Fisheries New Zealand
Tini a Tangaroa

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Updated high risk areas discussion paper

New Zealand

Prepared for the 16th Meeting of the Ecologically Related Species Working Group (ERSWG16) of the Commission for the Conservation of Southern Bluefin Tuna (CCSBT)

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New Zealand Government

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Executive Summary

At the 32nd meeting of the Extended Commission of the CCSBT, the Commission approved the 2025 Spatially Explicit Fishery Risk Assessment (SEFRA). At that time, '*Members emphasised that the next step should be for the ERSWG to consider the outcomes of the assessment and potential management actions*.'

This paper presents a proposal to define high risk areas and priority species under the Multi-Year Seabird Strategy (MYSS) within the CCSBT area of competence, and to take initial steps to improve management of seabird bycatch. Specifically, this paper seeks agreement on an approach to -

- Define high-risk areas per Action 1F of the MYSS.
- Define priority species per action 1D of the MYSS.
- Discuss possible approaches to address risk to seabirds identified in high risk areas.

As a starting point for discussion on these actions, New Zealand proposes -

- Priority species are identified as those species with a relative mortality of greater than or equal to 0.1 based on the 2025 SEFRA output.
- The five grid cells with the highest combined relative mortality are used to identify high risk areas. New Zealand proposes that the high risk classification is applied more broadly than these grid cells to the wider CCSBT Statistical Areas – therefore areas 4, 7, 8, and 9 are defined as high risk. These areas account for 8.5% of CCSBT Member pelagic longline effort.
- As a first step towards improving management of seabird bycatch in CCSBT fisheries, strengthen monitoring requirements within defined high risk areas to 20% human observer coverage, or 100% electronic monitoring on all vessels with minimum 10% footage review. Improving monitoring in these limited-effort areas would reduce uncertainty in future risk estimates and enable more effective assessment of adherence to existing mitigation requirements.

New Zealand encourages Members to use this paper as a starting point for discussion to agree to an approach to deliver to the 31st Meeting of the Extended Scientific Committee in August 2026, and advice to the Commission in October 2026.

1 Background/Context

Multi-year Seabird Strategy

1. The CCSBT Multi-Year Seabird Strategy was adopted at CCSBT 26, with strategic actions adopted at CCSBT 27. The MYSS relies heavily on the use of spatially explicit fisheries risk assessment (SEFRA) to complete the identified actions of the Action Plan and ultimately to meet the objectives of the MYSS. Relevant MYSS Actions include:
    - **Action 1A** – To agree on a SBT seabird bycatch target for reducing the level of impact of SBT fishing operations on seabird populations, including, but not limited to: (a) targets based on nominal reported seabird bycatch rates, and (b) targets based on SEFRA outputs.
    - **Action 1D** – Agree on the list of priority species and corresponding management targets, taking into account the status of seabird population, distributional overlaps with SBT fisheries, and significance of SBT fisheries in their mortality.
    - **Action 1E** – Update SEFRA seabird risk assessment to evaluate the progress in seabird bycatch mitigation by SBT fisheries and their impacts on seabird populations from the previous assessment in 2019.
    - **Action 1F** – Establish a robust definition of high-risk areas that takes into account the precautionary approach by (a) Establishing a definition of high-risk areas. (b) Identifying areas that meet the definition. (c) Characterising the nature of the risk in each area. (d) Developing tailored measures aimed at reducing those risks.
    - **Action 3D** – Assess the cumulative impacts of fishing for SBT on seabirds, particularly threatened albatross and petrel species, across tuna RFMOs including developing methods for extrapolating seabird bycatch levels and seabird bycatch rates to identify total mortalities and total mortality rates.
2. All these Actions are highly dependent on the application of the SEFRA and the subsequent interpretations of its outputs. To enable accurate interpretations of the SEFRA outputs to achieve the identified Actions, specific and robust definitions of various terms within each of these Actions, including ‘priority species’ and ‘high risk areas’, are required.

3. Having agreed definitions will also avoid imposing a potentially unnecessary burden on operators. Identifying specific areas of high risk to seabird species of particular concern would enable management responses to be tailored to the individual drivers of risks.

Spatially Explicit Fisheries Risk Assessment (SEFRA)

4. The 13th meeting of ERSWG agreed that the high-risk areas analysis should be incorporated into the SEFRA analysis. During the 14th meeting of the ERSWG, New Zealand presented the results of a SEFRA for seabirds which used New Zealand observer data and international effort data (in part from CCSBT Members) to extrapolate risk to seabirds from surface longline, bottom longline and trawl fishing across the Southern Hemisphere. It was noted at this meeting that *‘collaboration should be continued with this [next] round of SEFRA, in the areas of data contribution, model development and examination of model robustness.’* It was

agreed that a collaborative SEFRA would be undertaken by CCSBT Members looking at risk to seabirds from their respective surface longline fisheries.

