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Ongoing monitoring of national marine recreational harvest: trials of self-complete, online approaches

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EXECUTIVE SUMMARY

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This report describes research into the viability of alternative modes of data gathering for amateur recreational harvest by marine fishers with a view to estimating New Zealand's national annual harvest. The benchmark against which the alternatives are measured is the earlier National Panel Survey (NPS) which yielded consistent and credible estimates comparable with onsite measures. The NPS employed computer assisted telephone interviews (CATI), an adaptive questionnaire, and a high frequency of fisher interviews. This research dispensed with the CATI interview and utilised self-completion of the questionnaire, with fishers reporting no more than monthly using one of two interfaces, i.e., an online link to the questionnaire delivered by text or a progressive web app. Monitoring harvest over approximately one year showed the online link estimates to substantially underestimate amateur harvest against the CATI, and the web app to substantially overestimate harvest. Neither could show a credible correspondence to onsite measures, in the way that CATI collection did.

1. INTRODUCTION

October 2018 saw the completion of the second National Panel Survey (NPS) monitoring the recreational harvest of marine species (Wynne-Jones et al. 2019). This provided a data set directly comparable in methodology to the initial NPS performed six years earlier (Wynne-Jones et al. 2014). The NPS is an offsite method using a statistically random, nationally representative sample of fishers, monitored over a 12-month period. Monitoring was by a process of texting to determine whether the fisher had fished during a stipulated period, followed by an in-person Computer Assisted Telephone Interviewing (CATI) administered interview if they had done so or had not responded. Harvest estimates from the NPS offsite method have been compared with estimates from an onsite aerial overflight, ramp intercept method monitoring harvest over the same period to determine whether consistent, method independent harvest estimates were being produced.

Although the data produced by the NPS is considered accurate, it is both labour and cost intensive. The NPS utilised CATI to elicit and record the fishing activity of a high quality probability, statistically random, representative sample. For future monitoring, this is problematic primarily due to the cost of maintaining a CATI team to administer data collection over the course of an entire fishing season. Another consideration is the technological future proofing of the project. Voice calls over either a mobile, or especially a landline phone, are likely to be a less acceptable and therefore a less effective method of communication with panellists for collection of data during the next five yearly national harvest estimation.

Due to these reasons, lower cost and more technology reliant data collection modes were trialled in the 2018/19 and 2019/20 seasons. Specifically, these were a hyperlink contained in a text message across both seasons and a web app with offline functionality. This shifts the activity of data collection from the research company to self-reportage by the enrolled sample.

These trials also allowed for additional value to be extracted from the statistically random, representative sample of fishers recruited for the NPS. Specifically, the ongoing monitoring described in this report utilised the panel of respondents initially recruited for the NPS. Offsets to the economy of re-use of the panel lay in possible fatigue or learning effects. This work was not able to determine such effects if any were at play. Similarly, seasonal differences in fishing conditions and fish abundance, if any, were not able to be determined.

1.1 Objectives

The overall objective was set by Fisheries New Zealand in the commissioning of this project.

This was to design and test methods alternative to the NPS to following the fishing activity of a subsample of the panellists over the 2018/19 and the 2019/20 fishing years. We have further specified the objectives for this phase of the research as:

i. To determine whether an adequate sample of fishers would accept enrolment into further reporting over and above the initial 12-month period for which they agreed to at the time of initial recruitment (with however, self-completion instead of CATI supported reporting).

ii. Furthermore, whether the sample that did accept enrolment would be composed of a similar demographic and avidity (Appendix 20.9) profile to the original NPS sample, and therefore whether the current regime for weighted harvest estimates would maintain the integrity that it has demonstrated in the previous panel surveys.

iii. To determine whether this enrolled sample would comply, and to what extent, with self-reporting their fishing each month in response to no more than a text prompt, with reminder prompts if needed.

iv. To determine whether the trial sample would report a frequency of fishing and a number of fish caught, comparable to that reported by the NPS, over the same period, allowing that this assessment might be confounded to some extent by weather or abundance differences between the seasons.

v. Finally, to assess the similarity or difference between the national harvest estimates produced from the NPS data as against the self-complete data collected by the hyperlink and the app respectively.

2. METHODOLOGY AND DESIGN

Due to the primary interest of the trial being the effectiveness of online self-reporting data collection as a replacement for CATI, the wider concept of the NPS methodology was kept intact.

Enrolled fishers were contacted by text at specified intervals to report via structured offsite questionnaires about their fishing activity over monthly time periods, primarily to produce estimates of recreational harvest. The interview mode, as previously explained, moves from CATI to self-complete mode for active fishing. Panel members who did not fish in the given time period were still able to text 'no' to indicate they didn't fish in the given time period. In the 2018/19 season, this self-complete mode was a hyperlink delivered by text or email, whereas in 2019/20 both the link and the web app were used to allow a comparison between the two modes, and between each and the NPS.

The estimation methodology used to prepare harvest figures was also consistent with the NPS. An unweighted logistic regression model was applied to the various samples in the two seasons of ongoing data collection. The variables, as of enrolment into the NPS in 2017, of territorial authority, meshblock enumeration, number of fishers in a meshblock, sex, age group, ethnicity, and stated avidity, with the first three reflecting the sample design as surrogates for weights. Territorial authority, enumeration, and number of fishers were found to be of insignificant difference. Sex was barely significant but ethnicity was significant, about the same as avidity but less so than age group. Since including ethnicity in weighting estimates would mean coarsening age group, weighting was performed on the variables of stated avidity and fine age group when raw data were recalibrated to the fishing statistics for the national population as at enrolment in 2017. Although other estimation methods are possible, consistency of weighting and estimation methodology is important for two reasons. Firstly, the NPS must take precedence in any comparisons because it has produced figures that have been shown to be comparably accurate. Secondly, assessing the ability of the alternate self-complete data collection modes to perform the role of the CATI mode requires all other elements of the methodology to remain as consistent with the NPS as possible.

Non-response was treated more weakly than in the NPS. Fishers who didn't report harvest data in any month were assumed to have not fished, and no imputation of fishing data took place. This is because the experimental comparison was primarily to identify mode effects and differences.

Aside from differences in the method and instrument used are two contextual differences. These are that we cannot tell how much or how little effect participation in the preceding 12 months has created a "training" effect resulting in more or better responding, nor by contrast how many fishers will struggle to adapt to a different data collection mode. Furthermore, it is difficult to know what proportion of fishers do not continue in further trial seasons because they may feel they have done enough to fulfil their implied social contract or it may be a fatigue effect, rather than an unwillingness or inability to self-report their fishing activity via the trialled self-complete data collection modes.

These trials extend the NPS 2017/18 sample into a longitudinal panel. Panels of that kind generally rely on replenishment of attrition, and/or refreshment of the members by rotating in some newly recruited members and retiring some current members. This treatment is not available for the sample to be used for the present trials.

3. SPECIFICATIONS OF ONLINE AND APP MODES

The online questionnaire was created using QuestionPro software (Appendix 20.5) Personalised links are generated for each fisher for each monthly broadcast, then exported as a batch and run through a custom short link generator so that they can fit within a singular text message. This allows both for responses to be tracked and to have personal fisher information to be included in the dataset consisting of responses from fishers without manual addition. This mode is online, so can be compromised by quality of internet connectivity.

National Research Bureau partnered with Acronym technology to select the most suitable form of app technology with which to monitor and collect fishing data.

Based on their advice, NRB decided to produce a progressive web app (Appendix 20.8) rather than a native app for the 2019/20 fishing season. This type of technology allowed for the two key functions required for a methodological comparison against the online link delivered by text:

- access through an icon on the home screen of a device when notified, and
- offline collection of data.

Moreover, progressive web apps offer a regular site that mimics and appears as a native mobile app to users but has benefits in the context of this methodological trial.

- Allows installation without needing to go through an app store. This allows access to be restricted to only those fishers on the panel so adoption rates can be measured, a key indicator of the mode's viability. This is heightened by password protection, so panel members cannot direct others to the app and allow non-panel members to pollute the sample.
- Fishers can use the app initially through a link so that they aren't being asked to install an app with contents they are not familiar with.
- Wider compatibility with browsers and devices than a native mobile app. However, due to the contacts being phone numbers, it is optimised for mobile phone users. This was an important consideration because the recreational fishers are on average older than the general population and therefore may be more likely to use older model devices.
- Uses a far smaller amount of space on the device it is installed on.
- Automatically remains up to date rather than asking the fisher to add updates.

The benefits of a native mobile app, by contrast—easier to find in an app store; access to utilities such as GPS, etc.; customisation of features to iPhone or android user interface specifically; enhanced security—range from none to negligible in a population survey conducted by basic questionnaire.

The app technology allowed for additional features that aren't present in the basic online self-complete link. These additional features are listed below.

- Home page with the calendar months within the fishing season listed, allowing fishers to back-fill data for months that they had not responded to initially.
- Auto-fill when selecting species to decrease scrolling required.
- Additional question to allow carry over of method, platform, and area answer options of previous species when entering responses for finfish species, decreasing answers required and participant burden.

A further question asking fishers how many of a species they caught but returned to the sea was also added to the app version of the questionnaire. This was outside the parameters of the research but was added due to multiple fishers suggesting its inclusion to the NRB. It was thought that its inclusion would make the app more attractive to fishers, both by being responsive to the requests of the sample and encompassing additional focus on fisheries sustainability.

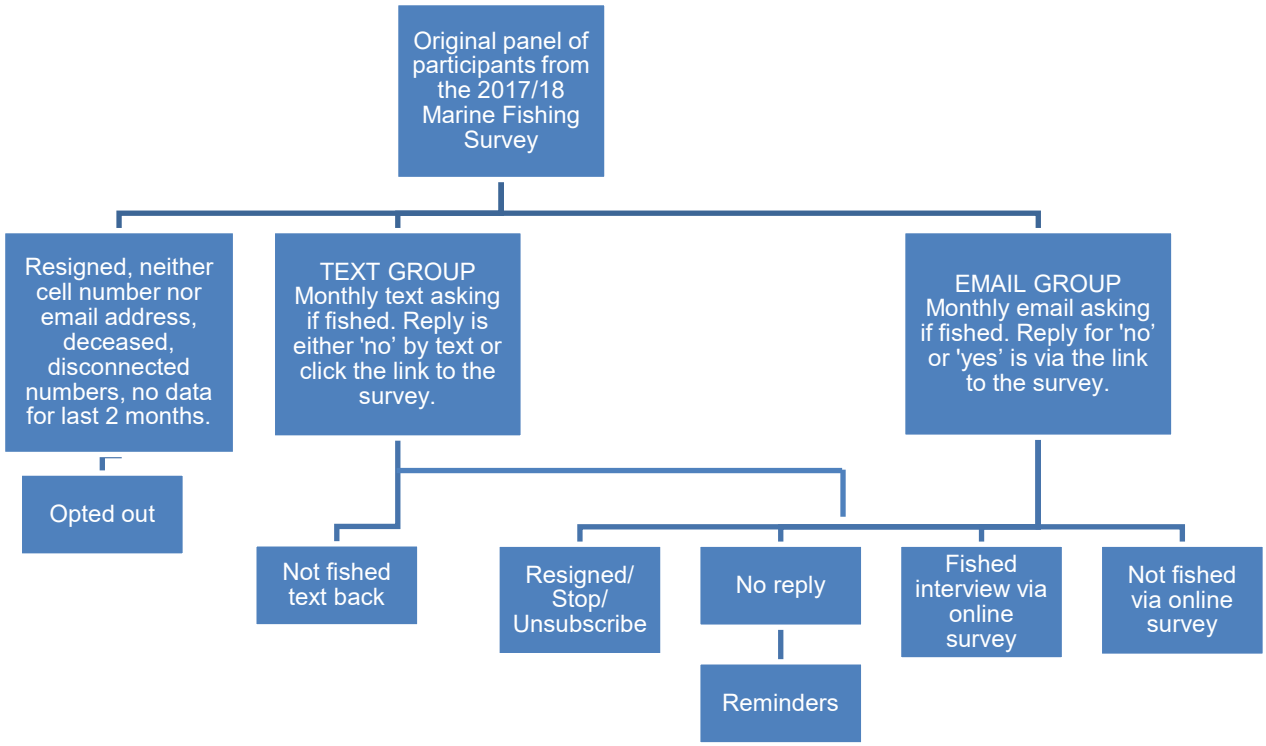
Upon completion of the first monthly fishing record, users of the app are asked the demographic questions that were asked of NPS fishers at door to door screening and recruitment (Wynne-Jones et al. 2019). These demographics are vital to accurate weighting and stratification of the data collected from the sample, and thus accurate harvest estimates. An app being installed on a mobile device may seek to replace this screening process in part or whole. For the sake of comparability, initial demographics collected for the NPS and screening are retained when comparing data and harvest estimates between the two modes.

4. ENROLMENT OF THE ONLINE SAMPLE

The strategy for utilising the NPS sample was that of rolling the panel members into the continuation sample, i.e., panel members were enrolled unless they had opted out or were lost to the NPS sample already. Each panellist received a letter of explanation and encouragement to continue. In addition, they received an online explanation reinforcing the encouragement and describing the simplified recording and the self-completion approach. Copies of these two communications are enclosed in the Appendices. Respondents were predominantly cellphone owner-users and a small proportion were email users. The very few panellists who had only landline were not approached for the continuation sample.

Enrolment allowed for opt-out rather than opt-in as a way of maximising the number of fishers who would likely proceed. This is illustrated in the schematic below.

Schematic of monthly self-completion fishing surveys



5. ONLINE QUESTIONNAIRE

The requirements of a self-completion, online questionnaire are inherently more limiting than those of an interviewer administered CATI questionnaire. Specifically, the questionnaire must be simpler for the respondent to feel they are following the logic of the flow, and shorter, i.e., quicker to complete. Fewer topics (and less detail on each topic) are generally involved, given the usual provisos of the salience and importance of the survey to the respondent.

The NPS questionnaire was adapted for use in an online self-complete extension of the harvest estimate survey in the following ways:

i. Rather than asking for trip by trip detail, the questionnaire asked for all marine fishing in a nominated month, month by month.

ii. Within a month, the questionnaire first asked what species were caught and kept in that month, and then asked detailed questions on the platform, launching (if a boat was used), method, and area fished for that species. The questions then moved to the second species caught, if any, asking the same detailed questions.

iii. The questioning capitalised on the observation that although a variety of platforms, methods, areas, etc., are engaged when all fishers are considered, individual fishers tended to use the same approach predominantly in a time window such as a month, or even longer. This led to use of the heuristic notion of "mostly in this month", e.g., area mostly fished, and method mostly used, to capture the fisher's predominant behaviour. There is an expected small trade-off in cases where a fisher, within a single month, used different platforms or methods or areas to catch a particular species. This variation is defaulted to the predominant behaviour through the heuristic "mostly".

iv. The online self-complete version required a different approach to identifying which of the 51 areas (Appendix 20.5) the fisher had fished in. For the NPS, this question-answer was mediated by the interviewer using a detailed map and asking for nearest city/town and nearest land point. For the online version a two-step approach is used. The fisher is first asked to identify which part of New Zealand they fished in. They are then presented with a map showing the detail of the numbered areas along that part of the New Zealand coastline from which to select the specific area they fished. The areas are numbered, and the fisher needs to enter their area number into the answer space on the questionnaire.

v. Sample members are still able to text back 'no' to record no fishing for the time period, as they did in the NPS.

A copy of the questionnaire wording and logic is attached as an (Appendix 20.5).

6. RATIONALE FOR THE "MOSTLY" HEURISTIC RECORDING

Recording, in this instance, fish harvested and the method and approach to fishing, is not a natural part of participation in recreation. Given the 'escape' benefits of fishing, it is perhaps especially inimical to the mood and motivation of the marine recreational fisher.

Fishing data, to be of scientific value in harvest estimation, does however require a disciplined framework of reporting. The challenge is to make this as little onerous as possible while retaining the scientific value of the data captured.

One approach is the use of heuristics. A heuristic in the context used here for constructing self-reporting of amateur harvest takes the definition that it is an approach that employs a practical method not guaranteed to be optimal, perfect, logical, or rational, but instead sufficient for reaching an immediate goal. However, the primary concern of the study is to compare national estimates.

The reporting model adapted for self-reporting in the online and the app trials reduces the daily report time frame of the NPS to a monthly report time frame. This is done to limit intrusion into the fishers' cellphone traffic and into their attention time, to 12 times a year. Recall and reporting is consequently framed around the harvest in each of the 12 calendar months. Within each month the fisher is asked how many of each species of fish were harvested over the whole month.

Descriptions of what platform, launch, method, and area fished are subject to the qualification "mostly". For instance, the fisher indicates from a map which of the 51 areas each species harvested that month was "mostly" caught in. This means that if the fisher caught some of a given species in, for example, area 8 of the 51 areas and some in area 10, then the area in which more were caught is the "mostly" area for reporting within that month. Where equal numbers were caught in each of two areas, for example, then the area first fished (named) is the "mostly" area.

How well this heuristic serves without introducing skews in the data depends on the number of fishers using more than one area for a given species, and the disproportion of catch between areas in any multiple area month. Five of a species caught in one area and one in another is less unrepresentative than three in one area and three in the other.

Tables 1–3 show the use of two or more of the 51 areas for harvesting a given species within a given month, using NPS 2017/18 data. For snapper (Table 1) this figure rises to 10% of fishers during peak harvest months, but for tarakihi (Table 2) and crayfish/red lobster (Table 3) it tends to below 5%.

Table 1: Number of fishers who reported snapper harvest in one only, two, or more than two fishing areas for those who harvested snapper in that month. (Source: 2017/18 NPS data and map of 51 fishing areas.)

Year/month	Single area	Two areas	Multiple areas	Total fishers	% fishers going to more than one area in the same month (rounded)
2017/10	393	36	2	431	9
2017/11	553	36	9	600	7
2017/12	707	55	5	768	8
2018/01	664	64	2	730	9
2018/02	495	32	3	530	7
2018/03	555	57	5	617	10
2018/04	438	27	1	466	6
2018/05	226	12	0	238	5
2018/06	207	14	0	221	6
2018/07	136	7	1	144	6
2018/08	161	8	0	169	5
2018/09	254	19	3	276	8

Table 2: Number of fishers who reported tarakihi were harvested in one only, two, or more than two fishing areas for those who did harvested tarakihi in that month. (Source: 2017/18 NPS data and map of 51 fishing areas.)

Year/month	Single area	Two areas	Multiple areas	Total fishers	% fishers going to more than one area in the same month (rounded)
2017/10	64	2	0	66	3
2017/11	77	1	0	78	1
2017/12	103	0	0	103	0
2018/01	99	2	0	101	2
2018/02	47	1	0	48	2
2018/03	48	2	0	50	4
2018/04	40	0	0	40	0
2018/05	18	1	0	19	5
2018/06	31	0	0	31	0
2018/07	13	1	0	14	7
2018/08	25	1	0	26	4
2018/09	40	0	0	40	0

Table 3: Number of fishers who reported red lobster/crayfish were harvested in one only, two, or more than two fishing areas for those who did harvested red lobster/cray in that month. (Source 2017/18 NPS data and map of 51 fishing areas).

Year/month	Single area	Two areas	Multiple areas	Total fishers	% fishers going to more than one area in the same month (rounded)
2017/10	60	4	0	64	6
2017/11	77	3	0	80	4
2017/12	95	3	0	98	3
2018/01	77	2	0	79	3
2018/02	31	1	0	32	3
2018/03	29	1	0	30	3
2018/04	23	0	0	23	0
2018/05	5	0	0	5	0
2018/06	11	0	0	11	0
2018/07	8	0	0	8	0
2018/08	14	0	0	14	0
2018/09	17	0	0	17	0

7. COMPOSITION OF THE SAMPLE

Table 4 shows the level of participation in the ongoing monitoring over the year following the NPS. All NPS panellists excluding those who had become permanently absent from the panel, or had no internet connection, were initially rolled over into the text-online-self-complete version. The enrolled sample was highly comparable with the NPS across all major demographics. (Appendix 20.9 gives the definition of avidity).

Table 4: Comparison of the demographic profile of participants (unweighted).

		NPS CATI %	Self-complete link %
Area	Northland	6.1	5.8
	Auckland	28.9	28.7
	BOP	10.3	10.3
	Waikato	10.6	10.7
	Gisborne	1.4	1.4
	Hawke's Bay	5.1	4.8
	Taranaki	3.3	3.4
	Manawatu/Whanganui	3.7	3.7
	Wellington	8.3	8.6
	Tasman	7	6.6
	West Coast	1.1	1.3
	Canterbury	8.3	8.7
	Otago	3.9	4.2
	Southland	1.8	1.8
		100	100
Gender	Male	73.1	75.2
	Female	26.9	24.8
		100	100
Ethnicity	Māori	16.3	14.6
	Non-Māori	83.7	85.4
		100	100
Age (y)	15-24	9.8	7.7
	25-34	17.2	15.3
	35-44	19.5	20.8
	45-54	19.9	21.5
	55-64	18	20.6
	65-74	11.9	11.4
	75+	3.4	2.6
	Not stated	0.2	0.2
		100	100
Avidity	B stated	50.1	47.4
	C stated	31.5	33.2
	D stated	18.4	19.4
		100	100

8. FINDINGS OF THE NPS VS. ONLINE SAMPLE OVER THE 12-MONTH TRIAL

The main finding of online self-completion survey during the 2018/19 season is that a substantially lower level of fishers reported harvest compared with the CATI mode of data collection utilised in the NPS (Table 5). This includes fishers who reported fishing but didn't catch and keep any species and therefore won't be included in any tables that describe the characteristics of the fishing.

Table 5: Number of fishers who contributed fishing data during the entire fishing season by mode.

