Fisheries New Zealand
Tini a Tangaroa

Annual Review Report

For Highly Migratory Species and Pacific Fisheries 2022/23

Fisheries New Zealand Technical Paper No: 2023/03

Prepared by: Fisheries New Zealand

ISBN No: 978-1-991120-53-3 (online)

ISSN No: 2624-053X (online)

December 2023

Te Kāwanatanga o Aotearoa
New Zealand Government

Disclaimer

While every effort has been made to ensure the information in this publication is accurate, Fisheries New Zealand does not accept any responsibility or liability for error of fact, omission, interpretation or opinion that may be present, nor for the consequences of any decisions based on this information. Requests for further copies should be directed to:

This publication is available on the Ministry for Primary Industries website at http://www.mpi.govt.nz/news-and-resources/publications/

Te Kāwanatanga o Aotearoa
New Zealand Government

Contents

Overview

The Annual Review Report for Highly Migratory Species and Pacific Fisheries 2022/23 (the Annual Review Report) reviews the delivery of management initiatives specified in the Annual Operational Plan for Highly Migratory Species Fisheries 2022/23 (the Annual Operational Plan). The Annual Review Report also reviews overall performance of highly migratory species (HMS) fisheries in relation to some of the wider HMS management objectives.

The Annual Operational Plan covers the time period from 1 July 2022 to 30 June 2023. This Annual Review Report will review the delivery of tasks during the timeframe of the Annual Operational Plan, and will consider data from the 2021/22 fishing year (1 October 2021 through 30 September 2022), or earlier years if the data is not yet available.

The Annual Operational Plan identified tasks under Key Focus Areas and Business as Usual items, which were designed to contribute towards the ten Management Objectives defined in the National Fisheries Plan for HMS 2019, outlined below:

Use outcome	1	Support viable and profitable commercial HMS fisheries in New Zealand
	2	Maintain and enhance world class game fisheries in New Zealand fisheries waters
	3	Māori interests (including customary, commercial, recreational, and environmental) are enhanced
Environmental outcome	4	Maintain sustainable HMS fisheries within environmental standards
	5	Implement an ecosystem approach to fisheries management, taking into account associated and dependent species
	6	Protect, maintain, and enhance fisheries habitats
Governance conditions	7	Maintain an effective fisheries management regime
	8	Recognise and deliver Deed of Settlement obligations
	9	Ensure New Zealand interests are taken into account internationally
	10	Contribute to Pacific capacity development

Key Focus Areas (KFAs)

KFA 1: MANAGE INTERACTIONS OF HMS FISHERIES WITH SEABIRDS

Summary

New Zealand's National Plan of Action for seabirds was updated in 2020. The new 'National Plan of Action-Seabirds 2020: Reducing the incidental catch of seabirds in fisheries' (NPOA Seabirds) has a vision that, *New Zealanders work towards zero fishing-related seabird mortalities*, and has four goals:

1. *Avoiding bycatch* — effective bycatch mitigation practices are implemented in New Zealand fisheries

2. *Healthy seabird populations* — direct effects of New Zealand fishing do not threaten seabird populations or their recovery

3. *Research and information* — information to effectively manage direct fisheries effects on seabirds is continuously improved

4. *International engagement* — New Zealand actively engages internationally to promote measures and practices that reduce impacts on New Zealand seabirds.

A key feature of the NPOA Seabirds is an annual report, which reports on progress towards objectives set out under each goal. Much of the information previously reported in this section of the Annual Review Report will now be found in the Seabird Annual Review Report[1], which will be published around the same time as this report.

Seabird captures

During the 2021/22 fishing year, there were 55 observed seabird captures in the surface longline fishery (6% observed effort). This comprises 39 petrels and shearwaters, 15 small albatrosses, and one large albatross. This is an increase from the 51 observed seabird captures in the 2020/21 fishing year (11% observed effort).

During the 2021/22 fishing year, there were 208 fisher-reported seabird captures in the surface longline fishery. This comprises 41 small albatrosses, 16 large albatrosses, 27 unidentified albatrosses, and 124 petrels and shearwaters. This is an increase from the 179 fisher-reported seabird captures in the 2020/21 fishing year.

Seabird proxy measures

Capture rate reduction targets provide a gauge against which the 'avoiding bycatch' goal of the NPOA Seabirds 2020 can be measured.

In lieu of capture rate reduction targets being set for surface longline fisheries (which are not able to be accurately set due to low observer coverage), alternative "proxy" measures are used to provide an indication of trends towards agreed proxy targets in incidental seabird captures in the surface longline fishery. Three proxy measures are used: the level of observed use of mitigation measures; the level of self-reporting of non-fish bycatch on observed trips compared with non-observed trips; and vessel adherence to protected species risk management plans (PSRMPs).

Observed use of mitigation measures

- *Tori line, line weighting, and night setting use rates on observed sets.*

The 'Fisheries (Seabird Mitigation Measures – Surface Longlines) Circular 2019' requires commercial fishers setting surface longlines to either:

1. Use hook shielding devices, *or*
2. Use a tori line; and either:
    a. Set lines at night: *or*
    b. Weight lines to legal specifications.

The following tables provide the observed seabird mitigation use rates in the southern bluefin tuna surface longline fishery, and for the swordfish and 'other tunas' surface longline fisheries combined (swordfish and bigeye, pacific bluefin, and yellowfin)[2]. **Table 1** shows continued good use of mitigation measures in the southern bluefin fishery, while **Table 2** shows that mitigation use has improved since last year for those vessels targeting swordfish and 'other tunas.'[3] Note in 2021/22 there was no observer coverage in the surface longline fisheries targeting southern bluefin tuna in area 5, and no coverage in the swordfish and 'other tuna' in area 6.

[1] Seabird Annual Report: https://www.mpi.govt.nz/fishing-aquaculture/sustainable-fisheries/managing-the-impact-of-fishing-on-protected-species/reducing-deaths-of-seabirds/

[2] The surface longline fishery has been divided into these three groups because different target species can have different mitigation set-ups. For example, surface longline operations targeting swordfish may prefer to set during the day and use line weighting, compared with those targeting bluefin tuna, which may prefer to set at night.

[3] Note that observed mitigation use rates report only presence/absence of mitigation and not whether mitigation meets a standard.

Non-compliance reported by observers is referred to MPI Fisheries Compliance district offices for follow-up. Where additional investigation is necessary, fishery officers contact the skipper and/or permit holder and may follow up with an inspection of the vessel and its mitigation devices.

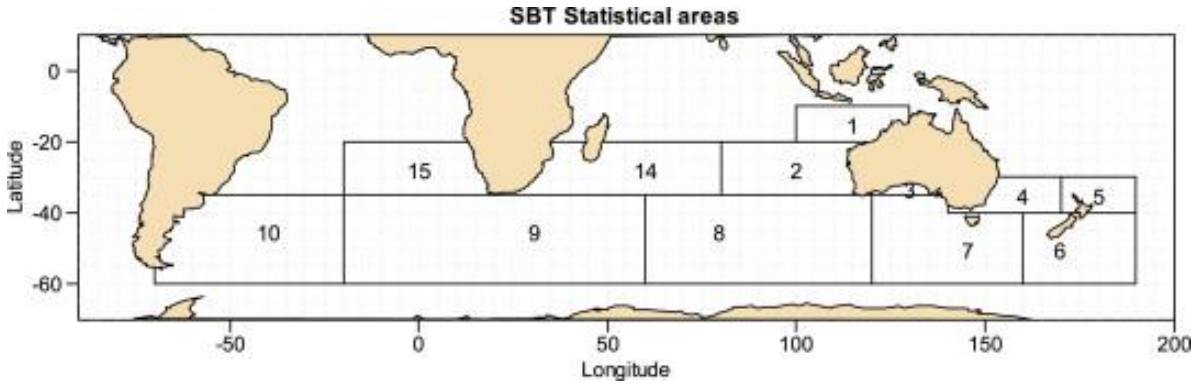
Table 1. Observed mitigation use rates (percentage of observed events[4] with specific mitigation measures) per year and area for surface longline effort targeting southern bluefin tuna.

Fishing year	Area (CCSBT stat area)	Tori line and night setting	Tori line and line weighting	Tori line, night setting, and line weighting	Night setting and line weighting	Tori line only	Night setting only
2020/21	5	71		29			
	6	45		55			
2021/22	5						
	6	16	2	82			

Table 2. Observed mitigation use rates (percentage of observed events with specific mitigation measures) per year and area for surface longline effort targeting swordfish and all tunas apart from southern bluefin tuna.

Fishing year	Area (CCSBT stat area)	Tori line and night setting	Tori line and line weighting	Tori line, night setting, and line weighting	Night setting and line weighting	Tori line only	Night setting only
2020/21	5	21	28	14		36	1
	6		60	40			
2021/22	5	25	32	43			
	6						

Note that the CCSBT statistical areas are illustrated in the below map:



Levels of self-reporting

- *Levels of self-reporting of bycatch will be measured by comparing the birds per unit effort (BPUE[5]) for observed hooks compared with non-observed hooks.*

During the 2021/22 fishing year, there was a significantly higher BPUE for observed trips than non-observed trips, however it should be noted that the unusually low observer coverage in the 2021/22 fishing year (approximately 6%) means that the observed BPUE may not be representative of the fleet. Low levels of observer coverage affect the accuracy of reported BPUE because of the limited number of vessels and trips that are observed compared to overall effort. The historical discrepancy between

[4] One 'event' equates to one set.

[5] Birds per unit effort (BPUE) is the number of seabird captures per 1,000 hooks.

observed and unobserved BPUE may also suggest some level of under reporting of seabird captures on non-observed commercial trips. Compared with the previous year, both observed and non-observed BPUE increased.

Table 3. Observed seabird capture rate compared with fisher-reported seabird capture rate in the surface longline fishery.

Fishing year	Observed BPUE	Non-observed BPUE
2020/21	0.30	0.11
2021/22	0.87	0.13

The difference in observed and self-reported captures has been raised at multiple Fish Plan Advisory Group meetings and Longline Workshops. Fishers are reminded that reporting seabird captures is a legal requirement and are urged to be more diligent in this area. Members of the HMS and Pacific fisheries team have also been working closely with the Department of Conservation Protected Species Liaison Officer Programme to try and increase education and awareness of seabird reporting requirements with fishers.

Vessel adherence to protected species risk management plans

- *Level of audits that indicate that vessels are adhering to their protected species risk management plans*

The Protected Species Liaison Programme continues to work with vessels in the HMS and inshore fisheries. A key output from the programme is assisting vessels in developing Protected Species Risk Management Plans (PSRMPs) specific to their operations. PSRMPs have been developed for all active surface longline vessels and are reviewed a minimum of once per year. Additionally, all but one vessel in the purse seine fleet had a PSRMP in the 2021/22 fishing year. Fishing vessels are audited against their PSRMPs by FNZ observers. Detailed breakdowns of vessel adherence to their PSRMPs, as well as alignment of PSRMPs to the mitigation standards, can be found in the Liaison Programme Annual Report for the 2021/22 fishing year, available on the DOC Conservation Services Programme webpage.[6]

Due to the low observer coverage in the fleet, there were only three observer audits of surface longline PSRMPs in the 2021/22 fishing year (down from 14 the previous year). The audits indicated 100% adherence to bycatch mitigation procedures, reporting, and handling or release, which means vessels were confirmed to have controlled/dimmed spotlights that were shining astern during night setting, avoided using frozen bait, electronically reported all protected species captures to MPI, and handled any live protected species captures with due care. Additionally, all observed vessels only set at night. However vessels had low adherence to their fish waste management (including used baits) and bait discharge procedures and some problems with tori line specifications.

None of the surface longline vessels audited were using hook-shielding devices. Two of the three audits had large seabird capture events while observers were onboard.

Other management initiatives

Seabird Advisory Group

Members of the HMS and Pacific Fisheries Team attended multiple meetings of the Seabird Advisory Group in 2022/23. The team led various initiatives such as developing a framework for reviewing Mitigation Standards, and reviewing the surface longline Mitigation Standards. The review included

[6] Liaison Officer Programme Annual Report 21/22: https://www.doc.govt.nz/globalassets/documents/conservation/marine-and-coastal/marine-conservation-services/reports/202122-annual-plan/mit2021-01-protected-species-liaison-project-annual-report-2021-22.pdf

examining the performance of the fleet against the various outcomes of the standards to determine whether there was a need to revise them.

Surface Longline Circular Review

A key outcome of the review of the surface longline Mitigation Standards was the decision to review the Fisheries (Seabird Mitigation Measures – Surface Longlines) Circular 2019 (SLL circular). This was due mainly to low uptake of key 'best practice' mitigation measures by the surface longline fleet, combined with the continued high capture rate of seabirds. The review entails an assessment of the existing mandatory measures to determine whether additional measures should be regulated to help further reduce risk of seabird interactions in the surface longline fleet.

The HMS and Pacific Fisheries Team are leading the review of the SLL circular in 2023, including facilitating public consultation. A decision on the outcome of the review will be made towards the end of 2023.

Supporting uptake of hook-shielding devices

The Department of Conservation funded the purchase of hook-shielding devices with the goal of aiding uptake in the surface longline fleet. COVID-19 delayed the delivery of the devices, and then technical difficulties around the depth at which the devices opened led to several participants discontinuing their use. Additionally, some operators had issues with the hook-shielding devices not opening during sets.

A study funded by the Department of Conservation provided some suggested improvements for the uptake of hook-shielding devices including: 1) enable device use at shallower fishing depths, 2) provide advice on how to avoid tangles in storage bins, and 3) provide certainty about future costs. In consideration of this, the Department of Conservation ordered new hook-shielding devices (as part of MIT2020-01) with a 10-metre release depth and arranged for better user-support upon uptake of devices. Despite these changes, uptake of hook-shielding devices remained low during 2022/23.

The Department of Conservation is waiting on enough operational data to complete the second half of project MIT2020-01, which makes a comparative assessment of bycatch and target fish capture rates between vessels using hook-shielding devices and those using other mitigation options.

Commission for the Conservation of Southern Bluefin Tuna (CCSBT) Seabird Initiatives

The Ecologically Related Species Working Group (ERSWG) of the CCSBT last met in March 2022. Historically, the Group was convened on an ad hoc basis to address specific issues identified by the Extended Commission, however at the meeting in March it was decided that more regular meetings would be beneficial. The ERSWG will now meet biennially, with informal technical meetings occurring in the off years. The next technical meeting will occur in June 2024 and will focus on updating the southern hemisphere seabird risk assessment.

Representatives from the HMS and Pacific Fisheries Team and the Aquatic Environment Science Team participated in the ERSWG meeting in March 2022, along with representatives from the Department of Conservation. The New Zealand delegation presented multiple technical papers, including a multi-threat risk assessment for antipodean albatross, and a framework for a southern hemisphere seabird risk assessment. A key objective for the meeting was agreement on actions for the Multi-Year Seabird Strategy. These actions compliment the objectives previously adopted by the Commission. This strategy will guide the actions of the Commission towards reducing the impact of the southern bluefin tuna fishery on seabirds. Actions for the strategy were agreed by participating Members and were adopted by the CCSBT Extended Commission in October 2022.

Southern Hemisphere Seabird Risk Assessment

The National Plan of Action for Seabirds 2020 is based on a risk assessment approach to identify and manage seabird interactions with commercial fisheries. As many of New Zealand's seabird species migrate widely and interact with a wide range of fisheries internationally, a spatially explicit fisheries risk assessment (SEFRA) was developed to extend across the southern hemisphere. A third iteration of the risk assessment was contracted for 2021 and was presented to the CCSBT ERSWG in March 2022. Due to delays in the contracting process, only the framework for the risk assessment was presented. However, the final results were available in October 2022 and were submitted to the CCSBT Extended

Commission meeting.[7] The Commission agreed on the work plan put forward by the ERSWG to continue advancing the SEFRA work into 2023/24, which will be led by New Zealand and Japan. The final SEFRA is scheduled to be presented at the next ERSWG in June 2024.

Western and Central Pacific Fisheries Commission (WCPFC) Seabird Initiatives

Requirements for mitigating the impact of longline fishing on seabirds in the WCPFC are set out in the 2018 seabird Conservation and Management Measure (CMM 2018-03)[8]. In 2019, WCPFC adopted voluntary guidelines for the handling and safe release of seabirds caught by longline fishing. The guidelines are based on the Agreement on the Conservation of Albatrosses and Petrels' (ACAP) best practice to ensure that seabirds captured alive are released in as good a condition as possible.

During 2022, New Zealand, along with Australia, France and the United States, participated in Operation Nasse, a regional maritime operation to detect and deter illegal, unreported, and unregulated fishing and determine compliance to the WCPFC Conservation and Management Measures on the high seas in the Tasman Sea and South Pacific Ocean. The examination of seabird mitigation measures was prioritised for aerial surveillance and inspection by New Zealand Fishery Officers as vessels were active below the latitude of 30° South (deemed to be of increased risk to seabirds). Several issues relating to non-compliant tori lines were identified and it was noted that there are ongoing concerns about the correct implementation of seabird mitigation requirements and that monitoring of these requirements will be a focus of future operations.

New Zealand submitted two information papers to the WCPFC Scientific Committee in August 2022. The first paper was a population assessment of Antipodean albatross, with simulations suggesting an on-going decline in population of almost 5% per annum.[9] The second paper reported on the first two years of a study which tracks seabirds and their overlap with longline fishing activity, highlighting high risk areas in the Tasman Sea and north-west of New Zealand.[10]

Japan and the US also submitted papers to the Scientific Committee on seabird mitigations. The US papers reported on its research exploring the effectiveness of seabird mitigations in their Hawaii small deep-set longline fleet (<24 metres). New Zealand welcomed the conclusions of the US-led research, which provided quantitative evidence that the use of blue-dyed bait is ineffective as a seabird mitigation, despite it being a mitigation option in CMM 2018-03 for the North Pacific. New Zealand also acknowledged the US-led research which demonstrated that tori lines are effective and practical for small vessels in the North Pacific.

The Scientific Committee recommended to the WCPFC that the seabird mitigation measure is reviewed in 2023 or 2024, with mitigation measures evaluated for effectiveness and compared against ACAP best practice. The Scientific Committee noted that tori lines have proven to be an effective and practical means to reduce seabird bycatch in small vessels in the North Pacific; that the weight of streamers and aerial extent need to be taken into account in the design of tori lines; and that scientific evidence indicates that the use of blue-dyed bait is ineffective as seabird mitigation.

The WCPFC, noting the global decline in seabird populations, endorsed the Scientific Committee's recommendation to review the seabird mitigation measure over 2023 and 2024. New Zealand offered to lead this review.

---

[7] Southern Hemisphere Seabird Risk Assessment: https://www.ccsbt.org/system/files/ERSWG14_13_NZ_SouthernHemisphere_Seabird_RiskAssessmentFramework.pdf

[8] WCPFC seabird conservation and management measure: https://www.wcpfc.int/doc/cmm-2018-03/conservation-and-management-measure-mitigate-impact-fishing-highly-migratory-fish

[9] Antipodean albatross population assessment: https://meetings.wcpfc.int/node/16337

[10] Antipodean albatross spatial distribution and fisheries overlap: https://meetings.wcpfc.int/node/16338

In Port Inspections

The easing of COVID-19 quarantine restrictions has allowed New Zealand Fisheries Compliance to recommence the inspection of foreign flagged fishing vessels entering into our ports. These port inspections are required as a condition of entry into New Zealand fisheries waters, and are undertaken in accordance with the United Nations Port State Measures Agreement (PSMA)[11] and the WCPFC Minimum Guidelines for Port State Measures.[12] A key area of inspection is the examination of seabird mitigation equipment required under the WCPFC Seabird Conservation and Management Measure.[13] Non-compliance in relation to seabird measures has been identified on several vessels and New Zealand is continuing to work with the responsible flag state and the fishing masters to rectify these issues.

Te Pātuitanga Ahumoana a Kiwa

Through its Te Pātuitanga Ahumoana a Kiwa (Te Pātui) team, the Ministry for Primary Industries engages with Pacific Island Countries and territories (PICTs) to build capacity in fisheries administrations. The programme is developing fisheries compliance e-learning modules on high seas boarding and inspection. This will include a course to ensure PICTs understand how to correctly monitor compliance with WCPFC conservation and management measures, including how to inspect vessels and equipment to mitigate HMS fishing impacts on seabirds.

Other engagement

At the Fish Plan Advisory Group Meetings in November 2022 and May 2023, the HMS and Pacific Fisheries Team presented information to fishers on seabird capture rates and use of seabird mitigation measures. The Protected Species Liaison Programme also presented an update on activities in the surface longline fleet.

A Surface Longline Workshop was held in April 2023 in Tauranga in conjunction with Fisheries Inshore New Zealand (FINZ). Presentations on seabirds are an integral part of longline workshops, and a productive discussion on the seabird circular review was led by the HMS and Pacific Fisheries team.

