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National Panel Survey of Marine Recreational Fishers 2022–23

New Zealand Fisheries Assessment Report 2024/51

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Correction November 2024 Row labels in Table 37 “Groper – Hapuku/Bass” and “Groper – Hapuku only” now correctly read “Groper – Bass” and “Groper – Hapuku”.
Correction December 2024 The number of Groper – Hapuku/Bass in Table 35 should be 11 989 (as in Table 36), and not 1665 (which is the number for Groper – Bass).

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***New Zealand Fisheries Assessment Report 2024/51*. 116 p.**

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PLAIN LANGUAGE SUMMARY

The National Panel Survey of Marine Recreational Fishers was undertaken with the primary goal of estimating recreational harvest of all species in all areas for the season running October 2022 to September 2023 inclusive. These estimates are produced through a series of surveys.

Firstly, 36 197 addresses were approached by interviewers between July and September 2022. The purpose of these visits is twofold. Firstly, all adults at the address are screened for age group, gender, ethnicities and fishing status. This shows what percentage of New Zealanders, both in total and as members of the each group in the previous sentence, consider themselves to be marine recreational fishers in some capacity. These addresses had a 79% response rate of being screened for this data.

Secondly, when there is at least one person at the address who identify themselves as a fisher of this variety, one fisher is randomly selected to take part in a monitoring process whereby they report the details of their fishing over the coming 12 months by a combination of text message and phone interviews. The former was used to find out if the individual had fished in a given period, the latter to record further details of their catch if they had. An initial panel of 5625 fishers agreed to take part in this process, which is an 86% response rate of recruiting fishers into the monitoring component of the research.

At the end of the season, the data collected by the text contacts and phone interviews is combined with the level of fishing claimed during the original process of screening for and recruiting fishers. This process produces estimates for the harvest by New Zealand's marine recreational fishing population for the 12 month season, along with data about the characteristics of fishing activity (method, area etc).

The 2022–23 season was estimated to have had 1 122 588 fishing trips by marine recreational fishers, a drop to 62% of trips estimated for the last NPS in 2017-18. This was mostly due to both a lower proportion of New Zealanders classifying themselves as marine recreational fishers, falling from 20.4% to 17.6%, as well as a drop of panel members reporting at least one trip dropping from 55.6% to 47.2%. This was the main reason for the national harvest dropping from 7 million finfish and 3.9 million other marine species to 3.7 million finfish and 1.6 million other marine species. The estimated numbers harvested were also combined with the most recent mean fish weights survey to also produce harvest estimates in tonnage to inform stock assessments.

EXECUTIVE SUMMARY

Heinemann[1], A.; Gray[2], A. (2024). National Panel Survey of Marine Recreational Fishers 2022–2023.
***New Zealand Fisheries Assessment Report 2024/51*. 116 p.**

This report presents the results of a nationwide survey of 5625 empanelled marine fishers who reported their recreational marine fishing activity over the fishing season from 1 October 2022 to 30 September 2023. The survey was conducted by the National Research Bureau Ltd (NRB) on behalf of Fisheries New Zealand, a business unit of the Ministry for Primary Industries (MPI).

The survey was essentially a repeat of the earlier editions of the National Panel Survey of Marine Recreational Fishers (NPS) conducted in 2011–12 and 2017–18. The methodology was the same, using state-of-the-art social science methods and 'population-based sampling' which allows results to be scaled up to a national level. These methods have proven to be the most robust available for off-site surveys, with other concurrent on-site research having corroborated data gathered in these two prior editions.

The sample frame was based on meshblocks. A meshblock is the smallest geographical unit for which statistical data is reported by Statistics New Zealand. There are 53 599 meshblocks in New Zealand. For this survey, 1100 meshblocks were sampled proportional to Territorial Land Authority population and then up to 37 houses per meshblock randomly selected to screen for homes in which there was at least one fisher. A random process was used to select one marine fisher (aged 15 or over) within a fishing household and this person was asked to join the fishing panel for the 2022–23 fishing year.

The sampling procedure resulted in 36 197 dwellings being physically visited by NRB interviewers. The dwelling screening response rate was 79% of those successfully screened for demographics and potential panellists. Of those households containing eligible panellists, meaning they contained at least one or more fishers, 86% agreed to participate in the panel. While these response rates are slightly lower than the 2011–12 and 2017–18 editions (86% screened and 91% enrolled in 2011, and 85% screened and 92% enrolled in 2017), these should still be considered high by the standards of voluntary research and sufficient to produce credible data.

The initial component of the monitoring technique was to poll fishers periodically to see if they had marine fished via SMS texting which is convenient and of low burden to the respondent. Fishers were assigned a reporting frequency based on both their stated fishing avidity at time of enrolment and time of the season, ranging from fortnightly contact to every six weeks They were simply asked if they had gone fishing (any method) or not and to reply ‘yes’ or ‘no’. If people didn't or couldn't text, they were instead rung by telephone. Where a person replied yes to the SMS (or contact was not made this way), they were telephoned to ask for details about any fishing. The telephone interviews were managed by a distributed CATI (computer assisted telephone interview) and the interviews were highly structured for accuracy of recall and reporting.

For the first time in the implementation of the panel monitoring, the SMS contacts were required by telco carriers to include a direct opt out prompt, whereby replying “Stop” to the scheduled contact enquiring about any fishing activity, the panellist would then be removed from the text contact schedule. Nearly a third of initial panellists (1 829, or 32.5%) used this option through the course of the season, although phone contact was still attempted unless they resigned from the panel directly to NRB or a CATI operator directly. This however had limited success after the initial “Stop” response, and the resultant non-response during the monitoring period was the most challenging aspect of the research.

According to the methods of this survey, the total estimated number of recreational fishing trips in New Zealand in 2022–23 was 1 122 588. This is 62% the 1 810 379 estimated by the same methodology in 2017–18, which is itself 73% of the 2011–12 figure of 2 466 786.

[1] National Research Bureau
[2] Statistics Research Associates Ltd.

The total number of fishing trips during a season is the result of both the number of individuals who describe themselves as fishers within New Zealand, as well as the number of trips each of these fishers take, if any. The screening and recruitment component of the research found that in 2022, 17.6% of New Zealand's adult population consider themselves recreational marine fishers, which is a decrease from the 20.8% measured in 2017, itself a decrease of a similar proportion from the 24.6% measured in 2011. Similarly, only 47.2% of the enrolled panel took at least one trip in the 2022–23 season, compared to 55.6% in 2017–18 and 61.0% in 2011–12. The distribution of number of trips taken by those panellists who actively fished was broadly consistent with the previous edition of the research.

Collected catch data were expanded by recognised statistical methods to produce harvest estimates (number) for the entire New Zealand population (aged 15 or older), for the whole country, by Fisheries Management Areas (FMA) for several species. Estimated harvests of major finfish and other species were converted to total harvest weight in tonnage using mean weight data provided by concurrent onsite survey projects.

The total marine harvest of all marine species was estimated to be around 5.3 million by number. This was comprised of 3.7 million finfish and 1.6 million other marine species. This continues the trend of lower harvest in 2017–18, which was a reduction from the 2011–12 estimates of 8.7 million finfish and 8.3 million other species to 7 million finfish and 3.9 million other species.

In terms of proportion of total harvest by species, the distribution of catch was similar to previous editions. The three most frequently harvested - snapper, kahawai and blue cod - accounted for 75% of all harvested finfish, compared to 72% in 2017–18 and 74% in 2011–12. The most common finfish species by far was snapper which accounted for 52% of the finfish harvested (49% in 2017–18 and 52% in 2011–12). Of the other marine species harvested, the most common reported was kina with a calculated harvest of 0.56 million by number, followed by paua (0.25 million) and pipi (0.56 million). There was a significant drop in harvest of shellfish species although this must be considered in the context of fisheries closures for species such as scallops, as well as rahui and other restrictions.

1. INTRODUCTION

1.1 Background

Measuring the catch of recreational marine fishers, in addition to that of commercial and customary fishers, is vital to the assessment of the stocks of finfish and other marine life in New Zealand waters. The information is used by scientists, regulators and fisheries managers to better understand the sustainability of our fisheries, and determine what, if any, controls are needed.

The different methods of surveying recreational catch can be broken down into on-site and off-site methods. On-site surveys include boat ramp counts and intercept surveys, creel surveys, roving style surveys, and aerial over-flight surveys to observe boat activity. However, the length of New Zealand's coastline, the sheer number of access points, and the need to measure fishing activity over time make it difficult and prohibitively expensive, to determine total marine harvest for all New Zealand using such methods.

In contrast, off-site methods generally use household interviews or other structured reporting methods to measure fishing activity and harvest. The National Panel Survey (NPS) of Marine Recreational Fishers 2022–2023 was such an off-site survey, and the third edition of the project. Although it relies on fishers staying in contact and reporting trips and harvest via a standardised interview throughout an entire season, the method has particular advantages in terms of geographical coverage, representativeness and scalability. With 'known probability' meshblock sampling, harvest estimates can be calculated for the entire population (aged 15 and over) for an entire year. The history and development of the methodology behind the survey is well documented elsewhere. Readers are particularly referred to Heinemann et al (2015). The 2022–23 edition was conceived and implemented as a direct continuation of this approach, due to its prior success and in the interests of comparability.

To summarise briefly, earlier attempts at similar surveys (i.e. telephone diary surveys before the 2011–12 NPS) had certain design and execution issues, particularly with 'self-selection' of more avid fishers, which created a bias towards heavier fishers that left the panel unrepresentative and therefore unsuitable to be scaled to the national population when producing harvest estimates. Similarly, the ‘diary’ format (rather than a series of ‘interviews’ utilised by the NPS) had longer time frames for reporting which created a greater potential for recall issues e.g., including activity outside the specified time frame, forgetting and therefore omitting activity, estimation rather than exact details, neglecting entries until date of collection etc.

The process of developing the current design of the National Panel Survey, first implemented for the 2011–12 NPS (also called the Large-Scale Multi-Species Survey or LSMS), was extensive and aimed to nullify as much as possible the issues identified with the earlier surveys. In doing so, it would produce a more defensible approach and more accurate estimates (e.g., Hartill et al 2004, National Research Bureau 2011).

Development of the NPS design was not undertaken by a single party. The Ministry of Fisheries (now Fisheries New Zealand), the National Research Bureau Ltd (commissioned to conduct the survey), representatives from NIWA, other fisheries scientists and involved parties, met over many months under the auspices of the Marine Amateur Fishing Working Group (MAFWG) and other forums, to discuss and inform the development of a systems-based approach to estimating recreational harvest, including the NPS survey. A number of trials and experiments were conducted to test SMS (text messaging, see Wynne-Jones & Heinemann 2010) reporting options, examine alternatives (e.g., 'snowball sampling' as described by Johnson & Sabin 2010, Griffiths et al. 2010), and to test methods to be finally employed in the NPS and supporting systems. Furthermore, after the completion of the second edition of the NPS in 2018, there was further testing of alternative online methods, specifically online self completion and hosting the monitoring on an app downloaded by the fisher, to update the harvest monitoring over the season. However, neither was able to produce the same accuracy as the existing Computer Assisted Telephone Interview (CATI) data collection mode.

In both 2011–12 and 2017–18, the NPS was conducted and supported by two completely independent on-site corroborating surveys, an aerial overflight survey of the boat-based fishery in FMA 1 (Hartill et al. 2013, 2019), and in the first edition, a multi-method creel survey of boat based fishers in the western Bay of Plenty (Holdsworth 2016). The resulting harvest estimates (Wynne-Jones et al. 2014, 2019) were considered to corroborate each other and therefore produce harvest estimates with a level of accuracy sufficient for the management of fisheries.

The only change to methodology from the previous editions was the removal of the 'drop in' survey, where people who identified as non-fishers during the screening and enrolment phase were recontacted at both the halfway point and completion of the monitoring period to see whether they had fished in that period. This was done because the results of this component were not precise enough to contribute to harvest estimates, which are explicitly the primary purpose of the NPS.

Based on the need for updated information, Fisheries New Zealand commissioned a further edition of the NPS at the end of 2021 for the 2022–23 fishing season.

1.2 Survey objectives

The following objectives were set down by Fisheries New Zealand in the commissioning of this project.

Overall objectives:

1. To continue the implementation of an integrated amateur harvest estimation system by providing estimates of absolute total amateur harvest on a stock basis to inform fisheries management.

Specific objectives:

1. To deliver a repeat of the 2011–12 and 2017–18 National Panel Surveys in FMAs 1,2,3,5,7,8 and 9 during the period 1 October 2022 to 30 September 2023.

2. To estimate total amateur harvest by fishstock for all species recorded during the survey.

3. To collaborate with concurrent onsite survey project(s) to provide robust comparisons of harvest estimates for specified areas.

1.3 About this report

This report presents summary results from the National Panel Survey of Marine Recreational Fishers 2022–23. Although a scientific report, it is intended for a general readership and as a stand-alone document, covering the methodology, data collection, and a summary of the resulting harvest estimates.

The main body of this report gives details of the outcomes of the recruitment phase of the survey and the resultant makeup of the panellists in terms of demographics and stated fishing avidity. The process and outcome of monitoring the panellists is shown and an examination of the attrition conducted.

Key to this survey is the method of expanding the reported fishing by panellists to population estimates. Details of this are given in this report to better understand how the final harvest estimates were arrived at. This is provided by independent statistician Alistair Gray of Statistics Research Associates, who has been responsible for the design and then implementation of this process in all editions of the NPS.

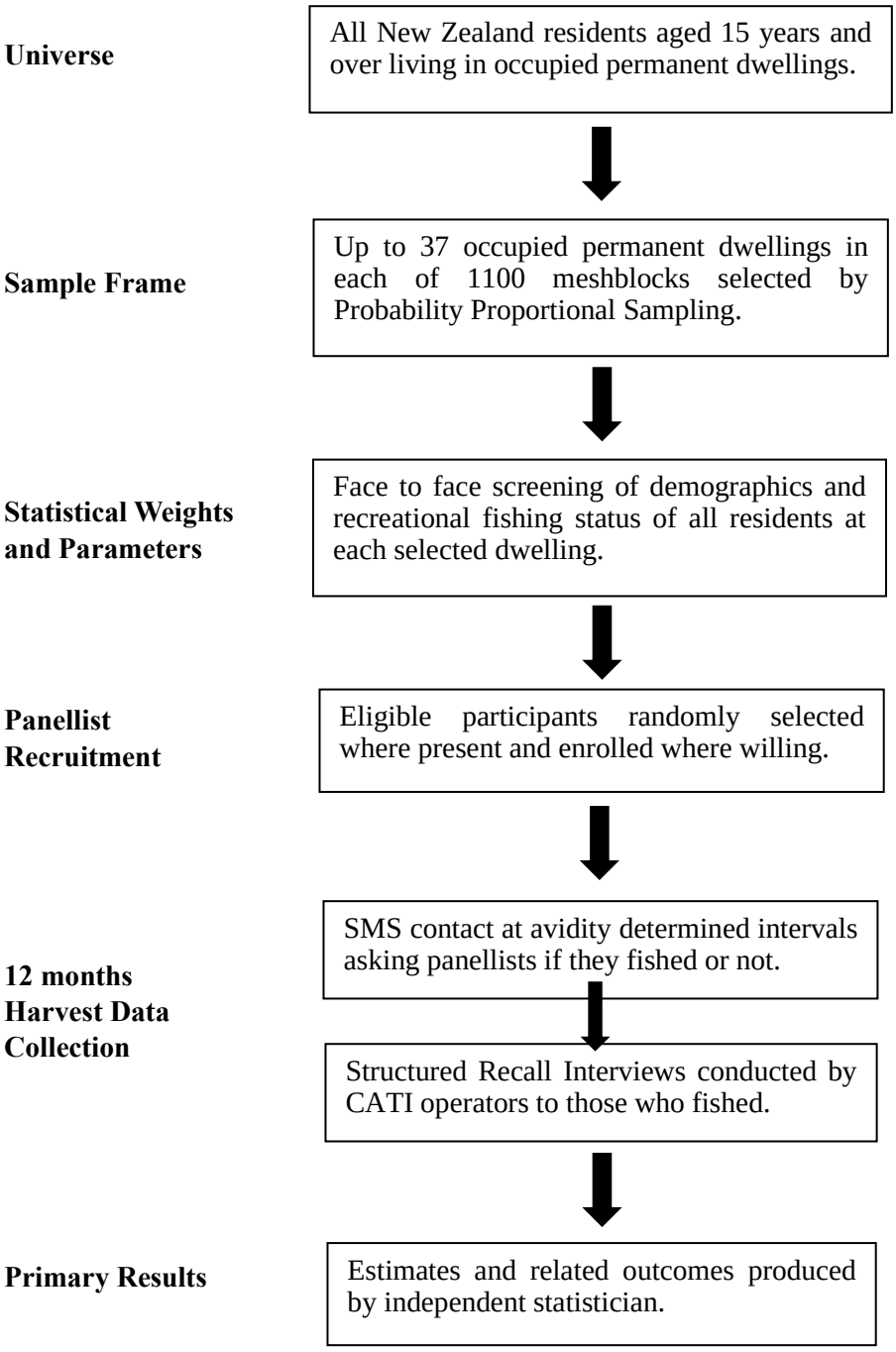
A section on fishing trip data follows, with weighted data presented by week, method/platform and by FMA (Fisheries Management Areas). The main output from this survey, the calculated harvest estimates in both number and tonnes, are presented for the whole of New Zealand. Harvest by species is shown by number, and where estimates of mean weight are available (most major species), by tonnage. Following this are various breakdowns for the species (by number not weight) including by FMA, by catch method, and by platform.

Harvest estimates are also shown for 18 frequently caught species in a readily accessible 'one fish to a page' format. For each fish there is a summary of harvest (both number and tonnage) by Quota management Area (QMA), harvest (number) by method and also platform, as well as bag size frequency by QMA. No estimates at a finer scale than QMAs are presented here but estimates can be calculated down to the scale of the 51 individual reporting areas used in the CATI interviews. Estimates at such fine scale however, are unlikely to be accurate.

2. METHODOLOGY

2.1 Survey schematic

Figure 1: Schematic of panellist selection, contact approach and data collection used in the National Panel Survey.



2.2 Survey design summary

Key aspects of the survey's design (Figure 1) include:

- The areal frame was the 53 598 Census meshblocks. These are defined by Statistics New Zealand and are the smallest population based sampling areas available.
- The following meshblocks were excluded from the frame as they are likely to contain no or few people.
    - All meshblocks in the Chatham Islands and other offshore islands with the exception of Waiheke Island.
    - All Oceanic, Inlet, and Inland Water meshblocks.
    - All meshblocks containing six or fewer Private Permanent Occupied (PPO) Dwellings at Census 2018.
- This left 45 379 meshblocks. The coverage of the New Zealand population is about 99%.
- The meshblocks were stratified by Territorial Authority (TA) to ensure that all TAs were sampled. To increase the sample size in small TAs a Kish allocation method (Kish 1992) was used to allocate the sample meshblocks. This balances between proportional allocation to TAs and equal allocation.
- The primary sampling units are 1100 meshblocks which were drawn from this reduced frame sorted in TA order and Urban Area order using a systematic probability proportional to size sampling scheme with the Census 2018 count of Occupied Private Dwelling (OPD) used as the size measure.
- Secondary sampling units are these OPDs and up to 37 dwellings/homes within each sampled meshblock were selected, an increase on the limit of 32 in 2017–18 where additional homes had to be introduced during field work. This increase led to an extra 5% of addresses approached in 2022–23, inclusive of the previous edition's booster sample.
- Face-to-face interviewing of an adult in each selected home was used to screen for marine fishers (aged 15 plus) of any avidity from seldom to frequent fishers. Proxy reporting by one adult for the home was permitted, but enrolment and permission to contact could only be given by the randomly selected fisher.
- Random (equal probability) selection of a fisher who was invited to be in the survey panel. Non replacement applied (i.e., no one else in the household could volunteer instead). This was done with a matrix combining kish grid and fisher avidity selection table. Panellists were instructed on the reporting requirements and given a main survey information brochure covering all aspects of the study but particularly the contact regime for reporting fishing.
- The actual enrolment was of 5625 fishers into the 12 month 2022–23 NPS.
- Incentive prize draws for participating in the survey were provided. These were weekly MTA vouchers valued at $100 as well as 5 grand prizes of $1000 redeemable at Hunting and Fishing New Zealand.
- Panellists were placed on an SMS contact schedule dependent on their avidity and time of season. The most frequent contact was fortnightly for the most avid in summer, the least frequent every six weeks for the least avid in winter. This was to determine whether they had done any recreational marine fishing in the period that needed to be captured in further detail.
- Follow up via structured CATI (Computer Assisted Telephone Interview). This data collection of further trip and harvest detail occurred with all panel members who text replied that they had fished during the period asked about by SMS. All landline only panel members were contacted directly by phone call.

Collected data was expanded by recognised statistical methods to achieve harvest estimates for the entire New Zealand adult population (and by FMA, QMA etc.).

2.3 Survey design advantages

The original development phase of the survey method was substantial and included a comprehensive pilot stage before the implementation of the first NPS in 2011–12. It had provided estimates corroborated by on site measurements that proved it could produce credible harvest estimates. Key advantages of the survey method are:

- Purposive Proportional sampling of meshblocks reduces biases associated with list and/or voluntary samples while allowing for nationwide coverage.
- Along with the above, screening all residents of sampled homes for demographics allows known probability of selection sampling which allows data to be scaled to the national population. To improve precision, addresses without fishers were also screened for demographics of residents for the first time in 2022.
- Face-to-face recruitment improves agreement to participate and allows physical demonstration of materials and procedures.
- Removal of reliance on a self-completion fishing diary plus user friendly contact methods (including a SMS option) that minimises recall biases if diaries are not completed quickly, reduces respondent burden, minimises attrition rates and helps to maintain long term participation in the panel. There is less need to 'rotate' participants under such conditions.
- High frequency of contact, particularly with more avid fishers, reduces time between catch and reporting, thus reducing recall error.
- The SMS texting option reduces burden on panellists by limiting the number of structured interviews required only to periods when fishing has taken place. This also results in CATI interactions having a shorter duration as well as being less frequent.
- Related to the above, the more frequent contact results in shorter intervals being reviewed in each CATI interaction and therefore less recall error in harvest data.
- The use of a structured and administered CATI allows for uniformity of responses and reduction of individual bias across a large sample.
- Alternative online methods to CATI were attempted after the conclusion of the prior NPS in 2017–18, but CATI produced a more complete and less biased response than the online methods trialled.

2.4 2022–23 Modifications

As the 2022–23 NPS was commissioned as a repeat survey of the previous editions, no alterations to the methodology were introduced. However, the screening and recruitment phases were able to be modernised with the introduction of an app that digitised many of the paper forms used in the previous editions. This allowed more flexible allocation of workloads to interviewers, more immediate monitoring of their performance and eliminated the need to manually punch results. It also required two small procedural changes.

Firstly, instead of interviewers enumerating meshblocks on their first visit, the NZ Post's Postal Address File (PAF) was sourced for the 1100 selected meshblocks. The process of selecting an address as start point and then producing a list of addresses sequentially from it was done by excel random number generator within the PAF spreadsheet and loaded into the app for the interviewer to approach without needing to enumerate. This also had the benefit of allowing for GPS monitoring as a check on the validity of interviewer activity.

Secondly, in contrast to previous editions, the app made it possible to efficiently collect the demographic data for homes from dwellings which contained no fishers. With this level of detail of stated recreational marine fishing within the national population, more precise weights were able to be created for the sample size.

Finally, due to significant labour shortages in mid 2022 and the prior inability to complete fieldwork before the monitoring period began, the screening and enrolment process started earlier than previously- early rather than late July. Combined with the app streamlining data collection, screening and enrolment was completed just after the first monitoring date of October 1st 2022.

2.5 Sampling process

The sampling process to select homes to screen, identify any fishing homes and select fishers to invite into the survey is shown below:

1.	Survey Frame:	Meshblocks as defined by Statistics NZ were the primary sampling units, using 2021 boundaries as those were the most current edition when selection was performed in early 2022.
2.	Geographic Coverage:	All New Zealand, excluding small offshore islands. Waiheke was included but Stewart Island, Great Barrier Island and smaller islands were excluded. This was done for logistic/economic reasons.
3.	Qualifying Meshblocks:	Meshblocks with six or fewer homes were removed (Coverage of all New Zealand homes remains around 99%). Small meshblocks would yield few or zero fishers.
4.	Ordering Meshblocks:	Meshblocks were arranged North to South in a listing, and then sorted by Territorial Authority (TA) and within TA by urban, secondary urban and rural areas. The TAs are strata. The sample meshblocks are allocated to the strata using a Kish allocation which provides for intermediate steps between proportional allocation to TAs and equal allocation. The allocation of the meshblocks was weighted 90% to proportional allocation and 10% to equal allocation to ensure adequate representation of smaller TAs. Section 3 has a map showing the final distribution of the 1 100 meshblocks across TAs.
5.	Selecting Meshblocks:	Within each TA the required sample of meshblocks is taken with a systematic probability proportional to size sampling scheme with the StatsNZ 2018 count of Private Permanent Occupied (PPO) Dwelling used as the size measure. This is implemented by taking a cumulative count of PPO Dwellings, working out the skip interval, k, taking a random number in the interval from 1 to k, and then taking every meshblock which the next k lands in.
6.	Postal Address File:	NZPost provided a spreadsheet containing a complete list of residential addresses in the 1100 selected meshblocks.
7.	Start point:	Residential addresses in each meshblock were sorted alphanumerically and assigned a random number by excel within the range of 1 to the total number of residential addresses in the meshblock. This was done sight unseen of the meshblock itself.
8.	House Selection:	Up to 37 houses were selected to screen, an increase from 32 in the previous edition. Where there were fewer than 37 houses in a meshblock, all houses were selected. Where there were more than 37 houses, the 36 houses that followed the start point after the addresses were sorted alphanumerically became the sample. Combined with the start point, this meant complete random selection at the level of dwelling.

9. Screening Process: Any adult contacted at the house could be screened to determine the required information of all permanent residents aged 15 and over. The interviewer introduced the survey and used the Fisheries New Zealand authorisation letter to legitimise their call. They then entered the following demographic data into the app: gender, age group ethnic group and fishing avidity of each person was sought. This was done for all households whether there was a fisher, or fishers, present or not.

10. Avidity Classifications: The choices of marine fishing avidity were:
    - A Non-fisher: Either 'never' fished or 'used to but given up'.
    - B Fish occasionally, but no more than three times a year.
    - C Fish several times a year, about four to nine times.
    - D Fish regularly, 10 times a year or more.

11. Respondent Selection: When more than one person in the home claimed an avidity between B and D, the 500 combination Kish Grid/Fisher Selector Table matrixes used previously as hard copies had been integrated into the software to select just one fisher to be invited to be eligible to join the panel for monitoring. These matrixes were assigned sequentially to meshblocks and addresses. Similar to the selection at the dwelling level, individual selections are truly random and do not allow self-selection by any person into the survey. No substitution of any refusing or uncontactable respondent was permitted. There was an equal probability of any fisher within a house being selected into the survey, no matter their avidity. When only one individual in the house claimed an avidity between B and D, they were automatically the selected eligible fisher.

12. Enrolment: While any adult could screen for the household as a proxy, only the selected individual could give permission to be enrolled into the panel. If they agreed, the identified respondent was enrolled into the survey by confirming their preferred phone contact details for monitoring interviews over the coming season. Each enrolled fisher was given the detailed information brochure that fully explained their role.

13. Call Frequency: Up to five visits were made at each sampled home to attempt to contact the respondent. Days of week and times of day for these calls were varied to maximise contact.

14. Call Integrity: NRB supervisors called back 10% of completed interviews to confirm that the interview was done with the named persons, how long it took, number of adults 15 years and over in the house and if they had offered to wear a mask during the interaction due to Covid 19 protocols. The app also provided a GPS check to ensure that screening occurred at the correct address.

15. Outcome Codes: Extensive coding of the outcome at both a household and individual (where at least one individual resident was eligible by claiming an avidity between B and D level) was recorded in order that detailed response rates could be calculated.

3. SCREENING AND ENROLMENT OUTCOMES

3.1 Sampled meshblocks

Figure 2 shows how the 1100 sampled meshblocks were spread among Territorial Local Authorities (TAs). Table 1 lists each TA and its distribution of meshblocks.

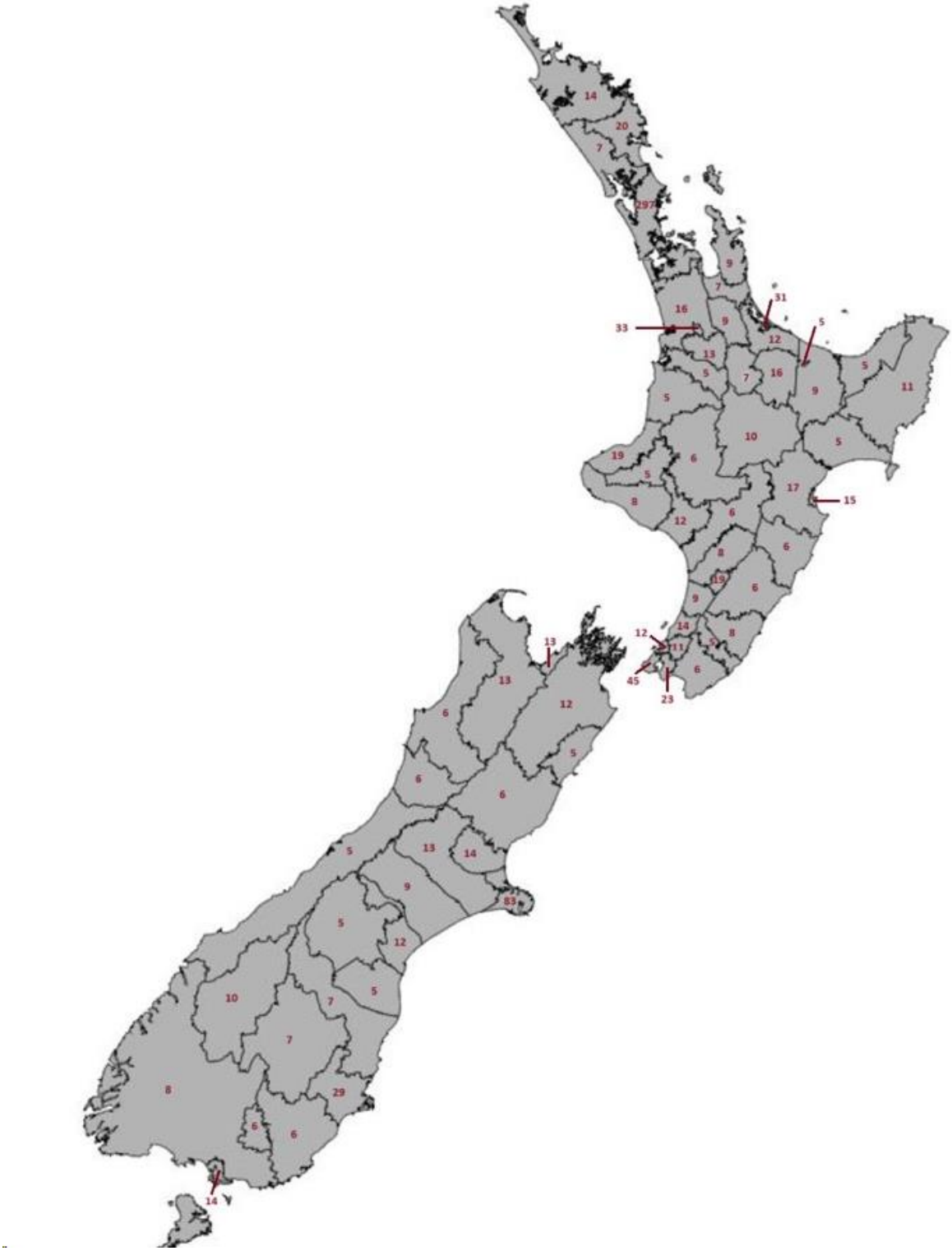


Figure 2: Location of sampled meshblocks according to Territorial Authority.

Table 1: Count of sampled meshblocks by Territorial Authority.

Territorial Authority	Meshblock Count	Territorial Authority	Meshblock Count
Far North District	14	Tararua District	6
Whangarei District	20	Horowhenua District	9
Kaipara District	7	Kapiti Coast District	14
Auckland City	297	Porirua City	12
Thames-Coromandel District	9	Upper Hutt City	11
Hauraki District	7	Lower Hutt City	23
Waikato District	16	Wellington City	45
Matamata-Piako District	9	Masterton District	8
Hamilton City	33	Carterton District	5
Waipa District	13	South Wairarapa District	6
Otorohanga District	5	Tasman District	13
South Waikato District	7	Nelson City	13
Waitomo District	5	Marlborough District	12
Taupo District	10	Buller District	6
Western Bay of Plenty	12	Grey District	6
Tauranga City	31	Westland District	5
Rotorua District	16	Hurunui District	6
Whakatane District	9	Kaikoura	5
Kawerau District	5	Waimakariri District	14
Opotiki District	5	Christchurch City	83
Gisborne District	11	Selwyn District	13
Wairoa District	5	Ashburton District	9
Hastings District	17	Timaru District	12
Napier City	15	Mackenzie District	5
Central Hawke’s Bay District	6	Waimate District	5
New Plymouth District	19	Waitaki District	7
Stratford District	5	Central Otago District	7
South Taranaki District	8	Queenstown-Lakes	10
Raupehu District	6	Dunedin City	29
Whanganui District	12	Clutha District	6
Rangitikei District	6	Southland District	8
Manawatu District	8	Gore District	6
Palmerston North City	19	Invercargill City	14

3.2 Screening and recruiting materials

Interviewers' field kits consisted of the items listed below (Table 2). They were briefed and trained on the use of the materials in full day, in person, regional seminars.

Table 2: Field interviewer's materials.

1. Tablet and app, the latter replaces hard copy screener, fisher selector and enumeration form used in previous editions.
2. Meshblock description and map- digital and hard copy
3. Double sided Laminate- Showcard (age/ethnicity/gender/marine fishing avidity) and Fisheries New Zealand authorisation letter
4. Loose Fisheries New Zealand authorisation letters
5. Language identifier
6. 6×A4 Survey Information Brochure for addresses with resident fishers

In addition, the NRB website contained a section dedicated to the research until the final week of monitoring. This included the ability to download digital versions of the field materials listed above, as well as memory jogger forms to print out and more detailed maps of the fishing areas.

3.3 Screening outcomes and response rate

Within the 1100 sampled meshblocks, 36 197 dwellings were visited, of which 25 445 were successfully screened (i.e., a household member agreed to answer the screening questions) from which 5625 fishers of B, C or D avidity aged 15 or over agreed to be enrolled in the 2022–23 NPS by providing a phone contact number. Table 3 describes the outcomes of the screening attempts at a dwelling level.

Table 3: Number of dwellings visited and contact outcomes.

		NPS Edition		
	2022 n	2022%	2017%	2011%
Access Denied*	1 811	5.0%	2.7%	2.2%
Appointment	5	0.0%	0.0%	0.0%
Household Refusal	3 481	9.6%	6.9%	5.5%
Incapacitated/Illness	111	0.3%	0.6%	0.3%
Language	56	0.2%	0.5%	0.5%
No Reply	1 840	5.1%	4.1%	5.0%
Not Available**	132	0.4%	0.2%	0.1%
Other/NE/Partial	437	1.2%	0.4%	0.2%
Unavailable during survey dates	352	1.0%	0.8%	0.7%
Vacant	2 527	7.0%	5.5%	5.8%
Screened	25 445	70.3%	78.5%	79.6%

* = Gate, Dog etc

** = Not available when house visited

Screening Summary

The screening response rate for the 2022–23 NPS at a dwelling level was 79% (86% in 2011–12 and 85% in 2017–18). The formula for which the number is arrived at is described in Table 4. The response rate calculations, using industry standard methods employed in the two previous editions of the NPS, were based on the screening outcomes for all sampled dwellings as reported by the interviewers. There was a notable increase in some non-screened categories compared to previous editions. Household refusals, where a member of the household refused to provide demographic information and refused on behalf of all other members too, occurred at a higher level. However, a refusal rate of below 10% should still be considered low and suggests that there is still a widespread tolerance amongst the public to co-operate with the screening portion of the NPS methodology.

Also, access denied, where an interviewer is unable to access the property of a selected dwelling, nearly doubled as a proportion of responses. This is largely due to an increasing number of dwellings being apartments or other configurations whereby an interviewer, or any other member of the public, cannot access the property by design.

Vacant, where nobody lives at the address or no occupied dwelling exists, or no reply, where somebody lives at the address but doesn't answer the interviewer's attempt at contact, also showed small increases compared to the 2017–18 edition.

Table 4: Categorisation of screening outcomes.

Category	Outcomes
Interviews (a_i)	Interviews (I)
Not Eligible (b_i)	Not eligible (NE), Vacant (V), Unavailable (U)
Eligibility Not Established (c_i)	No reply (NR), Access Denied (AD), Household refusal (HR)
Eligible Non Response (d_i)	Respondent refusal (RR), Not available (NA), Appointment (APT), Language (L), Incapacitated (INC), Hospitalised (HOS), Partial (P), Other (OTH)

An estimate of the eligible households within the PSU_i calculated as:

$$a_i + d_i + \frac{c_i \acute{} \ (a_i + d_i)}{(a_i + b_i + d_i)}$$

The response rate for PSU_i is the number of interviews achieved divided by the estimated eligible households.

$$\frac{a_i}{a_i + d_i + \frac{c_i \acute{} \ (a_i + d_i)}{(a_i + b_i + d_i)}}$$

This reduces to the following:

$$\frac{a_i \acute{} \ (a_i + b_i + d_i)}{(a_i + d_i)(a_i + b_i + c_i + d_i)}$$

The response rate for a group of PSU's is the average of the response rate for the individual PSUs, weighted by the estimated number of eligible households within each.

Applying this formula to the screening outcomes resulted in the final screening response rate of 79%.

$$\frac{25\,445 \times (25\,445 + 3\,316 + 304)}{(25\,445 + 304) \times (25\,445 + 3\,316 + 7\,132 + 304)} = 79\%$$

3.4 Enrolment outcomes and response rate

Enrolment Summary

The enrolment response rate for the 2022–23 NPS at the 25 445 dwellings where screening successfully took place, calculated by the same method as for the screening response rate, was 86%. This compares with 91% in 2011–12 and 92% in 2017–18. Note that this response rate is 'of those successfully screened' (i.e., 85% of 79%) (Table 5).

$$\frac{5\,625 \times (5\,625 + 18\,850 + 879)}{(5\,625 + 879) \times (5\,625 + 18\,850 + 91 + 879)} = 86\%$$

Table 5: Number of dwellings with fishers encountered and contact outcomes.

	2022 Screened n	2022 Screened %	2017 Screened %	NPS Edition 2011 Screened %
Access Denied	15	0.1%	0.0%	0.0%
Appointment	0	0.0%	0.0%	0.0%
Respondent Refusal	791	3.1%	1.9%	2.4%
Incapacitated/Illness	16	0.1%	0.0%	0.0%
Language	11	0.0%	0.0%	0.1%
No Reply	76	0.3%	0.0%	0.0%
Not Available	55	0.2%	0.3%	0.2%
Other	6	0.0%	0.0%	0.2%
Unavailable	184	0.7%	0.3%	0.3%
Enrolled	5 625	22.1%	25.5%	29.0%
Not Eligible	18 666	73.4%	71.9%	67.7%

3.5 Avidity mix of screened sample

Table 6 shows the raw number of those in the 2022–23 NPS according to the stated fishing avidity of household members and their age group. Random selection of fishers (B, C and D avidity) and their invitation into the survey was based on this sample.

Table 6: Avidity mix of screened sample 2022–23 NPS.

		Age Group – YEARS								
	TOTAL	15–19	20–24	25–34	35–44	45–54	55–64	65–74	75+	Refused
Unweighted Base	46 958	3 217	3 126	7 328	7 587	7 601	7 180	6 063	4 634	222
A-Never	38 660	2 744	2 609	6 036	6 024	6 020	5 671	5 045	4 293	218
	82.3%	85.3%	83.5%	82.4%	79.4%	79.2%	79.0%	83.2%	92.6%	98.2%
B-Not more than 3 times a year	3 298	233	242	552	663	590	537	348	131	2
	7.0%	7.2%	7.7%	7.5%	8.7%	7.8%	7.5%	5.7%	2.8%	0.9%
C-About 4-9 times a year	2 876	158	176	428	527	559	527	379	121	1
	6.1%	4.9%	5.6%	5.8%	6.9%	7.4%	7.3%	6.3%	2.6%	0.5%
D-10 times a year or more	2 124	82	99	312	373	432	445	291	89	1
	4.5%	2.5%	3.2%	4.3%	4.9%	5.7%	6.2%	4.8%	1.9%	0.5%

3.6 Avidity mix of enrolled fishers

In terms of the proportion of fishers of each avidity in the 2022–23 panel compared to previous editions, there is a significant decrease in avidity B fishers and a corresponding increase in avidity D fishers. However, looking at the absolute numbers shows that this is due to a significant decrease in B fishers, whereas the absolute numbers of D fishers was largely consistent with the two prior panels (Table 7).

It was worth noting that stated avidity is used primarily for two reasons. Firstly, in panel selection to ensure a representative panel and avoid the bias towards heavier fishers that self-selection allows. Secondly, it allows a contact schedule most suited to the panellist's activity level. Stated avidities are not used in the creation of harvest estimates.

