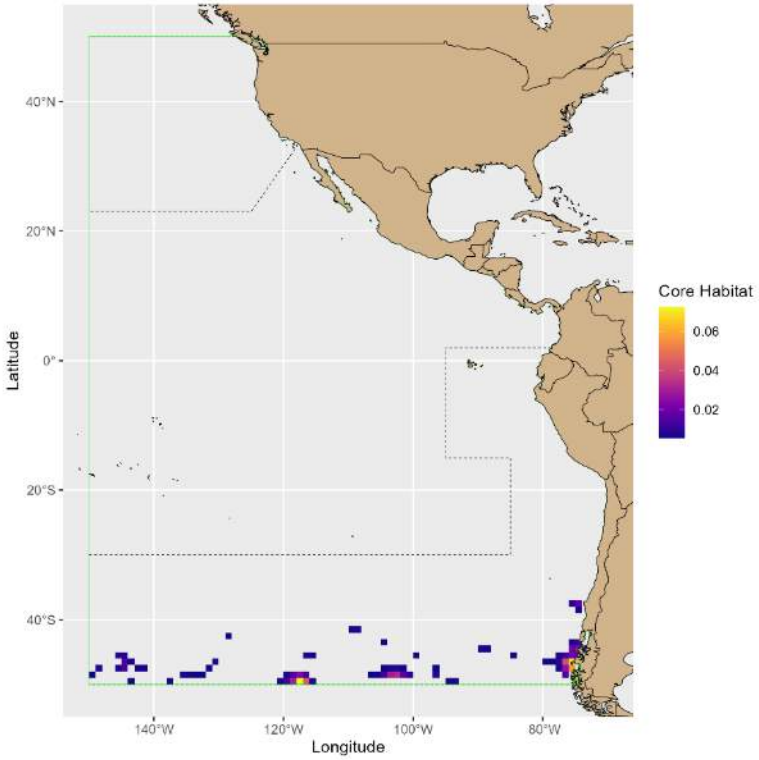
SUPPLEMENTAL 3 FIGURE 10. Core habitat (top) and associated relative overlap (bottom) with Global Fishing Watch estimated pelagic longline fishing effort for adult non-breeding Chatham Albatross (*Thalassarche eremita*; GPS/PTT tracks). The highest relative overlap are areas in yellow. The areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 3, FIGURA 10. Hábitat central (arriba) y traslape relativo asociado (abajo) con el esfuerzo de pesca estimado por Global Fishing Watch de la pesquería palangrera pelágica para el albatros de Chatham (*Thalassarche eremita)* adulto no reproductor (registros GPS/PTT). Las áreas de mayor traslape relativo son las que aparecen en amarillo. Las áreas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



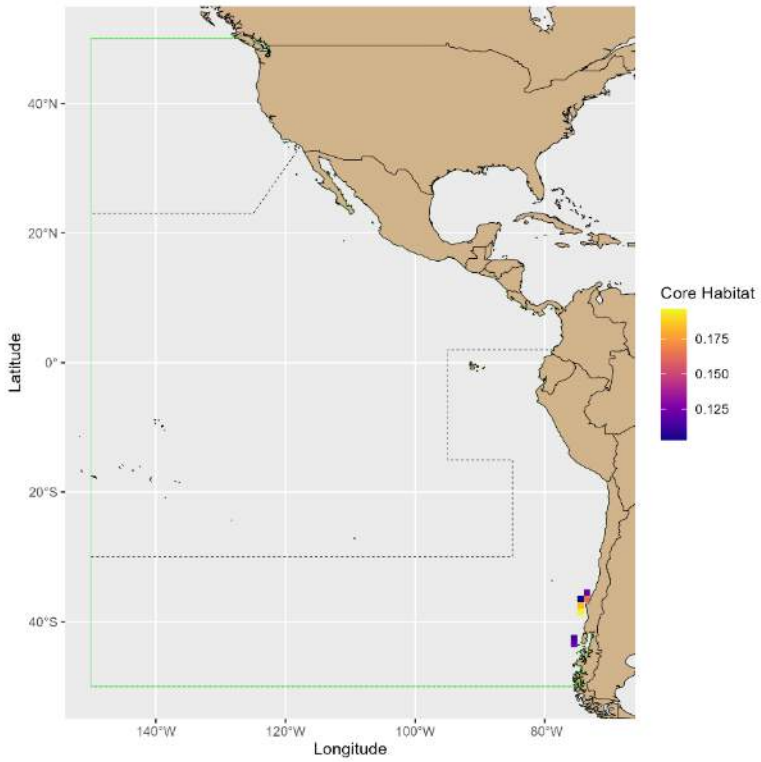
SUPPLEMENTAL 3 FIGURE 11. Core habitat for adult non-breeding Grey Petrel (*Procellaria cinerea*; GLS tracks). There is no overlap between core habitat and Global Fishing Watch estimated pelagic longline fishing effort. The areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 3, FIGURA 11. Hábitat central de la pardela gris (*Procellaria cinerea*) adulta no reproductora (registros GLS). No hay traslape entre el hábitat central y el esfuerzo de pesca de la pesquería palangrera pelágica estimado por Global Fishing Watch. Las áreas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



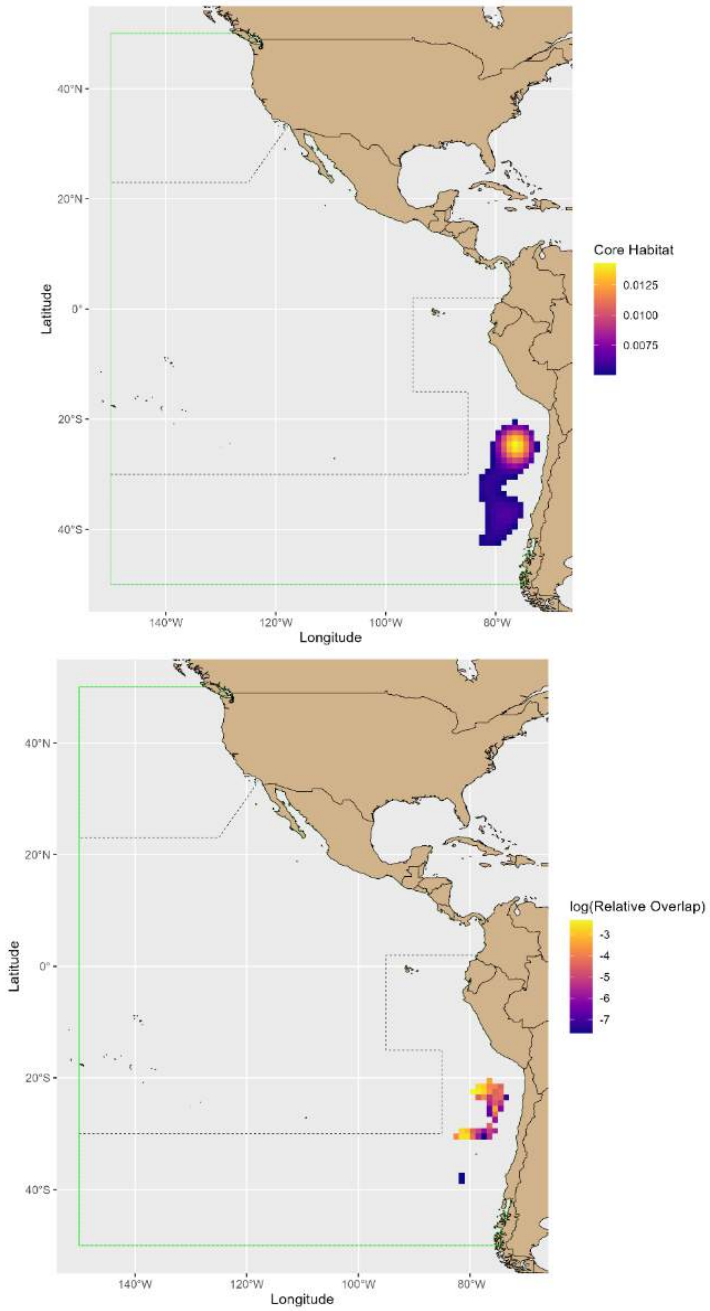
SUPPLEMENTAL 3 FIGURE 12. Core habitat for juvenile Northern Giant Petrel (*Macronectes halli*; GPS/PTT tracks). There is no overlap between core habitat and Global Fishing Watch estimated pelagic longline fishing effort. The areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 3, FIGURA 12. Hábitat central del petrel gigante de Hall (*Macronectes halli*) juvenil (registros GPS/PTT). No hay traslape entre el hábitat central y el esfuerzo de pesca de la pesquería palangrera pelágica estimado por Global Fishing Watch. Las áreas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



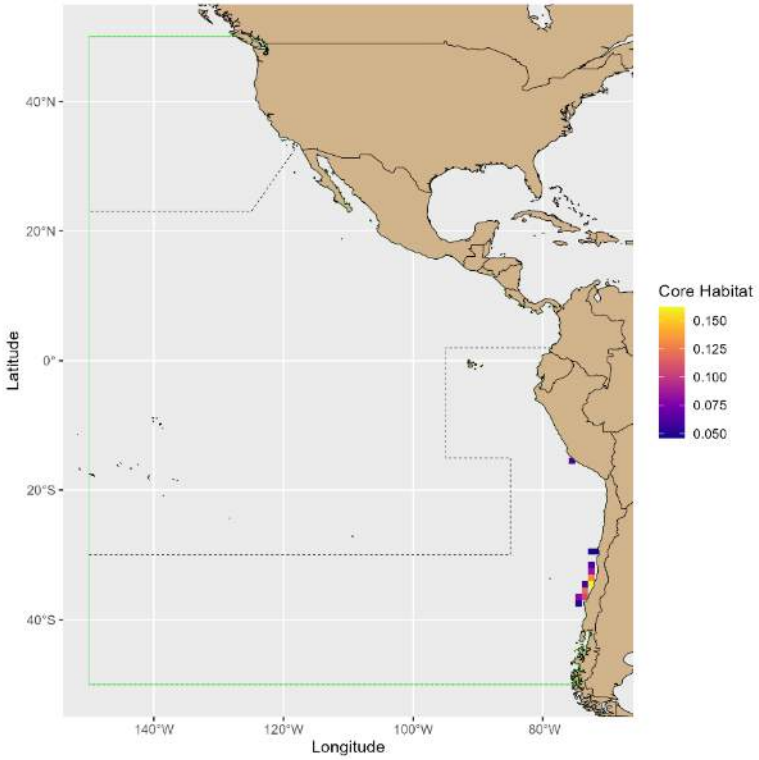
SUPPLEMENTAL 3 FIGURE 13. Core habitat for adult non-breeding Northern Royal Albatross (*Diomedea sanfordi*; GPS/PTT tracks). There is no overlap between core habitat and Global Fishing Watch estimated pelagic longline fishing effort. The areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 3, FIGURA 13. Hábitat