The HMS and Pacific Fisheries Team help facilitate quarterly commercial reporting of seabird and protected marine species captures, which is publicly available on the Ministry for Primary Industries website[14]. Team members also serve as subject matter experts for associated media inquiries and Official Information Act requests received from the public.

KFA 2: CONTRIBUTE TO INTERNATIONAL PROCESSES THROUGH REGIONAL FISHERIES MANAGEMENT ORGANISATIONS

Summary

New Zealand is a member of CCSBT and WCPFC. As a member of these regional fisheries management organisations (RFMOs), New Zealand has a number of commitments, including participating in annual meetings, ensuring obligations are upheld (e.g. submission of data and national reports, and compliance with management measures), and proposing changes to enhance the regional management of highly migratory species.

Once again, the COVID-19 pandemic impacted these organisations, as well as their members, in 2022/2023. The CCSBT meetings were all virtual. However, the WCPFC meeting met in person for the

[11] United Nations, Port State Measures Agreement: https://www.fao.org/3/i5469t/I5469T.pdf

[12] WCPFC Conservation and Management Measure on minimum standards for Port State Measures (CMM 2017-02), https://www.wcpfc.int/doc/cmm-2017-02/conservation-and-management-measure-minimum-standards-port-state-measures

[13] WCPFC Conservation and Management Measure to mitigate the impact of fishing for highly migratory fish stocks on seabirds (CMM 2018-03), https://www.wcpfc.int/doc/cmm-2018-03/conservation-and-management-measure-mitigate-impact-fishing-highly-migratory-fish

[14] Seabirds and protected marine species caught by commercial fishers webpage: https://www.mpi.govt.nz/science/open-data-and-forecasting/fisheries/seabirds-and-protected-marine-species-caught-by-commercial-fishers/

first time since 2019, although subsidiary bodies such as the Technical and Compliance Committee and Scientific Committee met virtually.

One benefit of the virtual meeting format was that more officials and representatives could attend the meetings due to the increased accessibility of the online platforms. Officials from Fisheries New Zealand and other parts of the Ministry for Primary Industries, the Ministry of Foreign Affairs and Trade, and the Department of Conservation attended the virtual meetings. Prior to these meetings, consultations took place to inform domestic stakeholders on international management issues and to allow for input into New Zealand's negotiation positions.

A summary of activities in relation to CCSBT and WCPFC carried out in 2022/23 is outlined below.

The Commission for the Conservation of Southern Bluefin Tuna (CCSBT)

Fisheries New Zealand administers the CCSBT Catch Documentation Scheme and authorised vessel list, prepares and submits fisheries data, and prepares for and attends annual meetings.

In 2022, officials virtually attended the following CCSBT meetings:

- Twenty Seventh Meeting of the Extended Scientific Committee, 29 August – 6 September 2022
- Seventeenth Meeting of the Compliance Committee, 4 - 7 October 2022
- Twenty Ninth Annual Meeting of the Extended Commission, 10 - 14 October 2022

The Management Procedure was run in 2022 so the focus of the Extended Scientific Committee (ESC) meeting was discussion around the recommendation for changes to the total allowable catch (TAC). Ultimately, the recommendation from the ESC was for an increase of 3,000 tonnes to the TAC. However, the decision to increase the TAC was deferred to October 2023 due to uncertainties in Australian farming operations and in the Japanese markets.

There was little progress on resolving the potential underreporting in the Australian southern bluefin tuna farming operations at the Compliance Committee and Extended Commission meetings. Members indicated the need for tangible progress by next year and the implementation of stereo-video by the 2024 to 2026 quota block. Stereo-video would help ensure that fish being transferred from the tow cages to the farms were being accurately reported and therefore accounted for. Australia produced a work plan to demonstrate its commitment to implementing stereo-video and started a trial in its farming operations in early 2023.

The update to the Japanese market study that was commissioned by CCSBT in 2021 was ultimately determined to be infeasible due to uncertainties in the formula that was used to inform the original study. This project was meant to establish a mechanism to help verify Member's catch by examining information from Japanese markets but assumptions in the previous model were deemed unrealistic to duplicate. Japan committed to developing a work plan to be presented at the 2023 CCSBT meetings that would continue to advance the initiative to resolve uncertainties in the Japanese markets.

The Western and Central Pacific Fisheries Commission (WCPFC)

In 2022, New Zealand officials attended the following WCPFC meetings – all meetings were virtual aside from the Commission meeting itself:

- A range of Pacific Islands Forum Fisheries Agency meetings throughout the year
- 18th Regular Session of the WCPFC Scientific Committee, 10-18 August 2022, and the first Science-Management Dialogue, 19-22 August 2022
- 18th Regular Session of the WCPFC Technical and Compliance Committee, 21-27 September 2022
- Special Session of WCPFC to discuss COVID-19 decisions relating to purse seine observer coverage and at-sea transhipment observers, 9 June 2022
- WCPFC South Pacific Albacore Roadmap Intersessional Working Group, 15 July 2022
- WCPFC Electronic Reporting and Electronic Monitoring Working Group, 19-20 July 2022
- WCPFC Workshop on Labour Standards for crews on fishing vessels, 27 July 2022
- 19th Regular Session of the Commission, 27 November - 3 December 2022

The Scientific Committee reviewed a new stock assessment for skipjack. It was assessed that the recent median spawning biomass depletion was 0.51 for the 2018-2021 period; the stock is not overfished nor experiencing overfishing.

New Zealand engaged actively in the discussion on the skipjack stock assessment, noting the complexities of the model and the need to take into account uncertainties relating to effort creep and recruitment patterns. There was no consensus at the Scientific Committee on management advice for skipjack. There were, however, several recommendations about stock assessment models and new research to improve the future analysis of skipjack.

A key outcome of WCPFC 19 was the adoption of an interim Management Procedure for skipjack, the predominant tuna species caught in the region (62% of the total catch within the Western and Central Pacific Ocean, worth US$2.17 billion in 2021 – the bulk of which is caught in the waters of Parties to the Nauru Agreement (PNA) + Tokelau). The initiative was led by PNA + Tokelau and supported by members of the Pacific Island Forum Fisheries Agency (including New Zealand).

It provides for pre-agreed management until 2030 to maintain the skipjack stock consistent with a set Target Reference Point and above the Limit Reference Point. It applies to the EEZs and high seas of the Convention Area.

Based on the 2022 stock assessment for skipjack, the Target Reference Point is estimated to be 50% of spawning biomass in the absence of fishing – with the harvest control rule managing the stock within a range of 40% to 57% of estimated unfished biomass. The Limit Reference Point is set at 20% of the estimated recent average spawning potential in the absence of fishing – and the risk of breaching this Limit Reference Point must be no greater than 20%.

The WCPFC will hold two workshops in 2023 to consider catch limits and allocations for high seas purse seine and longline bigeye tuna fishing – these limits are due to be agreed under the tropical tuna measure. New Zealand is currently allocated 160 days for high seas purse seine fishing.

It is expected that the effective implementation of the skipjack Management Procedure will require resolution of the issues relating to high seas purse seine allocations – including for small island developing States which are currently exempt from limits on the high seas in recognition of their development needs.

The Commission adopted a revised Terms of Reference and work plan for the south Pacific albacore intersessional working group for 2023-2026. The revised Terms of Refences empowers the group to progress work on a Target Reference Point to be agreed in 2023, Management Procedure to be adopted in 2024, a revised conservation and management measure, and an allocation framework which takes into consideration all fisheries.

FFA members put forward a proposal to strengthen the current conservation and management measure for Southwest Pacific swordfish. The stock is currently healthy – but there are concerns that significant increases in catch could result in a high risk of breaching the limit reference point. The proposed measure sought to expand the area of coverage to South of the equator (rather than just South of 20° South), accommodate zone based management and compatible high seas limits (constraining total catch to the 2016-2018 level of 7,558 tonnes), and manage both target and bycatch fisheries.

There was agreement from all Members that any revised measure should encompass the whole area of the stock South of the equator. Most Members showed a willingness to engage on the proposal, however, ultimately there was no agreement on a revised measure with one member blocking adoption. Australia will continue work on this measure in 2023.

It was agreed to resume the Compliance Monitoring Review process in 2023 (covering assessment of compliance in 2021 and 2022). New Zealand-led work on a risk-based framework will be used to guide prioritisation of obligations for assessment in future. Audit Points have been adopted to help ensure there are clear and transparent criteria, and less scope for misinterpretation of obligations.

New Zealand and Indonesia continue to co-chair work to develop a binding measure on crew conditions on vessels.

There is on-going work to develop a regional electronic monitoring programme. New Zealand co-chaired work at WCPFC19 which resulted in the requirement for vessels to electronically report catch and effort data to national authorities within 15 days of the end of a high seas trip or transhipment at sea. CCMs are also required to submit their operational data electronically (in accordance with the agreed Standards, Specifications and Procedures) to the WCPFC by 30 April each year.

KFA 3: MANAGE INTERACTIONS OF HMS FISHERIES WITH SHARKS, RAYS, AND SEA TURTLES

Summary

Highly migratory shark and turtle species spend only part of their time in New Zealand waters, and can migrate over considerable distances. The surface longline fishery interacts with highly migratory sharks, (blue shark, mako shark and porbeagle shark), and turtles (leatherback turtle, green turtle, and hawksbill turtle) and the purse seine fishery interacts with spine-tailed devil rays and manta rays. New Zealand cooperates with other countries to manage these species, notably through RFMOs, including WCPFC and CCSBT.

New Zealand's *National Plan of Action for the Conservation and Management of Sharks 2013* (NPOA Sharks)[15] sets out goals and objectives for the conservation and management of sharks. Public consultation seeking feedback on a revised NPOA Sharks closed on 13 September 2022, and is due to be published in 2023.

Monitoring HMS shark, ray, and turtle captures

Captures of HMS sharks and rays

Information on commercial catch of blue sharks, mako sharks, and porbeagle sharks is provided in **Figure 14**, **Figure 15**, and **Figure 17**. During the 2021/22 fishing year, there were no observed or fisher reported spine-tailed devil ray interactions in the purse seine fishery targeting skipjack. This is a significant reduction from the 94 fisher reported captures in 2020/21. However this is likely due to a significant decrease in effort in the purse seine fishery[16].

An estimate of the current customary catch of HMS sharks is not available. However, the mako shark is designated as a taonga species of significance in the Chatham Islands Forum Fisheries Plan, Mai i Nga Kuri a Wharei ki Tihirau Fisheries Forum Plan, Te Hiku o Te Ika Forum Fisheries Plan, and Ngaa Hapuu o Te Uru o Tainui Customary Fisheries Forum regional fisheries management plan. The blue shark is identified as a taonga species of significance in the Mai i Nga Kuri a Wharei ki Tihirau Fisheries Forum Plan and Te Hiku o Te Ika Forum Fisheries Plan.

Historically there was a recreational target fishery for mako shark and they were highly prized as a sport fish. Most mako sharks are now taken as a bycatch while targeting other species. Reported catch has declined since the mid-1990s with many recreational fishers choosing to tag and release as part of the ongoing New Zealand billfish and gamefish tagging programme.

Captures of HMS Turtles

Under the Wildlife Act 1953, sea turtles are protected species in New Zealand's waters. There has historically been a low number of turtle captures in New Zealand's waters. Annual captures have fluctuated between the 2009/10 and 2021/22 fishing years, with an average of 18 per year. The vast

[15]NPOA Sharks 2013: https://fs.fish.govt.nz/Page.aspx?pk=165

[16] Observer coverage in the purse seine fishery targeting skipjack tuna for the 2020/21 fishing year is discussed in BAU 2 (Monitoring commercial fisheries).

majority of turtles captured are released alive (around 95%) although post-release survival rates are unknown.

The 2020/21 fishing year was an exceptional season with a marked increase in turtle interactions in surface longline fisheries. Fifty-six were caught, of which 50 were leatherback turtles. Leatherback turtles are the species most frequently caught in New Zealand waters and are listed as 'Critically Endangered' by the International Union for Conservation of Nature (IUCN).

In the 2021/22 fishing year, the number of turtle captures in the surface longline fishery was lower than the previous fishing season (**Figure 1**). Fisher reported captures decreased from 56 in 2020/21, to 10 reported captured in 2021/22. Observed captures of turtles have also decreased from 21 in 2020/21, to 5 observed captured in 2021/22 – however, observer coverage in the surface longline fleet has also declined (from approximately 11% in 2020/21 to approximately 6% in 2021/22). Note that fisher reported data includes observed interactions; therefore the two columns are not cumulative.

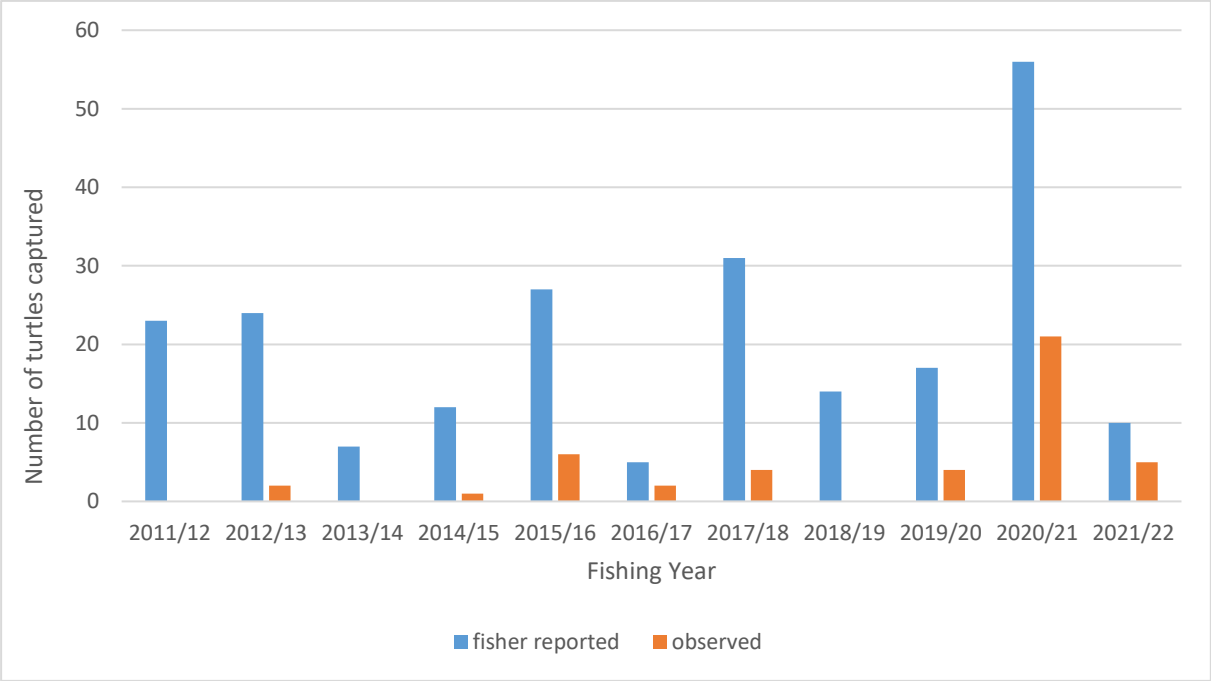


Figure 1. Fisher-reported captures of sea turtles in the surface longline fleet in the last ten fishing years (including observed captures).

It is likely that, due to changing oceanic currents and warmer water temperatures, more sea turtle interactions with the surface longline fleet could occur in New Zealand's waters.

To help address the issue of sea turtle bycatch in commercial fisheries, Fisheries New Zealand and the Department of Conservation have established a cross-agency working group to proactively review and address sea turtle bycatch in the surface longline fishery. The working group is currently exploring a dedicated management plan for sea turtles, amongst several other initiatives.

To better understand the turtle interactions, and particularly the peak in 2020/21, Fisheries New Zealand and the Department of Conservation are collaborating on research on leatherback turtle interactions in the surface longline fishery with the University of Florida. This research focuses on analysing variables in the fishery which could impact turtle capture rates such as sea surface temperature and ocean current variation. The research is due to be completed in late 2023 and will help inform further management actions.

A range of regulatory and non-regulatory measures were considered, on top of the existing measures in place. Some key work areas include:

- Progressing a mandate on the use of circle hooks in all surface longline fisheries (came into effect on 3 August 2023);
- Working with the Protected Species Liaison Programme (DOC) which provides turtle dehooking kits and education to fishers, including best handling and release guidance;

- The surface longline fishing fleet has been prioritised for camera rollout in November 2023 in recognition of the protected species risks in this fishery, including turtles. The camera programme may improve information on the nature and extent of turtle interactions in New Zealand waters, and may open new avenues for monitoring and management.

National Plan of Action for Sharks

The NPOA Sharks is a comprehensive plan for the conservation and management of sharks taken in New Zealand fisheries, to ensure an appropriate balance between conservation and sustainable utilisation. The stated purpose of the current NPOA Sharks is:

> *"To maintain the biodiversity and long-term viability of all New Zealand shark populations by recognising their role in marine ecosystems, ensuring that any utilisation of sharks is sustainable, and that New Zealand receives positive recognition internationally for its efforts in shark conservation and management."*

In 2021, a review of the NPOA Sharks 2013 commenced with input from the Shark Advisory Group, which is composed of representatives from Fisheries New Zealand, the Department of Conservation, the Ministry of Foreign Affairs and Trade, Te Ohu Kaimoana, the fishing industry, environmental non-governmental organisations, and the recreational fishing sector.

The Shark Advisory Group provided input on the scope, goals and objectives from the NPOA Sharks 2013 to inform the development of new goals and objectives for the new iteration of the plan. Consultation on the new NPOA Sharks closed on 13 September 2022, and is due to be published in 2023.

International Actions for Sharks and Turtles

Due to COVID-19, the fourth Meeting of the Signatories to the Memorandum of Understanding (MOU) on the Conservation of Migratory Sharks (CMS) did not take place in 2021 and was postponed to early 2023. Under the WCPFC 2021-2025 Shark Research Plan[17], a stock assessment of South West Pacific blue shark and South West Pacific shortfin mako shark were presented to the Scientific Committee in 2022. The Shark Research Plan also includes work to develop catch histories for key sharks in the Convention Area; to advise on mitigation and safe release methods; to improve biological data; and to enhance observer collection of shark data.

The stock assessment for South West Pacific blue shark began in 2021, but a reduction and refinement of the models was required in 2022 in order to provide a basis for management advice. The WCPFC Scientific Committee considered it unlikely that the stock is overfished, or subject to overfishing.

The WCPFC Scientific Committee considered the stock assessment for South West Pacific mako was not sufficiently robust to provide management advice. The Scientific Committee provided a number of recommendations to improve future shark assessments, including that stock assessments should occur over a two-year timeframe to enable thorough shark data analysis, increased efforts to reconstruct catch histories for sharks, additional tagging (including around New Zealand), and growth studies.

Reflecting concern about the status of oceanic whitetip and silky sharks, the WCPFC shark measure was amended to ban the use of wire trace as branch lines and the use of shark lines in the tropical region (between 20°N and 20°S). Provisions for the full utilisation of sharks, the prohibition of finning and the application of alternative measures were rolled over until 2024.

Beginning on 1 January 2024, the WCPFC shark measure will require that sharks caught by longline vessels and not retained are required to be released as soon as possible, taking into consideration the safety of the crew and observers, using the following guidelines:

- Leave the shark in the water, where possible; and
- Use a line cutter to cut the branchline as close to the hook as possible.

[17] 2021-2025 Shark Research Plan (23July) - Rev.01 / Project 97 (SRP) - Final Report | WCPFC Meetings

Business as Usual (BAU) tasks

BAU 1: ENGAGE WITH TANGATA WHENUA AND FISHERIES STAKEHOLDERS

Sufficient and appropriate engagement with stakeholders and providing for input and participation for tangata whenua is an essential part of fisheries management. Engagement with HMS and Pacific fisheries stakeholders occurs in a variety of ways and through various fora. In 2021/22, the HMS and Pacific Fisheries Team engaged with stakeholders via the following:

- Hosted two HMS Fish Plan Advisory Group meetings, both virtual
- Held stakeholder pre-meetings prior to attendance at CCSBT and WCPFC regular meetings
- Liaised fortnightly with the Department of Conservation Protected Species Liaison Programme and FINZ
- Maintained communications with Te Ohu Kaimoana representatives
- Developed one-pagers for Iwi Fisheries Forums on proposed regulation changes around HMS fisheries
- Engaged with industry on the development of a Small Pelagics Fishery Plan for purse seining on the North Island
- Ensured that the National Fisheries Plan for HMS Fisheries, Annual Operational Plans, and Annual Review Reports are available on the Fisheries New Zealand website.