Table 7: Stated avidity mix of enrolled fishers in the two National Panel Surveys.

	2022–23		2017–18		2011–12	
	N	%	N	%	N	%
B	2 213	39.3	3 496	50.1	3 526	50.3
C	1 987	35.3	2 197	31.5	2 183	31.1
D	1 425	25.4	1 282	18.4	1 304	18.6
Total	5 625	100	6 975	100	7 013	100

The enrolment proportions across avidity are representative of both the overall screening results as well as the fisher selection performed by the app (Table 8).

Table 8: Stated avidity of screened and selected fishers.

	All Screened	All Selected	All Enrolled
	%	%	%
B	41.4	41.6	39.3
C	34.4	34.7	35.3
D	24.2	23.7	25.4
Total	100	100	100
Base	10 018	6 776	5 625

4. MONITORING OF PANELLISTS

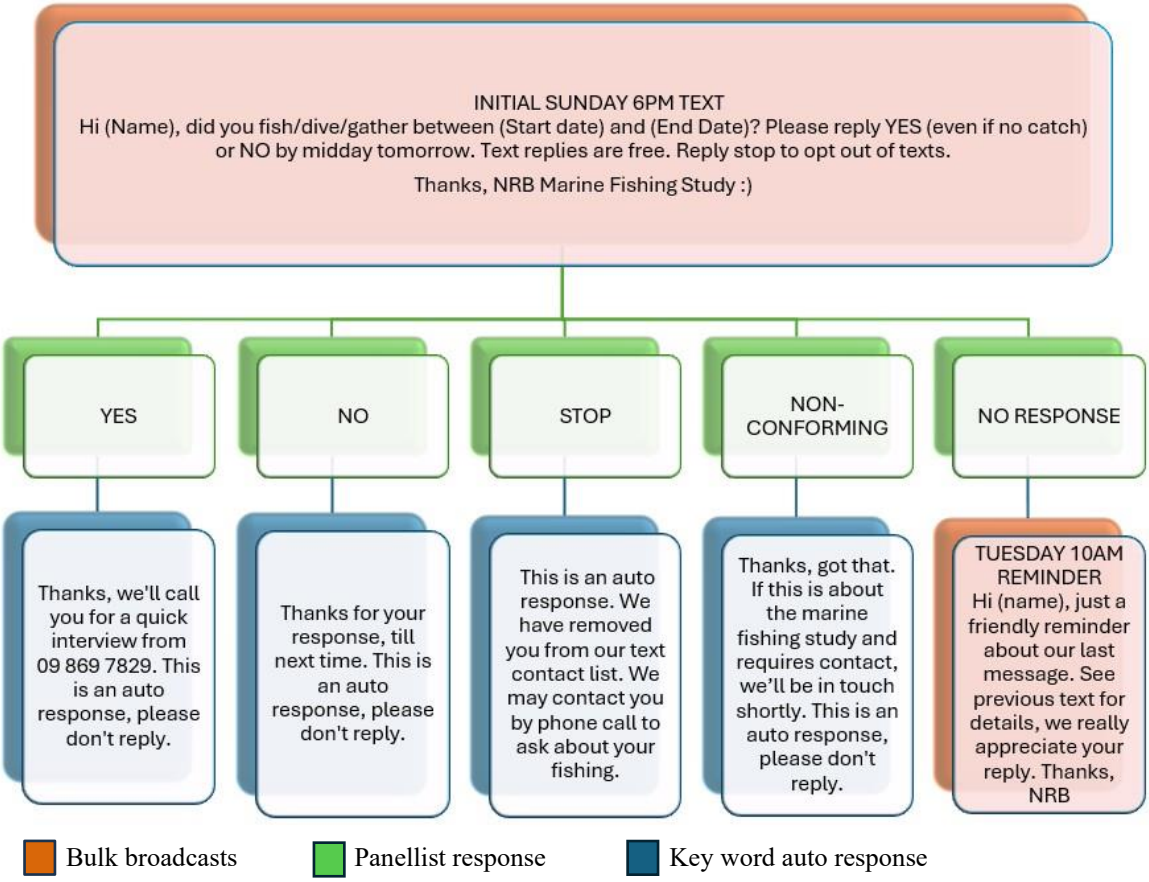
4.1 SMS Method

All participants who provided a mobile number, which was almost the entire panel, were automatically placed in the SMS contact schedule. The remainder, or those who did not (or could not) reply instead entered only the CATI system to achieve the same outcome (i.e., they were contacted at their chosen telephone number and interviewed periodically). Panellists with mobile numbers only were able to change to a CATI only contact approach if they preferred.

Panellists were contacted from a 4 digit short code that was assigned exclusively to the NPS. All replies to the short code were free for panellists with costs being paid by the holder of the short code i.e., NRB.

Bulk broadcasts to panellists were sent on Sunday evenings about their fishing up to the day the SMS was sent, with reminders on Tuesday morning if no answer had been received by this point. Each response received an auto reply dependent on the content of the panellist's SMS response (Figure 3). The content of the replies determined whether they were contacted for a structured recall interview by CATI or were scheduled for their next contact through bulk SMS broadcast (time period dependent on stated avidity and season).

Figure 3: Schematic of SMS Contact and Response During Monitoring Period.



The above procedure is in line with the previous editions, although there was an enforced addition in 2022–23. OneNZ, who have a significant market share and therefore are provider to the plurality of any panel that could be assembled in New Zealand, would only allow bulk broadcasts from a short code on the conditions that an explicit prompt to opt out of text contact was included and that NRB include its name as the commercial entity responsible for the messaging was included (in previous editions, the more generic 'NZ Marine Fishing Survey' was used). Attempts to position the broadcasts as a component of public good research rather than commercial activity were unsuccessful, and therefore the SMS contact schedule went ahead with these modifications to the previous messaging templates.

The default surveying frequency used for the fishers of different avidity is shown in Table 9. The schedule considered only two fishing 'seasons' - 'summer' being the first seven months of the monitoring period from October through to April and 'winter' being the final five months of May through to September.

The schedule was based on matching the most appropriate reporting schedule according to the stated avidity of the fisher collected at the time of enrolment. This was expected to reduce the chance of annoying survey participants with excessive contact, while not introducing recall error by asking about trips that occurred too long in the past, or too many trips in the one interview.

In addition, fishers were able to change their reporting frequency by agreement as the study progressed, either to increase the frequency (e.g., if a fisher was fishing more frequently than anticipated), or to decrease it (e.g., if a fisher was fishing less). Furthermore, they were able to temporarily suspend themselves from being contacted if they would be unavailable for extended periods e.g., overseas travel, medical procedures etc. This tailoring of reporting regime, in both the ongoing and temporary ways described, was designed to encourage on-going participation in the survey. A change to a fisher's schedule could also be made after discussion during the CATI interviews, or in response to direct contact with NRB.

Every week, contact by SMS (or CATI for landline only and non-texting panellists) was made with the scheduled survey participants according to their nominated contact frequency, as described in Table 9. These were slightly less frequent than the previous editions to minimize the number of opt out prompts each panellist received. In October-April, D fishers were contacted fortnightly instead of weekly and C Fishers triweekly instead of fortnightly. From May - September B fishers were contacted every six instead of every four weeks. The contact frequency is still regular enough for recall error to be unlikely.

Table 9: Default contact frequency by avidity.

	Stated avidity at enrolment		
	B (least avid)	C (middle avidity)	D (most avid)
October-April	Every 4 weeks	Every 3 weeks	Fortnightly
May-September	Every 6 weeks	Every 4 weeks	Fortnightly

4.2 Text responding rate

Approximately 95% of the participants provided a mobile number as their only method of contact and were therefore automatically entered into the bulk SMS broadcast contact list, the most immediate way to respond to the initial question of whether they had fished of not (over the agreed responding period). However, not all panellists actually did respond to the outgoing SMS messages. Table 10 shows the relative success of the SMS programme for each week of the survey. Note that where no text response was received to either the initial or reminder broadcast, follow up contact was made by a CATI operator. Where there was also no response to a CATI attempt, they were re-entered into the SMS broadcast for the following week, but now also asked about if they fished in the extra week e.g., a panellist who didn't respond by either SMS or CATI about the period October 1st – October 16th would receive an SMS asking whether they fished October 1st – October 23rd.

Table 10: Text responding rate for the 2022–23 NPS.

	Contacted	Yes	No	SMS RR% (Yes+No/Conatcted)	NPS 2017/18 RR%
9/10/2022	2 175	171	1 244	68	63
16/10/2022	2 529	303	1 253	64	52
23/10/2022	2 318	243	1 075	60	59
30/10/2022	2 078	252	1 206	73	65
6/11/2022	1 920	154	1 137	69	66
13/11/2022	1 973	144	1 248	74	61
20/11/2022	2 191	99	1 183	63	64
27/11/2022	1 468	103	993	77	70
4/12/2022	1 449	108	935	75	78
11/12/2022	1 410	103	824	69	74
18/12/2022	1 294	110	841	77	76
27/12/2022	2 041	244	1 295	77	73
8/01/2023	2 610	410	1 014	57	71
15/01/2023	1 860	272	886	65	71
22/01/2023	2 080	284	1 005	65	72
29/01/2023	1 137	88	405	46	75
5/02/2023	2 525	210	1 508	70	76
12/02/2023	1 356	91	479	46	79
19/02/2023	2 211	144	1 337	70	77
26/02/2023	1 636	114	859	62	80
5/03/2023	1 699	155	874	63	80
12/03/2023	1 485	81	749	58	81
19/03/2023	2 431	161	1 561	73	80
26/03/2023	1 009	57	342	41	81
2/04/2023	1 822	114	1 064	66	78
9/04/2023	1 812	94	1 039	64	78
16/04/2023	1 793	133	1 067	69	77
23/04/2023	1 183	60	516	50	78
30/04/2023	2 100	131	1 322	71	77
7/05/2023	1 241	47	580	53	76
14/05/2023	1 845	69	1 145	68	78
21/05/2023	771	19	202	29	79
28/05/2023	1 670	66	1 009	66	79
4/06/2023	1 023	44	396	44	76
11/06/2023	1 641	77	960	65	79
18/06/2023	1 081	43	459	48	80
25/06/2023	2 064	59	1 386	72	79
2/07/2023	959	12	388	42	76
9/07/2023	1 273	12	683	56	78
16/07/2023	897	26	316	39	80
23/07/2023	1 851	44	1 203	69	79
30/07/2023	1 212	43	571	53	76
6/08/2023	1 702	56	1 045	66	77
13/08/2023	862	21	293	38	78
20/08/2023	1 483	41	898	64	80
27/08/2023	990	41	413	47	77
3/09/2023	1 479	73	814	61	77
10/09/2023	1 089	34	479	49	78
17/09/2023	1 918	56	1 255	70	79
24/09/2023	969	30	384	44	77
1/10/2023	3 543	99	2 641	77	80

Valid text replies were sent with lower frequency than previous editions (Table 11). Winter months in particular received a lower response, particularly in weeks when continuous non responder's schedules made up the majority of the bulk broadcast sample. These continuous non responders, of whom there were more than in previous editions (6.2% in 2022–23 compared to 3.6% in 2017–18), have a

disproportionate effect on overall response rates as in the procedure described above, as they will produce a non reply for every week in the monitoring period after their first attempted contact. However, Table 11 still shows a significant decline in overall response to SMS contact since 2017–18, a trend that had already begun between the first two editions.

Table 11: Overall Text responding rate for all editions of the NPS.

NPS Edition	% of Yes or No SMS responses
2011–12	81.7
2017–18	74.4
2022–23	61.6

As discussed in Section 4.1, there was also an additional valid keyword response in the 2022–23 NPS. Panellists were required to be instructed that by text replying "Stop" they would be able to opt out of any further text contact for the remainder of the monitoring period. This did not preclude attempts to contact these panellists by CATI operator and were therefore not treated as resignations from the study. Table 12 below shows that approximately a third of the original panel chose to opt out by replying "Stop" at some point of the monitoring period.

Table 12: "Stop" opt out responding rate for the 2022–23 NPS.

Week	Weekly Responses	Cumulative Responses n	Cumulative Responses %
9/10/22	62	62	1.1
16/10/22	69	131	2.3
23/10/22	75	206	3.7
30/10/22	63	269	4.8
6/11/22	38	307	5.5
13/11/22	62	369	6.6
20/11/22	105	474	8.4
27/11/22	37	511	9.1
4/12/22	41	552	9.8
11/12/22	41	593	10.5
18/12/22	46	639	11.4
27/12/22	31	670	11.9
8/01/23	67	737	13.1
15/01/23	47	784	13.9
22/01/23	59	843	15.0
29/01/23	29	872	15.5
5/02/23	48	920	16.4
12/02/23	49	969	17.2
19/02/23	59	1 028	18.3
26/02/23	35	1 063	18.9
5/03/23	43	1 106	19.7
12/03/23	36	1 142	20.3
19/03/23	52	1 194	21.2
26/03/23	17	1 211	21.5
2/04/23	28	1 239	22.0
9/04/23	32	1 271	22.6
16/04/23	39	1 310	23.3

Week	Weekly Responses	Cumulative Responses n	Cumulative Responses %
23/04/23	21	1 331	23.7
30/04/23	40	1 371	24.4
7/05/23	28	1 399	24.9
14/05/23	32	1 431	25.4
21/05/23	4	1 435	25.5
28/05/23	21	1 456	25.9
4/06/23	12	1 468	26.1
11/06/23	34	1 502	26.7
18/06/23	14	1 516	27.0
25/06/23	33	1 549	27.5
2/07/23	5	1 554	27.6
9/07/23	15	1 569	27.9
16/07/23	6	1 575	28.0
23/07/23	35	1 610	28.6
30/07/23	27	1 637	29.1
6/08/23	25	1 662	29.5
13/08/23	12	1 674	29.8
20/08/23	13	1 687	30.0
27/08/23	7	1 694	30.1
3/09/23	21	1 715	30.5
10/09/23	19	1 734	30.8
17/09/23	29	1 763	31.3
24/09/23	12	1 775	31.6
1/10/23	54	1 829	32.5

4.3 CATI operation

The use of a highly structured CATI, which controls the sample as well as the routing and piping (customising questions depending on answers given) of the questionnaire reduces dependence on highly trained interviewers but still there is much the interviewers needed to be made familiar with. All CATI operators were experienced in administering structured interviews on previous CATI projects.

All CATI operators underwent remote training where they were taken through a variety of possible scenarios they could encounter, based on data from previous editions of the NPS. Once they had familiarised themselves with the interview and the most common types of interviews (area, species, method etc) they would administer, they had to successfully negotiate a series of ‘live’ test interviews with a supervisor before being confirmed for the NPS specific position.

For the first time, CATI operators were provided with a searchable list of land points and their corresponding fishing areas, as well as an online map of New Zealand’s coastline with the boundaries of the areas overlaid so that an unknown location could be readily searched to reduce interview duration. These additional materials were based on feedback from CATI operators at the completion of the previous edition.

The standard contact regime is shown in Table 13. There was of course some variation on this, for instance for long weekends or where special efforts were made to contact 'hard to contact' participants. In the latter case calling was sometimes conducted on weekends. Also, a number of significant weather events during the monitoring period e.g., Auckland Anniversary Day flooding and Cyclone Gabrielle, required modifications of schedules so that panellists weren’t called at times that would be considered

both impractical and insensitive. The preferred contact days and times, if any, were provided at enrolment but could be updated at any time if a panellist's routine changed. Unless they had specific times and dates, they were factored into the CATI contact schedule as illustrated below.

Table 13: Weekly contact schedule used when contacting panellists.

	SUN	MON	TUES	WED	THURS
10am			Text reminders to non responders		
8am–6pm	Call back attempts to participants who have texted yes but not completed CATI interview (overdue)*		CATI interview of 'yes' texters, non texters and those overdue from last week.	CATI interview of 'yes' texters, non texters and those overdue from last week.	CATI interview of 'yes' texters, non texters and those overdue from last week.
6–9pm		CATI interview of 'yes' texters and non texters	CATI interview of 'yes' texters, non texters and those overdue from last week.	CATI interview of 'yes' texters, non texters and those overdue from last week.	CATI interview of 'yes' texters, non texters and those overdue from last week.
6pm	Texts to all due fishers asking if they fished over stipulated period (fortnightly/ last 3 weeks etc.)				

*During 'summer' fishing months

The standard prioritization of contacts is listed below. The most avid fishers at enrolment were always attempted first and then the others in descending avidity.

1. Panellists who texted 'Yes' on the prior Sunday. Interviewed first to reduce any recall bias.
2. Panellists who texted 'Yes' in the previous week but were unable to be contacted
3. Landline only panellists
4. Panellists who had previously replied "Stop" to opt out of texting
5. Panellists who had not responded to the SMS broadcast

4.4 CATI questionnaire

NRB and the Marine Amateur Fishing Working Group designed the CATI (Computer Assisted Telephone Interview) questionnaire to deliver temporally and spatially resolved estimates of fish harvest. This was done before the first edition in 2011 and has remained consistent since for the purpose of collecting comparable data.

The primary purpose of the questionnaire was to find out the trip and harvest detail of those panellists who had responded to our SMS broadcast with a 'yes', indicating that they had fished in the period asked about. However, the questionnaire is also able to record non fishing activity by those who cannot or did not reply to the SMS broadcast.

The complete questionnaire is included in the appendices. The following gives an overview of the major routing:

- For each week the program asked whether there was fishing on any day.
- For each fishing day, the program asked about fishing trips.
- For each trip the program asked details of each platform.
- For each platform the program asked about areas fished.
- For each area fished the program asked about fishing method.
- For each method the program asked if:
    1. Nothing was caught or gathered.
    2. Caught and all released or discarded.
    3. Fish or other species were caught and not discarded or released.
- For each method where something was caught the program asked details on species caught.

For each species caught by a group catch method (i.e., not rod/line, or spear fishing), there were further questions about any shared effort in catching them in order to isolate personal harvest so as not to have group catch reported as the catch of the panellist alone.

4.5 Survey fishing areas

For the 2011–12 NPS and 2017–18 NPS, 51 zones/areas were used to collect fishing and catch information via the CATI (Figure 4). These 51 areas can be used (Table 14) to estimate fishing and harvest within any given Fishery Management Area (FMA, excluding FMA 4, Chatham Islands) or Quota Management Area (QMA, excluding components in FMA 4), including the unique QMAs that apply to paua, rock lobster (crayfish) and scallops.

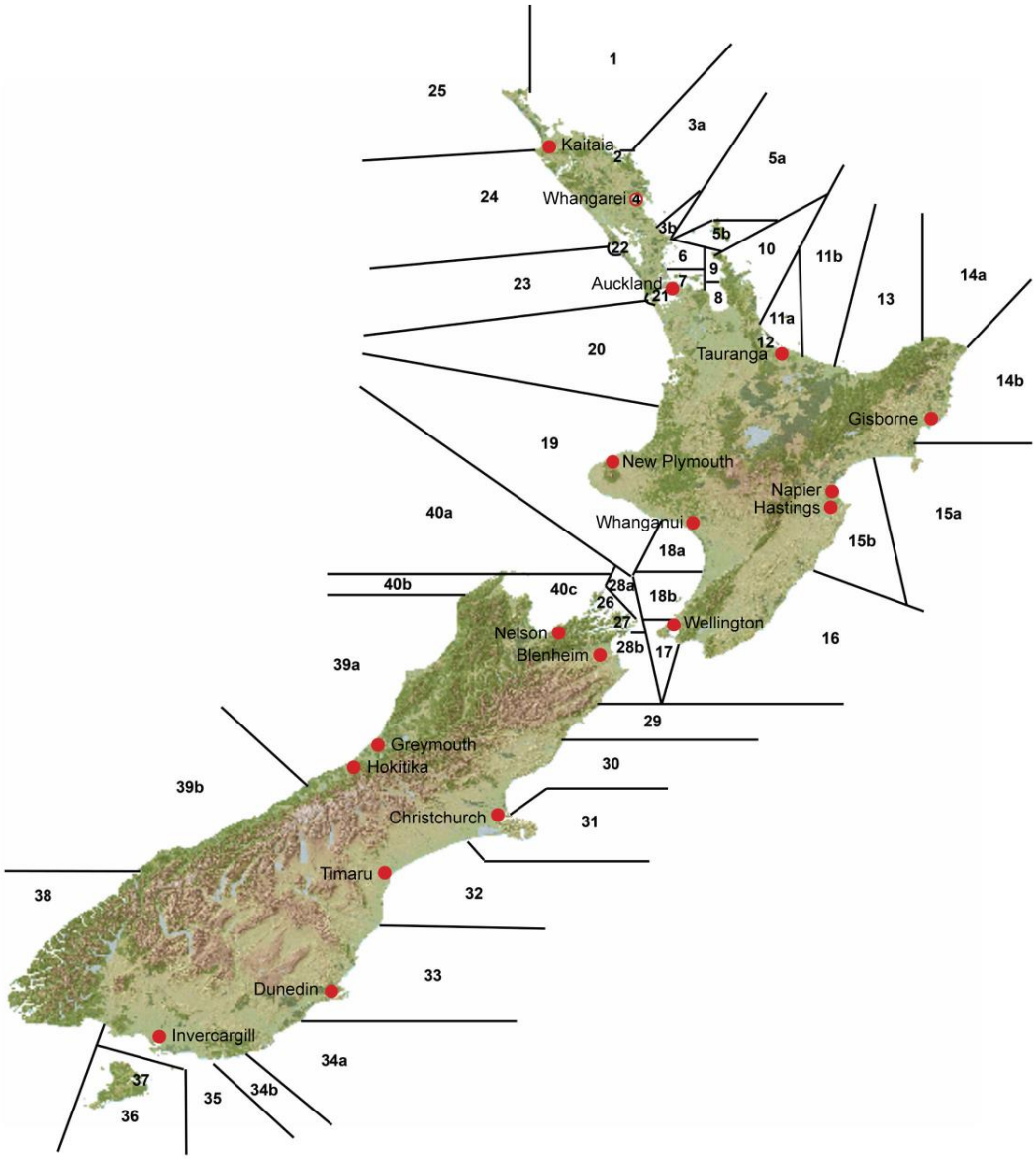


Figure 4: Fishing areas used by panellists when reporting the location of their fishing effort and catch.

Table 14 shows how the 51 survey areas can be used to derive harvest estimates for the FMAs (Fishery Management Areas) or specific QMAs (Quota Management Areas). Note that FMA 4 (Chatham Island and surrounding waters) is excluded from the scope of the survey.

Table 14: List of survey areas and equivalent FMAs and QMAs.

			QMA								
Area	Area Description	FMA	SNA/ KIN	KAH	BCO/ HPB/ TAR	GUR	TRE	ALB/ SKJ	CRA	SCA	PAU
1	North Cape to Cape Brett	1	1	1	1	1	1	1	1	1	1
2	Bay of Islands	1	1	1	1	1	1	1	1	1	1
3a	Cape Brett to Te Arai Point	1	1	1	1	1	1	1	1	1	1
3b	Te Arai Point to Cape Rodney	1	1	1	1	1	1	1	2	1	1
4	Whangarei Harbour & entrance	1	1	1	1	1	1	1	1	1	1
5a	North of Barrier Islands	1	1	1	1	1	1	1	2	1	1
5b	Barrier Islands	1	1	1	1	1	1	1	2	CS	1
6	Western Hauraki Gulf	1	1	1	1	1	1	1	2	CS	1
7	Inner Hauraki Gulf	1	1	1	1	1	1	1	2	CS	1
8	Firth of Thames	1	1	1	1	1	1	1	2	CS	1
9	Eastern Hauraki Gulf	1	1	1	1	1	1	1	2	CS	1
10	Eastern Coromandel	1	1	1	1	1	1	1	2	CS	1
11a	Northern Bay of Plenty	1	1	1	1	1	1	1	2	CS	1
11b	Middle Bay of Plenty	1	1	1	1	1	1	1	2	1A	1
12	Tauranga Harbour & entrances	1	1	1	1	1	1	1	2	CS	1
13	Eastern Bay of Plenty	1	1	1	1	1	1	1	2	1A	1
14a	East Cape – Northern	2	2	2	2	2	2	1	2	2A	2
14b	East Cape – Southern	2	2	2	2	2	2	1	3	2A	2
15a	Hawke Bay – Northern	2	2	2	2	2	2	1	3	2A	2
15b	Hawke Bay – Southern	2	2	2	2	2	2	1	4	2A	2
16	Cape Turnagain to Turakirae Head	2	2	2	2	2	2	1	4	2A	2
17	Turakirae Head to Titahi Bay	2	2	2	2	2	2	1	4	2A	2
18a	Waitotara River to Manawatu River	8	8	8	8	8	7	1	9	8A	2
18b	Manawatu River to Titahi Bay	8	8	8	8	8	7	1	4	8A	2
19	Waitotara River to Tirua Point	8	8	8	8	8	7	1	9	8A	2
20	Tirua Point to entrance area of Manukau	9	8	8	1	1	7	1	9	9A	1
21	Manukau Harbour & entrance area	9	8	8	1	1	7	1	9	9A	1
22	Kaipara Harbour & entrance area	9	8	8	1	1	7	1	9	9A	1
23	Manukau Entrance to Kaipara Entrance	9	8	8	1	1	7	1	9	9A	1
24	West of Northland	9	8	8	1	1	7	1	1	9A	1
25	Reef Point to North Cape	9	8	8	1	1	7	1	1	1	1
26	Marlborough Sounds	7	7	3	7	7	7	1	5	7	7
27	Queen Charlotte Sound & Tory Channel	7	7	3	7	7	7	1	5	7	7
28a	Stephen Is to Tory Channel excl. sounds	7	7	3	7	7	7	1	5	7	7
28b	Tory Channel to Clarence River	7	7	3	7	7	7	1	5	7C	7
29	Clarence River to Conway River	3	3	3	3	3	3	1	5	3	3
30	Conway River to Sumner Beach	3	3	3	3	3	3	1	5	3	3
31	Sumner Beach to Rakaia River	3	3	3	3	3	3	1	5	3	3
32	Rakaia River to Waitaki River	3	3	3	3	3	3	1	5	3	3
33	Waitaki River to Tokomairiro River	3	3	3	3	3	3	1	7	3	5D
34a	Tokomairiro River to Long Point	3	3	3	3	3	3	1	7	3	5D
34b	Long Point to Slope Point	3	3	3	3	3	3	1	8	3	5D
35	Slope Point to Te Waewae Inlet	5	3	3	5	3	3	1	8	5	5D
36	Stewart Is, Ruapuke Island & surrounds	5	3	3	5	3	3	1	8	5	5B
37	Patterson Inlet on Stewart Island	5	3	3	5	3	3	1	8	5	5B
38	South West of the South Island	5	3	3	5	3	3	1	8	5	5A
39a	North West of the South Island	7	7	3	7	7	7	1	9	7A	6
39b	West of the South Island	7	7	3	7	7	7	1	8	7A	6
40a	North of the South Island	7	7	3	7	7	7	1	9	7B	7
40b	Cape Farwell to Kahurangi Point	7	7	3	7	7	7	1	9	7A	7
40c	Golden Bay and Tasman Bay	7	7	3	7	7	7	1	5	7	7

Species key: SNA=snapper, KIN=kingfish, KAH=kahawai, BCO=blue cod, HPB=hapuku/bass, TAR=tarakihi, GUR=gurnard, TRE=trevally, ALB=Albacore tuna, SKJ=skipjack tuna, CRA=rock lobster, SCA=scallop, PAU=paua.

4.6 Final response by week

'Final Response by week' is the percentage of panellists for whom data for each week had been obtained by the end of the survey, either a confirmation of non-fishing in that week by SMS response (the most common outcome) or CATI interview (Table 15). Note that when contact (text or phone interview) is made with a participant, it can lead to back-filling previous weeks with fishing or not fishing information if there had been no reply to an earlier contact. It was also possible to back fill data from the exit survey when a panellist responded that they had not fished in the last 12 months. 'No data' is where we simply have no record of a person's fishing (or not) for that week, because of either resignation from the panel or non-response to our contact attempts. This rate of attrition is further examined in Section 5.

Table 15: 2017–18 NPS final response by week.

Week Ending	No n	No %	Yes n	Yes %	No Response n	No Response %
2/10/22	5 161	91.8	107	1.9	357	6.3
9/10/22	4 990	88.7	279	5.0	356	6.3
16/10/22	4 993	88.8	248	4.4	384	6.8
23/10/22	4 854	86.3	364	6.5	407	7.2
30/10/22	4 969	88.3	234	4.2	422	7.5
6/11/22	4 950	88.0	224	4.0	451	8.0
13/11/22	4 977	88.5	169	3.0	479	8.5
20/11/22	4 923	87.5	156	2.8	546	9.7
27/11/22	4 878	86.7	143	2.5	604	10.7
4/12/22	4 787	85.1	195	3.5	643	11.4
11/12/22	4 699	83.5	151	2.7	775	13.8
18/12/22	4 614	82.0	202	3.6	809	14.4
25/12/22	4 460	79.3	301	5.4	864	15.4
1/01/23	4 269	75.9	487	8.7	869	15.4
8/01/23	4 385	78.0	371	6.6	869	15.4
15/01/23	4 398	78.2	297	5.3	930	16.5
22/01/23	4 360	77.5	292	5.2	973	17.3
29/01/23	4 461	79.3	157	2.8	1 007	17.9
5/02/23	4 416	78.5	177	3.1	1 032	18.3
12/02/23	4 369	77.7	187	3.3	1 069	19.0
19/02/23	4 315	76.7	197	3.5	1 113	19.8
26/02/23	4 251	75.6	200	3.6	1 174	20.9
5/03/23	4 187	74.4	215	3.8	1 223	21.7
12/03/23	4 242	75.4	137	2.4	1 246	22.2
19/03/23	4 190	74.5	170	3.0	1 265	22.5
26/03/23	4 152	73.8	167	3.0	1 306	23.2
2/04/23	4 193	74.5	107	1.9	1 325	23.6
9/04/23	4 075	72.4	180	3.2	1 370	24.4
16/04/23	4 108	73.0	126	2.2	1 391	24.7
23/04/23	4 089	72.7	117	2.1	1 419	25.2
30/04/23	4 051	72.0	129	2.3	1 445	25.7
7/05/23	4 083	72.6	53	0.9	1 489	26.5
14/05/23	4 041	71.8	84	1.5	1 500	26.7
21/05/23	4 070	72.4	44	0.8	1 511	26.9
28/05/23	4 025	71.6	79	1.4	1 521	27.0
4/06/23	4 008	71.3	76	1.4	1 541	27.4
11/06/23	3 975	70.7	86	1.5	1 564	27.8
18/06/23	3 963	70.5	67	1.2	1 595	28.4
25/06/23	3 946	70.2	48	0.9	1 631	29.0

Week Ending	No n	No %	Yes n	Yes %	No Response n	No Response %
2/07/23	3 942	70.1	18	0.3	1 665	29.6
9/07/23	3 914	69.6	31	0.6	1 680	29.9
16/07/23	3 866	68.7	51	0.9	1 708	30.4
23/07/23	3 866	68.7	40	0.7	1 719	30.6
30/07/23	3 803	67.6	82	1.5	1 740	30.9
6/08/23	3 801	67.6	59	1.0	1 765	31.4
13/08/23	3 778	67.2	53	0.9	1 794	31.9
20/08/23	3 764	66.9	40	0.7	1 821	32.4
27/08/23	3 705	65.9	64	1.1	1 856	33.0
3/09/23	3 648	64.9	95	1.7	1 882	33.5
10/09/23	3 635	64.6	56	1.0	1 934	34.4
17/09/23	3 587	63.8	52	0.9	1 986	35.3
24/09/23	3 502	62.3	60	1.1	2 063	36.7
1/10/23	3 492	62.1	41	0.7	2 092	37.2

The proportion of panellists that fished in any given week was low. This demonstrates that surveying fishing is likely to have issues related to its status as a relatively rare behaviour, even amongst the fishing population. However, there is also a noticeable trend of missing data throughout the monitoring period caused by non-response due to panel attrition.

5. PANEL ATTRITION

5.1 Overall Attrition

The concept of attrition in a longitudinal study such as the monitoring of panellists in the NPS can be conceived of in different ways, but for the purposes of this Section it will simply relate to missing data for the weeks asked about in the 12 month period. Panellists who actively resigned and withdrew their consent to be contacted for the purposes of the study will be treated the same as panellists who stopped replying to our SMS and CATI attempts for undefined reasons. The reason for this perspective is two-fold. Firstly, panellists with an incomplete year's data due to resignation are not treated differently to those with an incomplete year's data due to non-response for unknown reasons. Secondly, it is not possible to know for certain that the unknown reason for non-response is in fact a resignation, which could be achieved by blocking the dedicated short code and/or phone number given the prevalence of mobile contacts in this edition, rather than for example, a lost or broken phone.

Compared to previous editions, there was a significant increase in attrition (Table 16). While the rate of attrition doubled between the first two editions, the rate of non-response increased at an even greater proportion in this edition, with over a third of the initial panel, 2 113 of 5 625, not providing a full 12 months data.

Table 16: Attrition by NPS edition

NPS edition	Overall Attrition
2011–12	7.6
2017–18	15.4
2022–23	37.5

5.2 SMS Opt Out Prompt

As previously discussed, the major procedural change in this edition of the NPS was the introduction of the opt out prompt by replying "Stop" be included in all bulk SMS broadcasts to panellists. This option was used by almost a third of the initial panel, 1829 of 5625 or 32.5%, which broadly correlates with the final levels of attrition in Table 16.

However, replying "Stop" only required that no further contact could be made with the panellist by means of SMS. This did not carry any legal obligation regarding contact by CATI operators. Therefore, all panellists who opted out of the SMS broadcast continued to be contacted by CATI, unless they specifically requested to resign from the panel when one of these contacts was made.

The above paragraph describes the operational procedure required to conform with OneNZ's terms so that they would allow bulk broadcasts on their network. It is probable though that, panellists considered the opt out to relate to the study in its entirety rather than just one aspect of the monitoring, despite an auto-reply that clarified this.

CATI operators were briefed in how best to try to keep panellists active rather than accept resignations. These were to:

- Move the panellist to a less frequent contact schedule or schedule specific times at which to call them.
- Remind the panellist of prize draws.
- Remind the panellist of the importance of the research to fisheries management.

This was met with only limited success, as the level of panel attrition shows in most cases panellists did not choose to remain in contact by CATI operator only.

5.3 Demographics of Attrition

Table 17 shows the level of attrition amongst all demographics, as well as compared to both the panellists with a complete season's data and attrition levels in the previous edition in 2017–18.

Table 17: Attrition amongst demographics of panellists.

	All Attrition Fishers n	All Attrition Fishers % of 2 113	Fully responding Fishers n	Fully responding Fishers % of 3 512	Total Fishers	Attrition rate % 22–23	Attrition rate % 17–18
Northland	86	4.1	161	4.6	247	34.8	17.3
Auckland	513	24.3	865	24.6	1 378	37.2	18.6
Waikato	232	11.0	391	11.1	623	37.2	15.9
Bay of Plenty	329	15.6	427	12.2	756	43.5	15.3
Gisborne	19	0.9	25	0.7	44	43.2	22.0
Hawke's Bay	101	4.8	168	4.8	269	37.5	17.9
Taranaki	91	4.3	131	3.7	222	41.0	15.4
Manawatu-Wanganui	160	7.6	202	5.8	362	44.2	18.2
Wellington	178	8.4	315	9.0	493	36.1	15.3
Tasman	32	1.5	102	2.9	134	23.9	10.0
Nelson	33	1.6	82	2.3	115	28.7	10.3
Marlborough	39	1.8	71	2.0	110	35.5	16.0
West Coast	55	2.6	62	1.8	117	47.0	13.8
Canterbury	165	7.8	286	8.1	451	36.6	12.7
Otago	60	2.8	159	4.5	219	27.4	14.1
Southland	20	0.9	65	1.9	85	23.5	11.7
Male	1 571	74.3	2 547	72.5	4 118	38.1	16.0
Female	542	25.7	965	27.5	1 507	36.0	16.8
15–19	116	5.5	113	3.2	229	50.7	28.0
20–24	175	8.3	127	3.6	302	57.9	32.9
25–34	428	20.3	457	13.0	885	48.4	25.6
35–44	422	20.0	645	18.4	1 067	39.6	15.0
45–54	355	16.8	692	19.7	1 047	33.9	13.1
55–64	277	13.1	762	21.7	1 039	26.7	8.5
65–74	234	11.1	552	15.7	786	29.8	10.8
75+	106	5.0	164	4.7	270	39.3	12.1
Māori	524	24.8	490	14.0	1 014	51.7	31.2
Non-Māori	1 589	75.2	3 022	86.0	4 611	34.5	13.2
avidityB	704	33.3	1 509	43.0	2 213	31.8	16.7
avidityC	779	36.9	1 208	34.4	1 987	39.2	14.8
avidityD	630	29.8	795	22.6	1 425	44.2	17.5

While the level of attrition is high, it is largely proportional as can be seen by the comparable proportions of the demographics. The most notable exception is Māori and non-Māori, with the former much more likely to have provided an incomplete season of data. Also, fishers aged 15–34 are more likely to have provided an incomplete season of data and those aged 55 years and over less likely.

These above groups with the highest levels of attrition in this edition were also the most likely to provide incomplete data in the 2017–18 edition of the NPS. This shows that broadly the same non-response trends are consistent across the two editions, but more severe in 2022–23.

5.4 Effect of Stop Prompt on Attrition

Table 18 shows that those who replied "Stop" to opt out of texting were significantly more likely than those who didn't to provide an incomplete season of data, even though we continued to attempt contact with the former group by CATI alone. This suggests that many who replied "Stop" to opt out considered this an opt out of the research in general rather than just the SMS contact. Note that the table excludes the 949 panellists who had explicitly resigned from all contact, including CATI.

Table 18: Attrition by "Stop" reply status.

"Stop" reply status	All Still Enrolled n	Attrition n	Attrition %
"Stop" texted	1 133	540	47.7
"Stop" not texted	3 543	634	17.9

How the non-response caused by this attrition was treated in the creation of estimates is outlined in Section 6, while possible approaches to reduce it as much as possible in any further uses of the existing methodology is discussed in Section 10.

6. EXPANSION TO POPULATION-LEVEL DATA

6.1 Estimation method

The data on recreational fishers is collected from a probability-based sample survey. Hence the usual method of estimating population quantities is to weight each respondent's data by the inverse of their probability of selection. Non-response at the respondent level (unit record level), occurs in two ways: households who refuse to participate in the avidity screening questionnaire; and people who when recruited to the panel refuse to participate. To account for this non-response, the selection (sample design) weights were modified appropriately.

The probability of selecting a sampled meshblock is:

$$\frac{nM_i}{\sum_N M_i}$$

where n, N, M_i are respectively the sample size, population number of meshblocks and number of occupied dwellings in meshblock i at the 2018 Census. The probability of selecting a dwelling within a meshblock is:

$$\frac{m_i}{M_i^{'}}$$

where $m_i, M_i^{'}$ are respectively the number of dwellings screened for fishers in meshblock i and the number of occupied dwellings in meshblock i when NRB enumerated the meshblock by PAF at the time of the survey. If there are f_{ij} fishers in dwelling j in meshblock i, then the probability of selecting a fisher is:

$$\frac{1}{f_{ij}}$$

The overall probability of selection is the product of these three probabilities and the selection weight is the inverse of this overall probability:

$$\frac{\sum_N M_i M_i^{'} f_{ij}}{nM_i m_i}$$

Since there is some nonresponse these selection weights are multiplied by a factor

$$\frac{(a_i + d_i)(a_i + b_i + c_i + d_i)}{a_i(a_i + b_i + d_i)}$$

where a_i, b_i, c_i, d_i are respectively the number of Eligible Responding Households, Not Eligible Households, Eligibility Not Established Households, and Eligible Non-Responding Households in meshblock i. This 'adjusted selection weight' is the inverse of the meshblock screening response rate as discussed in Section 3.4.

Although the median adjusted selection weight for fishers recruited to the panel was 56.4 with interquartile range (IQR) (48.3, 67.4), there are 68 fishers with weights greater than 171 (6 IQR above the median). There are three contributing factors to producing large selection weights for a fisher. First, the meshblock they lived in had substantial growth in the number of dwellings so that $M_i^{'}$ was very much greater than M_i and hence their ratio was much large than 1. Second, the response rate in their meshblock was much lower than average, for example only one or two eligible responding dwellings. Third, they lived in a dwelling with many fishers. Although variability in weights contributes to the overall sample error, truncating the weights (which is known as winsorization) produces some bias. In any case the fisher's selection weight is modified to account for nonresponse. Hence it is the impact of the final weight which matters.

Some people refused to participate after being recruited to the panel, and others only partially responded during the survey year. This nonresponse was adjusted at the calibration stage (see Section 6.5).

The above household nonresponse adjustment controls for broad meshblock characteristics, for example, inner city dwellings may be harder to contact than suburban dwellings. But nonresponse also varies according to broader geographic regions as well as demographic characteristics (gender, age, ethnicity).

Having conditioned on these characteristics, non-respondents are usually assumed to be missing at random. These sorts of characteristics could be used to build a model of the probability of responding and these model derived probabilities could be used to further adjust the selection weights at the level of an individual. An alternative, which in practice has a similar outcome is to calibrate the respondent data to known population totals for these characteristics. The details of the calibration will be discussed more fully in Section 6.5. But the next paragraphs will give a summary of what is meant by calibration.