central de los albatros reales del norte (*Diomedea sanfordi*) adultos no reproductores (registros GPS/PTT). No hay traslape entre el hábitat central y el esfuerzo de pesca de la pesquería palangrera pelágica estimado por Global Fishing Watch. Las áreas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



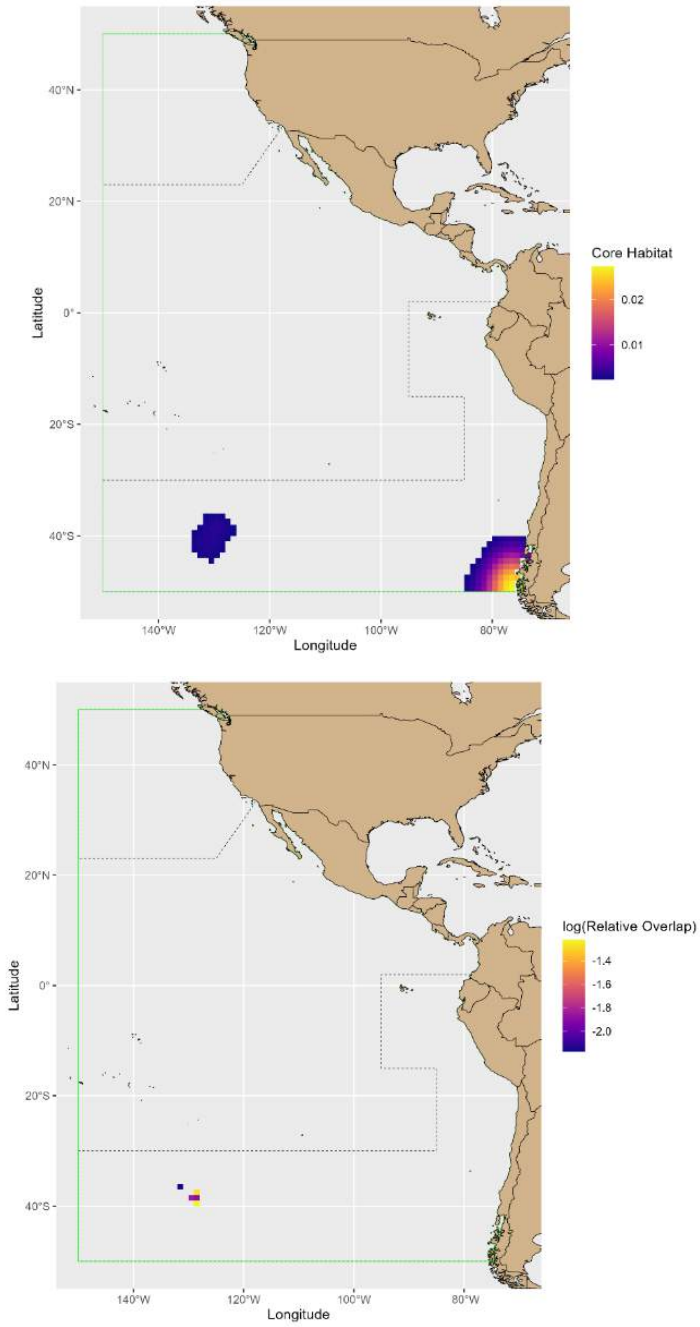
SUPPLEMENTAL 3 FIGURE 14. Core habitat (top) and associated relative overlap (bottom) with Global Fishing Watch estimated pelagic longline fishing effort for adult non-breeding Salvin's Albatross (*Thalassarche salvini*; GLS tracks). The highest relative overlap are areas in yellow. The areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 3, FIGURA 14. Hábitat central (arriba) y traslape relativo asociado (abajo) con el esfuerzo de pesca estimado por Global Fishing Watch de la pesquería palangrera pelágica para el albatros de Salvin (*Thalassarche salvini*) adulto no reproductor (registros GLS). Las áreas de mayor traslape relativo son las que aparecen en amarillo. Las áreas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



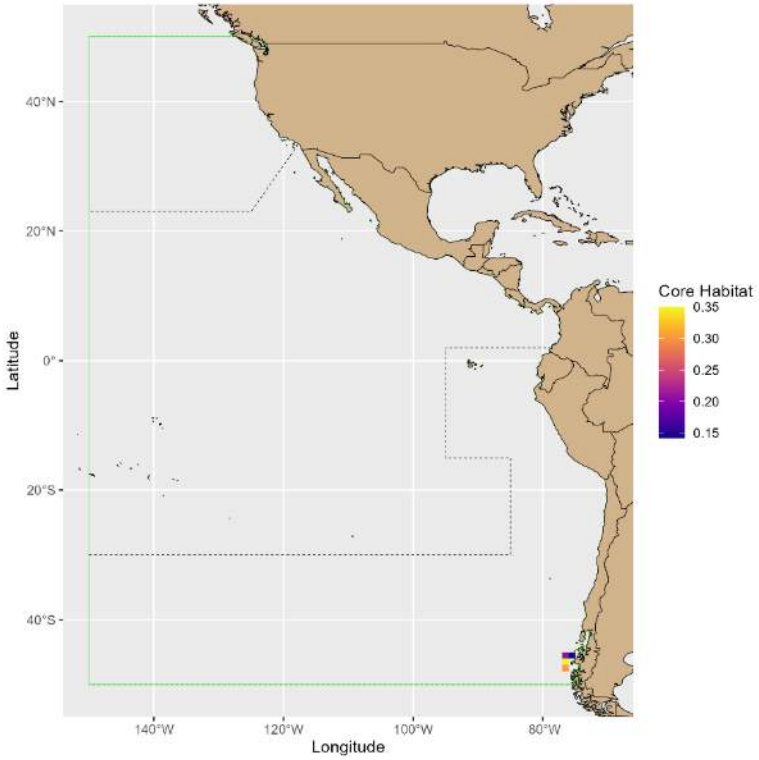