BAU 2: MONITOR COMMERCIAL FISHERIES AND ENSURE COMPLIANCE WITH MANAGEMENT MEASURES

Monitoring commercial fisheries

Information on HMS fisheries is collected from a variety of sources, including commercial reporting, non-commercial reporting, observer monitoring, and scientific research. Observer data provides the most detailed information on catch on a set-by-set basis, and is used for a variety of purposes, including as inputs into fishery characterisations and stock assessments. New Zealand also has obligations to CCSBT and WCPFC to provide observer coverage as follows:

- CCSBT: a target of 10% of catch and effort
- WCPFC: 100% coverage for purse seine vessels operating on the high seas between 20° North and 20° South (observers are sourced from the WCPFC regional observer programme but this has been suspended due to COVID-19); for other methods operating on the high seas, a minimum target of 5% coverage sourced from either the regional observer programme or, if fishing is immediately adjacent to a member's exclusive economic zone, the national observer programme.

Observer coverage for HMS fisheries is planned by month and by fishery, and to achieve the target coverage levels, while considering high risk areas and times for protected species interactions. Observer coverage is planned for the financial year to align with cost recovery processes, however this report provides observer coverage information by fishing year.

For the 2021/22 fishing year, approximately 7% of fishing effort (number of hooks) was observed in the surface longline fisheries targeting bigeye tuna, pacific bluefin tuna, swordfish, and yellowfin tuna combined. Approximately 5% of fishing effort (number of hooks) was observed in the surface longline fishery targeting southern bluefin tuna. The representativeness of observer coverage compared with total fishing effort is illustrated in Figures 2 and 3 below.

For the 2021/22 fishing year, there was no observer coverage in the domestic purse seine fishery targeting skipjack tuna. This is partly due to low effort in this fleet during the fishing year. Fourteen events were observed in the troll fishery targeting albacore, which was 0.26% of the total fishing days.

Figure 2. The left-hand image shows all fishing effort (number of hooks) and the right-hand image shows observed fishing effort (number of hooks observed) for the 2021/22 fishing year for the surface longline fisheries targeting bigeye tuna, Pacific bluefin tuna, swordfish, and yellowfin tuna.

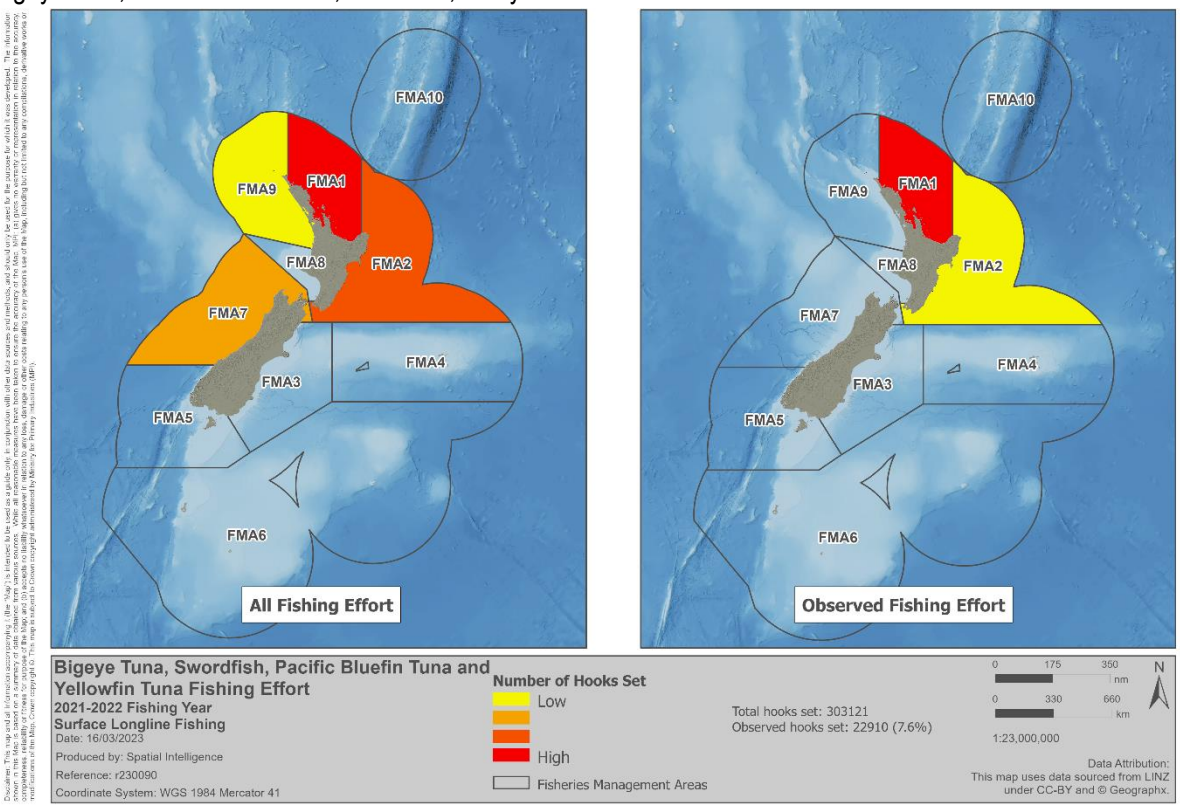
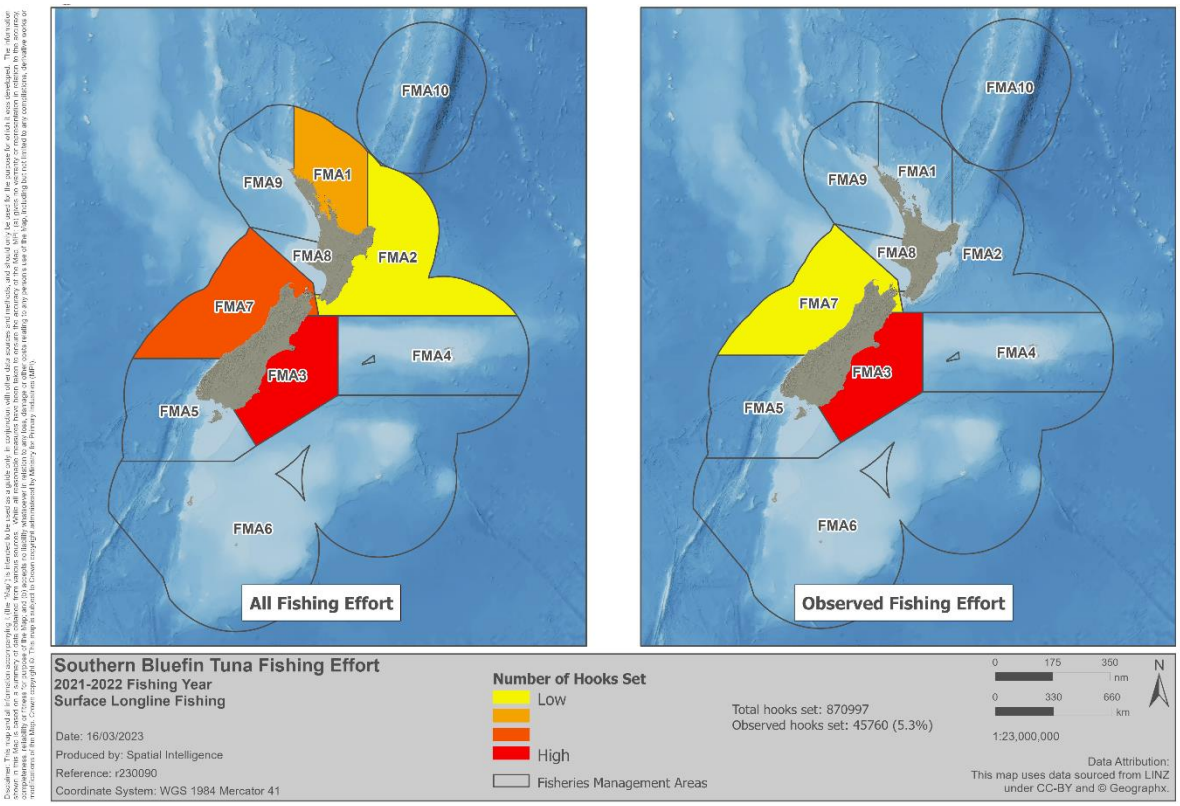


Figure 3. The left-hand image shows all fishing effort (number of hooks) and the right-hand image shows observed fishing effort (number of hooks observed) for the 2021/22 fishing year for the surface longline fishery targeting southern bluefin tuna.



Observer deployment is currently affected by poor watchkeeping practices on some vessels, particularly in the surface longline fleet. Maritime New Zealand has increased its regulatory focus to lift compliance with watchkeeping requirements. Fisheries New Zealand is placing observers where it can, reporting any watchkeeping issues to Maritime New Zealand, and boosting other monitoring methods where appropriate (noting the surface longline fleet has been prioritised in the rollout of onboard cameras and all vessels are scheduled to have functional cameras by January 2024).

Ensure compliance with Domestic Seabird Regulatory Requirements

During the 2021/22 fishing year, there were 17 inspections of New Zealand domestic surface longline vessels. There were five offences detected in relation to tori line configuration. In all instances non-compliance was minor with all tori lines remediated, following instruction from Fishery Officers, either at the time of inspection or prior to the vessels next fishing trip.

CCSBT Catch Documentation Scheme

The CCSBT Secretariat reports country Catch Documentation Scheme (CDS) compliance statistics to the annual meeting of the CCSBT Compliance Committee. New Zealand's report for the 2021 calendar year is shown in **Table 4** (note the 2022 report will be available at the 2023 CCSBT meetings in October 2023).

New Zealand's level of compliance with the Catch Documentation Scheme continues to be high. As of 1 January 2018, the Catch Tagging Form has been electronic. A function of the electronic form is that if a tag number has been used previously, a duplicate input will be highlighted. This feature has drastically reduced the number of duplicate tags submitted. Additionally, the CCSBT Secretariat is working on rolling out an electronic catch documentation scheme (eCDS) in the near future which will also help to streamline the CDS and reduce the number of duplicate tags that are submitted.

During the 2021/22 fishing year, two offences relating to the CCSBT CDS were detected. These offences were in relation to a Licensed Fish Receiver (LFR) which had failed to properly tag and record Southern Bluefin Tuna. The inspection of CCSBT CDS documentation during LFR inspections remains an area of ongoing compliance interest.

Table 4. CCSBT Catch Documentation Scheme compliance statistics for the 2021 calendar year

Category	Compliance
% of CMFs for Domestic Landings that contain complete and accurate information	100%
% of CMFs for Exports that contain complete and accurate information	99.6%
% of CMFs for Domestic Landings where the catch/harvest weight differs from the landed weight by <=5%	100%
% of CMFs for Exports where the catch/harvest weights are the same on both exporter and importer copies	99.8%
% of CMF for Exports where SBT catch/harvest numbers are the same on both exporter and importer copies	99.8%
% of CTFs where fish numbers exactly match CMF	100%
% of CTFs where fish weights match CMF within 5%	99.7%
Number of duplicate tag numbers submitting in tagging data	22

Note: 'CMF' is Catch Monitoring Form; 'CTF' is Catch Tagging Form; 'SBT' is southern bluefin tuna.

Other Compliance Checks and Inspections

During the 2021/22 fishing year, Fishery Officers completed 49 commercial inspections of vessels which had targeted highly migratory species. These inspections were in addition to the seabird mitigation measure checks and more broadly focused on a variety of other regulatory fisheries requirements, including electronic and geo-positional reporting enquiries, CCSBT CDS checks, and general vessel requirements. There was one offence detected, resulting in a warning being issued for non-compliant vessel markings.

BAU 3: MAORI RIGHTS AND INTERESTS IN HMS FISHERIES

Customary fisheries are the fishing rights of tangata whenua, which are guaranteed through Te Tiriti o Waitangi – the Treaty of Waitangi. These rights are provided for under the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992 and the 1992 Deed of Settlement. Under the Deed of Settlement, the Crown has specific obligations to Māori to provide for customary fisheries management practices and traditional gathering of fish.

When consulting on fisheries issues, the Fisheries Act 1996 requires the Crown to provide for the input and participation of tangata whenua who have a non-commercial interest in the stock concerned; or an interest in the effects of fishing on the aquatic environment in the area concerned, while having particular regards to kaitiakitanga. The National Fisheries Plan for HMS outlines an objective to 'ensure Māori interests (including customary, commercial, recreational, and environmental) are enhanced'. Therefore, providing for input and participation of tangata whenua in fisheries management decision making and enhancing and strengthening customary interests is an important component of the work of the HMS and Pacific Fisheries Team.

Members of the HMS team are working with industry on the development of an industry led Small Pelagics Fishery Plan and as part of this process, is helping to facilitate input and participation with relevant Iwi Fisheries Forums. Additionally, information on potential changes to the surface longline seabird circular were made available to forums earlier this year.

There was no recorded take of highly migratory species through customary permits in 2022.

BAU 4: STRENGTHEN MANAGEMENT OF RECREATIONAL HMS FISHERIES

Monitoring

Fisheries New Zealand continued to support the monitoring of recreational fisheries for highly migratory species through amateur charter vessel reporting for southern and Pacific bluefin tuna. Fisheries New Zealand also continued to support the monitoring of voluntary reporting, including through the long-standing gamefish tagging programme and through targeted diary and logbook schemes. Further information can be found in the "Monitoring of non-commercial fisheries" section.

Southern bluefin tuna recreational fishery

Fisheries New Zealand continued to fund a survey of recreational southern bluefin tuna catch in the 2021/22 fishing year. The total landed catch estimated from the survey was 905 southern bluefin tuna. An additional allowance of 15% to 30% was made to cover unaccounted catch. The recreational harvest estimate for southern bluefin tuna in the 2021/22 October fishing year was an estimated 59.8 tonnes.

In 2019, the Minister of Fisheries implemented a recreational bag limit of one southern bluefin tuna per person per day for the recreational fishery by way of Gazette notice under Section 11 of the Fisheries Act 1996. Feedback from Compliance officers indicates that this new rule was complied with by recreational fishers throughout the season.

In January 2022, reports of southern bluefin tuna being caught off the west coast of the North Island prompted the HMS team to contribute to the development and distribution of educational materials for recreational fishers. These included social media posts on identifying southern bluefin, as well as a physical pamphlet on identification which was distributed at the Auckland boat shows in May 2022 and 2023.

BAU 5: CONTRIBUTE TO THE PACIFIC FISHERIES CAPACITY DEVELOPMENT PROGRAMME, TE PĀTUITANGA AHUMOANA KIWA

The Ministry for Primary Industries' Memorandum of Understanding (MoU) Programme for Pacific capacity development is implemented under Te Pātuitanga Ahu Moana a Kiwa (Te Pātui) Programme. Through Te Pātui, New Zealand is uniquely positioned to contribute significantly to securing the long-term prosperity of Pacific Island Countries and territories (PICTs). Te Pātui assists PICTs through technical assistance, which develops capacity within Pacific fisheries management and monitoring, control, and surveillance (MCS) frameworks.

Last year, as in other years, Te Pātui has worked with key resource providers in the Pacific region including SPC (The Pacific Community) and the FFA (Forum Fisheries Agency). Maintaining these strategic relationships has ensured coordinated and targeted provision of capacity building assistance to countries with which New Zealand has bilateral arrangements.

The re-opening of borders post-COVID 19 has enabled delivery of face-to-face capacity building with Advisors of Pacific Island fisheries agencies. Throughout the year, Te Pātui worked in close partnership with Pacific fisheries agencies, delivering focussed activities in Fiji, Tonga, Tuvalu and Samoa. Te Pātui advisors delivered in person capacity building workshops to Tonga and Samoa fisheries administrations. These workshops focussed on strengthening management systems and frameworks, data analysis and reporting, policy development, and implementation planning.

In Fiji, Te Pātui advisors visited the Inshore Fisheries Management Division, who have been developing management approaches for key inshore species. The team were able to re-engage with Fiji introducing the new advisors from Te Pātui and also meeting the new Inshore team providing advice and mentoring with focused future workplans being developed.

Ongoing work in Tonga has included assisting both the MFAT-funded Deepwater Snapper fishery project, and more directly, supporting new and existing staff to further build capacity. Staff are developing and implementing fisheries management skills to a high standard, utilising skills learnt through Te Pātui activities.

Te Pātui hosted two capacity development workshops in-country with Tonga and Samoa on development and review of fisheries management plans. Te Pātui held a week long English writing course with the Inshore Fisheries Team of Tuvalu. This interactive writing skills course provided training for key staff involved in drafting management plans.

During the year, Te Pātui continued with the e-learning fisheries management modules with increasing numbers of participants with the introduction of a similar MCS online course. The e-learning modules cover a range of topics, from fundamentals of fisheries management to fisheries trade and science. The e-learning is targeted at all job levels and roles in fisheries administration. Participation in e-learning modules increased by 47 individuals, representing 11 PICTs (23 from regional agencies). There have been ten webinars, which over 50 people have attended (90 min interactive session with MPI and SPC or FFA assistance). Feedback from participants has been positive and with the inclusion of the MCS online learning there has been an interest to begin with the management course before progressing to the MCS component.

BAU 6: DEVELOP AND IMPLEMENT HMS RESEARCH PLAN

Research provides important information for input into fisheries management. Planning and implementing research related to HMS fisheries is achieved jointly by the HMS and Pacific Fisheries Team and the Fisheries Science team. This is done with input from the Department of Conservation and stakeholders. A list of ongoing research projects is provided in

Table 5.

Table 5. Continuation of ongoing projects implemented on an annual basis

Code	Title	Description
ALB2021-01	Albacore catch sampling	Albacore commercial catch sampling programme. Results will be used in 2024 assessment update.
HMS2020-01	Catch sampling of BIG, YFN, SWO, TOR	Catch sampling results are inputs to the stock assessments of these species by WCPFC. These species' assessments will be updated over the next 3 years.
STM2022-01	Monitoring of striped marlin, including logbook programme	Striped marlin recreational monitoring programme, including the implementation of the logbook programme. Results will be used in 2024 assessment update.
STN2021-01	Annual catch-at-age of southern bluefin tuna	Data used as inputs to stock assessments; the next update scheduled for 2023.
STN2021-02	Recreational catch of southern bluefin tuna	Estimation of recreational harvest of southern bluefin tuna in New Zealand.
TAG2022-01	Data management from gamefish tagging programme	Management of gamefish tagging data that has been running for more than 40 years.

Commercial HMS fisheries information

This section of the report provides information on commercial HMS fisheries, including stock status, catch against total allowable commercial catch, and catches of non-quota species.

STOCK STATUS FOR HMS SPECIES

Table 6. Summary of stock status information for HMS fisheries.

Fishing year	Last assessment	Stock overfished	Overfishing occurring
Albacore tuna	2021	No	No
Bigeye tuna	2020	No	No
Pacific bluefin tuna	2022	Yes	Yes
Skipjack tuna	2022	No	No
Southern bluefin tuna	2020	Yes	No
Striped marlin	2019	Yes	As likely as not
Swordfish	2021	No	No

Yellowfin tuna	2020	No	No

Stock assessment updates

All assessments, except southern bluefin tuna, are presented to the Scientific Committee of WCPFC. Southern bluefin tuna assessments are presented to the Scientific Committee of CCSBT. The year of the most recent assessment for each key species is shown in **Table 6**.

In 2022, stock assessments for skipjack and Pacific bluefin tuna were updated. Parts of the information below are taken from Summary Reports of the Regular Sessions of the Scientific Committee, WCPFC. Information pertaining to southern bluefin tuna was extracted from "Commission for the Conservation of Southern Bluefin Tuna, Report of the Twenty Sixth Meeting of the Scientific Committee, 2021".

Albacore tuna (assessed 2021)

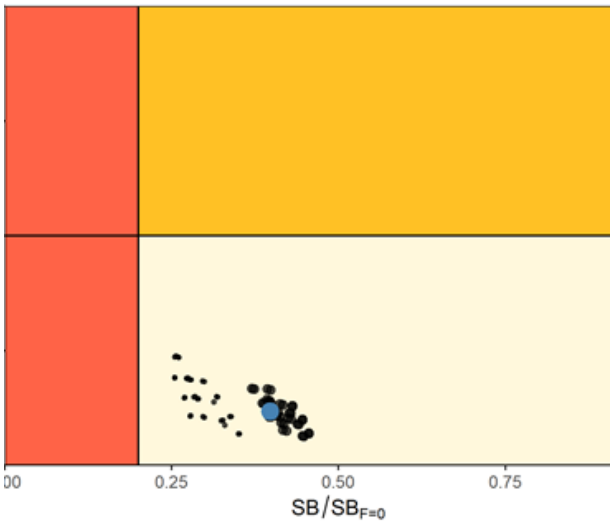


Figure 4. Estimated time-series (or "dynamic") Majuro plot summarising the Pacific-wide results for each of the albacore stock assessment models in the structural uncertainty grid for the 'latest' (2019) period. The blue point is the median value based on the weighted grid models, with the more heavily weighted models indicated by the larger black dots.

