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Tini a Tangaroa

Recreational harvest of southern bluefin tuna in New Zealand, 2021–22

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EXECUTIVE SUMMARY

Holdsworth, J.C.¹ (2023). Recreational harvest of southern bluefin tuna in New Zealand, 2021–22.

New Zealand Fisheries Assessment Report 2023/06. 18 p.

This report describes the New Zealand recreational catch of southern bluefin tuna in the 2021–22 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 and July.

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 2022 the fifth annual on-site (creel) access point survey collected detailed catch and effort information from returning fishers. The Waihou Bay Sport Fishing Club weigh station provided accurate weights of individual fish and assisted with collecting SBT heads for otolith extraction. Catch records were obtained from 15 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 2022 the survey intercepted 595 boat crews who landed 313 SBT. The total survey estimate of landed catch using average catch from surveyed boats and total trailer counts at Waihou Bay was 486 SBT (with a CV of 0.045). A further 86 SBT were recorded by other North Island sport fishing clubs with an average weight of 65.4 kg (s.d. 28.49). There were 367 individual boat names recorded from the Waihou Bay survey interviews, 64 fewer than in 2021.

In 2022 there were 34 SBT retained by Amateur Fishing Charter Vessels (AFCV) in the North Island, excluding trailer boat charters using the Waihou Bay boat ramp, with an estimated average weight of 66.63 kg (s.d. 23.53). The AFCV fishing effort and the retained catch were significantly less than in the last two years. The number of SBT reported as released was 26, less than in the previous two seasons.

The fishing effort and catch of private and AFCV from the west coast South Island fishery increased in 2022. A large number of small fish were available, and South Island charter vessels reported retaining 206 SBT with an average weight of 18.65 kg (s.d. 5.697). Most SBT were caught from 22 February to mid-April, though some catch was reported up to 23 July.

A respondent-driven off-site telephone survey estimated SBT harvest from private vessels off the South Island. The contact list of fishers included 54 boat owners in 2022; this list is still expanding. There were 93 SBT reported landed from January to June with an overall SBT average weight of SBT of 20.5 kg (s.d. 5.756).

Harvest reported as recreational catch taken from commercial vessels under section 111 of the Fisheries Act 1996 also increased in 2022 to 2.71 t, which is included in recreational harvest estimates.

The total landed recreational harvest estimate for 2021–22 is 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.

¹ 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 2021).

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. There have been a number of Total Allowable Catch (TAC) increases following allocation decisions by the CCSBT.

In 2012 the TAC was set at 830 t, with a TACC of 817 t, a recreational allowance of 8 t, a customary allowance at 1 t, and other sources of fishing-related mortality at 4 t. In 2018 the national allocation increased to 1088 t following an update of the stock assessment by CCSBT and operation of the agreed management procedure. Following consultation, TACC was increased to 1046 t, the recreational allowance was set at 20 t, the customary allowance was set at 2 t, and other sources of fishing related mortality was set at 20 t.

The 2020 SBT stock assessment results indicate an increase in stock biomass from 20% of the unfished levels of Total Reproductive Output (similar to spawning stock biomass) in 2019. The stock was projected to be at 29% of unfished levels by 2035, close to the management target of 30% (Anon. 2020).

In 2020 the Extended Commission meeting agreed to retain the global SBT TAC of 17 647 tonnes per year from 2021 to 2023 inclusive, as calculated by the management procedure and recommended by the Extended Scientific Committee. However, the Commission agreed that it no longer needed to set aside 306 t of the global TAC for unaccounted mortalities. New Zealand's SBT catch limit was increased by 14 t. Fisheries New Zealand included a review of the SBT TAC in the October 2021 sustainability round, and the recreational allowance increased to 34 t.

1.2 Description of the recreational fishery

There has been a small 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. Most of the SBT were less than 30 kg and caught on 10 kg line (Marquand 1978). 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 second 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 Waihou Bay. Fish were caught by trolling lures using the same tackle as the summer billfish fishery. Members of the Waihou 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, with a further 13 released from the east coast recreational fishery, 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 there was a number of private boats 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. In 2020 a survey was conducted to improve estimates of recreational landed catch from private boats in the South Island. The national recreational harvest estimate for southern bluefin tuna in 2019–20 was 48.9 t (Holdsworth 2021). In 2020–21 the on-site survey estimated the number of SBT landed at Waihou Bay increased to 445 (CV 0.023) with a mean weight of 76 kg and the national recreational harvest estimate was 57.2 t which includes an allowance for unaccounted catch of 22.5% (Holdsworth 2022).

1.3 Objectives

This report summarises the results for the first year of the Fisheries New Zealand project STN2021-02, which has the following overall 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 2022 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.

This report describes the recreational catch in the 2021–22 New Zealand fishing year (1 October 2021 to 30 September 2022) and compares this with harvest estimates from previous surveys that started in 2018.