5. New Zealand and Japan led extensive intersessional work, including a technical ERSWG meeting in 2023, to further develop the SEFRA model and coordinate data inputs from other Members. The model was successfully run in early 2024 and some results agreed at the fifteenth meeting of the ERSWG in June 2024. As a result of this work, the ERSWG updated their advice on seabirds to the Extended Commission of the CCSBT to '*consider taking further actions that would ensure robust seabird mitigation measures and effective monitoring of implementation of the mitigation measures, whilst minimising impacts on SBT surface longline fisheries effort.'*

6. A technical meeting of the ERSWG (ERS Tech) was hosted in April 2025 in Wellington, New Zealand as a hybrid meeting.[1] This meeting finalised the SEFRA model, building on the 2024 model and addressing key issues. Australia, Fishing Entity of Taiwan, Japan, New Zealand, Republic of Korea, and South Africa submitted their data on seabird captures from their observer programs in the agreed format for the combined risk assessment. All Members provided total effort of pelagic longlines operating in the southern hemisphere, regardless of target species.

7. Following the meeting, the modelling team posted the results of the model runs and total catch estimates of the final models. The group produced a technical report[2] summarising the development and results of the 2025 SEFRA which was adopted by the Extended Commission in October 2025.

2 Introduction

8. At the 32nd meeting of the Extended Commission of the CCSBT, the Commission approved the 2025 SEFRA. At that time, '*Members emphasised that the next step should be for the ERSWG to consider the outcomes of the assessment and potential management actions*.'
9. This paper builds on the 2025 SEFRA, as well as on previous discussions, including the previous iteration of this paper provided to ERSWG15 in 2024 (*High risk areas discussion paper*), and the paper presented by New Zealand at EC31 in 2024 (*Proposal to revise monitoring requirements for identified high-risk areas for seabirds in the CCSBT convention area*).

10. Reaching agreement on an appropriate method to use in identifying risk (SEFRA) was a necessary first step towards a definition of high risk areas. Having agreed on the most appropriate methodology to apply, Members now need to agree on how outputs from the SEFRA analysis can define high risk areas. This discussion will also contribute to definitions of priority species.

11. The report adopted by the EC in 2025 identifies the areas of highest risk to seabirds (based on estimated annual deaths) as areas in the Tasman Sea, south-eastern Indian Ocean and south-eastern Atlantic Ocean (Appendix 1, Figure 1). There were 25 taxa of albatrosses and petrels potentially caught in pelagic longline fisheries by participating Members of the CCSBT that were considered under the SEFRA. Gibson's albatross, Amsterdam albatross, Tristan albatross and Sooty albatross were the taxa estimated to be at highest risk – noting that following the 2024 SEFRA, *Macronectes spp* (giant petrels) were excluded because data was limited and current conservation status is relatively favourable.

[1] Australia, Indonesia, Japan, Korea, New Zealand, BirdLife International (BLI) and the Agreement on the Conservation of Albatrosses and Petrels (ACAP), together with the ERSWG Chair, the leader of the modelling team and the CCSBT Seabird Project Manager attended in person. South Africa, Taiwan and Humane World for Animals (HWA) attended online.
[2] https://www.ccsbt.org/system/files/2025-09/EC32_14_ERSWGChair_Report_ERSTech_0.pdf

12. New Zealand notes there is uncertainty and limitations in the application of the SEFRA model. However, at this stage, the best available information and the most sophisticated methods have been used in the 2025 collaborative assessment in identifying risk to seabirds. The results have shown applicable and relevant outcomes in terms of CCSBT member fishing effort and the potential impact on at-risk species.

13. The role of the ERSWG membership is to consider the information presented and make a determination on the appropriate settings to apply in a CCSBT context that would, in turn, define 'high risk areas' and identify 'high priority species'. Any agreed recommendation from this group will need to be considered and endorsed by the Extended Scientific Committee and the Extended Commission. The group should consider the options presented in terms of which option is most appropriate for CCSBT and our shared objective of minimising the southern bluefin fishery's impact on seabirds.

3 Considerations

14. NZ proposes two guiding principles for defining high risk areas and priority species:
    a. areas identified as 'high risk' are relevant to CCSBT and the areas/fleets where fishing effort occurs;
    b. areas identified as 'high risk' are beneficial to the most at-risk seabird species.