SUPPLEMENTAL 3 FIGURE 15. Core habitat for adult non-breeding Salvin's Albatross (*Thalassarche salvini*; GPS/PTT tracks). There is no overlap between core habitat and Global Fishing Watch estimated pelagic longline fishing effort. The areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 3, FIGURA 15. Hábitat central del albatros de Salvin (*Thalassarche salvini)* adulto no reproductor (registros GPS/PTT). No hay traslape entre el hábitat central y el esfuerzo de pesca de la pesquería palangrera pelágica estimado por Global Fishing Watch. Las áreas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



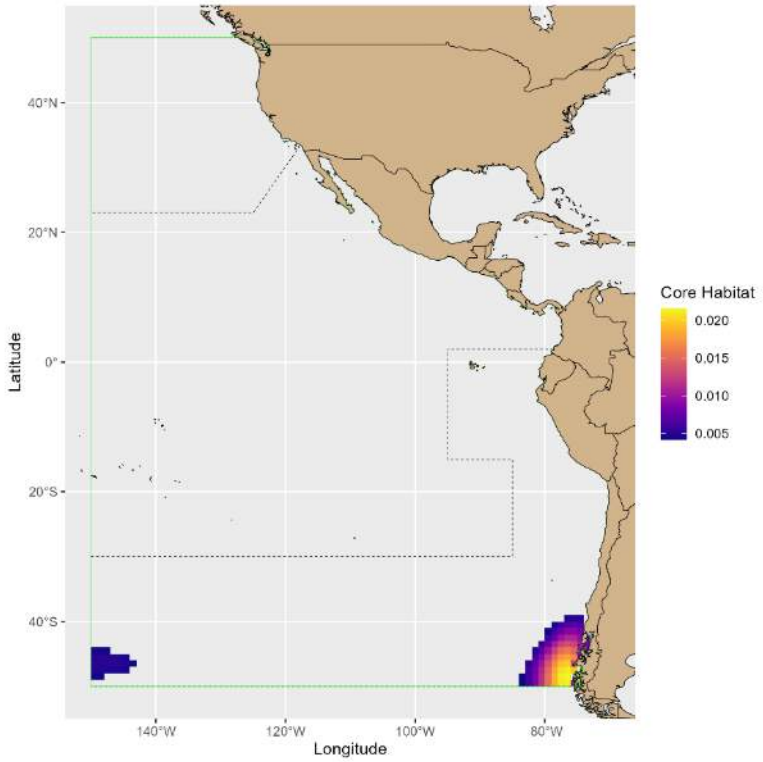
SUPPLEMENTAL 3 FIGURE 16. Core habitat (top) and associated relative overlap (bottom) with Global Fishing Watch estimated pelagic longline fishing effort for juvenile Wandering Albatross (*Diomedea exulans*; GLS tracks). The highest relative overlap are areas in yellow. The areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 3, FIGURA 16. Hábitat central (arriba) y traslape relativo asociado (abajo) con el esfuerzo de pesca estimado por Global Fishing Watch de la pesquería palangrera pelágica para el albatros errante (*Diomedea exulans*) juvenil (registros GLS). Las áreas de mayor traslape relativo son las que aparecen en amarillo. Las áreas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