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. This was the fifth year this on-site survey was conducted with support from the Waihou Bay community and the Waihou Bay Sport Fishing Club. A presentation on the survey design and results from 2021–22 was made at a meeting of the Highly Migratory Species Working Group chaired by Fisheries New Zealand in March 2022. A large component of the annual recreational SBT harvest is still caught from trailer boats fishing off Cape Runaway, while SBT are within range during June and July. 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 4 June to 14 August 2022 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 72 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 1 July to 30 July 2022 due to increased fishing effort;
4. One primary 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;
8. Fishers are asked whether they caught any seabirds.

Data were collected on hard copy forms developed in 2018 (Holdsworth 2019). These included seabird interaction questions and a laminated seabird species groupings show card. 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. Estimated weights were recorded for fish landed but not weighed and those reported as released. Interview sessions have been extended to include boats that returned in the morning and early afternoon since 2020 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 was 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. 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 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 a replacement on each survey day to assign catch to boat crews that were not interviewed based on the trailer count for that day. For days not surveyed, CPUE from all survey days was resampled with a 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 2000 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 2022 calendar year because no recreational SBT catch was reported between 1 October and 31 December 2021.

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, there are a finite number of boats actively engaged in the fishery and recruiting most of them to respond to a regular SMS and phone survey, similar to the national panel survey (e.g., Wynne-Jones et al. 2014), would go a long way toward characterising this fishery and providing 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 14594). 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 unfiltered and 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 most (87%) 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

There is anecdotal information that some SBT are processed onboard and are not included in club records or landed at Waihou Bay during the survey period. 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. From January to March 2022, juvenile SBT were caught by recreational and commercial fishers off the west coast of the North Island (from Manukau

to Cook Strait). This is the first time that SBT have been recorded there from inshore areas in any numbers.

For the 2021–22 project, the Highly Migratory Species Working Group again 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 2021–22, 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. Southern bluefin tuna length information was collected where possible from the Waihou Bay on-site survey and in conjunction with the collection of fish heads for otolith extraction from the club weigh station. The length distributions of SBT sampled for otoliths were summarised.

3. RESULTS

3.1 Landed catch from the 2022 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, 4 June 2022. On 5 June there were 13 boats fishing, and 12 crews were interviewed. Four crews had been targeting SBT, and one boat had landed two SBT and dropped two others. Fishing effort was relatively low until 17 June and this was followed by increased fishing effort during several good weather windows (Figure 1).

A survey total of 896 boat trailers were counted over 72 days, a decrease in trailer counts from 2021 and similar to 2020 surveys (Table 1). There were 15 survey days with 595 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 80%. Overall, 66% of the total trailer count from all days in the survey period were interviewed. Most crews were cooperative during the survey, even when the ramp was busy, and no crews refused to answer the interview questions this year.

A total of 313 landed SBT were reported to the interviewer at the ramp (Table 1). Of these, 169 SBT (54%) were processed at sea or not weighed at Waihou Bay. A further 31 SBT were in the Waihou Bay Sport Fishing Club weigh station records because they were caught on days without surveys or landed after dark.

The distribution of fishing effort per day shows that most fishing effort occurred during weather windows from 17 June to 5 July. There were seven days in this period with more than 50 boat trailers counted and fishing effort for SBT from Waihou Bay ended in early August (Table A1 in Appendix 1, Figure 1).

The number of SBT caught per day was highest on fishable days during the last week of June and the first week of July, and there were seven days when 20 or more SBT were landed at Waihou Bay during this period (Figure 1).

