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Tini a Tangaroa

# Recreational harvest of southern bluefin tuna in New Zealand, 2022–23

New Zealand Fisheries Assessment Report 2024/21

J.C. Holdsworth,

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Fisheries Science Editor  
Fisheries New Zealand  
Ministry for Primary Industries  
PO Box 2526  
Wellington 6140  
NEW ZEALAND

Email: [Fisheries-Science.Editor@mpi.govt.nz](mailto:Fisheries-Science.Editor@mpi.govt.nz)  
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## **Plain language summary**

This report estimates the total recreational catch of southern bluefin tuna in New Zealand for the 2022–23 fishing year.

Tuna numbers and weights are collected using a monthly telephone survey of South Island fishers and a boat ramp survey at Waihou Bay in the eastern Bay of Plenty where most of these fish are landed.

Catch records from fishing clubs, online reporting, and recreational charter boats are also used.

In 2022–23, the Total Allowable Catch of New Zealand southern blue tuna was 1102 tonnes. The Commission for the Conservation of Southern Bluefin Tuna requires member countries to report their total catch.

Overall the number of southern bluefin tuna caught in the recreational fishery was about 1500, which is more than in previous years, but the average weight was lower.

The total landed weight for the recreational fishery was estimated to be between 65 and 73 tonnes with a mid-point of 69.3 tonnes.

The global population of southern bluefin tuna is increasing under the current management system and catch rates in the New Zealand commercial and recreational fishery are also likely to increase in future.

## EXECUTIVE SUMMARY

**Holdsworth, J.C.<sup>1</sup> (2024). Recreational harvest of southern bluefin tuna in New Zealand, 2022–23.**

*New Zealand Fisheries Assessment Report 2024/21. 18 p.*

This report describes the New Zealand recreational catch of southern bluefin tuna in the 2022–23 fishing year. The species code for southern bluefin tuna (*Thunnus maccoyii*) used for catch reporting in the New Zealand commercial fishery is STN. In this report, the internationally recognised abbreviation for southern bluefin tuna, SBT, is used.

There are two distinct recreational fisheries for southern bluefin tuna in New Zealand. One off the west coast of the South Island from January to July and a target fishery that started in 2017 off the east coast of the North Island, mainly in June to August.

The North Island recreational catch is predominantly taken by trailer boats launching from the Waihou Bay boat ramp in the eastern Bay of Plenty. In 2023 the sixth annual on-site (creel) access point survey collected detailed catch and effort information from returning fishers. The Waihou Bay Sport Fishing Club weigh station weighs and records individual fish mainly for members of sport fishing clubs. Catch records were obtained from 12 other North Island sport fishing clubs.

An adaptive sampling strategy has been used since 2018 to initiate Waihou Bay survey days when ten or more trailers for offshore capable boats are present at 11:00 am. Trailer counts for all days during the season are used as a measure of fishing effort. In 2023 the survey period was extended to cover the fishery that continued through most of August for the first time. A record number of 815 boat crews were interviewed over 21 survey days. Trailer counts totalled 1204 over 86 days. The total survey estimate of landed catch using average catch from surveyed boats and total trailer counts at Waihou Bay was 940 SBT (with a CV of 0.031). The average weight was 46.9 kg and the survey harvest estimate was 44.1 t.

There were 494 individual boat names recorded from the Waihou Bay survey interviews. Some fishers also donated SBT heads and 49 otolith pairs were extracted for ageing. A further 35 SBT were recorded by other North Island sport fishing clubs with an average weight of 49.6 kg (s.d. 23.79) and harvest weight of 1.7 t. North Island catch rates were higher in 2023, but a high proportion of relatively small SBT were caught.

A respondent-driven off-site telephone survey estimated SBT harvest from private vessels off the South Island. The contact list of fishers included 66 boat owners in 2023; this list is still expanding. There were 158 SBT reported landed from December to August with an overall average weight of 39.8 kg (s.d. 28.84) and a higher total harvest estimate than previous years of 6.3 t.

In 2023 there were 108 SBT retained by Amateur Fishing Charter Vessels. Their fishing effort and the retained weight of SBT (4.4 t) were significantly less than in the last three years.

Harvest reported as recreational catch taken from commercial vessels under section 111 of the Fisheries Act 1996 in 2023 totalled 1.10 t, which is included in recreational harvest estimates.

The total landed recreational harvest estimate for 2022–23 is 1241 SBT weighing 57.55 t. Allowing an additional 15% to 30% for unaccounted landed catch by private vessels gives a range of 65.4 t to 73.2 t and a central point estimate of 69.3 t.

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<sup>1</sup> Blue Water Marine Research, New Zealand.

## 1. INTRODUCTION

Southern bluefin tuna (SBT, *Thunnus maccoyii*) is a single stock, primarily distributed between 30° S and 45° S, with one confirmed spawning area in the Indian Ocean between Java and Western Australia (Farley & Davis 1998, Patterson et al. 2008). Initial growth is rapid, with juveniles reaching 50 cm at one year old. Southern bluefin tuna up to 5 years old undertake annual cyclical migrations in which they generally spend austral summers in the Great Australian Bight and move east as far as New Zealand or west into the Indian Ocean as far as South Africa during the winter (Bestley et al. 2010, Basson & Farley 2014). Fish older than five years disperse widely across the southern oceans from the western Atlantic across the Indian Ocean to the Tasman Sea. SBT can live to 30 years old, reaching maturity at 10 to 12 years of age and a maximum size of around 190 cm fork length and 140 kg by 20 years old (Gunn et al. 2008).

### 1.1 Description of the commercial fishery

Japanese surface longline vessels were attracted to New Zealand waters during the 1960s to catch southern bluefin tuna. During the 1970s and 1980s, some of the fleet, along with vessels from Korea, took up licences to fish part of the year in New Zealand waters. The New Zealand domestic surface longline fishery expanded rapidly during the 1990s, targeting swordfish (*Xiphias gladius*), bigeye tuna (*Thunnus obesus*), and southern bluefin tuna (Fisheries New Zealand 2023).

New Zealand is a founding member of the Commission for Conservation of Southern Bluefin Tuna (CCSBT), an intergovernmental organisation responsible for the conservation and management of SBT. Member countries receive an allocation from the global total allowable catch and must report all sources of SBT fishing mortality each year, including recreational catch.

The SBT catch limit for New Zealand was 420 tonnes (t) in the early 1990s. On introduction to the Quota Management System (QMS) in 2004, the Total Allowable Commercial Catch (TACC) was set at 413 t, with a recreational allowance of 4 t, a customary allowance at 1 t, and other sources of fishing-related mortality at 2 t. The Total Allowable Catch (TAC) in 2022–23 was 1 102 t, in line with allocation decisions by the CCSBT.

The 2023 CCSBT scientific committee meeting found that the stock status had improved (compared with the 2020 stock assessment) and that the results of the management procedure allowed an increase of 3000 tonnes in the 2024–2026 TAC. As a result of this, New Zealand's national allocation was increased by 186 t to 1288 t and a review of sustainability measures is expected to be concluded in 2024.

### 1.2 Description of the recreational fishery for southern bluefin tuna

There has been a recreational fishery off the South Island west coast, mainly from Fiordland over summer since the 1970s. The Fiordland Game Fishing Club was formed and was a member of the New Zealand Sport Fishing Council (NZSFC) until the late 1980s. Modest numbers of SBT were caught with most being less than 30 kg and caught on 10 kg line (Marquand 1978). The highest catch recorded by the club was 33 SBT in 1979. A recreational fishery for Pacific bluefin tuna (*Thunnus orientalis*) developed in 2005 off the west coast of the South Island with charter boats fishing from Greymouth and Hokitika. Occasionally southern bluefin tuna were caught in this fishery during August and September.