The basic idea behind calibration is an adjustment of the (nonresponse adjusted) selection weights derived from the inverse of the inclusion probabilities adjusted for nonresponse. Call these the design weights

$$d_k = \frac{1}{\pi_k'}$$

(for respondent k). The adjustment is made so that the new weights, call these w_k, match known population totals of certain auxiliary variables, e.g., for age group or sex counts. But also, they need to be as close as possible to the d_k's. In effect the d_k's can be expressed in terms of what are called g-factors:

$$w_k = g_k d_k \text{ or } w_k = \frac{g_k}{\pi_k'}.$$

It is sensible to consider making the g-factors close to 1 by minimising an appropriate distance between 1 and the g-factors. For example, using the usual Euclidean distance we would minimise:

$$\sum_{k=1}^{N} (g_k - 1)^2$$

where the sum is over all the population. Of course, we only have a sample so we need to minimise a sample version of this:

$$\sum_{k=1}^{n} \frac{1}{\pi_k'} (g_k - 1)^2$$

or

$$\sum_{k=1}^{n} \frac{1}{d_k} (w_k - d_k)^2$$

Hence the g-factors are sample dependent. This quantity is minimised subject to the new weights when applied to the variables thought to be related to nonresponse summing to known population totals. For example, if x_i is a (1-0 or dummy) variable which is 1 if the respondent is female aged 35–44 and zero otherwise, and the population count of such people is t_{x_i}, then the constraint is

$$\sum_{k=1}^{n} w_k x_{ik} = t_{x_i}.$$

One disadvantage of the Euclidean distance is that the calibrated weights can be negative. A distance which avoids this problem is

$$\sum_{k=1}^{n} w_k \log \frac{w_k}{d_k} - w_k + d_k$$

based on the iterative proportional fitting algorithm used to get maximum likelihood estimates in contingency tables (Deville & Sarndal 1992) and this approach has been used for this survey. With this distance, calibration can be seen to be a generalisation of the raking ratio method of adjusting sample totals to census totals where there is an incomplete multiway table. For example, there is no sex by age by ethnicity table but only a sex by age table and a sex by ethnicity table.

6.2 Treatment of missing data

With a panel survey, it is possible that a person responds for some weeks but not others, for example, because they cannot be contacted. Where possible, these missing data have been backfilled at a subsequent interview. Some method of adjusting for this missing data has to be applied where this backfilling has not been possible. There are two possibilities. The first is to delete the person (and all the good information) from the sample and readjust the weights. The second is to use the person's or other respondent's recent information to impute for the missing values. This is discussed in more detail below.

With any survey item nonresponse can occur. For any time period during the 2022–23 survey, some questions may not be answered. Fortunately, this is not the case with key variables such as species, platform, method and area. But people have, for example refused to give their gender (71), age (222) or ethnicity (565), or combinations of these (676 people in total). These raw numbers are much larger than the 2017–18 survey. However, this time we asked all eligible people in a responding household their demographic information, whereas last time we asked just the panel members and a sample of 4 000 avidity A fishers who were sampled in the follow-up survey. There were 71 stated avidity A, but no stated avidity B, nor stated avidity C, nor stated avidity D with missing gender. There were 218 stated avidity A, 2 stated avidity B, 1 stated avidity C, and 1 stated avidity D with missing age. There were 512 stated avidity A, 27 stated avidity B, 16 stated avidity C, and 9 stated avidity D with missing ethnicity. Hence discounting the avidity A fishers, the demographic nonresponse this time was similar to last time. These missing values were imputed randomly based on avidity and the non-missing age gender or ethnicity distributions in the sample.

The people who did not give information for all 53 weeks that the survey ran can be categorised as follows.

1. People who were recruited to the panel but never responded. There were 350 (6.2% this time; 3.6% in 2017–18). They are treated as if they were nonresponse at the recruitment stage and their weights are set to 0.

2. People who exited the population. There are three ways this can occur: people may die during the year (around 38 000 in the population as a whole); people may migrate overseas during the year (around 118 000); and people may move out of private dwellings, for example go to prison. These reflect the natural dynamics of the population. For cost reasons, we do not capture incomers to the population, for example people who turn 15 during the survey (around 66 000), or who immigrate to New Zealand (around 237 000). In the screening sample we would expect to pick up about 1400 people who would exit the population of whom about 90–100 would be fishers. This time we did not establish which fishers exited the population as last time it was smaller (19 of them, rather than the expected 100).

3. People who could not be contacted or have resigned from the survey and where data are missing for too many weeks. Call them partial respondents missing too much data. Recall that in 2022–23, all SMS broadcasts to panellists were required to include a “Stop” prompt to allow individuals to unsubscribe from the text contact list (contact could still be, and was, made by phone call). Over the year 1829 panellists, 32.5% of the initial sample, replied “Stop” at some point of the study. In the sample there were 871 of these partial respondents missing too much data (15.5% compared with 7.5% in 2017–18). The cut-off for 'too many weeks missing data' is somewhat subjective. Many of these people have long continuous spans of missing data often ending in a resignation, as opposed to long continuous spans of non-missing data interspersed with the

occasional missing week. Hence the motivation for the cut-off was whether data were available from that person for the summer season (in particular, over the summer holidays) when fishing activity is highest. We chose a cut-off of 22 weeks; week 22 of the survey being the last complete week of February and the next week having 3 days only. This is similar to what was done in the 2017–18 survey where week 23 was used as it had 4 days in February. It is usual in household surveys to identify key variables/questions which if not answered lead to the whole record not being used as their weight is set to zero and the non-respondent being accounted for by adjusting the weights of the respondents rather than imputing (in some manner) their responses. For example, in the Statistics New Zealand Labour Force Survey, if labour force status cannot be established, the record is dropped (Statistics New Zealand 2016).

4. People who are not missing too much data and who would not be expected to have fished in the missing weeks.[3] In the sample there are 753 of these (13.4% compared with 2.6% in 2017–18). Essentially, this accounts for the very avid fishers who have, for example, one or two missing weeks, or not so avid fishers who have a moderate number of missing weeks. These people could be used and retain their weights. But because of the requirement to have the "Stop" message on the text it was thought that the assumption (accepted in the previous two panel surveys) that these fishers had actually finished their fishing rather than resigning was not tenable. For example, compared with the fully responding fishers their summary statistics were uniformly lower: Q1 = 0; median =3; Q3=11 compared with Q1=1; median=5; Q3 =16. So, this group also had their weight set to zero.[4]

5. People who are not missing too much data and who would be expected to have fished in the missing weeks. In the sample there are 139 of these (2.5% compared with 0.6% in 2017–18). This group is dominated by stated avidity D fishers (64.0% compared with 22.6% of fully responding fishers) and they catch more fish than the fully responding fishers, for example their summary statistics are: Q1=2; median=8; Q3 =14. So, if this group has their weight set to zero effectively having their record imputed by the average of the fully responding fisher there is likely undercount.[5] But equally, leaving them in with missing weeks is also likely to lead to undercount. So, imputation of missing weeks using a nearest neighbour imputation was examined. The results are described below (Table 19).

Table 19: Imputation category by stated avidity.

	Stated Avidity		
Imputation Category	B	C	D
1. Don't Impute Adjust Weights: too many missing weeks	120	126	84
2. Don't Impute: Not expected to fish	276	277	200
3. Possibly Impute	11	39	89

The nearest neighbour imputation method used was similar to that used in the 2011–12 and 2017–18 surveys. Previously, for a fisher with a missing week, their data for the most recent non-missing week was used to define the nearest neighbour classes (fishing area, species, platform, and method). For example, if they caught snapper by rod in a trailer motorboat in the Inner Hauraki Gulf, we would look for other fishers who fished in the week of missing data with these characteristics. This restriction to 1 week meant that very frequently no neighbour could be found. This time taking a window around the week with the missing data was examined. The three windows considered were plus or minus 1 week,

[3]The probability of fishing (number of weeks they fished divided by the number of weeks they responded) was estimated for each person who had not too much missing data. Then an estimated number of weeks they might fish was estimated by multiplying that probability by the number of weeks since the last response. For this group the expected number of weeks was less than 1.

[4] A sensitivity analysis was carried out looking at the impact of treating the different classes of partial respondents. If the people who are not missing too much data and would not expect to have fished in the missing weeks kept their weight, the percentage of people fishing would be 1.2% less than the final estimate well outside the sample error of the difference which is less than 0.2%. The total finfish count would be nearly 20% less and the total other marine species count would be about 21% less.

[5] Setting this group's weight to zero results in the percentage of people fishing being 0.5% less than the final estimate. The total finfish count would be 14% less and the other marine species 7% less.

or plus or minus 2 weeks, or plus or minus 3 weeks. Also considered were the group of respondents to be used as donors: those fully responding; all respondents including partial respondents; fully responding and partial responding with last response greater than week 22 (those who are not missing too much data). The different windows were tested on the fully responding group. The window of plus or minus 2 weeks was used when examining the impact of increasing the class of donors from those fully responding.

Generally speaking, across the major species and their QMAs, changing the window made little difference, certainly well within the expected sampling error[6]. Similarly using the fully responding, or all respondents, gave similar results. Interestingly using fully responding and partial responding with last response greater than week 22 produced results which were more often much different but still within sampling error.

For the major species by their QMAs, with the exception of SNA 1 and KAH 1, the additional catch from the imputation was within the sampling error of the estimates without imputation. For SNA 1, the estimate without imputation was 1 396 977 (SE 79 770). The imputation estimate was 104 703 (SE 13 411). For KAH 1 the estimate without imputation was 236 173 (SE 19 087). The imputation estimate was 25 697 (SE 5321). Even in these cases, the imputation estimate would be within commonly used confidence intervals.

After some analysis of the nearest neighbours for the few cases to be imputed it was decided that the imputation was unreliable. So, as in the 2011–12 survey we make the assumption that the non-responding fishers did not fish in the weeks where they did not provide data. This may introduce a small negative bias but as such panellists contributed only around 1% of the total estimated catch (see Table 23) any such bias is likely to be much less than 1%.

Table 20 gives the (weighted before accounting for partial nonresponse) percentage of total fish over all species caught by people in the non response categories described earlier in this section, summed over the weeks they did respond.

Table 20: Imputation category by catch.

Imputation Category	Finfish %	Non-finfish Species %
1. Don't Impute Adjust Weights: too many missing weeks	3.9	4.8
2. Don't Impute: Not expected to fish	9.4	15.1
3. Possibly Impute	9.0	5.7

6.3 Variance estimates

Because the sample design was stratified by TA, the method of calculating the variance for the numbers was to use a delete n jackknife (JKn) where the unit deleted from a stratum was the primary sampling unit (PSU), a StatsNZ meshblock. This was the same as the 2017–18 survey. For the 2011–12 survey, there was no stratification so a delete 1 (JK1) jackknife was used. All things being equal a stratified design should be slightly more accurate since the stratification should eliminate the variation in stratum means or even the variation in the stratum standard deviations (Cochran 1977 pp 99–101). The disproportionate allocation to TA will also increase the accuracy for the small regional councils.

Suppose we have an estimator $\hat{\theta}$ of some population parameter θ based on the full sample. Then the Jackknife Technique has the following steps.

1. Partition the sample of size n into K random groups of equal size m. We assume that, for any given sample s each group is a simple random sample from s even if it itself is not a simple random sample.

[6] That is averaging the sample error for each replication of the imputation.

2. For each group $k \in K$, calculate $\hat{\theta}_{[-k]}$, an estimator of the same functional form as $\hat{\theta}$ but based on the data omitting the kth group.
3. Define for each $k \in K$, the kth pseudovalue $\hat{\theta}_{-k} = K\hat{\theta} - (K-1)\hat{\theta}_{[-k]}$. This is motivated by the case of the usual sample mean estimator where the sample value X_i can be written as $X_i = n\acute{X} - (n-1)\acute{X}_{[-k]}$ where $\acute{X}$ is the sample mean for the full sample and $\acute{X}_{[-k]}$ is the sample mean for the sample with the kth observation omitted.
4. Form the Jackknife estimator of θ $\hat{\theta}_{[JK]} = \frac{1}{K}\sum_1^K \hat{\theta}_{-k}$ which is an alternative estimator to $\hat{\theta}$. The difference between these two estimators is the Jackknife bias.
5. Form the Jackknife variance estimator $\hat{V}_{[JK1]} = \frac{1}{K(K-1)}\sum_1^K \left(\hat{\theta}_{-k} - \hat{\theta}_{[JK]}\right)^2$.

The estimator $\hat{V}_{[JK1]}$ is used to estimate $V(\hat{\theta})$ as well as $V(\hat{\theta}_{[JK]})$. If the $\hat{\theta}_{-k}$'s were uncorrelated then $\hat{V}_{[JK1]}$ would be unbiased for $V(\hat{\theta}_{[JK]})$. But in general, they are correlated so unbiassedness does not hold. There are no exact results for the properties (bias variance, asymptotic distribution, etc.) of the Jackknife estimator and the Jackknife variance estimator for complex estimators, but empirical evidence suggests that it gives good estimates of sample errors for many complex statistics (Wolter 2007 Ch. 9).

A little algebra shows that $\hat{V}_{[JK1]}$ has an alternative representation as $\frac{(K-1)}{K}\sum_1^K \left(\hat{\theta}_{[-k]} - \acute{\theta}_{.}\right)^2$, where $\acute{\theta}_{.}$ is the mean of the $\hat{\theta}_{[-k]}$'s. This is possibly a more intuitive way of thinking about it as a modified variance of the Jackknife estimates.

If the Jackknife bias is large then is it usual to use the Jackknife Mean Square Error estimator (mse) $\hat{V}_{[JK2]} = \frac{1}{K(K-1)}\sum_1^K \left(\hat{\theta}_{-k} - \hat{\theta}\right)^2$ or alternatively $\frac{(K-1)}{K}\sum_1^K \left(\hat{\theta}_{[-k]} - \hat{\theta}\right)^2$

Usually in the case of complex designs the *naive* Jackknife estimator given above is adjusted so that for linear estimators the Jackknife variance corresponds to the usual analytic expression of the variance.

For multistage sampling such as the National Panel Survey the random groups for the Jackknife technique are usually the primary sampling units (PSUs; meshblocks in the case of this study but quite often random groups of PSUs).

For stratified samples one has to be more careful. One approach is to delete a PSU (or random group of PSUs) from one stratum only at a time. Here, since the stratum estimators are independent, we form for each stratum the estimate, say, the mse $\frac{(K-1)}{K}\sum_1^K \left(\hat{\theta}_{[-k]} - \hat{\theta}\right)^2$ whereas before $\hat{\theta}$ is the estimator of the population parameter θ, and $\hat{\theta}_{[-k]}$ is the estimator omitting the kth group in the stratum. Of course, the K' s will generally vary from strata to strata. For the overall mse we sum the stratum mse's.

Because the nonresponse adjustment was carried out at the meshblock level this variance estimation procedure incorporates variability due to this process. The jackknife estimates were calibrated to the population totals. This means that the variance estimates include the variability due to different types of nonresponse in the categories of the calibration variables. As mentioned above there are two usual methods of calculating the variance: about the average of the jackknife estimates or about the estimate. The latter has been used but because of the calibration these are effectively the same.

6.4 Fish weights employed

Mean fish weight estimates for 26 species of finfish and three species of other marine species were provided by a concurrent Fisheries New Zealand project (Davey et al. 2024). These were based on fish measurements made during creel surveys of recreational fishers throughout New Zealand. In some cases, separate mean weight estimates were provided for summer and winter. In other cases, a yearly estimate was used which is a (weighted) average of the two seasonal weights. For the most commonly caught species there were often estimates for all or almost all Quota Management Areas (QMAs). In other cases, the QMA weights are an average across all or some QMAs.

Final harvest estimates for a fish stock were calculated by applying the appropriate (i.e., at the QMA level) mean fish weight to each respondent's catch count and then applying their calibrated weight and summing up across all respondents.

Because the weights of the major fish species also have measurement error this should be incorporated into the estimates of the weights. The samples to measure the species' weight is independent of the panel survey, so the usual estimator for a product of two independent variables has been used: if X, Y are independent then:

$$V(XY) = E(X)^2V(Y) + E(Y)^2V(X) + V(X)V(Y)$$

and hence the coefficient of variation (CV) squared is

$$\frac{V(XY)}{E(XY)^2} = \frac{V(XY)}{E(X)^2E(Y)^2} = \frac{V(Y)}{E(Y)^2} + \frac{V(X)}{E(X)^2} + \frac{V(X)}{E(X)^2}\frac{V(Y)}{E(Y)^2} = cv(X)^2 + cv(Y)^2 + cv(X)^2cv(Y)^2$$

For the most common caught species this CV is somewhat bigger because in most cases the CV of the fish weights are not negligible (ranging from 0.3% to 5.0%). However, since the CV of the fish counts are less than 1 the last term, the product of the CVs, is negligible. Looking at the other two terms, the CV of the product of the fish count and fish weight typically increased the CV by less than 1 percentage point. This has a relatively greater impact for the more accurately estimated species such as snapper (from 4.8% to 5.2%), but less so say for gurnard (from 29.8% to 30.0%) or tarakihi (from 17.5% to 17.9%). So in practice they could be ignored, and they have not been included in the CV of the fish tonnage.

6.5 Details of calibration

The intention was to calibrate the response adjusted selection weights to known population totals from the 2023 National Census of Population and Dwellings undertaken by Statistics New Zealand (StatsNZ): specifically, by gender, age, ethnicity at the regional council level. However, as was the case for the 2017–18 survey, the release of the data from the current census (2023 in this case) has been delayed compared with previous Censuses in the 2000's. So, the data were not available for estimation.

Instead, StatsNZ estimated resident population (ERP) data have been used. These data are accurate at the regional council level for coarse classifications of age groups and gender. The classifications by ethnicity are more problematic. The only reliable estimates are for the two broad classifications Māori and non-Māori which are published for the June year and for finer age groups.

As the panel survey started in October, the relevant population classification totals were provided by the September ERP. However, there is little difference between the estimates at the five-year age groups by gender, typically less than 0.5%.

Another complicating factor is that actual age was not collected in the panel survey, rather age in age groups: '15–19', '20–24', '25–34', '35–44', '45–54', '55–64', '65–74', '75+'.

The non-availability of the Census 2023 data does however mean that the calibration data for the three surveys were determined on the same basis. The model chosen is also the same, which had agegp*sex*eth + region, where agegp is the finer age group '15–19' '20–24' '25–34' '35–44' '45–54' '55–64' '65–74' '75+' and eth splits people who report Māori into one group and the rest into another. People with missing agegp, sex or eth were imputed. The region variable is the Regional Council areas.

One difference with this survey, as mentioned above, is that all eligible people in responding households were asked to provide demographic data which means we have a more accurate estimate of the calibrated fisher population.

The nonresponse adjusted selection weights by stated avidity have Kish design effects (deff) (which are essentially one plus the square of the CV of the weights) of 1.374, 1.300, 1.327, 1.301 for the stated avidities A, B, C, and D respectively which is more even than in previous surveys.

The first stage of producing the calibrated weights was to calibrate all people in responding households, so that even fishers recruited to the panel who never responded, or partially responded had a calibrated weight. The Kish deffs by avidity were very similar to the selection weight deffs: 1.382, 1.341, 1.349, 1.383, respectively.

Previously the selection weights were modified to account for the panel nonresponse, as discussed in Section 6.2, by setting those fishers nonresponding or partially responding weights to zero. Then the responding fishers and sample of avidity A people were recalibrated to the population totals. This time because the calibrated estimates were more accurate, the nonresponding or partially responding fishers calibrated weights were set to zero. The weights of the responding sample were recalibrated to the estimated population totals of the recruited panel members. This increased the Kish deffs as expected. For the stated avidities B, C, and D, they are 1.819, 2.201, 1.957 respectively. These are larger than the 2017–18 survey which had Kish deffs of 1.626, 1.539, 1.569, respectively. This is because of the increased nonresponse.

The extreme weights also increased. One measure of extreme weights is any weight bigger than the cutoff median(w) plus 6 times the IQR(w), where w is the set of weights and IQR is the interquartile range of the set of weights. The original calibrated weights had a cutoff of 294.7 with 31, 17, and 20 weights bigger than the cutoff for fishers with stated avidities B, C, and D, respectively. The final calibrated weights had a much bigger cutoff: 607.4. There were 9, 8 and 8 weights bigger than the cutoff for fishers with stated avidities B, C, and D. But of these only 2, 6, and 4 fished.

For the more commonly caught species (see Section 9), the impact on the estimates by these respondents with extreme weights was essentially zero and very much smaller than the sample errors in part because a large number of fishers and trips contribute to the estimate[7]. Hence the weights were not truncated.

The 'coverage' factors (how much the sample estimate is rated up or down to match the population total) for the regional council estimates and age group gender and ethnicity are provided in Tables 21 and 22.

The regions with highest coverage factors reflecting greater nonresponse were in Northland and Gisborne, and were probably driven by higher nonresponse from Māori and young people. Otherwise the response factors are similar across regions, Nelson being the exception by having more responding panel members than expected.

Māori have higher coverage factors than non-Māori, as do young people and generally non-Māori women.

[7] For example, for the 12 fishers with weights over 607.4, truncating their weight to this level would reduce their contributions to total catch by relatively insignificant amounts. Specifically, for kahawai, snapper, oyster, and pipi, the reductions in counts would be 147; 2808; 633; 421, respectively. The estimated counts for these species are 513 980; 1 948 102; 83 866; 203 052, respectively. The coefficients of variation (or relative sample errors) are: 7%, 5%, 29% and 27% respectively.

Table 21: Survey coverage by region.

Region	Coverage	Region	Coverage
Auckland Region	1.39	Northland Region	2.02
Bay of Plenty Region	1.44	Otago Region	1.51
Canterbury Region	1.41	Southland Region	1.29
Gisborne Region	1.92	Taranaki Region	1.44
Hawkes Bay Region	1.28	Tasman Region	1.18
Manawatu-Wanganui Region	1.46	Waikato Region	1.44
Marlborough Region	1.31	Wellington Region	1.39
Nelson Region	0.92	West Coast Region	1.50

Table 22: Survey coverage by key demographics.

Age group	Gender	Ethnicity	Coverage	Age group	Gender	Ethnicity	Coverage
15–19	Male	Māori	2.50	15–19	Male	Non-Māori	1.41
20–24	Male	Māori	2.15	20–24	Male	Non-Māori	1.39
25–34	Male	Māori	1.99	25–34	Male	Non-Māori	1.53
35–44	Male	Māori	1.73	35–44	Male	Non-Māori	1.39
45–54	Male	Māori	1.86	45–54	Male	Non-Māori	1.32
55–64	Male	Māori	1.98	55–64	Male	Non-Māori	1.32
65–74	Male	Māori	1.44	65–74	Male	Non-Māori	1.20
75+	Male	Māori	1.50	75+	Male	Non-Māori	1.22
15–19	Female	Māori	2.21	15–19	Female	Non-Māori	1.40
20–24	Female	Māori	2.27	20–24	Female	Non-Māori	1.47
25–34	Female	Māori	1.76	25–34	Female	Non-Māori	1.43
35–44	Female	Māori	1.71	35–44	Female	Non-Māori	1.28
45–54	Female	Māori	1.87	45–54	Female	Non-Māori	1.30
55–64	Female	Māori	1.83	55–64	Female	Non-Māori	1.39
65–74	Female	Māori	1.89	65–74	Female	Non-Māori	1.31
75+	Female	Māori	1.43	75+	Female	Non-Māori	1.38

7. FISHING TRIPS ESTIMATES

7.1 Total number of fishing trips

The total estimated number of fishing trips, both catch and non-catch, in 2022–23, weighted to population estimates was calculated as 1 122 588 (Figure 5). This was a 42.8% lower estimate than for the 2017–18 NPS (1 963 950 trips). Both of these estimates include charter trips but exclude customary fishing trips and any recreational catch from a commercial vessel (data for these are separately gathered and reported to Fisheries New Zealand). It includes all trips irrespective of whether they produced harvest or not.

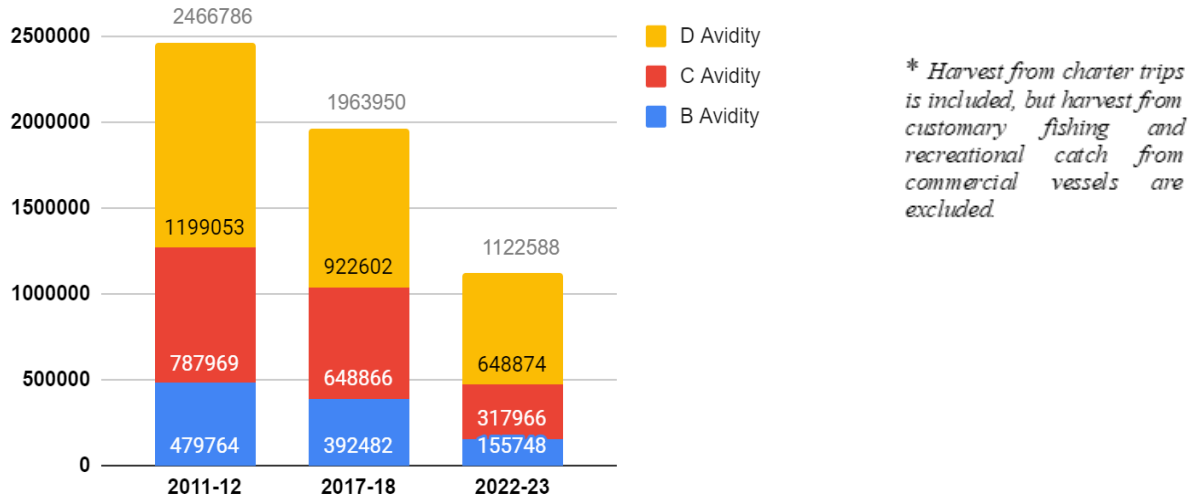


Figure 5: Estimated number of fishing trips by avidity and NPS year*.

Compared with 2017–18, D avidity trips were 42.2% lower compared to a 20.4% decrease between the 2011–12 and 2017–18 editions. However, the decrease in fishing trips amongst B and C fishers is more significant and accounts for the majority of the total decrease in fishing trips. Compared with 2017–18, C avidity trips were 51.0% lower and B avidity trips 60.3% lower. The decrease for these avidities between 2011–12 and 2017–18 were 17.7% and 18.2% respectively.

The main factor for the reduction of total fishing trips during the season is fewer panel members fishing during the study period. Those that did, fished a similar amount to respondents in previous editions, although there was a decrease in the most frequent fishers, defined here as 20 trips or more, who although outliers have a greater multiplier effect within the total trip estimates (Table 23).

Table 23: Distribution of days fished by NPS year.

	2011–12	2017–18	2022–23
% Panel members who fished in season	61	55.6	47.2
Lower quartile days fished	1	1	1
Median days fished	2	2	2
Upper Quartile days fished	6	5	4
% More than 20 days fished	3.5	3	1

The possibility that the more severe decrease in total fishing trips was a result of higher non-response rather than actual panelist activity was considered. However, even when panellists who contributed a full season of responses are isolated, there is still a pattern of fewer fishing trips than the previous edition

of the project for all avidities (Table 24). The fewer total fishing days are more than a function of higher non-response. Only 5 days or more amongst D fishers has a notable difference.

Table 24: Annual days fished by panellists by avidity with complete response across season.

	2022–23			2017–18		
Times Fished	B	C	D	B	C	D
0	63.6	37.9	11.9	57.1	28.8	12.7
1	18.6	21.9	15.0	21.0	18.8	10.5
2	7.9	13.1	12.8	8.2	13.1	8.3
3	4.2	9.6	10.6	4.6	10.0	7.7
4	2.3	5.0	7.5	3.4	6.9	6.1
5+	3.3	12.5	42.0	5.6	22.5	54.7

7.2 Fishing events by week

The estimated number of fishing trips reported in the 2022–23 NPS by week shows the now established pattern of heavier fishing in the summer (Figure 6), particularly around the Christmas/New Year holiday period. Note that the first week shows a low number of trips because it consists of just 2 days within the fishing season. The other weeks all cover seven days of data, except for week 53 which only covers six.

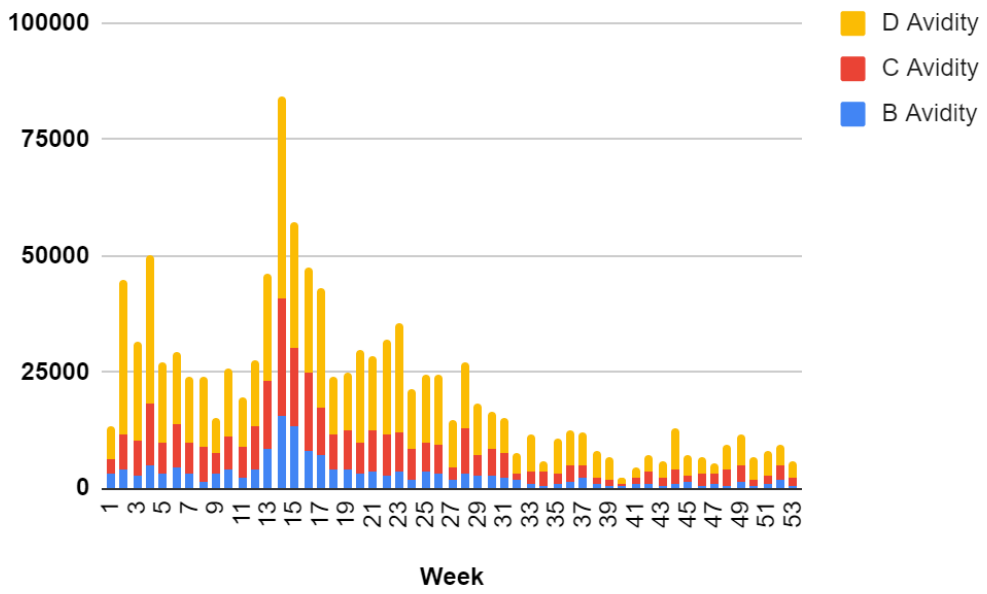


Figure 6: Estimated number of fishing trips by avidity and week (excluding customary and commercial).

7.3 Fishing events by method and platform

Where trips are viewed according to method, it is evident that the most frequent method of fishing was by rod or line. 940 710 trips were conducted this way, which accounts for four out of five events during the study period (Table 25).

Method	Rod/line	Longline/ Kontiki	Net	Pot	Dredge	Hand-gather from shore	Hand-gather by diving	Spear-fishing	Other
n	940 710	64 262	14 987	22 102	2 551	26 209	71 694	33 094	4 653
%	79.7	5.4	1.3	1.9	0.2	2.2	6.1	2.8	0.4

Table 25: Fishing Events by Method.

The most common platform for fishing events was trailer motor boats, with 515 992 accounting for nearly half of all events. Next most common was fishing from land, 414 207 trips accounting for almost a third of all events. When Larger motor boats are also included with the afore mentioned, these three platforms account for almost all recreational marine fishing in New Zealand. (Table 26)

Table 26: Fishing events by Platform.

Platform	n	%
Trailer motor boat	515 992	46.1
Larger motor boat or launch	126 939	11.4
Trailer yacht	1 620	0.1
Larger yacht or keeler	14 516	1.3
Kayak, canoe, or rowboat	35 937	3.2
Off land, including beach, rocks or jetty	414 207	37.0
Something else	9 059	0.8

As would be expected given the above figures, the most common method and platform combinations are rod and line fishing from either motor boat or land (Table 27), which is in alignment with findings of previous editions.

Table 27: Fishing events by method and platform.**

Platform		Method: Rod/line	Longline/ Kontiki	Net	Pot	Dredge	Hand gather from shore	Hand gather by diving	Spear-fishing	Other
Trailer motor boat		466 018	17 352	4 368	14 228	2 069	1 008	30 776	17 624	116
	CV	0.04	0.19	0.33	0.30	0.36	0.68	0.16	0.17	1.01
	%*	49.5	27.0	29.1	64.4	81.1	3.8	42.9	53.3	2.5
Larger boat/launch		121 745	2 984	986	2 622	482	87	3 735	2 091	0
	CV	0.12	0.34	1.01	0.95	0.89	1.00	0.31	0.36	0.00
	%	12.9	4.6	6.6	11.9	18.9	0.3	5.2	6.3	0.0
Trailer yacht		1 352	122	0	0	0	0	0	146	0
	CV	0.46	1.00	0.00	0.00	0.00	0.00	0.00	1.01	0.00
	%	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.4	0.0
Larger yacht/keeler		12 554	1 189	0	0	0	0	589	703	0
	CV	0.24	0.55	0.00	0.00	0.00	0.00	0.56	0.59	0.00
	%	1.3	1.8	0.0	0.0	0.0	0.0	0.8	2.1	0.0
Kayak/rowboat		29 511	1 941	1 126	584	0	275	1 841	1 411	0
	CV	0.21	0.45	0.77	0.82	0.00	0.72	0.56	0.43	0.00
	%	3.1	3.0	7.5	2.6	0.0	1.0	2.6	4.3	0.0
Off land		300 789	40 675	8 508	4 668	0	24 839	34 435	11 119	4 537
	CV	0.06	0.12	0.21	0.59	0.00	0.13	0.14	0.20	0.92
	%	32.0	63.3	56.8	21.1	0.0	94.8	48.0	33.6	97.5
Other		8 740	0	0	0	0	0	319	0	0
	CV	0.31	0.00	0.00	0.00	0.00	0.00	0.76	0.00	0.00
	%	0.9	0.0	0.0	0.0	0.0	0.0	0.4	0	0

** Column percent ** Multiple response (e.g., a trip could involve more than 1 platform or method)*

7.4 Fishing events by month and FMA

The number of events in a FMA indicates how popular each area is for recreational fishing, a popularity largely driven by proximity to population centres. See Section 2.14 for a description of FMA boundaries.

Table 28 shows that the majority of events in New Zealand (51.6%) occurred in FMA 1 (East Northland, the Hauraki Gulf, and the Bay of Plenty). This is however a decrease in the 56.4% of all trips recorded in the previous edition of the NPS.

Table 28: Fishing events by FMA.

FMA	1	2	3	5	7	8	9
n	576 732	116 081	78 476	32 227	115 964	107 947	90 843
%	51.6	10.4	7	2.9	10.4	9.7	8.1

Approximately a third of all events occurred in the peak summer holiday months of December and January (Table 29), and less than one in five events occurred in the ‘winter’ months (according to the study contact schedule in Section 4.1).

Table 29: Fishing Events by month.

Month	n	%
October 22	168 305	15.1
November 22	94 446	8.4
December 22	185 022	16.5
January 23	184 355	16.5
February 23	116 573	10.4
March 23	107 772	9.6
April 23	84 564	7.6
May23	36 317	3.2
June 23	39 986	3.6
July 23	31 848	2.8
August 23	30 422	2.7
September 23	38 660	3.5

However, as with combination of method and platform, management area and month fished in show a broad alignment with the distribution of trips in the previous edition of the NPS (Table 30).

Table 30: Fishing events by month and FMA.**

		FMA						
Month		1	2	3	5	7	8	9
Oct22		92 230	17 832	10 783	5 090	12 281	13 995	16 095
	CV	0.09	0.15	0.26	0.28	0.13	0.16	0.16
	%*	16.0	15.4	13.7	15.8	10.6	13.0	17.7
Nov22		42 960	17 103	11 831	1 787	6 677	6 744	7 344
	CV	0.09	0.13	0.19	0.38	0.18	0.21	0.18
	%	7.4	14.7	15.1	5.5	5.8	6.2	8.1
Dec22		96 831	22 029	14 332	3 252	19 914	16 958	11 707
	CV	0.07	0.15	0.15	0.29	0.14	0.13	0.16
	%	16.8	19.0	18.3	10.1	17.2	15.7	12.9
Jan23		83 063	17 294	14 738	5 666	26 749	24 401	12 443
	CV	0.07	0.14	0.15	0.24	0.13	0.15	0.14
	%	14.4	14.9	18.8	17.6	23.1	22.6	13.7
Feb23		61 003	8 659	7 074	3 960	11 067	12 132	12 679
	CV	0.10	0.18	0.16	0.23	0.14	0.17	0.21
	%	10.6	7.5	9.0	12.3	9.5	11.2	14.0
Mar23		65 050	66 13	5 877	4 046	10 625	6 590	8 971
	CV	0.09	0.25	0.19	0.37	0.17	0.26	0.17
	%	11.3	5.7	7.5	12.6	9.2	6.1	9.9
Apr23		39 874	5 548	5 499	2 416	11 782	11 697	7 748
	CV	0.09	0.20	0.21	0.26	0.16	0.16	0.20
	%	6.9	4.8	7.0	7.5	10.2	10.8	8.5
May23		19 802	4 254	1 790	685	2 469	3 856	3 461
	CV	0.11	0.24	0.38	0.41	0.40	0.25	0.36
	%	3.4	3.7	2.3	2.1	2.1	3.6	3.8
Jun23		20 756	3 794	1 496	3 529	4 109	3 244	3 058
	CV	0.13	0.33	0.39	0.37	0.30	0.24	0.27
	%	3.6	3.3	1.9	11.0	3.5	3.0	3.4
Jul23		16 225	5 466	1 300	282	3 659	1 771	3 145
	CV	0.12	0.25	0.33	0.54	0.44	0.33	0.40
	%	2.8	4.7	1.7	0.9	3.2	1.6	3.5
Aug23		18 069	2 728	1 107	980	3 438	1 939	2 162
	CV	0.13	0.30	0.43	0.47	0.45	0.36	0.42
	%	3.1	2.3	1.4	3.0	3.0	1.8	2.4
Sep23		20 868	4 762	2 651	534	3 194	4 621	2 030
	CV	0.13	0.20	0.22	0.45	0.28	0.21	0.30
	%	3.6	4.1	3.4	1.7	2.8	4.3	2.2

** Column percent ** Multiple response (e.g., a trip could involve more than 1 FMA)*

7.5 Fishing events by method and FMA

Fishing using a rod and line is by far the most common method in each FMA, accounting for comfortably more than half of all trips in every area.

However, there is some variation in the other methods used in each FMA (Table 31); hand gathering or floundering from the shore was more prevalent in FMAs 3, 5 and 8 whilst using a kontiki or longline was very prevalent in FMA 8 and somewhat more prevalent in FMAs 7 and 9.

Table 31: Fishing events by method and FMA.**

		FMA						
Method		1	2	3	5	7	8	9
Rod/line		519 944	79 487	54 350	23 216	99 225	90 480	74 052
	CV	0.05	0.12	0.10	0.16	0.09	0.12	0.10
	%*	86.8	63.2	62.8	62.9	77.9	81.4	78.9
Longline/kontiki		27 721	5 373	2 764	231	9 975	11 200	7 000
	CV	0.15	0.26	0.38	0.62	0.19	0.19	0.28
	%	4.6	4.3	3.2	0.6	7.8	10.1	7.5
Net		4 123	1 021	584	1 372	2 244	694	4 951
	CV	0.38	0.44	0.55	0.65	0.37	0.50	0.31
	%	0.7	0.8	0.7	3.7	1.8	0.6	5.3
Pot		3 032	8 978	4 733	1 200	3 679	422	59
	CV	0.82	0.37	0.62	0.52	0.73	0.79	1.00
	%	0.5	7.1	5.5	3.3	2.9	0.4	0.1
Dredge		0	0	0	1314	0	0	1237
	CV	0.00	0.00	0.00	0.47	0.00	0.00	0.55
	%	0.0	0.0	0.0	3.6	0.0	0.0	1.3
Hand gather from shore		11 085	2 556	2 695	1 600	2 451	3 972	1 849
	CV	0.20	0.37	0.27	0.71	0.27	0.46	0.33
	%	1.9	2.0	3.1	4.3	1.9	3.6	2.0
Hand gather by diving		14 345	22 405	15 188	6 358	6 363	3 457	3 578
	CV	0.18	0.19	0.21	0.21	0.29	0.34	0.67
	%	2.4	17.8	17.6	17.2	5.0	3.1	3.8
Spearfishing		14 043	5 954	6 220	1 599	3 463	877	939
	CV	0.23	0.24	0.33	0.52	0.35	0.41	0.41
	%	2.3	4.7	7.2	4.3	2.7	0.8	1.0
Other		4 435	0	0	0	0	0	217
	CV	0.95	0.00	0.00	0.00	0.00	0.00	1.01
	%	0.7	0.0	0.0	0.0	0.0	0.0	0.2

** Column percent ** Multiple response (e.g., a trip could involve more than 1 method or FMA)*

7.6 Fishing events by platform and FMA

As in the previous edition, the two most common platforms for fishing trips in all areas were trailer motorboats and fishing from land which account for an overwhelming majority of all trips (Table 32).