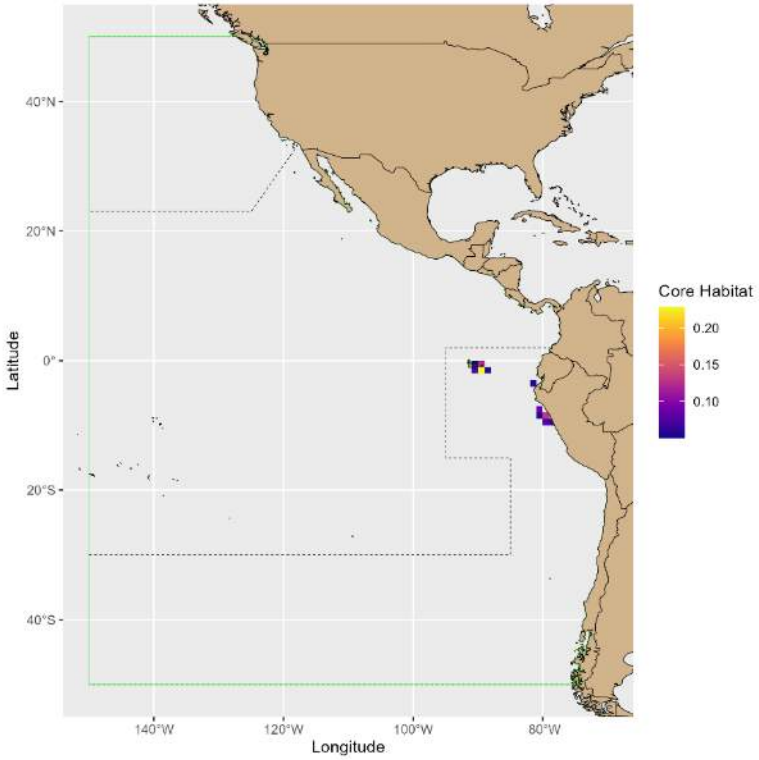
SUPPLEMENTAL 3 FIGURE 17. Core habitat for juvenile Wandering Albatross (*Diomedea exulans*; GPS/PTT tracks). There is no overlap between core habitat and Global Fishing Watch estimated pelagic longline fishing effort. The areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 3, FIGURA 17. Hábitat central de los albatros errantes (*Diomedea exulans)* juveniles (registros GPS/PTT). No hay traslape entre el hábitat central y el esfuerzo de pesca de la pesquería palangrera pelágica estimado por Global Fishing Watch. Las áreas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



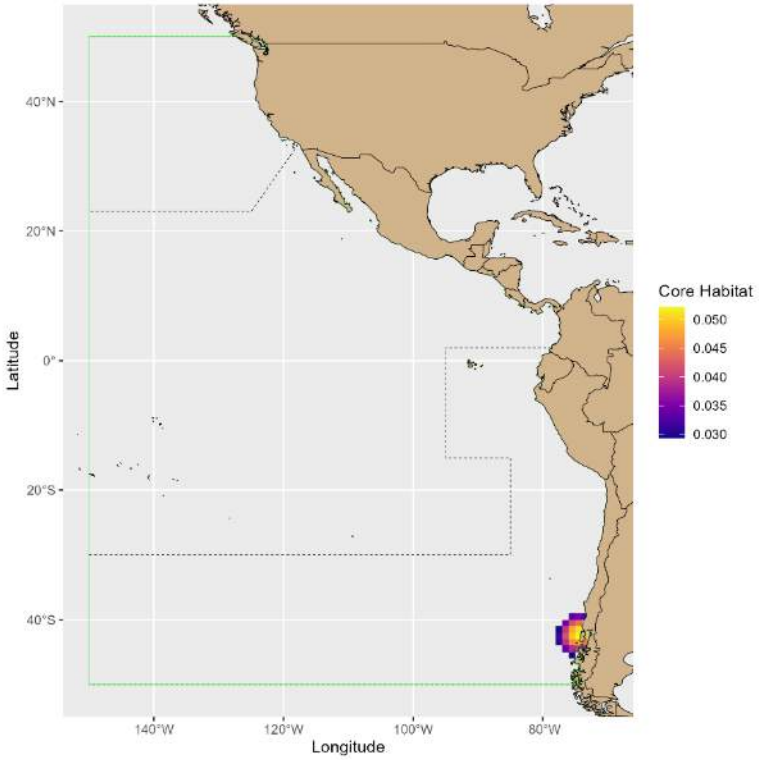
SUPPLEMENTAL 3 FIGURE 18. Core habitat for adult non-breeding Wandering Albatross (*Diomedea exulans*; GLS tracks). There is no overlap between core habitat and Global Fishing Watch estimated pelagic longline fishing effort. The areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 3, FIGURA 18. Hábitat central del albatros errante (*Diomedea exulans*) adulto no reproductor (registros GLS). No hay traslape entre el hábitat central y el esfuerzo de pesca de la pesquería palangrera pelágica estimado por Global Fishing Watch. Las áreas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