CCSBT Fishing Effort

15. The application of the SEFRA model considered here includes all surface longline fishing effort from the fleets of CCSBT Member countries and, where available, observer records of seabird bycatch. Proxies were used where Member observer/electronic monitoring data were unavailable.

16. There may be additional risk from non-fisheries threats, non-CCSBT member countries, and fishing methods not considered in the current assessment. Management goals should be to reduce the relative impact of SBT target fisheries on ecologically related seabirds, not to reach defined population targets.

17. As was noted at ERSWG15, CCSBT Members should consider taking further actions that would ensure robust seabird mitigation measures and effective monitoring of implementation of the mitigation measures, whilst minimising impacts on SBT surface longline fisheries effort.

At-Risk Seabird Species

18. When proposing a definition of 'High Risk Areas', there is a need to consider what proportion of relative mortality the areas encapsulate for assessed species to determine potential scope for reducing impacts within the proposed area(s).

19. The modelled relative mortality scores by species could be considered alongside the respective IUCN status.

4 Proposal to identify and define high-risk areas and priority species based on 2025 SEFRA outcomes

20. New Zealand proposes the following general approach for identifying high risk areas and priority species:
    a. All species with a relative mortality above a defined threshold according to the SEFRA outputs are identified as priority species.
    b. These species are combined into a data layer, and a number of cells (in terms of relative mortality) are then used to identify relevant high risk areas.

21. New Zealand considers that high risk areas should apply to a broader area beyond the five by five degree grid cells identified by the SEFRA. Any monitoring or management measures considered by ERSWG should apply to relevant CCSBT statistical areas where highest risk has been identified (Appendix 1, Figure 2). The initial approach proposed here is improved monitoring in these areas - this will ensure that effort displacement can be accounted for and streamline reporting around agreed strata, as well as ensuring operational simplicity.

22. Based on this approach, the following settings are proposed by New Zealand for defining high risk areas and priority species:
    a. As a starting point for discussion, New Zealand proposes that all species with a relative mortality above 0.1 according to the SEFRA outputs are considered priority species.
    b. These species are combined into a data layer, and the top five cells (in terms of relative mortality) are then used to identify high risk CCSBT Statistical Areas.

23. Marine Stewardship Council (MSC) Fisheries Standards version 3.1 introduced new requirements for bycatch that require species to be managed such that they are able to recover to a minimum of '50% of unimpacted levels within three generations or 100 years, whichever is shorter'. In the context of CCSBT, this means that a relative mortality above 0.5 would indicate that impact from CCSBT Member pelagic longline fisheries alone is insufficient to meet this criterion.[3]

24. In acknowledgement that impact to bycatch species is unlikely to be solely from CCSBT Members' pelagic longline fisheries, a limit of 0.1 is proposed for discussion. This is to ensure that impact from CCSBT members has a negligible contribution to total risk and recovery can be achieved within the timeline specified by the MSC Standard.

25. High risk areas identified using this approach are CCSBT Statistical Areas 4, 7, 8 and 9. Effort in this area accounts for 8.5% of CCSBT Member countries' pelagic longline fisheries effort from the 2025 SEFRA (Appendix 1, Figure 3). The code for this analysis can be found in Appendix 2.

26. The process outlined here allows for high risk areas to shrink if the number of species with a relative mortality above 0.1 decreases in subsequent assessments.

[3] This is the same 100-year performance goal used in Wade (1998)

5 Strengthening requirements in high-risk areas

27. Within the CCSBT Statistical Areas identified as highest risk to seabirds (4, 7, 8 and 9), New Zealand proposes strengthening monitoring requirements for CCSBT Member pelagic longline vessels. Specifically, this would entail a minimum of 20% human observer coverage, or 100% deployment of cameras with minimum 10% review rate.

28. These requirements would apply to all pelagic longline operations targeting SBT in CCSBT stat areas 4, 7, 8 and 9 (Appendix 1, Figure 3).

29. With fishing effort in these areas contributing to only 8.5% of total CCSBT member pelagic longline fishing effort, doubling the human observer coverage equates to an additional 0.85% of fishing being monitored (Appendix 1, Figure 4).

6 Discussion & Next Steps

30. New Zealand invites Members to discuss and seek agreement on a process and associated variables for defining high risk areas and priority species to meet objectives under the MYSS. The ERSWG may wish to recommend to the ESC and ultimately to the Commission to –

    a. Agree on defined ‘high-risk areas’ per Action 1F of the MYSS

    b. Agree on defined ‘priority species’ per Action 1D of the MYSS

    c. Discuss possible approaches to address risk to seabirds identified in the high risk areas.