Table 32: Fishing events by platform and FMA.**

						FMA	
Platform	1	2	3	5	7	8	9
Trailer motor boat	290 248	53 509	25 573	15 641	60 714	34 818	35 489
CV	0.06	0.17	0.18	0.18	0.11	0.15	0.14
%*	50.3	46.1	32.6	48.5	52.4	32.3	39.1
Larger boat/launch	85 980	6 664	2 609	6 435	16 202	2 164	6 886
CV	0.15	0.43	0.25	0.32	0.35	0.32	0.31
%	14.9	5.7	3.3	20.0	14.0	2.0	7.6
Trailer yacht	1 078	0	127	0	415	0	0
CV	0.44	0.00	1.01	0.00	1.02	0.00	0.00
%	0.2	0.0	0.2	0.0	0.4	0.0	0.0
Larger yacht/keeler	11 130	393	147	88	2 243	516	0
CV	0.28	0.81	1.02	1.01	0.41	0.57	0.00
%	1.9	0.3	0.2	0.3	1.9	0.5	0.0
Kayak/rowboat	19 787	4 318	546	1 116	3 642	4 129	2 399
CV	0.28	0.45	0.54	0.68	0.30	0.56	0.51
%	3.4	3.7	0.7	3.5	3.1	3.8	2.6
Off land	160 704	51 047	49 381	8 947	32 692	65 687	45 749
CV	0.11	0.12	0.11	0.29	0.13	0.13	0.15
%	27.9	44.0	62.9	27.8	28.2	60.9	50.4
Other	7 805	151	94	0	55	634	319
CV	0.34	1.01	1.00	0.00	1.06	0.79	0.76
%	1.4	0.1	0.1	0.0	0.0	0.6	0.4

** Column percentage ** Multiple response (e.g., a trip could involve more than 1 platform or FMA)*

7.7 Fishers by FMA

The estimated number of persons who fished (at least once, including no catch) in each of the FMAs is shown in Table 33. Substantially more fishers fished in FMA1 than any other FMA, but this continues to slowly decrease as a percentage of fishers compared to the previous two NPS surveys. Compared with the 2017–18 NPS, there were noticeably fewer fishers in each FMA. This was most pronounced in the two most northern FMAs, where there were over 30% fewer fishers compared to the previous edition of the NPS.

Table 33: Fishers by FMA.

						FMA	
	1	2	3	5	7	8	9
2022–23 Estimate	156 627	37 373	25 451	8 976	33 210	33 152	35 919
2022–23 % of all fishers	47.4	11.3	7.7	2.7	10.0	10.0	10.9
2017–18 Estimate	228 086	47 827	34 850	11 923	45 834	36 779	57 708
2017–18 % of all fishers	49.3	10.3	7.5	2.6	9.9	7.9	12.5
2011–12 Estimate	268 559	61 834	42 678	10 432	47 521	42 344	57 216
2011–12 % of all fishers	50.6	11.7	8.0	2.0	9.0	8.0	10.8
% change between 2017–18 and 2022–23	-31	-22	-27	-25	-28	-10	-38

7.8 Trips by Harvest status

The NPS questionnaire (found in appendices) not only captures harvest data, but also details of trips where no species were harvested by the panelist, either because nothing was caught on that trip, or because all catch was released, and none kept. Note that in the latter instance, no further distinction is made as to why catch was released e.g. whether the release was due to the species being an undesirable eating fish or whether it was undersized etc.

There has been a slight increase in the proportion of fishing activity throughout the season that resulted in no harvest, both through catch and release and no catch (Table 34). Results are displayed with both trips and events as the base. Trips may include multiple events that include both harvest and non-harvest fishing outcomes e.g., a panelist may successfully spearfish and unsuccessfully dive on the same trip, therefore trips are multiple response.

Table 34: Harvest status of trips and events per season.

	2011–12		2017–18		2022–23	
	Trips %	Events %	Trips %	Events %	Trips %	Events %
Catch and keep something	75.5	74.1	76.6	75.4	71.7	69.6
Catch and release everything	7.4	7.3	8.3	8.2	10.7	10.3
No catch	18.9	18.6	16.7	16.4	20.7	20.1

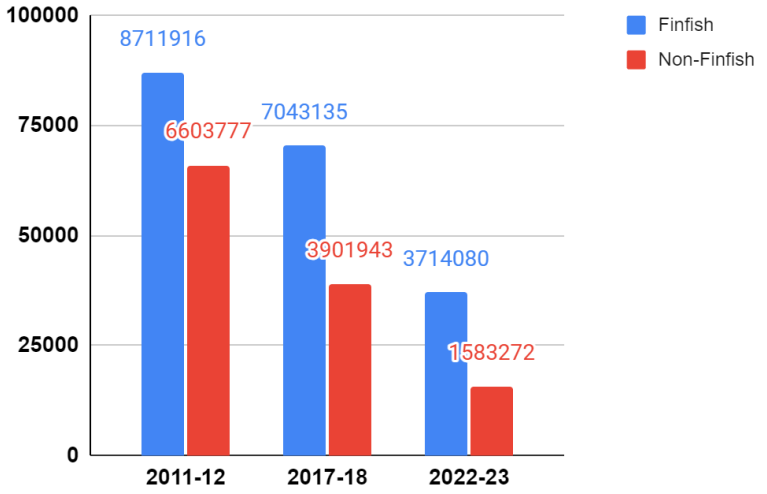
8. HARVEST ESTIMATES

8.1 Total recreational marine harvest

As a brief reminder of the more detailed explanation in Section 6.2, non-response was addressed in multiple ways when producing estimates depending on the nature of the panelist's non-response. Panellists who never responded to harvest data monitoring requests had their population weights set to 0, and therefore the weights of those who did respond changed accordingly. Alternatively, non-response for weeks of panellists who provided some but not all data during the season were assumed to have not fished in the weeks where they did not respond. This may introduce a small negative bias to the estimates that follow in this Section and Section 9.

The total number of both finfish and non-finfish (weighted to population estimates) harvested and reported in all three editions of the NPS, including the 2022–23 season, are shown following in Figure 7 below. The term 'harvested' means that a fish was caught and not released.

The estimated total recreational harvest for finfish in 2022–23 was 3 714 080 fish. The total count for non-finfish was 1 583 272. These estimates are lower than those from the 2011–12 NPS by 47.2% and 59.4% respectively.



* *Harvest from charter trips is included, but harvest from customary fishing and recreational catch from commercial vessels are excluded.*

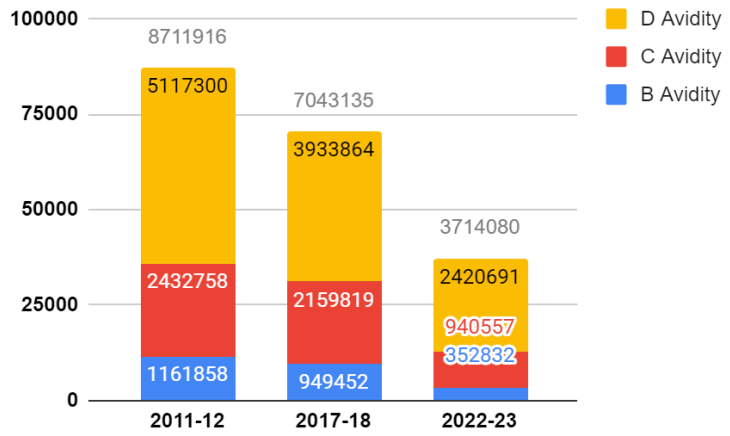
Figure 7: Estimated total marine harvest by NPS year*.

The lower count of species harvested is primarily a result of fewer fishing trips occurring in the 2022–23 season, 42.2% fewer trips than in 2017–18 as shown in Section 7.1 which is broadly comparable to the 47.2% reduction in finfish harvested. Similarly, the total number of fishing trips in 2017–18 was lower than 2011–12 by 20.4%, with a corresponding 19.2% decrease in finfish harvested. This suggests a strong correlation between recreational marine fishing trips undertaken and recreational marine harvest of fin fish species.

As in 2017–18, the reduction in non finfish species was more severe than for finfish when compared to the estimate from the previous edition of the NPS and doesn't have as strong a correlation with fishing trips undertaken. It should be noted that there were closures of several fisheries over the monitoring period of the research. Most significantly, scallop fisheries in Northland and Coromandel areas were closed for the duration of the season, accounting for a significant proportion of the reduction in comparison to the previous NPS. This will be shown in further detail in Section 9. There were also closures for part of the season in other non finfish fisheries such as paua in the Kaikoura area and rahui which, while not government enforced, limited or prohibited the collection of shellfish in areas such as Taranaki. These factors must be considered when making any comparison of total non finfish harvest between the most recent edition of the NPS and its predecessor.

8.2 Finfish harvest by avidity

For the 2022–23 survey year, D avidity fishers harvested 2.42 million or 65.2% of the finfish, C avidity fishers harvested 25.3%, and B avidity 9.5% (Figure 8). This compares to the 2017–18 proportions by stated avidity of 55.9% by D fishers, 30.7% by C Fishers and 13.5% by B fishers. In contrast to the decrease between 2011–12 and 2017–18, where D fishers showed the greatest proportional decrease in harvest, 2022–23 finfish harvest by avidity exhibits more notable proportional decreases by B and C fishers of 62.8% and 56.5% respectively in comparison to the previous NPS, with D fishers exhibiting a 38.5% decrease.



* *Harvest from charter trips is included but harvest from customary fishing, and recreational harvest from commercial vessels is excluded.*

Figure 8: Total number of finfish harvested by avidity and NPS year*.

8.3 Finfish harvest by week

In general, the distribution of fish caught each week (Figure 9) broadly aligns with the distribution of trips by week (see Figure 6), with the period of most activity coinciding with summer holidays. There is a notable spike in week 4, which is the week that includes the Labour Day public holiday.

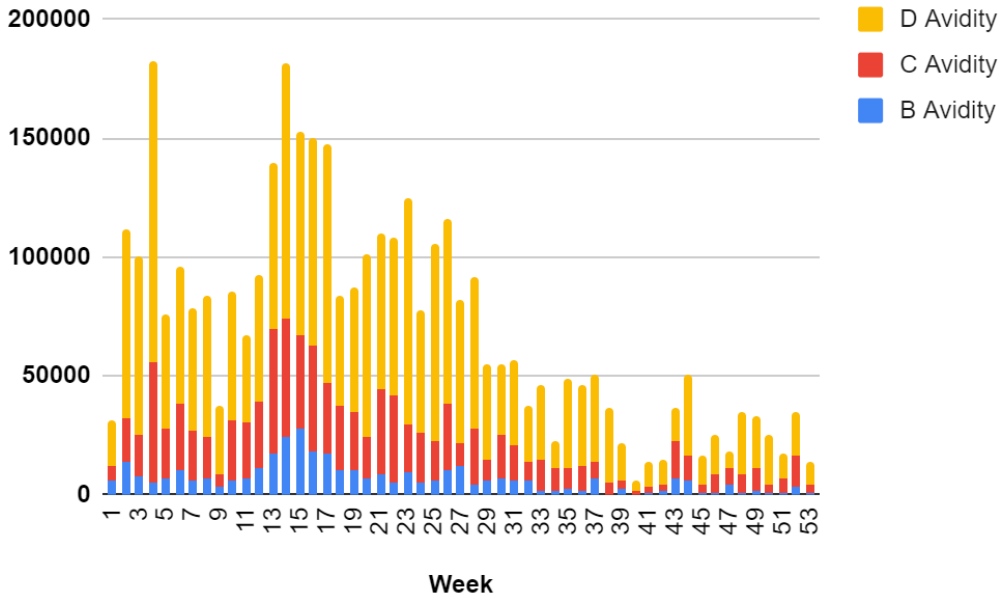


Figure 9: Estimated number of finfish harvested by avidity and week (excluding customary and commercial).

8.4 Finfish harvest by species in detail

The four most commonly harvested species in 2022–23 accounted for 80.2% of all finfish taken, by number (Table 35). The most frequently harvested species by far was snapper with 1 948 102 being taken or 3 010 tonnes, just over half of the total finfish harvest of 3 726 068 fish. The second most commonly harvested finfish was kahawai of which 513 980 were harvested or 810.29 tonnes. Harvest of blue cod, the most common species caught in the South Island, was 316 746 or 170.02 tonnes.

Table 35: NZ finfish total harvest (table sorted by harvest number).

	Fishers (n)	Events (n)	Fish (n)	CV	Weight (tonnes)	CV	Mean Weight (kg)
Snapper	1 405	4 299	1 948 102	0.05	3 009.82	0.05	1.55
Kahawai	938	2 001	513 980	0.07	810.29	0.08	1.58
Cod – Blue	317	825	316 746	0.11	170.02	0.11	0.54
Gurnard — Red	395	712	201 100	0.27	114.63	0.30	0.57
Tarakihi	187	325	126 682	0.18	126.78	0.18	1.00
Trevally	347	568	101 750	0.11	151.12	0.11	1.49
Mackerel – Jack	61	90	58 941	0.25	24.64	0.25	0.42
Sea perch	59	120	56 251	0.23	36.06	0.23	0.64
Butterfish	68	121	47 101	0.24	50.98	0.24	1.08
Flatfish	54	90	41 627	0.32	9.69	0.32	0.23
Kingfish	139	199	34 628	0.14	352.77	0.14	10.19
Mullet – Grey	26	41	25 871	0.42	21.17	0.42	0.82
Tuna – Skipjack	30	40	21 102	0.40	43.96	0.40	2.08
Mullet – Yellow Eyed	37	53	19 355	0.27	6.29	0.27	0.33
Mackerel – Blue	24	26	16 550	0.43	18.65	0.43	1.13
Trumpeter	30	60	16 439	0.32	24.05	0.32	1.46
Pilchard	9	14	15 888	0.73	18.36	0.73	1.16
Shark – Rig	90	137	14 861	0.19	37.03	0.19	2.49
Other Fin fish	56	75	12 354	0.22	-	-	-
Groper – Hapuku/Bass	56	79	11 989	0.41	77.01	0.20	6.39*
Groper – Hapuku only	52	67	10 323	0.21	65.92	0.20	6.39
Garfish	9	11	9 948	0.41	-	-	-
Blue Moki	31	39	9 558	0.30	20.36	0.30	2.13
Blue Maomao	18	30	9 060	0.36	-	-	-
Barracouta	37	43	7 910	0.32	16.84	0.32	2.13
Koheru	12	17	7 850	0.36	-	-	-
Shark – Spiny Dogfish	24	24	6 905	0.35	4.43	0.35	0.64
Shark – School shark	32	41	6 429	0.32	-	-	-
John Dory	32	38	6 262	0.25	8.02	0.25	1.28
Spotty/Paketi	9	15	6 028	0.49	-	-	-
Tuna – Albacore	20	29	4 949	0.30	36.06	0.30	7.29
Porae	19	20	4 431	0.36	-	-	-
Bluenose	17	24	3 492	0.33	28.38	0.33	8.13
Elephant fish	14	18	3 101	0.62	-	-	-
Gemfish	12	18	2 965	0.62	-	-	-
Wrasse	11	11	2 876	0.45	-	-	-
Cod – Red	21	25	2 775	0.32	2.61	0.32	0.94
Māori Chief	4	6	2 239	0.84	-	-	-
Moki	9	9	2 229	0.42	-	-	-
Marlin	10	11	2 134	0.39	-	-	-
Perch	4	4	1 498	0.63	-	-	-
Mako shark	2	2	1 458	0.94	-	-	-
Parrotfish	3	7	1 350	0.65	-	-	-
Red Moki	4	4	1 120	0.56	-	-	-
Trout/Sea Trout	5	6	1 106	0.52	-	-	-
Parore	7	7	1 014	0.58	-	-	-
Pigfish	7	7	971	0.40	-	-	-
Bream/Brim	2	5	535	0.81	-	-	-
Hammerhead Shark	4	4	533	0.55	-	-	-
Eel	5	5	464	0.55	-	-	-

	Fishers (n)	Events (n)	Fish (n)	CV	Weight (tonnes)	CV	Mean Weight (kg)
Stingray	3	3	455	0.62	-	-	-
Warehou	3	3	306	0.61	-	-	-
Leatherjacket	3	3	269	0.71	-	-	-
Bronze Whaler Shark	1	1	245	1.00	-	-	-
Ling	1	1	84	1.00	-	-	-
Salmon	3	4	79	1.00	-	-	-
Rock Cod	1	1	72	1.02	-	-	-
Kelpie	1	1	61	1.02	-	-	-

**Mean weight for hapuku only used for combined category due to scarcity of bass weight data*

8.5 Finfish harvest compared with earlier editions

Table 36 shows the estimated harvest for each finfish species for all editions of the NPS. For the majority of finfish species, there has been a decrease in the harvest estimate. The exceptions to this trend are species with a comparatively small estimate due to being infrequently caught and kept.

Table 36: 2022–23 Finfish harvest estimate compared with previous NPS estimates (table sorted alphabetically by species).

	2022–23	2017–18	2011–12	22–23 and 17–18 Difference n	22–23 and 17–18 Difference %
Barracouta	7 910	18 581	39 652	-10 671	-57.4
Blue Maomao	9 060	13 072	31 488	-4 012	-30.7
Blue Moki	9 558	31 939	27 926	-22 381	-70.1
Bluenose	3 492	9 629	7 784	-6 137	-63.7
Bream/Brim	535	32	14 070	503	1 572.8
Bronze Whaler Shark	245	203	570	42	20.8
Butterfish	47 101	67 490	69 831	-20 389	-30.2
Carpet Shark	0	422	452	-422	-100.0
Cod – Blue	316 746	594 934	682 550	-278 188	-46.8
Cod – Red	2 775	30 200	33 963	-27 425	-90.8
Conger Eel		368	488	-368	-100.0
Eel	464	3 244	19 621	-2 780	-85.7
Elephant fish	3 101	3 047	6 198	54	1.8
Flatfish	41 627	95 859	143 619	-54 232	-56.6
Garfish	9 948	28 354	23 123	-18 406	-64.9
Gemfish	2 965	8 466	2 889	-5 501	-65.0
Groper – Hapuku/Bass	11 989	38 272	37 502	-26 283	-68.7
Groper — Hapuku*	10 323	*	*	*	*
Gurnard – Red	201 100	360 059	430 531	-158 959	-44.1
Hammerhead Shark	533	1 158	1 429	-625	-54.0
John Dory	6 262	26 064	32 303	-19 802	-76.0
Kahawai	513 980	1 009 675	1 170 324	-495 695	-49.1
Kelpie	61	0	0	61	0.0
Kingfish	34 628	89 744	64 700	-55 116	-61.4
Koheru	7 850	17 824	3 834	-9 974	-56.0
Leatherjacket	269	2 709	2 936	-2 440	-90.1
Ling	84	320	1 333	-236	-73.8
Mackerel – Blue	16 550	20 620	32 976	-4 070	-19.7
Mackerel – Jack	58 941	82 736	121 116	-23 795	-28.8
Mako shark	1 458	1 048	529	410	39.2

	2022–23	2017–18	2011–12	22–23 and 17–18 Difference n	22–23 and 17–18 Difference %
Māori Chief	2 239	2 145	4 574	94	4.4
Marlin	2 134	1 168	985	966	82.7
Moki	2 229	1 836	2 976	393	21.4
Mullet – Grey	25 871	65 966	38 127	-40 095	-60.8
Mullet – Yellow Eyed	19 355	108 492	125 972	-89 137	-82.2
Parore	1 014	8 245	4 328	-7 231	-87.7
Parrotfish	1 350	2 800	4 276	-1 450	-51.8
Perch	1 498	1 065	2 247	433	40.7
Pigfish	971	2 185	2 247	-1 214	-55.5
Pilchard	15 888	60 455	23 231	-44 567	-73.7
Porae	4 431	7 000	15 004	-2 569	-36.7
Red Moki	1 120	2 950	1 853	-1 830	-62.0
Rock Cod	72	1 775	5 252	-1 703	-96.0
Sand shark	0	701	3 719	-701	-100.0
Salmon	79	587	2 824	-508	-86.5
Sea perch	56 251	116 948	160 581	-60 697	-51.9
Shark – Rig	14 861	35 369	47 718	-20 508	-58.0
Shark – School shark	6 429	6 826	30 555	-397	-5.8
Shark – Spiny Dogfish	6 905	13 985	22 200	-7 080	-50.6
Snapper	1 948 102	3 496 711	4 552 908	-1 548 609	-44.3
Spotty/Paketi	6 028	17 149	9 055	-11 121	-64.9
Stargazer/Monkfish	0	555	534	-555	-100.0
Stingray	455	2 841	11 053	-2 386	-84.0
Tarakihi	126 682	302 990	361 256	-176 308	-58.2
Trevally	101 750	138 185	173 762	-36 435	-26.4
Trout/Sea Trout	1 106	1 980	2 720	-874	-44.1
Trumpeter	16 439	8 244	6 548	8 195	99.4
Tuna – Albacore	4 949	12 463	21 898	-7 514	-60.3
Tuna – Skipjack	21 102	29 892	41 182	-8 790	-29.4
Warehou	306	1 038	1 968	-732	-70.6
Wrasse	2 876	7 988	7 252	-5 112	-64.0
Other	12 354	26 530	19 374	-14 176	-53.4

**Previously grouped together with bass in both earlier editions of NPS*

8.6 Finfish harvest by species and FMA

The harvest of different species of finfish varies by FMA (Table 37), largely because of their relative geographic abundance. For instance, snapper was predominantly harvested in northern FMAs and blue cod in southern FMAs. This is consistent with the distributions of the two previous editions of the NPS.

Table 37: Finfish harvest by FMA (table sorted alphabetically by species).

	FMA						
	1	2	3	5	7	8	9
Barracouta	158	620	3 223	688	963	2 145	114
Blue Maomao	6 052	1 822	0	0	0	1 052	134
Blue Moki	591	1 603	3 878	1 168	2 317	0	0
Bluenose	1 481	117	861	497	170	0	367
Bream/Brim	145	0	0	0	390	0	0
Bronze Whaler Shark	245	0	0	0	0	0	0
Butterfish	2 109	11 355	18 734	6 974	6 872	1 058	0
Cod – Blue	1 570	33 561	95 435	106 753	61 109	18 190	128
Cod – Red	443	229	1 133	0	830	140	0
Eel	0	0	0	51	0	137	277
Elephant fish	0	105	2 598	17	380	0	0
Flatfish	6 020	1 044	1 262	14 955	8 679	1 571	8 095
Garfish	9 505	0	0	0	285	0	158
Gemfish	2 120	657	0	99	89	0	0
Groper – Bass	345	0	708	0	448	0	164
Groper – Hapuku	1 774	3 002	2 856	381	1 293	517	501
Gurnard — Red	36 595	85 233	1 265	2 210	27 882	24 805	23 110
Hammerhead Shark	533	0	0	0	0	0	0
John Dory	4 687	165	0	0	215	895	300
Kahawai	235 275	66 183	20 257	1 699	30 109	83 155	77 303
Kelpie	0	0	0	61	0	0	0
Kingfish	23 569	5 130	0	247	1 236	1 412	3 033
Koheru	6 169	1 680	0	0	0	0	0
Leatherjacket	132	0	0	137	0	0	0
Ling	84	0	0	0	0	0	0
Mackerel – Blue	8 860	6 333	0	0	923	433	0
Mackerel – Jack	45 925	7 512	0	0	3 701	1 720	83
Mako shark	1 458	0	0	0	0	0	0
Māori Chief	0	0	0	0	2 239	0	0
Marlin	984	0	0	0	0	0	1 150
Moki	0	779	542	325	584	0	0
Mullet – Grey	3 346	479	0	0	1 089	0	20 957
Mullet – Yellow Eyed	8 857	2 817	273	0	300	4 173	2 936
Parore	609	0	0	0	0	0	405
Parrotfish	609	0	0	0	741	0	0
Perch	0	0	1 498	0	0	0	0
Pigfish	971	0	0	0	0	0	0
Pilchard	4 596	0	0	0	0	0	11293
Porae	4 188	169	0	0	74	0	0
Red Moki	840	0	0	0	0	0	281
Rock Cod	0	0	0	0	0	72	0
Salmon	0	0	79	0	0	0	0
Sea perch	225	764	42 180	1 822	11 021	239	0
Shark – Rig	58	974	2 738	1 000	6 107	3 323	663
Shark – School shark	3 045	526	252	80	1 884	281	360
Shark – Spiny Dogfish	1 158	139	2 945	99	2 384	116	64
Snapper	1 391 494	91 519	121	473	89 819	194 568	180 107

	FMA						
	1	2	3	5	7	8	9
Spotty/Paketi	0	0	510	0	5 518	0	0
Stingray	142	0	90	0	0	223	0
Tarakihi	40 602	48 349	10 436	5 407	11 056	10 565	268
Trevally	79 237	4 992	419	99	1 773	7 303	7 926
Trout/Sea Trout	180	0	690	78	158	0	0
Trumpeter	0	0	8 843	7 399	197	0	0
Tuna – Albacore	976	300	0	683	1 422	334	1 232
Tuna – Skipjack	7 667	1 253	0	0	174	241	11 767
Warehou	0	100	0	0	65	140	0
Wrasse	828	194	0	120	1 734	0	0
Other Fin fish	5 468	1 686	281	1 193	1 371	140	2 215
Total	1 951 926	381 393	224 108	154 716	287601	358 946	355 390
% of finfish harvest	52.6	10.3	6.0	4.2	7.7	9.7	9.6

8.7 Finfish harvest by species and method

The overwhelming majority of finfish were harvested using rod and line (Table 38) although moki and butterfish were taken mainly by spearfishing, grey mullet were taken mainly by net, and flatfish were taken mainly by net or using hand-held spears from the shore. This is consistent with the distributions of the two previous editions of the NPS.

Table 38: Finfish harvest by species and method (table sorted alphabetically).

	Rod/line	Longline/ Kontiki	Net	Pot	Dredge	Hand gather from shore	Hand gather by diving	Spear-fishing	Other
Barracouta	7 793	118	0	0	0	0	0	0	0
Blue Maomao	5 029	0	1 172	0	0	0	0	2 859	0
Blue Moki	1 924	0	2 267	0	0	0	0	5 367	0
Bluenose	3 492	0	0	0	0	0	0	0	0
Bream/Brim	390	0	0	0	0	0	0	145	0
Bronze Whaler Shark	245	0	0	0	0	0	0	0	0
Butterfish	1 565	0	2 927	0	0	0	0	42 609	0
Cod – Blue	307 537	3 318	0	162	0	0	0	5 729	0
Cod – Red	2 440	195	0	0	0	0	0	140	0
Eel	464	0	0	0	0	0	0	0	0
Elephant fish	1 284	1 799	17	0	0	0	0	0	0
Flatfish	368	125	28 561	0	0	5 423	0	7 150	0
Garfish	9 006	0	942	0	0	0	0	0	0
Gemfish	2 965	0	0	0	0	0	0	0	0
Groper — Bass	1 401	0	0	0	0	0	0	264	0
Groper — Hapuku	10 168	23	0	0	0	0	0	132	0
Gurnard — Red	186 760	13 792	246	0	0	0	0	303	0
Hammerhead Shark	126	407	0	0	0	0	0	0	0
John Dory	6 146	0	0	0	0	0	0	116	0
Kahawai	470 927	18 861	14 986	0	0	0	0	8 627	579
Kelpie	61	0	0	0	0	0	0	0	0

	Rod/line	Longline/ Kontiki	Net	Pot	Dredge	Hand gather from shore	Hand gather by diving	Spear-fishing	Other
Kingfish	30 426	63	0	0	0	0	0	4 139	0
Koheru	5 579	0	0	0	0	0	0	2 271	0
Leatherjacket	137	0	0	0	0	0	0	132	0
Ling	84	0	0	0	0	0	0	0	0
Mackerel – Blue	16 550	0	0	0	0	0	0	0	0
Mackerel – Jack	58 545	395	0	0	0	0	0	0	0
Mako shark	1 458	0	0	0	0	0	0	0	0
Māori Chief	2 239	0	0	0	0	0	0	0	0
Marlin	2 134	0	0	0	0	0	0	0	0
Moki	1 068	0	0	0	0	0	0	1 161	0
Mullet – Grey	3 612	1 484	20 775	0	0	0	0	0	0
Mullet – Yellow Eyed	13 976	44	5 025	0	0	0	0	311	0
Parore	125	0	467	0	0	0	0	423	0
Parrotfish	1 350	0	0	0	0	0	0	0	0
Perch	1 498	0	0	0	0	0	0	0	0
Pigfish	746	0	0	0	0	0	0	225	0
Pilchard	15 510	0	98	0	0	0	0	281	0
Porae	2 098	0	1 130	0	0	0	0	1 203	0
Red Moki	690	0	0	0	0	0	0	431	0
Rock Cod	72	0	0	0	0	0	0	0	0
Salmon	79	0	0	0	0	0	0	0	0
Sea perch	54 368	1 379	0	0	0	0	0	504	0
Shark – Rig	12 237	2 624	0	0	0	0	0	0	0
Shark – School shark	4 943	1 485	0	0	0	0	0	0	0
Shark – Spiny Dogfish	6 627	278	0	0	0	0	0	0	0
Snapper	1 850 006	81 904	3 855	0	0	0	0	11 146	1 191
Spotty/Paketi	6 028	0	0	0	0	0	0	0	0
Stingray	313	0	0	0	0	0	0	142	0
Tarakihi	124 935	410	0	0	0	0	0	1 337	0
Trevally	96 361	2 025	1 261	0	0	0	0	2 103	0
Trout/Sea Trout	1 106	0	0	0	0	0	0	0	0
Trumpeter	16 439	0	0	0	0	0	0	0	0
Tuna – Albacore	4 915	34	0	0	0	0	0	0	0
Tuna – Skipjack	21 004	99	0	0	0	0	0	0	0
Warehou	165	140	0	0	0	0	0	0	0
Wrasse	2 876	0	0	0	0	0	0	0	0
Other Finfish	7 853	269	426	0	0	0	0	3 806	0
Total	3 388 245	131 271	84 154	162	0	5 423	0	103 054	1 770
% of finfish harvest	91.2	3.5	2.3	0.0	0.0	0.1	0.0	2.7	0.0

8.8 Finfish harvest by species and platform

85.9% of finfish were taken off a vessel of some description (Table 39), with 67.1% of all finfish taken from trailer boats. The estimates for these two categories in the previous NPS were 84.4% and 62.8% respectively.

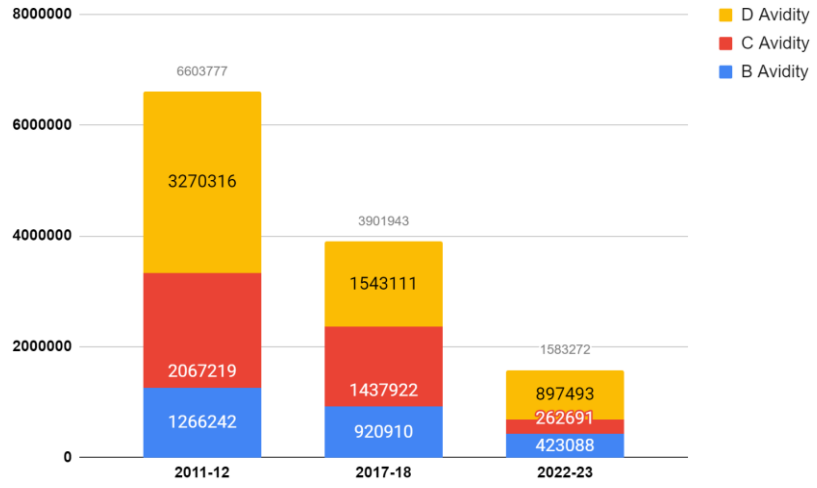
Table 39: Finfish harvest by species and platform (table sorted alphabetically).

	Trailer motor boat	Larger boat/ launch	Trailer yacht	Larger yacht/ keeler	Kayak/ rowboat	Off land	Other
Barracouta	6 232	1 056	0	0	400	222	0
Blue Maomao	4 727	215	0	438	0	3 680	0
Blue Moki	4 178	71	0	0	130	5 179	0
Bluenose	2 415	908	0	170	0	0	0
Bream/Brim	145	0	0	0	0	390	0
Bronze Whaler Shark	245	0	0	0	0	0	0
Butterfish	26 388	3 062	0	0	2 342	15 310	0
Cod – Blue	219 644	75 745	0	1 637	6 928	12 792	0
Cod – Red	791	729	0	0	0	1 255	0
Eel	143	0	0	0	0	321	0
Elephant fish	2 115	0	0	0	0	986	0
Flatfish	3 755	1 635	0	0	1 536	34 701	0
Garfish	1 305	0	0	0	657	7 986	0
Gemfish	2 604	361	0	0	0	0	0
Groper – Bass	1 199	245	0	0	221	0	0
Groper – Hapuku	7 948	2 154	0	0	221	0	0
Gurnard – Red	168 076	13 367	0	336	1 218	16 710	1 394
Hammerhead Shark	213	0	0	0	0	319	0
John Dory	2 371	1 973	0	0	130	1 077	712
Kahawai	270 560	40 297	959	2 802	17 649	180 094	1 621
Kelpie	61	0	0	0	0	0	0
Kingfish	24 672	5 998	178	359	460	2 960	0
Koheru	6 483	1 367	0	0	0	0	0
Leatherjacket	269	0	0	0	0	0	0
Ling	84	0	0	0	0	0	0
Mackerel – Blue	7 715	1 771	0	0	389	6 675	0
Mackerel – Jack	36 412	2 966	0	88	232	19 243	0
Mako shark	1 458	0	0	0	0	0	0
Māori Chief	2 239	0	0	0	0	0	0
Marlin	1 529	605	0	0	0	0	0
Moki	1 435	289	0	0	0	505	0
Mullet – Grey	7 429	1 478	0	0	7 209	9 755	0
Mullet – Yellow Eyed	4 130	1 131	0	0	832	13 262	0
Parore	467	0	0	0	0	548	0
Parrotfish	609	741	0	0	0	0	0
Perch	1 137	361	0	0	0	0	0
Pigfish	554	288	0	0	130	0	0
Pilchard	1 436	0	0	0	0	14 452	0
Porae	1 946	715	0	0	0	1 547	223
Red Moki	150	690	0	0	0	281	0
Rock Cod	0	0	0	0	0	72	0
Salmon	0	0	0	0	0	79	0
Sea perch	42 822	13 253	0	0	124	53	0
Shark – Rig	6 602	835	0	0	102	7 322	0

	Trailer motor boat	Larger boat/ launch	Trailer yacht	Larger yacht/ keeler	Kayak/ rowboat	Off land	Other
Shark – School shark	3 945	1 041	0	0	0	1 442	0
Shark – Spiny Dogfish	5 258	558	0	0	0	1 089	0
Snapper	1 398 421	298 099	2 803	15 776	60 102	144 726	28 176
Spotty/Paketi	310	5 048	0	0	0	670	0
Stingray	313	0	0	0	0	142	0
Tarakihi	96 561	26 776	0	1 744	544	1 057	0
Trevally	68 135	12 931	61	609	4 666	15 266	82
Trout/Sea Trout	649	78	0	0	0	379	0
Trumpeter	13 939	2 499	0	0	0	0	0
Tuna – Albacore	4 745	203	0	0	0	0	0
Tuna – Skipjack	16 358	4 660	0	85	0	0	0
Warehou	165	0	0	0	0	140	0
Wrasse	1 031	170	0	905	220	550	0
Other Finfish	9 369	1 330	0	0	441	1 215	0
Total	2 493 893	527 698	4 000	24 949	106 882	524 450	32 207
% of finfish harvest	67.1	14.2	0.1	0.7	2.9	14.1	0.9

8.9 Non-finfish harvest by avidity

For the 2022–23 survey year, D avidity fishers harvested 423 088 or 56.7% of the non finfish, C avidity fishers harvested 16.6%, and B avidity 26.7% (Figure 10). This compares to the 2017–18 proportions by stated avidity of 39.5% by D fishers, 36.9% by C Fishers and 23.6% by B fishers. Similar to the finfish harvest distribution by avidity, 2022–23 non finfish harvest exhibits more notable proportional decreases by B and especially C fishers of 54.1% and 81.7% respectively in comparison to the previous NPS, with D fishers exhibiting a 41.8% decrease.



* *Harvest from charter trips is included but harvest from customary fishing and recreational harvest from commercial vessels are excluded. The 2011-12 count for non–finfish species does not include one extreme weighted count of kina for a particular fisher, removed as an outlier.*

Figure 10: Total number of non-finfish harvested by avidity and NPS year*.

8.10 Non-finfish harvest by week

The number of non-finfish harvested each week is broadly comparable with finfish distribution highest in summer, particularly around holiday periods (Figure 11).

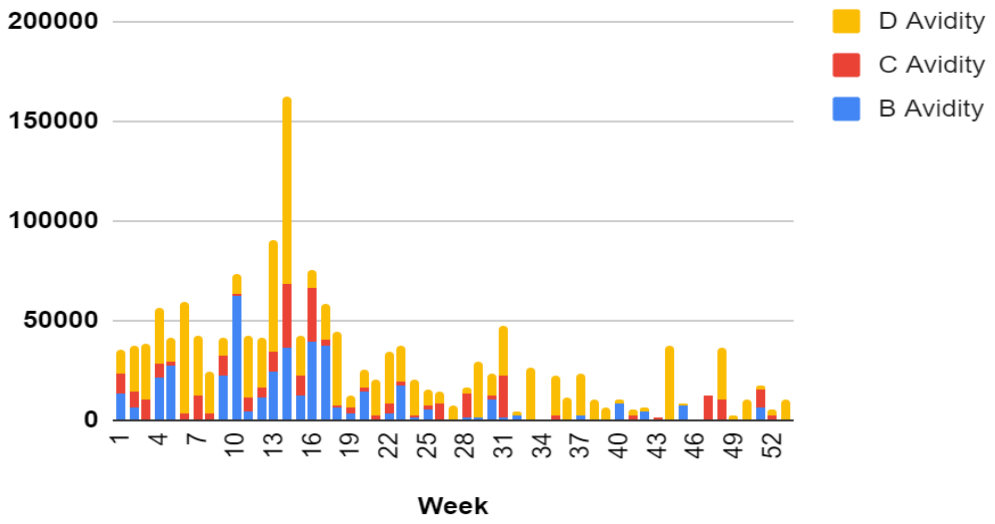


Figure 11: Estimated number of non-finfish harvested by avidity and week (excluding customary and commercial).

8.11 Non-finfish harvest by species in detail

Kina, ordinary paua and pipi were the most commonly harvested species in 2022–23 (Table 40), compared to pipi, tuatua and scallops in the previous NPS.

Table 40: Non-finfish harvest (table sorted alphabetically).

	Fishers (n)	Events (n)	Harvest (n)	CV	Mean Weight (kg)	Harvest (tonnes)	CV
Cockles	19	25	85 415	0.50	-	-	-
Crab	3	3	860	0.72	-	-	-
Rock Lobster – Packhorse	11	13	4 143	0.46	-	-	-
Rock Lobster – Spanish	6	9	6 008	0.65	-	-	-
Rock Lobster – Spiny/Red	157	402	149 749	0.16	0.76	113.38	0.16
Kina	75	144	556 942	0.34	-	-	-
Mussel	43	65	143 292	0.28	-	-	-
Octopus	5	5	641	0.49	-	-	-
Oyster	20	31	83 866	0.29	-	-	-
Paddle Crab	3	3	1 048	0.70	-	-	-
Paua – Ordinary	157	301	253 016	0.16	0.29	72.95	0.16
Paua – Yellow Foot	9	12	8 713	0.45	-	-	-
Pipi	46	60	203 052	0.27	-	-	-
Scallops	9	13	19 931	0.48	-	-	-
Squid	15	15	3 976	0.42	-	-	-
Tuatua	10	12	57 312	0.56	-	-	-
Other	6	7	5 308	0.82	-	-	-

8.12 Non-finfish harvest compared with earlier editions

The estimated harvest in 2022–23 was lower than in 2017–18 for all but three species — Spanish lobster, kina and yellowfoot paua (Table 41). In particular, shellfish species show a notable decrease in estimates. Some of this can be attributed to fisheries closures and rahui that limited the ability of recreational fishers to harvest these species, particularly scallops in the northern part of the country. The

methodological challenges in surveying harvest for such rare species (especially the wide CVs in Table 40) need to be borne in mind where drawing inferences from these estimates.

Table 41: Non-finfish harvest by FMA (table sorted alphabetically by species).

	2022–23	2017–18	2011–12	22–23 and 17–18 Difference n	22–23 and 17–18 Difference %
Cockles	85 415	340 246	734 742	-254 831	-74.9
Crab	860	10 336	16 749	-9 476	-91.7
Rock Lobster – Packhorse	4 143	11 883	4 080	-7 740	-65.1
Rock Lobster – Spanish	6 008	3 762	196	2 246	59.7
Rock Lobster – Spiny/Red	149 749	209 446	226 271	-59 697	-28.5
Kina	556 942	539 808	553 990	17 134	3.2
Mussel	143 292	341 864	983 347	-198 572	-58.1
Octopus	641	1 703	1 521	-1 062	-62.4
Oyster	83 866	186 060	303 190	-102 194	-54.9
Paddle Crab	1 048	5 914	9 354	-4 866	-82.3
Paua – Ordinary	253 016	425 661	525 634	-172 645	-40.6
Paua – Yellow Foot	8 713	3 014	14 076	5 699	189.1
Pipi	203 052	647 978	622 288	-444 926	-68.7
Puupuu	0	6 077	38 304	-6 077	-100.0
Scallops	19 931	561 592	1 669 681	-541 661	-96.5
Squid	3 976	6 705	4 682	-2 729	-40.7
Tuatua	57 312	564 401	869 751	-507 089	-89.8
Other	5 308	35 494	25 921	-30 186	-85.0

8.13 Non-finfish harvest by species and FMA

There is a general trend of much lower harvest estimates in northern parts of the country compared to the south (Table 42). Only FMA 3 produced a higher total harvest of ordinary paua than in the previous edition, possibly due to a less restrictive status in Kaikoura than during the last NPS. However, other South Island fisheries had much less severe decreases in paua harvest than the North Island compared to the previous editions. Similarly, rock lobster estimates were more stable in South Island compared to the more severe decreases in the North Island management areas. Furthermore, the area with the highest mussel harvest was FMA 7, whereas FMA 1 produced the largest harvest by a significant amount in 2017–18.

Table 42: Non-finfish harvest by FMA (table sorted alphabetically).