The latest stock assessment for south Pacific albacore tuna (*Thunnus alalunga*) was conducted in 2021, and for the first time covered the entire south Pacific stock in order to incorporate all population dynamics. The addition of the eastern Pacific Ocean region into the assessment did not notably alter the main assessment outcomes, and similar trajectories and terminal depletion were estimated in both RFMO regions.

The stock assessment indicates that South Pacific albacore tuna is unlikely to be overfished (<40% probability) and overfishing is very unlikely to be occurring (<10% probability). Although the stock is still in good status, there has been a substantial decline in stock status estimated over the last three years. The spawning stock biomass (SB) has become more depleted across the model period (1960–2019), with a notable increase in depletion in the most recent years.

Recalling advice issued in previous years, the WCPFC Scientific Committee recommended that longline catch of South Pacific albacore tuna be reduced to avoid further and extended declines in vulnerable biomass. A catch reduction would lower fishing mortality rates so that economically viable catch rates can be maintained, especially for longline catch of adult albacore.

Annual catch estimates for albacore in the South Pacific peaked at 93 835 t (all gears) in 2017. Catch by longliners represented 93% of the catch weight in 2020 at 64 963 t and represented a 21% decrease from 2019 despite a shift of effort from the tropical to the southern longline fishery in 2020. By comparison, the 2020 total albacore catch within the southern part of the WCPFC convention area was 61 778 t and the longline catch was 57 006 t.

For the WCPFC convention area, the 'recent (2016-2019)' and 'latest (2019)' SB estimates are on average both below the interim TRP of 0.56. Further, 86% of model runs (62 out of 72) estimated that SBrecent/SBF=0 was below the interim TRP.

Projections indicated that South Pacific albacore stock has a greater than 20% risk of falling below the limit reference point (LRP) in 2021 under both catch and effort scenarios. These projections indicate an extended period where biomass is below the current interim TRP and in most cases the TRP is not achieved within the 30-year projection period.

Bigeye tuna (assessed 2020)

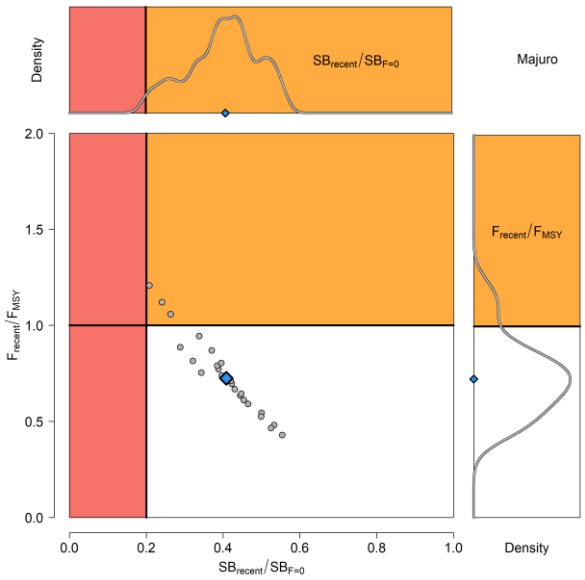


Figure 5. Majuro plot for the recent bigeye tuna spawning potential depletion (2015 – 2018) summarising the results for each of the models in the structural uncertainty grid with marginal distribution.

The latest stock assessment for bigeye tuna (*Thunnus obesus*) was conducted in 2020. The stock assessment indicates that bigeye tuna is not experiencing overfishing (87.5% probability) and it appears it is not in an overfished condition (100% probability). The WCPFC accepted the Scientific Committee's recommendations on bigeye tuna.

The Scientific Committee noted that levels of fishing mortality and depletion differ among regions, and the fishery impact was higher in the tropical region (Regions 3, 4, 7 and 8 in the stock assessment model), with particularly high fishing mortality on juvenile bigeye tuna in these regions. The Scientific Committee's recommended consideration of measures to reduce fishing mortality from fisheries that take juveniles, with the goal to increase bigeye fishery yields and reduce any further impacts on the spawning biomass for this stock in the tropical regions. Overall, the Scientific Committee recommended, as a precautionary approach, that the fishing mortality on bigeye tuna stock should not be increased from the level that maintains spawning biomass at 2012-2015 levels until the Commission can agree on an appropriate target reference point.

The Scientific Committee agreed that both bigeye and yellowfin stock assessments should be subject to external expert peer review to examine model complexity, weighting of data sources, spatial approaches and the extreme sensitivity to assumptions on growth amongst a range of other issues. This review will be reported to Scientific Committee in 2022, and ahead of the next bigeye stock assessment which is due in 2023.

The Scientific Committee noted that the preliminary estimate of total bigeye catch in 2019 was 135,680 tonnes, a 9% decrease from 2018 and an 8% decrease from the average 2014-2018. Longline catch in 2019 (68,371 tonnes) was a 0% decrease from 2018 and a 2% increase from the 2014-2018 average. Purse seine catch in 2019 (50,819 tonnes) was a 22% decrease from 2018 and a 17% decrease from the 2014-2018 average. Pole and line catch (1,400tonnes) was a 66% decrease from 2018 and a 66% decrease from the average 2014-2018 catch. Catch by other gear (15,090 tonnes) was a 33% increase from 2018 and 1% increase from the average catch in 2014-2018.

The Scientific Committee noted that under recent fishery conditions, the bigeye stock is initially projected to increase as recent estimated recruitment supports adult stock biomass. Adult stock biomass is then projected to decline slightly before again increasing. Projected fishing mortality is below F_{MSY} (median F2020/FMSY = 0.62, the risk of F2020 > FMSY = 0%) and projected median spawning biomass is above the Limit Reference Point (SB2020/SBF=0 = 0.2) (median SB2020/SBF=0 = 0.41; median SB2020/SBMSY = 1.79. Risk that SB2020 < Limit Reference Point = 0%).

Yellowfin tuna (Assessed 2020)

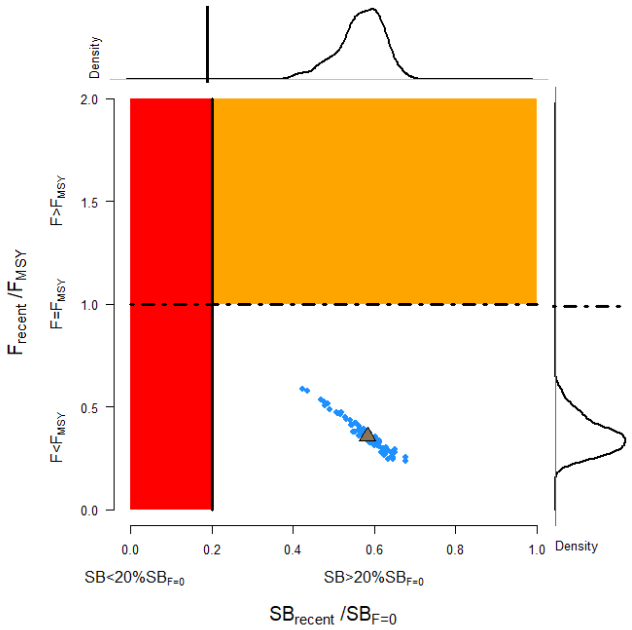


Figure 6. Majuro plot for the recent yellowfin tuna spawning potential depletion (2015 – 2018) summarizing the results for each of the models in the structural uncertainty grid with marginal distribution.

The latest stock assessment for yellowfin tuna (*Thunnus albacares*) was conducted in 2020. The stock assessment indicates that the yellowfin tuna stock is not experiencing overfishing (100% probability) and it appears that the stock is not in an overfished condition (0% probability).

The WCPFC Scientific Committee recommended as a precautionary approach that the fishing mortality on yellowfin tuna stock should not be increased from the level that maintains spawning biomass at 2012-2015 levels until the Commission can agree on an appropriate Target Reference point.

The Scientific Committee noted that the total yellowfin catch in 2019 was 669,362 tonnes, a 5% decrease from 2018 and a 9% increase from the average 2014-2018. Purse seine catch in 2019 (364,571 tonnes) was a 4% decrease from 2018 and a 8% decrease from the 2014-2018 average. Longline catch in 2019 (104,440 tonnes) was an 7% increase from 2018 and a 9% increase from the 2014-2018 average. Pole and line catch (37,563 tonnes) was a 43% increase from 2018 and a 40% increase from the average 2014-2018 catch. Catch by other gear (162,788 tonnes) was an 18% decrease from 2018 and 16% increase from the average catch in 2014-2018.

The Scientific Committee noted that under recent fishery conditions, the yellowfin stock is initially projected to increase as recent estimated recruitments support adult stock biomass. Adult stock biomass is then projected to decline slightly before again increasing. Projected fishing mortality is below FMSY

(median F2020/FMSY = 0.74, the risk of F2020 > FMSY = 3%) and projected median spawning biomass is above the Limit Reference Point (SB2020/SBF=0 = 0.2) (median SB2020/SBF=0 = 0.32; median SB2020/SBMSY = 1.33. Risk that SB2020 < Limit Reference Point = 8%).

It was also noted that under recent fishery conditions, the yellowfin stock was initially projected to increase as recent estimated relatively high recruitments support adult stock biomass, and then decline slightly.

Skipjack tuna (assessed 2022)

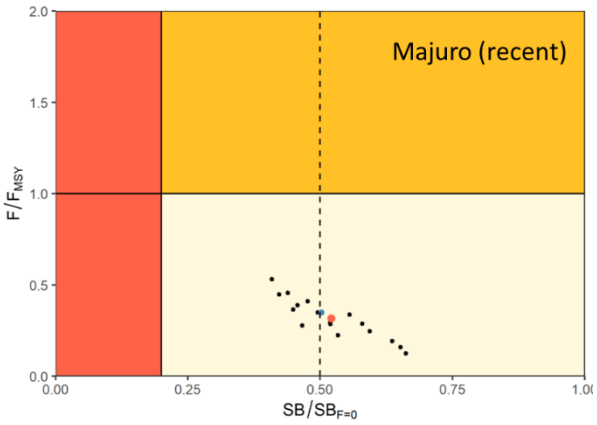


Figure 7. Majuro plot for recent skipjack tuna spawning potential (2018 – 2021) summarising the results for each of the models in the structural uncertainty grid with weighting. The vertical dotted line on the indicates the interim TRP of 0.50 SBF=0 for the skipjack stock as specified in CMM 2021-01.

The latest stock assessment for skipjack tuna (*Katsuwonus pelamis*) was conducted in 2022[18]. The assessment indicates that the skipjack tuna stock is not in an overfished state, nor is it experiencing overfishing.

Catches of skipjack tuna in the WCPO have increased from approximately 250 000 metric tonnes in the late 1970s to a peak catch of approximately 2 000 000 metric tonnes in 2019. Total catch in 2021 was 1 547 945 t, a 10% decrease from 2020 and a 14% decrease from the 2016–2020 average.

The 2022 skipjack stock assessment estimated that the overall median recent spawning depletion (SBrecent/SBF=0) is 0.51, which is close to the interim target reference point (TRP) of 0.50 (CMM 2021-01). None of the model runs were below the limit reference point (LRP) of 0.20 SBF=0. The median of Frecent/FMSY was 0.32. The 2022 stock assessment of skipjack tuna therefore indicated that, according to WCPFC reference points, the stock is not overfished nor undergoing overfishing.

The spawning potential and total biomass, while showing variability over time, do not show sustained long-term declining trends. In contrast, the trajectory of spawning potential depletion (SB/SBF=0) shows a long-term trend towards a more depleted status. The spawning potential depletion trajectory was largely driven by the model estimates of increased levels of unfished spawning potential over time, which are in turn driven by the model estimates of increasing recruitment over time. The model estimated increased recruitment over time to account for the increased catches in the face of a relatively stable biomass that is partly informed by several long-term stable CPUE indices of abundance (in particular the pole-and-line fishery indices) within the assessment. However, it is noted that spawning potential, recruitment, and total biomass are estimated to have declined since around 2010.

Fishing mortality continues to increase over time for the adult and juvenile components of the stock, with fishing mortality being consistently higher for adults. Levels of fishing mortality and depletion differ between regions. Fishery impact is highest in the tropical region, mainly due to the purse seine fisheries in the equatorial Pacific.

[18] Stock assessment of skipjack tuna in the western and central Pacific Ocean: 2022 (29July2022) - Rev.05 | WCPFC Meetings

The assessment provided a range of diagnostic analyses derived from the diagnostic model that indicated conflict between tag and CPUE data and instability in the convergence minima. Despite this, the model showed low retrospective bias and the important spawning potential depletion management quantities were robust to the differences in model convergence. However, data conflicts and the instability in model convergence minima require follow-up work and should be improved.

Southwest Pacific Striped marlin (Assessed 2019)

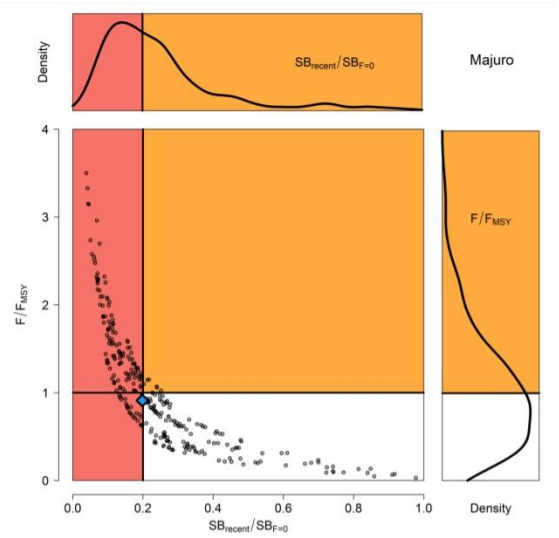


Figure 8. Majuro plot for the recent striped marlin spawning biomass (2014 – 2017) summarising the results for each of the models in the structural uncertainty grid.

The latest stock assessment for southwest Pacific striped marlin (*Kajikia audax*) was conducted in 2019. The Scientific Committee noted that there are no agreed Limit Reference Points for western and central Pacific Ocean billfish. However, the Scientific Committee also noted that based on the adopted uncertainty grid, the southwest Pacific striped marlin assessment results indicate that the stock is likely overfished, and close to undergoing overfishing based on MSY reference points.

The Scientific Committee recommends that WCPFC16 identify an appropriate Limit Reference Point for this stock. The recent spawning biomass depletion relative to the unfished condition was close to the Limit Reference Point adopted for tunas (SBrecent/SBF=0 = 0.2). The Scientific Committee noted that recent catches are approximately half the MSY, and that recent fishing mortality is slightly less than the fishing mortality that would result in MSY.

The Scientific Committee noted that the median of recent spawning biomass depletion relative to the unfished condition was (SBrecent/SBF=0) = 0.198, with a probable range of 0.093 to 0.464 (80% probable range), and there was a roughly 50.33% probability (151 out of 300 models) that the recent spawning biomass depletion relative to the unfished condition was below the Limit Reference Point adopted for tunas (SBrecent/SBF=0 = 0.2).

The Scientific Committee noted that the median of recent spawning biomass relative to the spawning biomass at MSY was (SBrecent/SBMSY) = 0.737 with a probable range of 0.334 to 1.635 (80% probable range), and there was a roughly 68.66% probability (206 out of 300 models) that the recent spawning biomass depletion was below the spawning biomass at MSY.

The Scientific Committee noted that the median of relative recent fishing mortality was (Frecent/FMSY = 0.911) with an 80% probability interval of 0.313 to 1.891, and there was a roughly 44.3% probability (133 out of 300 models) that the recent fishing mortality was above FMSY.

South Pacific Swordfish (Assessed 2021)

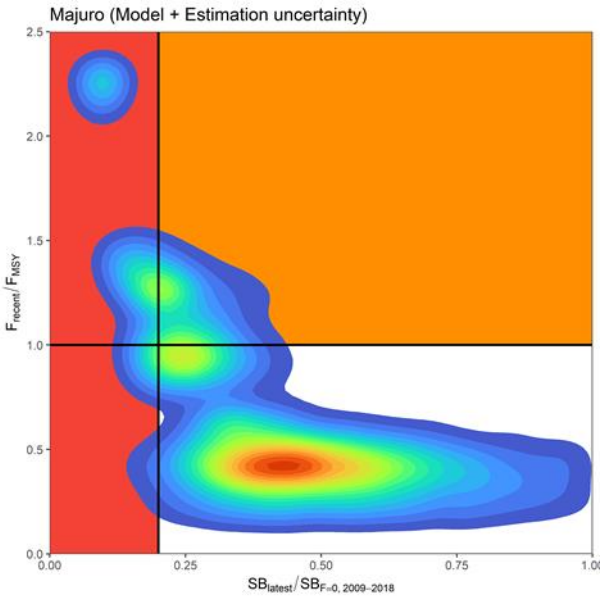


Figure 9. Estimated time-series (or "dynamic") Majuro plot from South Pacific swordfish model runs. Uncertainty in terminal stock status is shown; warmer colours indicate a greater density of samples, and cooler colours show the fringe of the distribution.

The latest stock assessment for south Pacific swordfish (*Xiphias gladius*) was conducted in 2021. The stock assessment included a new approach for developing a model ensemble, a more holistic representation of the uncertainty in management reference points, updates to the biological assumptions, the definition of reproductive potential as a function of length, and implementation of an "index" fishery approach.

The stock assessment indicates that it is unlikely that south Pacific swordfish stocks are in an overfished condition (<40% probability of being overfished), and it is unlikely the stock is experiencing overfishing (<40% probability of overfishing).

The outcomes of the assessment are on average more optimistic in relation to the 2017 assessment, but the estimated uncertainty has increased. Noting that a limit reference point for southwest Pacific swordfish has not yet been adopted by WCPFC, the Scientific Committee noted that the median recent swordfish spawning biomass is above both SB_{MSY} and the limit reference point 20% $SB_{F=0}$ applied to tunas, and recent fishing mortality is below F_{MSY}.

The WCPFC Scientific Committee noted that fishing mortality is predicted to have increased gradually across the assessment region through the mid-1990s. Fishing mortality is estimated to have sharply increased in the early-2000s and appears to have stabilised at high levels in the last decade.

Annual catch estimates for Southwest Pacific swordfish peaked at 11,128 t in 2012. Catch by longline vessels in 2020 was 5,373 t compared with 5,812 t in 2019, a decline of 7.6%. Over the past two decades, the majority of catch has been taken by a combination of swordfish targeting fleets (in the area south of 20° S; 42%) and fleets taking swordfish as a bycatch on the high seas (in particular in the eastern stock area north of 20° S; 34%).

Significant unresolved uncertainties remain in the stock assessment, relating in particular to the reliability of CPUE indices, longitudinal movements, spatial connectivity, and absolute population size. These uncertainties, combined with the need to further refine and review the new ensemble approach, suggest additional caution may be appropriate when interpreting the current assessment outcomes to guide management decisions. The Scientific Committee recommended that research priorities for this stock include directed longitudinal tagging of swordfish and a feasibility study on the utility of Close Kin Mark Recapture (CKMR).

Pacific bluefin tuna (assessed 2022)

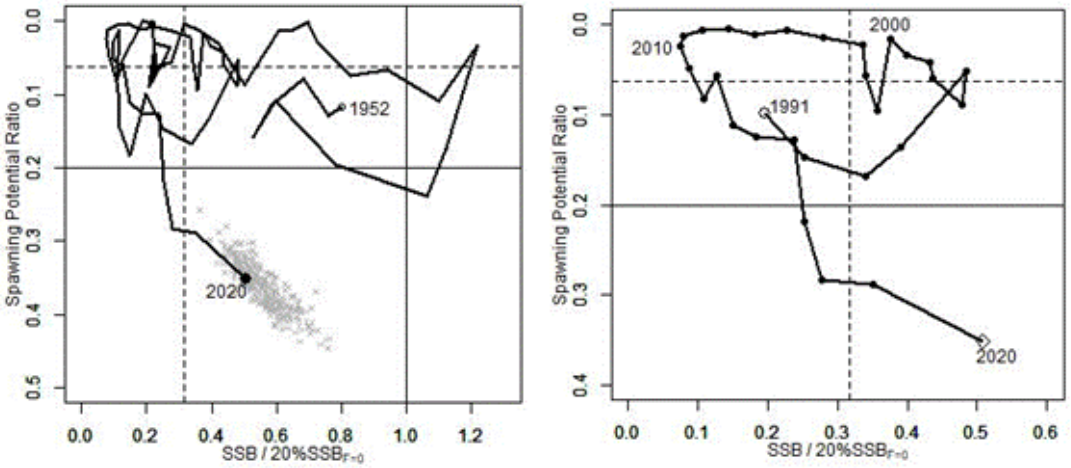


Figure 10. Kobe plots for Pacific bluefin tuna (*Thunnus orientalis*) estimated from the base-case model. The X-axis shows the annual *SSB* relative to 20% $SSB_{F=0}$ and the Y-axis shows the spawning potential ratio (*SPR*) as a measure of fishing mortality.