A North Island recreational SBT fishery rapidly emerged in June and July 2017 off Cape Runaway and eastern Bay of Plenty. Social media posts by commercial fishers, along with good catch rates and favourable weather, attracted hundreds of anglers to the eastern Bay of Plenty at short notice. Most fishing was from trailer boats launched at Waihau Bay. Fish were caught by trolling lures using the same tackle as the summer billfish fishery. Members of the Waihau Bay Sport Fishing Club operated a

weigh station adjacent to the boat ramp, weighing and recording most of the catch that year. In addition, some fish were taken back to home clubs and weighed there.

NZSFC clubs recorded 266 southern bluefin tuna kept and landed in 2017, mostly during late June and July. These North Island tuna were often over 60 kg, and the average weight was over 72 kg. The total landed weight of SBT recorded by clubs in 2017 was 19.4 tonnes. Over 90% of the North Island catch was landed at the Waihou Bay boat ramp that year.

Six charter vessels in the South Island fishery recorded a recreational landed catch in 2017 of 47 SBT with an estimated weight of 1.9 t. Therefore, the average weight of these fish was 40.6 kg. South Island sport fishing clubs recorded a further eight SBT in 2017. It is not known if these fish were taken from charter boats, but a number of private boats were active in this fishery when the weather was suitable.

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. The weight of these fish must be recorded on the Catch Landing Return and is included in the recreational catch estimate.

Fisheries New Zealand have contracted annual research projects since 2018 to estimate the national amateur harvest of SBT. The on-site boat ramp surveys at Waihou Bay covered the main access point for the east coast fishery. Sport fishing club weigh station records provided additional information on catch and the weight of individual fish. Charter boats are required to register and report fishing activity and weights for each SBT caught. Since 2020 a telephone survey has been conducted to improve estimates of recreational landed catch from private boats in the South Island.

Recreational and commercial fishers encountered a run of small SBT, about 12 kg off the west coast of the North Island (from Manukau to Cook Strait) from January to March 2022. They were caught from inshore boats fishing with baits and boats trolling for albacore (*Thunnus alalunga*). This is the first time that SBT have been seen and caught in numbers from this area and it was uncertain whether this would be 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. Some fishing clubs had prizes for the first SBT caught in the area in 2023 but none were recorded.

The national recreational harvest for 2021–22 was 905 SBT weighing 50.44 t. Allowing an additional 15% to 30% for unaccounted landed catch by private vessels gives a range of 56.7 t to 62.9 t and a central point estimate of 59.8 t. (Holdsworth 2023).

### 1.3 Objectives

This report summarises the results for the second year of the Fisheries New Zealand project STN2021-02 for the 2022–23 New Zealand fishing year (1 October 2022 to 30 September 2023), which has the following Objective:

1. To improve the estimates of the recreational catch and size composition of southern bluefin tuna (*Thunnus maccoyii*) in New Zealand fisheries waters.

The Specific Objectives are:

1. To update and undertake an on-site survey to estimate amateur harvest of southern bluefin tuna in the eastern Bay of Plenty.
2. To design and undertake a survey to estimate the amateur harvest of southern bluefin tuna off the west coast South Island.
3. To estimate the amateur southern bluefin tuna harvest for the 2023 southern bluefin tuna fishing season using the method developed in Specific Objectives 1 and 2, data from the amateur charter vessels, section 111 landings, sport fishing club records, and any other appropriate reporting methods.

4. To characterise the biological and temporal nature of the marine amateur harvest of southern bluefin tuna.
5. To collect otoliths from southern bluefin tuna caught by recreational fishing vessels fishing in the eastern Bay of Plenty.

## **2. DATA SOURCES AND METHODS**

### **2.1 North Island survey**

A primary component of this survey was to collect information from fishers who returned to the Waihou Bay boat ramp using on-site interviews. An adaptive survey approach uses trailer counts to target survey effort on days when the fishing effort was above a pre-determined level (Moore et al. 2015). This method has been used in a series of Fisheries New Zealand projects since 2018, with support from the Waihou Bay community and the Waihou Bay Sport Fishing Club. A large component of the annual recreational SBT harvest is still caught from trailer boats fishing off Cape Runaway when the SBT are within range from June to August. The remote location, weather conditions, and fishing success influences fisher interest and peak fishing periods.

The Waihou Bay on-site survey design was based around the following elements:

1. A survey period from 3 June to 27 August 2023 when SBT were most likely to be in the area;
2. Daily trailer counts at Waihou Bay at 11:00 am to estimate daily fishing effort for 86 days;
3. An adaptive survey approach with a decision rule that a survey is initiated if 10 or more boat trailers (for boats over 5 m long) are counted at 11:00 am. The threshold was raised to 15 boat trailers from 30 July 2023 due to increased fishing effort;
4. The interviewer intercepts crews as they return, to provide high coverage of boats returning on survey days;
5. Vessel and angler details are collected to match with club records of weighed fish to avoid double counting;
6. Records of the number of fishers per boat, fishing method, hours fished, individual catch, retained or released, and length measurements are collected for landed SBT;
7. Collection of heads, where possible, and extraction of otoliths;

Data were collected on hard copy forms developed in 2018 (Holdsworth 2019). The boat ramp was busy at times, and most of the interviews were initiated while the boat was being loaded onto the trailer. Where possible, SBT were measured (fork length); accurate weights were available from the club weigh station located next to the boat ramp. Fish that were gilled and gutted when weighed were not included in average weight calculations. Estimated weights were recorded for fish landed but not weighed and those reported as released. Since 2020, interview sessions have been extended to include boats that returned in the morning and early afternoon because a number of fishers were returning to the ramp as soon as one SBT was caught. Boat ramp interview sessions ended before dark, in line with the health and safety policy.

The Waihou Bay Sport Fishing Club provided collection bins for fish heads. Fish were measured, and a numbered cattle ear tag was attached to the head. Generally, the fish were processed on the boat, and the head with a label attached was left in the bin. Heads were collected and taken to a private property for otolith removal.



## 2.2 Expanded survey catch at Waihou Bay

The observed total catch includes the number of SBT intercepted by the on-site survey plus the number of non-survey SBT weighed by the Waihou Bay Sport Fishing Club. On busy days some boats are hauled out after dark. Interviewers do not work on the boat ramps after dark, though the club can weigh fish on request into the evening. Some boats with fish may have returned after the weigh station had closed. The catch observed during the survey will therefore be an incomplete record of all Waihou Bay landed catch.

Trailer counts at 11:00 every day during the survey period provided an estimate of total fishing trips. The creel survey collected information on the number of boats intercepted and the number of SBT landed on days when there were ten or more trailers for boats capable of fishing offshore. As the season progressed the threshold for initiating a survey day was increased due to increased fishing effort. Boat trip was used as the unit of fishing effort because it could be applied to interview data and trailer counts. The availability of SBT within the range of recreational vessels can vary daily. For survey days, the mean landed catch per trip from survey interviews was multiplied by the trailer count for that day. For non-survey days with trailers, the overall survey catch-per-unit-effort (CPUE, ratio of means) was multiplied by the trailer count for that day.

The variance associated with the landed catch was estimated by resampling catch per boat trip with replacement on each survey day for all vessels based on the trailer count for that day. For days not surveyed, CPUE from all survey days was resampled with replacement for the number of trailers counted for all non-survey days.