	FMA						
	1	2	3	5	7	8	9
Cockles	51 373	557	29 561	0	1 997	0	1 927
Crab	0	0	0	0	374	0	485
Rock Lobster – Packhorse	2 621	146	90	0	445	0	841
Rock Lobster – Spanish	253	5 371	0	318	66	0	0
Rock Lobster – Spiny/Red	19 114	50 858	27 894	13 346	26 851	8 534	3 151
Kina	130 280	233 081	24 370	16 830	9 099	68 852	74 431
Mussel	37 446	19 910	15 800	5 918	50 780	0	13 438
Octopus	76	187	0	108	148	122	0
Oyster	21 710	0	0	50 222	847	0	11 086
Paddle Crab	682	0	145	0	221	0	0
Paua – Ordinary	3 408	93 643	62 292	38 115	9 908	20 879	24 770
Paua – Yellow Foot	174	1 450	6 940	0	148	0	0
Pipi	159 192	5 581	1 062	0	4 673	25 929	6 616
Scallops	0	595	0	0	0	0	19 337

	FMA						
	1	2	3	5	7	8	9
Squid	2 650	772	179	28	348	0	0
Tuatua	52 168	0	861	1 558	0	0	2 725
Other Marine	102	4 663	543	0	0	0	0
Total	481 250	416 813	169 737	126 443	105 906	124 316	158 806
% non finfish harvest	30.4	26.3	10.7	8.0	6.7	7.9	10.0

8.14 Non-finfish harvest by species and method

Most non-finfish were harvested by hand gathering from a boat or from the shore (Table 43). Notable exceptions are scallops, primarily harvested by dredge, and the various rock lobster species, which were harvested by a combination of hand gathering and potting. In the 2022–23 season, pot harvest accounted for 31% of all lobster harvest, compared to 38% in the previous NPS.

Table 43: Non-finfish harvest by species and method (table sorted alphabetically).

	Rod/ line	Long-line/ Kontiki	Net	Pot	Dredge	Hand gather from shore	Hand gather by diving	Spear-fishing	Other
Cockles	0	0	0	0	0	85 415	0	0	0
Crab	0	0	0	0	0	860	0	0	0
Rock Lobster – Packhorse	0	0	0	1 478	0	0	2 665	0	0
Rock Lobster – Spanish	0	0	0	384	0	0	5 624	0	0
Rock Lobster – Spiny/Red	0	0	0	47 584	0	0	102 164	0	0
Kina	0	0	0	0	0	35 039	521 902	0	0
Mussel	0	0	0	0	0	58 778	84 514	0	0
Octopus	332	187	0	0	0	0	122	0	0
Oyster	0	0	0	0	50 222	33 183	461	0	0
Paddle Crab	0	0	0	682	0	366	0	0	0
Paua – Ordinary	0	0	0	0	0	29 628	223 388	0	0
Paua – Yellow Foot	0	0	0	0	0	0	8 713	0	0
Pipi	0	0	0	0	0	174 056	28 996	0	0
Scallops	0	0	0	0	19 337	0	595	0	0
Squid	3 976	0	0	0	0	0	0	0	0
Tuatua	0	0	0	0	0	57 312	0	0	0
Other Marine	106	0	0	0	0	588	4 614	0	0
Total	4 414	187	0	50 129	69 559	475 225	983 758	0	0
% non finfish harvest	0.3	0.0	0.0	3.2	4.4	30.0	62.1	0.0	0.0

8.15 Non-finfish harvest by species and platform

As would be expected, most harvest of shellfish species was taken from the land (with scallops the notable exception), although all species of rock lobster had trailer motor boats as the most common platform to be harvested from (Table 44).

Table 44: Non-finfish harvest by species and platform (table sorted alphabetically).

	Trailer motor boat	Larger boat/ launch	Trailer yacht	Larger yacht/ keeler	Kayak/ Rowboat	Off land	Other
Cockles	0	0	0	0	0	85 415	0
Crab	0	0	0	0	0	860	0
Rock Lobster – Packhorse	1 856	2 141	0	0	0	146	0
Rock Lobster – Spanish	2 653	0	0	0	3 355	0	0
Rock Lobster – Spiny/Red	109 308	7 923	0	356	2 442	29 578	143
Kina	354 218	4 938	0	376	0	196 737	672
Mussel	26 648	2 437	0	0	14 287	86 482	13 438
Octopus	371	148	0	0	0	122	0
Oyster	41 584	8 639	0	0	0	33 644	0
Paddle Crab	682	0	0	0	0	366	0
Paua – Ordinary	59 358	6 146	0	1 344	197	185 972	0
Paua – Yellow Foot	3 082	0	0	0	0	5 631	0
Pipi	0	0	0	0	0	203 052	0
Scallops	19 931	0	0	0	0	0	0
Squid	2 586	1 344	0	0	0	46	0
Tuatua	0	0	0	0	0	57 312	0
Other Marine	106	0	0	0	0	5 202	0
Total	622 383	33 716	0	2 076	20 281	890 564	14 252
% non finfish harvest	39.3	2.1	0.0	0.1	1.3	56.2	0.9

9. HARVEST ESTIMATES FOR SELECTED SPECIES

9.1 Albacore tuna

The total estimated harvest for the 2022–23 fishing year for albacore tuna was 4 949 fish or 36.1 tonnes (Table 45). There is only one fishstock for this species so all of the harvest is recorded as being from ALB 1. Almost all of the harvest was by rod or line (Figure 12) and from trailer boats (Figure 13). Almost two thirds of bag sizes (63.5%) were a single fish (Table 46).

Table 45: Albacore tuna harvest by fishstock.

QMA	Fishers (n)	Events (n)	Harvest (n)	CV	Mean Weight (kg)	Harvest (tonnes)	CV
ALB 1	20	29	4 949	0.30	7.29^	36.06	0.30
TOTAL	20	29	4 949	0.30	7.29	36.06	0.30

^Insufficient mean weight data collected by QMA or season, so national or annual mean used instead.

Figure 12: Albacore tuna harvest by method.

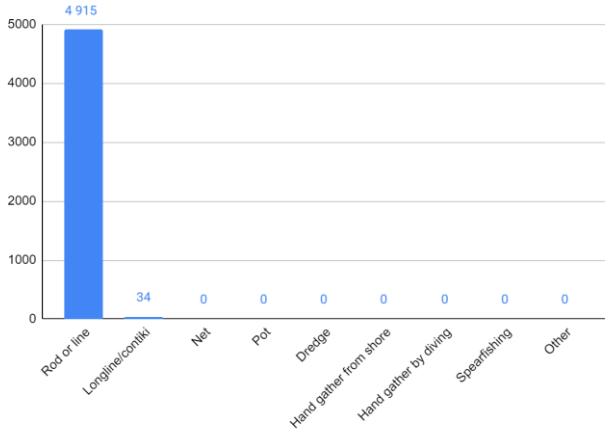


Figure 13: Albacore tuna harvest by platform.

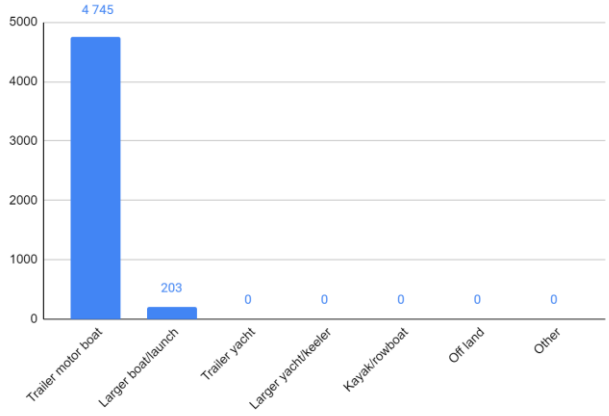


Table 46: Albacore tuna bag size by QMA (row percent)[8].

	Bag Size				
QMA	<1	1	2	3	4
ALB 1	3.3	63.5	12.1	16.5	4.7
TOTAL	3.3	63.5	12.1	16.5	4.7

[8] Bag size tables show the number of fishers with that bag size. Bag sizes of less than 1.0 are possible because of shared catch situations. Zero catches are not shown, as 'targeting without harvest' is not measured.

9.2 Blue cod

The total estimated harvest for blue cod for the 2022–23 fishing year was 316 746 fish, or 170 tonnes (Table 47). Almost two thirds of the harvest (63.9%) of the harvest was from the two QMAs BCO 3 (East Coast of the South Island) and BCO 5 (South of the South Island). When the other South Island QMA is included, BCO 7 (West Coast of the South Island plus Golden Bay and Tasman Bay), the proportion of the national catch is 83.1%. Almost all of the blue cod was caught with a rod or line (Figure 14) while fishing from a motorized vessel (Figure 15). The most frequent bag size (36.1%) was two fish, while just over half of bag sizes (54.5%) were two fish or less (Table 48).

Table 47: Blue cod harvest by fishstock.

QMA	Fishers (n)	Events (n)	Harvest (n)	CV	Mean Weight (kg)	Harvest (tonnes)	CV
BCO 1	12	12	1570	0.32	0.51	0.80	0.32
BCO 2	40	64	33 561	0.39	0.55*	18.07	0.39
BCO 3	87	194	95 435	0.23	0.56*	53.65	0.23
BCO 5	63	183	106 753	0.18	0.55*	58.09	0.18
BCO 7	116	320	61 109	0.17	0.53*	31.09	0.17
BCO 8	35	52	18 318	0.26	0.55*	8.33	0.26
TOTAL	317	825	316 746	0.11	0.54	170.02	0.11

* Seasonal and/or sub area mean weights used for tonnage estimates, but annual mean weights listed.

Figure 14: Blue cod harvest by method.

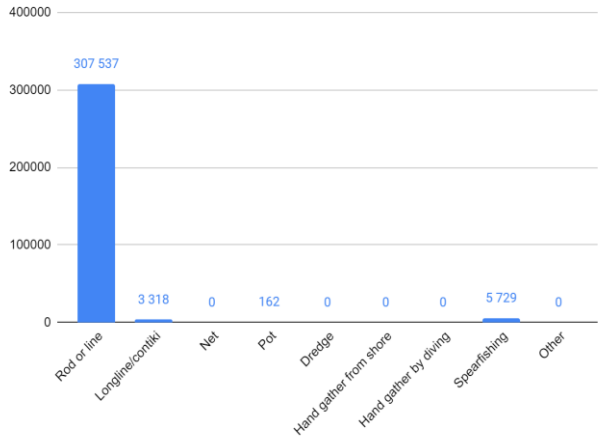


Figure 15: Blue cod harvest by platform.

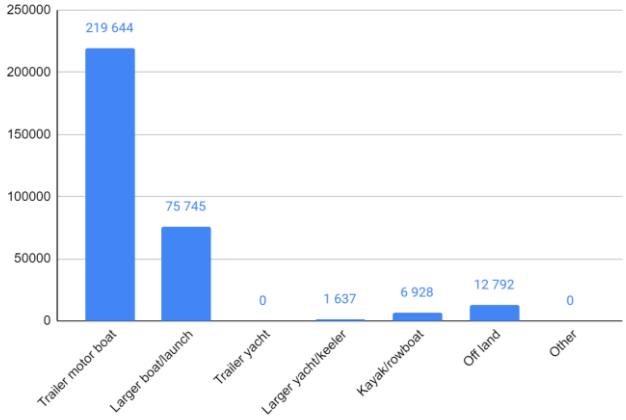


Table 48: Blue cod bag size by QMA (row percent).

	Bag Size													
QMA	<1	1	2	3	4	5	6	7	8	9	10	11	12	13+
BCO 1	0.0	93.9	6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BCO 2	0.0	22.0	12.8	19.4	9.5	9.2	9.6	9.7	4.0	0.0	3.2	0.0	0.0	0.5
BCO 3	0.3	15.0	22.0	8.9	10.0	6.3	10.4	3.8	3.0	1.5	10.5	0.5	0.7	6.8
BCO 5	0.7	3.1	9.8	17.0	5.9	7.5	12.9	6.3	8.4	1.3	12.2	0.9	2.9	11.2
BCO 7	0.2	19.6	70.5	3.9	3.1	0.8	0.6	0.5	0.2	0.0	0.3	0.0	0.4	0.0
BCO 8	0.0	36.9	16.1	10.1	10.1	4.6	13.7	0.0	5.0	1.0	0.0	0.0	0.0	2.4
TOTAL	0.3	18.1	36.1	9.7	6.4	4.6	7.2	3.4	3.2	0.7	5.3	0.3	0.9	4.0

9.3 Bluenose

The total estimated harvest for bluenose for the 2022–23 fishing year was 3 492 fish, or 28.4 tonnes (Table 49). Over half of the bluenose (52.9%) were caught in BNS 1 (top third of the North Island), and over a third (38.9%) in BNS 3 (East and South of South Island). All of the bluenose was caught using a rod or line (Figure 16) and all from boats (Figure 17). Almost two thirds of bag sizes were just a single fish, and only 16.3% more than two fish (Table 50).

Table 49: Bluenose harvest by fishstock.

QMA	Fishers (n)	Events (n)	Harvest (n)	CV	Mean Weight (kg)	Harvest (tonnes)	CV
BNS 1	10	12	1 847	0.48	8.87	16.39	0.48
BNS 2	1	1	117	1.01	7.29^	0.86	1.01
BNS 3	5	10	1 358	0.51	7.29^	9.90	0.51
BNS 7	1	1	170	1.00	7.29^	1.24	1.00
BNS 8	-	-	-	NA	-	0.00	NA
TOTAL	17	24	3 492	0.33	8.13	28.38	0.33

^ Insufficient mean weight data collected by QMA or season, so national or annual mean used instead.

Figure 16: Bluenose harvest by method.

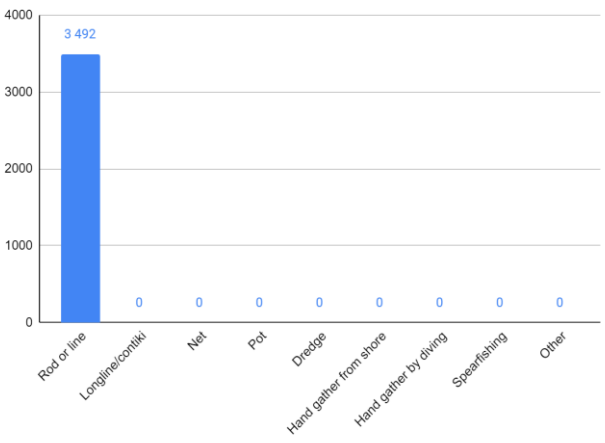


Figure 17: Bluenose harvest by platform.

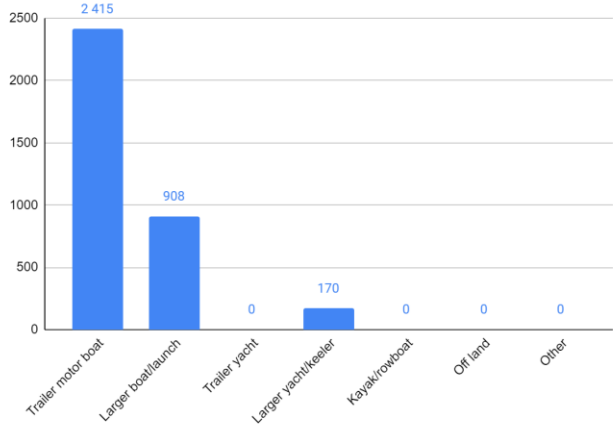


Table 50: Bluenose bag size by QMA (row percent).

	Bag Size				
QMA	<1	1	2	3	4
BNS 1	0.0	65.0	12.0	14.5	8.6
BNS 2	0.0	100.0	0.0	0.0	0.0
BNS 3	0.0	67.1	21.5	0.0	11.4
BNS 7	0.0	0.0	100.0	0.0	0.0
BNS 8	-	-	-	-	-
TOTAL	0.0	65.2	18.5	7.4	8.9

9.4 Flatfish including flounder

The total estimated harvest for flatfish (flounder/sole/brill/turbot) for the 2022–23 fishing year was 41 627 fish, or 9.7 tonnes (Table 51). Flatfish were most commonly harvested from FLA 3 (East and South of the South Island) compared to FLA 1 (top third of the North Island) in 2017–18. Netting is by far the most frequent method (68.6%) of catch (Figure 18). 17.2% were recorded as being caught by spearfishing, but it is likely many of these would have actually been caught via hand held spear (and should more correctly be counted as by floundering from shore/hand gathering). Over four fifths (83.4%) were recorded as being caught from land, which is in contrast with the overwhelming majority of finfish species (Figure 19). The range of bag sizes was very wide, although three was the most common with almost a quarter of bag sizes (22.3%), and over a half of bag sizes (59.8%) being three or fewer (Table 52).

Table 51: Flatfish including flounder harvest by fishstock.

QMA	Fishers (n)	Events (n)	Harvest (n)	CV	Mean Weight (kg)	Harvest (tonnes)	CV
FLA 1	19	26	14 115	0.32	0.23	3.28	0.32
FLA 2	7	8	2 615	0.59	0.23	0.61	0.59
FLA 3	14	28	16 218	0.74	0.23	3.77	0.74
FLA 7	14	28	8 679	0.42	0.23	2.02	0.42
TOTAL	54	90	41 627	0.32	0.23	9.69	0.32

Figure 18: Flatfish including flounder harvest by method.

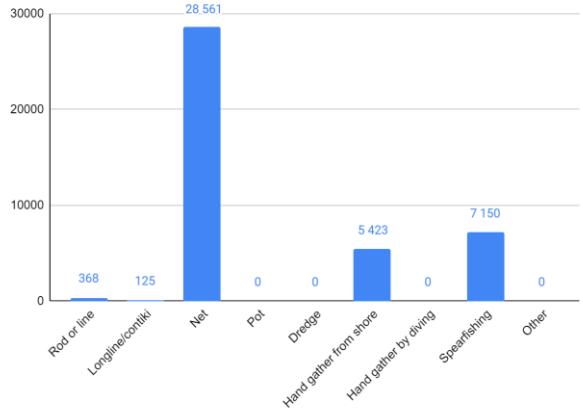


Figure 19: Flatfish including flounder Harvest by platform.

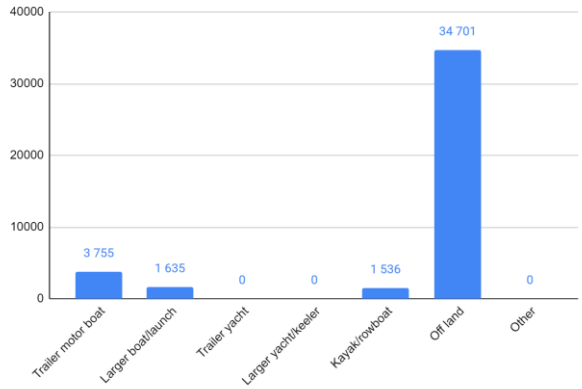


Table 52: Flatfish including flounder bag size by QMA (row percent).

	Bag Size													
QMA	<1	1	2	3	4	5	6	7	8	9	10	11	12	13+
FLA 1	0.0	17.8	13.7	38.8	0.0	7.2	11.6	5.9	0.0	0.0	0.0	0.0	0.0	5.0
FLA 2	0.0	42.6	22.0	17.0	0.0	0.0	0.0	0.0	0.0	18.3	0.0	0.0	0.0	0.0
FLA 3	3.6	22.1	7.1	8.3	3.3	8.5	0.0	0.0	6.6	0.0	13.3	0.0	0.0	27.1
FLA 7	29.3	4.9	3.8	4.1	7.7	5.1	6.0	0.0	18.2	3.3	11.6	0.0	0.0	6.0
TOTAL	6.7	18.8	11.0	22.3	2.3	6.4	6.5	2.7	5.2	2.6	5.5	0.0	0.0	10.0

9.5 Hapuku and Bass combined

The total estimated harvest for hapuku/bass for the 2022–23 fishing year was 11 989 fish, or 77 tonnes (Table 53). Note that for tonnage, hapuku weights have been used due to scarcity of bass weights. HPB 1 (top of the North Island), 2 (bottom of the North island) and 3 (East of the South Island) produced 23.2%, 25.0% and 29.7% respectively. Virtually all of these species were taken by rod and line (Figure 20) from some type of motorized boat (Figure 21). Over two thirds of bag sizes (68.6%) were just one fish, and only 3.4% were three fish or more (Table 54).

Table 53: Hapuku/bass harvest by fishstock.

QMA	Fishers (n)	Events (n)	Harvest (n)	CV	Mean Weight (kg)	Harvest (tonnes)	CV
HPB 1	16	21	2 783	0.33	6.66^	18.53	0.33
HPB 2	11	16	3 002	0.37	6.66^	19.99	0.37
HPB 3	12	21	3 564	0.49	5.67	20.91	0.49
HPB 5	4	5	381	0.67	6.66^	2.54	0.67
HPB 7	11	12	1 741	0.37	6.66^	11.59	0.37
HPB 8	3	4	517	0.62	6.66^	3.44	0.62
TOTAL	56	79	11 989	0.20	6.39	77.01	0.20

^ Insufficient mean weight data collected by QMA or season, so national or annual mean used instead.

Figure 20: Hapuku/bass harvest by method.

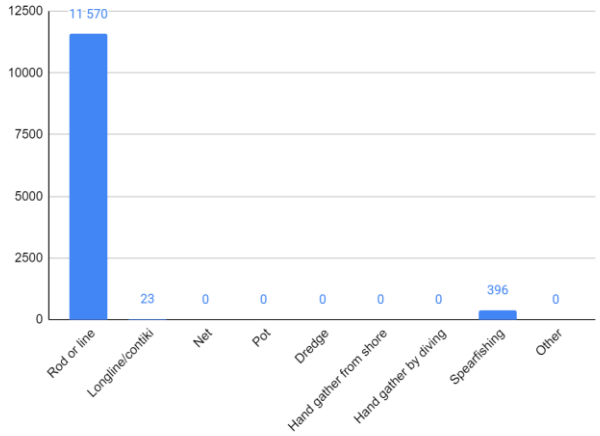


Figure 21: Hapuku/bass harvest By platform.

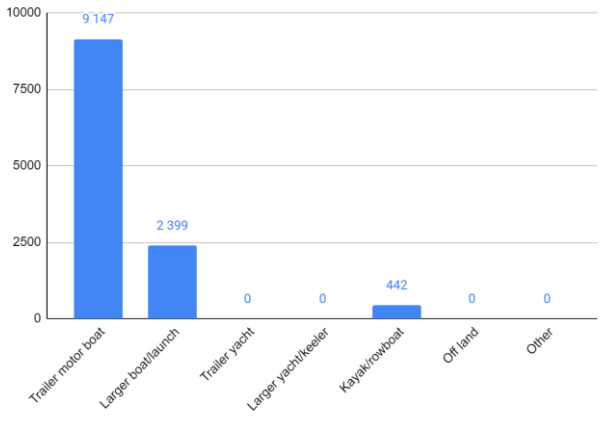


Table 54: Hapuku/bass bag size by QMA (row percent).

	Bag Size					
QMA	<1	1	2	3	4	5
HPB 1	0.0	68.2	28.0	3.7	0.0	0.0
HPB 2	0.0	66.6	29.6	0.0	3.8	0.0
HPB 3	0.0	68.3	24.4	2.3	0.0	5.0
HPB 5	33.4	47.6	19.0	0.0	0.0	0.0
HPB 7	0.0	66.2	33.8	0.0	0.0	0.0
HPB 8	0.0	100.0	0.0	0.0	0.0	0.0
TOTAL	1.9	68.6	26.1	1.5	0.8	1.1

9.6 Hapuku only

The total estimated harvest for hapuku for the 2022–23 fishing year was 10 323, or 65.9 tonnes (Table 55). This is a very close estimate to the previous subsection which presented the data for hapuku and bass combined, which indicates that hapuku is the far more commonly harvested species of the two by recreational marine fishers. Because of this, the patterns exhibited for method, platform and bag size in the previous subsection also hold true here, (Figures 22 and 23 and Table 56).

Table 55: Hapuku harvest by fishstock.

QMA.	Fishers (n)	Events (n)	Harvest (n)	CV	Mean Weight (kg)	Harvest (tonnes)	CV
HAP 1	14	16	2 274	0.35	6.66^	15.14	0.35
HAP 2	11	16	3 002	0.37	6.66^	19.99	0.37
HAP 3	11	16	2 856	0.55	5.67	16.20	0.55
HAP 5	4	5	381	0.67	6.66^	2.54	0.67
HAP 7	10	10	1 293	0.37	6.66^	8.61	0.37
HAP 8	3	4	517	0.62	6.66^	3.44	0.62
TOTAL	52	67	10 323	0.21	6.39	65.92	0.20

^ Insufficient mean weight data collected by QMA or season, so national or annual mean used instead.

Figure 22: Hapuku harvest by method.

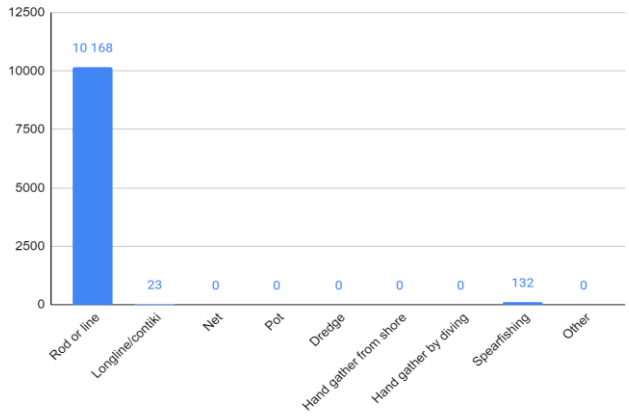


Figure 23: Hapuku harvest by platform.

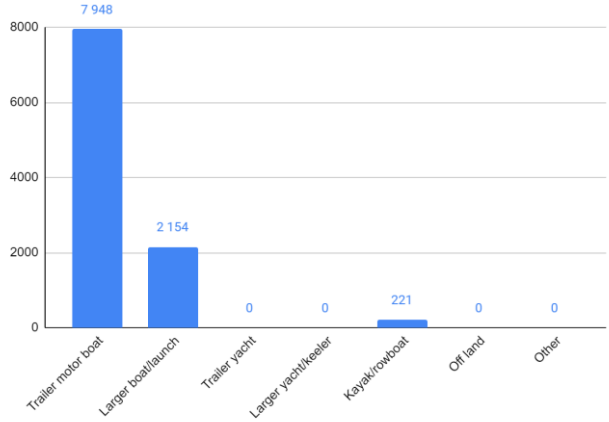


Table 56: Hapuku bag size by QMA (Row Percent).

	Bag Size					
QMA	<1	1	2	3	4	5
HAP 1	0.0	69.0	26.4	4.6	0.0	0.0
HAP 2	0.0	60.1	26.7	0.0	3.5	9.7
HAP 3	0.0	53.7	27.0	2.6	0.0	16.7
HAP 5	33.4	47.6	19.0	0.0	0.0	0.0
HAP 7	0.0	66.2	33.8	0.0	0.0	0.0
HAP 8	0.0	100.0	0.0	0.0	0.0	0.0
TOTAL	2.1	64.1	25.2	1.7	0.9	6.0

9.7 John dory

The total estimated harvest for john dory for the 2022–23 fishing year was 6 262 fish, or 8.0 tonnes (Table 57). The majority of john dory (79.6%) were taken from JDO 1 (top third of the North Island). Virtually all john dory were caught by rod and line (Figure 24), and while 31.5% were taken from a large motor boat or launch which is a notable amount for that platform, but from a small base (Figure 25). The most common bag size by far was just a single fish (79.6% of bags) (Table 58).

Table 57: John dory harvest by fishstock.

QMA	Fishers (n)	Events (n)	Harvest (n)	CV	Mean Weight (kg)	Harvest (tonnes)	CV
JDO 1	25	27	4 987	0.28	1.27	6.33	0.28
JDO 2	5	9	1 060	0.54	1.33^	1.41	0.54
JDO 3	-	-	-	NA		0.00	NA
JDO 7	2	2	215	0.72	1.33^	0.29	0.72
TOTAL	32	38	6 262	0.25	1.28	8.02	0.25

^ Insufficient mean weight data collected by QMA or season, so national or annual mean used instead.

Figure 24: John dory harvest by method.

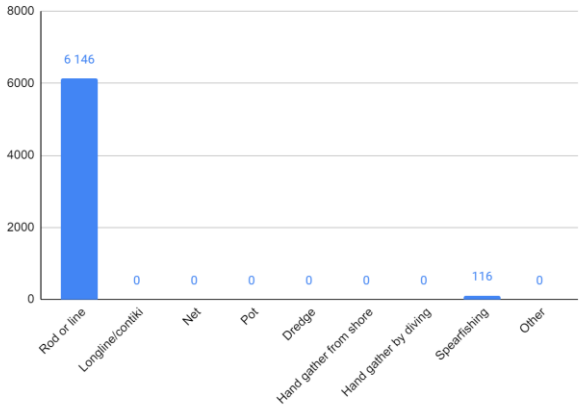


Figure 25: John dory harvest by platform.

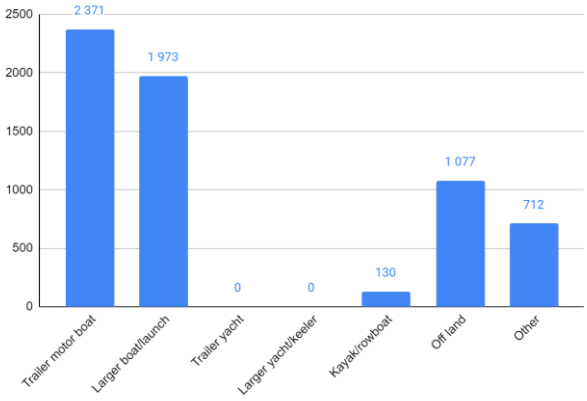


Table 58: John dory bag size by QMA (row percent).

QMA	<1	1	2
JDO 1	0.0	78.3	21.7
JDO 2	0.0	80.5	19.5
JDO 3	-	-	-
JDO 7	0.0	100.0	0.0
TOTAL	0.0	79.6	20.4

9.8 Kahawai

The total estimated harvest for kahawai for the 2022–23 fishing year was 513 980 fish, or 370.6 tonnes (Table 59). Almost half (45.8%) were caught in KAH 1 (North East of the North Island), while KAH 3 (South Island) accounted for almost a third (31.2%). Kahawai were mainly (Figure 26) caught by rod and line (91.6%). Just over half of the kahawai were caught from a trailer boat (52.6%) as the most common platform, but over a third (35%) were taken off land (Figure 27). Bag sizes for kahawai were mainly small; a single fish was the most common bag size at 43.6%, with about four fifths of bag sizes being three fish or less (Table 60).

Table 59: Kahawai harvest by fishstock.

QMA	Fishers (n)	Events (n)	Harvest (n)	CV	Mean Weight (kg)	Harvest (tonnes)	CV
KAH 1	490	981	235 275	0.08	1.56*	370.61	0.08
KAH 2	104	206	66 183	0.36	1.71	113.38	0.36
KAH 3	140	269	52 064	0.22	1.31*	67.55	0.21
KAH 8	255	545	160 458	0.12	1.60	258.75	0.12
TOTAL	938	2 001	513 980	0.07	1.58	810.29	0.08

***** Seasonal and/or sub area mean weights used for tonnage estimates, but annual mean weights listed

Figure 26: Kahawai harvest by method.

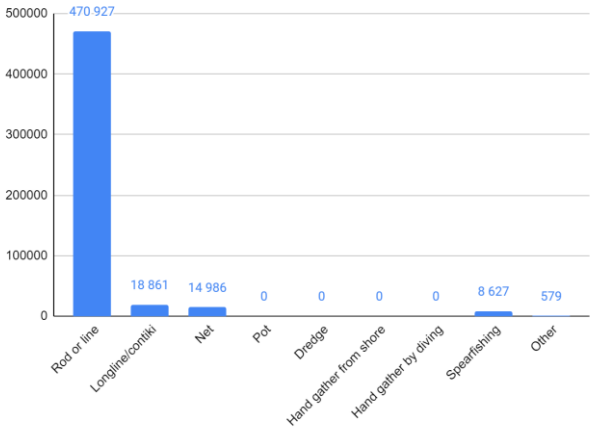


Figure 27: Kahawai harvest by platform.

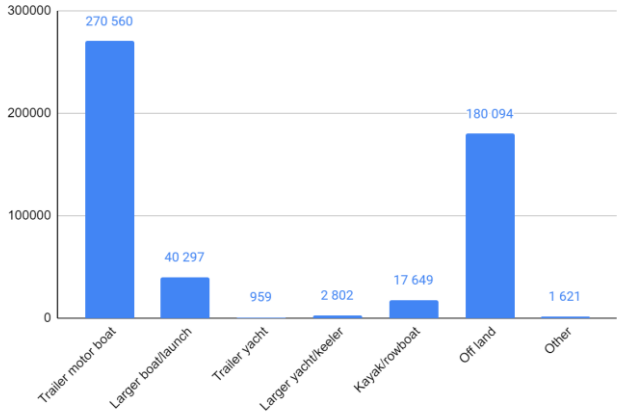


Table 60: Kahawai bag size by QMA (row percent).

	Bag Size													
QMA	<1	1	2	3	4	5	6	7	8	9	10	11	12	13+
KAH 1	3.1	46.2	26.7	11.1	6.7	2.2	1.4	1.0	0.2	0.0	0.2	0.1	0.3	0.9
KAH 2	1.1	41.4	23.9	9.9	6.7	1.8	8.6	0.0	2.2	0.4	0.0	0.9	1.8	1.3
KAH 3	0.6	51.0	23.9	6.4	5.0	4.1	0.2	3.3	2.2	0.0	1.4	0.0	0.0	1.7
KAH 8	3.6	36.9	25.1	10.8	6.4	7.0	4.2	1.5	0.7	0.8	1.3	0.6	0.3	0.8
TOTAL	2.8	43.6	25.6	10.4	6.4	3.7	2.9	1.2	0.8	0.3	0.6	0.3	0.4	1.0

9.9 Kingfish

The total estimated harvest for kingfish for the 2022–23 fishing year was 34 628 fish, or 352.8 tonnes (Table 61). Almost three quarters (71.2%) of the kingfish harvest was taken from KIN 1 (north east coast of the North Island). Virtually all kingfish were caught with a rod and line (Figure 28) and from some kind of boat (Figure 29). The most common bag size for kingfish was a single fish (76.8%), while only 5.6% of bag sizes were three fish or more (Table 62).

Table 61: Kingfish harvest by fishstock.

QMA	Fishers (n)	Events (n)	Harvest (n)	CV	Mean Weight (kg)	Harvest (tonnes)	CV
KIN 1	90	134	23 569	0.18	9.95	234.60	0.18
KIN 2	18	24	5 130	0.34	11.17	57.28	0.34
KIN 3	2	3	247	0.67	10.27^	2.54	0.67
KIN 7	14	14	1 236	0.38	10.27^	12.70	0.38
KIN 8	18	24	4 445	0.42	10.27^	45.66	0.42
TOTAL	139	199	34 628	0.14	10.19	352.77	0.14

^ Insufficient mean weight data collected by QMA or season, so national or annual mean used instead.

Figure 28: Kingfish harvest by method.

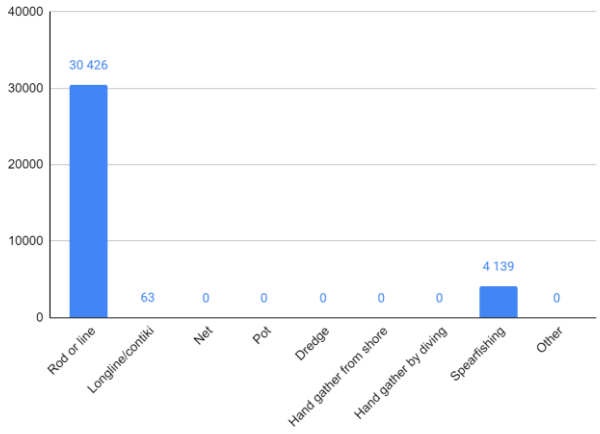


Figure 29: Kingfish harvest by platform.

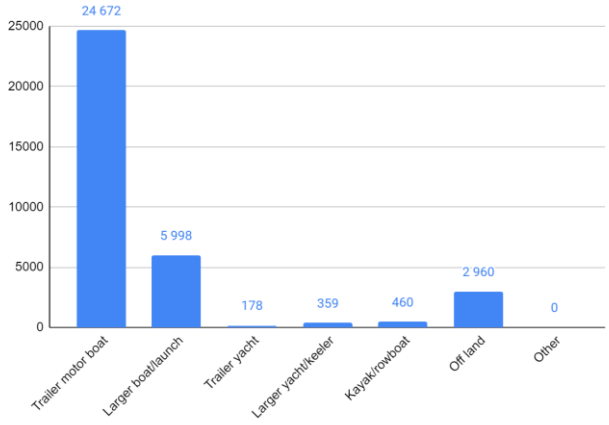


Table 62: Kingfish bag size by QMA (row percent).

	Bag Size										
QMA	**<1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
KIN 1	0.0	74.8	20.5	3.3	0.7	0.7	0.0	0.0	0.0	0.0	0.0
KIN 2	0.0	80.4	13.7	2.4	0.0	0.0	0.0	0.0	0.0	0.0	3.5
KIN 3	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
KIN 7	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
KIN 8	0.0	72.4	12.8	3.0	0.0	11.8	0.0	0.0	0.0	0.0	0.0
TOTAL	0.0	76.8	17.6	3.0	0.5	1.7	0.0	0.0	0.0	0.0	0.5

9.10 Lobster/crayfish (spiny/red)

The total estimated harvest for rock lobster for the 2022—23 fishing year was 149 749 lobsters, or 113.4 tonnes (Table 63), a less severe decrease than the most common finfish species. The harvest was concentrated in QMAs 4 (South East of the North Island) and 5 (North East of the South Island), with almost a third of all harvest in each, 31% and 31.7% respectively. Most rock lobster was taken by hand gathering by diving (68.2%), the rest using rock lobster pots (Figure 30). Just under a fifth (19.8%) of rock lobsters were taken off land; meaning divers entered the water from land rather than reporting hand gathering (Figure 31). Almost all bag sizes were between one and six, but the latter was the most common bag size (Table 64) in contrast to 2017–18 when it was two rock lobster.

Table 63: Lobster/crayfish harvest by fishstock.

QMA	Fishers (n)	Events (n)	Harvest (n)	CV	Mean Weight (kg)	Harvest (tonnes)	CV
CRA 1	15	27	9 873	0.49	0.82	8.00	0.49
CRA 2	25	48	11 593	0.30	0.86	9.99	0.31
CRA 3	10	25	9 257	0.51	0.62	5.74	0.51
CRA 4	44	129	46 483	0.38	0.74	32.58	0.39
CRA 5	40	110	47 483	0.29	0.90	38.48	0.26
CRA 7	3	5	1 992	0.54	0.71	1.41	0.54
CRA 8	24	45	17 300	0.33	0.72	12.50	0.33
CRA 9	11	13	5 767	0.43	0.85	4.66	0.42
TOTAL	157	402	149 749	0.16	0.76	113.38	0.16

Figure 30: Lobster/crayfish harvest by method.

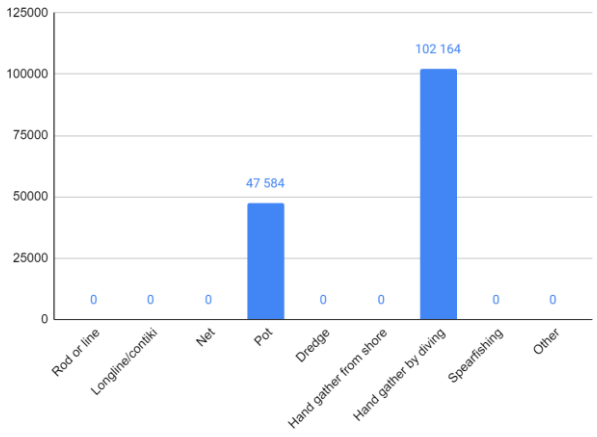


Figure 31: Lobster/crayfish harvest By platform.

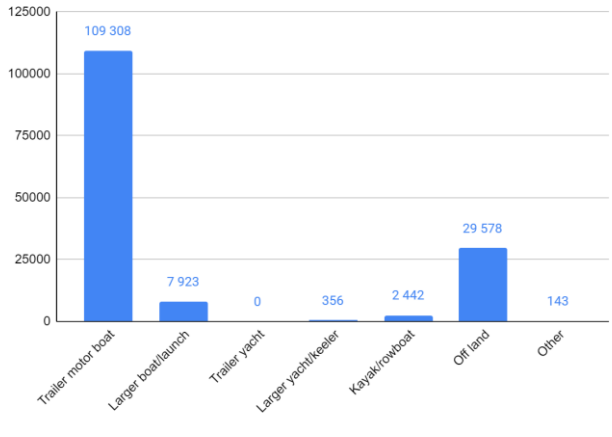


Table 64: Lobster/crayfish bag size by QMA (row percent).