The last stock assessment for Pacific bluefin tuna (*Thunnus orientalis*) was assessed by the Scientific Committee in 2022[19]. The assessment concluded that Pacific bluefin tuna spawning stock biomass has gradually increased in the last 10 years, and that the rate of increase is accelerating. These biomass increases coincide with a decline in fishing mortality, particularly for fish aged 0 to 3, over the last decade. The latest (2020) *SSB* is estimated to be 10.2% of SSB_0.

No biomass-based limit or target reference points have been adopted for Pacific bluefin tuna, but the stock is overfished relative to the potential biomass-based reference points (20% SSB_0) adopted for other tuna species by the IATTC and WCPFC. On the other hand, *SSB* reached its initial rebuilding target (SSB_{MED} = 6.3% SSB_0) in 2019, 5 years earlier than originally anticipated. This suggests that the measures incorporated in CMM2021-02 appear to be working as intended.

No fishing mortality-based reference points have been adopted for Pacific bluefin tuna by the IATTC and WCPFC. The recent (2018–2020) $F_{\%SPR}$ was estimated to produce a fishing intensity of 30.7% *SPR* and is below the level corresponding to overfishing for many *F*-based reference points proposed for tuna species.

The WCPFC Scientific Committee noted that, while the gradual improvement of the Pacific bluefin tuna stock is a step in the right direction, it must be remembered that the current spawning biomass of the stock is only 10.2% of the unfished level. This is well below the limit reference point (LRP) of 20% adopted for the key tuna species in WCPFC and suggests the Pacific bluefin tuna stock remains overfished relative to the LRP of key tuna species.

The WCPFC Scientific Committee supported the continued monitoring of recruitment and spawning stock biomass, and research on a recruitment index for the stock assessment, given the uncertainty in future recruitment and the influence of recruitment on stock biomass, as well as the impact of changes in fishing operations due to management changes.

A precautionary approach towards the management of Pacific bluefin tuna was recommended, until such time as the second rebuilding target is met.

[19] Stock assessment of Pacific bluefin tuna in the Pacific Ocean in 2022 | WCPFC Meetings

Southern bluefin tuna (assessed 2020)

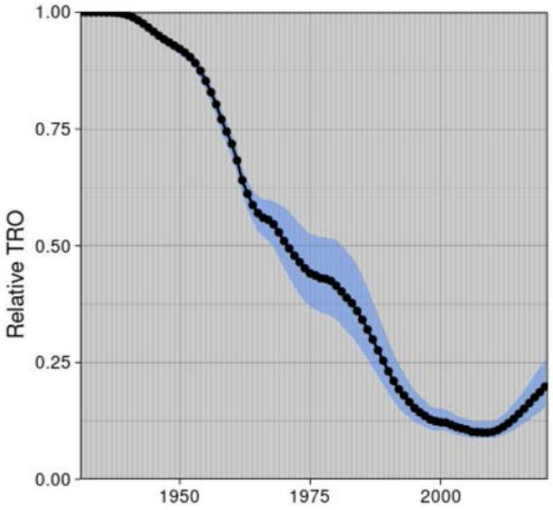


Figure 10. Trends in southern bluefin tuna (*Thunnus maccoyii*) relative Total Reproductive Output (TRO_{2020}/TRO_0) from 1931–2020 estimated for the current reference set. Historical and projected trajectories of the reference set (base19) operating models (median and 5/95 percentiles are shown).

The 2020 stock assessment suggested that the southern bluefin tuna total reproductive output (TRO) is at 20% of its initial level and remains below the target and the level that could produce maximum sustainable yield. However, there has been improvements in the stock condition since the 2011 stock assessment, which indicated the stock in 2011 was at 5.5% of initial TRO, and the 2017 stock assessment, which indicated the stock in 2017 was at 13% of initial TRO. The fishing mortality rate was estimated to be below the level associated with MSY.

Trend estimates indicate that the southern bluefin tuna stock has been rebuilding by approximately 5% every year since reaching a low point in 2009. Projections calculated using the Cape Town Procedure (adopted in 2019) and the reference set of operating models resulted in a relative *TRO* of 0.29 (0.19–0.43) in 2035 — just below the previously tuned median value of 0.30 for the 2019 Management Procedure testing. Under the same projections the target (30% relative *TRO*) is projected to be achieved in 2037, with median catches of around 20 800 t (compared with a median average catch of 19 308 t estimated previously) for the 2020 to 2035 period. The rebuilding plan for the stock appears to be achieving the objectives set by the CCSBT Extended Commission.

Table 7. Summary of the southern bluefin tuna stock and fishery

Measurable	Measure
Maximum sustainable yield	33,207 tonnes (31,471-34,564 tonnes)
Reported catch (2019)	16,843 tonnes
Current (2020) biomass (B10+)	204,596 tonnes (184,272-231,681 tonnes)
Total reproductive output (TRO)	0.20 (0.16–0.24)
B10+	0.17 (0.14–0.21)
Catch limit for Members (2018, 2019, and 2020)	17,647 tonnes

COMMERCIAL CATCH AGAINST TOTAL ALLOWABLE COMMERCIAL CATCH

Unless otherwise stated, all amounts are shown in tonnes. All figures are for the fishing year (1 October-30 September). Data comes from Fisheries New Zealand's BI Hub database and the November 2022 Fisheries Assessment Plenary Report.

The main surface longline target species are bigeye tuna, southern bluefin tuna, and swordfish. For these three species, information on total catch, effort, and catch per unit effort has been provided. Other species caught by surface longline are blue sharks, mako sharks, porbeagle sharks, pacific bluefin tuna, and yellowfin tuna. For these species, information on total catch has been provided.

The commercial catch figures are compiled from monthly harvest returns (MHRs), which record greenweight (unprocessed weight) of fish. MHRs are required to be submitted to FishServe by all fishing permit holders and other persons, for each calendar month for all fish taken during that month (and is not fishing method specific).

The total allowable commercial catch figures are set under section 14 of the Fisheries Act 1996 and are for the portion of the HMS stocks that are found in New Zealand fisheries waters.

Bigeye tuna

In 2021/22, bigeye tuna total allowable commercial catch remained at 714 tonnes. Commercial catch was 33 tonnes. This is a significant decrease from recent years (**Figure 11**) and is a reflection of reduced effort in the fishery. New Zealand's commercial catch of bigeye tuna makes up less than 0.5% of the total Western and Central Pacific Ocean commercial catch.

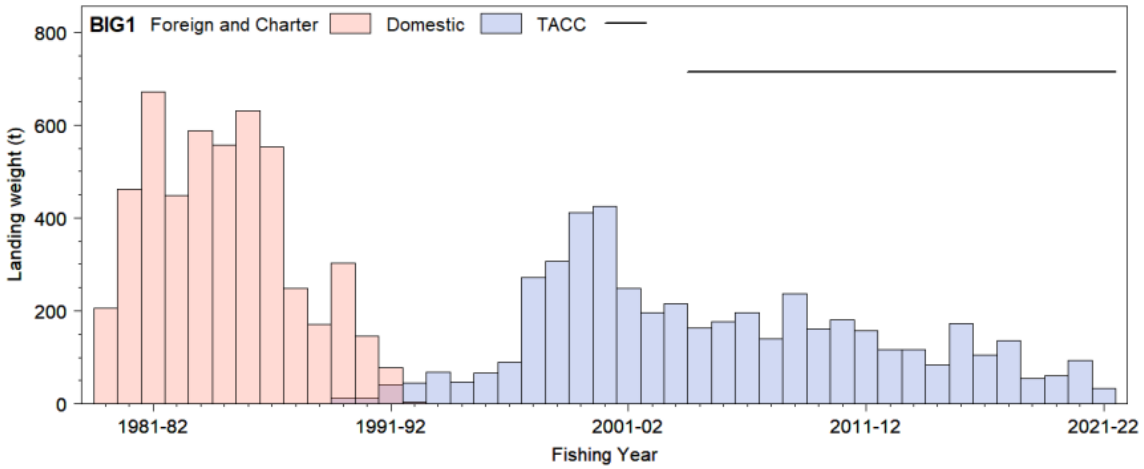


Figure 11. Bigeye tuna (BIG1) total allowable commercial catch and catch since 1979-80.

Bigeye tuna is targeted and caught as bycatch in the surface longline fishery. Bigeye tuna is also caught as bycatch in the troll fishery, the bottom longline fishery, and the purse seine fishery.

The number of surface longline vessels targeting bigeye tuna in the last five fishing years has ranged between 11 and 28. The number of hooks set targeting bigeye tuna in the last ten fishing years has ranged between around 182,000 and 1.2 million hooks (**Figure 12**).

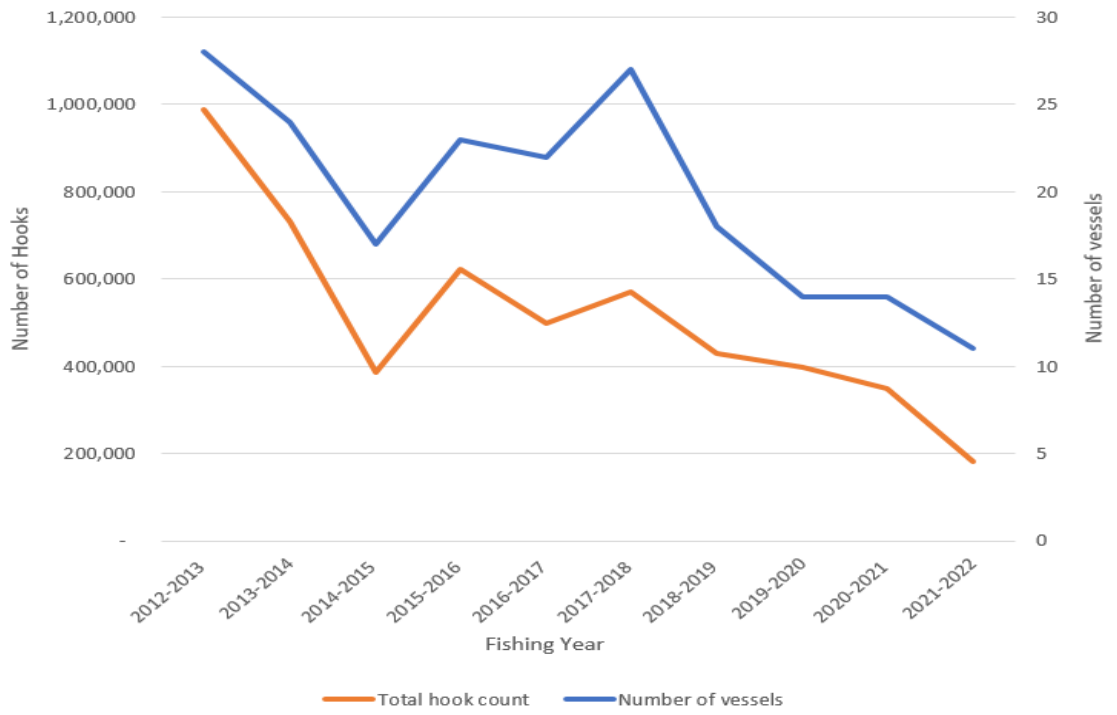


Figure 12. Number of surface longline vessels and number of hooks set targeting bigeye tuna over the last ten fishing years.

For bigeye tuna, catch per unit effort over the last ten fishing years has ranged between 1.4 and 3.9 fish per 1,000 hooks (**Figure 13**).

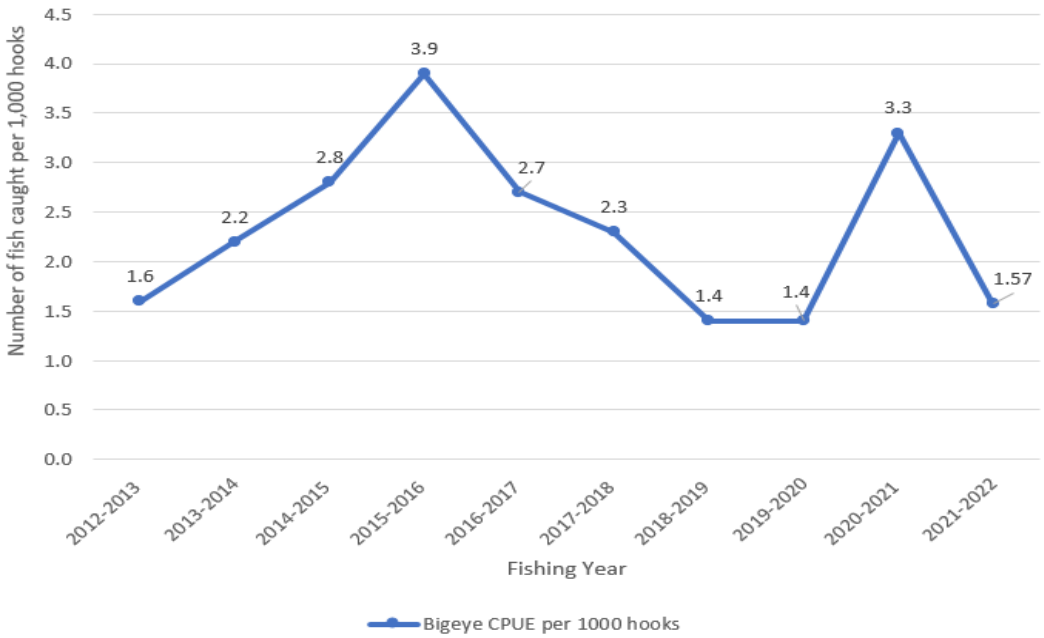


Figure 13. Catch per unit effort[20] of bigeye tuna when targeted in the surface longline fishery over the last ten fishing years.

[20] The catch per unit effort was calculated by using the estimated targeted commercial effort (in terms of number of hooks) and the estimated commercial catch from that targeted effort (in terms of number of fish caught). The catch per unit effort is not standardised. The information is aggregated over all New Zealand fisheries waters (excluding effort and catch from outside New Zealand fisheries waters), and is provided for the last ten fishing years.

Blue shark

In 2021/22, blue shark total allowable commercial catch remained at 1,860 tonnes. Commercial catch was 55 tonnes. Since its peak in the early 2000's, catch of blue shark has been declining and remains low (**Figure 14**).

Blue sharks are caught as bycatch mainly in the tuna surface longline fishery. A small number of blue sharks are also caught as bycatch in a number of other fisheries, such as the bottom longline fishery, the midwater trawl fishery, and the set net fishery.

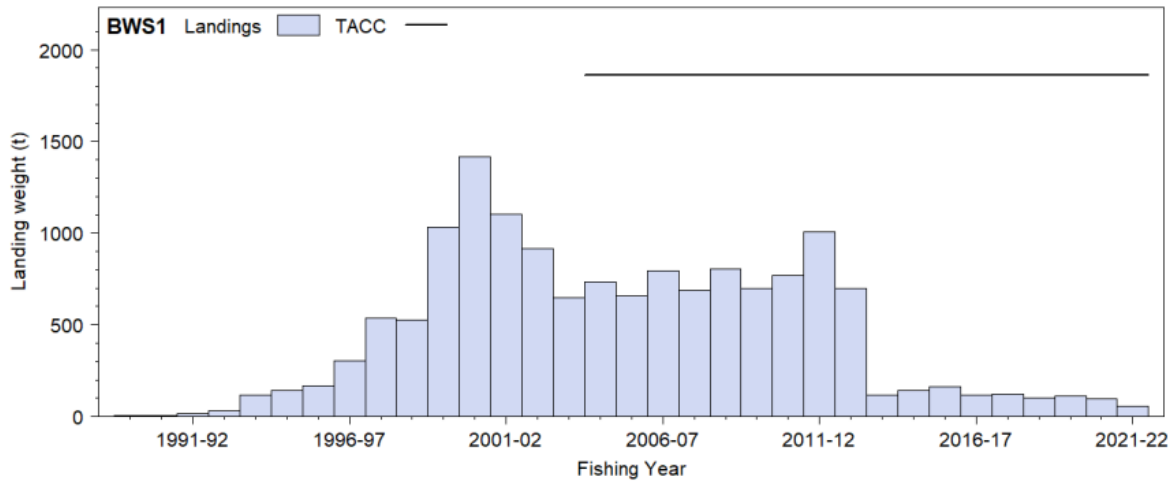


Figure 14. Blue shark (BWS1) total allowable commercial catch and catch since 1989-90.

Mako shark

In 2021/22, mako shark total allowable commercial catch remained at 200 tonnes. Commercial catch was 12 tonnes. Since its peak in the early 2000's, catch of mako sharks has been steadily declining (**Figure 15**).

Mako sharks are caught as bycatch mainly in the surface longline fishery. Mako sharks are also caught as bycatch in a number of other fisheries, such as the bottom longline fishery, the set net fishery, and the midwater and bottom trawl fisheries.

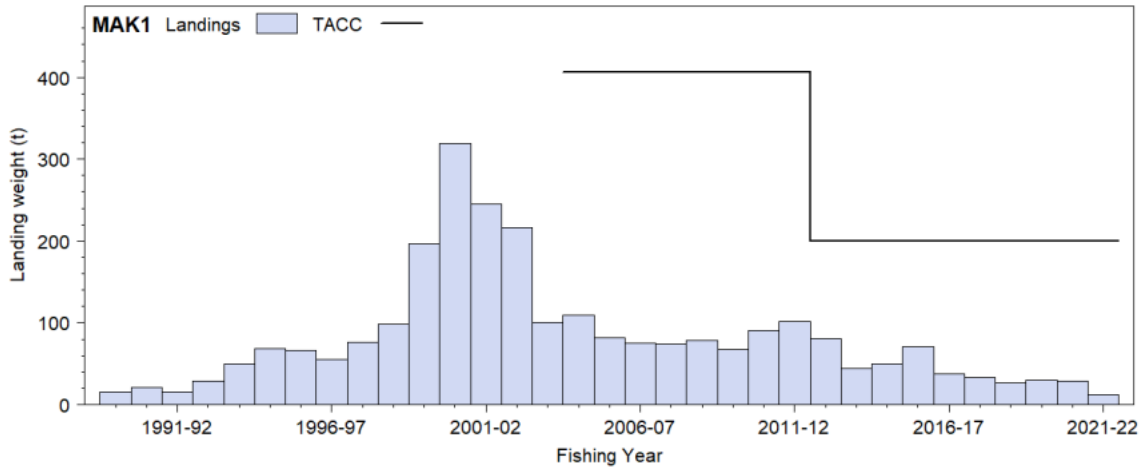


Figure 15. Mako shark (MAK1) total allowable commercial catch and catch since 1989-90.

Pacific bluefin tuna

In 2021/22, Pacific bluefin tuna total allowable commercial catch remained at 116 tonnes. Commercial catch was 31 tonnes, which is a reduction from the previous year's catch (**Figure 16**).

Pacific bluefin tuna is occasionally targeted in the surface longline fishery, however mainly caught as bycatch. Pacific bluefin tuna is also caught as bycatch in a number of other fisheries, such as the midwater trawl fishery and the bottom trawl fishery.

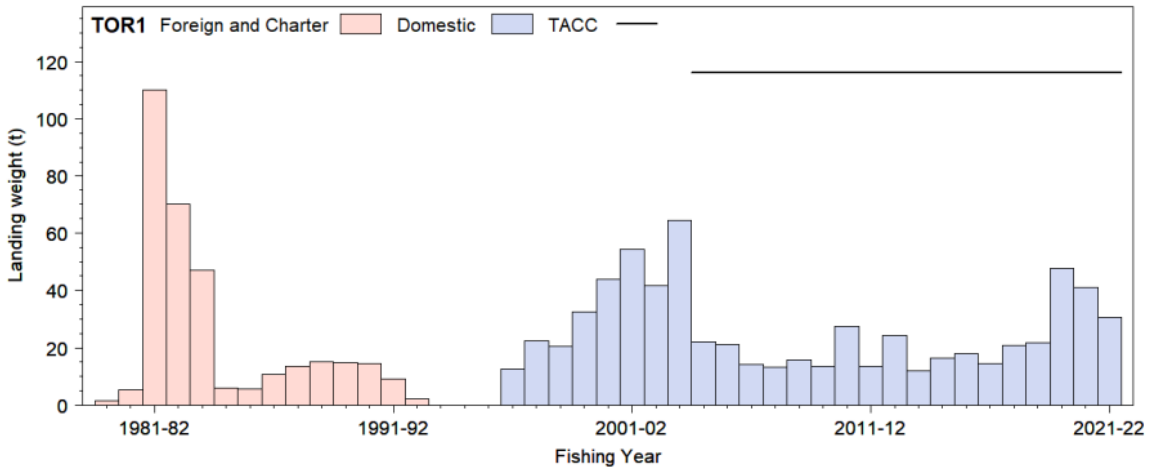


Figure 16. Pacific bluefin tuna (TOR1) total allowable commercial catch and catch since 1979-80.