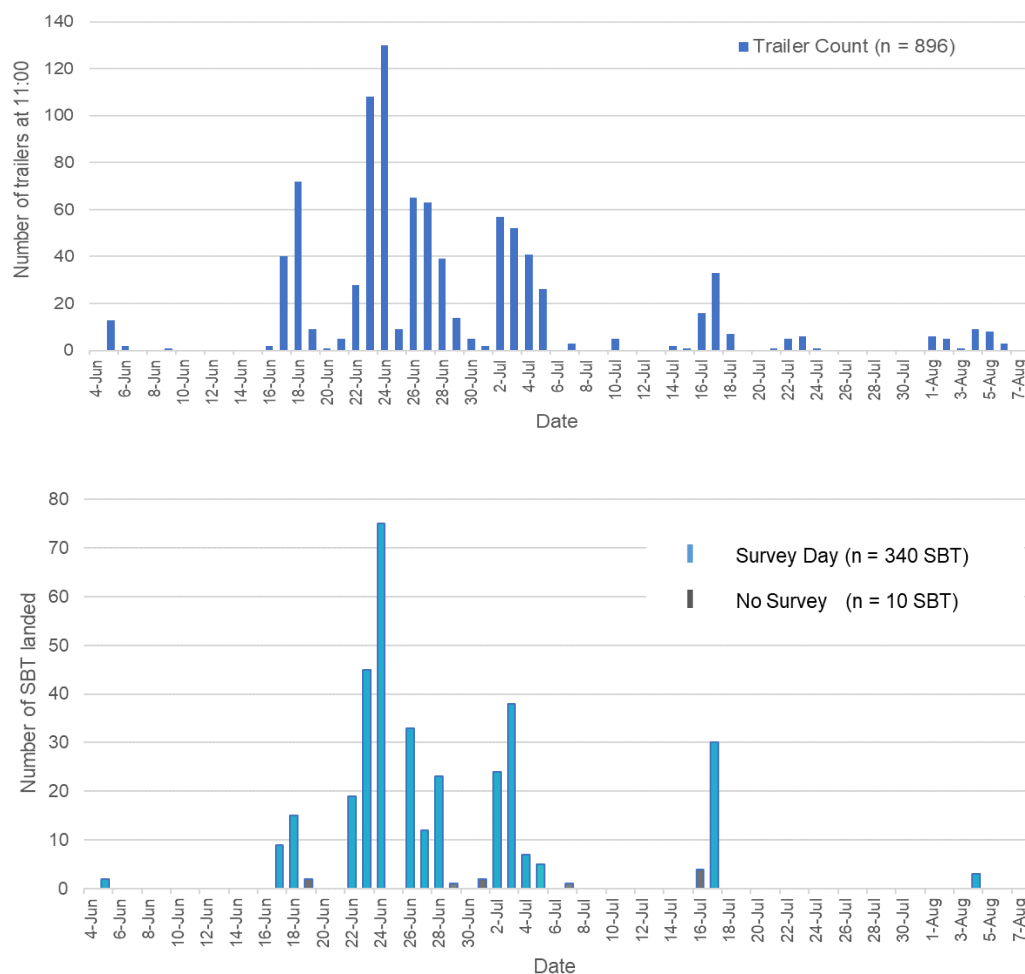


Figure 1: Waihou Bay trailer counts in 2022 by day (top) and number of landed SBT captured in survey interviews plus club weigh station observations on survey days and non-survey days at Waihou Bay (bottom).

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

Year	Trailer count	Survey interviews	Landed SBT survey	Landed SBT survey and club	Otoliths collected
2017	—	—	—	207	—
2018	678	336	34	61	32
2019	852	537	118	196	80
2020	891	715	267	291	90
2021	1037	699	305	355	45
2022	896	595	313	344	91

Southern bluefin tuna landed catch at Waihou Bay in 2020 was highest in late July, while in 2021 landed catch peaked on 4 and 5 July (Figure 2). In 2022 most SBT landed catch was recorded between mid-June to the first week of July, with 70 SBT landed at Waihou Bay on 24 June 2022.

An average of 0.57 SBT were caught per boat day in the 2022 survey, including the 8% of those fish released (Figure 3). The highest catch rate in 2022 was on 17 July and the highest catch rate from previous surveys was 1.33 SBT per boat day for 24 crews interviewed on 30 July 2020.

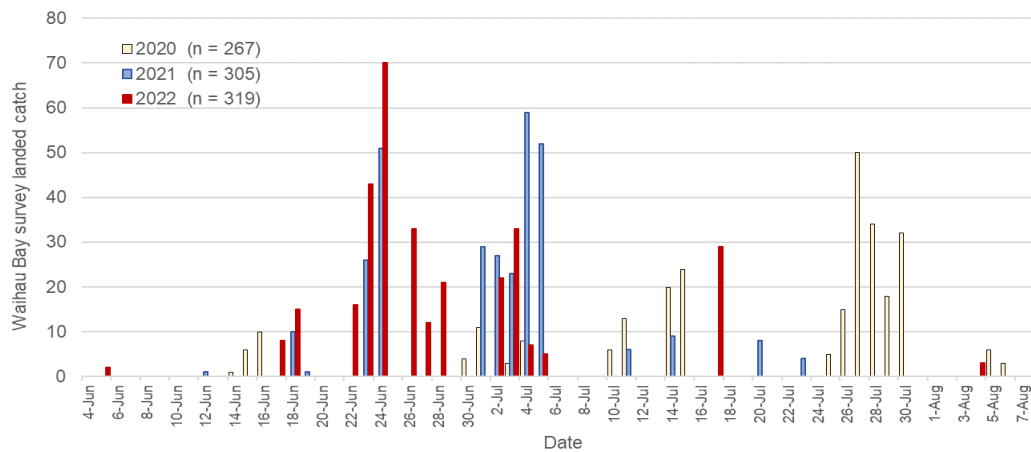


Figure 2: The daily number of landed SBT from survey interviews plus club weigh station observations on survey days and non-survey days at Waihou Bay, by year since 2020.