Mode/season	NPS CATI	Self-complete link
Total sample (n)	6 977	3 943
Panel members who completed active fishing interviews (n)	3 704	1 293
Panel members who completed active fishing interviews (%)	53.1	32.8

Table 6 compares the 12-month harvest levels in terms of number of fish harvested. Implicit is the design assumption that any differences are attributable to the different methods rather than to differences in abundance of fish or suitability of weather for fishing between the two years.

Tables 7–13 relate to fishing behaviours and characteristics. The purpose of preparing these tables is to see whether the self-complete ongoing sample remained comparable with the NPS sample and whether any differences in harvest could be interpreted by differences that developed in fishing behaviour or in reporting of harvest.

Finally, Tables 14–16 report on participation behaviour and are provided to inform the wider objective of understanding self-reporting in the context of marine amateur fishing.

Table 6 shows that significantly fewer of the three most commonly harvested species were reported through self-completion than through administered CATI interviewing. A scoping figure of the self-complete reporting around the low 60 percent or less covers most of the finfish species common to amateur harvest. Only the shellfish and crustacea were reported at similar levels to the NPS.

The base numbers reflect the number of fishers who reported harvest of at least one species in at least one month of the 2018/19 season that constituted the study period. This applies for Tables 6–10.

Table 6: The 12-month harvest comparison of CATI 2017/18 and self-complete 2018/19 (sig diff refers to statistically significant difference).

	NPS CATI			Self-complete link				
Species	Number of fish	SE	CV	Number of fish	SE	CV	Sig diff	Self-complete as % of CATI
Snapper	3 496 711	209 018	0.06	2 155 949	166 240	0.08	1	62
Kahawai	1 009 675	52 264	0.05	642 534	55 472	0.09	1	64
Blue Cod	594 934	54 587	0.09	315 449	45 912	0.15	1	53
Red Gurnard	360 059	34 264	0.10	221 805	34 648	0.16	0	62
Tarakihi	302 990	37 542	0.12	205 192	35 370	0.17	0	68
Trevally	138 185	10 474	0.08	111 362	14 655	0.13	0	81
Kingfish	89 744	11 721	0.13	64 088	8 361	0.13	0	71
Skipjack Tuna	29 892	5 185	0.17	36 452	12 696	0.35	0	122
Hāpuku or Bass	38 272	5 483	0.14	16 119	3 718	0.23	1	42
Albacore Tuna	12 463	2 752	0.22	7 813	2 947	0.38	0	63
Bluenose	9 629	2 318	0.24	8 895	3 753	0.42	0	92
Sea perch	116 948	37 556	0.32	64 139	16 773	0.26	0	55
Red Cod	30 200	5 653	0.19	12 395	4 601	0.37	0	41
John Dory	26 064	4 567	0.18	29 968	12 149	0.41	0	115
Flounder, Sole or other flatfish	95 859	17 416	0.18	54 150	18 447	0.34	0	56
Rest of Finfish	691 510	72 648	0.11	759 808	150 619	0.20	0	109
Total Finfish	7 043 135	327 084	0.05	4 706 120	370 894	0.08	1	67
Crayfish/Lobster Spiny/Red	209 446	22 922	0.11	223 877	55 190	0.25	0	107
Ordinary Pāua (not yellow foot)	425 661	48 282	0.11	391 211	131 886	0.34	0	92
Scallops	561 592	80 171	0.14	761 181	206 817	0.27	0	136
Rest of Other marine Species	2 705 244	288 026	0.11	2 446 988	331 741	0.14	0	90
Total of other marine species	3 901 943	313 343	0.08	3 823 257	476 712	0.12	0	98
Base number*	**3 278**			**1 151**				

* Base excludes those fishers who recorded no species caught.

Table 7 shows the comparative skew away from the most commonly harvested finfish and a significant increase in the harvest of scallops, when reported by self-completing through the link.

Table 7: Species as proportion of 12-month harvest estimate for the two methods

	NPS CATI			Self-complete link			
Species	Proportion	SE	CV	Proportion	SE	CV	Significant difference
Snapper	49.6%	1.4%	0.03	45.8%	1.9%	0.04	0
Kahawai	14.3%	0.6%	0.04	13.7%	0.9%	0.07	0
Blue Cod	8.4%	0.8%	0.09	6.7%	1.0%	0.15	0
Red Gurnard	5.1%	0.4%	0.08	4.7%	0.7%	0.15	0
Tarakihi	4.3%	0.5%	0.12	4.4%	0.7%	0.17	0
Trevally	2.0%	0.1%	0.07	2.4%	0.3%	0.12	0
Kingfish	1.3%	0.2%	0.12	1.4%	0.1%	0.1	0
Skipjack Tuna	0.4%	0.1%	0.17	0.8%	0.3%	0.32	0
Hāpuku or Bass	0.5%	0.1%	0.14	0.3%	0.1%	0.23	0
Albacore Tuna	0.2%	0.0%	0.22	0.2%	0.1%	0.37	0
Bluenose	0.1%	0.0%	0.23	0.2%	0.1%	0.42	0
Sea perch	1.7%	0.5%	0.32	1.4%	0.4%	0.26	0
Red Cod	0.4%	0.1%	0.19	0.3%	0.1%	0.37	0
John Dory	0.4%	0.1%	0.17	0.6%	0.2%	0.38	0
Flounder, Sole or other flatfish	1.4%	0.2%	0.18	1.2%	0.4%	0.34	0
Rest of finfish	9.8%	0.9%	0.09	16.1%	2.3%	0.14	0
Crayfish/Lobster Spiny/Red	5.4%	0.6%	0.12	5.9%	1.4%	0.23	0
Ordinary Pāua (not yellow foot)	10.9%	1.3%	0.12	10.2%	3.1%	0.3	0
Scallops	14.4%	2.0%	0.14	19.9%	4.7%	0.24	1
Rest of other marine species	69.3%	2.9%	0.04	64.0%	5.1%	0.08	0
Base number	**3 278**			**1 151**			

This multiple response table (Table 8) shows that the fishers reported much the same relative use of harvest method with the exception of hand gathering from shore and of netting.

Table 8: Comparison of method mostly used to fish (multiple response, weighted).

	NPS CATI		Self-complete link		
Method	Proportion	SE	Proportion	SE	Significant difference
Rod or line (not longline)	87.0%	0.8%	87.9%	1.3%	0
Longline including set line, kontiki, or kite	9.9%	0.8%	9.1%	1.2%	0
Net (not including landing net used if caught by line)	5.4%	0.5%	3.2%	0.5%	1
Pot (e.g., for crayfish)	3.1%	0.4%	3.0%	0.6%	0
Dredge, grapple, or rake	0.9%	0.2%	1.8%	0.5%	0
Hand gather or floundering from shore	9.7%	0.7%	14.1%	1.4%	1
Hand gather by diving	13.5%	0.8%	12.2%	1.3%	0
Spearfishing	3.6%	0.4%	3.8%	0.8%	0
Some other method	0.1%	0.1%	0.5%	0.2%	0
Base number	**3 278**		**1 151**		

Table 9 shows platform use differed between the NPS and the self-complete survey. The latter were less likely to report fishing from larger motor boats and off land.

Table 9: Comparison of platform mostly used to fish (multiple response, weighted).

	NPS CATI		Self-complete link		Significant
Platform	Proportion	SE	Proportion	SE	difference
Trailer motor boat	62.2%	1.2%	68.3%	1.7%	1
Larger motor boat or launch	25.0%	0.9%	17.5%	1.4%	1
Trailer yacht	0.5%	0.2%	0.5%	0.3%	0
Larger yacht or keeler	1.5%	0.3%	1.3%	0.3%	0
Kayak, canoe, or rowboat	6.1%	0.5%	6.2%	1.0%	0
Off land, including beach, rocks, or jetty	42.6%	1.2%	33.6%	1.8%	1
Something else	1.5%	0.3%	2.4%	0.6%	0
Base number	**3 278**		**1 151**		

Table 10 shows that use of the fishing areas was comparable—proportionately—during the CATI year and the self-complete links year. Any differences in harvest reported by these two modes would not therefore be attributable to fishers changing the fishing areas they patronised between the two years.

Table 10: Comparison of Fishery Management Area (FMA) fished in (multiple response, weighted).

	NPS CATI		Self-complete link		
Area	Proportion	SE	Proportion	SE	Significant difference
FMA 1	59.2%	1.3%	61.7%	1.8%	0
FMA 2	11.6%	0.7%	12.3%	1.2%	0
FMA 3	7.6%	0.6%	7.8%	0.9%	0
FMA 5	3.1%	0.4%	2.5%	0.5%	0
FMA 7	11.2%	0.7%	9.9%	1.0%	0
FMA 8	8.5%	0.7%	7.3%	1.0%	0
FMA 9	14.5%	1.0%	13.7%	1.4%	0
Base number	**3 278**		**1 151**		

The self-reported data did not produce a marked difference in the number of fish harvested over 12 months by fishers who did report having fished (Table 11). The exception to this overview may be among those fishers who harvested more than 20 finfish over the year, where this is more evident among the NPS data. There is no evidence that self-reporters truncated their harvest reports, once they had reported the harvest. Where the figure is below "1", this is due to apportioning caught fish between multiple fishers.

Table 11: Comparison of annual number of finfish harvested per fisher who did fish and did report catch over 12 months.

	NPS CATI		Self-complete link		Significant difference
Number finfish	Proportion	SE	Proportion	SE	
[0–0.3)	18.7%	0.9%	17.5%	1.4%	0
[0.3–1)	0.2%	0.1%	0.0%	0.0%	0
[1–2)	7.9%	0.6%	6.7%	0.8%	0
[2–3)	6.0%	0.5%	5.8%	0.9%	0
[3–4)	5.0%	0.4%	4.7%	0.8%	0
[4–5)	5.7%	0.5%	4.8%	0.8%	0
[5–6)	4.0%	0.4%	3.9%	0.6%	0
[6–7)	3.6%	0.4%	4.8%	0.7%	0
[7–8)	3.4%	0.4%	5.4%	0.9%	0
[8–9)	2.8%	0.3%	3.2%	0.6%	0
[9–10)	2.6%	0.3%	2.8%	0.6%	0
[10–11)	2.0%	0.2%	2.9%	0.6%	0
[11–12)	1.8%	0.2%	1.7%	0.4%	0
[12–13)	2.3%	0.3%	2.4%	0.6%	0
[13–14)	1.9%	0.3%	1.5%	0.3%	0
[14–15)	1.7%	0.3%	1.6%	0.4%	0
[15–16)	1.0%	0.2%	1.9%	0.4%	0
[16–17)	1.2%	0.3%	1.9%	0.5%	0
[17–18)	0.9%	0.2%	1.0%	0.3%	0
[18–19)	1.2%	0.3%	1.7%	0.4%	0
[19–20)	0.9%	0.2%	1.8%	0.6%	0
[20–40)	13.4%	0.8%	11.2%	1.0%	0
[40–100)	9.2%	0.6%	8.7%	1.0%	0
[100–200)	2.0%	0.3%	1.2%	0.3%	0
> 200	0.8%	0.2%	0.7%	0.3%	0
Base number	**3 704**		**1 293**		

Note that the base numbers for Tables 11–13 are larger than those given in Tables 7–10. This is because fishers who reported fishing, but no harvest, were not asked further questions about that month's fishing in the self-complete version of the questionnaire.

The self-completion data for the number of days fished over 12 months are broadly comparable with CATI data; only the reporting of a single day fished during the entire season was significantly different (Table 12).

Table 12: Comparison of annual number of days fished per fisher across 12 months.

	NPS CATI		Self -complete link		Significant difference
Days fished	Proportion	SE	Proportion	SE	
1	33.5%	1.0%	26.1%	1.5%	1
2	17.1%	0.8%	18.2%	1.3%	0
3	11.0%	0.6%	14.3%	1.1%	0
4	8.2%	0.6%	7.7%	1.0%	0
5	5.9%	0.4%	5.8%	0.8%	0
6	5.4%	0.5%	6.0%	0.8%	0
7	2.9%	0.3%	4.6%	0.7%	0
8	2.5%	0.3%	3.1%	0.6%	0
9	1.8%	0.3%	2.3%	0.5%	0
10	1.8%	0.3%	2.7%	0.7%	0
11	1.6%	0.3%	1.3%	0.3%	0
12	1.2%	0.2%	0.9%	0.4%	0
13	1.0%	0.2%	0.7%	0.2%	0
14	0.8%	0.2%	0.8%	0.3%	0
15–20	2.3%	0.3%	3.1%	0.7%	0
21–40	2.7%	0.4%	2.2%	0.5%	0
> 40	0.4%	0.1%	0.3%	0.2%	0
Base number	**3 704**		**1 293**		

With the exception of a small but significant difference in the ethnicity make-up of the two responding years, the profile of participants is very similar (Table 13). We would not expect the demographics of the sample to explain the lower harvest evident in the self-reported data.

Table 13: Comparison of demographics of fishers who reported harvest data.

		NPS		Self-complete link		Significant difference
		Proportion	SE	Proportion	SE	
Gender	Male	71.1%	1.0%	69.9%	1.7%	0
	Female	28.9%	1.0%	30.1%	1.7%	0
Age group	15-19	5.4%	0.6%	4.6%	1.0%	0
	20-24	5.5%	0.6%	5.2%	1.1%	0
	25-34	16.2%	0.9%	15.7%	1.5%	0
	35-44	17.9%	0.8%	15.4%	1.2%	0
	45-54	23.2%	1.0%	24.2%	1.5%	0
	55-64	19.0%	0.9%	20.3%	1.4%	0
	65-74	10.6%	0.7%	12.8%	1.1%	0
	75+	2.3%	0.3%	1.8%	0.4%	0
Ethnicity	Māori	15.4%	0.9%	11.4%	1.3%	1
	Non-Māori	84.6%	0.9%	88.6%	1.3%	1
Avidity	B	36.0%	1.1%	38.1%	1.8%	0
	C	37.3%	1.1%	36.5%	1.7%	0
	D	26.7%	1.0%	25.3%	1.5%	0
Region	Auckland	30.2%	1.3%	33.4%	1.9%	0
	Bay of Plenty	8.9%	0.7%	9.3%	1.0%	0
	Canterbury	7.3%	0.6%	6.9%	0.8%	0
	Gisborne	1.3%	0.2%	1.2%	0.5%	0
	Hawke's Bay	3.8%	0.4%	4.1%	0.5%	0
	Manawatu-Wanganui	3.9%	0.5%	3.5%	0.6%	0
	Marlborough	2.2%	0.4%	1.7%	0.4%	0
	Nelson	2.0%	0.2%	2.1%	0.4%	0
	Northland	9.2%	0.6%	7.3%	1.0%	0
	Otago	4.0%	0.4%	3.4%	0.6%	0
	Southland	1.4%	0.2%	1.6%	0.5%	0
	Taranaki	3.2%	0.4%	2.2%	0.4%	0
	Tasman	2.4%	0.3%	2.1%	0.7%	0
	Waikato	12.1%	0.7%	13.0%	1.2%	0
	Wellington	7.6%	0.6%	7.5%	0.9%	0
	West Coast	0.6%	0.1%	0.6%	0.2%	0
Base number		**3 704**		**1 293**		

Additional tables describing the rates of participation in the ongoing self-completion year follow. It is important to note in Table 14 that the lack of response in each month is not attributable to the same fishers. The self-complete link mode shows variable compliance for any given fisher, i.e., a fisher may respond in one month but not in another. Only 1608 fishers, 40.8% of the sample, provided a response for each of the 12 months.

Table 14: Monthly participation (number of fishers) of self-complete link sample (n=3943).

Month/year	Replied yes – fished	Replied no – did not fish	No response
October 2018	453 11.5%	2 462 62.4%	1 028 26.1%
November 2018	308 7.8%	2 654 67.3%	981 24.9%
December 2018	561 14.2%	2 312 58.6%	1 070 27.1%
January 2019	535 13.6%	2 296 58.2%	1 112 28.2%
February 2019	322 8.2%	2 494 63.3%	1 127 28.6%
March 2019	349 8.9%	2 354 59.7%	1 240 31.4%
April 2019	395 10.0%	2 289 58.1%	1 259 31.9%
May 2019	194 4.9%	2 416 61.3%	1 333 33.8%
June 2019	155 3.9%	2 454 62.2%	1 334 33.8%
July 2019	97 2.5%	2 489 63.1%	1 357 34.4%
August 2019	111 2.8%	2 437 61.8%	1 395 35.4%
September 2019	164 4.2%	2 352 59.7%	1 427 36.2%

At the beginning of the study period, a substantial number of fishers were unwilling or unable to transition from the behaviours of the previous mode (Table 15). Reasons for this could include:

- Text replying yes rather than clicking through to the link and filling in the self-completion survey
- Being averse to reporting online, on their phone, or both
- Internet connectivity issues.

Fishers were more likely to exit the questionnaire early or not enter at all, instead texting yes and not replying as was encouraged in the NPS. This suggests the act of self-reporting itself is not onerous with respect to effort and questionnaire length.

Although compliance improved throughout the course of the study period, there was still a substantial number of fishers who claimed, by text reply, to have been fishing but did not self-complete a monthly questionnaire.

Table 15: Composition of response type for panel members who reported fishing in a given month.

Month	Positive respondents	Fished but no harvest data	Partial interview with harvest data	Complete interview
October 2018	453	132 29.1%	7 1.5%	314 69.3%
November 2018	308	91 29.5%	1 0.3%	216 68.1%
December 2018	561	135 24.1%	19 3.4%	407 72.5%
January 2019	535	102 19.1%	17 3.2%	416 77.8%
February 2019	322	62 19.3%	5 1.6%	255 79.2%
March 2019	349	51 14.6%	6 1.7%	292 83.7%
April 2019	395	55 13.9%	8 2.0%	332 84.1%
May 2019	194	19 9.8%	5 2.6%	170 87.6%
June 2019	155	12 7.7%	5 3.2%	138 89.0%
July 2019	97	8 8.2%	2 2.1%	87 89.7%
August 2019	111	20 18.0%	0	91 82.0%
September 2019	164	11 6.7%	12 7.3%	141 86.0%

In the summer months, which constitute the peak marine amateur fishing period, the self-complete link obtains a considerably lower proportion of interviews (Table 16). These participation rates best explain the disparities between the CATI harvest estimate and the lower self-complete link harvest estimate. The missing data of fishers who indicated they fished but did not contribute harvest data also contributes to the difference, but, even if compliance was total, it would result in a considerably lower rate of participation.

Table 16: Number of panel members who reported actively fishing in a calendar month by mode (% of starting sample).

Month	NPS CATI	Self-complete link	Subset of active self-complete fishers who reported harvest data
October	979 (14.0%)	453 (11.5%)	321 (8.1%)
November	1096 (15.7%)	308 (7.8%)	217 (5.5%)
December	1479 (21.2%)	561 (14.2%)	426 (10.8%)
January	1423 (20.4%)	535 (13.6%)	433 (11.0%)
February	868 (12.4%)	322 (8.2%)	260 (6.6%)
March	965 (13.8%)	349 (8.9%)	298 (7.6%)
April	761 (10.9%)	395 (10.0%)	340 (8.6%)
May	359 (5.1%)	194 (4.9%)	175 (4.4%)
June	377 (5.4%)	155 (3.9%)	143 (3.6%)
July	275 (3.9%)	97 (2.5%)	89 (2.3%)
August	341 (4.9%)	111 (2.8%)	91 (2.3%)
September	474 (6.8%)	164 (4.2%)	153 (3.9%)

9. DISCUSSION ON THE NPS VS. ONLINE FINDINGS

This trial showed the lower engagement of the sample with online self-reporting compared with the CATI methodology described by Wynne-Jones et al. (2019). When invited to roll-over from the CATI panel into the self-report online trial, 1222 of 5165 fishers (24%) opted out before the first questionnaire link was sent. When asked to report their fishing in the past calendar month, approximately one quarter to one third of those in the trial simply did not respond. Of those who had fished, an average of one quarter either did not answer the questionnaire at all or gave only partial information. Although it might be argued that fatigue or panel conditioning effects from the original NPS sample contributed to the level of depletion and non-compliance, it is also clear that there is no groundswell of preference for self-reporting via online questionnaire delivered by text.

Non-response in the above forms need not be fatal to the use of internet reporting provided that respondents and non-respondents don't differ on characteristics determining the values in the dependent variable. Encouragement for the online sample in this trial comes from comparing a range of fisher demographics and behaviours between the trial sample and the source NPS sample. In this respect the online sample was found to be composed of similar age groups, used fishing methods in similar proportions, visited FMAs to fish in similar proportions, and were only moderately different in the proportions of the main finfish species harvested and platforms fished from.

Harvest reporting, however, differed markedly between the NPS and self-complete samples viewed over the study period. Whereas 53.1% of the NPS sample reported harvest data over the previous season, only 32.8% of the ongoing sample did so. Furthermore, the NPS reported many more days fished than the ongoing trials. Ongoing reporters were weighted toward infrequent fishing, e.g., 1–5 days, and were under-represented in higher frequencies, such as 11 plus days over the summer.

These reporting step differences result in population estimates of the number of fish of the main species harvested by the online sample averaging only 68% of that of the equivalent NPS, a statistically significant difference. The three most caught species by recreational fishers show significant differences in harvest between the NPS CATI and self-complete link, i.e., snapper (62%), kahawai (64%), and blue cod (53%).

It seems fair to conclude that reporting having fished or not, and, more so, entering the detail of that fishing, is not elicited by the text/online self-complete regime to the level offered by the interviewer driven CATI approach. Notwithstanding the confounding factors arising from re-use of the NPS panel members, the self-complete does not attract comparable recording of the number of fish harvested, in spite of reasonably good alignment of fisher profiles and behaviours.

The question that may arise is whether the data can be statistically treated, e.g., by further calibration, to align harvest estimates more closely to the NPS. Calibration, however, is a process applied to the independent variables to align the samples. It is not meaningfully applied to the dependent variable, i.e., the number of fish reported as harvested by each fisher.