31. As a starting point for the discussion, New Zealand proposes the following settings:

    a. Those species with a relative mortality above 0.1 according to the SEFRA outputs are considered priority species

    b. The five grid cells with the highest combined relative mortality are used to identify high risk areas – CCSBT Statistical Areas 4, 7, 8, and 9 are therefore identified as high risk. These areas would account for 8.5% of CCSBT Member pelagic longline effort.

    c. As a first step towards improving management of seabird bycatch in CCSBT fisheries, New Zealand proposes strengthened monitoring requirements within defined high risk areas. These include 20% human observer coverage or 100% electronic monitoring on all vessels with minimum 10% footage review. Improving monitoring in these limited effort areas would reduce uncertainty in future risk estimates and enable more effective assessment of adherence to mitigation requirements.

32. New Zealand welcomes discussion on how CCSBT could give effect to enhancing monitoring measures including through revision of the existing resolution. CCSBT Members that are members of other tuna RFMOs may advocate for revisions to existing CMMs of those RFMOs to strengthen protections for seabirds in light of the agreed SEFRA outcomes. Noting for example that WCPFC has recently strengthened seabird measures through CMM 2025-05, effective 3 February 2026.

33. To continue building on the work of the ERSWG contributing to the actions of the MYSS, it is essential that a schedule for regular updates to the SEFRA is established, taking into account budgetary and capacity implications. New Zealand suggests that the SEFRA could be updated every four years, in-line with the time blocks used in the assessment. This would require an update of the assessment in 2029 for presentation to the ERSWG in 2030.

34. New Zealand invites Members to discuss this proposal at the ERSWG16 with the aim of taking some proposed management measure to ESC, and ultimately to the Extended Commission in 2026.

Appendix 1 – Figures and tables

Table 1 - relative mortality (RM) for each of the 25 species considered in the all species approach to defining 'high risk' areas, and their respective IUCN listing (CR – critical, EN – endangered, VU – vulnerable, NT – near threatened, LC – least concern). Red text indicates species selected as priority species for consideration.

FAO Code	Common name	RM in HRA	Total RM	Percent	IUCN
DIW	Gibson's albatross	0.643	0.735	88%	EN
PHU	Sooty albatross	0.225	0.319	70%	EN
DBN	Tristan albatross	0.218	0.356	61%	CR
TWD	New Zealand white-capped albatross	0.168	0.245	68%	NT
DSB	Southern Buller's albatross	0.151	0.228	66%	NT
DAM	Amsterdam albatross	0.124	0.387	32%	EN
TQH	Indian yellow-nosed albatross	0.121	0.201	60%	EN
DIP	Southern royal albatross	0.102	0.142	72%	VU
DIX	Wandering albatross	0.093	0.143	65%	VU
TQW	Campbell black-browed albatross	0.083	0.130	64%	VU/LC
DCR	Atlantic yellow-nosed albatross	0.066	0.211	31%	EN
PHE	Light-mantled sooty albatross	0.055	0.064	86%	NT
DCU	Shy albatross	0.050	0.067	75%	NT
DQS	Antipodean albatross	0.050	0.142	35%	EN
DIC	Grey-headed albatross	0.031	0.036	87%	EN
DIQ	Northern royal albatross	0.021	0.051	42%	EN
PCW	Westland petrel	0.021	0.046	45%	EN
DKS	Salvin's albatross	0.014	0.067	22%	VU
DNB	Northern Buller's albatross	0.011	0.101	10%	NT
DIM	Black-browed albatross	0.010	0.035	29%	LC
PCI	Grey petrel	0.003	0.008	42%	NT
DER	Chatham Island albatross	0.003	0.060	5%	VU
PRO	White-chinned petrel	0.003	0.013	22%	VU
PRK	Black petrel	0.003	0.029	9%	VU
PCN	Spectacled petrel	0.001	0.016	4%	VU