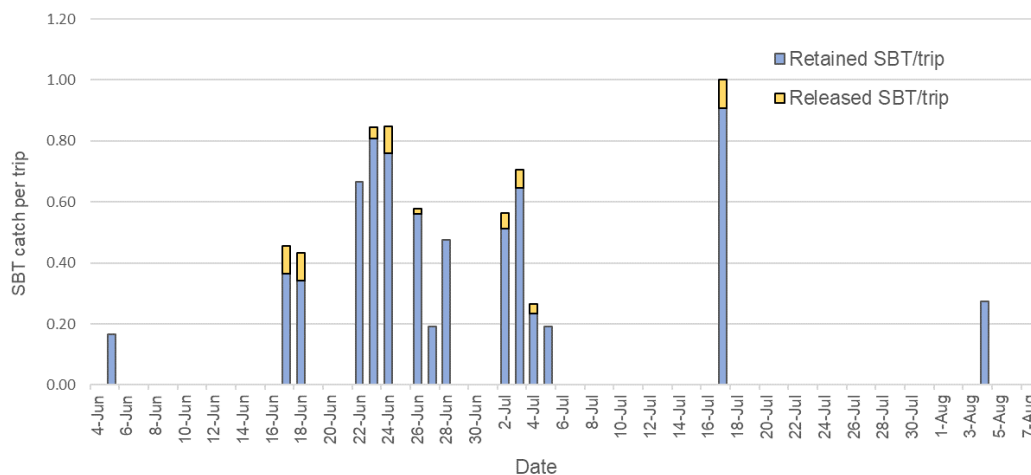


Figure 3: The daily catch rate of landed SBT per trip from the Waihou Bay on-site survey in 2022.

Compared with the surveys in the two previous seasons, there were fewer boats fishing, fewer interviews completed, and more SBT landed (Table 1). There were more Waihou Bay survey SBT in the 60-kg and 70-kg weight bins in 2022 than in the North Island club records, excluding Waihou Bay (Figure 4). The survey weight distribution in 2022 was similar to the 2020 survey, and the proportion of 70, 80, and 90 kg fish was less than in 2021 (Figure 5).

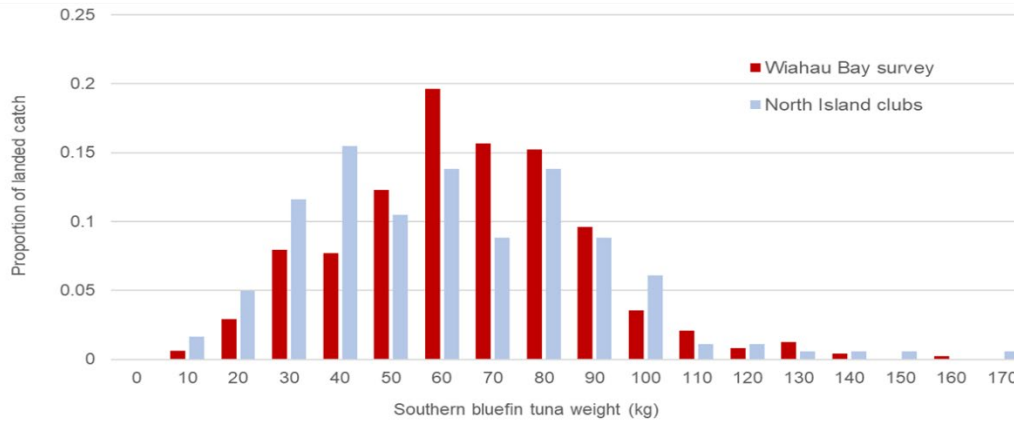


Figure 4: The weight distribution of SBT in 2022 from Waihou Bay survey interviews and from North Island sport fishing club weigh stations (not including Waihou Bay).

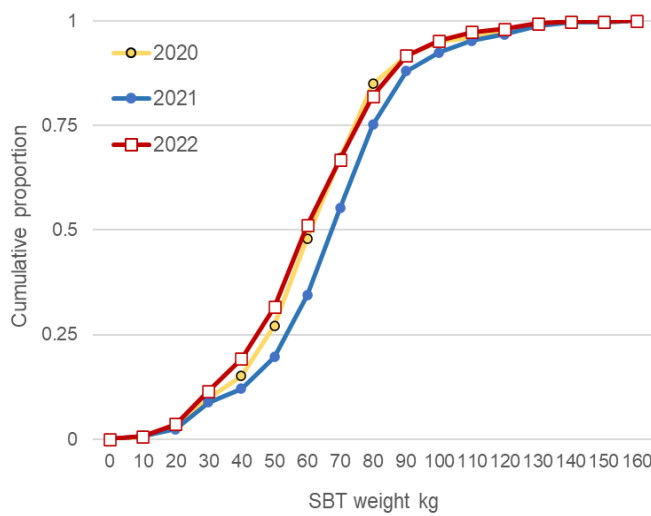


Figure 5: The cumulative proportion of SBT weight from Waihou Bay survey interviews by year.