It may also be advantageous to reflect on the potential confounding effects of the re-use of participants who had already contributed over 12 months, and furthermore in a different model to that which they may have become attached. The test of a freshly recruited sample, adding also a stronger instalment step and some greater level of support to fishers reporting compliance, is suggested for any further research into methodology.

10. APP VS. ONLINE METHODOLOGY

A third phase, engaging the sample for a third year was then begun. This required randomly splitting the (remaining) sample from the self-complete phase into two, i.e., a test group who would be asked to report by means of an app and a control group who would simply continue with online (link) self-completion.

The objectives were to determine whether fishers would download the app and, if so, whether the harvest behaviour reported to the app would be comparable with that reported in the CATI and self-complete link modes. The two aspects of the app trial of interest, therefore, were firstly the level of adoption and secondly the character of the harvest reporting. The implementation of the first objective was completed in November 2019. The second objective concerning the use of apps emerged over the 12 months of November 2019 to October 2020. A more detailed account of the method and tables of the findings are provided below.

10.1 Sampling methodology

The panel members who remained in October 2019 were split into two separate, numerically equal groups. One would continue using the 2018/19 mode of reporting, whereby they would receive a monthly text containing a personalised link to the harvest questionnaire or the option to freetext "no" if they hadn't fished that month. This is the control group.

For the other group, there would be an attempt to convert as many fishers f as possible to install the app access to the harvest questionnaire and report all fishing or non-fishing activity by this mode throughout the 2019/20 season. This is the test group.

Any panel member who had not replied to the 2018/19 self-complete trial in any form over the year two 12-month study period was deemed ineligible and excluded from the 2019/20 sample, leaving 3143 panel members remaining. These remaining panel fishers were stratified by their stated avidity at the time of enrolment into the National Panel Survey. This is due to avidity being the factor most likely to determine the fishing levels of a panel member. Alternating Fisher Ids within each avidity level, which largely correspond with north to south geographic location at time of enrolment, were assigned to the two self-complete modes of reporting fishing activity, viz app or link.

During 2018/19, some panel members had requested to be primarily contacted by email rather than cellphone to self-complete or had only provided a landline and email address at the recruitment for the National Panel Survey. Any of these panel members who were placed in the app request group were swapped back into the link group and replaced by a panel member with a corresponding stated avidity and geographic area.

10.2 Recruitment methodology

The methods used to convert fishers onto the app were largely informed by the need to produce comparability with both a) the 2018/19 conversion from CATI interviewing to online self-completion, and b) the continuation of the online self-complete sample from the 2018/19 season into the 2019/20 season. The level of both adoption and rejection of the app amongst panel members is one of the key areas being assessed in terms of its viability as a mode to collect recreational harvest data. Comparing against both transitions allows for comparisons to be made not just between the different modes, but to account for year to year attrition. All contacts would again be made by text and would be sent on a similar schedule of a recruitment text explaining the new methodology followed by an initial text requesting monthly fishing activity, with reminders to non-responders.

Our first contact with panel members regarding the app was on October 28, 2019. In this text (Appendix 20.6), the app sample members were sent the recruitment text containing a brief explanation of the change of reporting mode, a link to an information page about how the app would be similar to their current self-completion by link, instructions on how to install it onto their device, and an option to opt out of the study for the 2019/20 season.

Similarly, the panel members who were to continue reporting by link were alerted to this on the same day and given the option to opt out of the study for the 2019/20 season. So as not to send a message that seemed as though its primary purpose was to allow fishers to leave the study, an option to change from receiving the link by text to email was included.

The primary purpose of contacting the link sample in this way was to act as a control so that a comparison could be made between the two groups that would show what proportion of the rejection of app invites, if any, could be attributed to the new and/or changing mode of reporting (by app) and how much could be attributed to attrition due to the study entering its third year, i.e., third request. This text was sent not so much as to offer panel members the email option, but to offer the link sample a comparable opt out. The level of opt out, or refusal rate, is one of the key indicators (see Figure 1) of how effective a data collection mode will be.

Conversely, the invite text to install the app consisted of the website address, the panel member's password, and a link to the information page. The password was used so that only the selected panel members could use the app and not share it with other fishers.

11. SAMPLING AND RECRUITMENT STRATEGY AND IMPLEMENTATION

11.1 Splitting the 2018/19 sample into two subsamples

At the end of the 2018/19 fishing season, 3143 fishers remained "empanelled". The term "empanelled" was kept as broad as possible to allow as many fishers as possible to be offered the new app mode of data collection. Therefore, any panel member who had responded in any month of the 2018/19 season and hadn't resigned was considered "empanelled".

This remaining sample was stratified by stated avidity and then alternated by fisher ID, which is determined by meshblock. Geography and avidity were the two factors most likely to create a bias in either data collection mode if either was over- or under-represented in a methodological trial for a national estimate of fishing activity. This allowed for two comparable subsamples, with potential bias minimised, to be offered the two different collection modes. In total, 1572 were offered to report fishing via the app mode and 1571 offered to continue reporting by texted link.

Refer to the schematic at the end of section 11.2 for a visual representation.

11.2 Recruitment strategies and rationale

On 26 October 2019, once data collection for September 2019, the final month of the fishing season, had been completed, both the link and the app subsamples outlined in the section above were contacted by text.

The app subsample members were told that, for the following season, monitoring of their fishing would continue, but they would only be able to report via an app. The text also included a link to an information page on the NRB website about the app, which detailed the similarity of the questions asked as well as new features to make the reporting process less burdensome, installation instructions (the "add to home screen" button on the home page), the end of text reply answering "no" for non-fishing months, and notice that all fishers who installed the app would go into a prize draw for a $200 MTA voucher. They were informed that their invites to use the app would be sent on November 1st.

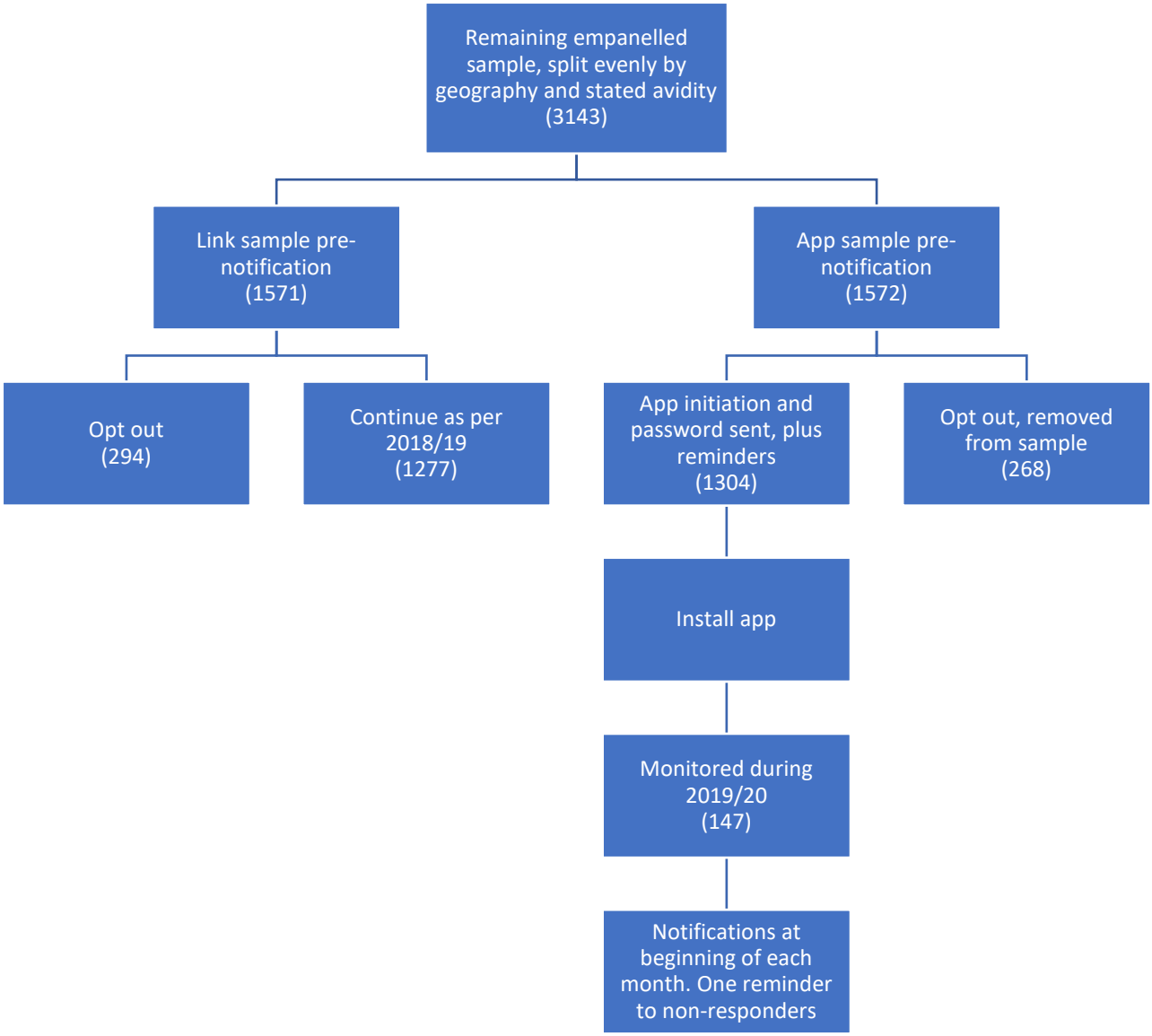
Both samples had their text message end with the offer to opt out of a third season of research by replying "stop" to the message.

At the end of October, all panel members from both subsamples were contacted in the way described above, a few days earlier. The link subsample members were sent a message with a link to report their fishing as they had done in the previous season. The app subsample members were sent a text with a link to the app and their individual invite token/password to allow them to access the app and report their fishing.

Reminders were sent out to both groups after 4 days to members of both samples that hadn't replied to the texts. Additionally, panel members who had reported their non-fishing by text and not installed the app onto their home screen were asked to do so and reminded that they would have to do so to report fishing in the future. A further reminder was sent to the app sample members who had not responded a further 4 days after this.

Due to continuing low response within the app subsample, those who hadn't either installed the app or interacted with the app at all were given the same text copy at the beginning of December when asked to report their November fishing, both in the initial text and reminder. Any fishers who installed the app at this point were included in the ongoing sample.

Schematic of 2019/20 sampling strategy



12. DEMOGRAPHIC COMPOSITION OF ACHIEVED SAMPLES

12.1 Seasonal and modal conversion rates

October is the first month of the new fishing season and therefore the first month when empanelled fishers were asked to report their fishing activity with a new data collection mode.

Figure 1 shows continuation of the online link mode had significantly higher uptake compared to the offer of the app, which suggests that the app does not have wide appeal as a mode for reporting amongst empanelled fishers. The offer of the app also induced a higher resignation rate than either the conversion to, or extension of, the online link mode.

Resignations represent a significantly lower percentage of responses compared to the change of modes required to report fishing between 2017/18 to 2018/19 (CATI to online link) and 2018/19 to 2019/20 (online link to app). This suggests that an empanelled sample could provide a second year of usable data if reporting doesn't require a change of behaviour through a new mode in the second fishing season.

Although resignations represent only a slightly higher percentage of responses when compared to the shift of modes between 2017/18 and 2018/19, no response comprises the plurality of responses. This suggests a 'soft' refusal, with fishers knowing that simply not interacting with the app allows them to exit from the panel. Similarly, fishers should not be expected to install the app themselves. It is likely fishers see the installation process as a burden, or possibly intrusive.

Note that October responses for the app include installations of the app where the fisher did not enter monthly fishing data, as well as fishers who installed the app on their device. All these fishers were re-contacted about November fishing and relevant fishers were reminded to install the app. The final achieved subsample contains only those fishers who did install the app on their device. In total, 147 fishers (49.7% of interactions, and 9.4% of fishers who were invited to install the app) chose to install the app on their device, so it is these fishers who are considered the app subsample. Fishers who interacted with the app but chose not to install it on their devices are not considered to be part of the app sample.

For the link subsample, all fishers who did not resign are included in the achieved subsample.

12.2 Enrolment findings

These findings address the objective of whether recreational marine fishers adopt the app when actively offered it. Subsequent findings will report whether they persevere with it, and whether their harvest reporting shows consistency and content comparable to link self-completion or indeed CATI interviewed data.

Findings for the uptake of the app as a means of (continuing) self-reporting marine fishing are shown in Table 17. The transition from a text-link took place in October 2019, the beginning of the summer being taken here as the start of the seasonal summer fishing season. The first row of Table 17 shows that three times as many of the fisher panel (61.7%) engaged with the text-link as with the app (18.8%). Those offered the app were more likely to not respond at all (49.2%) or to resign from the panel (31.7%).

Given the rapid pace of app adoption as an intermediate platform for a wide range of commercial services, it was argued by some that an app might also be an effective way for marine fishers to provide their harvest data into a research database. The results of this controlled experiment give no encouragement to that view.

Clearly there is no latent preference or appeal attached to app use that marine fishery research could expect to capitalise on in its search for more economical ways to gather amateur's harvest data.

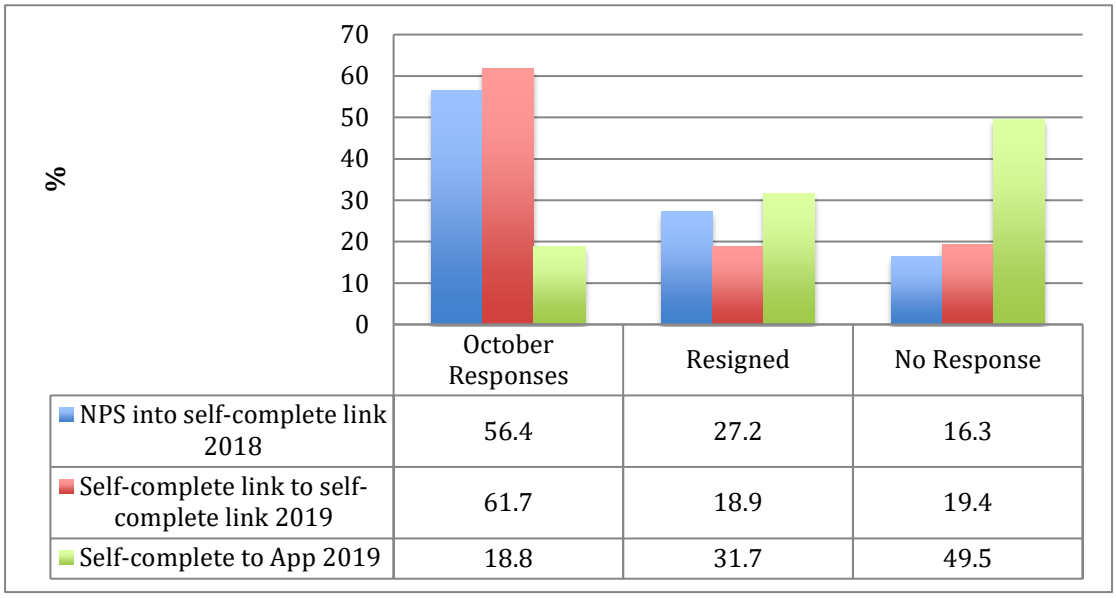


Figure 1: October response outcomes (%).

Table 17: October response outcomes.

	NPS into self-complete link 2018	Self-complete link to self-complete link 2019	Self-complete to App 2019
October responses	2 915	970	*296
Resigned	1 407	297	498
No response	843	304	778
Initial sample	5 165	1 571	1 572

* Includes responses that did not install the app on the home screen of their device.

Table 18 compares the avidity, age, and area of residence of the fishers remaining in the experiment for 2019/20 monitoring of self-completion by these two methods. The differences in the profile between the control and test samples are relatively small. This suggests that rejection vs. acceptance of the app is not driven directly by fishing related factors like avidity or age or area of fishing, but rather by an aversion to app use itself.

Table 18: Comparing demographic profile of samples (unweighted).

		NPS CATI (n=6 977)	2019/20 Self complete link subsample (n=1 277)	2019/20 App installation subsample (n=147)
Avidity	B	3 497 (50.1%)	592 (46.4%)	59 (40.1%)
	C	2 197 (31.5%)	433 (33.9%)	57 (38.8%)
	D	1 283 (18.4%)	252 (19.7%)	31 (21.1%)
Gender	Male	5 100 (73.1%)	986 (77.2%)	110 (74.8%)
	Female	1 897 (26.9%)	291 (22.8%)	37 (25.2%)
Ethnicity	Māori	1 136 (16.3%)	175 (13.7%)	13 (8.8%)
	Non-Māori	5 841 (83.7%)	1102 (86.3%)	134 (91.2%)
Age group (y)	15–24	688 (9.8%)	84 (6.6%)	4 (2.7%)
	25–34	1 201 (17.2%)	167 (13.1%)	20 (13.6%)
	35–44	1 358 (19.5%)	249 (19.5%)	29 (19.7%)
	45–54	1 388 (19.9%)	304 (23.8%)	36 (24.5%)
	55–64	1 257 (18.0%)	283 (22.2%)	39 (26.5%)
	65–74	831 (11.9%)	157 (12.3%)	16 (10.9%)
	75+	240 (3.4%)	31 (2.4%)	3 (2.0%)
	Not stated	16 (0.2%)	2 (0.2%)	0
Area of residence	Northland	427 (5.8%)	80 (6.3%)	4 (2.7%)
	Auckland	2019 (28.9%)	365 (28.6%)	43 (29.3%)
	Waikato	723 (10.3%)	124 (9.7%)	15 (10.2%)
	BOP	737 (10.6%)	133 (10.4%)	18 (12.2%)
	Gisborne	100 (1.4%)	18 (1.4%)	3 (2.0%)
	Hawke's Bay	336 (5.1%)	63 (4.9%)	7 (4.8%)
	Taranaki	228 (3.3%)	43 (3.4%)	4 (2.7%)
	Manawatu/Whanganui	283 (3.7%)	47 (3.7%)	7 (4.8%)
	Wellington	582 (8.3%)	116 (9.1%)	8 (5.4%)
	Tasman	491 (7.0%)	78 (6.1%)	12 (8.2%)
	West Coast	80 (1.1%)	17 (1.3%)	4 (2.7%)
	Canterbury	577 (8.3%)	119 (9.3%)	14 (9.5%)
	Otago	269 (3.9%)	52 (4.1%)	5 (3.4%)
	Southland	127 (1.8%)	22 (1.7%)	3 (2.0%)

12.3 Demographics of final achieved sample

As mentioned earlier in this report, though the app asks participants for their demographic details when they record their monthly fishing on the first occasion, the demographics listed below for that mode are those given when they were screened and recruited for the NPS in 2017, because this allows for a direct comparison to both the initial NPS sample and the online link subsample, who are not given the opportunity to update their demographic details in their assigned data collection mode.

The link and app subsamples have relatively similar demographic make-up, both when compared to each other, as well as when compared back to the original NPS sample. The app was taken up at low levels across all demographics.

The most notable differences are amongst fishers aged 15–24 and Māori. The profile of the sample who installed the app inclines towards a higher level of avidity. It is not clear whether this is the result of introducing new modes of data collection or the extension of their participation beyond the 12-month period requested at the time of screening and enrolment for the NPS.

13. FINDINGS FOR NPS-ONLINE-APP HARVEST ESTIMATES, AFTER ADJUSTING FOR COVID-19 INTERRUPTION

The 2019/20 season was the second in the assessment of the likely acceptability of two self-complete survey modes for the purpose of estimates of recreational harvest of marine species. This second season involved the splitting of the originally recruited door to door sample, such as remained, into matched halves so that an online self-complete mode could be compared with an app mode across the same season, in their ability to match the benchmark CATI data collection mode.

Interrupting this plan was the arrival of the Covid-19 pandemic. New Zealand responded by instituting a public health protection scheme aimed to minimise and, if possible, eliminate the spread of the virus. Specifically, various alert levels with corresponding restrictions on public gatherings, movements, and activities were defined. Recreational fishing, in so far as it is a non-essential activity requiring travel of a related nature, was prohibited at level 4 restrictions. The likelihood of the fisher's mindset and behaviour towards both self-reporting and the recreation itself being influenced, even after progressive lowering of the alert levels, cannot be discounted.

In the following sections, the 2019/20 season will be reported by two different periods: all months uninterrupted by Covid-19, October to February, and the entire season with 2017/18 adjusted to account for the Covid-19 interruptions in 2019/20. The former is considered a truer and more accurate comparison, and fortunately coincides with the peak season for amateur fishers. The months of March onwards are still included for the sake of completeness.