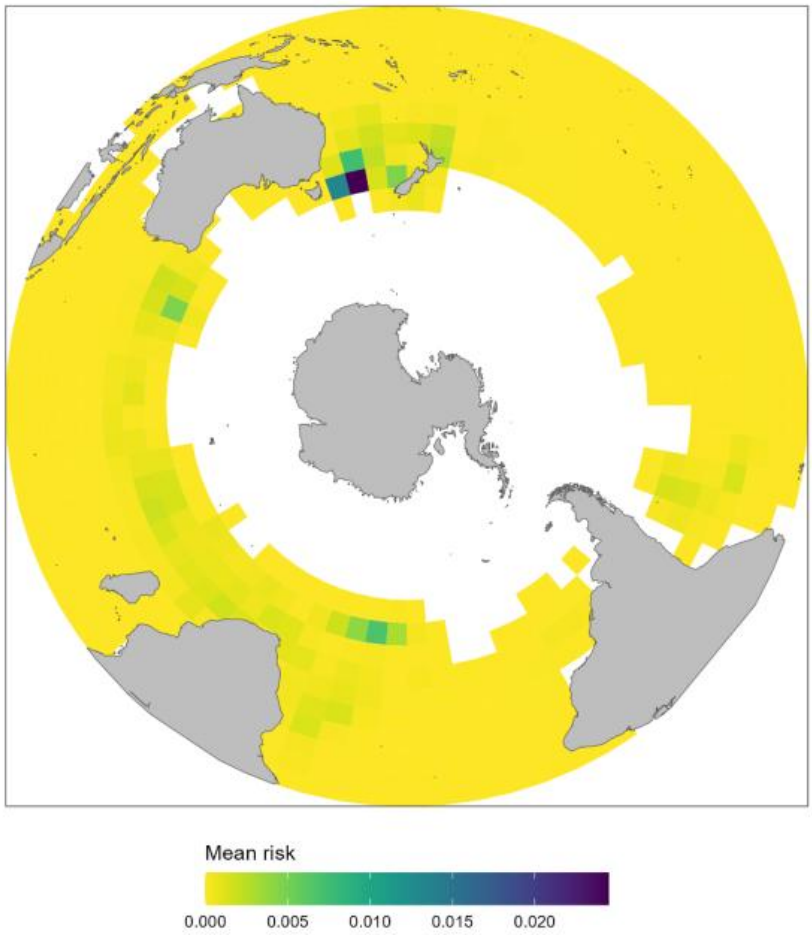


Figure 1. Map identifying the mean risk to all species of seabird considered by the 2025 SEFRA.

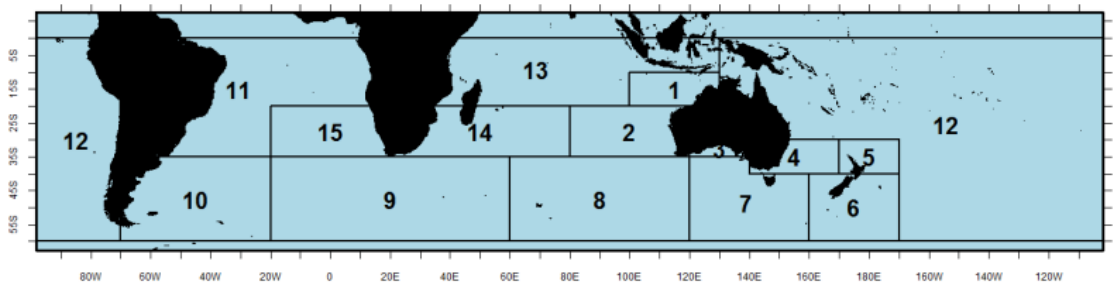


Figure 2. Map of CCSBT statistical areas.