The on-site survey collected information on the number of SBT landed per trip and the number of unsuccessful trips. In 2022, 63% of crews interviewed at Waihou Bay landed no SBT that day and, of those that caught fish, 69% landed one fish per trip, 24% landed two fish, and 6% landed three fish per trip (Figure 6). In addition, 26 SBT were released or tagged and released. There were 367 individual boat names recorded from the Waihou Bay survey interviews.

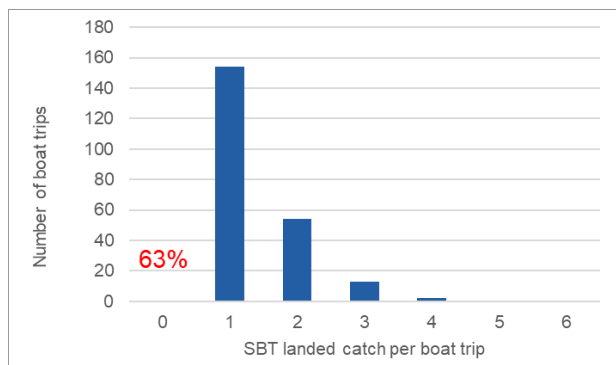


Figure 6: The number of SBT landed per private boat trip (day) in 2022 from on-site survey data and the proportion of trips with zero catch (red).

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 2022 is 486 SBT (CV 0.045) (Table 2). The average weight of SBT weighed and estimated was 70.2 kg (s.d. 23.85).

Table 2: Recreational harvest estimates for 2021–22 from available sources with an allowance for unaccounted catch of 22.5% and range of 15% to 30%.

Source	Harvest #	Mean wt (kg)	Harvest wt (t)
North Island			
Waihou Bay Survey	486 (CV 0.045)	70.184	34.11
Other club catch	86	65.415	5.63
Charter vessel	34	66.625	2.27
South Island			
Phone survey	93	20.484	1.91
Charter vessel	206	18.645	3.84
National			
section 111	?		2.71
Total	905		50.46
Plus unaccounted catch			
Low estimate 15%	1005		56.7
High estimate 30%	1105		62.9
Point estimate 22.5%	1055		59.8

3.2 Sport fishing club records

A total of 86 SBT were recorded landed by North Island sport fishing clubs other than those in the Waihou Bay survey and club records in 2021–22. Most of these fish were caught in June and July in the Bay of Plenty. In addition, there were SBT caught off Hawke Bay and Gisborne. The average weight for these fish was 65.4 kg (s.d. 28.02) (Table 2). Where there is an overlap between club records and charter vessel records, the number of fish is counted for charter vessels only.

The distribution of weights recorded by all North Island clubs, including Waihou Bay, in 2022 has a broad distribution between 30 and 89 kg in 2022 (Figure 4). Four SBT over 150 kg were recorded in club records, including a 173.6 kg fish weighed at Whakatane and a 179 kg fish weighed after dark at Waihou Bay.

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 the fishery and data collection were hampered by slips closing the road 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 at www.fishcatch.co.nz that fishers could use to self-report SBT and other gamefish catch.

The off-site telephone survey database expanded from 17 boat owners in 2020 to 54 owners in 2022 using a variety of sources, including referrals for fishers. Not all of these contacts fished for SBT in 2022. There were 93 SBT reported landed, with a weight range of 10 to 40 kg and an average of 20.5 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 South Island and decreased in the North Island in 2022 (Figure 7). Based on the recorded estimated weights, the combined SBT harvest by charter vessels in 2021–22 was 5.9 t (Table 3).

The South Island charter vessels reported retaining 206 SBT in 2022, which is significantly more than previous reporting years, and the average weight of retained SBT was 18.65 kg (s.d. 5.697) (Table 2). 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 2022, fishing started in mid-June and followed similar trends to those for the Waihou Bay based fishery, with catch highest in mid-July (Figure 8). A total of 60 SBT were caught off the North Island, excluding trailer boat charters using the Waihou Bay boat ramp, with an estimated average weight of 66.63 kg (s.d. 23.53), and 26 SBT were released (43% of catch).

The average duration of North Island charter fishing events targeting SBT in 2022 was 5.7 hours (s.d. 2.52). The retained catch for successful days was mostly 1 to 3 SBT (92%), with just two days with four or more fish retained (Figure 9). The average duration of South Island charter events was 1.5 hours (s.d. 1.11).