The variance associated with total landed catch was estimated by adding the bootstrap estimates from survey days and non-survey days to give 1000 estimates of total landed catch at Waihou Bay, which was used to generate an overall CV and 95% confidence intervals.

## 2.3 Sport fishing club records

New Zealand Sport Fishing Council clubs from the Bay of Plenty, Gisborne, Hawke's Bay, Auckland, and Northland provided detailed catch records from weigh stations with certified scales. Clubs weigh and record fish caught by affiliated club members and generally for non-members on request. Club records include the date, species, boat and angler names, fish weight, and usually the location of capture. If the fish is being weighed on behalf of another club, this is identified as a 'courtesy weigh'. Sport fishing clubs traditionally target yellowfin tuna (*Thunnus albacares*) and billfish over the summer months (December to May) and use an austral fishing year from 1 July to 30 June. The recreational SBT fishery cuts across the end of this fishing year and the start of the next. However, information in this report is effectively the same as for the 2023 calendar year. Typically, no recreational SBT catch is reported between 1 October and 31 December each year.

All available club catch records are compiled into a spreadsheet and sorted by date, vessel, weight, and angler so that fish that have been entered by two clubs—the club that weighs the fish and the club that the angler belongs to—are not double counted. Landed fish recorded in the ramp survey are also matched with club records using date, vessel, and angler to ensure that these fish are not double counted.

## 2.4 South Island survey

Prior to 2020, recreational harvest estimates for SBT for the South Island comprised data from the amateur fishing charter vessel reporting system, reports on commercial fishing catch and effort returns of SBT catch by recreational methods for personal use under section 111 of the Fisheries Act 1996, and anecdotal reports from well-connected people on the catch by private fishers. In 2019–20, a survey was initiated to estimate the amateur harvest of southern bluefin tuna off the west coast of the South Island. The focus of the design was to estimate the number and weight of SBT caught by amateur fishers on private boats. The primary platform in this fishery is trailer boats launched from a limited number of access points in Fiordland and Jackson Bay.

One advantage of a relatively small group of committed SBT fishers is that they tend to know who else has been fishing and share information amongst themselves. Some survey techniques use Respondent Driven Sampling (i.e., ‘Snowballing’) to recruit hard-to-reach components of populations. A register of South Island boat owners who target SBT was generated from sport fishing clubs and known contacts. Studies in Australia and New Zealand have investigated the potential of this approach and found problems with its ability to determine the harvest of particular species (Heinemann & Gray 2010, Griffiths 2012). Most of these relate to potential biases from the individuals used in the initial sample and the non-random selection of survey respondents from their network of contacts.

In the South Island SBT fishery, we have assumed that there are a finite number of boats actively engaged in the fishery and we have recruited most of them to respond to a monthly SMS and phone survey during the fishing season, similar to the national panel survey (e.g., Wynne-Jones et al. 2014). This provides data to characterise the fishery and estimate unscaled catch and effort for the core fleet. Southern bluefin tuna are suitable for this approach because the species is easily identified, catches are memorable, and management restrictions are not likely to cause anglers to under-report catch (Pollock et al. 1994). The bycatch of SBT by fishers targeting inshore species is likely to be small.

## **2.5 Amateur fishing charter boat records**

An extract of the amateur fishing charter vessel (AFCV) records from events where southern bluefin and Pacific bluefin tuna were targeted or caught was obtained from Fisheries New Zealand (replot 15349). A review of the AFCV database was undertaken in 2019 that identified a range of potential errors to look for (Hartill et al. 2020). The extract received was checked for missing or out-of-range entries.

The AFCV records were matched with fishing club records, and duplicate entries were removed from the club records used in the harvest estimates. Catch by trailered charter boats fishing out of Waihou Bay during the survey period were removed from the charter records to avoid double counting catch when calculating national harvest estimates. This is because trailer counts on non-survey days, and boats that return after dark, will include charter boat trailers. Individual SBT estimated weights were recorded for 98% of landed catch records. These were used to calculate the average weight and standard deviation of retained SBT.

## **2.6 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. The weight of these fish must be recorded on the Catch Landing Return with destination code ‘F’. Fisheries New Zealand provided the number of records and sum of estimated weights for section 111 landings.

## **2.7 Allowance for unaccounted catch**

Fishers can process SBT onboard and these fish are not included in club records. The coverage of South Island fishers in the telephone survey is still incomplete. In 2018, a factor of 15% to 30% was added to the national SBT catch recorded by recreational fishers as an estimate of unaccounted catch.

For the 2022–23 project, the Highly Migratory Species Working Group recommended adding 15% to 30% to landed catch by private fishers to cover the likely range of unaccounted catch. The midpoint of this range was used as the point estimate. In 2022–23, for the amateur fishing charter vessel retained catch, it was assumed that reporting was reasonably complete, and no adjustment for the unaccounted charter catch was made.

## 2.8 Biological data

Sport fishing club weigh stations maintain catch records, including weights from certified scales, date, and location data. Fishers are asked during the survey interview or at the weigh station whether they would donate the head of their tuna for otolith extraction and ageing. The length distributions of SBT sampled for otoliths were summarised.

## 3. RESULTS

### 3.1 Landed catch from the 2023 Waihou Bay survey

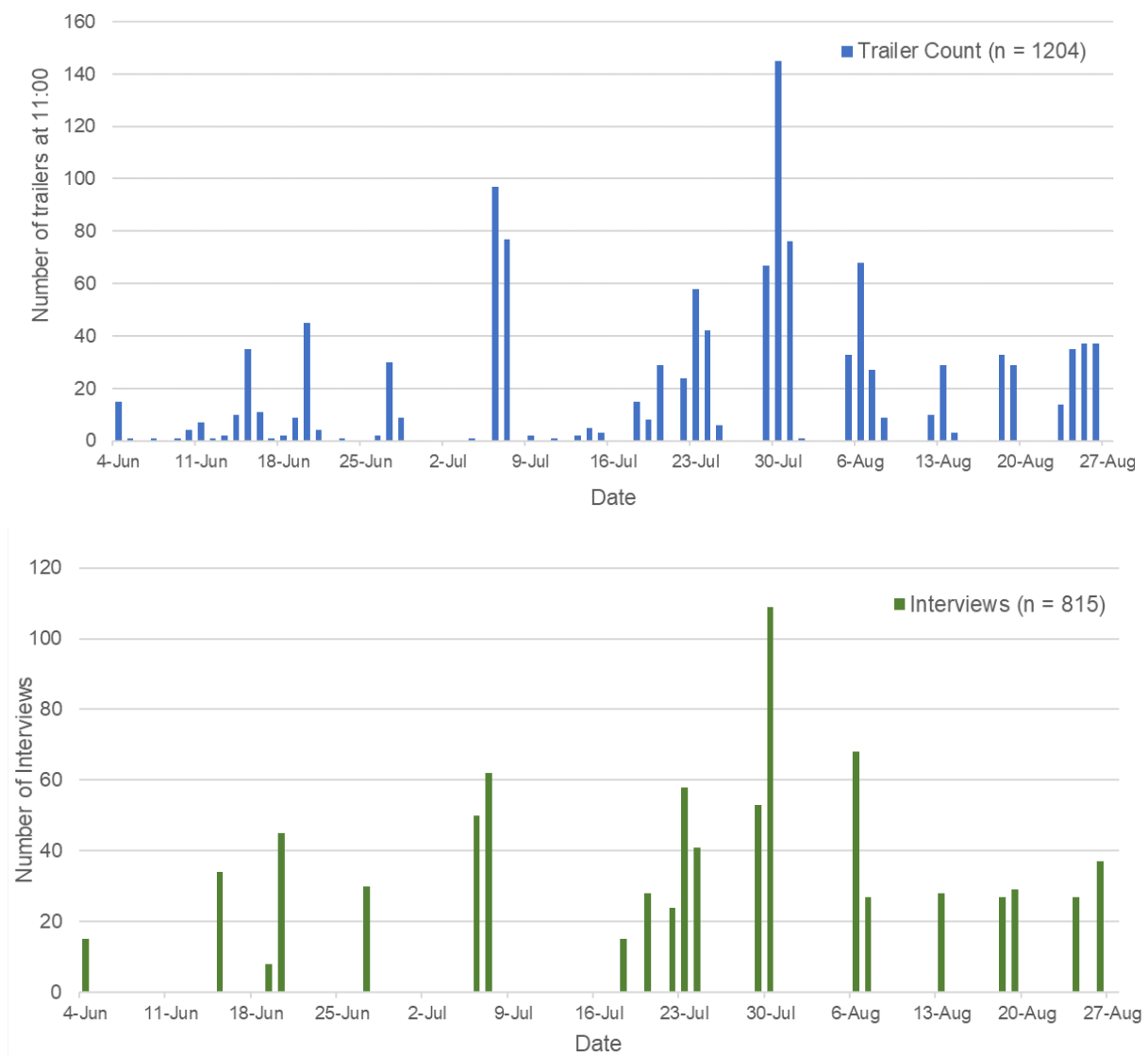
Blue Water Marine Research discussed and coordinated the lead-up to the on-site survey with Waihou Bay Sport Fishing Club members. Trailer counts started on Saturday, 3 June 2023. Fishing effort was relatively low until mid-June and was limited throughout the month due to short weather windows (Figure 1). Previous surveys have recorded peaks in fishing effort and catch in June or July with catch and effort ending in early August. In 2023 the peak in effort and catch occurred at the end of July to early August and fishing continued for the rest of that month (Figure 1). The survey was extended by 2 weeks to estimate catch for the whole period.