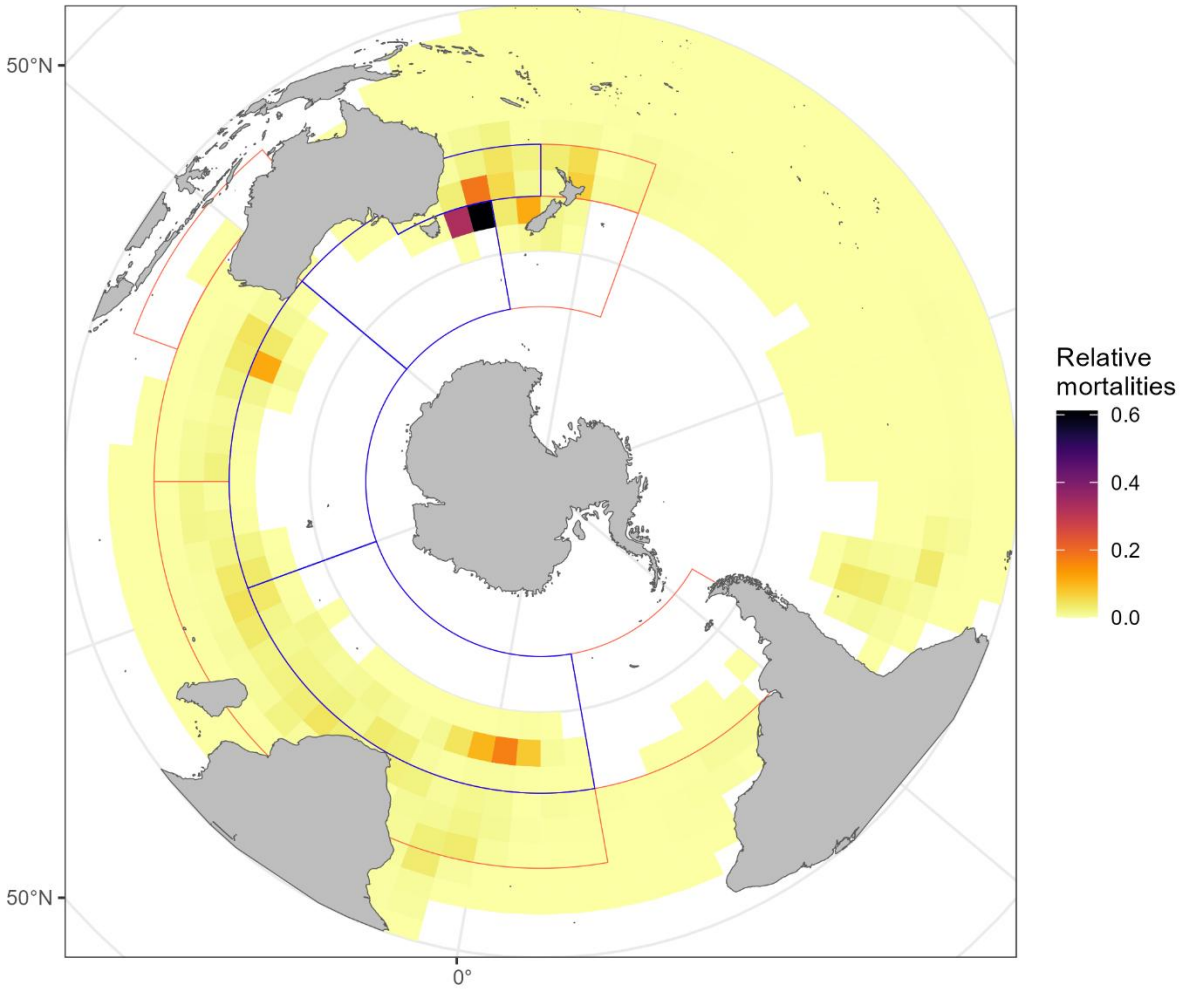


Figure 3. Map identifying the mean Relative Mortality to all species of seabird considered by the 2025 SEFRA. CCSBT Statistical Areas highlighted in blue are the identified 'High Risk Areas' – Statistical Areas 4, 7, 8 and 9. CCSBT Statistical Areas highlighted in red and the remaining CCSBT Statistical Areas not selected by this process.