Porbeagle shark

In 2021/22, porbeagle shark total allowable commercial catch remained at 110 tonnes. Commercial catch was 26 tonnes. Over the last decade since the reduction of the TACC, commercial catch has fluctuated between 25 and 84 tonnes (**Figure 17**).

Porbeagle sharks are caught as bycatch mainly in the tuna and swordfish surface longline fisheries. Porbeagle sharks are also caught as bycatch in a number of other fisheries, such as the hoki and southern blue whiting midwater trawl fishery, the set net fishery, and the bottom longline fishery.

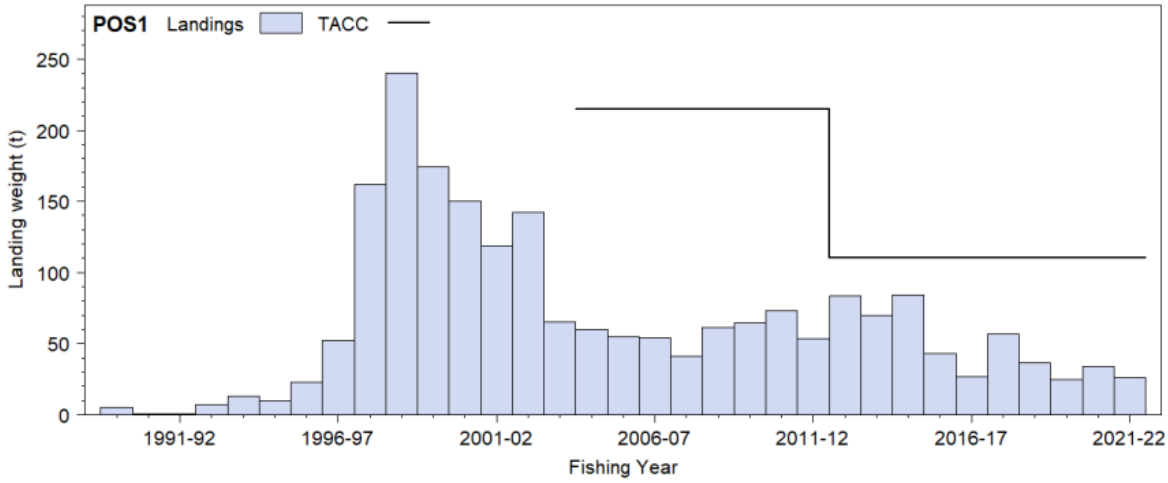


Figure 17. Porbeagle shark (POS1) total allowable commercial catch and catch[21] since 1989-90.

[21] This catch does not include those sharks that are returned under Schedule 6.

Southern bluefin tuna

In 2021/22, southern bluefin tuna total allowable commercial catch remained at 1,046 tonnes and commercial catch was 874 tonnes. This is the first increase in catch since 2016/17 when catch peaked at 914 tonnes and then started to decline to a low of 787 tonnes in 2020/21 (**Figure 18**).

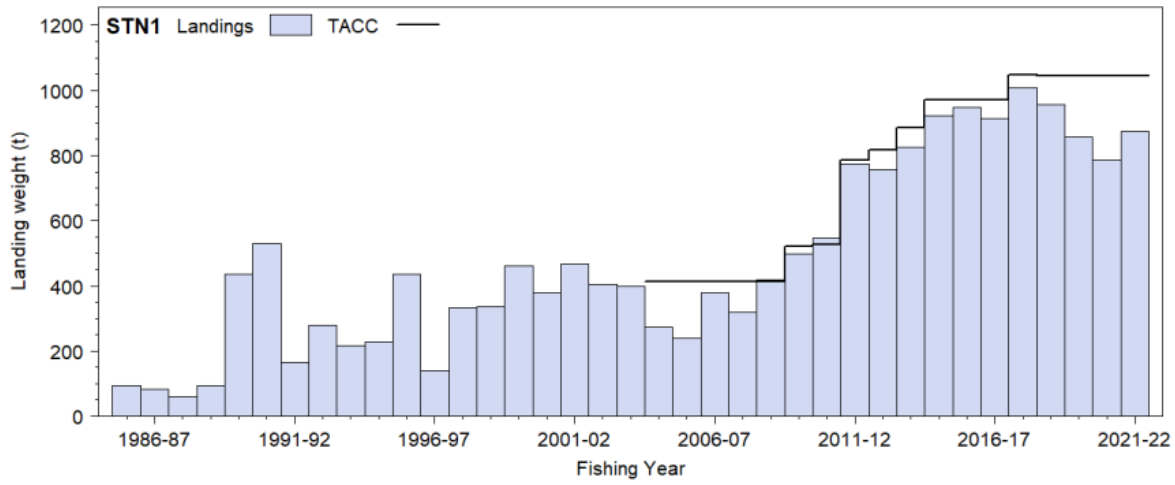


Figure 18. Southern bluefin tuna (STN1) total allowable commercial catch and catch since 1985-86.

Southern bluefin tuna is targeted and caught as bycatch mainly in the surface longline fishery. Southern bluefin tuna is also caught as bycatch in a number of other fisheries, such as the midwater trawl fishery, the set net fishery, and the troll fishery.

The number of surface longline vessels targeting southern bluefin tuna in the last ten fishing years has ranged between 23 and 37. The number of hooks set targeting southern bluefin tuna in the last ten fishing years has ranged between 864,000 and 1,600,000 hooks (

Figure 19).

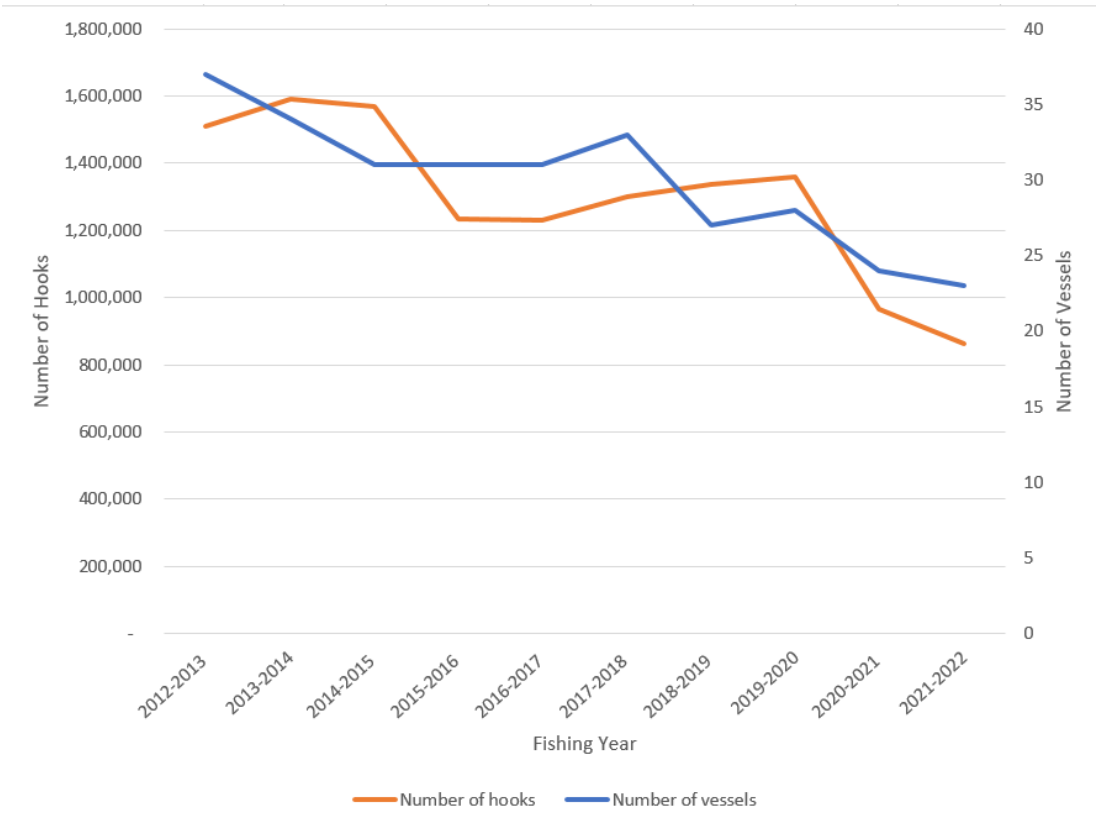


Figure 19. Number of surface longline vessels and number of hooks set targeting southern bluefin tuna over the last ten fishing years.

Southern bluefin tuna is mainly caught between May and September, with smaller amounts being caught between October and February, and catch generally peaking in June and July (**Figure 20**).

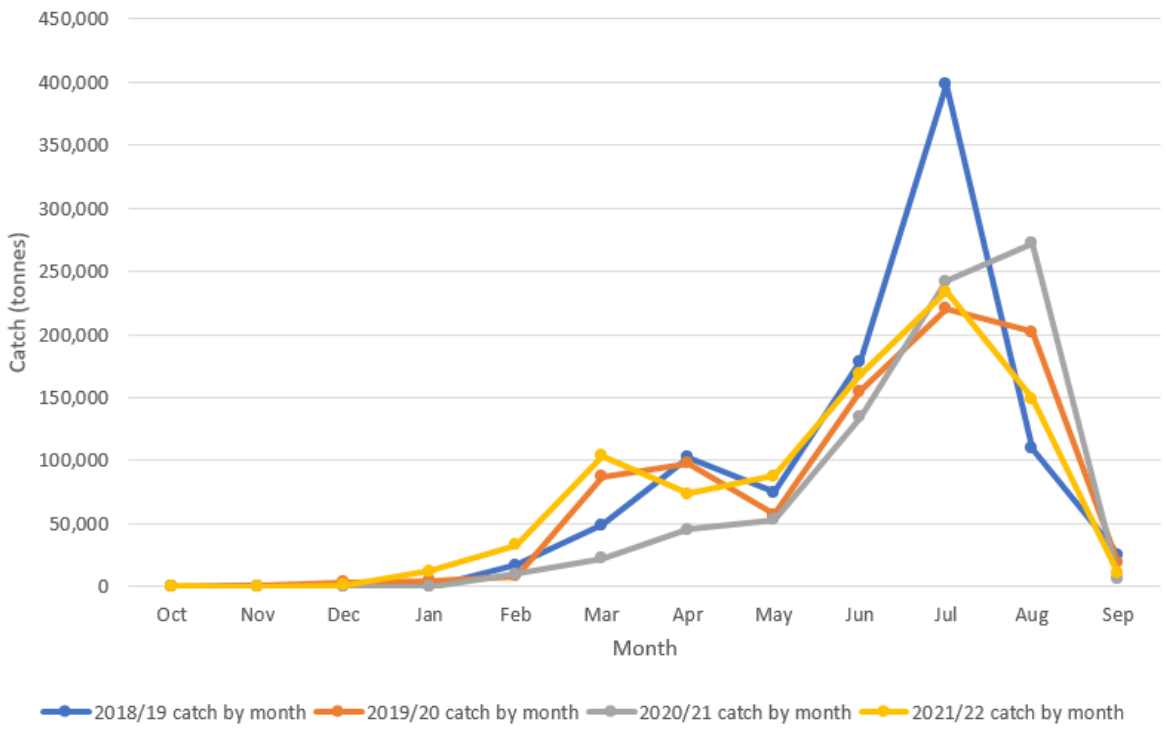


Figure 20. Southern bluefin tuna catch by month over the last four fishing years.

For southern bluefin tuna, catch per unit effort over the last ten fishing years has ranged between 7.7 and 19.02 fish per 1,000 hooks (**Figure 21**).

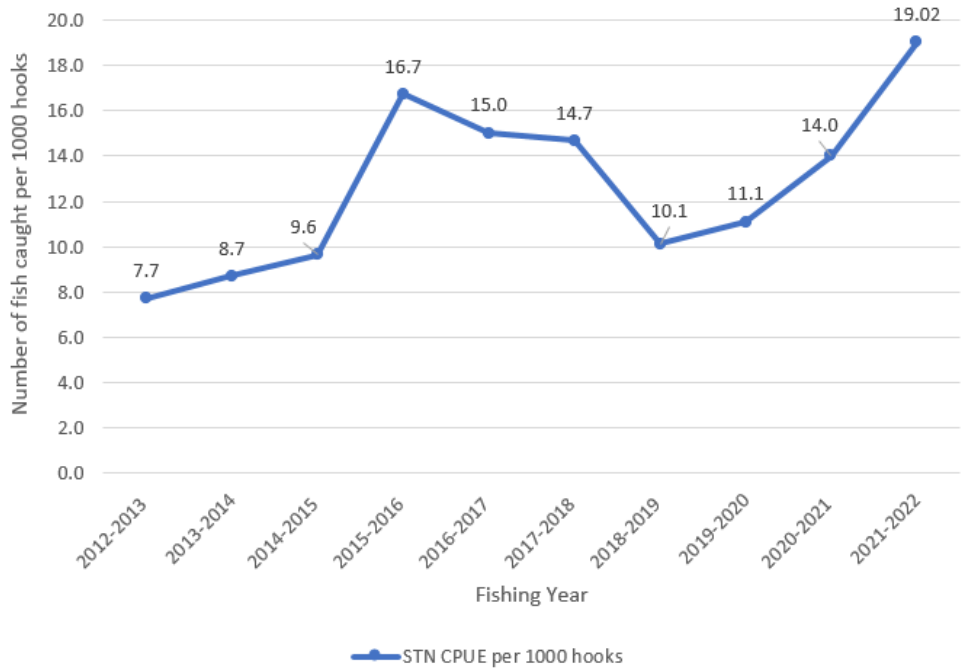


Figure 21. Catch per unit effort[22] of southern bluefin tuna when targeted in the surface longline fishery over the last ten fishing years.

Swordfish

In 2021/22, swordfish total allowable commercial catch remained at 885 tonnes. Commercial catch was 141 tonnes. Over the last ten fishing years, commercial catch has been on a downward trend but last year saw a slight increase in catch, the first increase in almost a decade. This year catch once again decreased to the lowest it has been since the 1990's (**Figure 22**).

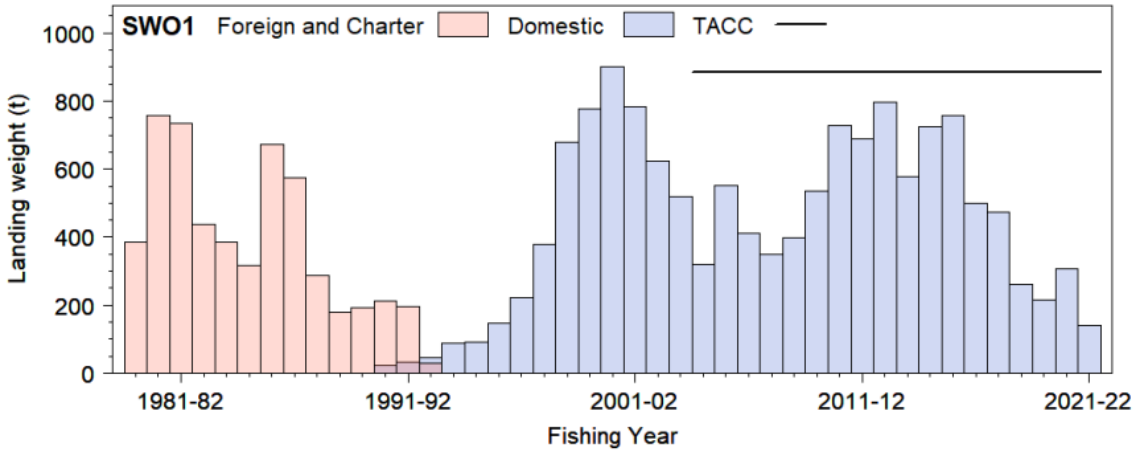


Figure 22. Swordfish total allowable commercial catch total allowable commercial catch and catch since 1979-80.

Swordfish is sometimes targeted but mainly caught as bycatch in the bigeye tuna and southern bluefin tuna surface longline fishery. Swordfish is also caught as bycatch in a number of other fisheries, such as the bottom longline fishery, the jack mackerel and hoki midwater trawl fishery, and the skipjack tuna purse-seine fishery.

[22] The catch per unit effort was calculated by using the estimated targeted commercial effort (in terms of number of hooks) and the estimated commercial catch from that targeted effort (in terms of number of fish caught). The catch per unit effort is not standardised. The information is aggregated over all New Zealand fisheries waters (excluding effort and catch from outside New Zealand fisheries waters), and is provided for the last ten fishing years.

The number of surface longline vessels targeting swordfish in the last five fishing years has ranged between 10 and 22. The number of hooks set targeting swordfish in the last five fishing years has ranged between approximately 116,000 and 450,000 (**Figure 23**).

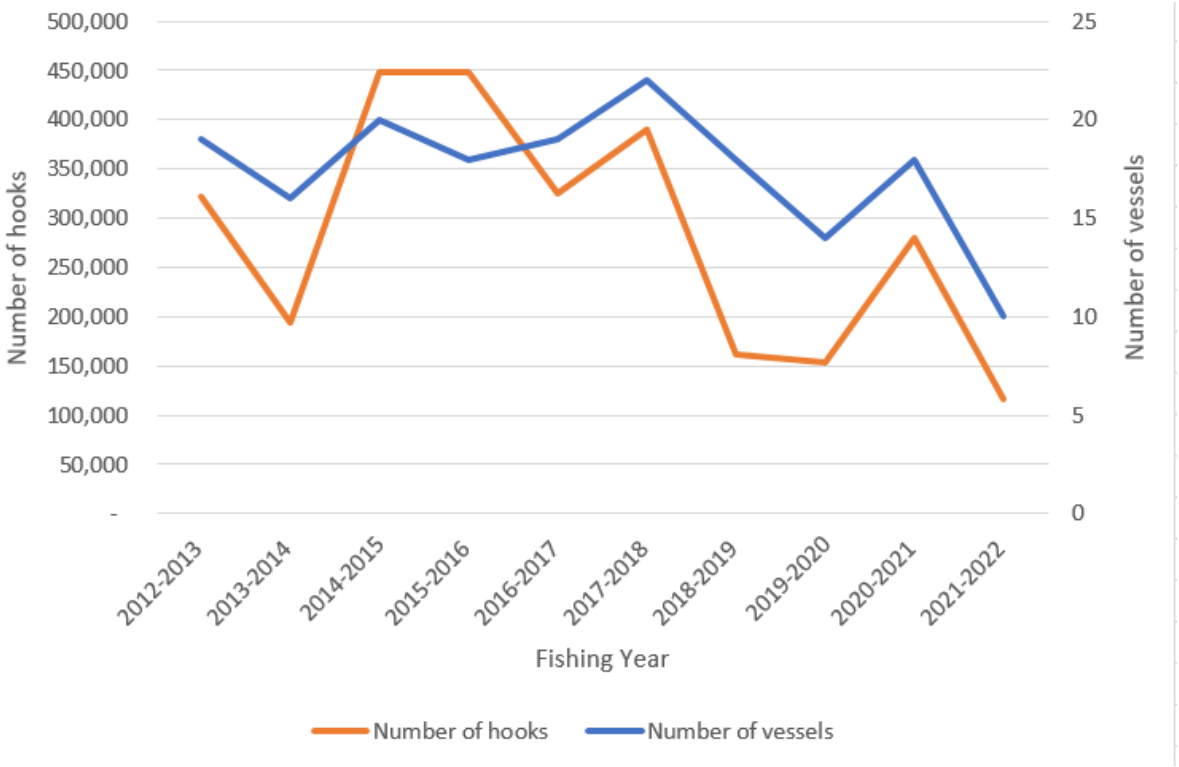


Figure 23. Number of surface longline vessels and number of hooks set targeting swordfish over the last ten fishing years.