A survey total of 1204 boat trailers were counted over 86 days (Table 1). There were 21 survey days with 815 boat crews intercepted and interviewed on the boat ramp (Table A1 in Appendix 1). The proportion of crews interviewed vs. the trailer counts on survey days was 87%. Overall, 68% of the total trailer count from all days in the survey period were interviewed. Fishing crews were cooperative during the survey, even when they were tired and the ramp was busy. No interview refusals were recorded, but it is possible that some fishers may underreport their catch.

A total of 653 landed SBT were reported to the interviewer at the ramp. Of these, 437 SBT (67%) were processed at sea or not weighed at Waihou Bay. The average weight of landed SBT (46.9 kg) was substantially lower than in previous surveys (Table 1). A further 33 SBT were in the Waihou Bay Sport Fishing Club weigh station records because they were caught on days without surveys or landed after dark on survey days.

The number of SBT caught per day was highest on fishable days during the last week of July and the first week of August, with four days during this period when more than 50 SBT were landed at Waihou Bay (Figure 2).

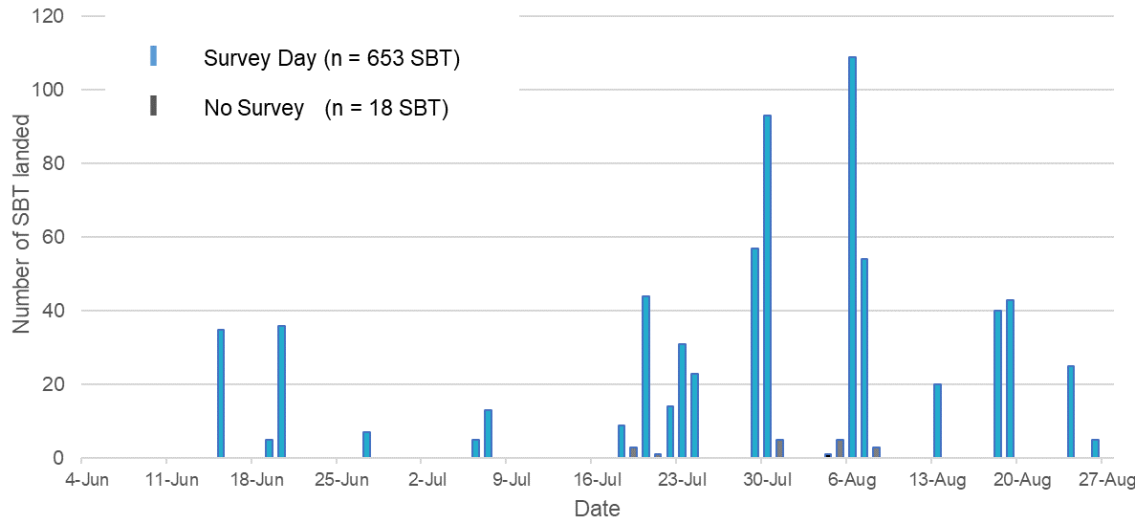
An average of 0.80 SBT was caught and landed per boat day in the 2023 survey (Figure 3). The highest catch rate in 2023 was 2.0 SBT per trip on 7 August, which exceeded the highest catch rate from previous surveys of 1.33 SBT per trip on 30 July 2020.



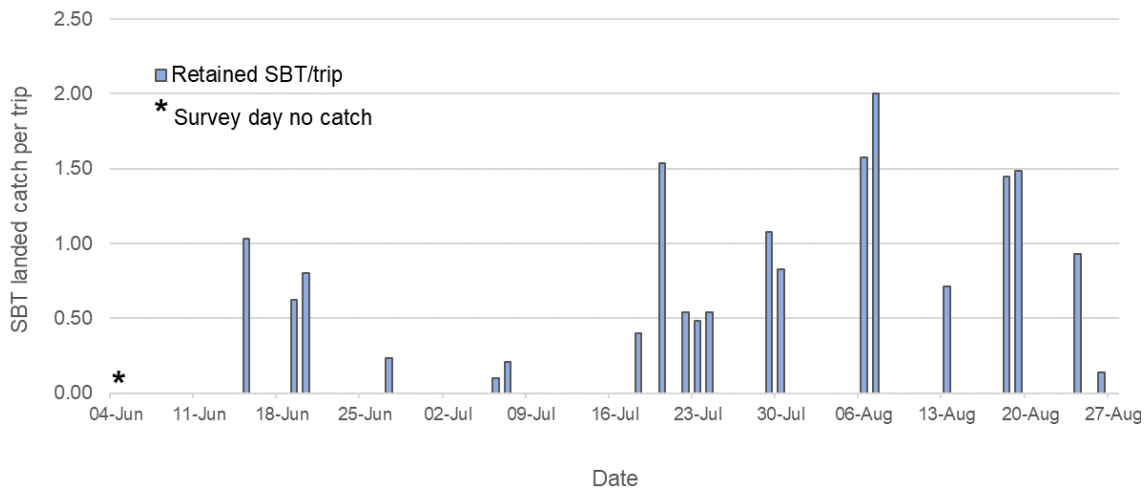
**Figure 1: Waihou Bay trailer counts in 2023 by day (top) and number of landed SBT captured in survey interviews plus club weigh station observations on survey days and non-survey days at Waihou Bay (bottom).**

**Table 1: Waihou Bay creel survey trailer counts, number of interviews, the number and average weight of SBT landed, and the number of otoliths collected, by year.**