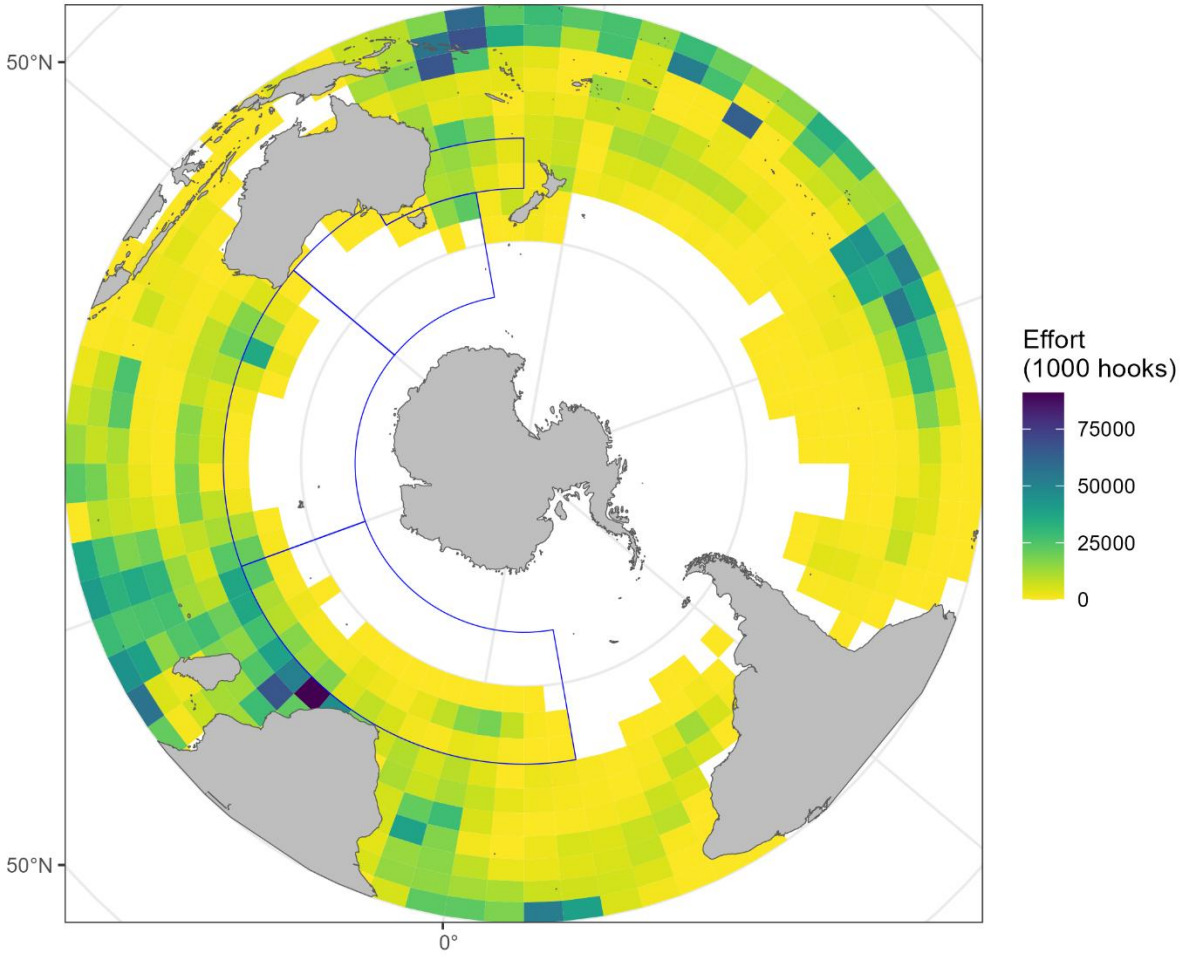


Figure 4. Map identifying the CCSBT member pelagic longline fishing effort considered by the 2025 SEFRA. CCSBT Statistical Areas highlighted in blue are the identified 'High Risk Areas' – Statistical Areas 4, 7, 8 and 9.