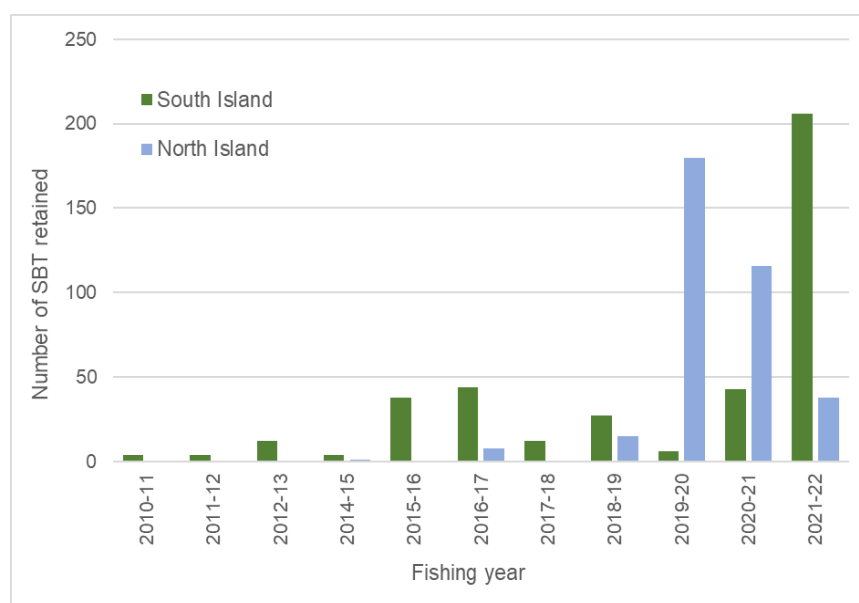


Figure 7: SBT retained catch by amateur fishing charter vessels by year and fishery.

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

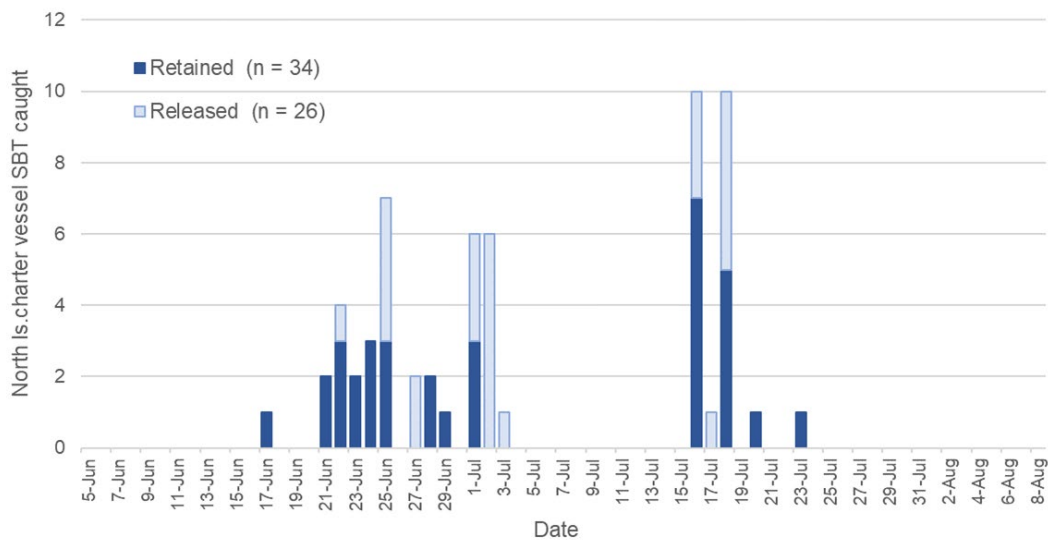


Figure 8: The number of SBT retained or released from amateur charter vessels by day in the North Island in 2022.

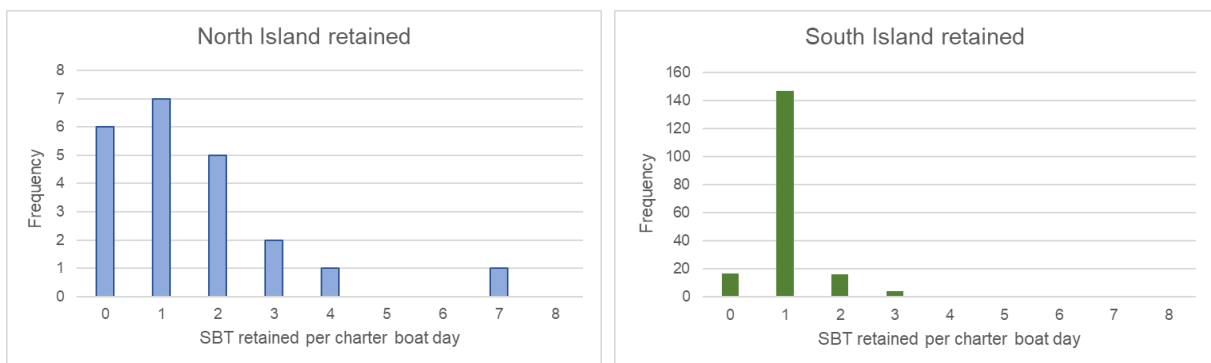


Figure 9: The number of SBT retained per amateur fishing charter vessel day when targeting SBT off the North Island (left) and the South Island (right).