Year	Trailer count	Survey interviews	Landed SBT survey	Mean weight from interviews (kg)	Otolith samples collected
2018	678	336	34	78.3	32
2019	852	537	118	72.3	80
2020	891	715	267	71.2	90
2021	1037	699	305	76.1	45
2022	896	595	313	70.2	91
2023	1204	815	653	46.9	49

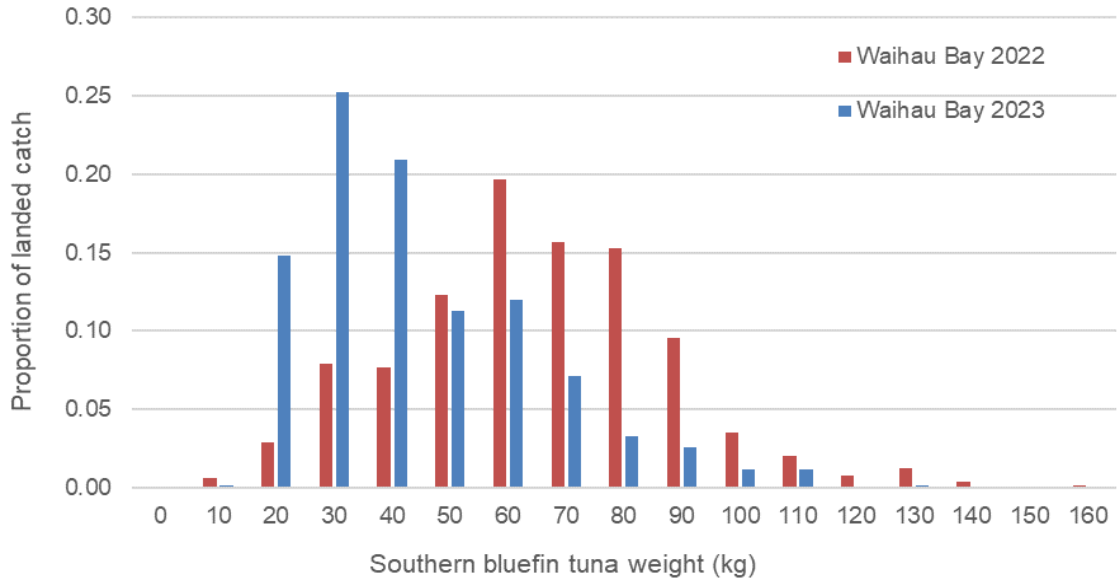


**Figure 2: The daily number of landed SBT from survey interviews plus club weigh station observations on survey days and non-survey days at Waihou Bay in 2023.**

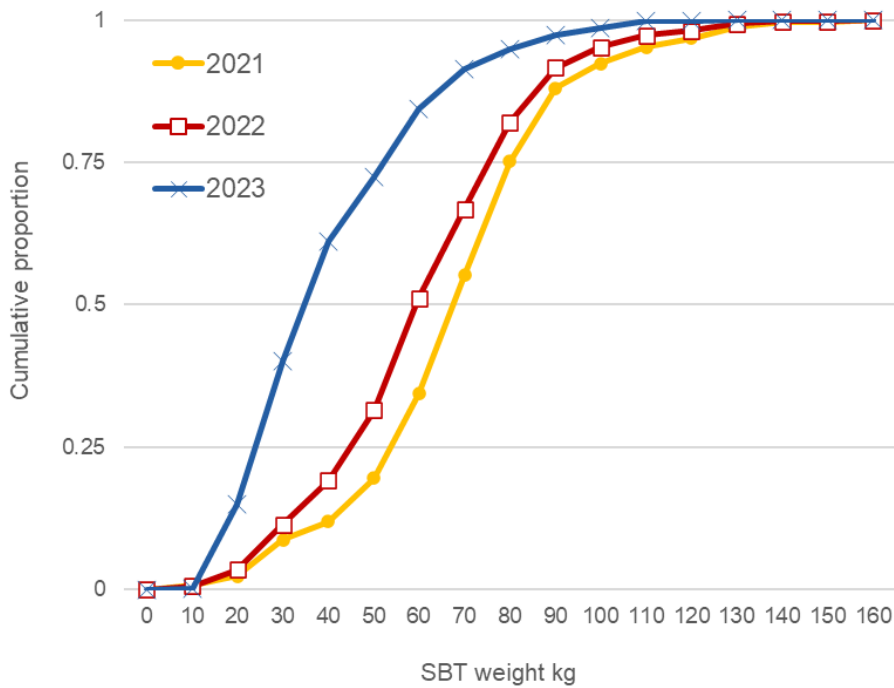


**Figure 3: The daily catch rate of landed SBT per trip from the Waihou Bay on-site survey in 2023.**

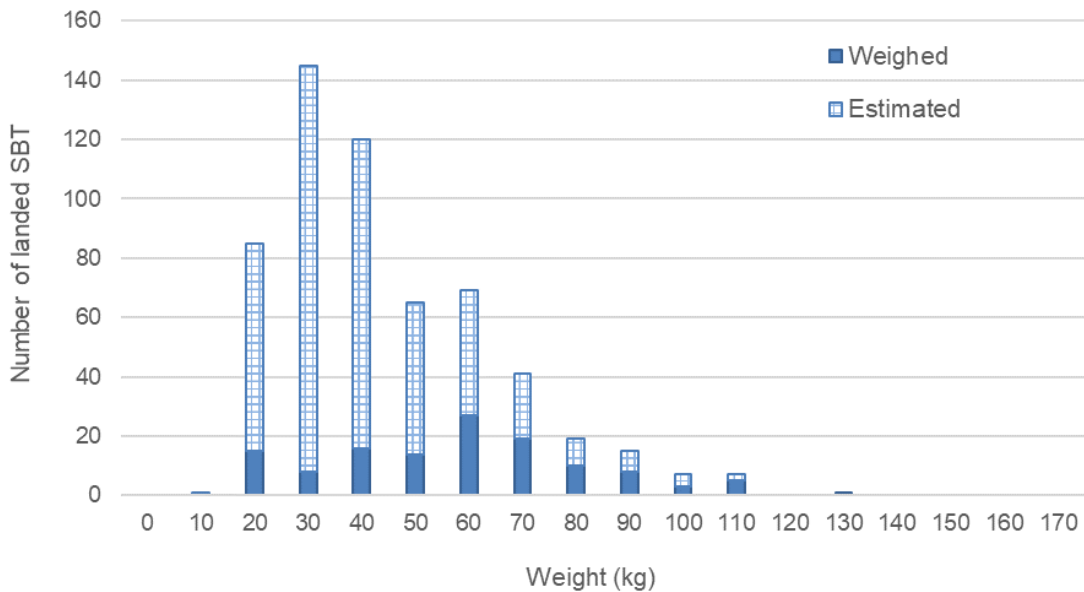
Compared with previous surveys, the season was later, there were more good fishing days, higher catch rates, and more SBT landed (Table 1) (Holdsworth 2023). In 2023 there was a much higher proportion of SBT less than 50 kg than in 2022 in the North Island fishery, including fish landed at Waihou Bay (Figure 4). The cumulative weight distribution in 2023 is very different to preceding seasons which had a high proportion of landed catch 60 kg or heavier and average weights over 70 kg (Figure 5). A high proportion of SBT landed (78%) were not weighed by the club but estimated weights, particularly for smaller SBT, were provided by interviewed fishers (Figure 6).