	Bag Size												
QMA	<1	1	2	3	4	5	6	7	8	9	10	11	12
CRA 1	4.8	30.1	17.1	16.3	0.0	3.3	28.4	0.0	0.0	0.0	0.0	0.0	0.0
CRA 2	5.5	11.9	30.1	47.1	1.7	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CRA 3	0.0	18.8	19.6	43.8	14.0	0.0	3.8	0.0	0.0	0.0	0.0	0.0	0.0
CRA 4	1.6	18.3	28.7	11.1	14.0	5.2	19.8	0.9	0.5	0.0	0.0	0.0	0.0
CRA 5	5.8	10.7	18.2	7.3	13.3	9.7	34.3	0.0	0.0	0.0	0.0	0.0	0.6
CRA 7	0.0	10.6	0.0	68.1	0.0	0.0	21.3	0.0	0.0	0.0	0.0	0.0	0.0
CRA 8	2.2	18.2	15.8	12.8	10.4	0.0	29.5	2.2	7.6	0.0	0.0	0.0	1.4
CRA 9	0.0	10.7	6.9	15.0	20.1	10.9	36.4	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	3.3	16.1	22.1	17.8	11.1	5.3	22.5	0.5	0.9	0.0	0.0	0.0	0.3

9.11 Paua (ordinary)

The total estimated harvest for paua for the 2022–23 fishing year was 253 016 paua, or 73.0 tonnes (Table 65). The overwhelming majority of paua was taken from two QMAs, with nearly half of the harvest (45.3%) taken from PAU 2 (bottom two thirds of the North Island) and over a third (35.6%) from PAU 5 (bottom of the South Island). Almost all paua (88.3%) were taken by hand gathering by diving and the remainder by hand gathering from the shore (Figure 32). This is one species where access is most often from the land, with almost three quarters 73.5% of the harvest taken off land (Figure 33). There was a spread of bag sizes but many people (41.8%) appeared to reach the bag size limit of 10 paua (Table 66).

Table 65: Paua harvest by fishstock.

QMA	Fishers (n)	Events (n)	Harvest (n)	CV	Mean Weight (kg)	Harvest (tonnes)	CV
PAU 1	8	14	28 178	0.87	0.25^	8.12	0.87
PAU 2	72	143	114 522	0.17	0.28^	33.01	0.17
PAU 3A	9	12	1 979	0.68	0.46	0.91	0.68
PAU 3B	19	23	8 277	0.33	0.29^	2.39	0.33
PAU 5A	4	6	6 514	0.59	0.29^	1.88	0.59
PAU 5B	12	26	11 989	0.33	0.29^	3.46	0.33
PAU 5D	31	62	71 650	0.30	0.29^	20.65	0.30
PAU 6	0	0	0	NA		0.00	NA
PAU 7	9	15	9 908	0.35	0.29^	2.87	0.35
TOTAL	164	301	253 016	0.16	0.29	73.29	0.16

^ Insufficient mean weight data collected by QMA or season, so national or annual mean used instead.

Figure 32: Paua harvest by method.

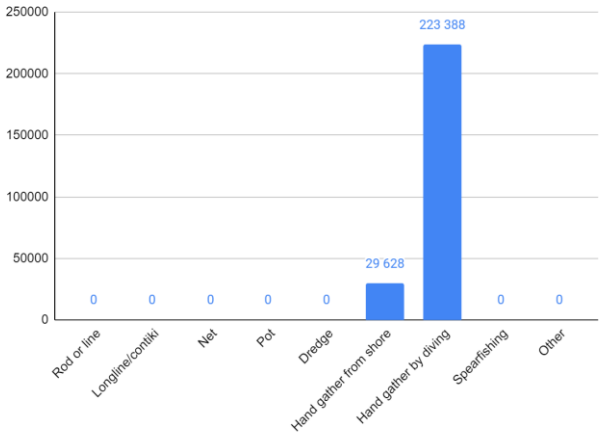


Figure 33: Paua harvest by platform.

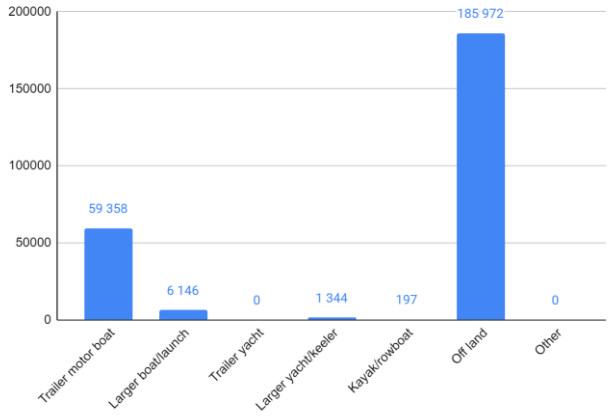


Table 66: Paua bag size by QMA (row percent).

	Bag Size													
QMA	<1	1	2	3	4	5	6	7	8	9	10	11	12	13+
PAU 1	0.0	0.0	11.1	0.0	0.0	4.4	11.0	3.4	3.2	0.0	55.7	0.0	0.0	11.1
PAU 2	1.0	4.8	10.9	8.1	8.9	12.2	4.5	3.6	2.3	2.9	35.9	0.0	0.8	4.2
PAU 3	0.0	0.0	13.8	38.6	4.3	33.4	3.6	3.4	0.0	0.0	3.0	0.0	0.0	0.0
PAU 5A	0.0	0.0	0.0	0.0	0.0	73.8	0.0	26.2	0.0	0.0	0.0	0.0	0.0	0.0
PAU 5B	0.0	0.0	0.0	12.1	18.2	0.0	2.3	5.8	0.0	5.8	55.7	0.0	0.0	0.0
PAU 5D	0.0	4.2	5.5	5.5	2.1	1.8	1.8	0.0	1.6	2.5	69.0	0.0	0.0	6.0
PAU 6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PAU 7	0.0	8.0	4.7	12.0	12.7	35.8	4.7	0.0	0.0	0.0	22.1	0.0	0.0	0.0
TOTAL	0.5	3.7	8.7	9.1	6.5	13.4	4.1	3.4	1.7	2.2	41.8	0.0	0.4	4.4

9.12 Red cod

The total estimated harvest for red cod for the 2022–23 fishing year was 2775 fish, or 2.6 tonnes (Table 67), which is one of the most significant species decreases compared to 2017–18. Almost half of red cod were caught in RCO 3 (East of the South Island) compared to RCO 2 (east and south coasts of the North Island) in 2017–18. Almost all red cod (87.9%) was caught with a rod and line (Figure 34) and nearly half (45.2%) was caught off land (Figure 35). The most common bag size (60.5%) was a single fish with no bag sizes of more than four being recorded in this edition (Table 68). The small base should be acknowledged when interpreting the results for this species.

Table 67: Red cod harvest by fishstock.

QMA.RCO	Fishers (n)	Events (n)	Harvest (n)	CV	Mean Weight (kg)	Harvest (tonnes)	CV
RCO 1	3	3	443	0.79	0.94^	0.42	0.79
RCO 2	6	7	369	0.53	0.94^	0.35	0.53
RCO 3	8	11	1 133	0.48	0.94^	1.07	0.48
RCO 7	4	4	830	0.72	0.94^	0.78	0.72
TOTAL	21	25	2 775	0.32	0.94	2.61	0.32

^ Insufficient mean weight data collected by QMA or season, so national or annual mean used instead.

Figure 34: Red cod harvest by method.

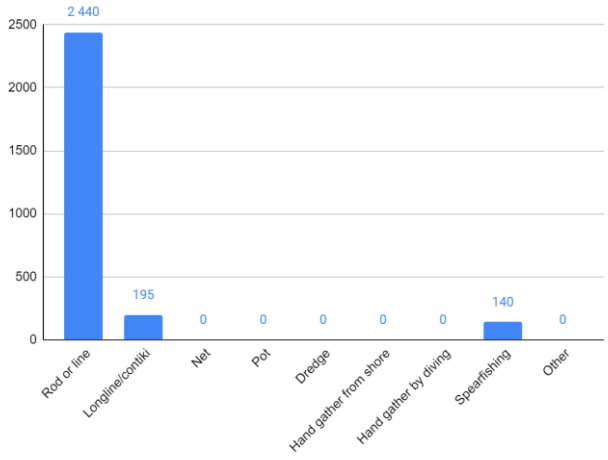


Figure 35: Red cod harvest by platform.

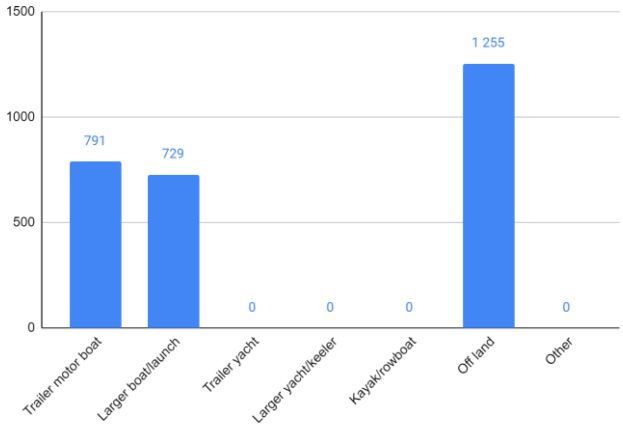


Table 68: Red cod bag size by QMA (row percent).

	Bag Size										
QMA	<1	1	2	3	4	5	6	7	8	9	10
RCO 1	0.0	50.4	0.0	49.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RCO 2	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RCO 3	0.0	42.3	16.5	29.1	12.1	0.0	0.0	0.0	0.0	0.0	0.0
RCO 7	0.0	54.7	0.0	45.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	0.0	60.5	5.7	29.7	4.2	0.0	0.0	0.0	0.0	0.0	0.0

9.13 Red gurnard

The total estimated harvest for red gurnard for the 2022–23 fishing year was 201 100 fish, or 114.6 tonnes (Table 69). Red gurnard was caught across the five QMA areas, but mainly in GUR 1 and 2 (the North and East of the North Island) where almost three quarters (72.1%) of red gurnard were harvested. Most red gurnard (92.9%) were caught using a rod and line (Figure 36) and mostly from some type of boat (Figure 37), with only 8.3% taken from land. A bag size of one fish was most common (42.7% of bags) and only 7.4% of bags being seven or more. Bag sizes were notably larger in GUR 2, including bag sizes of more than 10 which weren't recorded in any other QMA (Table 70).

Table 69: Red gurnard harvest by fishstock.

QMA	Fishers (n)	Events (n)	Harvest (n)	CV	Mean Weight (kg)	Harvest (tonnes)	CV
GUR 1	187	286	59 705	0.13	0.46*	29.57	0.14
GUR 2	51	122	85 233	0.63	0.63	53.88	0.63
GUR 3	15	17	3 475	0.34	0.64	2.22	0.34
GUR 7	88	182	27 882	0.19	0.55*	15.29	0.19
GUR 8	60	105	24 805	0.21	0.57*	13.68	0.21
TOTAL	395	712	201 100	0.27	0.57	114.63	0.30

***** Seasonal and/or sub area mean weights used for tonnage estimates, but annual mean weights listed.

Figure 36: Red gurnard harvest by method.

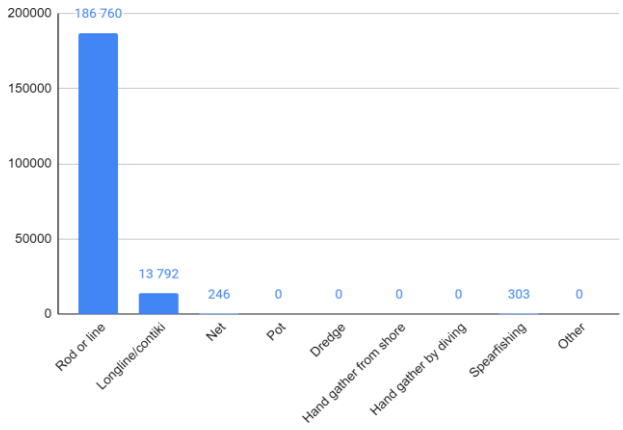


Figure 37: Red gurnard harvest By platform.

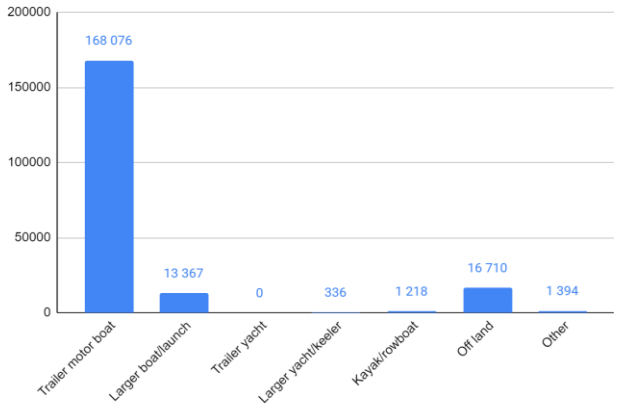


Table 70: Red gurnard bag size by QMA (row percent).

	Bag Size													
QMA	<1	1	2	3	4	5	6	7	8	9	10	11	12	13+
GUR 1	6.1	51.3	26.1	7.8	3.7	2.6	1.3	0.2	0.3	0.0	0.0	0.0	0.5	0.0
GUR 2	3.5	17.0	12.9	8.8	10.2	8.7	10.2	3.9	4.6	0.0	4.0	4.0	2.8	9.3
GUR 3	0.0	51.8	11.2	12.8	4.2	15.2	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GUR 7	3.1	43.9	29.2	13.4	4.7	0.5	1.4	1.5	1.2	0.0	1.1	0.0	0.0	0.0
GUR 8	6.4	47.9	23.1	10.3	2.6	0.0	5.8	2.5	1.4	0.0	0.0	0.0	0.0	0.0
TOTAL	5.0	42.7	23.3	9.5	5.0	3.2	3.9	1.5	1.5	0.0	1.0	0.8	0.8	1.8

9.14 Sea perch

The total estimated harvest for sea perch for the 2017–18 fishing year was 56 251 fish, or 36.1 tonnes (Table 71). Sea perch were taken most frequently in southern QMAs. Three quarters of the harvest (75%) was taken from SPE 3 (East coast of the South Island) and the majority of the remainder (19.6%) in SPE 7 (West Coast of the South Island). Virtually all sea perch was taken by rod and line (Figure 38) and from a boat (Figure 39). Over a third (39.6%) of bag sizes were two or less, while almost three quarters of bag sizes (70.1%) were of five or fewer fish.The percentage 12.8% of bag sizes being ten or more is a high for a species but a smaller proportion than in 2017–18 (24.9%) (Table 72).

Table 71: Sea perch harvest by fishstock.

QMA	Fishers (n)	Events (n)	Harvest (n)	CV	Mean Weight (kg)	Harvest (tonnes)	CV
SPE 1	2	2	225	0.70	0.51^	0.14	0.70
SPE 2	3	3	764	0.72	0.51^	0.49	0.72
SPE 3	35	67	42 180	0.28	0.50	27.04	0.28
SPE 5	4	6	1822	0.63	0.51^	1.17	0.63
SPE 7	14	40	11 021	0.53	0.55	7.07	0.53
SPE 8	2	2	239	0.73	0.51^	0.15	0.73
SPE 9	0	0	0	NA		0.00	NA
TOTAL	59	120	56 251	0.23	0.64	36.06	0.23

^ Insufficient mean weight data collected by QMA or season, so national or annual mean used instead.

Figure 38: Sea perch harvest by method.

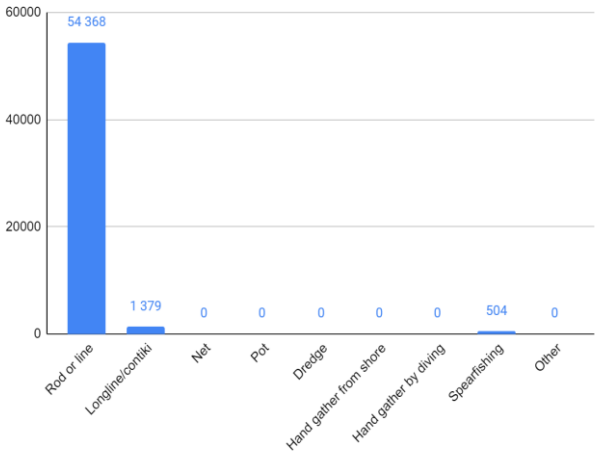


Figure 39: Sea perch harvest by platform.

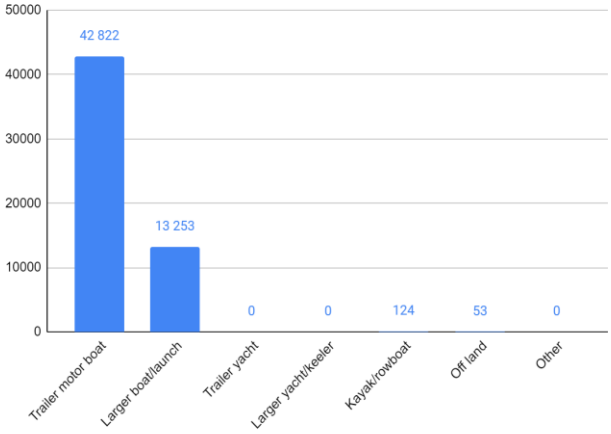


Table 72: Sea perch bag size by QMA (row percent).

	Bag Size													
QMA	<1	1	2	3	4	5	6	7	8	9	10	11	12	13+
SPE 1	0.0	54.2	45.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SPE 2	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SPE 3	0.0	4.7	9.9	3.6	19.3	17.4	7.2	3.5	3.8	6.2	7.8	0.0	2.5	14.0
SPE 5	0.0	0.0	51.7	17.1	0.0	0.0	15.6	15.6	0.0	0.0	0.0	0.0	0.0	0.0
SPE 7	2.5	35.7	25.1	14.6	11.2	0.0	2.6	0.0	5.6	2.6	0.0	0.0	0.0	0.0
SPE 8	0.0	73.8	26.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SPE 9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	0.9	17.6	21.1	8.0	14.3	9.1	5.4	2.5	4.1	4.2	4.1	0.0	1.3	7.4

9.15 Skipjack tuna

The total estimated harvest for skipjack tuna for the 2022–23 fishing year was 21 102 fish, or 44 tonnes (Table 73), which is one of the least drastic decreases for a commonly caught fin species. There is only one QMA for this species so all this species is recorded as being from SKJ 1. All skipjack was taken by rod and line (Figure 40) and from some type of boat (Figure 41). While the bag size variation is quite wide (Table 74) and just one or two fish is the most common bag size as in 2017–18 (55.9% compared to 61% in the previous edition), bag sizes of 10 or more were more frequently recorded in this edition (11% compared to 3.7%, although from a smaller base).

Table 73: Skipjack tuna harvest by fishstock.

QMA	Fishers (n)	Events (n)	Harvest (n)	CV	Mean Weight (kg)	Harvest (tonnes)	CV
SKJ 1	30	40	21 102	0.40	2.08^	43.96	0.40
TOTAL	30	40	21 102	0.40	2.08	43.96	0.40

^ Insufficient mean weight data collected by QMA or season, so national or annual mean used instead.

Figure 40: Skipjack tuna harvest by method.

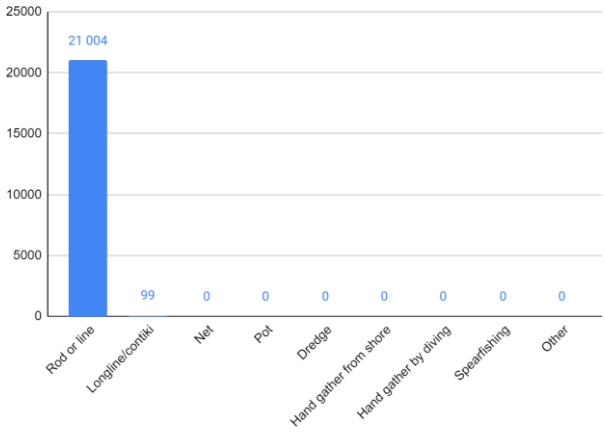


Figure 41: Skipjack tuna harvest By platform.

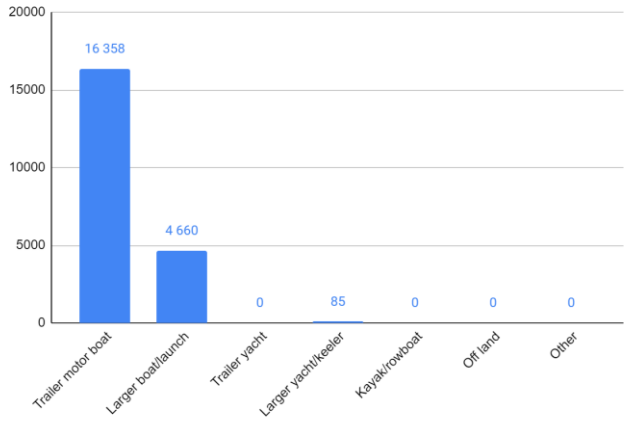


Table 74: Skipjack tuna bag size by QMA (row percent).

	Bag Size													
QMA	<1	1	2	3	4	5	6	7	8	9	10	11	12	13+
SKJ 1	0.0	31.4	24.8	11.7	7.5	7.5	2.1	1.2	2.7	0.0	5.5	0.0	0.0	5.5
TOTAL	0.0	31.4	24.8	11.7	7.5	7.5	2.1	1.2	2.7	0.0	5.5	0.0	0.0	5.5

9.16 Snapper

The total estimated harvest for snapper, the most commonly taken finfish, for the 2022–23 fishing year was 1 948 102 fish, or 2 150.9 tonnes (Table 75). The bulk of this was harvested in SNA 1 (North east of the North Island), where 71.4% of the snapper were taken. Almost all snapper (95%) were caught by rod and line with just 5% being taken using the next most common method, longline/kontiki (Figure 42). Almost three quarter of snapper (71.8%) were caught from a trailer boat (67.6%) followed by larger boats/launches (15.3%) and from land (7.4%%) (Figure 43). There is a relatively even distribution of bag sizes compared to other species. About a third of bag sizes were two or less (35.9%), another third three to five fish (35.5%) and the approximately equal remainder six fish or more (Table 76).

Table 75: Snapper harvest by fishstock.

QMA	Fishers (n)	Events (n)	Harvest (n)	CV	Mean Weight (kg)	Harvest (tonnes)	CV
SNA 1	945	2 982	1 391 494	0.06	1.13*	2 150.89	0.06
SNA 2	92	200	91 519	0.25	1.33*	138.78	0.25
SNA 3	3	3	594	0.61	1.21^	0.90	0.61
SNA 7	145	390	89 819	0.14	1.48*	137.30	0.14
SNA 8	337	724	374 675	0.11	1.65*	581.93	0.11
Total	1 405	4 299	1 948 102	0.05	1.55	3 009.82	0.05

^ Insufficient mean weight data collected by QMA or season, so national or annual mean used instead.
* Seasonal and/or sub area mean weights used for tonnage estimates, but annual mean weights listed.

Figure 42: Snapper harvest by method.

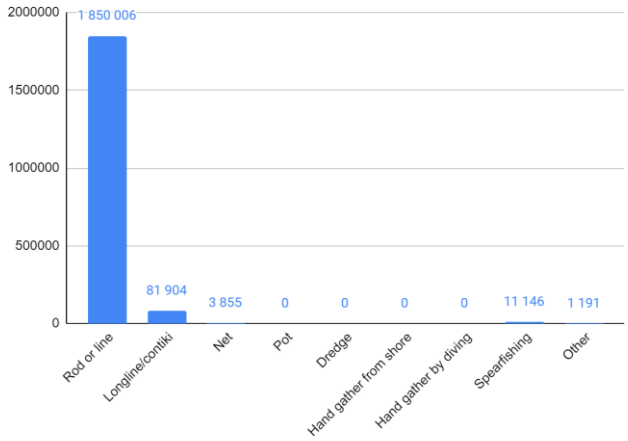


Figure 43: Snapper harvest By platform.

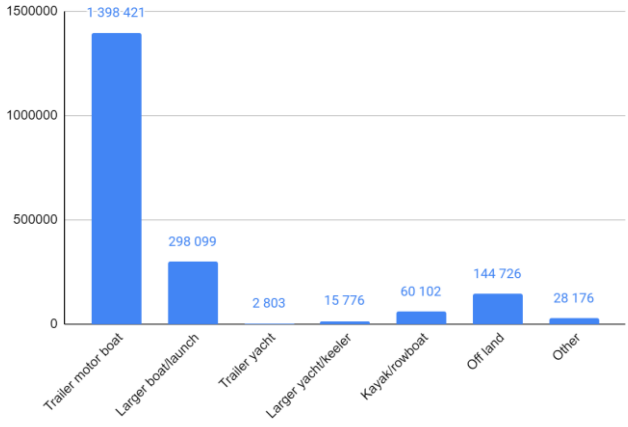


Table 76: Snapper bag size by QMA (row percent).

	Bag Size													
QMA	<1	1	2	3	4	5	6	7	8	9	10	11	12	13+
SNA 1	0.6	16.6	16.2	15.3	12.0	11.4	7.2	17.4	0.7	0.2	1.0	0.1	0.6	0.6
SNA 2	0.5	31.0	18.0	11.4	9.9	7.6	3.6	2.9	3.0	0.0	11.1	0.0	0.0	1.0
SNA 3	0.0	42.2	45.5	0.0	0.0	0.0	12.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SNA 7	1.0	30.5	21.4	18.5	9.7	6.5	7.3	0.8	1.8	0.5	1.8	0.3	0.0	0.0
SNA 8	2.1	21.0	12.6	12.5	8.4	9.0	7.8	4.9	5.3	1.9	11.7	0.0	0.5	2.3
TOTAL	0.9	19.0	16.0	14.9	11.1	10.5	7.1	13.5	1.6	0.5	3.3	0.1	0.5	0.7

9.17 Tarakihi

The total estimated harvest for tarakihi for the 2022–23 fishing year was 126 682 fish, or 126.8 tonnes (Table 77). Almost three quarters of tarakihi (70.4%) was harvested in TARs 1 and 2 (the North and South East of the North Island respectively). Virtually all tarakihi was taken by rod and line (Figure 44) and from a boat of some kind (Figure 45). Just over half of bag sizes (53.4%) were of two fish or less (Table 78), with the remainder of bag sizes showing a relatively wide and even distribution.

Table 77: Tarakihi harvest by fishstock.

QMA	Fishers (n)	Events (n)	Harvest (n)	CV	Mean Weight (kg)	Harvest (tonnes)	CV
TAR 1	63	106	40 870	0.22	0.95*	38.81	0.22
TAR 2	49	77	48 349	0.39	1.05	50.64	0.39
TAR 3	20	40	10 436	0.39	0.96	10.01	0.39
TAR 5	13	31	5 407	0.43	1.02^	5.52	0.43
TAR 7	33	47	11 056	0.31	0.87	9.58	0.31
TAR 8	17	24	10 565	0.40	1.02	12.22	0.40
TOTAL	187	325	126 682	0.18	1.00	126.78	0.18

^ Insufficient mean weight data collected by QMA or season, so national or annual mean used instead.
* Seasonal and/or sub area mean weights used for tonnage estimates, but annual mean weights listed.

Figure 44: Tarakihi harvest by method.

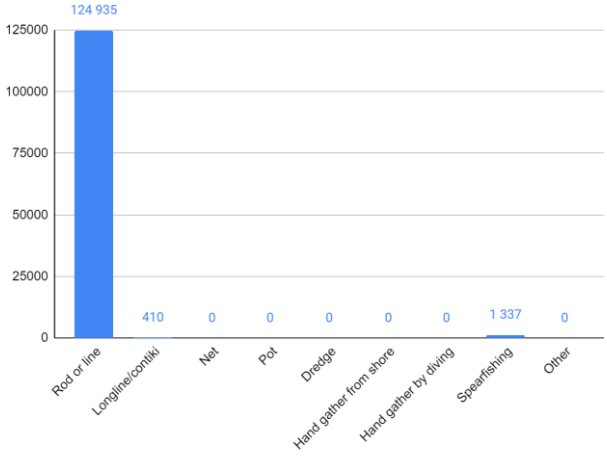


Figure 45: Tarakihi harvest by platform.

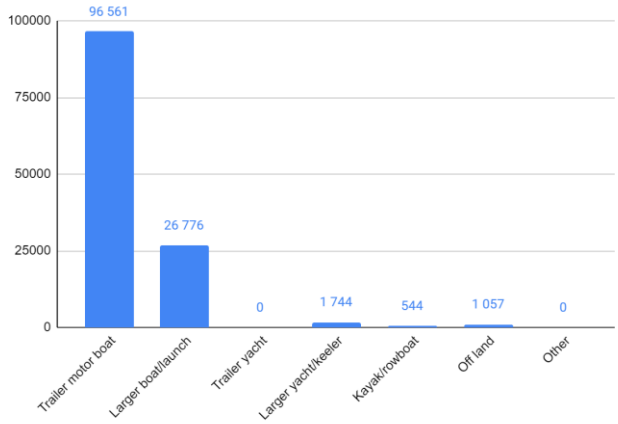


Table 78: Tarakihi bag size by QMA (row percent).

	Bag Size													
QMA	<1	1	2	3	4	5	6	7	8	9	10	11	12	13+
TAR 1	0.0	32.2	26.4	18.7	2.3	7.1	3.5	4.4	2.1	0.0	2.4	0.0	1.0	0.0
TAR 2	0.0	14.2	18.5	7.8	12.1	9.9	8.9	2.2	7.2	0.0	2.0	0.8	2.9	13.4
TAR 3	0.0	35.8	31.0	5.9	3.8	0.6	0.6	9.3	6.0	7.0	0.0	0.0	0.0	0.0
TAR 5	0.0	61.3	10.6	5.5	17.4	2.3	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TAR 7	0.0	49.3	13.1	17.2	4.9	4.9	3.9	0.0	1.6	0.0	0.0	0.0	5.1	0.0
TAR 8	0.0	21.3	21.7	8.5	13.8	7.7	7.5	4.7	3.6	0.0	7.5	3.6	0.0	0.0
TOTAL	0.0	31.6	21.8	12.9	7.1	6.6	4.8	3.5	3.6	0.7	2.0	0.5	1.7	3.3

9.18 Trevally

The total estimated harvest for trevally for the 2022–23 fishing year was 101 750 fish, or 151.1 tonnes (Table 79). There are only four QMAs for trevally and over three quarters (77.9)% is taken from TRE 1 (north east coast of the North Island). Virtually all the catch was by rod and line (Figure 46). Although most trevally was caught from a boat, an appreciable number (15%) was caught off land (Figure 47). Bag sizes for trevally were small, with 68.5% of bags being just one fish and 89.1% being two or less (Table 80).

Table 79: Trevally harvest by fishstock.

QMA	Fishers (n)	Events (n)	Harvest (n)	CV	Mean Weight (kg)	Harvest (tonnes)	CV
TRE 1	256	423	79 237	0.13	1.34*	106.76	0.14
TRE 2	21	27	4 992	0.29	1.62	8.12	0.29
TRE 3	2	2	518	0.85	1.45^	0.75	0.85
TRE 7	76	116	17 003	0.18	2.09*	35.49	0.18
TOTAL	347	568	101 750	0.11	1.49	151.12	0.11

^ Insufficient mean weight data collected by QMA or season, so national or annual mean used instead.
* Seasonal and/or sub area mean weights used for tonnage estimates, but annual mean weights listed.

Figure 46: Trevally harvest by method.

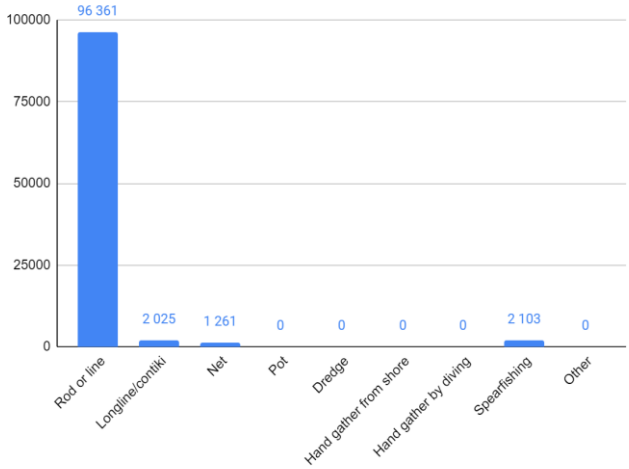


Figure 47: Trevally harvest by platform.

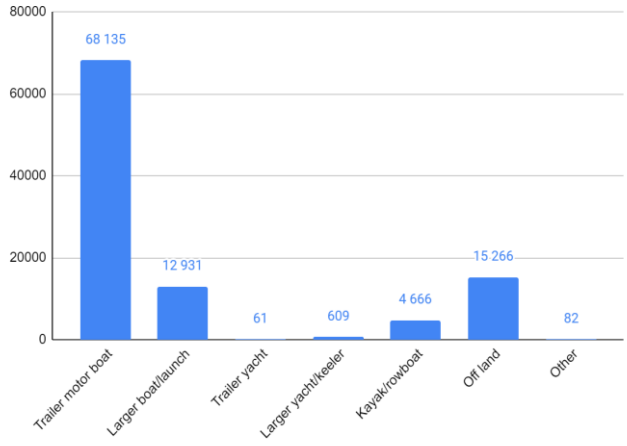


Table 80: Trevally bag size by QMA (row percent).

	Bag Size												
QMA	<1	1	2	3	4	5	6	7	8	9	10	11	12
TRE 1	1.3	66.9	20.1	6.1	4.0	0.5	0.2	0.1	0.1	0.0	0.0	0.0	0.6
TRE 2	2.5	65.7	18.9	10.4	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRE 3	0.0	41.6	0.0	58.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRE 7	1.9	73.9	17.7	3.9	1.9	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	1.5	68.1	19.5	6.1	3.5	0.5	0.1	0.1	0.1	0.0	0.0	0.0	0.4

10. QMA HARVEST ESTIMATES BY METHOD AND PLATFORM

For the major species covered in Section 9, QMA harvest estimates are presented at a finer scale by both method (Table 81) and platform (Table 82). Only methods and platforms which produced non zero catch have been included. Table data is ordered alphanumerically by QMA code.

Table 81: Harvest estimates by QMA and method.

Method	QMA	Harvest (n)	CV	Harvest (tonnes)	CV	QMA % (tonnes)
Rod/Line	ALB 1	4 915	0.30	35.82	0.30	99.3
Longline	ALB 1	34	1.02	0.25	1.02	0.7
Rod/Line	BCO 1	1 570	0.32	0.80	0.32	100
Rod/Line	BCO 2	33 157	0.40	17.85	0.40	98.8
Spearfishing	BCO 2	404	0.73	0.22	0.73	1.2
Rod/Line	BCO 3	90 556	0.24	50.90	0.24	94.9
Longline	BCO 3	1 046	0.88	0.60	0.88	1.1
Pot	BCO 3	162	1.01	0.09	1.01	0.2
Handgather by diving	BCO 3	1 633	1.06	0.91	1.06	1.7
Spearfishing	BCO 3	2 038	0.65	1.15	0.65	2.1
Rod/Line	BCO 5	105 463	0.18	57.38	0.18	98.8
Longline	BCO 5	57	1.00	0.03	1.00	0.1
Handgather by diving	BCO 5	146	1.02	0.08	1.02	0.1
Spearfishing	BCO 5	1 087	0.45	0.60	0.45	1.0
Rod/Line	BCO 7	60 605	0.17	30.83	0.17	99.2
Longline	BCO 7	182	0.90	0.09	0.90	0.3
Spearfishing	BCO 7	322	0.92	0.17	0.93	0.5
Rod/Line	BCO 8	16 186	0.28	7.45	0.28	89.4
Longline	BCO 8	2 033	0.88	0.84	0.88	10.1
Spearfishing	BCO 8	99	1.00	0.04	1.00	0.5
Rod/Line	BNS 1	1 847	0.48	16.39	0.48	100
Rod/Line	BNS 2	117	1.01	0.86	1.01	100
Rod/Line	BNS 3	1 358	0.51	9.90	0.51	100
Rod/Line	BNS 7	170	1.00	1.24	1.00	100
Pot	CRA 1	493	1.01	0.35	1.01	4.4
Handgather by diving	CRA 1	9 380	0.52	7.65	0.52	95.6
Pot	CRA 2	84	1.00	0.06	1.00	0.6
Handgather by diving	CRA 2	11 510	0.31	9.93	0.31	99.4
Pot	CRA 3	4 645	0.72	2.88	0.72	50.2
Handgather by diving	CRA 3	4 612	0.61	2.86	0.61	49.8
Pot	CRA 4	14 512	0.41	8.90	0.41	27.3
Handgather by diving	CRA 4	31 971	0.52	23.68	0.52	72.7

Method	QMA	Harvest (n)	CV	Harvest (tonnes)	CV	QMA % (tonnes)
Pot	CRA 5	21 081	0.60	14.73	0.58	38.3
Handgather by diving	CRA 5	26 402	0.26	23.76	0.26	61.7
Handgather by diving	CRA 7	1 992	0.54	1.41	0.54	100
Pot	CRA 8	4 213	0.40	3.04	0.40	24.3
Handgather by diving	CRA 8	13 087	0.40	9.46	0.40	75.7
Pot	CRA 9	2 557	0.76	1.95	0.76	41.8
Handgather by diving	CRA 9	3 210	0.47	2.72	0.47	58.2
Rod/Line	FLA 1	126	1.00	0.03	1.00	0.9
Net	FLA 1	6 269	0.41	1.46	0.41	44.5
Handgather from Shore	FLA 1	3 275	0.73	0.76	0.73	23.2
Spearfishing	FLA 1	4 445	0.64	1.03	0.64	31.4
Rod/Line	FLA 2	103	1.01	0.02	1.01	3.3
Net	FLA 2	2 050	0.73	0.48	0.73	78.7
Spearfishing	FLA 2	461	0.75	0.11	0.75	18.0
Rod/Line	FLA 3	138	1.02	0.03	1.02	0.8
Longline	FLA 3	125	1.01	0.03	1.01	0.8
Net	FLA 3	14 159	0.76	3.29	0.76	87.3
Handgather from Shore	FLA 3	1 795	0.70	0.42	0.70	11.1
Net	FLA 7	6 082	0.52	1.42	0.52	70.3
Handgather from Shore	FLA 7	354	1.01	0.08	1.01	4.0
Spearfishing	FLA 7	2 243	0.83	0.52	0.83	25.7
Rod/Line	GUR 1	53 895	0.13	26.36	0.15	89.1
Longline	GUR 1	5 724	0.35	3.18	0.38	10.8
Spearfishing	GUR 1	86	1.00	0.03	1.00	0.1
Rod/Line	GUR 2	84 493	0.63	53.41	0.63	99.1
Longline	GUR 2	628	0.58	0.40	0.58	0.7
Net	GUR 2	113	1.01	0.07	1.01	0.1
Rod/Line	GUR 3	3 259	0.36	2.08	0.36	93.7
Spearfishing	GUR 3	216	1.02	0.14	1.02	6.3
Rod/Line	GUR 7	23 569	0.17	12.89	0.17	84.4
Longline	GUR 7	4 180	0.40	2.32	0.40	15.2
Net	GUR 7	133	1.01	0.07	1.01	0.5
Rod/Line	GUR 8	21 544	0.22	11.86	0.22	86.7
Longline	GUR 8	3 261	0.61	1.82	0.60	13.3
Rod/Line	HPA 1	2 143	0.37	14.27	0.37	94.2
Spearfishing	HPA 1	132	1.01	0.88	1.01	5.8
Rod/Line	HPA 2	3 002	0.37	19.99	0.37	100
Rod/Line	HPA 3	2 856	0.55	16.20	0.55	100

Method	QMA	Harvest (n)	CV	Harvest (tonnes)	CV	QMA % (tonnes)
Rod/Line	HPA 5	358	0.72	2.38	0.72	94.1
Longline	HPA 5	23	0.71	0.15	0.71	5.9
Rod/Line	HPA 7	1 293	0.37	8.61	0.37	100
Rod/Line	HPA 8	517	0.62	3.44	0.62	100
Rod/Line	HPB 1	2 388	0.35	15.90	0.35	85.8
Spearfishing	HPB 1	396	1.01	2.63	1.01	14.2
Rod/Line	HPB 2	3 002	0.37	19.99	0.37	100
Rod/Line	HPB 3	3 564	0.49	20.91	0.49	100
Rod/Line	HPB 5	358	0.72	2.38	0.72	94.1
Longline	HPB 5	23	0.71	0.15	0.71	5.9
Rod/Line	HPB 7	1 741	0.37	11.59	0.37	100
Rod/Line	HPB 8	517	0.62	3.44	0.62	100
Rod/Line	JDO 1	4 870	0.29	6.18	0.29	97.6
Spearfishing	JDO 1	116	1.00	0.15	1.00	2.4
Rod/Line	JDO 2	1 060	0.54	1.41	0.54	100
Rod/Line	JDO 7	215	0.72	0.29	0.72	100
Rod/Line	KAH 1	212 445	0.08	333.04	0.08	89.8
Longline	KAH 1	5 887	0.28	9.75	0.29	2.6
Net	KAH 1	8 345	0.62	13.70	0.65	3.7
Spearfishing	KAH 1	8 018	0.83	13.31	0.84	3.6
Other	KAH 1	579	1.01	0.81	1.01	0.2
Rod/Line	KAH 2	63 069	0.38	108.05	0.38	95.3
Longline	KAH 2	2 447	0.37	4.19	0.37	3.7
Net	KAH 2	392	1.01	0.67	1.01	0.6
Spearfishing	KAH 2	275	1.01	0.47	1.01	0.4
Rod/Line	KAH 3	50 587	0.22	65.57	0.22	97.1
Longline	KAH 3	1 003	0.72	1.35	0.73	2.0
Net	KAH 3	140	1.01	0.18	1.01	0.3
Spearfishing	KAH 3	334	0.72	0.45	0.71	0.7
Rod/Line	KAH 8	144 825	0.12	232.63	0.12	90.0
Longline	KAH 8	9 523	0.26	15.52	0.27	6.0
Net	KAH 8	6 110	0.71	10.60	0.71	4.1
Rod/Line	KIN 1	20 269	0.20	201.75	0.20	86.0
Longline	KIN 1	63	1.00	0.62	1.00	0.3
Spearfishing	KIN 1	3 237	0.36	32.22	0.36	13.7
Rod/Line	KIN 2	4 373	0.39	48.83	0.39	85.2