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 2021–22 October fishing year, the reported section 111 landings weighed 2.71 t. This is the highest annual weight of section 111 catch reported over the last eight years (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	2018–19	454
2015–16	661	2019–20	671
2016–17	1 038	2020–21	879
2017–18	507	2021–22	2 709

3.6 Otoliths collected

A total of 91 usable otolith pairs were extracted from southern bluefin tuna intercepted during the creel survey at Waihou Bay in 2022. The weight of these fish ranged from 27.6 to 134 kg. The fork length of these fish ranged from 105 to 192 cm, with a mode of 150 cm (Figure 10). Measurements were made with the fish on top of a measuring mat or at the club weigh station.

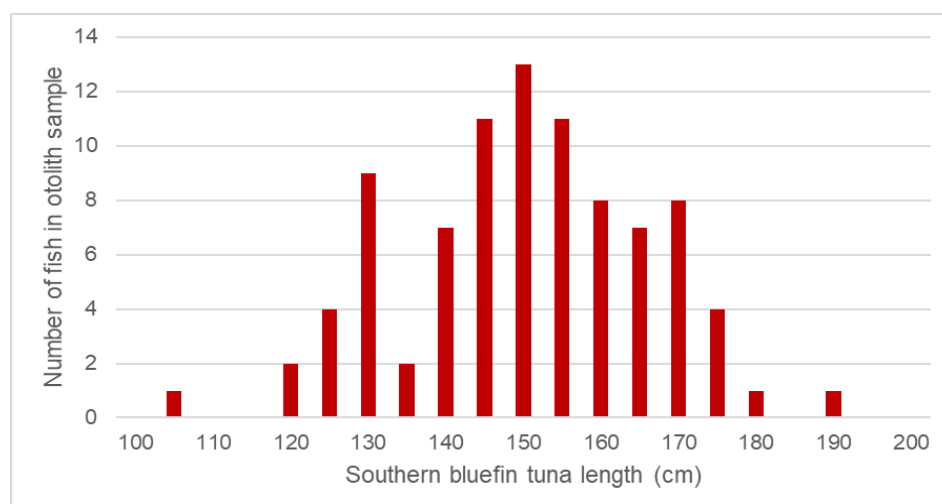


Figure 10: Length distribution of southern bluefin tuna caught in the recreational fishery from Waihou Bay which had otoliths removed in 2022.

3.7 2021–22 recreational harvest estimate for southern bluefin tuna

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, and the non-commercial catch on commercial vessels sum to a national estimate of recreational SBT catch in 2021–22 was 50.46 t (Table 2).

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 56.7 t to 62.9 t of SBT and a point estimate recreational SBT harvest in 2021–22 of 59.8 t (Table 2).

4. DISCUSSION

This is the fifth 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 weight of 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. Private fishers with trailer boats remain the main participants in this fishery. The primary access point to the main fishing area is the boat ramp at Waihou Bay, where an adaptive sampling strategy has been used since 2018 to target survey effort on days when the fishing effort was above a pre-determined level (Moore et al. 2015).

Daily boat trailer counts at 11:00 am totalled 896 which was 140 less than in 2021. The on-site survey at the Waihou Bay boat ramp covered 15 days and interviewed fishers from 595 boat trips, 104 less than in 2021. Most of the survey catch came from the last week of June and the first week of July, similar to 2021. A large storm and flooding in July collapsed a section of the road to Waihou Bay and may have reduced fishing effort later in the season. A brief weather window in mid-July showed that good numbers of SBT were still present off Cape Runaway.

Not all boat trips in the survey period targeted SBT, but, at the height of the season, few inshore fishers were encountered because the ramp was busy and car parks were full well before dawn. Having one main access point, with a high proportion of trips targeting SBT over a relatively short period, makes the on-site survey particularly efficient. We are fortunate to have an interviewer who monitors coastguard radio, lives close to the boat ramp, and can intercept most boats returning to the ramp on survey days.

A number of SBT are caught early in the morning, and increasingly crews will return to the ramp when they have one fish onboard. The Waihou Bay Sport Fishing Club weigh station is located adjacent to the boat ramp. In 2022, the club told fishers that the weigh station would be restricting the number of fish weighed, and they encouraged fishers to return to the ramp and weigh their fish soon after landing. This is to ease congestion around the boat ramp, shop, and hotel, which are adjacent to each other on Orete Point Road.