**Figure 4:** The weight distribution of landed SBT in 2022 and 2023 from Waihou Bay survey interviews.

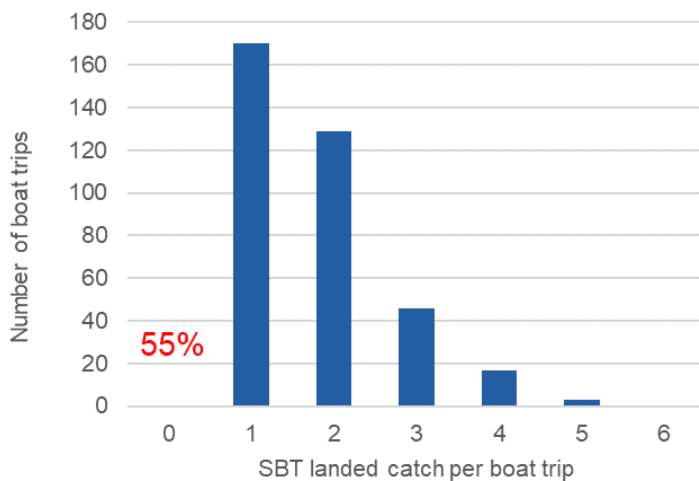


**Figure 5:** The cumulative proportion of landed SBT weight from Waihou Bay survey interviews by year.



**Figure 6: The number of landed SBT by weight estimated and weighed from Waihou Bay survey interviews in 2023.**

The on-site survey collected information on the number of SBT landed per trip and the number of unsuccessful trips. In 2023, 55% of crews interviewed at Waihou Bay landed no SBT, and, of those that caught fish, 47% landed one fish per trip, 35% landed two fish, 13% landed three fish, and 5% landed four fish per trip (Figure 7). In addition, 118 SBT were released or tagged and released. These catch rates are significantly higher than recorded in previous surveys. There were 494 individual boat names recorded from the Waihou Bay survey interviews.



**Figure 7: The number of SBT landed per private boat trip (day) in 2023 from on-site survey data and the proportion of trips with zero catch (red).**

The total number of SBT landed at Waihou Bay was estimated using survey CPUE and trailer counts to expand the survey data. This assumes that all fishers accurately reported their landed catch when interviewed and that boats that returned after dark or on non-survey days had the same average CPUE as surveyed boats. The expanded survey estimate of the landed catch from Waihou Bay in 2023 is 940 SBT (CV 0.031) (Table 2). The average weight of SBT weighed and estimated was 46.9 kg (s.d. 20.87).

**Table 2: Waihou Bay survey expanded number of SBT landed and mean weight by year.**

Year	Waihou Bay expanded number of landed SBT	CV	Mean weight	SD
2018	69	0.106	78.3	19.13
2019	192	0.075	72.3	20.49
2020	304	0.015	71.2	23.26
2021	445	0.023	76.1	24.19
2022	486	0.045	70.2	21.17
2023	940	0.031	46.9	20.87

### 3.2 Sport fishing club records

A total of 35 SBT were recorded landed by sport fishing clubs other than those in the Waihou Bay survey and online catch reports on the Fishtag & Catch NZ website in 2022–23. Most of these fish were caught in June off Hawkes Bay and Gisborne or in July and August in the Bay of Plenty. The average weight for these fish was 49.59 kg (s.d. 23.79). Compared with previous survey years, there was a higher proportion of small SBT and fewer large SBT weighed by these clubs in 2023. Where there is an overlap between club records and charter vessel records, the number of fish is counted for charter vessels only.

### 3.3 Survey of South Island fishers

There is limited information about the South Island fishery, which has operated out of Fiordland since the 1970s. The Fiordland Sport Fishing Club recorded 18 to 36 SBT per year in the late 1970s. Most of these SBT were small and caught during the NZSFC Nationals tournament in February. The club disbanded around 1990. Reports from members of other South Island fishing clubs in 2019 indicate that a few dedicated fishers target SBT out of the fiords and occasionally Jackson Bay.

A survey of boat owners in the South Island SBT fishery was initiated in 2020. Some good contacts were made, but fishing was hampered by a road closure to Milford Sound after a February storm. On 23 March 2020, the New Zealand Government introduced level 3 Covid-19 restrictions, followed by level 4 (stay-at-home) restrictions on 25 March. Recreational fishers were not allowed on the water until 12 May 2020 in level 2. In April 2021, Blue Water Marine Research created a catch-reporting web page [www.fishcatch.co.nz](http://www.fishcatch.co.nz) for fishers to self-report SBT and other gamefish catch.

The off-site telephone survey database expanded from 17 boat owners in 2020 to 66 owners in 2023 using a variety of sources, including referrals from fishers. Fishing conditions were good off the west coast of the South Island in 2023 with relatively calm weather and warmer water temperatures. The SBT fishery started in December, earlier than usual, and finished in August with some large fish caught off Hokitika. There were 158 SBT reported landed, with a weight range of 14 to 170 kg and an average of 39.8 kg.

### 3.4 Amateur fishing charter boat records

An extract of amateur fishing charter vessel records from events where southern bluefin tuna or Pacific bluefin tuna were targeted or caught was provided by Fisheries New Zealand. Charter fishing effort and retained SBT catch increased in the North Island and decreased in the South Island in 2023. Based on the recorded estimated weights, the combined SBT harvest by charter vessels in 2022–23 was 4.4 t (Table 3).

The South Island charter vessels reported retaining 49 SBT in 2023, which is significantly less than in 2022, and the average weight of retained SBT was 21.15kg (s.d. 15.25). Most SBT were caught from 22 February to mid-April, though some catch was reported up to 23 July.

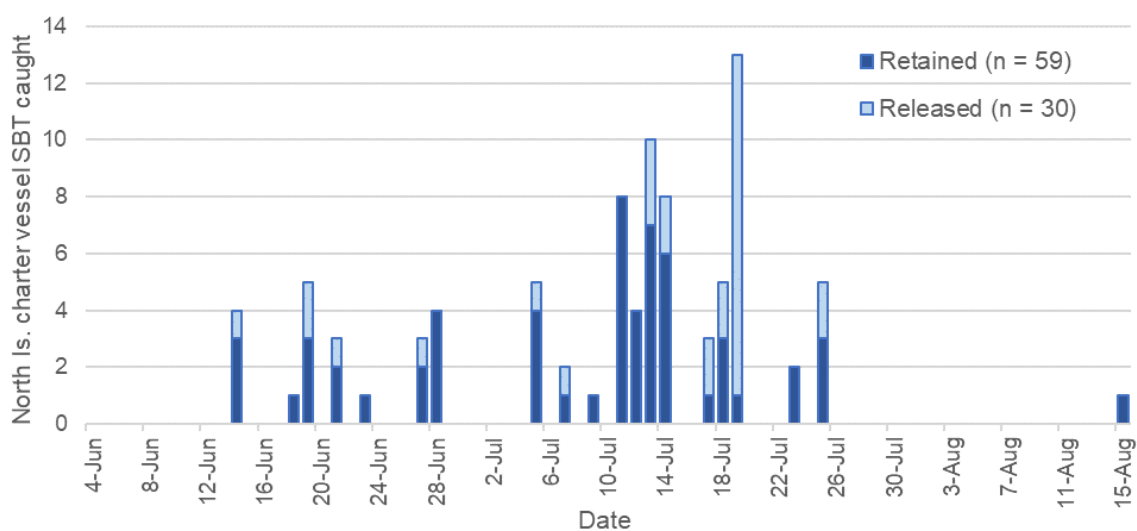


The charter fishing effort off the North Island is mainly off Cape Runaway in the eastern Bay of Plenty. In 2023, fishing started in mid-June with highest daily catches in mid-July (Figure 8). In total, 59 SBT were caught off the North Island, with a broad distribution of weights from 10 to 130 kg (Figure 9). The average weight was 56.22 kg (s.d. 27.16), and 30 SBT were released (34% of catch).