The strategy for estimation and observations on the character of the harvest has been repeated to exclude the dates under which New Zealand was placed under level 4 restrictions. Therefore, this provides:

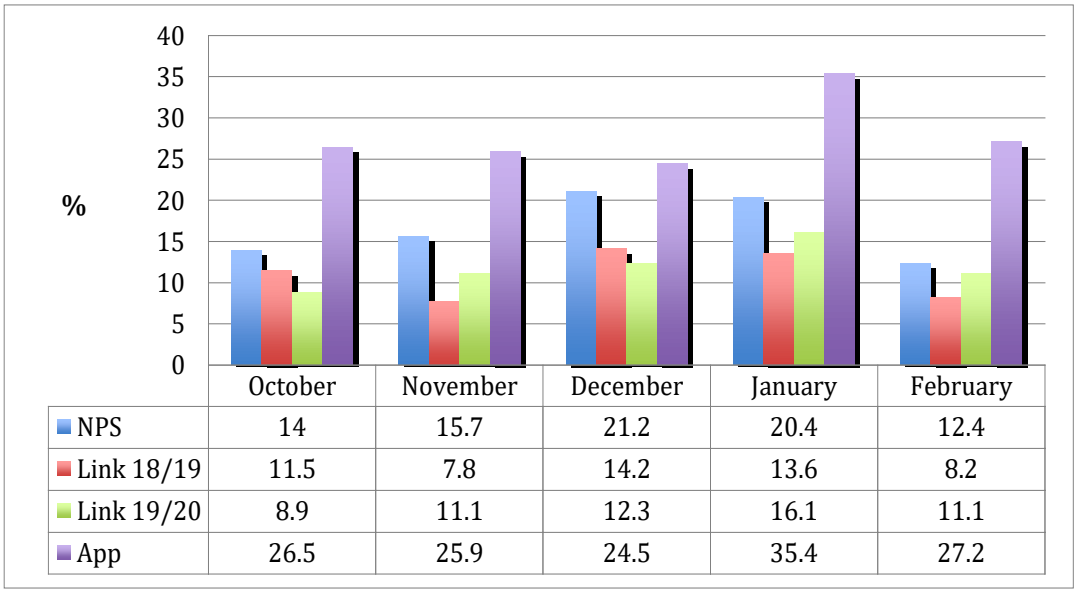
- Estimates and behaviours up to February 2020, where all reported data occur before the severity of Covid-19 is apparent and corresponding prevention methods are introduced.
- Estimates and behaviours for the whole 2019/20 season, with the caveat that no recreational fishing at all was to occur during the level 4 restrictions. Since the trial of the two self-complete modes involved a comparison with the NPS, the corresponding dates in which New Zealand was at level 4 were removed from the NPS data set when comparisons were made.
- Because of level 4 restrictions taking up the majority of April 2020, it was not surveyed as a calendar month. Instead, the May 2020 questionnaire by self-complete link asked about the period of fishing since level 4 ended. This was done with the agreement of the client.
- At level 3, New Zealanders were again able to fish recreationally in marine areas, but with restrictions around related activities such as boating. Such fishing as was done at level 3 was

included. The lesser effects of level 3 restrictions were not taken into account in the estimates. For most of August, Auckland was placed under localised level 3 restrictions, which further complicates the Covid-19 overlap.

- Note that the base numbers for the NPS will differ from those given previously because fishing from corresponding Covid-19 level 4 dates have been excluded from the data for comparison purposes.

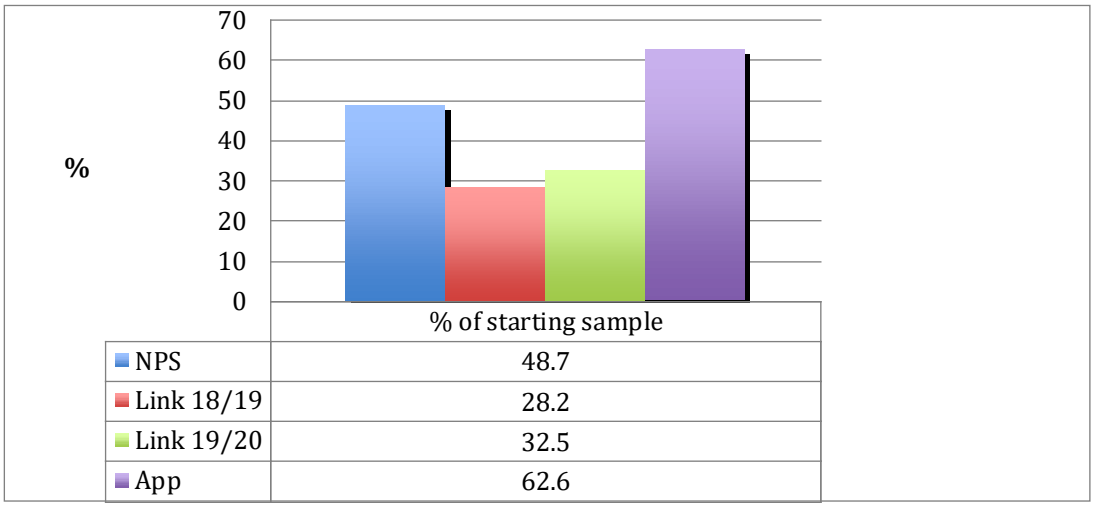
14. COMPARISON OF EXTENT AND QUALITY OF PARTICIPATION/RESPONSE OCTOBER19–FEBRUARY 20

Although the app produces a smaller empanelled subsample than the link, the fishers who participate are more likely to fish in any given month (Figure 2) and across any of the peak summer six months (Figure 3), than in the NPS or the online link. The online link measured lower fishing incidence than the NPS over two consecutive seasons.



	October	November	December	January	February
NPS	14	15.7	21.2	20.4	12.4
Link 18/19	11.5	7.8	14.2	13.6	8.2
Link 19/20	8.9	11.1	12.3	16.1	11.1
App	26.5	25.9	24.5	35.4	27.2

Figure 2: Fishers who reported fishing activity by calendar month (includes partials with and without harvest data).



	% of starting sample
NPS	48.7
Link 18/19	28.2
Link 19/20	32.5
App	62.6

Figure 3: Fishers who contributed harvest data October-February.

The link has produced a smaller percentage of fishers reporting than the NPS, as was also the case in 2018/19. This is likely to be a result of a broadly inclusive sample using a self-complete mode of response which produced a high but consistent proportion of non-response data, shown in Table 19 for the 2019/20 season. This consistent level of non-response data suggests that the incidence of fishing in any given month is being under-reported.

Although similar to the link, the app sample also produced a high percentage of non-response, it notably produced a smaller incidence of reporting non-fishing compared with both the NPS and the link (Table 20). This suggests that fishers see the app as a way of reporting active fishing only, rather than non-fishing, and that texting "no" is a preferred mode of reporting non-fishing. The result is fishing and non-fishing incidence raw data that look significantly different to those in the NPS and may not be as valid when weighted to produce harvest estimates.

Non-response data show a steady rise across the season as a monthly response from fishers, as opposed to the consistent levels that are evident in the responses to the link. This shows that the app feature to enable back fill of previously non answered months is not being used as a back-filling opportunity as often as allowed.

Table 19: Number and percentage who participated by month (link mode sample N=1277).

Month	Replied yes – fished	Replied no – did not fish	No response/ resigned
October 2019	114 8.9%	859 67.3%	304 23.8%
November 2019	142 11.1%	840 65.8%	295 23.1%
December 2019	157 12.3%	783 61.3%	337 26.4%
January 2020	206 16.1%	714 55.9%	357 28.0%
February 2020	142 11.1%	777 60.8%	358 28.0%

Table 20: Number and percentage who participated by month (installed app mode sample N=147).

Month	Replied yes – fished	Replied no – did not fish	No response/ resigned
October 2019	39 26.5%	94 63.9%	14 9.5%
November 2019	40 27.2%	78 52.3%	29 19.7%
December 2019	36 24.5%	56 38.1%	55 37.4%
January 2020	52 35.4%	53 36.1%	42 28.6%
February 2020	40 27.2%	61 41.5%	46 31.3%

The app produced a much lower amount of partial harvest records amongst monthly data, almost eliminating it as an operational issue (Table 21). It is highly likely that this is due to its ability to operate while being offline, whereas the online link is only functional when the device the fisher is answering is connected to the internet. The app also allows method, platform, and area data to be carried from one species to the next in a single question, reducing the burden on the fisher in the app version of the 2019/20 harvest interview.

However, partial harvest records are less common than in the same time period during the 2018/19 season. This suggests that converting the sample (remotely) from the mode they were enrolled in to a new mode created a period where data were impacted. Conversely, extending a study with the same data collection mode resulted in more complete data. This should be taken into account in any future extensions of a study period. If population-based harvest estimates are conducted by an online self-complete mode in the future, it would be prudent to incorporate a recovery phase to clean and complete partial raw data in concurrence with primary data collection. CATI would be a logical choice if the primary means of contact was through text and, therefore, a mobile device.

Table 21: Partial responses as % of total fishing responses across alternative modes.

Month	2018/19 Link	2019/20 Link	Installed App
October	30.7	7.9	0
November	31.9	10.6	2.5
December	27.5	10.2	0
January	22.2	19.4	0
February	20.8	9.2	0
Total	**26.2**	**12.2**	**0.5**

15. COMPARISON OF FISHING CHARACTERISTICS IN APP VS. ONLINE TRIAL OCTOBER 2019–FEBRUARY 2020

Table 22 shows that the different types of data collection modes do not create a significant difference in species as a proportion of the national catch estimates.

Table 22: Species as proportion of 12-month harvest estimate.

	NPS CATI 2017/18		App 2019/20		Sig diff NPS vs. phone app	Self-complete link 2019/20		Sig diff NPS vs. weblink
	Number of fish	SE	Number of fish	SE		Number of fish	SE	
Snapper	48.1%	1.7%	48.8%	10.3%	0	45.6%	6.5%	0
Kahawai	13.0%	0.6%	17.5%	7.1%	0	10.6%	1.5%	0
Blue Cod	9.0%	0.9%	9.1%	4.8%	0	6.8%	1.5%	0
Red Gurnard	5.9%	0.5%	3.0%	1.0%	0	4.9%	1.1%	0
Tarakihi	4.6%	0.5%	4.2%	2.5%	0	3.2%	0.9%	0
Trevally	1.9%	0.2%	3.5%	1.5%	0	2.8%	0.7%	0
Kingfish	1.4%	0.2%	0.9%	0.4%	0	1.5%	0.5%	0
Skipjack Tuna	0.4%	0.1%	0.0%	0.2%	0	0.3%	0.2%	0
Hāpuku or Bass	0.6%	0.1%	0.0%	–	–	0.4%	0.1%	0
Albacore Tuna	0.2%	0.1%	0.7%	0.6%	0	0.9%	0.5%	0
Bluenose	0.1%	0.0%	0.0%	–	–	0.1%	0.1%	0
Sea perch	2.2%	0.8%	0.1%	0.1%	0	1.8%	0.9%	0
Red Cod	0.5%	0.1%	0.0%	–	–	0.3%	0.1%	0
John Dory	0.3%	0.1%	0.1%	0.1%	0	0.9%	0.9%	0
Flounder, Sole, or other flatfish	1.3%	0.2%	0.6%	0.4%	0	0.7%	0.5%	0
Rest of Finfish	10.6%	1.0%	11.5%	5.9%	0	19.2%	9.7%	0
Base number*	**2 828**		**83**			**361**		

* Number of fishing trips with catch reported.

Table 23 shows that the different types of data collection modes only produced significance in the incidence of longline fishing between the CATI of the NPS and the app. However, the proportion of fishing methods reported are for the most part comparable between the three data collection modes.

Table 23: Comparison of methods mostly used to fish (multiple response, weighted).

	NPS CATI 2017/18		App 2019/20			Self-complete link 2019/20		
Method	Proportion	SE	Proportion	SE	Sig diff NPS vs. phone app	Proportion	SE	Sig diff NPS vs. weblink
Rod or line (not longline)	85.0%	0.9%	87.8%	4.9%	0	82.5%	2.5%	0
Longline including set line, kontiki, or kite	9.4%	0.8%	2.4%	1.6%	1	6.9%	1.4%	0
Net (not including landing net used if caught by line)	4.5%	0.5%	5.0%	3.3%	0	2.3%	0.9%	0
Pot (e.g., for crayfish)	3.1%	0.4%	8.7%	4.4%	0	3.8%	1.2%	0
Dredge, grapple, or rake	0.6%	0.2%	0.3%	0.3%	0	3.8%	1.8%	0
Hand gather or floundering from shore	8.2%	0.7%	15.3%	5.6%	0	11.7%	1.9%	0
Hand gather by diving	13.6%	0.9%	10.9%	4.4%	0	16.3%	2.4%	0
Spearfishing	3.6%	0.5%	7.2%	3.7%	0	4.1%	1.4%	0
Some other method	0.0%	0.0%	4.3%	3.8%	–	0.0%	–	–
Base number*	**2 828**		**83**			**361**		

Table 24 shows that the different types of data collection modes only produced significant difference between the incidence of larger motor boat or launch fishing between the CATI of the NPS and the app. However, the proportion of fishing platforms reported are for the most part proportionally comparable between the three data collection modes.

Table 24: Comparison of platforms mostly used to fish (multiple response, weighted).

	NPS 2017/18		App 2019/20			Self-complete link 2019/20		
Platform	Proportion	SE	Proportion	SE	Sig diff NPS v phone app	Proportion	SE	Sig diff NPS v weblink
Trailer motor boat	59.8%	1.3%	59.2%	7.9%	0	57.2%	3.1%	0
Larger motor boat or launch	21.5%	1.0%	16.2%	5.6%	0	13.5%	2.0%	1
Trailer yacht	0.3%	0.1%	0.0%	–	–	0.8%	0.6%	0
Larger yacht or keeler	1.2%	0.3%	0.9%	1.0%	0	3.0%	1.1%	0
Kayak, canoe, or rowboat	5.7%	0.5%	14.7%	6.0%	1	3.4%	1.1%	0
Off land, including beach, rocks, or jetty	40.2%	1.3%	24.2%	6.2%	1	34.0%	3.0%	0
Something else	1.3%	0.3%	3.4%	2.5%	0	1.4%	0.9%	0
Base number*	**2 828**		**83**			**361**		

* Number of fishing trips with catch reported

Table 25 shows that the different types of data collection modes did not create a significant difference for FMAs fished as a proportion of the national catch estimates.

Table 25: Comparison of the FMAs which were fished in (multiple response, weighted).

	NPS CATI 2017/18		App 2019/20			Self-complete link 2019/20		
Area	Proportion	SE	Proportion	SE	Sig diff NPS v phone app	Proportion	SE	Sig diff NPS v weblink
FMA 1	57.2%	1.4%	67.3%	6.6%	0	54.7%	3.1%	0
FMA 2	11.6%	0.8%	12.0%	4.5%	0	12.5%	1.8%	0
FMA 3	7.4%	0.7%	6.8%	4.1%	0	9.3%	1.9%	0
FMA 5	2.5%	0.4%	1.4%	1.5%	0	3.4%	1.1%	0
FMA 7	11.0%	0.7%	6.7%	2.8%	0	10.8%	2.2%	0
FMA 8	8.2%	0.7%	8.4%	4.1%	0	6.0%	1.2%	0
FMA 9	13.4%	1.1%	12.6%	4.7%	0	12.2%	2.4%	0
Base number*	**2 828**		**83**			**361**		

* Number of fishing trips with catch reported

Although Table 26 does not indicate a significant difference between the total numbers of finfish caught between October 2019 and February 2020, the app produced a larger amount of participants who reported larger total catches than the CATI and particularly the link. This suggests that the app has a sample bias towards more avid fishers.

Table 26: Comparison of number of finfish harvested per fisher who did fish and did report catch October 2019–February 2020.

	NPS CATI 2017/18		App 2019/20		Sig diff NPS v phone app	Self-complete link 2019/20		Sig diff NPS v weblink
Number finfish	Pro-portion	SE	Pro-portion	SE		Pro-portion	SE	
[0–0.3)	20.1%	1.0%	16.9%	4.9%	0	17.6%	2.2%	0
[0.3–1)	0.4%	0.1%	0.0%	–	–	0.0%	0.0%	1
[1–2)	8.8%	0.7%	9.8%	5.8%	0	6.1%	1.4%	0
[2–3)	7.1%	0.5%	3.5%	2.7%	0	10.2%	1.9%	0
[3–4)	5.1%	0.5%	1.1%	1.1%	1	6.7%	1.4%	0
[4–5)	5.7%	0.5%	3.2%	1.5%	0	7.1%	1.8%	0
[5–6)	4.5%	0.4%	3.6%	1.7%	0	6.3%	1.7%	0
[6–7)	4.0%	0.5%	5.9%	2.8%	0	3.8%	1.1%	0
[7–8)	4.0%	0.4%	4.8%	2.9%	0	3.9%	1.1%	0
[8–9)	2.3%	0.3%	5.0%	2.0%	0	3.2%	1.0%	0
[9–10)	2.4%	0.3%	3.7%	3.5%	0	3.3%	1.1%	0
[10–11)	1.9%	0.2%	1.4%	0.9%	0	2.9%	1.1%	0
[11–12)	2.2%	0.4%	1.6%	1.6%	0	2.9%	1.0%	0
[12–13)	2.6%	0.4%	2.6%	2.3%	0	2.6%	1.0%	0
[13–14)	1.8%	0.3%	2.7%	1.7%	0	2.1%	0.6%	0
[14–15)	1.8%	0.3%	0.0%	0.0%	1	0.8%	0.4%	0
[15–16)	1.1%	0.2%	6.1%	6.1%	0	0.9%	0.5%	0
[16–17)	1.1%	0.2%	0.7%	0.7%	0	1.0%	0.6%	0
[17–18)	1.0%	0.2%	0.0%	–	–	0.9%	0.5%	0
[18–19)	1.2%	0.2%	1.0%	1.0%	0	2.4%	0.9%	0
[19–20)	1.2%	0.2%	3.2%	2.5%	0	0.9%	0.4%	0
[20–40)	13.0%	0.7%	12.0%	4.4%	0	10.3%	1.7%	0
[40–100)	5.4%	0.5%	9.8%	4.0%	0	3.2%	0.9%	0
[100–200)	1.0%	0.2%	1.1%	0.7%	0	0.1%	0.1%	1
> 200	0.2%	0.1%	0.0%	–	–	0.9%	0.6%	0
Base number	**3 222**		**92**			**398**		

The most significant difference in Table 27 is the relative frequency of fishers who only fished one day between October 2019 and February 2020 in the app data when compared with both the CATI and link modes. Similar to Table 26, this suggests a sample bias amongst the participants who agreed to report by app.

Table 27: Comparison of number of days fished per fisher October 2019 – February 2020.

	NPS CATI 2017/18		App 2019/20		Sig diff	Self-complete link 2019/20		Sig diff
Days fished	Pro-portion	SE	Pro-portion	SE	NPS v phone app	Pro-portion	SE	NPS v weblink
1	28.4%	1.1%	9.6%	3.0%	1	29.6%	2.7%	0
2	17.1%	0.8%	22.9%	5.7%	0	17.9%	2.2%	0
3	12.0%	0.7%	11.6%	3.4%	0	14.2%	2.3%	0
4	7.9%	0.6%	14.3%	5.2%	0	11.6%	2.1%	0
5	6.1%	0.5%	15.0%	7.5%	0	8.8%	1.8%	0
6	4.7%	0.5%	5.4%	3.2%	0	5.6%	1.3%	0
7	3.1%	0.3%	6.1%	4.3%	0	2.2%	0.8%	0
8	3.4%	0.4%	0.5%	0.5%	1	1.1%	0.5%	1
9-	2.7%	0.4%	0.0%	-	-	0.9%	0.5%	1
10	2.2%	0.3%	2.1%	2.1%	0	1.7%	0.7%	0
11	1.8%	0.3%	1.8%	1.4%	0	0.0%	-	-
12	1.8%	0.3%	2.2%	1.6%	0	0.6%	0.5%	0
13	0.7%	0.2%	2.2%	1.4%	0	0.9%	0.4%	0
14	0.9%	0.2%	2.0%	2.0%	0	2.1%	1.0%	0
15-20	3.2%	0.4%	3.7%	2.9%	0	1.4%	0.6%	0
21-40	3.4%	0.4%	0.5%	0.3%	1	1.5%	0.7%	0
> 40	0.5%	0.1%	0.4%	0.4%	0	0.0%	0.0%	1
Base number	**3 222**		**92**			**398**		

Table 28 shows that the demographics of the samples across the three data collection modes are broadly comparable in their proportionality.

Table 28: Comparison of demographic profile of fishers responding with harvest data (unweighted).

		NPS CATI 2017/18		App 2019/20		Sig diff NPS v phone app	Self-complete link 2019/20		Sig diff NPS v weblink
		Pro-portion	SE	Pro-portion	SE		Pro-portion	SE	
Avidity	B	32.9%	1.1%	41.4%	7.5%	0	32.3%	2.8%	0
	C	38.1%	1.1%	35.3%	6.4%	0	41.4%	2.9%	0
	D	29.0%	1.1%	23.3%	5.6%	0	26.2%	2.5%	0
Gender	Male	72.0%	1.1%	69.1%	7.9%	0	77.5%	2.6%	0
	Female	28.0%	1.1%	30.9%	7.9%	0	22.5%	2.6%	0
Ethnicity	Māori	15.8%	0.9%	8.4%	4.6%	0	9.2%	1.6%	1
	Non-Māori	84.2%	0.9%	91.6%	4.6%	0	90.8%	1.6%	1
Age group	15–19	5.2%	0.6%	6.3%	4.6%	0	1.2%	0.9%	1
	20–24	5.1%	0.6%	6.1%	6.1%	0	1.9%	0.9%	1
	25–34	16.5%	1.0%	20.7%	6.5%	0	12.9%	2.3%	0
	35–44	18.5%	0.9%	13.5%	4.7%	0	15.5%	2.0%	0
	45–54	23.4%	1.1%	20.0%	4.8%	0	29.0%	2.9%	0
	55–64	18.8%	1.0%	18.8%	4.7%	0	24.1%	2.4%	0
	65–74	10.3%	0.7%	14.0%	4.6%	0	14.6%	1.9%	0
	75+	2.2%	0.3%	0.7%	0.5%	0	0.8%	0.3%	1
Area of residence	Northland	9.0%	0.7%	3.2%	1.7%	1	7.5%	1.7%	0
	Auckland	29.7%	1.4%	32.9%	6.9%	0	32.3%	3.0%	0
	Waikato	12.0%	0.7%	19.8%	5.8%	0	10.3%	1.7%	0
	BOP	8.8%	0.7%	12.8%	5.1%	0	9.3%	1.6%	0
	Gisborne	1.3%	0.2%	1.0%	0.8%	0	1.9%	0.7%	0
	Hawke's Bay	4.0%	0.5%	3.3%	2.2%	0	4.4%	1.0%	0
	Taranaki	3.2%	0.4%	0.8%	0.5%	1	3.5%	0.9%	0
	Manawatu/ Whanganui	4.1%	0.5%	4.0%	2.6%	0	2.8%	0.7%	0
	Wellington	7.8%	0.6%	6.1%	3.6%	0	6.8%	1.3%	0
	Tasman	2.5%	0.4%	2.5%	1.8%	0	4.1%	0.9%	0
	West Coast	0.6%	0.1%	0.4%	0.3%	0	1.0%	0.5%	0
	Canterbury	7.3%	0.7%	4.4%	2.4%	0	7.4%	1.5%	0
	Otago	3.9%	0.5%	4.4%	3.6%	0	3.0%	1.0%	0
	Southland	1.3%	0.2%	1.3%	1.4%	0	1.8%	0.7%	0
Base number		**3 222**		**92**			**398**		

16. COMPARISON OF HARVEST ESTIMATES FOR NPS, ONLINE, AND APP

Weighting for estimates was applied to the 2017/18 NPS recruitment data for consistency because, although the app produced new demographics, the link did not.