For swordfish, catch per unit effort over the last ten fishing years has ranged between 4.7 and 13.5 fish per 1,000 hooks (

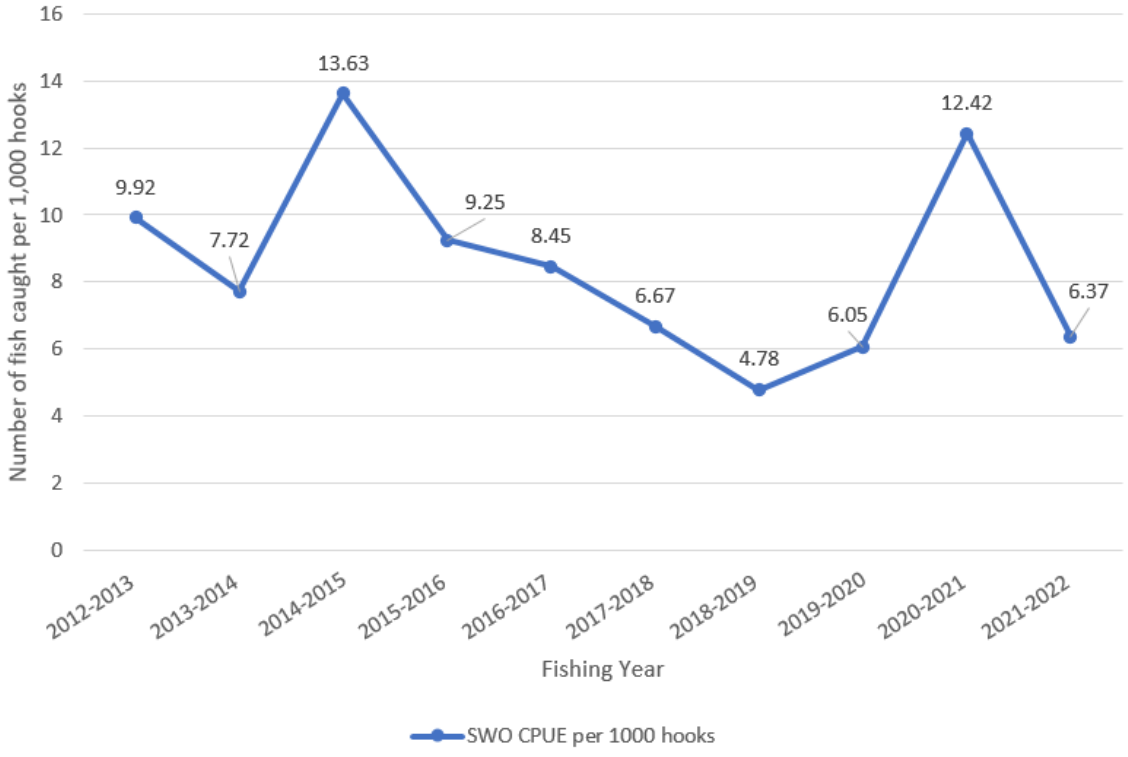


Figure 24).

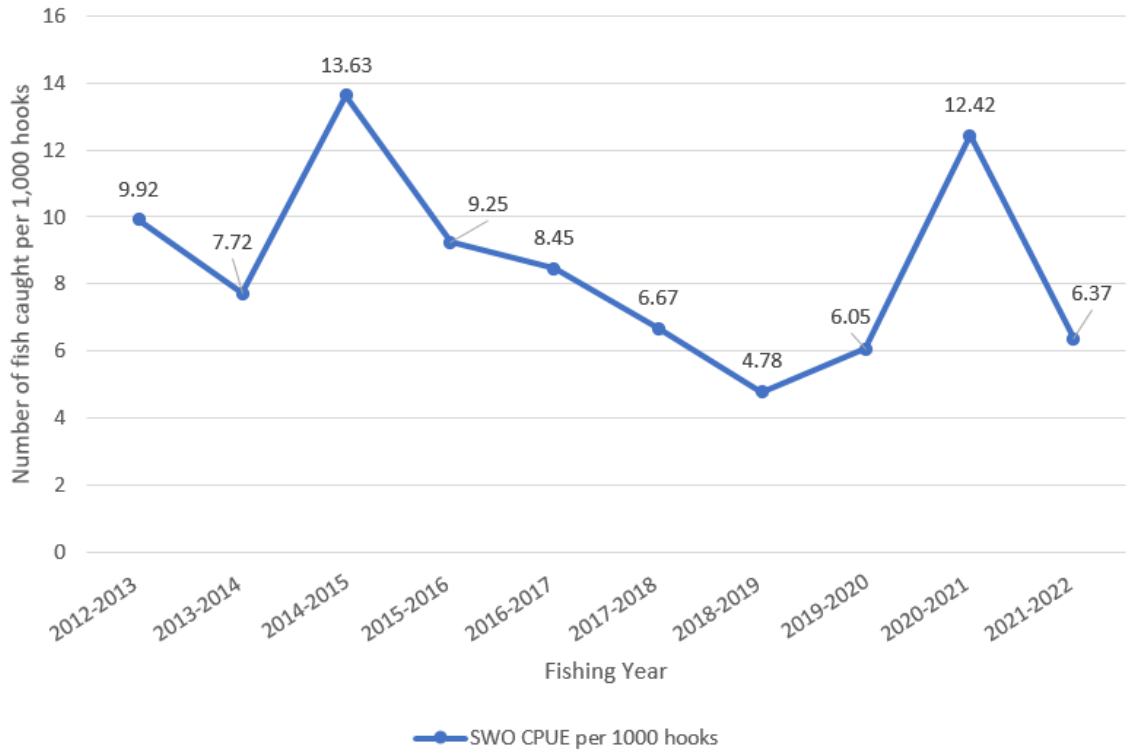


Figure 24. Catch per unit effort[23] of swordfish when targeted in the surface longline fishery over the last ten fishing years.

Yellowfin tuna

In 2020/21, yellowfin tuna total allowable commercial catch remained at 263 tonnes. Commercial catch was 3 tonnes, a significant reduction from the previous year's 25 tonnes (**Figure 25**).

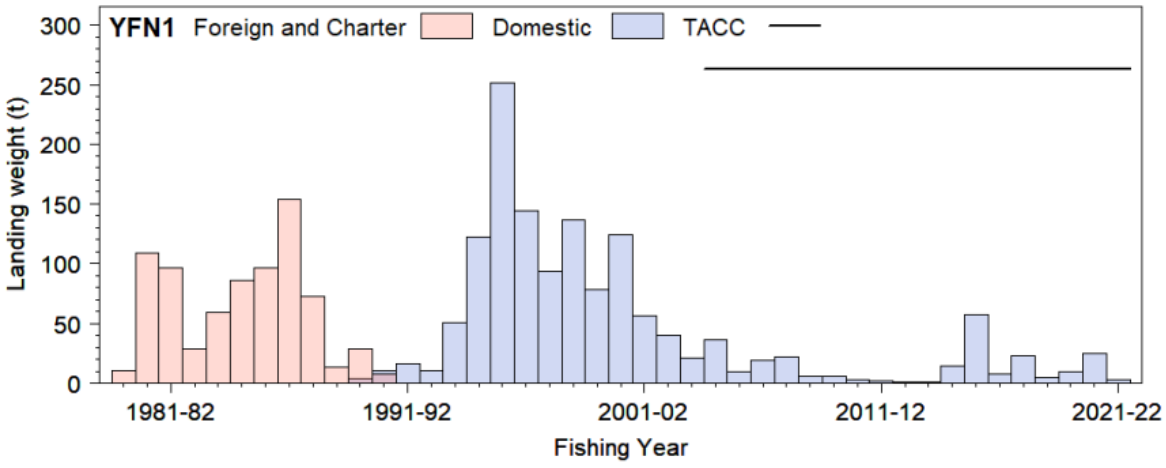


Figure 25. Yellowfin (YFN1) total allowable commercial catch and catch since 1979-80.

[23] The catch per unit effort was calculated by using the estimated targeted commercial effort (in terms of number of hooks) and the estimated commercial catch from that targeted effort (in terms of number of fish caught). The catch per unit effort is not standardised. The information is aggregated over all New Zealand fisheries waters (excluding effort and catch from outside New Zealand fisheries waters), and is provided for the last ten fishing years.

Yellowfin tuna is occasionally targeted in the surface longline fishery, however mainly caught as bycatch. Yellowfin tuna is also caught as bycatch in a number of other fisheries, such as the purse seine fishery, bottom longline fishery and troll fishery.

COMMERCIAL CATCHES OF NON-QUOTA SPECIES

Albacore tuna

In 2021, commercial catch of albacore tuna was 3,485 tonnes. Over the last five fishing years, commercial catch has increased by approximately 1,000 tonnes (**Figure 26**).

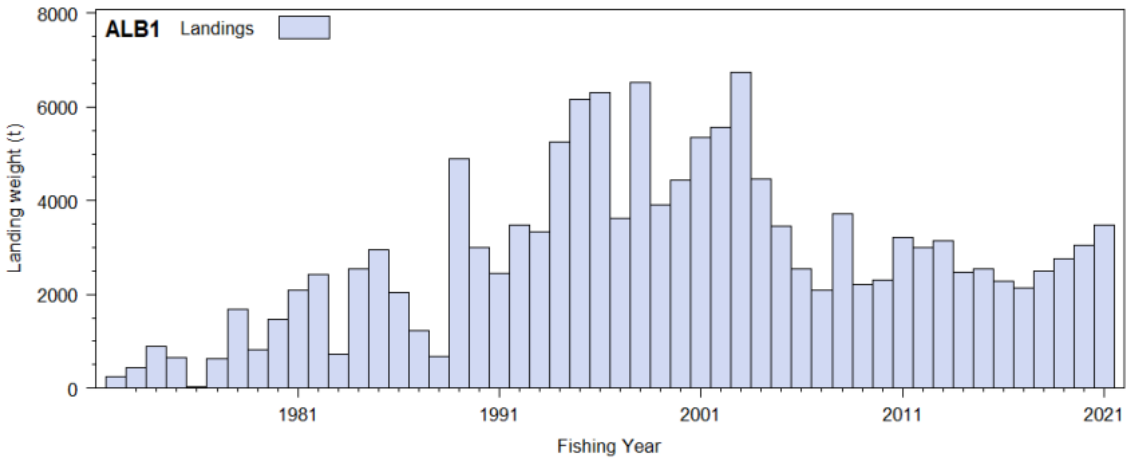


Figure 26. Total catch from Monthly Harvest Returns for albacore tuna (ALB1) since 1972.

Albacore tuna is targeted in the troll fishery. Albacore tuna is also caught as bycatch in a number of other fisheries, such as the surface longline fishery, the purse seine fishery, and the midwater trawl fishery.

The number of troll vessels targeting albacore tuna in the last five fishing years has ranged between 99 and 154. The number of vessel days targeting albacore tuna in the last five fishing years has ranged between 3,671 and 5,944 (**Figure 27**).

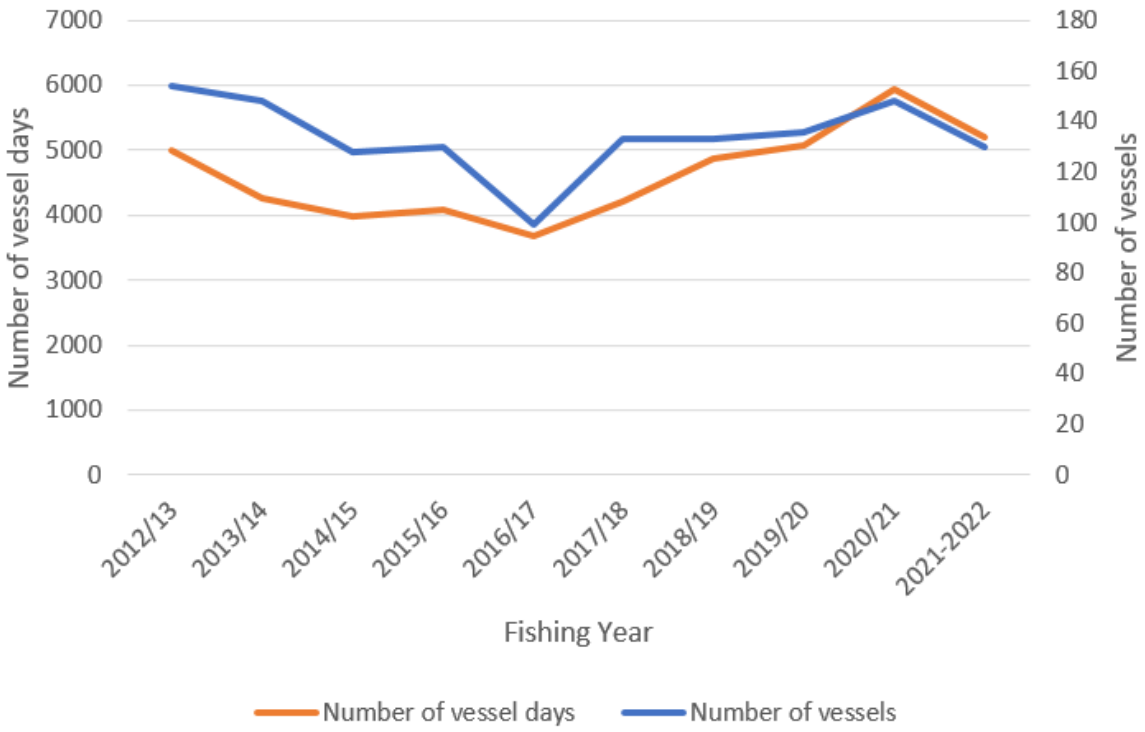


Figure 27. Number of troll vessels and vessel days targeting albacore tuna over the last ten fishing years.

Skipjack tuna

In 2021/22, commercial catch of skipjack tuna was 924 tonnes. This is a significant reduction from recent years – between 2015/16 and 2020/21 catch ranged from approximately 3,800 tonnes to 6,300 tonnes (**Figure 28**).

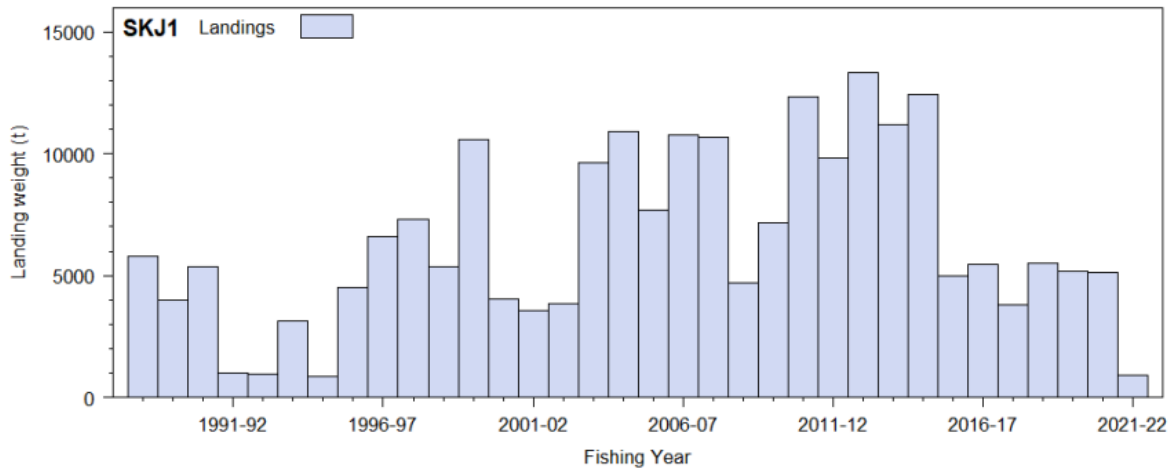


Figure 28. Total catch from Monthly Harvest Returns for skipjack tuna (SKJ1) since 1988-89.

Skipjack tuna is targeted in the purse seine fishery. Skipjack tuna is also caught as bycatch mainly in the troll fishery and the tuna surface longline fishery.

The number of purse seine vessels targeting skipjack tuna in the last five fishing years has continued to decline, from six to three. Based on industry feedback, the reduction in skipjack tuna vessels and the associated number of shots per year, is a direct consequence of the reduced availability/abundance of the species in New Zealand waters. The number of shots targeting skipjack tuna in the last five fishing years has declined from around 400 to just 47 (**Figure 29**).

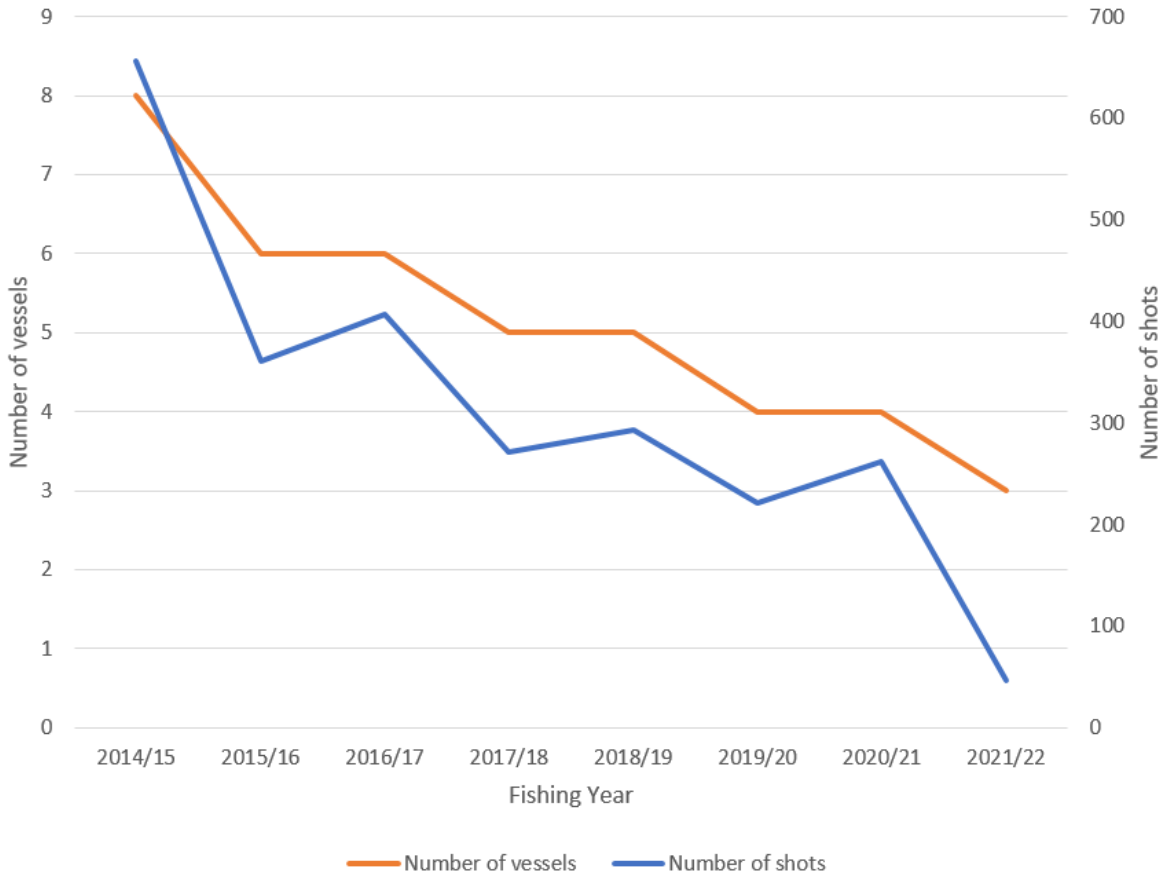


Figure 29. Number of purse seine vessels and shots targeting skipjack tuna over the last eight fishing years.

Environmental reporting

The source of this information is the database of protected species bycatch compiled by Dragonfly Ltd, see https://data.dragonfly.co.nz/psc-dev/. Unfortunately, the database has not been updated since 2019/20 due to problems encountered with the data.

The number of observed captures and estimated captures of species by surface longline vessels in the 2019/20 fishing year is shown in **Table 8.** Note there was no observed purse seine fishing in the 2019/20 fishing year.

Table 8. Observed captures and estimated captures of species in surface longline fisheries in the 2019/20 fishing year.

Species	Observed captures	Estimated captures
Birds	23	699
Reptiles	4	NA[24]
Marine mammals	15	185

[24] Estimate unable to be calculated due to issues with 'reptile' subset of data.

Cost recovery levies

Overall, total costs recovered over HMS for the 2022/23 financial year increased compared with costs recovered for the previous year **(Table 9).**

- An increase in research costs associated with the southern bluefin tuna fishery, due to two DOC projects (the Protected Species Liaison Programme, and hook shielding devices use in the surface longline fishery).
- An increase in compliance costs associated with the southern bluefin tuna fishery, due to an increase in port price for STN1.

2022/23	MPI Departmental		Observers		Research		Under/Over Recovery	
Fish Stock	Compliance	Registry	MPI	DOC	MPI	DOC	MPI	DOC
ALB	119,375	35,710	854		71,872	18,845	(58,401)	(10,204)
BIG1	82,840	24,781	69,877	12,794	7,881	53,622	(2,631)	(2,629)
BWS1	2,708	810	19		0	46	(3,538)	(46)
MAK1	679	203	5		0	12	(887)	(12)
MOO1	12,474	3,731	89		0	213	(372)	0
POS1	521	156	4		0	9	(680)	(9)
RBM1	12,214	3,654	87		0	209	(554)	0
SKJ	24,753	7,405	24,023	4,401		45,897		
STN1	87,143	26,068	321,675	59,292	24,813	51,976	(32,968)	(7,077)
SWO1	48,254	14,435	86,236	15,864	9,832	27,871	974	(3,258)
TOR1	14,393	4,306	103		1,089	2,828	(527)	(0)
YFN1	19,761	5,911	141		2,167		(287)	0
TOTAL	**425,115**	**127,171**	**503,113**	**92,351**	**117,654**	**201,529**	**(99,871)**	**(23,235)**
2021/22	497,482	144,880	469,908	86,215	139,825	81,866		
PY Change	(72,367)	(17,710)	33,206	6,136	(22,171)	119,663		

2018/19	2019/20	2020/21	2021/22	2022/23	PY $ Change
339,055	233,962	221,315	216,272	178,052	**(38,220)**
305,129	211,793	214,911	223,300	246,535	**23,235**
42,043	4,068	4,447	0	(0)	**(0)**
12,357	0	(13)	0	0	**0**
19,325	18,796	18,768	16,683	16,136	**(547)**
9,498	786	802	0	0	**0**
13,195	13,253	13,366	10,386	15,609	**5,223**
175,952	39,871	39,877	77,587	106,478	**28,891**
279,946	337,702	474,665	511,340	530,921	**19,581**
202,423	187,308	156,944	167,495	200,209	**32,715**
79,443	63,671	67,672	28,095	22,192	**(5,903)**
30,678	30,900	33,573	29,473	27,694	**(1,778)**
1,509,044	**1,142,110**	**1,246,328**	**1,280,630**	**1,343,827**	**63,196**

Table 9. Cost recovery levies for fishery and conservation services for HMS stocks in 2022/23

Monitoring of non-commercial fisheries

The information in this section is provided by the New Zealand Sport Fish Council (NZSFC), the Gamefish Tagging Programme report (FAR 2023/02), and the southern bluefin tuna recreational harvest report (FAR 2023/06).