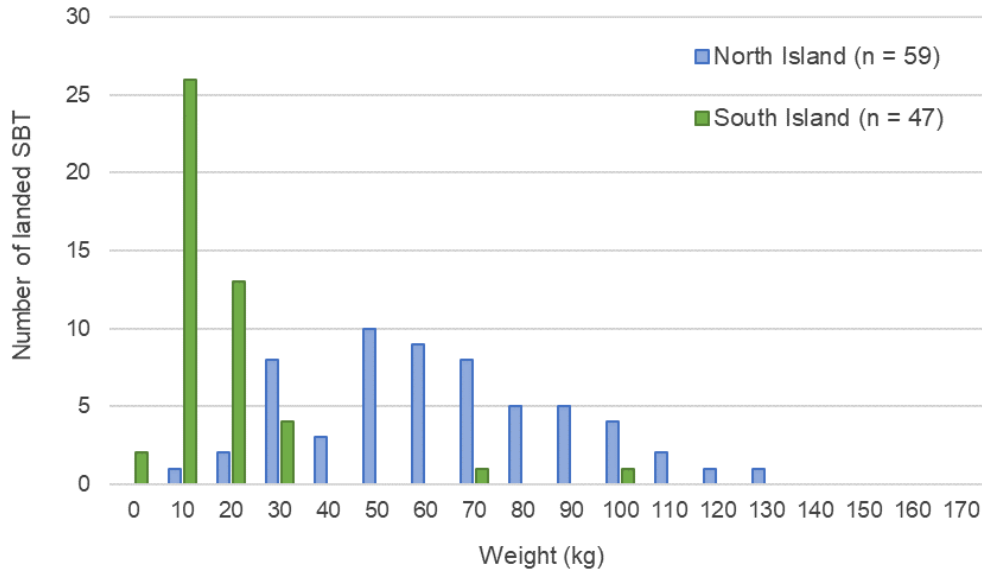
The average duration of North Island charter fishing events targeting SBT in 2023 was 6.1 hours (s.d. 2.49). The retained catch for successful days was mostly 1 to 3 SBT (92%), with just two days with four or more fish retained. The average duration of South Island charter events was 1.3 hours (s.d. 0.92).

**Table 3: Southern bluefin tuna effort and catch from amateur fishing charter vessel logbooks by year including trailer boats fishing from Waihou Bay.**

	Days with SBT target	Number of SBT caught	Number of SBT 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	–	–
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
2022–23	70	146	108	4 361



**Figure 8: The number of SBT retained or released from charter vessels by day in the North Island in 2023.**



**Figure 9: The number of retained SBT with weights by amateur fishing charter vessels from the North Island and the South Island in 2023.**

### 3.5 Section 111 landings

Southern bluefin tuna caught by commercial fishers and retained as recreational catch under section 111 of the Fisheries Act are recorded on Catch Effort Landing Returns. In the 2022–23 October fishing year, the reported section 111 landings weighed 1.10 t (Table 4).

**Table 4: Recreational catch retained by fishers on commercial vessels under a section 111 approval.**

Fishing year	Greenweight kg	Fishing year	Greenweight kg
2014–15	672	2019–20	671
2015–16	661	2020–21	879
2016–17	1 038	2021–22	2 709
2017–18	507	2022–23	1 099
2018–19	454		

### 3.6 Recreational harvest estimate for southern bluefin tuna in 2022–23

The total landed catch from the on-site survey at Waihou Bay, the sum of actual weights recorded by other North Island clubs, the number and average estimated weight from charter vessel logbooks, the sum of the weights from the South Island survey, plus the non-commercial catch on commercial vessels sum to a national estimate of recreational SBT catch in 2022–23 of 57.55 t (Table 5).

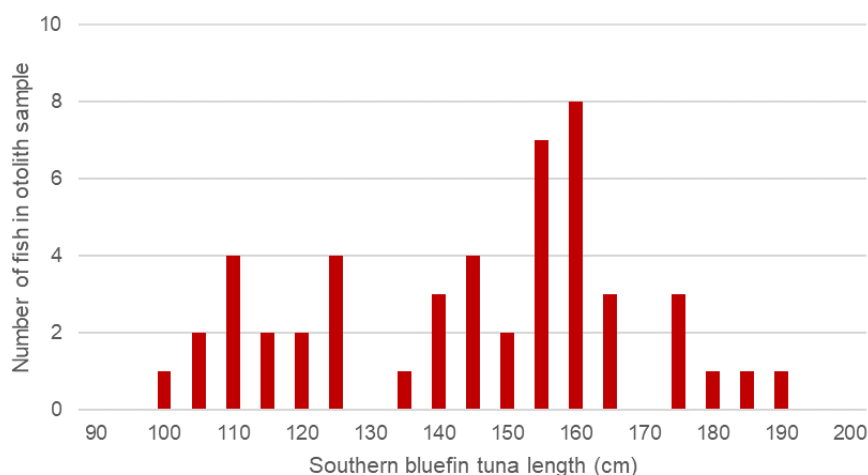
In addition, an allowance is made for unaccounted landed catch, which is mostly fish not landed at Waihou Bay and not weighed at a club on return to port. In the past, an estimate of 15% to 30% for unaccounted landed catch has been made; this gives a range of 65.4 t to 73.2 t of SBT and a point estimate recreational SBT harvest in 2022–23 of 69.3 t (Table 5).

**Table 5: Recreational harvest estimates for 2022–23 from available sources with an allowance for estimated unaccounted catch of 22.5% and range of 15% to 30%.**

Source	Harvest number	Mean wt (kg)	Harvest wt (t)
<b>North Island</b>			
Waihau Bay Survey	940 (CV 0.031)	46.883	44.07
Other club catch	35	49.590	1.74
Charter vessel	59	56.220	3.32
<b>South Island</b>			
Phone survey	158	39.791	6.29
Charter vessel	49	21.149	1.04
<b>National</b>			
section 111	?		1.10
<b>Total</b>	<b>1 241</b>		<b>57.55</b>
Plus unaccounted catch			
Low estimate 15%	1 411		65.4
High estimate 30%	1 581		73.2
<b>Point estimate</b>	<b>1 496</b>		<b>69.3</b>

### 3.7 Otoliths collected

A total of 49 usable otolith pairs were extracted from southern bluefin tuna intercepted during the creel survey at Waihau Bay in 2023. The weight of these fish ranged from 21.4 to 118 kg. The fork length of these fish ranged from 100 to 191 cm, with a mode of 160 cm (Figure 10). Measurements were made with the fish on top of a measuring mat or at the club weigh station.



**Figure 10: Length distribution of southern bluefin tuna caught in the recreational fishery from Waihau Bay which had otoliths removed in 2023.**

## 4. DISCUSSION

This is the sixth dedicated project to estimate the New Zealand recreational harvest of southern bluefin tuna. From the 1970s until 2016, the recreational catch was almost all from the South Island's west coast, and total landings were assumed to be relatively small. Charter vessels taking recreational fishers on fishing trips have been required to report the number and individual weights of retained SBT caught since 2010. However, prior to 2015–16, the annual charter boat reported catch was fewer than 15 fish per year.

The North Island recreational fishery developed rapidly in 2017 after reports of high catch rates of large SBT within the range of recreational fishers off Cape Runaway. The landed catch of SBT has increased each year of the survey. The weather in June 2023 was generally not suitable for offshore fishing by trailer boats from Waihou Bay. The number of fishing days and SBT caught increased from mid-July, peaking at the end of July and first weekend of August, and fishing continued through to the end of August for the first time. The survey was extended by two weeks to cover this period, and 21 survey days were completed.