Non-finfish species have not been measured due to small base numbers.

The online link harvest estimates of the most commonly landed finfish species were significantly different to the estimates from the CATI data collection mode of the NPS (Table 29).

Table 29: NPS estimates vs. online link estimates.

	NPS CATI			Self-complete link				
	Number of fish	SE	CV	Number of fish	SE	CV	Link / NPS	Significant difference NPS vs. weblink
Snapper	2 072 786	128 886	0.06	1 162 133	164 637	0.14	56.1	1
Kahawai	561 087	29 739	0.05	269 150	37 454	0.14	48.0	1
Blue Cod	386 710	39 745	0.10	173 121	39 076	0.23	44.8	1
Red Gurnard	252 701	26 676	0.11	125 829	29 036	0.23	49.8	1
Tarakihi	197 630	25 182	0.13	81 997	22 017	0.27	41.5	1
Trevally	82 096	7 121	0.09	71 175	18 936	0.27	86.7	1
Kingfish	60 940	7 745	0.13	37 425	11 731	0.31	61.4	1
Other finfish	698 679	112 543		628 894			90.0	
Total	**4 312 627**			**2 549 723**			**59.1**	

Although the app versus NPS estimates showed significant difference for snapper only, this is due to small base numbers of both the app subsample and the other species landed (Table 30). The more instructive figures are those in the App/NPS column. The app overestimated the marine amateur fishing harvest between October and February by a factor close to 2. The harvest estimate of the app as a proportion of the CATI estimate is a better indicative comparison than significant difference. This is due to the small sample size of app fishers and high levels of uncertainty.

Table 30: NPS estimates vs. installed app estimates.

	NPS CATI			App				Significant difference
	Number of fish	SE	CV	Number of fish	SE	CV	App/ NPS	NPS v phone app
Snapper	2 072 786	128 886	0.06	4 005 625	846 391	0.21	193.2	1
Kahawai	561 087	29 739	0.05	1 436 647	580 625	0.40	256.0	0
Blue Cod	386 710	39 745	0.10	749 847	393 953	0.53	193.9	0
Red Gurnard	252 701	26 676	0.11	249 803	80 207	0.32	98.9	0
Tarakihi	197 630	25 182	0.13	342 509	205 663	0.60	173.3	0
Trevally	82 096	7 121	0.09	284 337	121 400	0.43	346.3	0
Kingfish	60 940	7 745	0.13	70 746	34 995	0.49	116.1	0
Other Finfish	698 679	112 543		1 071 774			153.4	
Total	**4 312 627**			**8 211 287**			**190.4**	

17. DISCUSSION OF NPS VS. LINK VS APP

Neither the self-complete link nor the app have produced harvest estimates comparable to the NPS. Although seasonal factors may account for some of this difference, there are systematic issues with the two modes that result in these discrepancies. The online link under-projects whereas the app over-projects for reasons outlined below.

The online link has empanelled a sample that is comparable in demographic composition with the NPS sample. The characteristics of the fishing behaviour when reported are also comparable with the NPS data. This points to the frequency and comprehensiveness of response and responding as the principal reason for the difference in harvest estimates. However, the online link is capable of repair of these shortcomings. Although online self-completion can gather the majority of fishing data, it will not be able to capture all of it. The reporting lapses that occur can be remedied by a smaller CATI effort than was needed for the NPS, addressing shortfall in response concurrently with a primarily self-complete mode of data collection.

It is possible that by allowing fishers in the previous season to un-enrol rather than actively re-enrol, the sample for the link is in fact smaller than the stated n=1277. Fishers who are not answering could in this way be seen as refusals for participating in an additional season, instead of non-responding panellists. However, even if this is so, it would not have the effect of depressing the estimates of the online link mode's collected data due to the weighting methodology used to prepare estimates. This would not however account for the difference between the two modes, although it may reduce the severity of that difference.

An option for correcting discrepancies in the online link data arising from high levels of non-response is to use a weighting method for estimates that takes into account the higher level of non-response inherent in self response modes when compared with CATI. This however would be a suboptimal solution. It would necessitate the new approach being applied to previous raw NPS data for consistency, instead of continuing with a methodology that has produced two sets of comparatively accurate estimates. Instead, it is best to acknowledge that self-complete data in isolation will not be complete enough to function as the base for harvest estimates in the proven methodology of the NPS.

The online link has produced a similar proportion of total harvest between the two summer seasons that have been trialled, 64% of the NPS in 2018/19 and 59% in 2019/20.

Conversely, the app produces implausibly high harvest estimates when compared with the NPS. Like the link, monthly responses show fishing behaviours that are broadly in line with the other modes. The principal reason for the over-projection of the harvest estimates is the much higher incidence of fishing reported by panel members using the app. This strongly suggests that the installed app sample is not representative of New Zealand's marine recreational fishing population. It is likely that the process of installing the app creates a bias towards fishers who are more likely to fish. It has the unintended effect of screening out more casual fishers. As previously illustrated earlier in the report, it also has a low rate of installation amongst fishers who were requested to do so. In combination, the greater appeal to frequent fishers and perceived unsuitability to less frequent fishers results in the self-enrolment of an small, unrepresentatively active sample of fishers that cannot be used as the base for national harvest estimates.

The app mode does have a beneficial quality that could be utilised in any future self-complete data collection, which is its offline capability. Having the ability to collect data offline and carry over data from previous questions within an individual response leads to the near total elimination of partial responses. The offline capabilities are useful in this sense, but the associated installation process creates a selectivity of uptake that needs to be avoided.

Both modes produce individual fishing records that are largely comparable with the NPS, but it is the enrolment of a representative sample and consistent reporting of these records that are inferior to the CATI mode of data collection. These are the issues that need to be addressed if or when they replace existing parts of the current methodology.

As explained in section 13, this report prioritises the 5 pre-Covid months of October to February due to the extraordinary circumstances of 2020. However, we include the tables below for the sake of completeness. However, Tables 31–39 show fishing characteristics for the Covid adjusted 12-month study period reflect much the same findings as for the pre Covid 5-month period.

Table 31: Annual comparison of CATI 2017/18 and app 2019/20.

	NPS CATI			App			Sig diff NPS v app	App as % of CATI
	Number of fish	SE	CV	Number of fish	SE	CV		
Snapper	3 031 371	182 895	0.06	5 273 654	1 107 960	0.21	1	174
Kahawai	851 969	45 685	0.05	1 990 820	864 861	0.43	0	234
Blue Cod	549 855	52 020	0.09	1 063 253	557 988	0.52	0	193
Red Gurnard	333 429	32 117	0.10	271 896	81 307	0.30	0	82
Tarakihi	271 795	34 717	0.13	398 487	219 178	0.55	0	147
Trevally	115 000	8 876	0.08	368 686	166 077	0.45	0	321
Kingfish	80 488	10 731	0.13	117 067	63 558	0.54	0	145
Skipjack Tuna	24 276	4 751	0.20	3 608	3 619	1.00	1	15
Hāpuku or Bass	34 443	5 268	0.15	0	-	-	-	0
Albacore Tuna	12 187	2 748	0.23	57 427	45 303	0.79	0	471
Bluenose	7 123	1 907	0.27	0	-	-	-	0
Sea perch	110 993	37 254	0.34	11 294	6 929	0.61	1	10
Red Cod	29 862	5 632	0.19	5 313	5 377	1.01	1	18
John Dory	23 055	4 323	0.19	21 922	13 217	0.60	0	95
Flounder, Sole or other flatfish	80 386	14 372	0.18	56 674	38 902	0.69	0	71
Rest of Finfish	612 527	66 456	0.11	1 015 086	491 066	0.48	0	166
Total of Finfish	**6 168 758**	**287 023**	**0.05**	**10 655 180**	**2 372 246**	**0.22**	**0**	**173**
Crayfish/Lobster Spiny/Red	196 920	21 316	0.11	1 017 579	488 993	0.48	0	517
Ordinary Pāua (not yellow foot)	394 469	44 332	0.11	2 265 847	1 938 337	0.86	0	574
Scallops	542 576	77 586	0.14	1 664 916	1 278 587	0.77	0	307
Rest of Other marine Species	2 451 083	266 819	0.11	6 843 922	4 299 040	0.63	0	279
Total of Other marine Species	**3 585 049**	**289 148**	**0.08**	**11 792 270**	**6 732 789**	**0.57**	**0**	**329**
Base number*	**3 156**			**83**				

* Number of fishing trips with catch reported

Table 32: Annual comparison of CATI 2017/18 and self-complete link 2019/20.

	NPS CATI			Self-complete link			Sig diff NPS v link	Self-Complete as % of CATI
	Number of fish	SE	CV	Number of fish	SE	CV		
Snapper	3 031 371	182 895	0.06	1 703 048	216 398	0.13	1	56
Kahawai	851 969	45 685	0.05	448 800	56 503	0.13	1	53
Blue Cod	549 855	52 020	0.09	366 396	70 367	0.19	1	67
Red Gurnard	333 429	32 117	0.10	191 346	37 666	0.20	1	57
Tarakihi	271 795	34 717	0.13	148 135	34 953	0.24	1	54
Trevally	115 000	8 876	0.08	79 553	19 391	0.24	0	69
Kingfish	80 488	10 731	0.13	42 785	12 354	0.29	1	53
Skipjack Tuna	24 276	4 751	0.20	7 217	4 334	0.60	1	30
Hāpuku or Bass	34 443	5 268	0.15	17 924	5 674	0.32	1	52
Albacore Tuna	12 187	2 748	0.23	21 916	13 639	0.62	0	180
Bluenose	7 123	1 907	0.27	6 845	3 495	0.51	0	96
Sea perch	110 993	37 254	0.34	103 397	36 785	0.36	0	93
Red Cod	29 862	5 632	0.19	17 879	5 590	0.31	0	60
John Dory	23 055	4 323	0.19	30 982	25 028	0.81	0	143
Flounder, Sole or other flatfish	80 386	14 372	0.18	40 967	16 196	0.40	0	51
Rest of Finfish	612 527	66 456	0.11	601 358	249 845	0.42	0	98
Total of Finfish	**6 168 758**	**287 023**	**0.05**	**3 828 548**	**464 814**	**0.12**	**1**	**62**
Crayfish/Lobster Spiny/Red	196 920	21 316	0.11	222 718	59 606	0.27	0	113
Ordinary Pāua (not yellow foot)	394 469	44 332	0.11	320 504	81 206	0.25	0	81
Scallops	542 576	77 586	0.14	1 638 174	707 404	0.43	0	302
Rest of Other marine Species	2 451 083	266 819	0.11	2 700 233	599 541	0.22	0	110
Total of Other marine Species	**3 585 049**	**289 148**	**0.08**	**4 881 629**	**1 014 412**	**0.21**	**0**	**136**
Base number	**3 156**			**431**				

Table 33: Species as proportion of annual harvest estimate.

	NPS CATI 2017/18		App 2019/20		Sig diff CATI v App	Self-complete link 2019/20		Sig diff NPS v link
	Number of fish	SE	Number of fish	SE		Proportion	SE	
Snapper	49.1%	1.5%	49.5%	10.4%	0	44.5%	5.7%	0
Kahawai	13.8%	0.6%	18.7%	8.1%	0	11.7%	1.5%	0
Blue Cod	8.9%	0.8%	10.0%	5.2%	0	9.6%	1.8%	0
Red Gurnard	5.4%	0.5%	2.6%	0.8%	1	5.0%	1.0%	0
Tarakihi	4.4%	0.5%	3.7%	2.1%	0	3.9%	0.9%	0
Trevally	1.9%	0.1%	3.5%	1.6%	0	2.1%	0.5%	0
Kingfish	1.3%	0.2%	1.1%	0.6%	0	1.1%	0.3%	0
Skipjack Tuna	0.4%	0.1%	0.0%	0.0%	1	0.2%	0.1%	0
Hāpuku or Bass	0.6%	0.1%	0.0%	-	-	0.5%	0.1%	0
Albacore Tuna	0.2%	0.0%	0.5%	0.4%	0	0.6%	0.4%	0
Bluenose	0.1%	0.0%	0.0%	-	-	0.2%	0.1%	0
Sea perch	1.8%	0.6%	0.1%	0.1%	0	2.7%	1.0%	0
Red Cod	0.5%	0.1%	0.0%	0.1%	-	0.5%	0.1%	0
John Dory	0.4%	0.1%	0.2%	0.1%	0	0.8%	0.7%	0
Flounder, Sole or other flatfish	1.3%	0.2%	0.5%	0.4%	0	1.1%	0.4%	0
Rest of Finfish	9.9%	0.9%	9.5%	4.6%	0	15.7%	6.5%	0
Crayfish/Lobster Spiny/Red	5.5%	0.7%	8.6%	4.1%	0	4.6%	1.2%	0
Ordinary Pāua (not yellow foot)	11.0%	1.3%	19.2%	16.4%	0	6.6%	1.7%	0
Scallops	15.1%	2.2%	14.1%	10.8%	0	33.6%	14.5%	0
Rest of Other marine Species	68.4%	3.0%	58.0%	36.5%	0	55.3%	12.3%	0
Base number*	**3156**		**83**			**431**		

* Number of fishing trips with catch reported

Table 34: Comparison of methods mostly used to fish (multiple response, weighted).

Method	NPS CATI 2017/18 Proportion	NPS CATI 2017/18 SE	App 2019/20 Proportion	App 2019/20 SE	Sig diff NPS v phone app	Self-complete link 2019/20 Proportion	Self-complete link 2019/20 SE	Sig diff NPS v weblink
Rod or line (not long line)	86.1%	0.9%	86.8%	4.8%	0	85.9%	2.1%	0
Longline including set line, kontiki, or kite	10.1%	0.8%	2.3%	1.5%	1	8.6%	1.6%	0
Net (not including landing net used if caught by line)	5.2%	0.5%	4.7%	3.1%	0	3.1%	0.9%	0
Pot (e.g., for crayfish)	3.1%	0.4%	8.2%	4.1%	0	3.4%	1.0%	0
Dredge, grapple, or rake	0.9%	0.2%	1.2%	1.0%	0	3.6%	1.6%	0
Hand gather or floundering from shore	9.3%	0.7%	14.5%	5.4%	0	12.1%	1.8%	0
Hand gather by diving	13.5%	0.8%	11.9%	4.4%	0	14.7%	2.1%	0
Spearfishing	3.5%	0.4%	6.8%	3.5%	0	3.4%	1.1%	0
Some other method	0.1%	0.1%	4.1%	3.6%	`	0.0%	0.0%	–
Base number*	**3 156**		**83**			**431**		

Table 35: Comparison of platforms mostly used to fish (multiple response, weighted).

Platform	NPS CATI 2017/18 Proportion	NPS CATI 2017/18 SE	App 2019/20 Proportion	App 2019/20 SE	Sig diff NPS v phone app	Self-complete link 2019/20 Proportion	Self-complete link 2019/20 SE	Sig diff NPS v weblink
Trailer motor boat	61.2%	1.2%	59.7%	7.7%	0	60.5%	2.7%	0
Larger motor boat or launch	23.9%	0.9%	20.5%	6.1%	0	18.7%	2.2%	0
Trailer yacht	0.5%	0.2%	0.0%	0.0%	–	0.7%	0.5%	0
Larger yacht or keeler	1.4%	0.3%	0.9%	0.9%	0	2.8%	1.0%	0
Kayak, canoe, or rowboat	6.0%	0.5%	16.5%	6.0%	1	3.8%	1.0%	0
Off land, including beach, rocks, or jetty	42.4%	1.3%	24.5%	6.1%	1	34.2%	2.7%	1
Something else	1.5%	0.3%	3.6%	2.4%	0	1.4%	0.8%	0
Base number*	**3 156**		**83**			**431**		

* Number of fishing trips with catch reported.

Table 36: Comparison of FMAs fished in (multiple response, weighted).

	NPS CATI 2017/18		App 2019/20			Self-complete link 2019/20		
Area	Pro-portion	SE	Pro-portion	SE	Sig diff NPS v phone app	Pro-portion	SE	Sig diff NPS v weblink
FMA 1	58.8%	1.3%	66.9%	6.4%	0	55.3%	2.9%	0
FMA 2	11.3%	0.7%	12.1%	4.3%	0	12.0%	1.6%	0
FMA 3	7.6%	0.6%	7.2%	3.9%	0	9.2%	1.8%	0
FMA 5	2.9%	0.4%	1.4%	1.4%	0	3.7%	1.0%	0
FMA 7	10.7%	0.7%	6.3%	2.7%	0	13.0%	2.2%	0
FMA 8	8.4%	0.7%	8.0%	3.9%	0	5.8%	1.2%	0
FMA 9	14.2%	1.0%	13.3%	4.6%	0	11.9%	2.0%	0
Base number*	**3 156**		**83**			**431**		

* Number of fishing trips with catch reported

Table 37: Comparison of proportion of fishers who did fish and did report catch over 12 months.

	NPS CATI 2017/18		App 2019/20		Sig diff NPS v phone app	Self-complete link 2019/20		Sig diff NPS v weblink
Number finfish	Pro-portion	SE	Pro-portion	SE		Pro-portion	SE	
[0–0.3)	19.2%	0.9%	17.3%	4.9%	0	15.2%	2.0%	0
[0.3–1)	0.3%	0.1%	0.0%	0.0%	–	0.0%	0.0%	0
[1–2)	8.3%	0.7%	8.8%	5.5%	0	5.6%	1.3%	0
[2–3)	6.4%	0.5%	3.9%	2.6%	0	11.0%	1.8%	0
[3–4)	5.4%	0.5%	3.0%	1.8%	0	6.7%	1.3%	0
[4–5)	5.8%	0.5%	2.3%	1.2%	0	5.9%	1.6%	0
[5–6)	4.3%	0.4%	2.8%	1.4%	0	6.0%	1.5%	0
[6–7)	3.2%	0.4%	5.2%	2.6%	0	3.3%	1.0%	0
[7–8)	3.4%	0.4%	4.7%	2.8%	0	4.4%	1.3%	0
[8–9)	2.5%	0.3%	0.7%	0.7%	0	2.4%	0.8%	0
[9–10)	2.4%	0.3%	0.5%	0.4%	1	2.9%	0.9%	0
[10–11)	2.0%	0.2%	2.2%	1.1%	0	1.1%	0.6%	0
[11–12)	1.7%	0.2%	1.5%	1.5%	0	4.9%	1.2%	0
[12–13)	2.2%	0.3%	3.3%	2.3%	0	2.0%	0.7%	0
[13–14)	1.9%	0.3%	2.9%	1.8%	0	1.9%	0.6%	0
[14–15)	1.5%	0.3%	0.7%	0.7%	0	0.8%	0.4%	0
[15–16)	1.1%	0.2%	6.0%	5.9%	0	1.0%	0.6%	0
[16–17)	1.3%	0.3%	1.4%	1.0%	0	0.9%	0.4%	0
[17–18)	1.2%	0.2%	0.0%	0.0%	–	0.7%	0.5%	0
[18–19)	1.0%	0.2%	4.5%	3.5%	0	1.7%	0.7%	0
[19–20)	1.2%	0.2%	2.1%	2.2%	0	1.8%	0.8%	0
[20–40)	12.9%	0.7%	13.2%	4.2%	0	11.0%	1.5%	0
[40–100)	8.7%	0.6%	8.0%	3.2%	0	7.5%	1.4%	0
[100–200)	1.5%	0.3%	4.8%	2.9%	0	0.4%	0.2%	1
> 200	0.6%	0.1%	0.0%	0.0%	–	0.7%	0.5%	0
Base number	**3 578**		**96**			**472**		

Table 38: Comparison of days fished per fisher across 12 months.

	NPS CATI 2017/18		App 2019/20		Sig diff NPS v phone app	Self-complete link 2019/20		Sig diff NPS v weblink
Days fished	Pro-portion	SE	Pro-portion	SE		Pro-portion	SE	
1	35.5%	1.0%	9.3%	3.0%	1	27.9%	2.4%	0
2	17.3%	0.8%	22.5%	5.6%	0	14.2%	1.8%	0
3	10.7%	0.6%	8.6%	3.2%	0	12.2%	2.0%	0
4	8.0%	0.6%	8.6%	3.8%	0	10.4%	1.8%	0
5	6.0%	0.5%	17.1%	6.9%	0	9.5%	1.6%	0
6	5.2%	0.4%	6.4%	3.2%	0	4.8%	1.2%	0
7	3.0%	0.3%	5.2%	4.0%	0	2.8%	0.8%	0
8	2.4%	0.3%	0.0%	0.0%	1	2.9%	1.0%	0
9	1.6%	0.2%	2.6%	1.4%	-	4.3%	1.1%	0
10	1.8%	0.3%	0.5%	0.5%	0	1.7%	0.6%	0
11	1.3%	0.3%	4.0%	4.0%	0	1.3%	0.7%	0
12	1.1%	0.2%	2.1%	1.5%	0	0.8%	0.5%	0
13	1.0%	0.2%	2.2%	1.5%	0	0.4%	0.3%	0
14	0.4%	0.1%	0.0%	0.0%	1	1.3%	0.7%	0
15–20	2.1%	0.3%	6.9%	3.1%	0	2.1%	0.7%	0
21–40	2.2%	0.3%	3.5%	2.8%	0	2.9%	0.9%	0
> 40	0.2%	0.1%	0.6%	0.4%	0	0.4%	0.3%	0
Base number	**3578**		**96**			**472**		

Table 39: Comparing demographic profile of fishers who reported harvest data (unweighted).