Method	QMA	Harvest (n)	CV	Harvest (tonnes)	CV	QMA % (tonnes)
Spearfishing	KIN 2	757	0.58	8.45	0.58	14.8
Rod/Line	KIN 3	247	0.67	2.54	0.67	100
Rod/Line	KIN 7	1 092	0.41	11.21	0.41	88.3
Spearfishing	KIN 7	145	1.00	1.49	1.00	11.7
Rod/Line	KIN 8	4 445	0.42	45.66	0.42	100
Handgather by diving	PAU 1	28 178	0.87	8.12	0.87	100
Handgather from Shore	PAU 2	12 715	0.57	3.67	0.57	11.1
Handgather by diving	PAU 2	101 807	0.18	29.35	0.18	88.9
Handgather from Shore	PAU 3A	148	0.67	0.04	0.67	7.0
Handgather by diving	PAU 3A	1 831	0.74	0.53	0.74	93.0
Handgather from Shore	PAU 3B	869	0.63	0.25	0.63	10.5
Handgather by diving	PAU 3B	7 408	0.35	2.14	0.35	89.5
Handgather by diving	PAU 5A	6 514	0.59	1.88	0.59	100
Handgather by diving	PAU 5B	11 989	0.33	3.46	0.33	100
Handgather from Shore	PAU 5D	11 969	0.65	3.45	0.65	16.7
Handgather by diving	PAU 5D	59 680	0.35	17.20	0.35	83.3
Handgather from Shore	PAU 7	3 927	0.60	1.14	0.60	39.7
Handgather by diving	PAU 7	5 981	0.43	1.73	0.43	60.3
Rod/Line	RCO 1	443	0.79	0.42	0.79	100
Rod/Line	RCO 2	229	0.61	0.22	0.61	62.9
Spearfishing	RCO 2	140	1.02	0.13	1.02	37.1
Rod/Line	RCO 3	938	0.44	0.88	0.44	83.0
Longline	RCO 3	195	1.01	0.18	1.01	17.0
Rod/Line	RCO 7	830	0.72	0.78	0.72	100
Rod/Line	SKJ 1	21 004	0.41	43.75	0.41	99.6
Longline	SKJ 1	99	1.01	0.21	1.01	0.4
Rod/Line	SNA 1	1 331 146	0.06	2056.62	0.06	95.6
Longline	SNA 1	45 904	0.24	72.85	0.24	3.4
Net	SNA 1	3 672	0.77	5.37	0.76	0.2
Spearfishing	SNA 1	10 450	0.33	15.46	0.34	0.7
Other	SNA 1	322	1.00	0.59	1.00	<0.1
Rod/Line	SNA 2	87 616	0.26	132.76	0.25	95.7
Longline	SNA 2	3 659	0.64	5.67	0.62	4.1
Net	SNA 2	88	1.00	0.13	1.00	<0.1
Spearfishing	SNA 2	156	1.00	0.23	1.00	0.2

Method	QMA	Harvest (n)	CV	Harvest (tonnes)	CV	QMA % (tonnes)
Rod/Line	SNA 3	383	0.76	0.60	0.74	66.0
Spearfishing	SNA 3	211	1.01	0.31	1.01	34.0
Rod/Line	SNA 7	80 283	0.14	123.18	0.14	89.7
Longline	SNA 7	9 199	0.32	13.51	0.31	9.8
Net	SNA 7	95	1.05	0.17	1.05	0.1
Spearfishing	SNA 7	241	1.01	0.44	1.01	0.3
Rod/Line	SNA 8	350 578	0.11	545.11	0.11	93.7
Longline	SNA 8	23 141	0.30	35.51	0.31	6.1
Spearfishing	SNA 8	87	1.01	0.13	1.01	<0.1
Other	SNA 8	869	1.01	1.18	1.01	<0.1
Rod/Line	SPE 1	225	0.70	0.14	0.70	100
Rod/Line	SPE 2	764	0.72	0.49	0.72	100
Rod/Line	SPE 3	40 588	0.29	26.02	0.29	96.2
Longline	SPE 3	1 327	0.84	0.85	0.84	3.1
Spearfishing	SPE 3	265	1.00	0.17	1.00	0.7
Rod/Line	SPE 5	1 822	0.63	1.17	0.63	100
Rod/Line	SPE 7	10 969	0.53	7.03	0.53	99.6
Longline	SPE 7	53	1.03	0.03	1.03	0.4
Spearfishing	SPE 8	239	0.73	0.15	0.73	100
Rod/Line	TAR 1	40 827	0.22	38.77	0.22	99.9
Spearfishing	TAR 1	43	1.01	0.04	1.01	0.1
Rod/Line	TAR 2	48 349	0.39	50.64	0.39	100
Rod/Line	TAR 3	10 318	0.40	9.90	0.40	98.9
Longline	TAR 3	118	1.02	0.11	1.02	1.1
Rod/Line	TAR 5	5 407	0.43	5.52	0.43	100
Rod/Line	TAR 7	10 181	0.33	8.82	0.33	92.1
Spearfishing	TAR 7	875	0.71	0.76	0.71	7.9
Rod/Line	TAR 8	9 853	0.43	11.39	0.43	93.3
Longline	TAR 8	293	1.00	0.34	1.00	2.8
Spearfishing	TAR 8	419	1.02	0.48	1.02	3.9
Rod/Line	TRE 1	75 979	0.14	102.41	0.15	95.9
Longline	TRE 1	988	0.41	1.44	0.41	1.3
Net	TRE 1	167	0.72	0.24	0.73	0.2
Spearfishing	TRE 1	2 103	0.43	2.67	0.41	2.5
Rod/Line	TRE 2	4 389	0.32	7.14	0.32	87.9
Longline	TRE 2	490	0.74	0.80	0.74	9.9
Net	TRE 2	113	1.01	0.18	1.01	2.2

Method	QMA	Harvest (n)	CV	Harvest (tonnes)	CV	QMA % (tonnes)
Rod/Line	TRE 3	518	0.85	0.75	0.85	100
Rod/Line	TRE 7	15 474	0.19	32.27	0.19	90.9
Longline	TRE 7	547	0.72	1.21	0.72	3.4
Net	TRE 7	981	0.75	2.01	0.77	5.7

Table 82: Harvest estimates by QMA and platform.

Platform	QMA	Harvest (n)	CV	Harvest (tonnes)	CV	QMA % (tonnage)
Trailer Motor boat	ALB 1	4 745	0.30	34.58	0.30	98.5
Larger boat/Launch	ALB 1	203	1.01	1.48	1.01	1.5
Trailer Motor boat	BCO 1	1 067	0.36	0.54	0.36	67.5
Larger boat/Launch	BCO 1	504	0.63	0.26	0.63	32.5
Trailer Motor boat	BCO 2	20 578	0.37	10.87	0.36	60.2
Larger boat/Launch	BCO 2	12 011	0.90	6.64	0.91	36.8
Larger yacht/keeler	BCO 2	203	1.00	0.11	1.00	0.6
Kayak/Rowboat	BCO 2	769	0.62	0.44	0.63	2.4
Trailer Motor boat	BCO 3	73 297	0.28	41.23	0.28	76.8
Larger boat/Launch	BCO 3	9 470	0.39	5.31	0.39	9.9
Kayak/Rowboat	BCO 3	972	1.02	0.54	1.02	1.0
Off land	BCO 3	11 697	0.57	6.57	0.57	12.2
Trailer Motor boat	BCO 5	73 179	0.19	39.75	0.19	68.4
Larger boat/Launch	BCO 5	30 040	0.36	16.38	0.36	28.2
Kayak/Rowboat	BCO 5	3 182	0.96	1.76	0.96	3.0
Off land	BCO 5	352	0.74	0.19	0.74	0.3
Trailer Motor boat	BCO 7	35 183	0.21	17.82	0.21	57.3
Larger boat/Launch	BCO 7	21 988	0.31	11.23	0.31	36.1
Larger yacht/keeler	BCO 7	1 332	0.74	0.66	0.74	2.1
Kayak/Rowboat	BCO 7	2 005	0.70	1.08	0.71	3.5
Off land	BCO 7	600	0.61	0.31	0.62	1.0
Trailer Motor boat	BCO 8	16 340	0.28	7.50	0.28	90.0
Larger boat/Launch	BCO 8	1 734	0.96	0.73	0.93	8.8
Larger yacht/keeler	BCO 8	102	1.00	0.04	1.00	4.8
Off land	BCO 8	143	1.01	0.06	1.01	0.7
Trailer Motor boat	BNS 1	939	0.67	8.34	0.67	50.9
Larger boat/Launch	BNS 1	908	0.52	8.05	0.52	49.1
Trailer Motor boat	BNS 2	117	1.01	0.86	1.01	100
Trailer Motor boat	BNS 3	1 358	0.51	9.90	0.51	100
Larger yacht/keeler	BNS 7	170	1.00	1.24	1.00	100
Trailer Motor boat	CRA 1	8 332	0.57	6.79	0.57	84.9
Larger boat/Launch	CRA 1	1 473	0.75	1.15	0.76	14.4

Platform	QMA	Harvest (n)	CV	Harvest (tonnes)	CV	QMA % (tonnage)
Off land	CRA 1	68	1.01	0.06	1.01	0.8
Trailer Motor boat	CRA 2	9 752	0.35	8.40	0.35	84.1
Larger boat/Launch	CRA 2	450	1.00	0.39	1.00	3.9
Larger yacht/keeler	CRA 2	356	1.00	0.31	1.00	3.1
Off land	CRA 2	1 035	0.45	0.89	0.45	8.9
Trailer Motor boat	CRA 3	8 183	0.56	5.07	0.56	88.3
Off land	CRA 3	1 074	0.61	0.67	0.61	11.7
Trailer Motor boat	CRA 4	38 989	0.44	27.23	0.46	83.6
Kayak/Rowboat	CRA 4	195	1.00	0.12	1.00	0.4
Off land	CRA 4	7 299	0.31	5.23	0.30	16.1
Trailer Motor boat	CRA 5	26 165	0.28	22.28	0.28	57.9
Larger boat/Launch	CRA 5	2 699	0.71	2.37	0.73	6.2
Kayak/Rowboat	CRA 5	1 291	1.00	1.16	1.00	3.0
Off land	CRA 5	17 329	0.71	12.67	0.66	32.9
Trailer Motor boat	CRA 7	805	1.00	0.57	1.00	40.4
Off land	CRA 7	1 187	0.73	0.84	0.73	59.6
Trailer Motor boat	CRA 8	11 952	0.38	8.64	0.38	69.1
Larger boat/Launch	CRA 8	3 300	0.87	2.39	0.87	19.1
Kayak/Rowboat	CRA 8	957	1.01	0.69	1.01	5.5
Off land	CRA 8	1 091	0.85	0.79	0.85	6.3
Trailer Motor boat	CRA 9	5 129	0.47	4.13	0.46	88.4
Off land	CRA 9	495	0.87	0.42	0.87	9.0
Other	CRA 9	143	1.00	0.12	1.00	2.6
Trailer Motor boat	FLA 1	2 698	0.69	0.63	0.69	19.2
Larger boat/Launch	FLA 1	1 478	1.01	0.34	1.01	10.4
Kayak/Rowboat	FLA 1	1 536	0.68	0.36	0.68	11.0
Off land	FLA 1	8 402	0.45	1.95	0.45	59.5
Larger boat/Launch	FLA 2	156	1.00	0.04	1.00	6.6
Off land	FLA 2	2 458	0.62	0.57	0.62	93.4
Trailer Motor boat	FLA 3	555	1.00	0.13	1.00	3.4
Off land	FLA 3	15 663	0.77	3.64	0.77	96.6
Trailer Motor boat	FLA 7	502	0.69	0.12	0.69	5.9
Off land	FLA 7	8 178	0.44	1.90	0.44	94.1
Trailer Motor boat	GUR 1	42 745	0.15	20.75	0.17	70.2
Larger boat/Launch	GUR 1	7 629	0.34	4.03	0.37	13.6
Larger yacht/keeler	GUR 1	116	1.01	0.06	1.01	0.2
Off land	GUR 1	8 999	0.27	4.65	0.28	15.7
Other	GUR 1	217	1.00	0.08	1.00	0.3
Trailer Motor boat	GUR 2	81 894	0.65	51.77	0.65	96.1
Larger boat/Launch	GUR 2	2 082	0.56	1.32	0.56	2.4
Kayak/Rowboat	GUR 2	393	1.00	0.25	1.00	0.5

Platform	QMA	Harvest (n)	CV	Harvest (tonnes)	CV	QMA % (tonnage)
Off land	GUR 2	789	0.51	0.50	0.51	0.9
Other	GUR 2	75	1.01	0.05	1.01	0.1
Trailer Motor boat	GUR 3	1 694	0.40	1.08	0.40	48.6
Larger boat/Launch	GUR 3	830	0.96	0.53	0.96	23.9
Off land	GUR 3	951	0.72	0.61	0.72	27.5
Trailer Motor boat	GUR 7	21 539	0.23	11.78	0.23	77.0
Larger boat/Launch	GUR 7	2 361	0.43	1.31	0.44	8.6
Larger yacht/keeler	GUR 7	220	1.00	0.12	1.00	0.8
Kayak/Rowboat	GUR 7	169	1.01	0.09	1.01	0.5
Off land	GUR 7	3 594	0.51	1.99	0.51	13.0
Trailer Motor boat	GUR 8	20 204	0.24	11.08	0.24	81.0
Larger boat/Launch	GUR 8	466	0.62	0.26	0.61	1.9
Kayak/Rowboat	GUR 8	656	0.87	0.36	0.86	2.6
Off land	GUR 8	2 378	0.36	1.33	0.37	9.7
Other	GUR 8	1 101	0.87	0.65	0.87	4.8
Trailer Motor boat	HAP 1	1 278	0.51	8.51	0.51	56.2
Larger boat/Launch	HAP 1	997	0.45	6.64	0.45	43.8
Trailer Motor boat	HAP 2	2 394	0.46	15.94	0.46	79.7
Larger boat/Launch	HAP 2	608	0.58	4.05	0.58	20.3
Trailer Motor boat	HAP 3	2 856	0.55	16.20	0.55	100
Trailer Motor boat	HAP 5	171	0.94	1.14	0.94	44.9
Larger boat/Launch	HAP 5	210	0.95	1.40	0.95	55.1
Trailer Motor boat	HAP 7	821	0.46	5.47	0.46	63.5
Larger boat/Launch	HAP 7	251	0.76	1.67	0.76	19.4
Kayak/Rowboat	HAP 7	221	1.02	1.47	1.02	17.1
Trailer Motor boat	HAP 8	428	0.72	2.85	0.72	82.8
Larger boat/Launch	HAP 8	89	1.01	0.59	1.01	17.6
Trailer Motor boat	HPB 1	1 541	0.49	10.26	0.49	55.4
Larger boat/Launch	HPB 1	1 242	0.43	8.27	0.43	44.6
Trailer Motor boat	HPB 2	2 394	0.46	15.94	0.46	79.7
Larger boat/Launch	HPB 2	608	0.58	4.05	0.58	20.3
Trailer Motor boat	HPB 3	3 564	0.49	20.91	0.49	100
Trailer Motor boat	HPB 5	171	0.94	1.14	0.94	44.9
Larger boat/Launch	HPB 5	210	0.95	1.40	0.95	55.1
Trailer Motor boat	HPB 7	1 048	0.41	6.98	0.41	60.2
Larger boat/Launch	HPB 7	251	0.76	1.67	0.76	14.4
Kayak/Rowboat	HPB 7	442	1.02	2.94	1.02	25.4
Trailer Motor boat	HPB 8	428	0.72	2.85	0.72	82.8
Larger boat/Launch	HPB 8	89	1.01	0.59	1.01	17.6

Platform	QMA	Harvest (n)	CV	Harvest (tonnes)	CV	QMA % (tonnage)
Trailer Motor boat	JDO 1	1 872	0.31	2.38	0.31	37.7
Larger boat/Launch	JDO 1	1 973	0.54	2.50	0.54	39.6
Kayak/Rowboat	JDO 1	130	1.00	0.16	1.00	2.5
Off land	JDO 1	300	1.00	0.38	1.00	6.0
Other	JDO 1	712	1.00	0.90	1.00	14.2
Trailer Motor boat	JDO 2	283	0.74	0.38	0.74	27.0
Off land	JDO 2	777	0.69	1.03	0.69	73.0
Trailer Motor boat	JDO 7	215	0.72	0.29	0.72	100
Trailer Motor boat	KAH 1	140 570	0.09	221.42	0.09	59.7
Larger boat/Launch	KAH 1	22 852	0.29	34.88	0.28	9.4
Trailer yacht	KAH 1	959	1.00	1.38	1.00	0.4
Larger yacht/keeler	KAH 1	1 779	0.44	2.81	0.45	0.8
Kayak/Rowboat	KAH 1	7 159	0.34	11.13	0.34	3.0
Off land	KAH 1	60 671	0.18	96.95	0.18	26.2
Other	KAH 1	1 286	0.51	2.04	0.50	0.6
Trailer Motor boat	KAH 2	48 734	0.48	83.49	0.48	73.6
Larger boat/Launch	KAH 2	1 366	0.63	2.34	0.63	2.1
Larger yacht/keeler	KAH 2	102	1.00	0.17	1.00	0.1
Kayak/Rowboat	KAH 2	1 246	0.68	2.13	0.68	1.9
Off land	KAH 2	14 735	0.22	25.24	0.22	22.3
Trailer Motor boat	KAH 3	16 404	0.15	21.55	0.15	31.9
Larger boat/Launch	KAH 3	5 158	0.72	6.66	0.72	9.9
Larger yacht/keeler	KAH 3	608	0.55	0.78	0.55	1.2
Kayak/Rowboat	KAH 3	322	0.60	0.44	0.61	0.7
Off land	KAH 3	29 571	0.36	38.13	0.35	56.4
Trailer Motor boat	KAH 8	64 852	0.18	104.22	0.18	40.3
Larger boat/Launch	KAH 8	10 921	0.33	17.42	0.33	6.7
Larger yacht/keeler	KAH 8	312	0.75	0.49	0.75	0.2
Kayak/Rowboat	KAH 8	8 921	0.56	14.89	0.56	5.8
Off land	KAH 8	75 117	0.18	121.15	0.18	46.8
Other	KAH 8	335	1.00	0.58	1.00	0.2
Trailer Motor boat	KIN 1	15 367	0.23	152.95	0.23	65.2
Larger boat/Launch	KIN 1	5 040	0.36	50.17	0.36	21.4
Trailer yacht	KIN 1	178	1.03	1.78	1.03	0.8
Larger yacht/keeler	KIN 1	359	0.62	3.58	0.62	1.5
Kayak/Rowboat	KIN 1	460	0.76	4.58	0.76	2.0
Off land	KIN 1	2 164	0.41	21.54	0.41	9.2
Trailer Motor boat	KIN 2	4 372	0.40	48.82	0.40	85.2
Larger boat/Launch	KIN 2	515	0.70	5.76	0.70	10.1
Off land	KIN 2	242	1.01	2.71	1.01	4.7
Trailer Motor boat	KIN 3	247	0.67	2.54	0.67	100
Trailer Motor boat	KIN 7	1 092	0.41	11.21	0.41	88.3
Larger boat/Launch	KIN 7	145	1.00	1.49	1.00	11.7

Platform	QMA	Harvest (n)	CV	Harvest (tonnes)	CV	QMA % (tonnage)
Trailer Motor boat	KIN 8	3 594	0.50	36.92	0.50	80.9
Larger boat/Launch	KIN 8	297	0.71	3.05	0.71	6.7
Off land	KIN 8	554	0.82	5.69	0.82	12.5
Trailer Motor boat	PAU 1	1 331	0.72	0.38	0.72	4.7
Off land	PAU 1	26 847	0.91	7.74	0.91	95.3
Trailer Motor boat	PAU 2	19 973	0.46	5.76	0.46	17.4
Larger yacht/keeler	PAU 2	1 344	1.07	0.39	1.07	1.2
Off land	PAU 2	93 205	0.19	26.87	0.19	81.4
Off land	PAU 3A	1 979	0.68	0.57	0.68	100
Trailer Motor boat	PAU 3B	4 983	0.42	1.44	0.42	60.3
Off land	PAU 3B	3 294	0.49	0.95	0.49	39.7
Trailer Motor boat	PAU 5A	3 333	1.01	0.96	1.01	51.3
Larger boat/Launch	PAU 5A	1 016	1.01	0.29	1.01	15.5
Off land	PAU 5A	2 165	0.72	0.62	0.72	33.2
Trailer Motor boat	PAU 5B	10 554	0.39	3.04	0.39	87.9
Larger boat/Launch	PAU 5B	1 097	0.75	0.32	0.75	9.2
Off land	PAU 5B	339	1.01	0.10	1.01	2.9
Trailer Motor boat	PAU 5D	16 809	0.36	4.85	0.36	23.5
Larger boat/Launch	PAU 5D	2 063	1.02	0.59	1.02	2.9
Off land	PAU 5D	52 777	0.35	15.21	0.35	73.4
Trailer Motor boat	PAU 7	2 375	0.45	0.69	0.45	24.0
Larger boat/Launch	PAU 7	1 971	0.78	0.57	0.78	19.9
Kayak/Rowboat	PAU 7	197	1.01	0.06	1.01	2.1
Off land	PAU 7	5 365	0.54	1.55	0.54	54.0
Trailer Motor boat	RCO 1	443	0.79	0.42	0.79	100
Trailer Motor boat	RCO 2	140	1.02	0.13	1.02	37.1
Off land	RCO 2	229	0.61	0.22	0.61	62.9
Trailer Motor boat	RCO 3	100	1.00	0.09	1.00	8.4
Larger boat/Launch	RCO 3	729	0.70	0.69	0.70	64.5
Off land	RCO 3	304	0.72	0.29	0.72	27.1
Trailer Motor boat	RCO 7	108	1.00	0.10	1.00	12.8
Off land	RCO 7	722	0.82	0.68	0.82	87.2
Trailer Motor boat	SKJ 1	16 358	0.50	34.07	0.50	77.5
Larger boat/Launch	SKJ 1	4 660	0.48	9.71	0.48	22.1
Larger yacht/keeler	SKJ 1	85	1.00	0.18	1.00	0.4
Trailer Motor boat	SNA 1	979 972	0.06	1515.77	0.07	70.5
Larger boat/Launch	SNA 1	245 796	0.13	380.59	0.13	17.7
Trailer yacht	SNA 1	2 803	0.53	4.38	0.52	0.2
Larger yacht/keeler	SNA 1	15 048	0.36	23.32	0.37	1.1

Platform	QMA	Harvest (n)	CV	Harvest (tonnes)	CV	QMA % (tonnage)
Kayak/Rowboat	SNA 1	36 269	0.37	56.73	0.39	2.6
Off land	SNA 1	84 658	0.14	129.94	0.13	6.0
Other	SNA 1	26 949	0.42	40.16	0.41	1.9
Trailer Motor boat	SNA 2	75 811	0.29	115.47	0.28	83.2
Larger boat/Launch	SNA 2	5 695	0.41	8.27	0.40	6.0
Kayak/Rowboat	SNA 2	2 639	0.97	3.92	0.96	2.8
Off land	SNA 2	7 299	0.36	11.01	0.35	7.9
Other	SNA 2	75	1.01	0.11	1.01	<0.1
Trailer Motor boat	SNA 3	333	0.74	0.53	0.72	58.2
Off land	SNA 3	262	1.01	0.38	1.01	41.8
Trailer Motor boat	SNA 7	70 582	0.16	108.36	0.16	78.9
Larger boat/Launch	SNA 7	9 386	0.64	14.21	0.61	10.3
Larger yacht/keeler	SNA 7	521	1.01	0.75	1.01	0.5
Kayak/Rowboat	SNA 7	2 787	1.01	4.03	1.01	2.9
Off land	SNA 7	6 544	0.31	9.95	0.31	7.2
Trailer Motor boat	SNA 8	271 724	0.13	425.10	0.13	73.1
Larger boat/Launch	SNA 8	37 222	0.26	56.55	0.26	9.7
Larger yacht/keeler	SNA 8	207	0.70	0.32	0.70	<0.1
Kayak/Rowboat	SNA 8	18 407	0.71	31.67	0.72	5.4
Off land	SNA 8	45 963	0.19	66.55	0.18	11.4
Other	SNA 8	1 152	0.77	1.74	0.79	0.3
Trailer Motor boat	SPE 1	84	1.00	0.05	1.00	35.7
Larger boat/Launch	SPE 1	141	1.00	0.09	1.00	64.3
Trailer Motor boat	SPE 2	241	0.71	0.15	0.71	30.6
Larger boat/Launch	SPE 2	523	1.01	0.34	1.01	59.4
Trailer Motor boat	SPE 3	36 555	0.30	23.43	0.30	83.6
Larger boat/Launch	SPE 3	5 625	0.40	3.61	0.40	16.4
Trailer Motor boat	SPE 5	1 822	0.63	1.17	0.63	100
Trailer Motor boat	SPE 7	3 882	0.51	2.49	0.51	35.3
Larger boat/Launch	SPE 7	6 963	0.69	4.46	0.69	63.2
Kayak/Rowboat	SPE 7	124	1.02	0.08	1.02	1.1
Off land	SPE 7	53	1.03	0.03	1.03	0.4
Trailer Motor boat	SPE 8	239	0.73	0.15	0.73	100
Trailer Motor boat	TAR 1	27 295	0.26	25.91	0.26	66.7
Larger boat/Launch	TAR 1	12 851	0.43	12.22	0.43	31.5
Kayak/Rowboat	TAR 1	349	1.02	0.33	1.02	0.9
Off land	TAR 1	375	0.75	0.36	0.75	0.9
Trailer Motor boat	TAR 2	39 901	0.37	41.79	0.37	82.5
Larger boat/Launch	TAR 2	8 060	0.68	8.44	0.68	16.7
Off land	TAR 2	388	0.63	0.41	0.63	0.8
Trailer Motor boat	TAR 3	9 325	0.44	8.95	0.44	89.3

Platform	QMA	Harvest (n)	CV	Harvest (tonnes)	CV	QMA % (tonnage)
Larger boat/Launch	TAR 3	1 111	0.56	1.07	0.56	10.7
Trailer Motor boat	TAR 5	5 058	0.46	5.16	0.46	93.5
Larger boat/Launch	TAR 5	349	0.64	0.36	0.64	6.5
Trailer Motor boat	TAR 7	7 186	0.36	6.23	0.36	65.0
Larger boat/Launch	TAR 7	1 832	0.51	1.59	0.51	16.6
Larger yacht/keeler	TAR 7	1 744	1.00	1.51	1.00	15.8
Off land	TAR 7	294	1.01	0.25	1.01	2.6
Trailer Motor boat	TAR 8	7 796	0.52	9.02	0.52	73.8
Larger boat/Launch	TAR 8	2 574	0.62	2.98	0.62	24.3
Kayak/Rowboat	TAR 8	195	1.00	0.22	1.00	1.8
Trailer Motor boat	TRE 1	53 197	0.14	71.61	0.15	67.1
Larger boat/Launch	TRE 1	12 472	0.33	16.28	0.36	15.2
Trailer yacht	TRE 1	61	1.00	0.09	1.00	0.1
Larger yacht/keeler	TRE 1	399	0.58	0.51	0.59	0.5
Kayak/Rowboat	TRE 1	4 032	0.65	5.68	0.68	5.3
Off land	TRE 1	8 995	0.34	12.50	0.35	11.7
Other	TRE 1	82	1.01	0.08	1.01	<0.1
Trailer Motor boat	TRE 2	4 375	0.32	7.12	0.32	87.7
Off land	TRE 2	617	0.64	1.00	0.64	12.3
Trailer Motor boat	TRE 3	518	0.85	0.75	0.85	100
Trailer Motor boat	TRE 7	10 045	0.26	20.78	0.26	58.5
Larger boat/Launch	TRE 7	459	0.59	0.95	0.60	2.7
Larger yacht/keeler	TRE 7	211	1.01	0.46	1.01	1.3
Kayak/Rowboat	TRE 7	634	1.01	1.36	1.01	3.8
Off land	TRE 7	5 654	0.25	11.93	0.25	33.6

11. DISCUSSION

This National Panel Survey of Marine Recreational Fishers 2022–23 was commissioned and delivered as a repeat of the existing survey conceived and developed from 2010 onwards and then conducted for the 2011–12 and 2017–18 New Zealand fishing years. The methods were largely unchanged to allow direct comparisons between the earlier two editions. The only exception was the removal of the drop in survey which had proven to produce data that was too imprecise to contribute towards the creation of harvest estimates, which is explicitly the primary purpose of the research.

After the completion and analysis of both the 2011–12 and 2017–18 surveys, the harvest estimates were compared with those from independent contemporaneous on-site methods (Edwards & Hartill 2015, Hartill et al. 2019), which showed that the on site and off site methodologies corroborated the findings of each other. The methods and outputs were also considered in 2013 by two international experts in the estimation of recreational harvest who concluded that the NPS survey was '*well designed and implemented and appears to have produced statistically reliable information about harvest levels of most key fish stocks … a strong framework for repeat surveys*'. However, in the report for the 2017–18 edition of the study (Wynn-Jones et al 2019), there were concerns raised about the future viability of the research in relation to two factors. Firstly, the reduction of incidence of screened participants who claim marine fishing as a recreational activity, with "*A first ramification is that there appears to be a lower engagement in marine fishing in New Zealand in 2017–18 compared with 2011–12… The expected benefits of increasing the sample size over the 2011–12 survey, such as improving error estimates, could*

not be realised." Secondly, "*The ongoing move to mobile phones and away from landlines clearly has implications for future repeats of this type of survey, and some of the methods used during the NPS (e.g., prompting by text message) may have diminishing effectiveness in the future."* This latter issue was considered serious enough for further work to be commissioned regarding the feasibility of replacing CATI with an alternative online data collection mode (Heinemann et al. 2021). These two issues will be addressed in turn below.

Reduced fisher incidence at screening

During the screening and enrolment phase of the research, the trend of diminishing numbers of recreational marine fishers continued. The estimates of stated fishers in New Zealand based on screening results has reduced steadily edition on edition. In 2022, 18% of New Zealanders claimed recreational fishing as a hobby when screened, down from 21% in 2017 and 25% in 2011. While there was also a slight decrease in response rate at the screening (79% in 2022 compared to 85% in 2017 and 86% in 2011) and enrolment (89% in 2022 compared to 92% in 2017 and 91% in 2011) stages, the reduction in stated fishers is also a statistically significant factor in the smaller sample size, despite an additional 5% of dwellings being approached compared to 2017 (36 197 compared to 34 431). However, the smaller sample size was mitigated by collecting a greater amount of data at the screening process. Specifically, demographic data for members of all households screened, not just those with at least one fisher resident, were collected and supplied for the creation of estimates. The result of this is that the CVs, particularly for commonly caught species and highly frequented areas, are similar to those produced in 2018 despite the smaller sample.

Conversely, the impact of increased usage of smartphones and the resultant diminishing effectiveness on monitoring throughout the season continued and grew into a more significant issue, exacerbated by the requirement of the service provider OneNZ to include an opt out prompt that had not been present in the two earlier editions, which effectively offers participants the opportunity to exit the study each time contact is made with them.

SMS

While there was a decrease in the SMS response rate, it still performs its primary function of streamlining the CATI monitoring procedure by removing non fishers from the weekly CATI contact pool and thereby reduces burden on panellists by minimizing CATI contact to only necessary periods over the course of 12 months. This of course only applies to those that are able to be contacted by the SMS broadcasts. The inclusion of the opt out prompt in all SMS broadcasts, which approximately a third of panellists used during the course of the monitoring period, meant that with every SMS contact made, panellists were reminded that they did not have to respond to the message in question, or in fact any further attempts to contact them in this way. If there was to be a repeat of the current seasonal monitoring methodology, all possible attempts would need to be made to ensure that an opt out prompt was not included.

One possible answer may be to have panellists sign forms at the point of enrolment to confirm that they are happy to be contacted by bulk SMS broadcast. This would demonstrate to all relevant telcos that under anti-spam legislation that direct consent for contact has been given. While the face to face enrolment process that has been used previously should satisfy this definition, and has previously, ultimately permission to send bulk SMS broadcasts is at the discretion of the telcos, and an opt out prompt might still be deemed necessary. Conversely, these forms would have to then include how they would not have an opt out option, which might have issues in voluntary participation research. Also, this factor, or even the request to sign a document could have implications on the enrolment rate, and it is important that any improvements to the monitoring procedure are not cancelled out by reducing the effectiveness of the screening and enrolment process, which continued to produce highly credible data.

This is why double opt in is also a questionable method, which may make it more likely that an opt out can be excluded from SMS broadcasts. This would mean that potential panellists would have to reply

to an SMS message to confirm their participation, rather than just by providing contact details to a field interviewer. If they did not they could not be considered enrolled which could have consequences for enrolment response rate and panel size.

Even if SMS broadcasts are sent without an opt out prompt, there is nothing to stop panellists from blocking the short code if they decide they no longer want to participate in the research. The decrease in the rate of text responses in Section 3 do not include those who have stopped responding to SMS contact but not used the opt out prompt, and the lower response among the remaining 'active' panellists suggests that this behaviour is most likely already becoming more common.

The final consideration for SMS contact is an adjunct of the CATI monitoring where the detailed harvest data is collected. As Table 16 in Section 5 demonstrates, panellists who used the opt out prompt behaved in a way that suggests that they considered the opt out reply to be a resignation from the research rather than just the SMS contact.

CATI

After the 2017–18 edition of the NPS, Fisheries New Zealand commissioned ongoing monitoring of the remaining panel members who were willing to extend their participation in providing harvest details, except now by the methods of both online questionnaire and app. While neither of these modes provided data deemed accurate enough to replace CATI as the NPS mode of harvest data collection, because of non-response and non-representative self-enrolment respectively, it demonstrates that there has been a prior acknowledgement that CATI may have a limited utility in the future for reasons relating to both behavioural changes of smart phone ubiquity as well as the costs involved in maintaining a CATI team. The former issue has become more severe as evidenced by the increase in panel attrition in the 2022–23 edition, even though this was likely largely exacerbated by the opt out prompts required in the SMS broadcasts.

The Exit Survey conducted at the end of the monitoring period showed a notable increase in panellists who reported some level of dissatisfaction with the duration of the CATI. If CATI is still considered the optimal mode through which to collect trip and harvest data, it would be worthwhile to review the items in the questionnaire to see if all are necessary. Several deal with characteristics of the trips rather than contributing directly to the creation of harvest estimates e.g., platform, method etc. They also add a level of repetitiveness to the experience, as the questionnaire is designed as a series of loops that produce the most accuracy in regard to detail, but at the same time increase duration. Removing items deemed unnecessary and possibly simplifying existing items as well should produce a more streamlined questionnaire that would create a less onerous experience for the panellist and reduce one motivation for them to stop responding before the completion of the monitoring period. This would be best performed through the Marine Amateur Fisheries Working Group, who were instrumental in the creation of the questionnaire currently used.

Given the options that panellists have available to them in disregarding unwanted calls on their smartphones e.g., screening, blocking etc, this may still not be enough to reduce attrition to a desired level. It might be more practical to accept a certain level of attrition and therefore increase the original screening and enrolment levels, as this aspect has remained effective across three editions. This would also allow for the continued decrease of those who say they are marine fishers. Various strategies that are only minor modifications of the existing methodology are possible.

For instance, instead of limiting mesh blocks to 37 eligible dwellings, all addresses in the mesh block could be screened. Given the comparative rarity of recreational marine fishing amongst the national adult population, the clustering effect should be minimal. If this had been the sampling methodology in 2022, 55 932 addresses would have been screened instead of 36 197. The former number is slightly misleading as it includes large meshblocks with hundreds of dwellings that were inaccessible due to being apartments and/or gated communities. Similarly, non-replacement of mesh blocks could be less restrictive and when a meshblock appears highly unlikely to produce any screening or enrolments,

especially the aforementioned apartment blocks and gated communities, additional mesh blocks could be selected and added (rather than replace the hard to reach mesh blocks in question) to the original 1100 sampled.

Currently only one resident per dwelling can be selected and recruited into the panel. It may be possible to recruit multiple panellists within the one dwelling, either by having a proxy panellist who reports all household fishing, or by making all fishers at the address eligible as individuals. In 2022, this would have increased eligible fishers from 6 776 to 10 018. However, it would be important to ascertain what level of double reporting, if any, this could create and how that could be successfully mitigated in the creation of estimates. This would require some level of piloting before it could be used in NPS research. There could also be practicalities in data collection with panellists sharing a contact number.

Finally, CATI could be maintained as a recovery data collection method after trip and harvest data collection is first attempted through some form of online self-completion. The ongoing monitoring attempts performed online at the end of the second edition of the NPS produced a comparable type of harvest data, just with a lower response rate. It is possible that panellists who stopped responding by CATI would have been happy to continue contributing data if there was an online method for doing so. While the results from ongoing monitoring were encouraging in this respect, it would again require a pilot to more strenuously check that the differences in both administered interview versus self-complete and CATI versus online are not so significant as to distort the accuracy of data on the newly introduced data collection mode.

It is likely that a combination of approaches described in this Section will need to be implemented to maintain the accuracy of data, specifically during the monitoring period, in any future editions of the NPS.

Fisheries With Possible Underestimates

While results from this and previous editions of this survey have generally produced estimates that broadly align with concurrent onsite creel surveys, there are some instances in which the estimates produced by the onsite methodologies have been divergent from the off-site methodology of this research. There are specific characteristics for fisheries in which this is more likely to occur.

By the nature of an off-site survey of fishers, the research is targeted at the behaviour of fishers as a population, rather than the activity of a specific area or species stock. This is in contrast to creel surveys which have the advantage of more specifically targeting a particular area and species. With this being the case, fisheries with lower participation rates due to their more specialist or niche nature are less likely to be represented amongst panel members in comparison to a dedicated creel survey. Furthermore, species of this character are therefore more likely to be undercounted in the substitution and reweighting process as they are less likely to feature amongst the harvest of an average fisher than more commonly caught species. Rock lobster and paua are two instances of this, which is evident when comparing the estimates for PAU 3A detailed in this report with the creel survey of the same stock undertaken in April-June 2023 (Holdsworth 2023).

Similarly, more remote areas of coastline located significant distances from major population centres are also more likely to produce underestimates. Again, this is due to a lower probability that fishers that are active in that area are enrolled into the panel in comparison to areas located closer to larger populations of fishers. While the initial selection of mesh blocks takes account of this, and oversamples smaller Territorial Authorities by using a kish allocation to balance between proportional and equal allocation amongst TAs, the differences in population bases remain more significant than is accommodated by this sampling approach. The same rationale can be applied to smaller stretches of coastline.

It should be noted that the characteristics outlined above should not be viewed as sampling errors. Instead, it should be acknowledged that the main methodological benefit of an off-site panel survey is that it is able to provide coverage of all species and management areas for an entire season and provide

credible harvest estimates for the most commonly harvested species. If this were to be replicated by a series of on-site surveys, the cost would be impractical, although for more specialist fisheries e.g., paua and rock lobster, produce more accurate estimates due to a larger base of fishers participating. It may be that fisheries of this nature need a different methodology through which to produce harvest estimates, particularly if an off-site survey cannot produce a minimum of, say, 20–30 fishers and a CV of 0.25-0.5 (depending on the exact purpose the data is being used for).

As illustrated in Sections 3 and 4, the monitoring of the panel was less successful in 2022–23 than the previous editions of the study, both in the initial SMS contact and the CATI monitoring. This was primarily seen in the attrition of panel response throughout the season, covered in Section 5. Both the SMS and CATI methodology need to be examined to see why this occurred.

Season specific weather considerations

Finally, the measurements conducted will be invariably impacted by the prevailing weather and climatic conditions during the monitoring period. The 2022–23 season was punctuated by severe incidents including but not limited to Cyclone Gabrielle and the Auckland Anniversary floodings, which affected areas that have previously produced sizable amounts of active fishing data and occurred during a time frame which similarly sees a large amount of recreational fishing activity. The impact was not simply restricted to the events themselves, as infrastructure such as transport to coastal areas was damaged to a level that could have feasibly had an impact on total fishing trips and therefore harvest estimates for some time after. This could mean that the season that was monitored was somewhat atypical due to the confounding effects of the weather.

12. ACKNOWLEDGEMENTS

The survey involved screening, enrolling and then gathering fishing information from panellists over an entire year. The first two functions were performed by field interviewers during winter and a resurgence of Covid 19. The third was performed by CATI operators in a challenging environment for phone interviewing given the widespread shift from landlines to smartphones and the resultant changes in behaviour amongst the public. Their persistence and professionalism were key in completing a population study of such scale and complexity.

We would also like to express our appreciation to the members of the public who agreed to participate in this survey, and particularly those who contributed an entire season’s worth of trips and harvest data. Thank you very much for your text responses and details about your trips and catch, despite the voluntary nature of the research and the prompts reminding you that you could disengage at any time. This research would not be possible without your contributions. We hope you take some satisfaction from knowing that this information was invaluable in informing the sustainable management of New Zealand's marine fisheries in the years to come.

This work was funded by Fisheries New Zealand under project MAF2021-01.