This year's Waihou Bay survey recorded the most fishing effort, highest number of interviews, and highest SBT catch across the surveys. There were more small SBT caught, resulting in the lowest average weight of 46.9 kg compared with the average of all previous surveys (2018–2022) of 73.6 kg. The average catch rate of 0.8 SBT landed per boat day was higher in 2023 but the average landed catch weight per boat day (37.6 kg) was the same as in 2022.

Sport fishers were catching a few SBT off Hawkes Bay and Gisborne in May and June 2023. Fishers in the western Bay of Plenty occasionally found SBT but their catch was lower than in recent years. The unexpected run of small SBT found off the west coast of the North Island (from Manukau to Cook Strait) in 2022 was not seen in 2023.

The summer of 2023 in the South Island had relatively warm water and calm weather and there were a lot of fishers targeting bluefin tuna off Fiordland and Jackson Bay. Later in the season there were some large SBT caught by recreational fishers near the Hokitika Trench. The South Island SBT recreational fishery usually runs from January to May, consisting of mainly small fish, and is much more diffuse than the North Island SBT fishery. Previous on-site surveys of recreational catch from the southern South Island have struggled to collect sufficient data for harvest estimates, even for inshore species (Davey & Hartill 2011a, 2011b). The off-site telephone survey continues to have a good response from participants and is worth continuing and expanding. In April 2021 a catch reporting web page was added to the gamefish tagging site [www.fishcatch.co.nz](http://www.fishcatch.co.nz). The availability of this option for reporting landed or released SBT was included in a number of posts online, but uptake has been modest.

The Commission for the Conservation of Southern Bluefin Tuna (CCSBT) funds the stock assessments for SBT and sets management targets, an international TAC, and annual country allocations for much of the international catch. In 2023, the CCSBT increased the international TAC for 2024 based on the results of their management procedure. Overall, SBT abundance is predicted to increase to 30% of Total Reproductive Output by 2035 (Anon 2023). The increasing availability of SBT to recreational fishers is likely to continue. Some targeted fishing effort is occurring off the east coast of the South Island and western Bay of Plenty as SBT migrate through these areas. Fishing club records, charter vessel reporting, and social media activity will help identify areas where future survey effort may be required.

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## 7. APPENDIX 1

**Table A1: Waihou Bay creel survey trailer counts, number of interviews, and SBT landed by day. Total landed SBT including Waihou Bay Sport Fishing Club weigh station records by fishers using Waihou Bay boat ramp. Survey days in bold.**

Date	Trailer count	Survey interviews	Landed SBT survey	Landed SBT survey and club	Date	Trailer count	Survey interviews	Landed SBT survey	Landed SBT survey and club
3/06/2023	0	0	0	0	17/07/2023	0	0	0	0
<b>4/06/2023</b>	<b>12</b>	<b>15</b>	<b>0</b>	<b>0</b>	<b>18/07/2023</b>	<b>14</b>	<b>15</b>	<b>6</b>	<b>12</b>
5/06/2023	1	0	0	0	19/07/2023	8	0	0	6
6/06/2023	0	0	0	0	<b>20/07/2023</b>	<b>29</b>	<b>28</b>	<b>43</b>	<b>45</b>
7/06/2023	1	0	0	0	21/07/2023	0	0	0	2
8/06/2023	0	0	0	0	<b>22/07/2023</b>	<b>21</b>	<b>24</b>	<b>13</b>	<b>15</b>
9/06/2023	1	0	0	0	<b>23/07/2023</b>	<b>57</b>	<b>58</b>	<b>28</b>	<b>34</b>
10/06/2023	4	0	0	0	<b>24/07/2023</b>	<b>42</b>	<b>41</b>	<b>22</b>	<b>24</b>
11/06/2023	7	0	0	0	25/07/2023	6	0	0	0
12/06/2023	1	0	0	0	26/07/2023	0	0	0	0
13/06/2023	2	0	0	0	27/07/2023	0	0	0	0
14/06/2023	10	0	0	0	28/07/2023	0	0	0	0
<b>15/06/2023</b>	<b>35</b>	<b>34</b>	<b>35</b>	<b>35</b>	<b>29/07/2023</b>	<b>67</b>	<b>53</b>	<b>57</b>	<b>57</b>
16/06/2023	11	0	0	0	<b>30/07/2023</b>	<b>145</b>	<b>109</b>	<b>90</b>	<b>96</b>
17/06/2023	1	0	0	0	31/07/2023	76	0	0	10
18/06/2023	2	0	0	0	1/08/2023	1	0	0	0
<b>19/06/2023</b>	<b>9</b>	<b>8</b>	<b>5</b>	<b>5</b>	2/08/2023	0	0	0	0
<b>20/06/2023</b>	<b>45</b>	<b>45</b>	<b>36</b>	<b>36</b>	3/08/2023	0	0	0	0
21/06/2023	4	0	0	0	4/08/2023		0	0	2
22/06/2023	0	0	0	0	5/08/2023	33	0	0	10
23/06/2023	1	0	0	0	<b>6/08/2023</b>	<b>68</b>	<b>68</b>	<b>107</b>	<b>111</b>
24/06/2023	0	0	0	0	<b>7/08/2023</b>	<b>27</b>	<b>27</b>	<b>54</b>	<b>54</b>
25/06/2023	0	0	0	0	8/08/2023	9	0	0	6
26/06/2023	2	0	0	0	9/08/2023	0	0	0	0
<b>27/06/2023</b>	<b>30</b>	<b>30</b>	<b>7</b>	<b>7</b>	10/08/2023	0	0	0	0
28/06/2023	9	0	0	0	11/08/2023	0	0	0	0
29/06/2023	0	0	0	0	12/08/2023	10	0	0	0
30/06/2023	0	0	0	0	<b>13/08/2023</b>	<b>29</b>	<b>28</b>	<b>20</b>	<b>20</b>
1/07/2023	0	0	0	0	14/08/2023	3	0	0	0
2/07/2023	0	0	0	0	15/08/2023	0	0	0	0
3/07/2023	0	0	0	0	16/08/2023	0	0	0	0
4/07/2023	1	0	0	0	17/08/2023	0	0	0	0
5/07/2023	0	0	0	0	<b>18/08/2023</b>	<b>33</b>	<b>27</b>	<b>39</b>	<b>41</b>
<b>6/07/2023</b>	<b>97</b>	<b>50</b>	<b>5</b>	<b>5</b>	<b>19/08/2023</b>	<b>28</b>	<b>29</b>	<b>43</b>	<b>43</b>
<b>7/07/2023</b>	<b>77</b>	<b>62</b>	<b>13</b>	<b>13</b>	20/08/2023	0	0	0	0
8/07/2023	0	0	0	0	21/08/2023	0	0	0	0
9/07/2023	2	0	0	0	22/08/2023	0	0	0	0
10/07/2023	0	0	0	0	23/08/2023	14	0	0	0
11/07/2023	1	0	0	0	<b>24/08/2023</b>	<b>35</b>	<b>27</b>	<b>25</b>	<b>25</b>
12/07/2023	0	0	0	0	25/08/2023	37	0	0	0
13/07/2023	2	0	0	0	<b>26/08/2023</b>	<b>36</b>	<b>37</b>	<b>5</b>	<b>5</b>
14/07/2023	5	0	0	0	27/08/2023	0	0	0	0
15/07/2023	3	0	0	0					
16/07/2023	0	0	0	0	Total	1204	815	653	719