		NPS CATI 2017/18		App 2019/20		Sig diff NPS v phone app	Self-complete link 2019/20		Sig diff NPS v weblink
		Pro-portion	SE	Pro-portion	SE		Pro-portion	SE	
Avidity	B	35.3%	1.1%	42.3%	7.3%	0	37.2%	2.8%	0
	C	37.3%	1.1%	35.5%	6.2%	0	38.4%	2.7%	0
	D	27.4%	1.0%	22.2%	5.3%	0	24.4%	2.2%	0
Gender	Male	71.4%	1.0%	69.2%	7.7%	0	75.4%	2.6%	0
	Female	28.6%	1.0%	30.8%	7.7%	0	24.6%	2.6%	0
Ethnicity	Māori	15.7%	0.9%	9.4%	4.6%	0	9.2%	1.4%	1
	Non-Māori	84.3%	0.9%	90.6%	4.6%	0	90.8%	1.4%	1
Age group	15–19	5.2%	0.6%	6.0%	4.4%	0	3.1%	1.4%	0
	20–24	5.5%	0.6%	5.8%	5.9%	0	2.7%	1.0%	0
	25–34	16.3%	0.9%	22.6%	6.3%	0	13.2%	2.2%	0
	35–44	18.0%	0.9%	12.9%	4.5%	0	15.2%	1.8%	0
	45–54	23.4%	1.0%	20.7%	4.8%	0	26.6%	2.6%	0
	55–64	18.8%	0.9%	18.0%	4.4%	0	24.5%	2.3%	0
	65–74	10.4%	0.7%	13.3%	4.4%	0	14.0%	1.8%	0
	75+	2.3%	0.3%	0.7%	0.5%	1	0.7%	0.3%	1
Area of residence	Northland	9.0%	0.6%	4.2%	3.4%	0	7.5%	1.5%	0
	Auckland	30.4%	1.4%	31.8%	6.7%	0	30.0%	2.7%	0
	Waikato	12.3%	0.7%	5.8%	3.4%	0	11.2%	1.6%	0
	BOP	8.9%	0.7%	13.6%	5.2%	0	8.3%	1.4%	0
	Gisborne	1.3%	0.2%	1.0%	0.7%	0	1.5%	0.6%	0
	Hawke's Bay	3.8%	0.4%	3.1%	2.1%	0	4.4%	0.9%	0
	Taranaki	3.3%	0.4%	2.3%	1.8%	0	3.2%	0.8%	0
	Manawatu/ Whanganui	3.9%	0.5%	3.8%	2.5%	0	3.1%	0.8%	0
	Wellington	7.5%	0.6%	0.4%	0.3%	1	6.9%	1.2%	0
	Tasman	2.4%	0.3%	20.2%	5.7%	1	3.5%	0.8%	0
	West Coast	0.6%	0.1%	0.4%	0.3%	0	1.0%	0.4%	0
	Canterbury	7.1%	0.6%	4.2%	2.3%	0	9.6%	1.8%	0
	Otago	4.0%	0.4%	1.3%	1.3%	0	3.8%	1.2%	0
	Southland	1.5%	0.2%	2.2%	1.5%	0	1.9%	0.6%	0
Base number*		**3156**		**83**			**431**		

* Number of fishing trips with catch reported.

For the link sample a relatively consistent proportion reported fishing in each of the months (Table 40).

Likewise, the percentage who have fished, but gave no harvest data, is comparable through the year, except for an aberrant August (Table 41).

There were no partial data for the months listed amongst the fishers using the app. The steady increase in non-responses shows a high rate of attrition amongst the app sample, especially when compared with the consistent month by month non-responses produced by the self-complete link sample (Table 42).

The reportage of harvest data was more comparable with the CATI over the winter months than the summer months across both modes. This recalls the findings of the 2017/18 season (Table 43).

Table 40: Monthly participation rate of self-complete link sample (n=1277).

Month	Replied yes – fished	Replied no – did not fish	No response
March 1–25 2020	69 5.4%	888 67.3%	320 25.1%
Apr 28–May 2020	118 9.2%	830 65.0%	329 25.8%
June 2020	66 5.2%	876 68.6%	335 26.2%
July 2020	81 6.3%	845 66.2%	351 27.6%
August 2020*	58 4.5%	875 68.5%	344 26.9%
September 2020	76 6.0%	859 67.3%	342 26.8%

Table 41: Composition of response type for self-complete link fishers who reported fishing in a given month.

Month	All yes	Fished but no harvest data	Partial interview with harvest data	Complete interview
March 1–25 2020	69	4 5.8%	0	65 94.2%
April 28–May 2020	118	8 6.8%	2 1.7%	108 91.5%
June 2020	66	4 6.1%	1 1.5%	61 92.4%
July 2020	81	4 4.9%	0	77 95.1%
August 2020*	58	7 12.1%	0	51 88.9%
September 2020	76	5 6.6%	0	71 93.4%

Table 42: Monthly participation rate of app sample (n=147).

Month	Replied yes – fished	Replied no – did not fish	No response	Total %
March 2020	21 14.3%	71 49.7%	53 36.1%	100
April/May 2020	20 13.6%	72 49.0%	55 37.4%	100
June 2020	10 6.8%	77 52.4%	60 40.8%	100
July 2020	6 4.1%	78 53.1%	63 42.9%	100
August 2020*	11 7.5%	67 45.6%	69 46.9%	100
September 2020	7 4.8%	55 37.4%	85 57.8%	100

Table 43: Panel members who reported harvest data in a calendar month by mode.

Month	NPS CATI	Self-complete link 2019/20	App 2019/20
March 1–25 2020	690 9.9%	65 5.1%	21 14.3%
April 28–May 2020	389 5.6%	110 8.6%	20 13.6%
June 2020	377 5.4%	62 4.9%	10 6.8%
July 2020	275 3.9%	77 6.0%	6 4.1%
August 2020*	341 4.9%	51 4.0%	11 7.5%
September 2020	474 6.8%	71 5.6%	7 4.8%

18. ACKNOWLEDGEMENTS

We would like to express our appreciation to the members of the public who agreed to participate in this survey, beyond the originally agreed upon 12-month study period, many of whom stayed in contact with us for the further two years. This survey would not be possible without your support and efforts for which we are most grateful. We trust you take some pleasure from knowing that your contributions are invaluable in informing the sustainable management of New Zealand's fisheries in the years to come.

We would also like to thank members of the Marine Amateur Fisheries Working Group for their constructive input into all stages of the research. Their expertise and considered opinion proved invaluable in the design of the methodology and analysis of these findings.

This work was funded by Fisheries New Zealand under project MAF2018-02.

19. REFERENCES

Wynne-Jones, J; Gray, A; Heinemann, A.; Hill, L; Walton, L. (2019). National panel survey of marine recreational fishers 2017–18. *New Zealand Fisheries Assessment Report 2019/24*. 104 p.

Wynne-Jones, J; Gray, A; Hill, L; Heinemann, A. (2014). National panel survey of marine recreational fishers 2011–12 – Harvest estimates. *New Zealand Fisheries Assessment Report 2014/67*. 139 p.

20. APPENDICES

20.1 Request letter to NPS panel members

Ministry for Primary Industries
Manatū Ahu Matua

«First_Name» «Surname»
«Street_Number» «Street_Name»
«Suburb»
«Town» «Post_Code»

Dear «First_Name»

MARINE FISHER AND NON-FISHER SURVEY

Thanks so much for taking part in the 2017-18 Marine Fishing Survey. The survey has been a great success and accurately shows the importance of the recreational fisher as a stakeholder in the fish stocks of our coastal waters. For this reason, it is going to be extended for a further 12 months in a simpler form. We hope you will continue to take part.

By reporting your fishing, you are part of a scientific effort funded by the Ministry for Primary Industries, for the recreational fisher's benefit, and the public good. Your identity and your answers are always confidential and anonymous. Your personal details are never passed onto any government agency or used in any commercial way.

Going forward it will be easier to enter your fishing or non-fishing. Once a month, you'll be sent a link to a shorter questionnaire that you can complete yourself at your convenience, rather than getting a phone call. Months when you don't fish, and days when you fish but don't catch anything are both very important in the harvest calculations. They help tell whether there are enough fish to meet the demand of the marine fisher.

We hope you will be reporting your fishing and contributing to this scientific data by using the easier monthly reporting. For the past year close to 7000 marine fishers took part. Of course, participation isn't compulsory and you can opt out, but your contribution would be useful and greatly appreciated.

Yes, there will still be prize draws; a case of wine every month and at the end of the fishing year a major prize of an iPad Pro (or if preferred a Samsung equivalent). All winners are notified by phone and posted at www.nrb.co.nz/fishingsurvey-prize.html. There are more details about the ongoing survey at www.nrb.co.nz/fishingsurvey.html.

All the best for the 2018-19 fishing season.

If you have any specific questions about the study, please get in contact with us at fish@nrb.co.nz or ring 0800 672 476.

Yours sincerely

The Research Team
National Research Bureau Ltd
October 2018

20.2 Web information

NRB
NATIONAL RESEARCH BUREAU LTD

Home | Company Profile | Site Plan | Contact us | Job Opportunities

- Nationwide Surveys
- Central Government Research
- Local Government Research
- Customer Satisfaction
- Brand & Positioning Studies
- Advertising Research
- Focus Group Research
- Online Research
- Fieldwork Services
- Fishing Survey

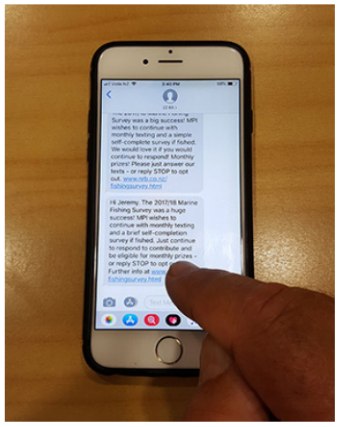
MARINE FISHER AND NON-FISHER SURVEY
Information For Participants

Data collection for the 2017/18 year is now complete. To every one who contributed, thank you so much for your participation! We really do appeciate your efforts. Winners of the final prizes have been notified and updated on this web page FishingSurveySpotPrizes.

Survey results for this year will be published on the Ministry for Primary Industry's website in 2019.

BUT... THE SURVEY CONTINUES, with your cooperation. Let us explain: Last year's Marine Fishing Survey was a huge success and so Fisheries NZ/MPI would dearly like to carry it on further. So, we are hoping that you will continue to report to us - but in a simplified and less intensive manner. The main points:

1. Texts from us will be on the last day of each month and ask about any fishing for the **last calendar month**.



2. If you haven't fished, you just text reply **No** and that's it for the month. All done.

3. If you have fished, you just **touch the link** to go to the survey. Or you can copy the link details into your internet browser – this achieves the same thing and brings up the survey.

4. Yes you have to **fill in your fishing details** yourself, but there is less detail and its very quick and easy! And you can do it at a time that suits you too!

5. If the link doesn't work out for you, don't worry because we can email you the link.

PRIZES! Yes there are prizes as before. There will be a monthly draw for a case of wine (or voucher equivalent if you prefer). There will also be a major prize draw for an iPad Pro (or Samsung equivalent if you prefer) for those who stay reporting for 12 months. We notify all winners and also post their names here: **FishingSurveySpotPrizes**

We really do hope you will see the benefit in continuing to report to us. By entering your catch and no-catch days you join several thousand fishers like

yourself in the scientific work to support and improve recreational marine fishing. More fish, bigger fish and fewer no-catch days. Support your science!

Your answers and your name and contact details are confidential to the research and are never disclosed or provided to another party, and never used for commercial purposes. You can appear in our prize draw list, but only with your permission.

What we propose to do is just keep texting to you, on the assumption that you will continue to be willing to participate. Our first text to you for the continuation survey will be on October 31st. If, sadly, you wish to opt out, please just let us know you wish to stop by phone 0800 672 476 or emailfish@nrb.co.nz or just reply STOP in a reply text to us.

Once again, thank you very much for helping us with this important project. *Marine Fishing Survey Team*.

More about the survey

Surveying recreational fishers catch (in addition to commercial fishers) is vital to the assessment of the stock of fish and other marine life in New Zealand. The information is used to better understand the situation of different species in our waters, and to help in the sustainable management of our fisheries.

The survey is all about the general public's recreational fishing in New Zealand's coastal waters. As a survey participant, we are most interested to find out if you went marinefishing (any method at all) in any given month, and if you did, what was caught. We are also interested to hear if you didn't go fishing, because this is how we build a statistical picture of our fisheries. We are surveying very avid fishers, and people who fish infrequently.All answers are equally important to us.

About Texting

If we text out to you, please reply with a NO (if you haven't fished) or click the link to go to your monthly survey. It would be helpful if you could do this promptly as it saves us reminding you. All texts to us are FREE. The texts will come once a month on the last day of the month.

Memory Jogger

Some people like to write down their fishing to help them remember. Click **Download Memory Jogger** if you would like a handy form to print off. However it is not essential. We will contact you frequently so your memory of any recent fishing is fresh. If you would like us to post you the form, just email fish@nrb.co.nz or ring 0800 672 476.

Identifying Species You Have Caught

Some people will catch species they do not recognise, or they may just want to check. When we first contacted you we will have given you a pamphlet with a few images of marine species to help you. For an online copy click **Download Fishing Survey Pamphlet**. You can also email or ring us for another copy if you wish.

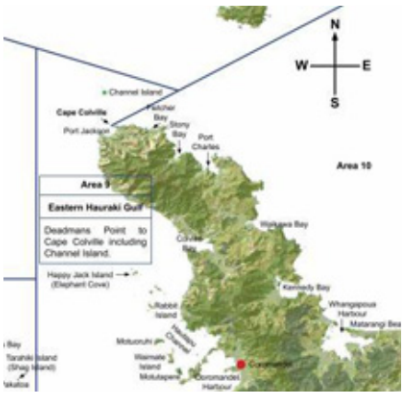
If you wish to find out more about fish species, the web is pretty useful. Here is a

site at United Fisheries which is particularly good (has over 60 species)

http://www.unitedfisheries.co.nz/content/albacore-tuna-thunnus-alalunga

Fishing Areas

For the continuation survey you don't need to know too much about the areas you have fished in. Our questionnaire will ask you to select the general area you mostly fished in. We don't need to find out your exact fishing spots and certainly won't tell others about them!



Further Information

Please feel free to contact us at fish@nrb.co.nz or ring 0800 672 476.

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Phone: 64 - 9-6300655 :: E-mail: **support@nrb.co.nz**

P.O. Box 10-118 Dominion Road | 114 Dominion Road, Mount Eden, Auckland 1024

20.3 Email request to NPS panel members

Email Invite

Hello {FIRST_NAME},
Recently we contacted you by text or email about your recreational marine fishing in November. We haven't heard from you yet, but would greatly appreciate it if you could take a moment to let us know if you went fishing.
Below is your link to report any recreational marine fishing you did in November. If for any reason you need to stop the survey, your progress will be saved and you will restart where you left off.
If you didn't fish, there is a question asking this in the survey. It is important for us to know who isn't fishing as well as who is and it will take you less than a minute.
<SURVEY_LINK>
To find out more about the survey and the prizes, please go to www.nrb.co.nz/fishingsurvey, or contact fish@nrb.co.nz with any questions.
Thank you for your ongoing help
The NZ Recreational Marine Fishing Research Team

Email Reminder

Hello {FIRST_NAME},
Recently we contacted you by text or email about your recreational marine fishing in November. We haven't heard from you yet, but would greatly appreciate it if you could take a moment to let us know if you went fishing.
Below is your link to report any recreational marine fishing you did in November. If for any reason you need to stop the survey, your progress will be saved and you will restart where you left off.
If you didn't fish, there is a question asking this in the survey. It is important for us to know who isn't fishing as well as who is and it will take you less than a minute.
<SURVEY_LINK>
To find out more about the survey and the prizes, please go to www.nrb.co.nz/fishingsurvey, or contact fish@nrb.co.nz with any questions.
Thank you for your ongoing help
The NZ Recreational Marine Fishing Research Team

20.4 Monthly request and reminder text

Invitation Text

Hi %%1%%. The 2017/18 Marine Fishing Survey was a huge success! MPI wishes to continue with monthly texting and a brief self-completion survey if fished. Just continue to respond to contribute and be eligible for monthly prizes - or reply STOP to opt out. Further info at www.nrb.co.nz/fishingsurvey.html

Monthly Text

Hi %%1%%, did you/fish/gather/dive in October? If YES go to %%2%% if NO please reply to this text with no. Thanks! NZ Marine Fishing Survey

Reminder Text

Hi %%1%%. Just wondering if you missed our last message. See previous TXT for details. We do appreciate your reply! NZ Marine Fishing Survey. :-)

20.5 Questionnaire logic

2019-20 NZ Marine Recreational Fishing Survey

Welcome to the Marine Recreational Fishing Survey for the month of September 2020.

This survey is conducted by NRB on behalf of Fisheries New Zealand, a division of the Ministry for Primary Industries.

A BRIEF NOTE ABOUT WHICH FISHING TO REPORT IN THE FOLLOWING QUESTIONS:

- * Only report your own personal catch, not the catch of the group that you fished with
- * Include any fishing done as part of a charter.
- * Do not count any fishing done with a customary permit or as a personal catch allowance from commercial fishing.

Thank you very much for your time and support. Please start the survey now by clicking on the 'Next' button below.

Just checking, did you go fishing in the month of September?

- ◯ Yes
- ◯ No

On how many days in September did you go fishing, gathering or diving in coastal/marine areas? Please include all days that you went out, even if you didn't catch anything.

PLEASE ENTER HERE: days

▫ Did you catch and keep any fi n fi sh in the month of September? Please exclude shellfi sh and non fi n species for now, they will be asked about separately.

- ◯ Yes
- ◯ No

▫ Please select all species that you caught and kept in the month of September. You will be asked a handful of questions about each species you caught in the last month.

- ☐ Snapper
- ☐ Kahawai
- ☐ Blue Cod
- ☐ Red Gurnard
- ☐ Tarakihi
- ☐ Sea Perch/ Jock Stewart/ Scarpie
- ☐ Flounder/ fl atfi sh
- ☐ Yellow Eyed Mullet
- ☐ Trevally
- ☐ Jack Mackerel
- ☐ Barracouta
- ☐ Blue Maomao
- ☐ Blue Mackerel
- ☐ Blue Moki
- ☐ Bluenose
- ☐ Bream/ Brim
- ☐ Bronze Whaler Shark
- ☐ Butterfi sh/ Greenbone
- ☐ Carpet Shark
- ☐ Dogfi sh
- ☐ Eel

- [ ] Elephant Fish
- [ ] Garfish or Piper
- [ ] Gemfish
- [ ] Grey Mullet
- [ ] Groper, Hapuku or Bass
- [ ] Hammerhead Shark
- [ ] John Dory
- [ ] Kelpie
- [ ] Koheru
- [ ] Kingfish
- [ ] Leatherjacket
- [ ] Ling
- [ ] Mako Shark
- [ ] Maori Chief
- [ ] Marlin
- [ ] Moki
- [ ] Parore
- [ ] Parrotfish
- [ ] Perch
- [ ] Pigfish
- [ ] Pilchards
- [ ] Porae
- [ ] Red Cod
- [ ]

- [ ] Red Moki
- [ ] Rock Cod
- [ ] Rig or Spotted Dog fish
- [ ] Salmon
- [ ] Sand Shark
- [ ] School Shark/ Tope
- [ ] Spotty/ Paketi
- [ ] Stargazer/ Monk fish
- [ ] Stingray
- [ ] Trout/ Sea Trout
- [ ] Trumpeter
- [ ] Tuna (Albacore)
- [ ] Tuna (Skipjack)
- [ ] Warehou
- [ ] Wrasse
- [ ] Other fish species (PLEASE SPECIFY)

How many ${piping_text} did you personally catch and keep?

How did you mostly catch the ${piping_text}?

- ◯ Rod or line
- ◯ Long line (including contiki or kite)
- ◯ Net (But not a landing net if caught on line)
- ◯ Spear
- ◯ Other (PLEASE SPECIFY)

Which of these best describes what you mostly fished from?

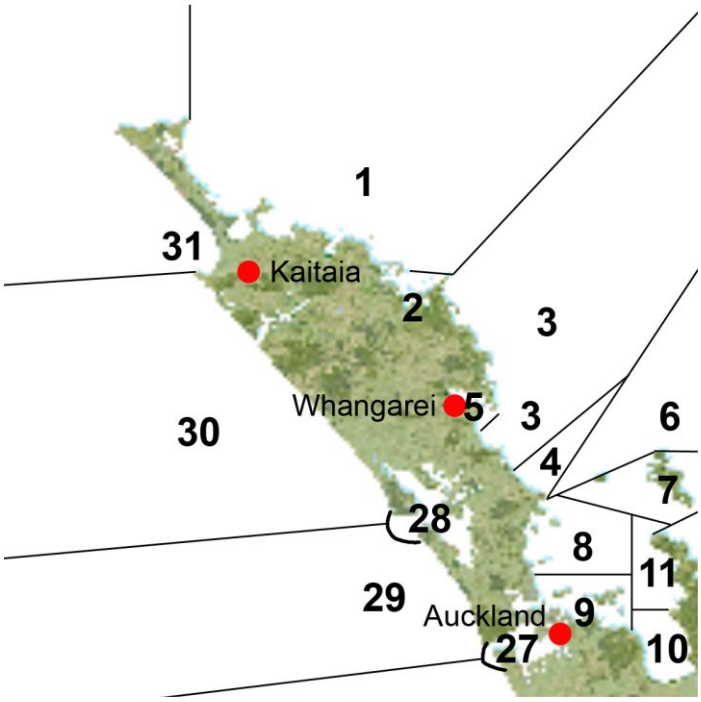
- ◯ Trailer Motor boat
- ◯ Larger Motor boat or launch
- ◯ Trailer yacht
- ◯ Large Yacht or Keeler
- ◯ Kayak, canoe or row boat
- ◯ Off land
- ◯ Other (Please specify)

If you fished from a boat, which of these describes how you mostly launched?