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APPENDIX 1: LETTER OF INTRODUCTION

Fisheries New Zealand
Tini a Tangaroa

Security Classification - None

NATIONAL SURVEY OF RECREATIONAL FISHERS

Dear Householder

Your address has been randomly selected and will be visited by an interviewer to take part in the 2022/23 New Zealand national survey of recreational fishers. This study is being conducted by NRB ltd on behalf of the Ministry for Primary Industries (Fisheries Branch) and in collaboration with NIWA.

Marine fishing, diving and gathering are recreational activities that many New Zealanders take part in at some point of their lives. This survey is being done to see how many of us fish in our coastal waters, how often we fish and what we catch.

If nobody in your home is a marine fisher, we just want to collect the demographic data (gender, age group and ethnicities) of those aged 15 and over so that we can determine the level of fishing amongst all parts of the population.

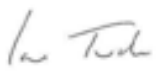
If one or more people in your household do fish in marine waters, we randomly select just one and arrange to contact them periodically by brief phone interview to find out where and how they fished, as well as what they caught throughout the 2022/23 season. This information is purely for survey purposes to create statistical data. All answers given in these interviews are anonymous and confidential - no identifying personal information is passed on to any government department and your contact details are not passed on to any other research project or commercial entity.

The data provided will be used to inform the Ministry for Primary Industries in managing the long-term sustainability of coastal fisheries for the enjoyment of all present and future New Zealanders. Results are publicly released on the Ministry for Primary Industries website.

More information on the current version of this project, as well as the report with the most recent results are available here.

https://www.mpi.govt.nz/national-survey-of-recreational-fishers

Yours sincerely



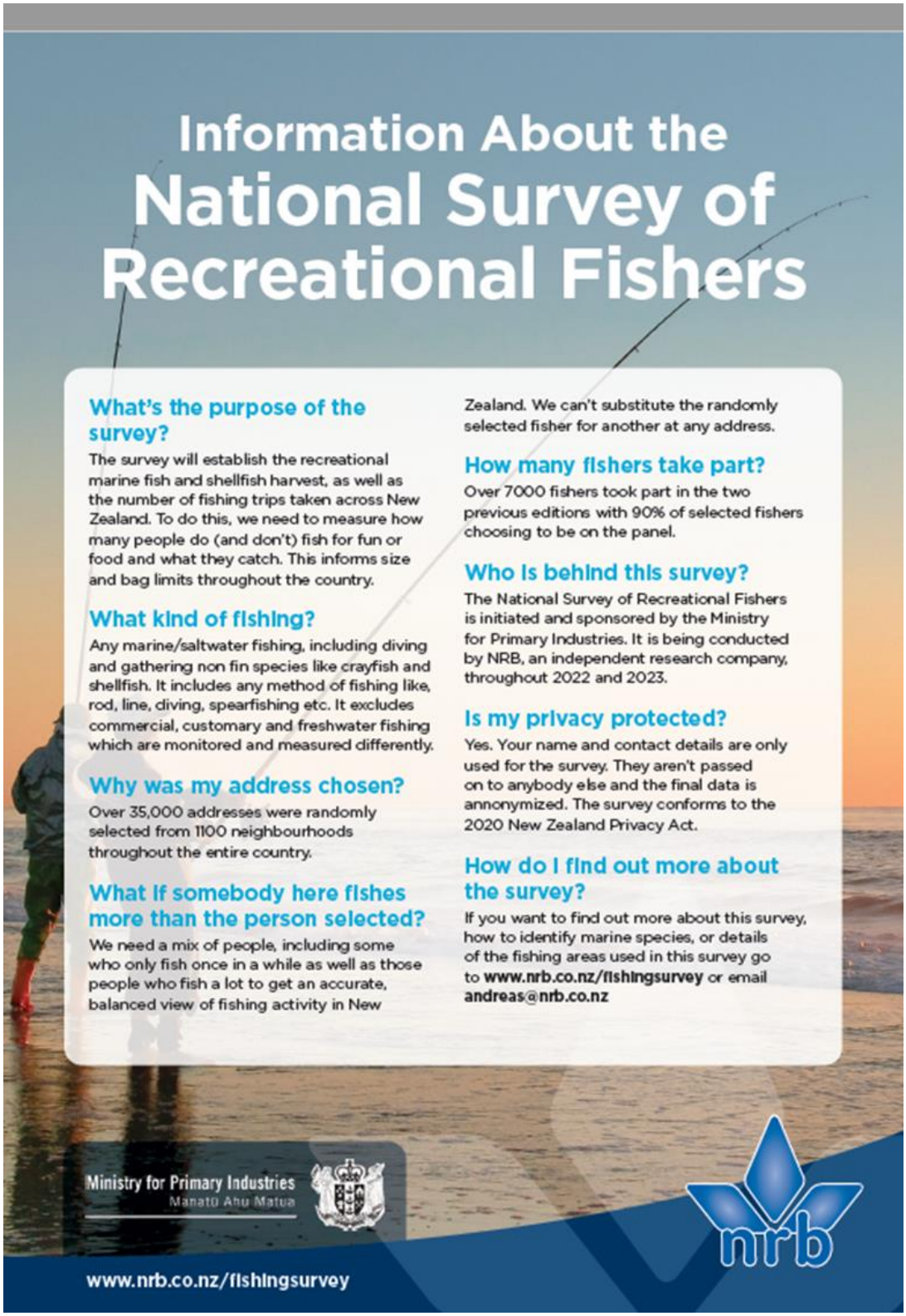
Dr Ian Tuck
Principal Advisor
Chair, Marine Amateur Fisheries Working Group

Ministry for Primary Industries
Charles Fergusson Building
34-38 Bowen Street
PO Box 2526
Wellington 6140, New Zealand

fisheries.govt.nz

APPENDIX 2: SHOWCARD

APPENDIX 3: INFORMATION BROCHURE




What do I have to do?
It's very easy. We just text you periodically to ask if you have been fishing (avid fishers more frequently and occasional fishers less so). You just need to reply YES or NO to the text, as shown in this brochure's texting guide. **All reply texts to us are free.** If you have fished in that time period, we'll phone you for a short phone interview which averages about 5 minutes.
What do you ask me if I have fished?
Only basic information such as which week/day you fished, what methods were used, wherabouts the fishing was done and how many of each species you landed and kept, if any.
When do you phone me if I have fished?
Most calls are made Monday through Thursday evenings. When we first call, you can give us a regular time that is best for you.
Do you ask about my best fishing spots?
No, we only need general areas. You can have a look at the map on the back of this brochure to see the 51 areas we have to locate the catch within.
What if I didn't catch anything?
It's very important for us to know this as it helps us get a true picture of fishing in New Zealand and where fish stock might be getting low. You still need to complete a phone interview but it will be very short.
How long does the survey run?
We text about your fishing trips and do short follow up phone interviews when you have from October 2022 to September 2023.
Is there a way to complete my fishing interviews online?
We trialled online surveying and an app after the last New Zealand Marine Fishing Survey. They didn't produce the same level of accuracy or amount of responses as phone interviews, so all interviewing will be done by phone again.
What's in it for me?
Ministry of Primary Industries can only manage what they can measure. Better data means more suitable fish size and bag limits which in turn leads to more fish for you to catch and more sustainable fisheries for the next generation of kiwi fishers. Your input is important and has real world consequences, as there is no better way to determine how many fish are being caught by recreational fishers than the direct input of the fishers themselves.
Everybody who completes the 12 months also enters the prize draw for one of five $1000 Hunting & Fishing New Zealand gift cards. There is also a weekly prize draw for a $100 petrol voucher each week for those who reply to our text.
Ministry for Primary Industries
Manatū Ahu Matua
www.nrb.co.nz/fishingsurvey

FISH IDENTIFICATION CHART

Popular Marine Species

Blue Cod

Blue Maomao

Blue Moki

Butterfish (Greenbone)

Elephant Fish

Garfish (Piper)

John Dory

Kahawai

Kingfish

Koheru

Lemon Sole

Red Cod

Red Gurnard

Red Moki

Sand Flounder

Sea Perch
(Jock Stewart,
Scarpie)

Snapper

Trevally

Trumpeter

FISH IDENTIFICATION CHART

Sometimes Confusing Species

Bluenose

Warehou

Barracouta

Gemfish

Blue Mackerel (Slimy/English)

Jack Mackerel

Yellow Eyed Mullet (herring)

Grey Mullet

Albacore Tuna

Skipjack Tuna (Bonito)

Hapuku

Bass

Tarakihi

Porae

School Shark (Tope, Flake)

Rig (Spotted Dogfish)

Spiny Dogfish (Bruno)

Red Rock Lobster (Crayfish, Spiny Lobster)

Packhorse Lobster (Green)

Spanish Lobster

Ordinary Paua / Yellow Foot Paua / Virgin Paua

Pipi

Tuatua

New Zealand Marine Fishing Survey

TEXTING AND PHONING CONTACT GUIDE

We initially contact you by text (although if you don't have a cellphone, we can contact you by landline). Contact is made with you on Sunday evenings. Using the shortcode 5857, we'll send you something like:

You just have to make a **free** text reply of **YES** or **NO**. It's easy for you as we always make initial contact and you just have to wait for our text. If you text YES, we contact you on an evening for a short phone interview in the next few days. If you haven't fished in the time period, all you have to do is reply NO and you're up to date.

We'll start contacting you weekly, fortnightly or monthly depending on how much fishing you tell our interviewer you do in an average year when you are recruited at your address. You can change the schedule to one that suits your fishing, just let your phone interviewer know when they call. Over winter we'll contact you less often as there is less recreational fishing done in those months.

Remember to text back yes even if you didn't catch anything as these trips are equally important. Also, don't text back your catch as there are a few questions about how and where you did your fishing in the phone interview.

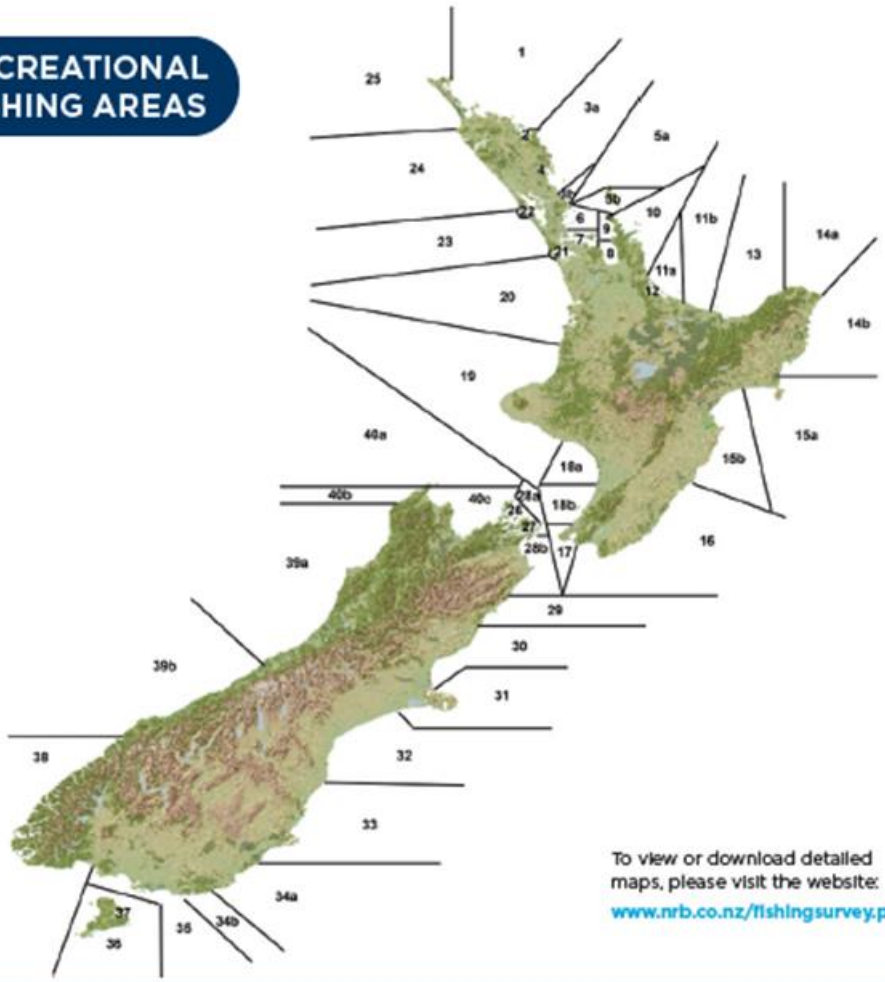
If we don't hear from you, we send a reminder on Monday and if there is still no reply for whatever reason, we'll try giving you a call later in the week or roll you over to the next contact schedule where we'll ask about any fishing done in both the old and new time period.

Every call you receive will come from the number 09 869 7829 so you'll always know when it's us getting in touch for the short interview about your fishing.

Remember that everyone who text replies goes into the weekly prize draw for a $100 petrol voucher.

www.nrb.co.nz/fishingsurvey

RECREATIONAL FISHING AREAS



To view or download detailed maps, please visit the website:
www.nrb.co.nz/fishingsurvey.php

RECREATIONAL FISHING AREAS INDEX

1	North Cape to Cape Brett
2	Bay of Islands
3a	Cape Brett to Te Arai Point
3b	Te Arai Point to Cape Rodney
4	Whangarei Harbour & entrance
5a	North of Barrier Islands
5b	Barrier Islands
6	Western Hauraki Gulf
7	Inner Hauraki Gulf
8	Firth of Thames
9	Eastern Hauraki Gulf
10	Eastern Coromandel
11a	Northern Bay of Plenty
11b	Middle Bay of Plenty
12	Tauranga Harbour & entrances
13	Eastern Bay of Plenty
14a	East Cape - Northern
14b	East Cape - Southern
15a	Hawke Bay - Northern
15b	Hawke Bay - Southern
16	Cape Turnagain to Turakirae Head
17	Turakirae Head to Titahi Bay
18a	Waitotara River to Manawatu River
18b	Manawatu River to Titahi Bay
19	Waitotara River to Tirua Point
20	Tirua Point to entrance area of Manukau
21	Manukau Harbour & entrance
22	Kaipara Harbour & entrance
23	Manukau Entrance to Kaipara Entrance
24	West of Northland
25	Reef Point to North Cape
26	Marlborough Sounds
27	Queen Charlotte Sound & Tory Channel
28a	Stephen Is to Tory Channel excl. sounds
28b	Tory Channel to Clarence River
29	Clarence River to Conway River
30	Conway River to Sumner Beach
31	Sumner Beach to Rakaia River
32	Rakaia River to Waitaki River
33	Waitaki River to Tokomirira River
34a	Tokomirira River to Long Point
34b	Long Point to Slope Point
35	Slope Point to Te Waewae Inlet
36	Stewart Is, Ruapuke Island & surrounds
37	Patterson Inlet on Stewart Island
38	South West of the South Island
39a	North West of the South Island
39b	West of the South Island
40a	North of the South Island
40b	Cape Farewell to Kahurangi Point
40c	Golden Bay and Tasman Bay

Ministry for Primary Industries
Manatū Ahu Matua

nrb

www.nrb.co.nz/fishingsurvey

APPENDIX 4: CATI QUESTIONNAIRE

ID
Respondent ID [6 digits: 4* PSU digits and 2 house number digits - done automatically by CATI system]

[ ]

INTRO
Select number to call.
❍ 1. Landline
❍ 2. Mobile/Cell
❍ 3. Other

Intro1 [This intro used for those who have texted YES last week **and** those from non-texting groups]
Hello <INSERT RESPONDENTS NAME>. It's <INTERVIEWER'S NAME> from the Recreational Marine Fishing Survey.

<IF A YES TEXT RECEIVED>Thanks for your text saying you'd been fishing.

I'm calling to log your fishing activities into the study database.

❍ 1. Continue
[Go to FishYN]

Intro2 [This intro used for those who were supposed to text reply – but nothing received on time last week]
Hello <INSERT RESPONDENTS NAME>. It's <INTERVIEWER'S NAME> from the Recreational Marine Fishing Survey. I'm calling to log your fishing activities into the study database.

We didn't seem to get a text from you. Can I ask if there is anything you need to know about the texting procedure?
ⓘ If respondent says all ok, then select option 4.
ⓘ If respondent wants to opt out of the survey, then click on the 'refused' tab above.
ⓘ If respondent is unsure of the texting procedure say "When you get our text asking if you have been fishing for a period, what you need to do is text a YES if you have been fishing, even if you didn't catch anything, or you text NO if you haven't been fishing in that period. You need to text before 10am on the Monday so we can get the text on time."

❍ 1. Changed number
❍ 2. Said they did not receive the text from NRB
❍ 3. Don't wish to receive any more texts from NRB
❍ 4. Number not changed

[If 1 go to NewCellPhone, If 2 go to ConfirmCellPhone, If 3 go to NoMoreTexts. If 4 go to FishYN],

ConfirmCellPhone [If answered 2 at Intro2]
Can I confirm your cell phone number is <INSERT CELL PHONE NUMBER>?
❍ 1. Yes
❍ 5. No [note Using 1 and 5 for yes/no answers is a protocol to reduce key stroke error]

[If 1 go to Go to FishYN. If 5 go to NewCellPhone]

NewCellPhone [If answered 1 at Intro2]
What is your cell phone number?

[ ]

[Go to FishYN]
NoMoreTexts [If answered 3 at Intro2]

That's fine, I'll just set it up so that you don't get any more texts and we phone you each time instead.

ⓘ If they change their mind and still want to text, go back to previous question and change answer.
ⓘ If respondent wants to opt out of the survey click on the 'refused' tab above.
❍ 1. Continue
[Go to FishYN]

Intro3 [If a STOP text received]
"Hi <name>, it's <interviewer's name> from the recreational marine fishing study. In response to our last message, you opted out of texting. Are you happy to continue being contacted only by phone call?"
MENTION SOCIAL VALUE OF RESEARCH, PRIZE DARWS, REDUCED SCHEDULE etc.

❍ 1. Yes- Continue interview
❍ 2. Yes and return to text contact list- Continue interview
❍ 3. No- Terminate call

FishYN
[If only last weeks fishing outstanding go to SingleWeekYN. If multiple periods to record go to MultiWeekYN]

MultiWeekYN [If multiple periods to record] [Programmer: Only show periods yet to be resolved]
We've got a few periods where we don't know about your fishing. I wonder if you could help us with that.

We are interested in any method of fishing including rod fishing, diving, gathering or trapping any marine species – and regardless of whether anything was caught or not. Remember, its salt water fishing only, whether recreational or customary – but no commercial!
READ OUT EACH PERIOD IN TURN AND ASK IF THEY FISHED AT ALL FOR THAT PERIOD. ANSWER YES OR NO FOR EACH PERIOD

ⓘ Please take enough time for the respondent to consider and answer for each period. It is fine if they need to consult a calendar or wish to discuss with you what they did at the time to help with memory.
ⓘ DO NOT include any fresh water fishing but DO include estuary fishing.

Week 1. Monday, 26 September 2022 to Sunday, 2 October 2022	Yes	No
Week 2. Monday, 3 October 2022 to Sunday, 9 October 2022	Yes	No
Week 3. Monday, 10 October 2022 to Sunday, 16 October 2022	Yes	No
Week 4. Monday, 17 October 2022 to Sunday, 23 October 2022	Yes	No
Week 5. Monday, 24 October 2022 to Sunday, 30 October 2022	Yes	No
Week 6. Monday, 31 October 2022 to Sunday, 6 November 2022	Yes	No
Week 7. Monday, 7 November 2022 to Sunday, 13 November 2022	Yes	No
Week 8. Monday, 14 November 2022 to Sunday, 20 November 2022	Yes	No
Week 9. Monday, 21 November 2022 to Sunday, 27 November 2022	Yes	No
Week 10. Monday, 28 November 2022 to Sunday, 4 December 2022	Yes	No
Week 11. Monday, 5 December 2022 to Sunday, 11 December 2022	Yes	No
Week 12. Monday, 12 December 2022 to Sunday, 18 December 2022	Yes	No
Week 13. Monday, 19 December 2022 to Sunday, 25 December 2022	Yes	No
Week 14. Monday, 26 December 2022 to Sunday, 1 January 2023	Yes	No
Week 15. Monday, 2 January 2023 to Sunday, 8 January 2023	Yes	No
Week 16. Monday, 9 January 2023 to Sunday, 15 January 2023	Yes	No
Week 17. Monday, 16 January 2023 to Sunday, 22 January 2023	Yes	No
Week 18. Monday, 23 January 2023 to Sunday, 29 January 2023	Yes	No
Week 19. Monday, 30 January 2023 to Sunday, 5 February 2023	Yes	No
Week 20. Monday, 6 February 2023 to Sunday, 12 February 2023	Yes	No
Week 21. Monday, 13 February 2023 to Sunday, 19 February 2023	Yes	No
Week 22. Monday, 20 February 2023 to Sunday, 26 February 2023	Yes	No

Week 23. Monday, 27 February 2023 to Sunday, 5 March 2023	Yes	No
Week 24. Monday, 6 March 2023 to Sunday, 12 March 2023	Yes	No
Week 25. Monday, 13 March 2023 to Sunday, 19 March 2023	Yes	No
Week 26. Monday, 20 March 2023 to Sunday, 26 March 2023	Yes	No
Week 27. Monday, 27 March 2023 to Sunday, 2 April 2023	Yes	No
Week 28. Monday, 3 April 2023 to Sunday, 9 April 2023	Yes	No
Week 29. Monday, 10 April 2023 to Sunday, 16 April 2023	Yes	No
Week 30. Monday, 17 April 2023 to Sunday, 23 April 2023	Yes	No
Week 31. Monday, 24 April 2023 to Sunday, 30 April 2023	Yes	No
Week 32. Monday, 1 May 2023 to Sunday, 7 May 2023	Yes	No
Week 33. Monday, 8 May 2023 to Sunday, 14 May 2023	Yes	No
Week 34. Monday, 15 May 2023 to Sunday, 21 May 2023	Yes	No
Week 35. Monday, 22 May 2023 to Sunday, 28 May 2023	Yes	No
Week 36. Monday, 29 May 2023 to Sunday, 4 June 2023	Yes	No
Week 37. Monday, 5 June 2023 to Sunday, 11 June 2023	Yes	No
Week 38. Monday, 12 June 2023 to Sunday, 18 June 2023	Yes	No
Week 39. Monday, 19 June 2023 to Sunday, 25 June 2023	Yes	No
Week 40. Monday, 26 June 2023 to Sunday, 2 July 2023	Yes	No
Week 41. Monday, 3 July 2023 to Sunday, 9 July 2023	Yes	No
Week 42. Monday, 10 July 2023 to Sunday, 16 July 2023	Yes	No
Week 43. Monday, 17 July 2023 to Sunday, 23 July 2023	Yes	No
Week 44. Monday, 24 July 2023 to Sunday, 30 July 2023	Yes	No
Week 45. Monday, 31 July 2023 to Sunday, 6 August 2023	Yes	No
Week 46. Monday, 7 August 2023 to Sunday, 13 August 2023	Yes	No
Week 47. Monday, 14 August 2023 to Sunday, 20 August 2023	Yes	No
Week 48. Monday, 21 August 2023 to Sunday, 27 August 2023	Yes	No
Week 49. Monday, 28 August 2023 to Sunday, 3 September 2023	Yes	No
Week 50. Monday, 4 September 2023 to Sunday, 10 September 2023	Yes	No
Week 51. Monday, 11 September 2023 to Sunday, 17 September 2023	Yes	No
Week 52. Monday, 18 September 2023 to Sunday, 24 September 2023	Yes	No
Week 53. Monday, 25 September 2023 to Sunday, 1 October 2023	Yes	No

[Programmer note: Open 'FISHING DETAILS INTERVIEW' for each week in which fishing was done]

FISHING DETAILS INTERVIEW

D1
Considering only the period from Monday <INSERT DATE> to Sunday <INSERT DATE>, on which of these days did you fish, dive, gather or trap marine species – regardless of whether you caught anything or not?

ⓘ If only laying out pots or nets, do not count as a day – it's only the harvesting day that counts
ⓘ Multiple answers permitted

❑ 1. Monday <DATE> [Up to 7 days allowed]
❑ 2. Tuesday <DATE>
❑ 3. Wednesday <DATE>
❑ 4. Thursday <DATE>
❑ 5. Friday <DATE>
❑ 6. Saturday <DATE>
❑ 7. Sunday <DATE> etc.

D2
Did any of your fishing activities include: a paid trip with a skipper of a charter boat?

ⓘ If a boat is hired or chartered without a hired skipper then select 'no'.

❍ 1. Yes
❍ 5. No
[If 'No', no further questions are asked about charter fishing]

D3
..fishing with a customary permit or authorisation
IF NECESSARY: Did any of your fishing activities include:?

❍ 1. Yes
❍ 5. No
[If 'No', no further questions are asked about customary fishing]

D4
..a personal allowance from a commercial catch?
IF NECESSARY: Did any of your fishing activities include?..

❍ 1. Yes
❍ 5. No
[If 'No', no further questions are asked about personal allowance from a commercial catch]

T1
Thinking of <INSERT FIRST DAY AND DATE>. If we say a 'trip' is **each time you went out and fished** – how many separate trips did you make on that day? [Up to 5 trips allowed]

==> <day and date> [Note: running reminders help the interviewer follow which period etc. that is being asked about]

[ ]

P1
Thinking of your first trip. Which of these did you fish from? Stop me when I mention the correct one.

ⓘ Read out answer options
ⓘ If diving, it's the platform used to launch from
ⓘ Multiple answers permitted

==> <day and date> ==> Trip (1 of <number of trips>)…

❑ 1. Trailer motor boat
❑ 2. Larger motor boat or launch
❑ 3. Trailer yacht
❑ 4. Larger yacht or keeler
❑ 5. Kayak, canoe, or rowboat
❑ 6. Off land, including beach, rocks or jetty
❑ 7. Other

P1a [Only asked if answered 'Other' at P1]
Please describe what you did your fishing from?
==> <day and date> ==> Trip (1 of <number of trips>)…

P2 [Only asked if answered 'Yes' at D2]
Was that a paid trip with a charter operator and a skipper?

==> <day and date> ==> Trip (1 of x)…

❍ 1. Yes
❍ 5. No

P3[1] [Only asked if answered '1 to 5' at P1]
Which of these did you launch from when you were fishing from the <INSERT BOAT TYPE FROM P1>? Stop me when I mention the correct one
ⓘ Read out answer options

==> <day and date> ==> Trip (1 of <number of trips>) ==> Platform: <boat type> …

❍ 1. Ramp
❍ 2. Marina
❍ 3. Mooring
❍ 4. Beach
❍ 5. Jetty or wharf
❍ 6. Anchorage
❍ 9. Other

P3b [Only asked if answered 1 at P3]
What was the name of that ramp?

P3a [Only asked if answered 'Other' at P3]
Please describe where you did your fishing from?

==> <day and date> ==> Trip (1 of <number of trips>) ==> Platform: <boat type> …

Z1
Thinking of when you were fishing from the <INSERT PLATFORM FROM P1>, What was the nearest city or township to where you were fishing?
ⓘ If necessary say "fishing includes diving, gathering or trapping any marine species."
ⓘ If multiple towns/cities type in up to three.

==> <day <day and date> ==> Trip (1 of <number of trips>) ==> Platform: <boat type> ==>

Z2
And what was the nearest land point to where you were fishing?
ⓘ If you need to give guidance say "well some examples are Simpson Point or Karaka Island or Waihi Beach".
ⓘ If multiple land points type in up to three.

==> <day <day and date> ==> Trip (1 of <number of trips>) ==> Platform: <boat type> ==>

Z3

I have to place your fishing in a specific area or areas. I have a map, but can you please help me work out which general area or areas you were fishing in? This is even if nothing was caught.

ⓘ USE YOUR MAPS!

ⓘ Interviewer to dialogue with respondents to identify the area/s fished.

ⓘ Multiple answers permitted

==> <day and date> ==> Trip (1 of <number of trips>) ==> Platform: <boat type> ==> zone <zone>

- ❑ 1. North Cape to Cape Brett
- ❑ 2. Bay of Islands
- ❑ 3a. Cape Brett to Te Arai Point
- ❑ 3b. Te Arai Point to Cape Rodney
- ❑ 4. Whangarei Harbour & entrance
- ❑ 5a. North of Barrier Islands
- ❑ 5b. Barrier Islands
- ❑ 6. Western Hauraki Gulf
- ❑ 7. Inner Hauraki Gulf
- ❑ 8. Firth of Thames
- ❑ 9. Eastern Hauraki Gulf
- ❑ 10. Eastern Coromandel
- ❑ 11a. Northern Bay of Plenty
- ❑ 11b. Middle Bay of Plenty
- ❑ 12. Tauranga Harbour & entrance
- ❑ 13. Eastern Bay of Plenty
- ❑ 14a. East Cape – Northern
- ❑ 14b. East Cape – Southern
- ❑ 15a. Hawke Bay - Northern
- ❑ 15b. Hawke Bay - Southern
- ❑ 16. Cape Turnagain to Turakirae Head
- ❑ 17. Turakirae Head to Titahi Bay
- ❑ 18a. Waitotara River to Manawatu River
- ❑ 18b. Manawatu River to Titahi Bay
- ❑ 19. Waitotara River to Tirua Point
- ❑ 20. Tirua Point to entrance area of Manukau
- ❑ 21. Manukau Harbour and entrance
- ❑ 22. Kaipara Harbour and entrance
- ❑ 23. Manukau Entrance to the Kaipara Entrance
- ❑ 24. West of Northland
- ❑ 25. Reef Point to North Cape
- ❑ 26. Marlborough Sounds
- ❑ 27. Queen Charlotte Sound & Tory Channel
- ❑ 28a. Stephen Is Tory Channel excl. sounds
- ❑ 28b. Tory Channel to Clarence River
- ❑ 29. Clarence River to Conway Rivers
- ❑ 30. Conway River to Sumner Beach
- ❑ 31. Sumner Beach to Rakaia River
- ❑ 32. Rakaia River to Waitaki River
- ❑ 33. Waitaki River to Tokomirira River
- ❑ 34a. Tokomirira River to Long Point
- ❑ 34b. Long Point to Slope Point
- ❑ 35. Slope Point to Te Waewae Inlet
- ❑ 36. Stewart Island, Ruapuke Island & surrounds
- ❑ 37. Patterson Inlet on Stewart Island
- ❑ 38. South West of the South Island
- ❑ 39a. North West of the South Island
- ❑ 39b. West of the South Island
- ❑ 40a. North of the South Island
- ❑ 40b. Cape Farewell to Kahurangi Point
- ❑ 40c. Golden Bay and Tasman Bay
- ❑ 41. Unknown (Interviewer can't establish zone)

M1
Thinking of when you were fishing near <INSERT Z2 ANSWER>, which fishing method of methods did you use? Stop me when I mention the correct one.

ⓘ Read out answer options, as needed
ⓘ Multiple answers permitted

==> <day <day and date> ==> Trip (1 of <number of trips>) ==> Platform: <boat type> ==> zone <zone>

❑ 1. Rod or line (not longline)
❑ 2. Long-line including set line, kontiki or kite
❑ 3. Net (not including landing net used if caught on line)
❑ 4. Pot (eg. for crayfish)
❑ 5. Dredge, grapple or rake
❑ 6. Hand gather or floundering from shore
❑ 7. Hand gather by diving
❑ 8. Spearfishing
❑ 9. Other

[Soft error check: If 2, 4 or 5 at M1 and 6 at P1 (land platform) say "Are you sure – platform was land/beach/rocks/jetty"]

M1a [Only asked if answered 'Other' at M1]
Can you please describe this 'other' method?

==> <day <day and date> ==> Trip (1 of <number of trips>) ==> Platform: <boat type> ==> zone <zone>

M1b [Only asked if answered '7' at M1]
When you were hand gathering by diving, was that…

ⓘ Read out answer options

==> <day <day and date> ==> Trip (1 of <number of trips>) ==> Platform: <boat type> ==> zone <zone>

❍ 1. Scuba diving
❍ 2. Snorkelling
❍ 3. Neither
❍ 4. Both

M1c [Only asked if answered '8' at M1]
When you were spearfishing, was that…

ⓘ Read out answer options

==> <day <day and date> ==> Trip (1 of <number of trips>) ==> Platform: <boat type> ==> zone <zone>

❍ 1. Scuba diving
❍ 2. Snorkelling
❍ 3. Neither
❍ 4. Both

M2 [Only asked if answered 'Yes' at D3]
Just to confirm, on that occasion were you recreational fishing, or fishing with a customary permit or authorisation?

==> <day <day and date> ==> Trip (1 of <number of trips>) ==> Platform: <boat type> ==> zone <zone>

❍ 1. Recreational / amateur
❍ 2. Customary permit or authorisation
❍ 3. Other

M3 [Only asked if answered '2' at M2]
Would you know what type? Would it be a customary authorisation under the kaimoana or South Island regulations… a customary permit… or something else?

ⓘ A customary permit is issued under Regulation 27 of the Fisheries Amateur Fishing Regs – hui, tangi.

==> <day <day and date> ==> Trip (1 of <number of trips>) ==> Platform: <boat type> ==> zone <zone>

❍ 1. Customary kaimoana or SI authorisation
❍ 2. Customary permit
❍ 3. Something else

M4 [Only asked if answered 'Other' at M2 or 'Something else' at M3]
Can you please tell me more about that?

==> <day <day and date> ==> Trip (1 of <number of trips>) ==> Platform: <boat type> ==> zone <zone>

C1a [ASKED OF ROD AND SPEAR FISHERS]
Thinking of when you were <INSERT FISHING METHOD>, including fish used for bait, which of these describes what happened with your **own** fishing?

ⓘ Read out all three answer options slowly!!

ⓘ If even one fish or other marine species was caught and kept by the fishing method, answer 3. This is even if others were discarded.

==> <day <day and date> ==> Trip (1 of <number of trips>) ==> Platform: <boat type> ==> zone <zone>
==> <method>

❍ 1. You yourself didn't catch or gather anything
❍ 2. You yourself caught something, but you released them all
❍ 3. You yourself caught something that you didn't release

C1b [ASKED FOR ALL OTHER METHODS]
Thinking of when you were <INSERT FISHING METHOD>, including fish used for bait, which of these describes your fishing?

ⓘ Read out all three answer options slowly!!

ⓘ If even one fish or other marine species was caught and kept by the fishing method, answer 3. This is even if others were discarded.

==> <day <day and date> ==> Trip (1 of <number of trips>) ==> Platform: <boat type> ==> zone <zone>
==> <method>

❍ 1. You didn't catch or gather anything
❍ 2. You caught or gathered something, but you released or discarded them all
❍ 3. You caught or gathered something that you didn't release or discard

C2
Including bait, what species did you [IF ROD OR SPEARFISHER: yourself] catch [If 2 AT C1: and release]. [IF ANSWERED 3 AT C1:] Please only include those species where at least one was kept.]

ⓘ If R says "Yellowtail" ask if they mean Kingfish, Koheru or Jack Mackerel ⓘ Multiple answers permitted!

==> <day <day and date> ==> Trip (1 of <number of trips>) ==> Platform: <boat type> ==> zone <zone>
==> <method>

Fin Fish [Soft error check: if a named fin fish AND method = 'handgather by diving', then say "Are you sure, method = handgather by diving?]

❑ 1. Barracouta
❑ 2. Blue Maomao
❑ 3. Blue Moki (If red, put under 'Other fish')
❑ 4. Bluenose
❑ 5. Butterfish (Greenbone)
❑ 6. Cod – Blue (always check if red or blue cod)
❑ 7. Cod – Red (if not red/blue, put under 'Other fish')
❑ 8. Flounder, Sole or other flatfish
❑ 9. Garfish (Piper)
❑ 10. Gemfish

❑ 11. Groper (Hapuku)
❑ 87. Groper (Bass)
❑ 12. Gurnard - Red
❑ 13. John Dory
❑ 14. Kahawai
❑ 15. Koheru
❑ 16. Kingfish (Yellowtail)
❑ 17. Mackerel – Blue/Slimy/English
❑ 18. Mackerel – Jack Mackerel
❑ 19. Mullet – Yellow Eyed/Herring
❑ 20. Mullet – Grey (if not yellow eyed/grey, put under 'Other Fish')
❑ 21. Porae (Big Lips) (not Parore! Check)
❑ 22. Pilchard (Sardine, Sprat)
❑ 23. Sea perch (Jock Stewart, Scarpie)
❑ 24. Shark – Spiny Dogfish (Bruno)
❑ 25. Shark – Rig (Spotted Dogfish)
❑ 26. Shark – School shark (Tope)
❑ 27. Snapper
❑ 28. Stingray - any kind incl. Skate
❑ 29. Tarakihi
❑ 30. Trevally
❑ 31. Trumpeter
❑ 32. Tuna – Skipjack (Bonito)
❑ 33. Tuna – Albacore
❑ 34. Other fish 1 (specify)
❑ 35. Other fish 2 (specify)
❑ 36. Other fish 3 (specify)
❑ 37. Other fish 4 (specify)
❑ 38. Other fish 5 (specify)

Other Marine Species

❑ 39. Cockles
❑ 40. Crayfish/Lobster – Spanish
❑ 41. Crayfish/Lobster – Spiny/Red (most common)
❑ 42. Crayfish/Lobster – Packhorse/Green
❑ 43. Kina
❑ 44. Mussel - any but not Horse Mussel
❑ 45. Oyster - any type
❑ 46. Paua – ordinary
❑ 47. Paua – Yellow Foot
❑ 48. Pipi
❑ 49. Scallops
❑ 50. Squid - any kind
❑ 51. Tuatua
❑ 52. Other marine species 1 (specify)
❑ 53. Other marine species 2 (specify)
❑ 54. Other marine species 3 (specify)
❑ 55. Other marine species 4 (specify)

C2a1 [Only asked if there is 'Other' fin fish]
Please specify the other fin fish

==> <day <day and date> ==> Trip (1 of <number of trips>) ==> Platform: <boat type> ==> zone <zone> ==> <method>

C2b1
Please specify the other marine species [Only asked if there is 'Other' marine species]

==> <day <day and date> ==> Trip (1 of <number of trips>) ==> Platform: <boat type> ==> zone <zone> ==> <method>

[ght OR where fish released only]

[IF 3 AT C1 AND ROD OR SPEAR FISHING METHOD:] **Remembering that's only the ones you yourself caught – not the group catch.** [All:] How many did you catch? [IF 3 AT C1:] and not release?

ⓘ If other than rod or spear fishing and R is not sure of his personal total, then record the number for the group

==> <day <day and date> ==> Trip (1 of <number of trips>) ==> Platform: <boat type> ==> zone <zone> ==> <method> ==> fish <species>

[Note program allows '0'!]
[Soft error check: If a Rod or spear fisher AND a named fin fish (1-36) AND C4>10 say: "Can I check again this was your own catch and not [IF BOAT (1-5 at P1):] the boat catch [OTHERWISE:] a group catch?"]

[Questions from C5 onwards are not asked for fish released]

C5 [Only asked if answered 'Yes' at D4]
Were these part of a personal allowance from a commercial catch?

==> <day <day and date> ==> Trip (1 of <number of trips>) ==> Platform: <boat type> ==> zone <zone> ==> <method> ==> fish <species>

❍ 1. Yes
❍ 5. No

C5b [Only asked if answered 'Yes' at C5]
Was that in accordance with a 'general approval' or a 'particular approval'?

ⓘ If it helps: "Those are the two different kinds of approval under section 111 of the Fisheries Act I believe. If you don't know which, that's ok."

==> <day <day and date> ==> Trip (1 of <number of trips>) ==> Platform: <boat type> ==> zone <zone> ==> <method> ==> fish <species>

❍ 1. General
❍ 2. Particular
❍ 3. Other
❍ 4. Not sure /Don't know

DIVISION OF GROUP CATCH

C6 [Only asked for methods other than spear fishing & rod fishing]
Was anyone else, apart from you, active in catching the <INSERT NUMBER OF THAT SPECIES> <INSERT NAME OF THAT SPECIES>?

==> <day <day and date> ==> Trip (1 of <number of trips>) ==> Platform: <boat type> ==> zone <zone> ==> <method> ==> fish <species>

❍ 1. Yes
❍ 5. No [Back to next fish/method/platform etc or finish if no more]

C7
How many people were active, in catching that including yourself? [Only asked if answered yes at C6]

==> <day <day and date> ==> Trip (1 of <number of trips>) ==> Platform: <boat type> ==> zone <zone> ==> <method> ==> fish <species>

C8
So, would it be correct to say your personal catch was <INSERT CALCULATED NUMBER OF SPECIES DIVIDED BY HOW MANY PEOPLE INVOLVED> [Note could be a fraction eg. 6 fish and 5 people = 1.2 fish personally caught]

❍ 1. Yes [Back to next fish/method/platform etc or finish if no more]
❍ 5. No

C9
Could you please tell me how many of those <SPECIES> you see as your personal catch?

==> <day <day and date> ==> Trip (1 of <number of trips>) ==> Platform: <boat type> ==> zone <zone> ==> <method> ==> fish <species>

C10
Could you give a brief reason why your personal catch was different from the average?

==> <day <day and date> ==> Trip (1 of <number of trips>) ==> Platform: <boat type> ==> zone <zone> ==> <method> ==> fish <species>

OTHER ROUTING NOTES

This CATI programs routes according to answers given. It works in a 'tree' structure, progressing down each unresolved 'branch' in turn. Eg:

- For each day, the program asks details of each trip.
- For each trip the program asks details of each zone.
- For each zone the program asks details of each method.
- For each method the program asks if: 1) Nothing was caught or gathered 2) Caught and all released or discarded 3) Fish or other species were caught and not discarded or released
- For each method where something was caught, the program asks for details on species caught.