A total of 313 landed SBT were reported to the interviewer at the ramp. Of these, 169 SBT (54%) were processed at sea or not weighed at Waihou Bay. This year no crews refused to answer the interview questions. A further 31 SBT were in the club weigh station records from non-survey days or landed after dark. Overall catch per boat day was higher in 2022, but the average size was smaller than in 2021. The expanded Waihou Bay survey estimate of landed catch, which scales up survey catch by trailer counts from all days, is 486 SBT (CV 0.045) for 2022.

The primary fishing method used was trolling lures, and there were no seabirds reported caught or tangled by any of the crews interviewed at Waihou Bay. Again, this year, many fishers were willing to leave tuna heads with labels attached for otolith extraction but getting accurate straight-line fork lengths from whole fish was not always possible.

Recreational fishers were having some success catching SBT 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 fishing with baits and boats trolling for albacore (*Thunnus alalunga*) from January to March. This is the first time that SBT 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 posts about this on social media, estimates of the total number are speculative. The allowance for an

unaccounted catch of 6 to 12 t above the harvest estimates from private fishers in 2022 will be sufficient to cover landings for this fishery.

This was the third year of surveying private fishers in the South Island. Data are available from charter vessels and recreational catch on commercial vessels because of the Fisheries New Zealand data reporting requirements. 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). As part of this project, the off-site telephone survey has had a good response from participants and is worth continuing and expanding.

There was lively online discussion about the value of tag and release and catch recording of gamefish in New Zealand early in 2021. Some people were interested in having an online catch reporting option for fish not included in NZSFC club records. Blue Water Marine Research developed a web page for reporting fish tagged and released or recaptured in the New Zealand Gamefish Tagging Programme at www.fishtagnz.co.nz. In April 2021, a catch reporting page was added to this site with a link from www.fishcatch.co.nz. The availability of this reporting option was included in a number of posts online, but uptake has been modest.

The Commission for the Conservation of Southern Bluefin Tuna funds the stock assessments for SBT and sets management targets, an international TAC, and annual country allocations for much of the international catch. In 2022, the CCSBT considered increasing the international TAC in 2024 based on the results of their management procedure. Overall, SBT abundance is predicted to increase to 30% of Total Reproductive Output by 2035. The increasing availability of SBT to recreational fishers is likely to continue.

5. POTENTIAL RESEARCH

This is a multi-year project (STN2021-02) to estimate the annual recreational harvest of SBT. The availability of large numbers of small SBT off the lower west coast of the North Island was unexpected and potentially unprecedented. Additional work is recommended to have regular contact with fishing clubs and tackle stores that can help characterise the biological and temporal nature of the marine amateur harvest of SBT in that region in 2023.

6. ACKNOWLEDGEMENTS

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8. 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
5/06/22	13	12	2	2	11/07/22	0		0	0
6/06/22	2		0	0	12/07/22	0		0	
7/06/22	0		0	0	13/07/22	0		0	0
8/06/22	0		0	0	14/07/22	2		0	0
9/06/22	1		0	0	15/07/22	1		0	0
10/06/22	0		0	0	16/07/22	16		0	4
11/06/22	0		0	0	17/07/22	33	32	29	30
12/06/22	0		0	0	18/07/22	7		0	0
13/06/22	0		0	0	19/07/22	0		0	0
14/06/22	0		0	0	20/07/22	0		0	0
15/06/22	0		0	0	21/07/22	1		0	0
16/06/22	2		0	0	22/07/22	5		0	0
17/06/22	40	22	8	9	23/07/22	6		0	0
18/06/22	72	44	15	15	24/07/22	1		0	0
19/06/22	9		0	2	25/07/22	0		0	0
20/06/22	1		0	0	26/07/22	0		0	0
21/06/22	5		0	0	27/07/22	0		0	0
22/06/22	28	24	16	19	28/07/22	0		0	0
23/06/22	108	52	43	45	29/07/22	0		0	0
24/06/22	130	92	70	75	30/07/22	0		0	0
25/06/22	9		0	0	31/07/22	0		0	0
26/06/22	65	57	33	33	1/08/22	6		0	0
27/06/22	63	63	12	12	2/08/22	5		0	0
28/06/22	39	40	21	23	3/08/22	1		0	0
29/06/22	14		0	1	4/08/22	9	11	3	3
30/06/22	5		0	0	5/08/22	8		0	0
1/07/22	2		0	2	6/08/22	3		0	0
2/07/22	57	39	22	24	7/08/22	0		0	0
3/07/22	52	51	33	38	8/08/22	0		0	0
4/07/22	41	30	7	7	9/08/22	0		0	0
5/07/22	26	26	5	5	10/08/22	0		0	0
6/07/22	0		0	0	11/08/22	0		0	0
7/07/22	3		0	1	12/08/22	0		0	0
8/07/22	0		0	0	13/08/22	0		0	0
9/07/22	0		0	0	14/08/22	0		0	0
10/07/22	5		0	0	Total	896	595	350	319