- ◯ A proper concrete-built ramp (public or club owned)
- ◯ A marina
- ◯ A mooring
- ◯ Off the beach or from a gravel/informal ramp
- ◯ A jetty or wharf
- ◯ An anchorage
- ◯ No boat/Fished from land (Wharf, jetty, beach etc)
- ◯ Other (please specify)

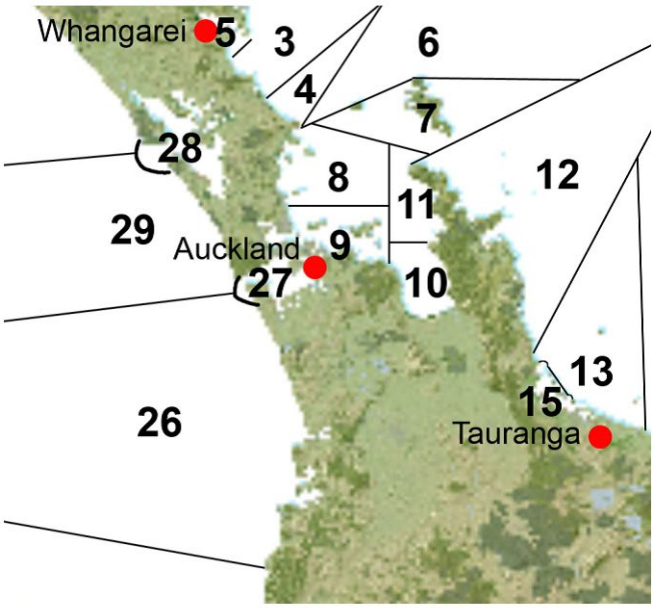
Which of these areas were you mostly fishing for ${piping_text} in?

- ◯ Northland
- ◯ Auckland/Coromandel/Tauranga
- ◯ Other North Island
- ◯ Wellington, Tasman and Marlborough
- ◯ Rest of South Island



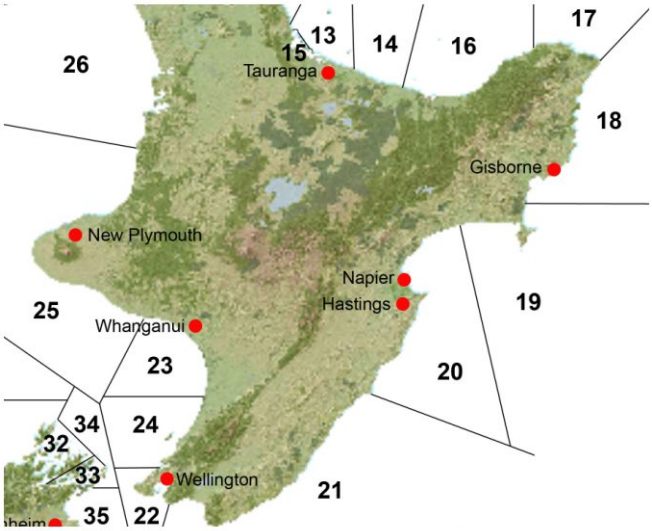
Please enter the number from the map of Northland that shows where you did most of your shing for ${piping_text}.

Enter number here



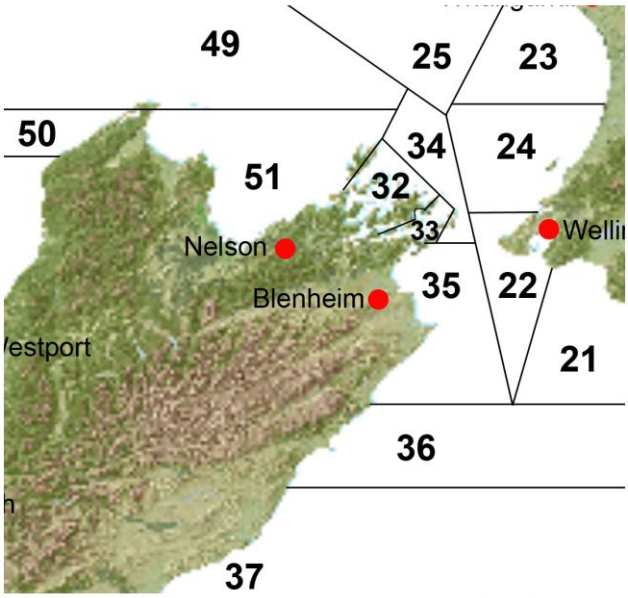
Please enter the number from the map of Auckland/ Coromandel/ Tauranga that shows where you did most of your shing for ${piping_text}.

Enter number here



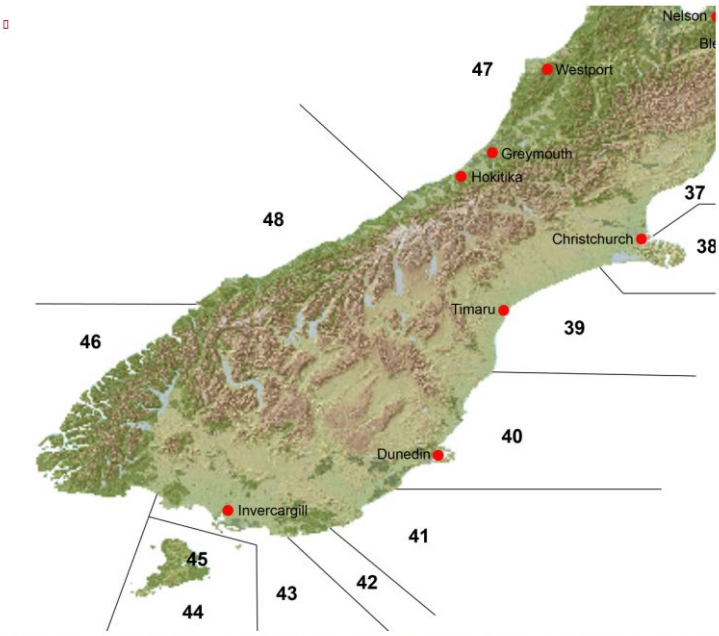
Please enter the number from the map of Other North Island that shows where you did most of your shing for ${piping_text}.

Enter number here



Please enter the number from the map of Wellington/ Tasman/ Marlborough that shows where you did most of your shing for ${piping_text}.

Enter number here



Please enter the number from the map of other South Island that shows where you did most of your shing for ${piping_text}.

Enter number here

How many did you personally catch and keep?

How did you mostly catch the ?

- ◯ Rod or line
- ◯ Long line (including contiki or kite)
- ◯ Net (But not a landing net if caught on line)
- ◯ Spear
- ◯ Other (PLEASE SPECIFY)

Which of these best describes where you mostly shed from?

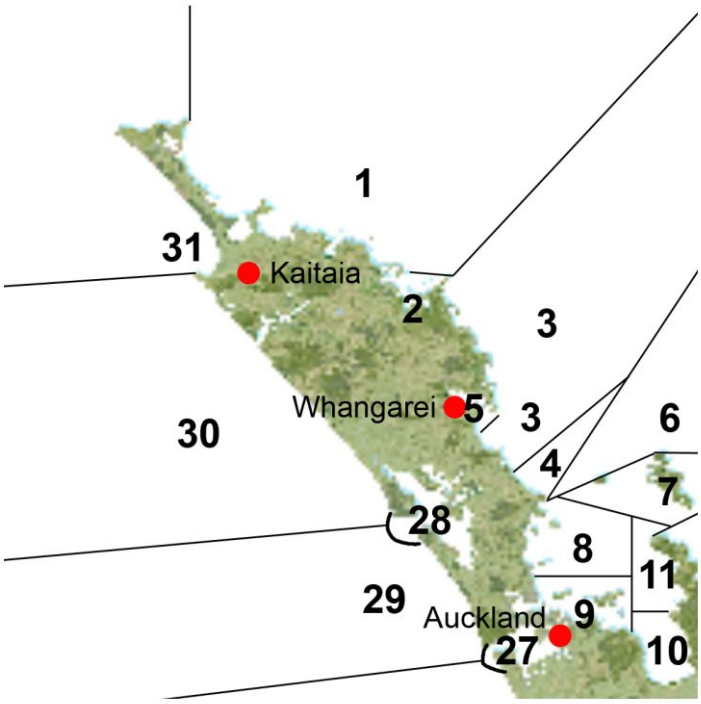
- ◯ Trailer Motor boat
- ◯ Larger Motor boat or launch
- ◯ Trailer yacht
- ◯ Large Yacht or Keeler
- ◯ Kayak, canoe or row boat
- ◯ Off land
- ◯ Other (Please specify)

If you shed from a boat, which of these describes how you mostly launched?

- ◯ A proper concrete-built ramp (public or club owned)
- ◯ A marina
- ◯ A mooring
- ◯ Off the beach or from a gravel/ informal ramp
- ◯ A jetty or wharf
- ◯ An anchorage
- ◯ No boat/ Fished from land (Wharf, jetty, beach etc)
- ◯ Other (please specify)

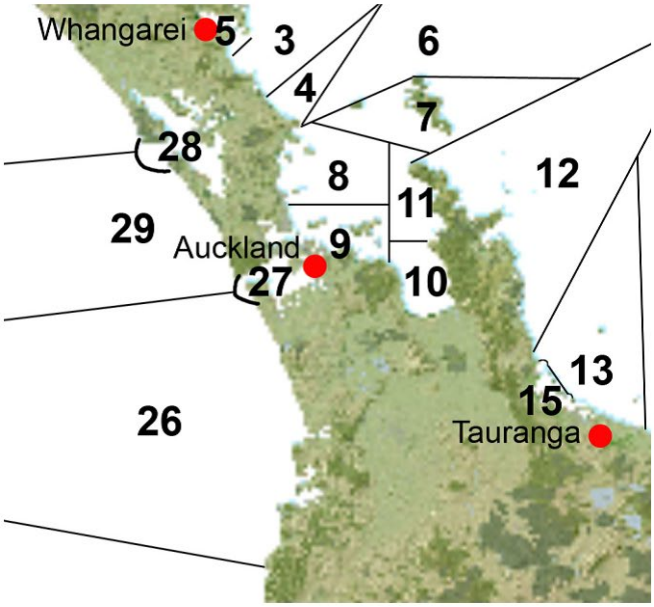
Which of these areas were you mostly shing for species in?

- ◯ Northland
- ◯ Auckland/ Coromandel/ Tauranga
- ◯ Other North Island
- ◯ Wellington, Tasman and Marlborough
- ◯ Rest of South Island



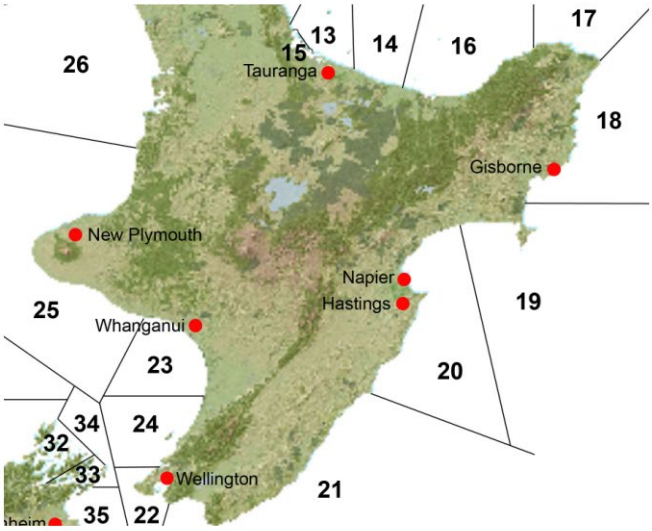
Please enter the number from the map of Northland that shows where you did most of your fishing for

Enter number here



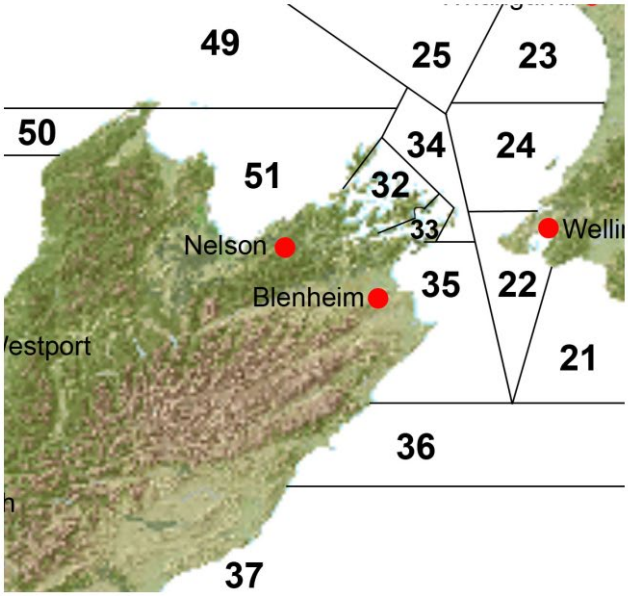
Please enter the number from the map of Auckland/ Coromandel/ Tauranga that shows where you did most of your fishing for

Enter number here



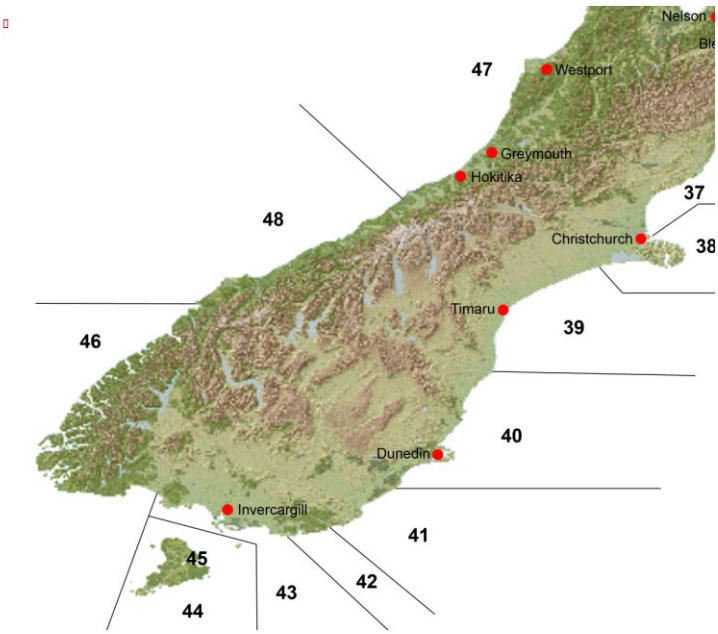
Please enter the number from the map of Other North Island that shows where you did most of your shing for

Enter number here



Please enter the number from the map of Wellington/ Tasman/ Marlborough that shows where you did most of your shing for

Enter number here



Please enter the number from the map of other South Island that shows where you did most of your shing for

Enter number here

 Did you catch/ gather and keep any crustaceans, kina or shell sh in September?

- Yes
- No

Which of these species did you catch/ gather and keep? (SELECT ALL THAT APPLY)

- [ ] Scallops
- [ ] Mussel
- [ ] Kina
- [ ] Pipi
- [ ] Tuatua
- [ ] Paua
- [ ] Cockles
- [ ] Oyster
- [ ] Crayfish
- [ ] Packhorse Lobster
- [ ] Spanish Lobster
- [ ] Squid
- [ ] Yellow foot Paua
- [ ] Other non-finfish species (PLEASE SPECIFY)

How many ${piping_text} did you personally catch/ gather and keep?

How did you mostly catch the ${piping_text}?

- ◯ Hand gathering
- ◯ Diving/ Snorkelling
- ◯ Pot
- ◯ Dredging
- ◯ Other (PLEASE SPECIFY)

Which of these best describes what you mostly fished from?

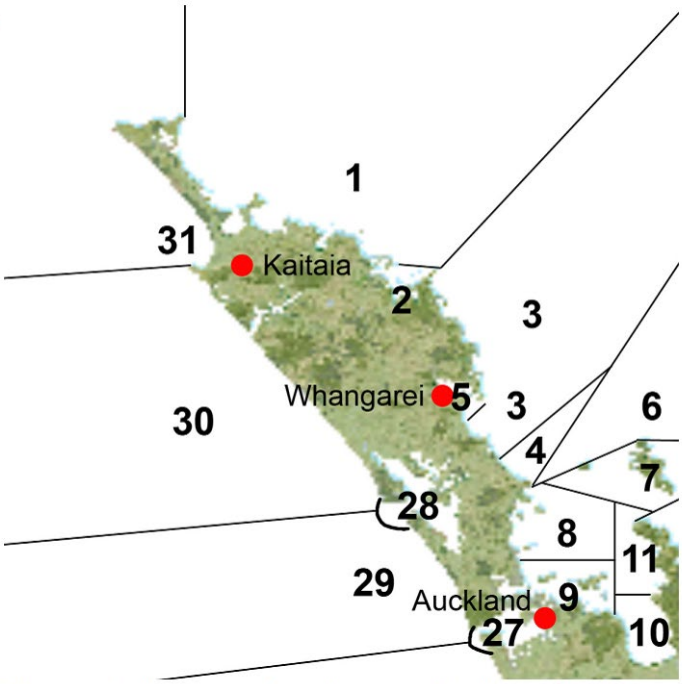
- ◯ Trailer Motor boat
- ◯ Larger Motor boat or launch
- ◯ Trailer yacht
- ◯ Large Yacht or Keeler
- ◯ Kayak, canoe or row boat
- ◯ Off land
- ◯ Other (Please specify)

If you fished from a boat, which of these describes how you mostly launched?

- ◯ A proper concrete-built ramp (public or club owned)
- ◯ A marina
- ◯ A mooring
- ◯ Off the beach or from a gravel/ informal ramp
- ◯ A jetty or wharf
- ◯ An anchorage
- ◯ No boat/ Fished from land (Wharf, jetty, beach etc)
- ◯ Other (Please specify)

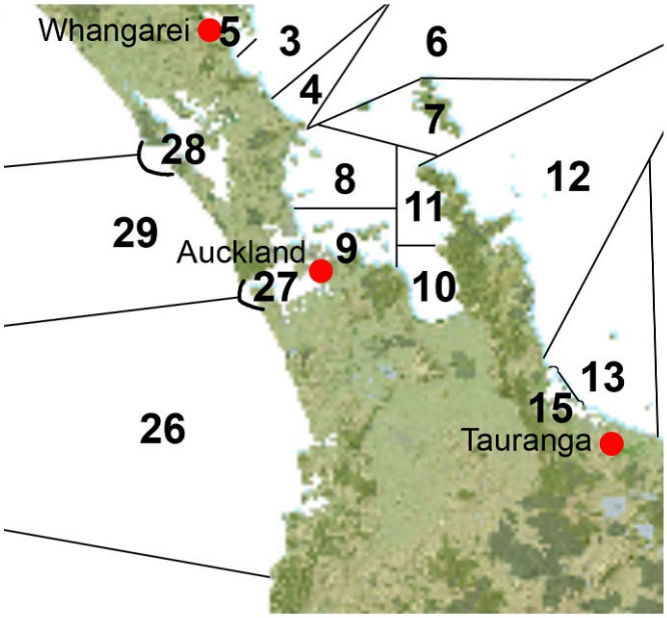
Which of these areas were you mostly fishing for ${piping_text} in?

- ◯ Northland
- ◯ Auckland/ Coromandel/ Tauranga
- ◯ Other North Island
- ◯ Wellington, Tasman and Marlborough
- ◯ Rest of South Island



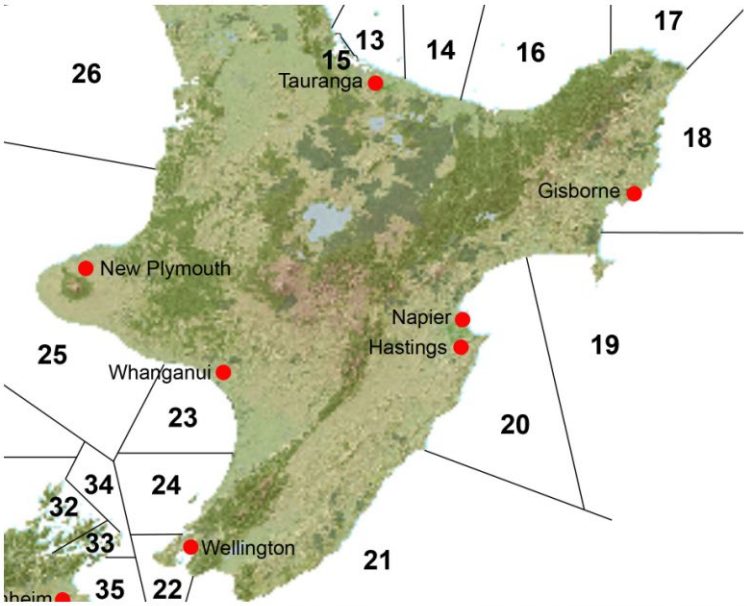
Please enter the number from the map of Northland that shows where you did most of your fishing for ${piping_text}.