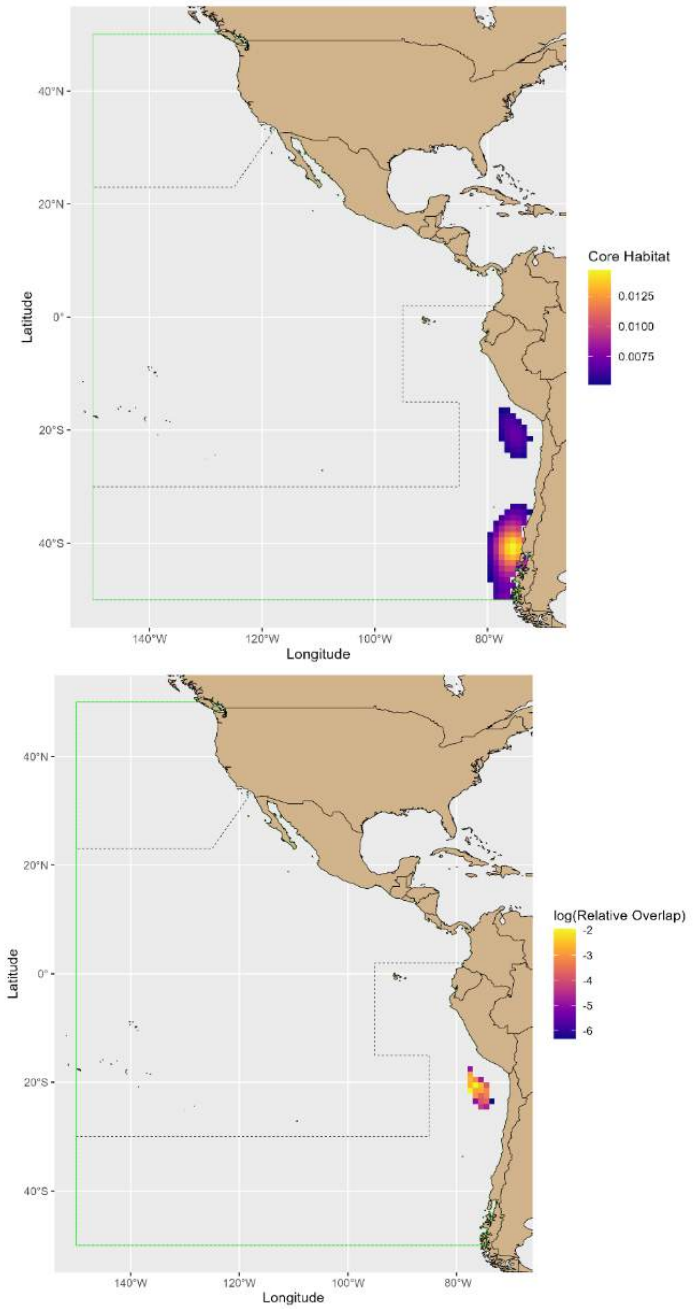
SUPPLEMENTAL 3 FIGURE 19. Core habitat for breeding Waved Albatross (*Phoebastria irrorata*; GPS/PTT tracks). There is no overlap between core habitat and Global Fishing Watch estimated pelagic longline fishing effort. The areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 3, FIGURA 19. Hábitat central del albatros de las Galápagos (*Phoebastria irrorata)* reproductor (registros GPS/PTT). No hay traslape entre el hábitat central y el esfuerzo de pesca de la pesquería palangrera pelágica estimado por Global Fishing Watch. Las áreas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



SUPPLEMENTAL 3 FIGURE 20. Core habitat for adult non-breeding Westland Petrel (*Procellaria westlandica*; GLS tracks). There is no overlap between core habitat and Global Fishing Watch estimated pelagic longline fishing effort. The areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 3, FIGURA 20. Hábitat dentral de la pardela de Westland (*Procellaria westlandica*) adulta no reproductora (registros GLS). No hay traslape entre el hábitat central y el esfuerzo de pesca de la pesquería palangrera pelágica estimado por Global Fishing Watch. Las áreas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.



SUPPLEMENTAL 3 FIGURE 21. Core habitat (top) and associated relative overlap (bottom) with Global Fishing Watch estimated pelagic longline fishing effort for adult non-breeding White-chinned Petrel (*Procellaria aequinoctialis*; GLS tracks). The highest relative overlap are areas in yellow. The areas north of the northern black dashed line and south of the southern black dashed line represent where two mitigation methods are required under C-11-02.

SUPLEMENTO 3, FIGURA 21. Hábitat central (arriba) y traslape relativo asociado (abajo) con el esfuerzo de pesca estimado por Global Fishing Watch de la pesquería palangrera pelágica para las pardelas gorgiblancas (*Procellaria aequinoctialis)* adultas no reproductoras (registros GLS). Las áreas de mayor traslape relativo son las que aparecen en amarillo. Las áreas al norte de la línea discontinua negra del norte y al sur de la línea discontinua negra del sur representan los lugares donde se requieren dos métodos de mitigación según la res. C-11-02.