Appendix 2 – Code

```
####################
#Data and libraries#
####################

library(sf)
library(ggplot2)
library(dplyr)
library(tidyr)
library(EnvStats)
library(sefraInputs)
library(viridis)
library(nzsf)
library(lwgeom)

setwd(choose.dir())

## load risk_grid
load('Data/risk_grid.rda', v=T)
load('Data/inputs_bio.rda', v=T)
load("Data/grid.rda")
load("Data/effort_t.rda")

## objects from shraInputsCCSBT used to create consistent maps
data(southern_map, package = "sefraInputs")
data(southern_bbox, package = "sefraInputs")

##CCSBT stat areas - projected onto SH map
data("CCSBT")
CCSBTcrs = st_crs(CCSBT)
CCSBT = st_set_crs(CCSBT, NA)
CCSBT = CCSBT %>%
  st_segmentize(0.1) %>%
  st_set_crs(CCSBTcrs) %>%
  st_transform(crs = st_crs(grid)) %>%
  st_union(by_feature = TRUE)

effort_t = as_tibble(effort_t)
sh_effort <- effort_t %>% left_join(., grid, by = "id_cell") %>% st_as_sf(.)

##Species information
spp = data.frame(code.sra = unique(inputsBio$sp_codes))
names(spp) = c("id_code", "code", "common_name")
spp = spp %>%
  left_join(inputsBio$sp_groups, by = "code")
spp = spp %>%  dplyr::select(id_code.x, code, common_name.x, genus,
scientific_name)
#  filter(genus == 'Diomedea') %>%
names(spp) = c('id_code', 'species_code', 'common_name', 'genus',
'scientific_name')
spp = rbind(spp, data.frame(id_code = 99, species_code = 'ALL', genus = 'All
genera', common_name = 'All species', scientific_name = "All species"))

############
#Processing#
############

#risk_grid = subset(risk_grid, subset = species_code %in% spp$species_code)
all_risk = cbind("all", "all", 99, aggregate(risk_grid$deaths,
by=list(risk_grid$id_cell), FUN=sum), aggregate(risk_grid$risk,
by=list(risk_grid$id_cell), FUN=sum))
all_risk = all_risk[,-6]
names(all_risk) = names(risk_grid)
risk_grid = bind_rows(risk_grid, all_risk)

#Add stat area to risk grid
```

```
grid_cent = st_centroid(grid)
grid_cent$StatArea = grid_cent[CCSBT,]

###################
##High Risk Areas##
###################

#Risk threshold and species
input = list(sel_species       = 'all',
             risk_threshold    = 0.1)

##Select species_code from spp
#risk = risk_grid[risk_grid$species_code == input$sel_species,]
risk = risk_grid[risk_grid$species_code %in% by_species[by_species$RM >
input$risk_threshold,]$species_code
,]

##Top5 rule
#top_five = risk_grid[which(risk_grid$species_code == by_species$species_code[1] |
risk_grid$species_code == by_species$species_code[2] | risk_grid$species_code ==
by_species$species_code[3]),]
top_five = risk %>%
  group_by(id_cell) %>%
  summarise(RM = sum(risk)) %>%
  arrange(desc(RM)) %>%
  filter(row_number()%in%1:5) %>%
  left_join(., grid, by = "id_cell")
top_five_centroid = st_as_sf(top_five)
top_five_centroid = st_centroid(top_five_centroid)

hr_area = CCSBT[top_five_centroid,]
hr_area_id = st_centroid(grid)[hr_area,]

## Add grid geometry to risk_grid, and convert to simple feature
map_dat <- risk_grid %>% left_join(., grid, by = "id_cell")
map_dat <- st_as_sf(map_dat)

#######
#Plots#
#######

## map of relative mortalities with high risk areas
map_dat %>% filter(., species_code %in% "all", risk > 0) %>%
    ggplot() +
    geom_sf(aes(fill = risk), col = NA) +
    viridis::scale_fill_viridis("Relative\nmortalities", direction = -1, option =
"inferno", limits = c(0, NA)) +
#    facet_wrap(vars(species_code)) +
      geom_sf(data = CCSBT, fill = NA, colour = 'tomato') +
      geom_sf(data = hr_area, fill = NA, colour = 'blue') +
    geom_sf(data = southern_map, fill = "grey") +
    coord_sf(xlim = southern_bbox[c(1, 3)], ylim = southern_bbox[c(2, 4)], expand =
FALSE) +
    theme_bw()
ggsave("HR_area_top5.png", width = 7)

## map of relative mortalities for high risk species
risk_plot %>%
    ggplot() +
    geom_sf(aes(fill = RM), col = NA) +
    viridis::scale_fill_viridis("Relative\nmortalities", direction = -1, option =
"inferno", limits = c(0, NA)) +
#    facet_wrap(vars(species_code)) +
      geom_sf(data = CCSBT, fill = NA, colour = 'tomato') +
      geom_sf(data = hr_area, fill = NA, colour = 'blue') +
    geom_sf(data = southern_map, fill = "grey") +
    coord_sf(xlim = southern_bbox[c(1, 3)], ylim = southern_bbox[c(2, 4)], expand =
FALSE) +
    theme_bw()
ggsave("HR_species_total_risk.png", width = 7)
```

```
## map of effort with high risk areas
sh_effort %>% filter(., thousand_hooks > 0) %>%
    ggplot() +
    geom_sf(aes(fill = thousand_hooks), col = NA) +
    viridis::scale_fill_viridis("Effort\n(1000 hooks)", direction = -1, limits =
c(0, NA)) +
#    facet_wrap(vars(species_code)) +
      geom_sf(data = hr_area, fill = NA, colour = 'blue') +
    geom_sf(data = southern_map, fill = "grey") +
    coord_sf(xlim = southern_bbox[c(1, 3)], ylim = southern_bbox[c(2, 4)], expand =
FALSE) +
    theme_bw()
ggsave("HR_area_effort_top5.png", width = 7)

###########
#Summaries#
###########

species_hr = subset(risk_grid, risk_grid$id_cell %in% hr_area_id$id_cell)

by_species_hr = group_by(species_hr, species_code) %>%
  summarise(RM = sum(risk)) %>%
  left_join(spp, by = "species_code") %>%
  dplyr::select(species_code, common_name, genus, scientific_name, RM) %>%
  arrange(desc(RM)) %>%
  left_join(., by_species, by = "species_code") %>%
  filter(species_code != 'all') %>%
#  select(-one_of(c('name.y', 'genus.y'))) %>%
  mutate(Percent = RM.x/RM.y) %>%
  write.csv(.,file = "by_species_hr_top5.csv")

effort_hr = subset(sh_effort, sh_effort$id_cell %in% hr_area_id$id_cell)
sum(effort_hr$thousand_hooks)

sum(effort_hr$thousand_hooks)/sum(sh_effort$thousand_hooks)
```