New Zealand Gamefish Tagging Programme

The following tables show the number of sharks and billfish tagged in the New Zealand Gamefish Tagging Programme in the exclusive economic zone by sport fishing year (July to June). The number of mako and blue sharks tagged and released each year has declined over the last six years (**Table 9**). These fish are almost all caught as bycatch in recreational fisheries. The recaptures for mako and blue sharks have also declined (**Table 10**).

Table 9. Number of pelagic sharks tagged and released by year since 2012/13.

Species	2012–13	2013–14	2014–15	2015–16	2016–17	2017–18	2018–19	2019–20	2020–21	2021–22	Annual Average
Blue shark	150	120	121	158	54	59	24	14	2	3	71
Bronze whaler	40	43	44	63	106	58	88	81	82	43	65
Hammerhead	19	27	17	52	34	27	24	17	18	9	24
Mako	536	367	424	587	331	289	217	96	92	29	297
Porbeagle	1			1		1					
Sevengill				1		1	1				
Thresher	16	11	8	17	13	6	7	3	7	12	10
Total	771	572	622	883	545	447	367	219	205	98	473

Table 10. Number of pelagic sharks tagged and recaptured by year since 2012/13.

Species	2012–13	2013–14	2014–15	2015–16	2016–17	2017–18	2018–19	2019–20	2020–21	2021–22	Annual Average
Blue shark	3	3	0	0	1	1	0	0	0	0	0.8
Bronze whaler	0	1	0	2	2	1	2	0	1	4	1.3
Hammerhead	0	1	0	0	0	0	0	0	0	0	
Mako	10	6	0	2	3	4	0	0	1	0	2.6
Total	13	11	0	4	6	6	2	0	2	4	4.8

The number of billfish tagged varies from year to year. The 2015/16 sport fishing year was a particularly good year, with 1,658 striped marlin tagged in the recreational fishery. This was followed by a cold fishing season in 2016/17 that resulted in lower fishing effort and 517 striped marlin tagged. The catch of all billfish species was lower in 2019/20 due to the COVID-19 restrictions that stopped recreational fishing in March and April (**Table 11**). There were five tagged striped marlin and one swordfish recaptured in 2021 and two striped marlin and swordfish recaptures in 2022. All recaptures were made in northern New Zealand waters apart from a striped marlin recaptured off Frazer Island, Queensland in May 2022.

Table 11. Number of billfish tagged and released by year and total billfish recaptures recorded in the gamefish tagging database.

Species	2012–13	2013–14	2014–15	2015–16	2016–17	2017–18	2018–19	2019–20	2020–21	2021–22	Annual Average
Striped marlin	819	492	967	1653	517	752	652	469	806	891	802
Blue marlin	15	9	33	36	35	72	62	38	30	39	37
Black marlin	2	4	7	5	4	5	3	1	3	1	4
Shortbill spearfish		6	12	26	12	24	35	12	10	15	17
Swordfish	40	34	25	29	31	62	22	20	39	18	32
Billfish recaptures	4	4	2	7	3	4	3	0	5	3	4

Landed catch of billfish by recreational fishers

NZSFC member clubs report annual catch tallies. For many years these were a reasonably complete record from a specialist and charter fishery. Over the last 20 years there has been an increase in the number of well-equipped private boats fishing for marlin and less of the landed catch is recorded by clubs. Striped marlin is the main species caught and numbers have been reasonably consistent. There were 377 landed striped marlin recorded by clubs in 2021/22 which is below the long term average (**Table 12**). The number of striped marlin landed or tagged and released by NZSFC club members since 1993/94 is shown in **Figure 30**.

Table 12. Billfish landed from New Zealand waters and recorded by New Zealand Sport Fish Council clubs.

Species	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	Annual Average
Striped marlin	744	620	696	900	516	618	507	333	627	377	594
Blue marlin	55	64	102	99	120	159	155	95	68	100	102
Shortbill spearfish	13	25	58	69	46	91	95	42	54	51	54
Swordfish	53	80	87	85	87	72	76	39	97	84	76
Black marlin	3	5	5	4	7	5	6	5	6	5	5

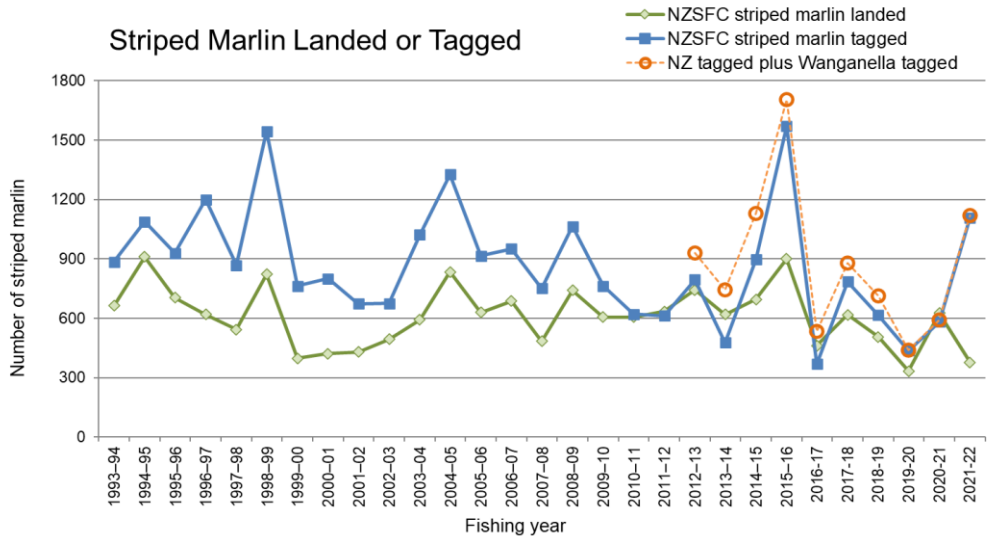


Figure 30. Recreational catch of striped marlin that were landed or tagged (plus Wanganella Bank tagged fish) from 1993/94 sport fishing year to 2021/22.

Note: The area that many fished on the Wanganella Banks is outside the New Zealand exclusive economic zone and has experienced high catch rates of striped marlin (at times over 20 fish per day). The NZSFC do not include these fish in club or national statistics.

Landed recreational catch of sharks from New Zealand Sport Fish Council records

The general declining trend of landed recreational catch of sharks (in particular mako sharks and blue sharks) from the late 1990s the mid-2000s was likely due to the recreational sector removing shark competitions and discouraging the landing of pelagic sharks in light of concerns of declining populations. These measures have maintained pelagic shark landings at low levels despite indications that the populations are recovering. The number of bronze whalers has increased and are taking fish off recreational lines in a number of areas.

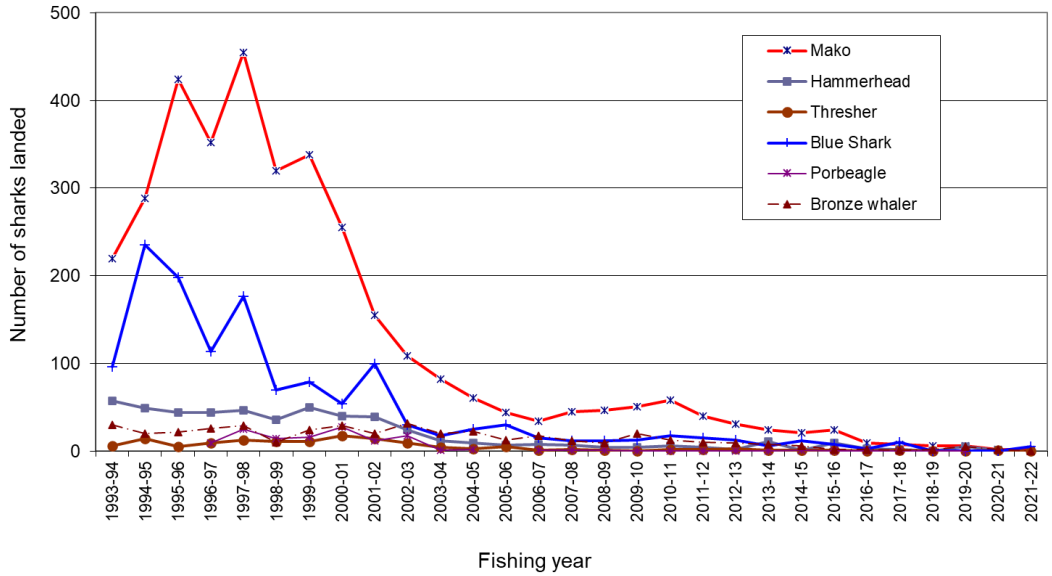


Figure 31. Recreational catch of shark species that were landed for New Zealand Sport Fish Council records from 1993/94 to 2021/22 sport fishing year.

Recreational catch of southern bluefin tuna

There are two distinct recreational fisheries for southern bluefin tuna in New Zealand. One is off the west coast of the South Island from January to July, and the other is a target fishery that began in 2017 off the east coast of the North Island, mainly in June and July. Prior to 2017, recreational catch of southern bluefin tuna was relatively rare. The fishery was concentrated in Fiordland and was quite small, and there was little recreational effort in the North Island. Starting in 2017 a combination of factors (including favourable weather conditions, increased availability of fish in the eastern Bay of Plenty, and a general increased recreational interest in southern bluefin tuna) resulted in much higher levels of catch than previously seen in this fishery. Since then, recreational catch of southern bluefin tuna has continued to grow (**Table 13)**.

Table 13. The estimated recreational harvest of southern bluefin tuna since 2017 (including 15-30% allowance for unaccounted catch).

Year	Number of STN landed	Estimated harvest weight (t)	With allowance for unaccounted catch (t)
2017	266	19.4	NA
2018	202	12.3	11.4 - 13.4
2019	349	21.2	24.4 - 27.5
2020	587	42.6	46.6 - 51.3
2021	589	48.7	54.1 - 60.3
2022	905	50.5	56.7 - 62.9

Fisheries New Zealand has commissioned a project to estimate the national recreational catch of southern bluefin tuna since 2018. This project draws on various data sources to produce the annual southern bluefin tuna recreational harvest estimate including: recreational charter operator records, North Island gamefish club records, a South Island phone survey, section 111 landings, and a targeted survey at Waihau Bay.

Recreational charter operator records

Compulsory reporting for recreational charter vessel operators was introduced in November 2010. These records indicate that catch of southern bluefin tuna on charter vessels fluctuates from year to year, likely due to the availability of fish, weather conditions, and customer demand for particular target species. Charter fishing effort and retained southern bluefin catch for North Island operators vs South Island operators can also vary. The number of southern bluefin tuna caught and retained on charter boats increased in 2021/22, however most of these were small fish so the estimated landed weight decreased from previous years (**Table 14**).

Table 14. Reported catch for southern bluefin tuna from amateur charter vessel logbooks by October fishing year.

	Number of target days	Number caught	Number retained	Estimated landed weight (kg)
2010/11	1	6	4	397
2011/12	4	6	4	131
2012/13	7	12	12	550
2013/14	0	0	0	0
2014/15	16	6	2	95
2015/16	33	38	37	1 267
2016/17	53	54	52	2 274
2017/18	37	12	12	597
2018/19	63	47	42	1 821
2019/20	125	225	153	10 884
2020/21	102	208	149	9 079
2021/22	150	331	249	5 917

Charter fishing effort and retained southern bluefin catch increased in the South Island and decreased in the North Island in 2022 (**Figure 32**). The fish caught on South Island charters were generally small (average 18.65 kg) compared to those caught on North Island charters (average 66.63 kg). This may be linked to an expansion of the range of juvenile southern bluefin due to changes in ocean conditions and increased recruitment as the southern bluefin population continues to recover from historical overfishing.

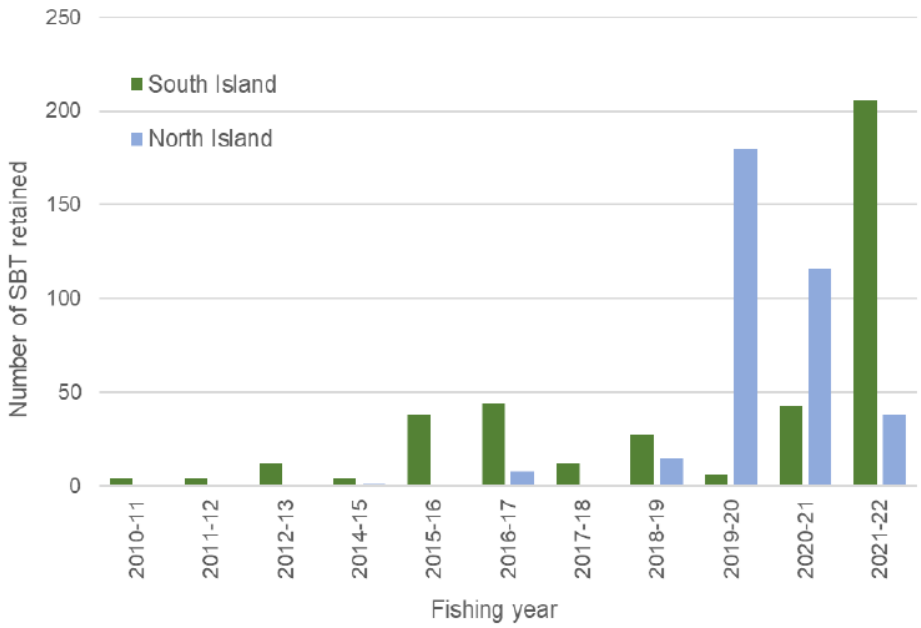


Figure 32. Southern bluefin (SBT) retained catch by amateur fishing charter vessels by year and fishery.
North Island gamefish club records

New Zealand Sport Fishing Council clubs from the Bay of Plenty, Gisborne, Hawke's Bay, Auckland, and Northland provide detailed catch records from affiliated weigh stations. Clubs weigh and record fish caught by affiliated club members and generally for non-members on request. Records gathered from these gamefish clubs show that in 2022, 86 fish were landed with an estimated total weight of 5.63 tonnes.

Recreational fishers were having some success catching southern bluefin from a range of ports in 2022. This included off the west coast of the North Island (from Manukau to Cook Strait) with a run of small fish, about 12 kg, caught from inshore boats from January to March. This is the first time that southern bluefin have been seen and caught in numbers from this area and it is uncertain whether this is a one off or rare event, or perhaps an expansion of the range of juvenile SBT due to changes in ocean conditions and increased recruitment. While there were social media posts about this unusual event, estimates of the total number are speculative.

The distribution of weights recorded by all North Island clubs (including Waihau Bay Sport Fishing Club) in 2022 has a mode of landed catch between 60 to 70 kg while fish landed to other North Island fishing clubs had a broad distribution of weights and more small fish were weighed. (**Figure 33**).

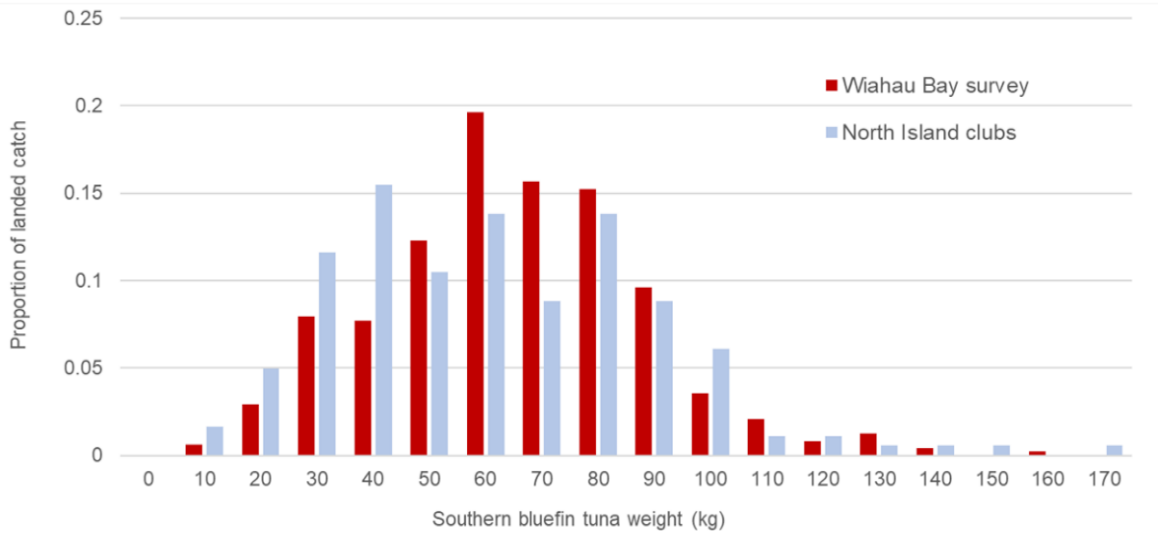


Figure 33. The distribution of southern bluefin tuna greenweights recorded in 2022 from Waihau Bay survey interviews and from North Island sport fishing club weigh stations (not including Waihau Bay).

South Island phone survey

A respondent-driven off-site telephone survey has been conducted since 2019/20 to estimate southern bluefin catch on the South Island. The focus of the design was to estimate the number and weight of southern bluefin caught by amateur fishers on private boats. The contact list of fishers included 54 boat owners in 2022; this list is still expanding.

The estimated southern bluefin harvest from private vessels off the South Island was 93 fish reported landed from January to June with an overall average weight of 20.5 kg.

Section 111 landings

Southern bluefin tuna caught by commercial fishers using recreational fishing gear may be retained for personal use under an approval provided by Fisheries New Zealand under section 111 of the Fisheries Act 1996. In the 2021–22 October fishing year, the reported section 111 landings of southern bluefin weighed 2.71 tonnes. This is the highest annual weight of section 111 catch reported over the last eight years.

Table 15 Recreational catch retained by fishers on commercial vessels under a section 111 approval.

Fishing year	Greenweight kg	Fishing year	Greenweight kg
2014–15	672	2018–19	454
2015–16	661	2019–20	671
2016–17	1 038	2020–21	879
2017–18	507	2021–22	2 709

Waihau Bay recreational catch survey

A primary component of the recreational harvest estimate is information collected from recreational fishers who fish out of Waihau Bay. A large proportion of the annual recreational southern bluefin harvest is generally still caught from trailer boats fishing off Cape Runaway, while southern bluefin are within range during June and July. The remote location, weather conditions, and fishing success influences fisher interest and peak fishing periods.

The total landed catch estimated from the 2022 Waihau Bay survey was 486 southern bluefin tuna. These fish were mainly caught in June and July. Sixty three percent of trips in the 2022 survey landed no southern bluefin tuna and of trips that caught fish, most landed just one or two. In addition, 26 southern bluefin were released, or tagged and released. Overall, there were 367 individual boat names recorded from the Waihau Bay survey interviews.

Recreational management measures

Following the surge in recreational catch in 2017 on the east coast of the North Island, Fisheries New Zealand undertook a public consultation to introduce new management measures for the recreational fishery. As a result, the recreational allowance for southern bluefin was increased from eight to twenty tonnes for the 2017/18 fishing year, and a recreational bag limit of one southern bluefin per person per day was put into effect for 2019.

In 2021 public consultation was held again to determine how an additional 14 tonne increase in TAC should be distributed across commercial and recreational allocations. Because recreational catch has continued its steady increase, the entire 14 tonne increase was ultimately allocated to the recreational allowance, increasing it from 20 to 34 tonnes.

Recently there have been concerns around the effectiveness of current controls in constraining the recreational catch of southern bluefin tuna, from Amateur Charter Vessels (ACV) in particular. Fisheries New Zealand is closely monitoring the ACV catch and the wider recreational catch, and will consider further advice to the Minister in late 2023.