Enter number here



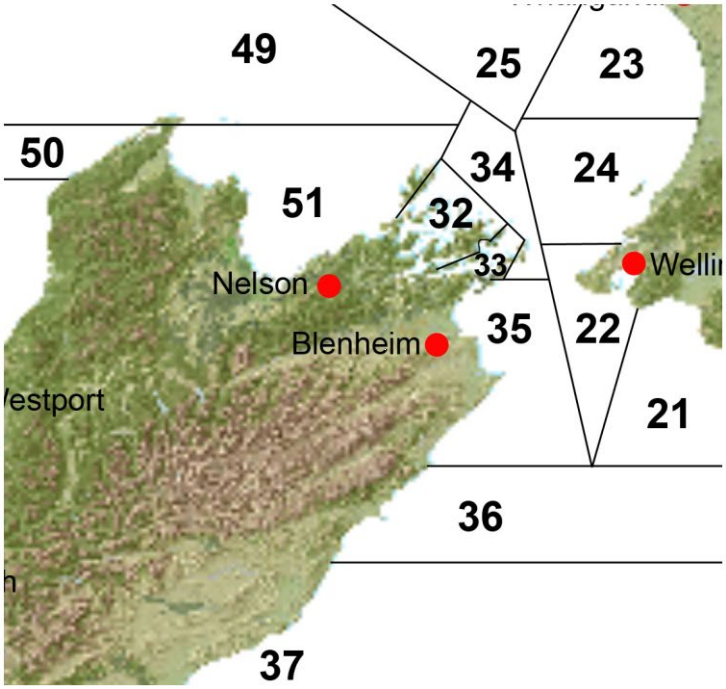
Please enter the number from the map of Auckland/ Coromandel/ Tauranga that shows where you did most of your fishing for ${piping_text}.

Enter number here



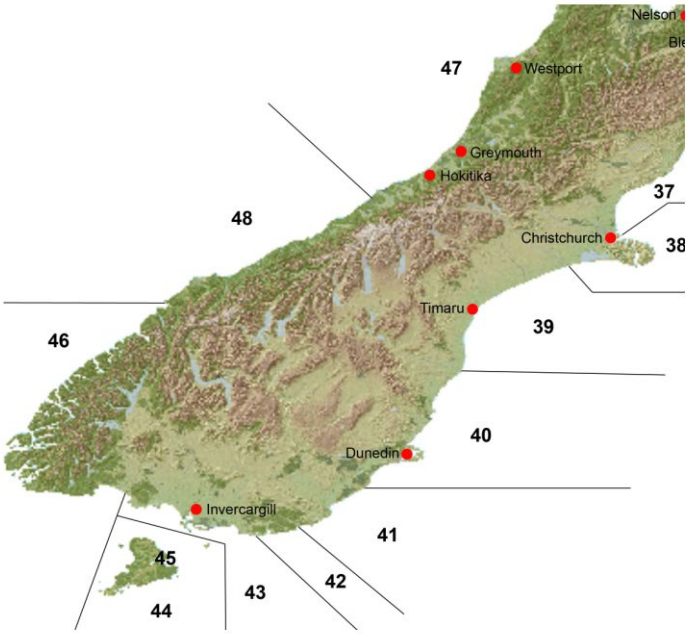
Please enter the number from the map of Other North Island that shows where you did most of your shing for ${piping_text}.

Enter number here



Please enter the number from the map of Wellington/ Tasman/ Marlborough that shows where you did most of your shing for ${piping_text}.

Enter number here



Please enter the number from the map of other South Island that shows where you did most of your shing for ${piping_text}.

Enter number here

 How many did you personally catch and keep?

- How did you mostly catch the ?

  - ◯ Hand gathering
  - ◯ Diving/ Snorkelling
  - ◯ Pot
  - ◯ Dredging
  - ◯ Other (PLEASE SPECIFY)

- Which of these best describes where you mostly shed from

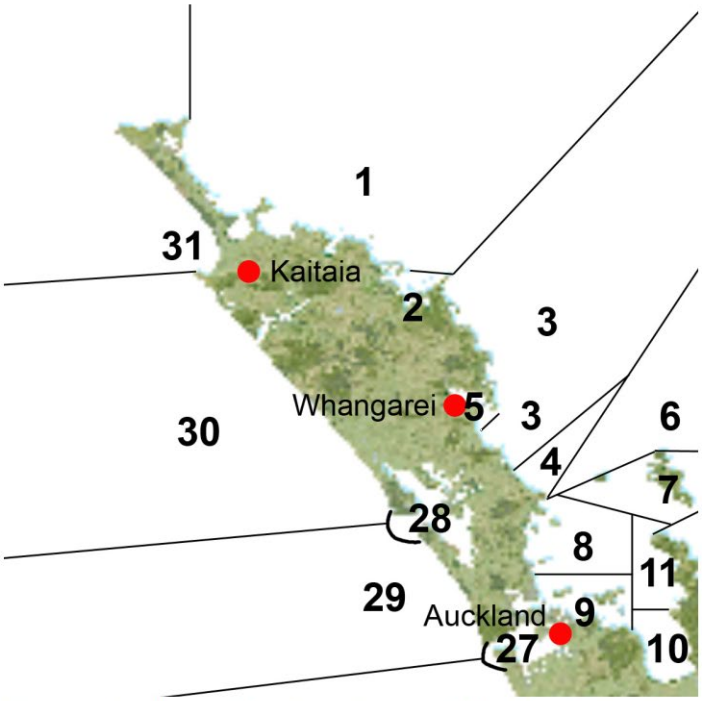
  - ◯ Trailer Motor boat
  - ◯ Larger Motor boat or launch
  - ◯ Trailer yacht
  - ◯ Large Yacht or Keeler
  - ◯ Kayak, canoe or row boat
  - ◯ Off land
  - ◯ Other (Please specify)

If you shed from a boat, which of these describes how you mostly launched?

- ◯ A proper concrete-built ramp (public or club owned)
- ◯ A marina
- ◯ A mooring
- ◯ Off the beach or from a gravel/ informal ramp
- ◯ A jetty or wharf
- ◯ An anchorage
- ◯ No boat/ Fished from land (Wharf, jetty, beach etc)
- ◯ Other (please specify)

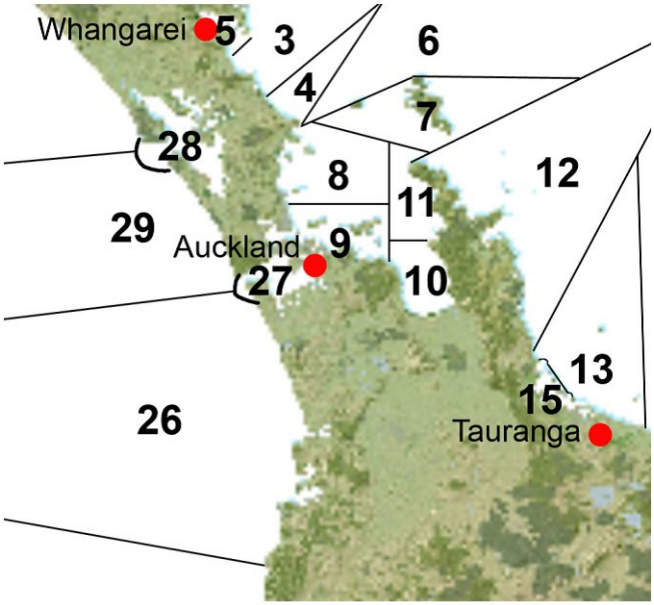
- Which of these areas were you mostly shing for in?

  - ◯ Northland
  - ◯ Auckland/ Coromandel/ Tauranga
  - ◯ Other North Island
  - ◯ Wellington, Tasman and Marlborough
  - ◯ Rest of South Island



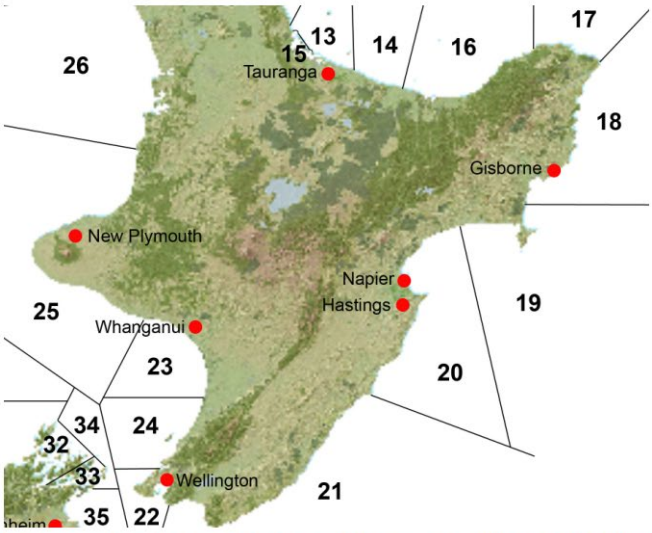
Please enter the number from the map of Northland that shows where you did most of your fishing for species.

Enter number here



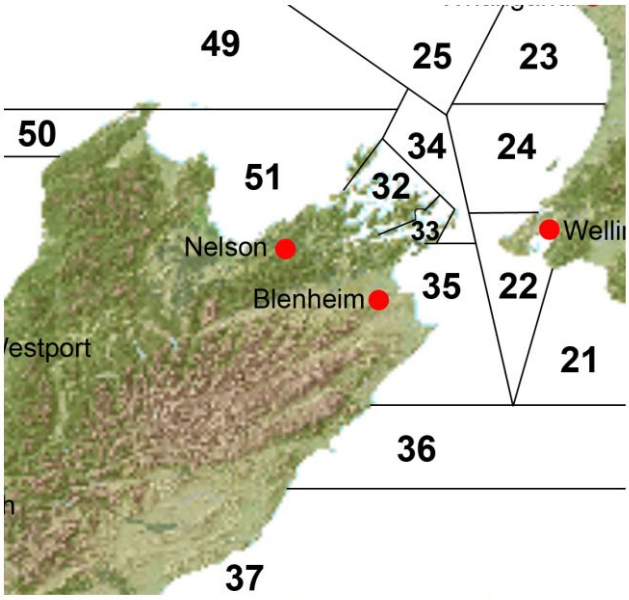
Please enter the number from the map of Auckland/ Coromandel/ Tauranga that shows where you did most of your fishing for species.

Enter number here



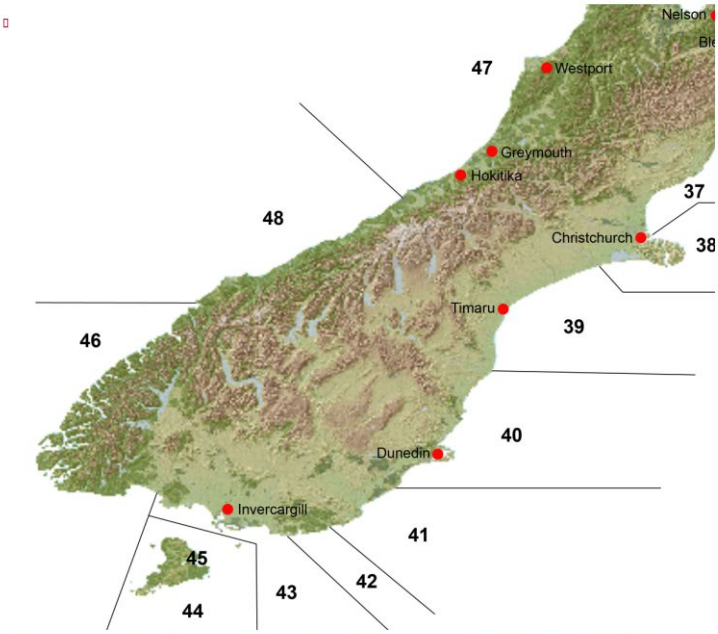
Please enter the number from the map of Other North Island that shows where you did most of your fishing for species.

Enter number here



Please enter the number from the map of Wellington/ Tasman/ Marlborough that shows where you did most of your fishing for species.

Enter number here



Please enter the number from the map of other South Island that shows where you did most of your shing for species.

Enter number here

Any other comments to add about your shing or non shing in September?

20.6 Texts

Online link texts

Link continuation notification

Hi %%1%%, the 2018/19 version of the study has been a big success and will continue for one last year. You'll be texted monthly with a survey link just like the last 12 months. Text STOP to opt out, or text us your email address if you would rather receive your survey link there.

All monthly texts containing a link to the personalised web address remain in the same format as 2018/19, which can be found in the corresponding six month report for that season and will be included in the final report.

Offline app texts

App invite notification

Hi %%1%%, thanks to people like you this study has been a great success. MPI wishes to continue for one more year, but with fishers now using an app to report their fishing or non fishing. More info at http://www.nrb.co.nz/fishingsurvey-app.html. App invites will be sent Friday November 1. To opt out text STOP.

App invite

Hi [Firstname), please go to nzfishdata.com to download the app and report your October fishing. Your invite token is [Password).
If you haven't fished, PLEASE DON'T TEXT REPLY NO, enter it in the app.

Text responses to 'no' replies from app sample

Thanks for replying [Firstname), but from now on we can only receive your fishing info through the app. Details are in our previous email. Much appreciated.

App invite reminder

Hi [Firstname), if you missed our last message, you can still go to nzfishdata.com to install the app and report your October fishing. Your invite token is [Password).
All installations go into prize draw for $200 MTA vouchers.

App Installation and non response reminder

Thank you to the many fishers who have installed the app and reported if they fished or not in October, it is very much appreciated. If you haven't joined them yet, please follow the instructions in your previous text messages and you'll go into the draw for $200 MTA vouchers.

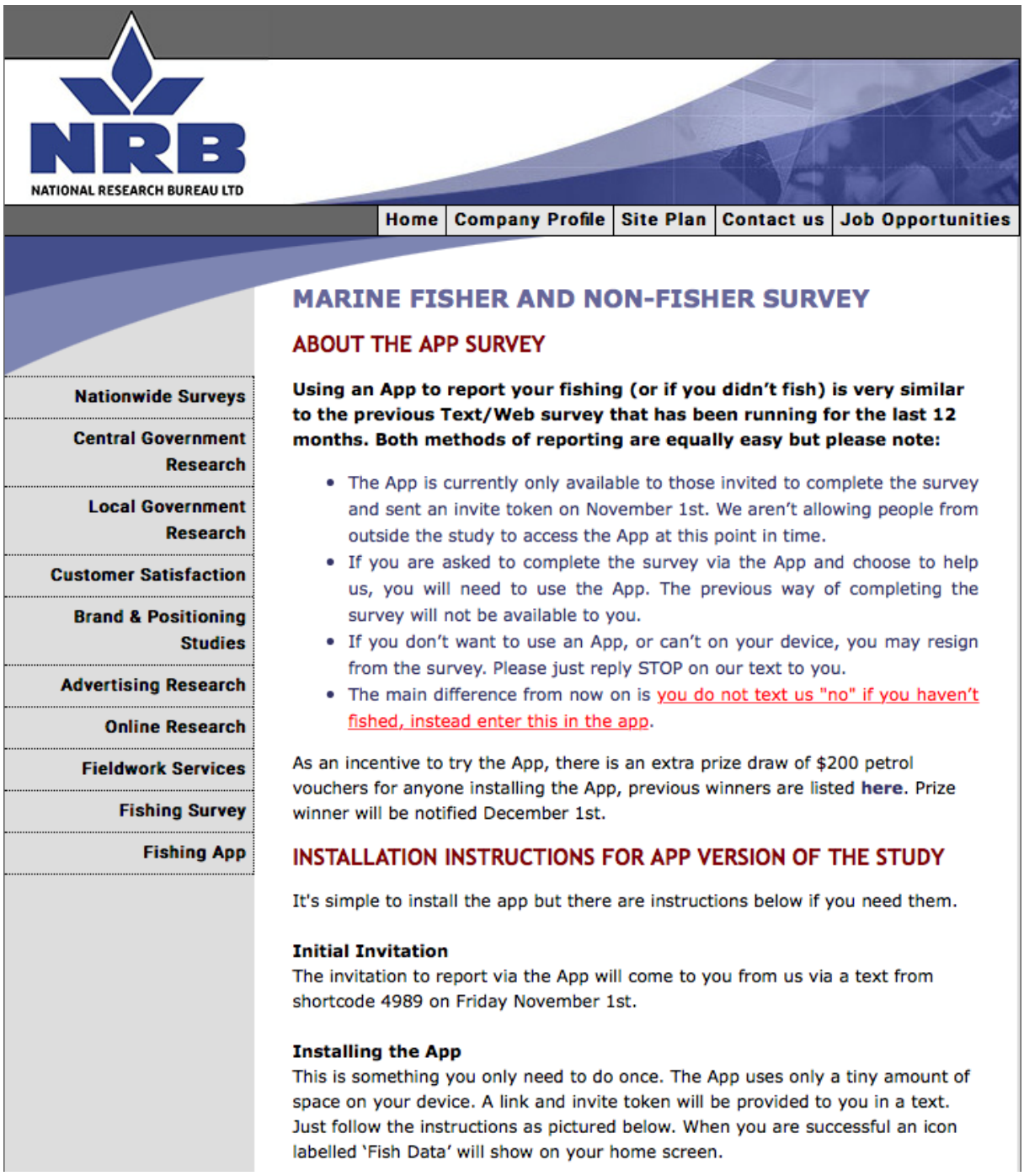
November app notification for non installers

Hi [Firstname), please report your November fishing on our app found at nzfishdata.com. If you haven't already, PLEASE INSTALL THE APP AS WELL to go into the draw for $200 MTA vouchers. Your invite token is still [Lastname).

Monthly notification for app installed fishers

Happy New Year [Firstname), please report your fishing activity for December on the NZ fishdata app.

20.7 NRB website info for App

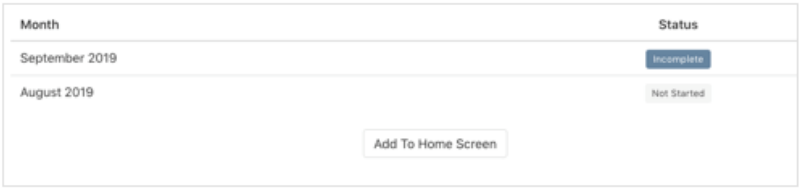


Details for the App Installation

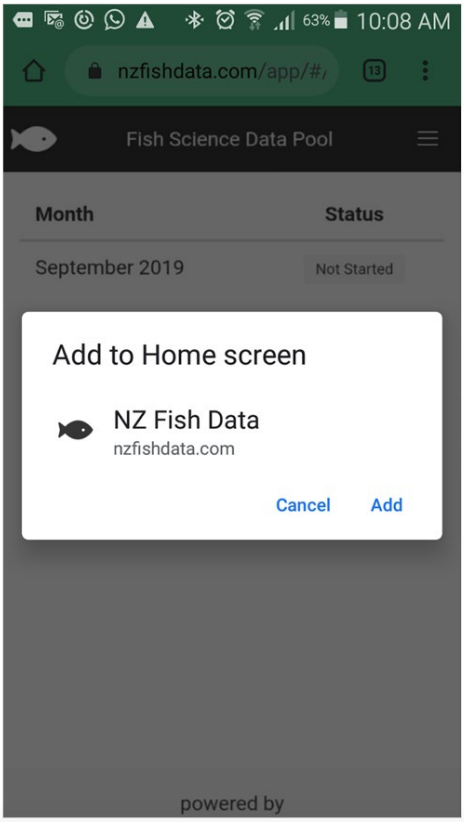
1. Go to the website we text you and enter your invite token. It will be 3 to 6 numbers and a lower case letter.

We are using a password function as only fishers already in the study are being asked to test the app as a reporting method for now.

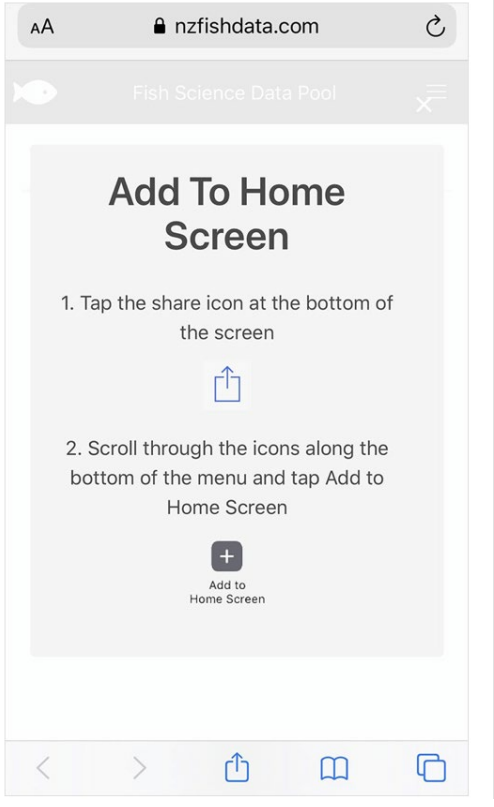
2. The next page will have an "add to home screen" button. Click on this to begin installation.



3. a. On an **android** device, you will now be able to add the icon onto your home screen by clicking add.



b. On an **iPhone**, these instructions will appear to allow you to manually download the icon onto your home screen.



This icon will now be on your home screen.

You can enter it to report your monthly fishing or non-fishing when you receive a notification at the beginning of the month.

Each Month

At the beginning of every month we will text you a reminder to tell us about whether you have fished or not. Instead of answering on a link sent in the text, you just go to the 'Fish Data' icon on your home screen. You will receive text notifications from 4989 instead of 2266.

If you have not fished: Just open the App and tell us this. Please don't text us 'no' as we are using the App to collect this information now.

If you have fished: Just open the App and go through the brief fishing questionnaire. It's very similar to what you've done before and very easy. There are a few added questions due to suggestions from fishers in the study, eg, you'll be asked how many of any species you caught how many you threw back. There is also a way to autofill your methods to save you time.

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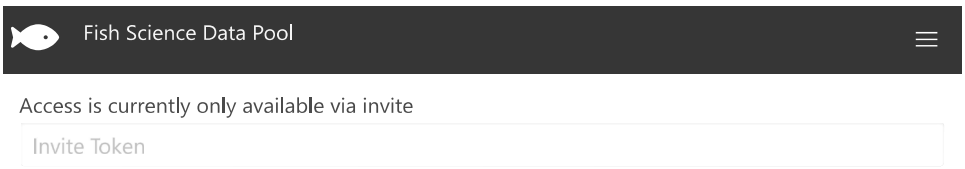
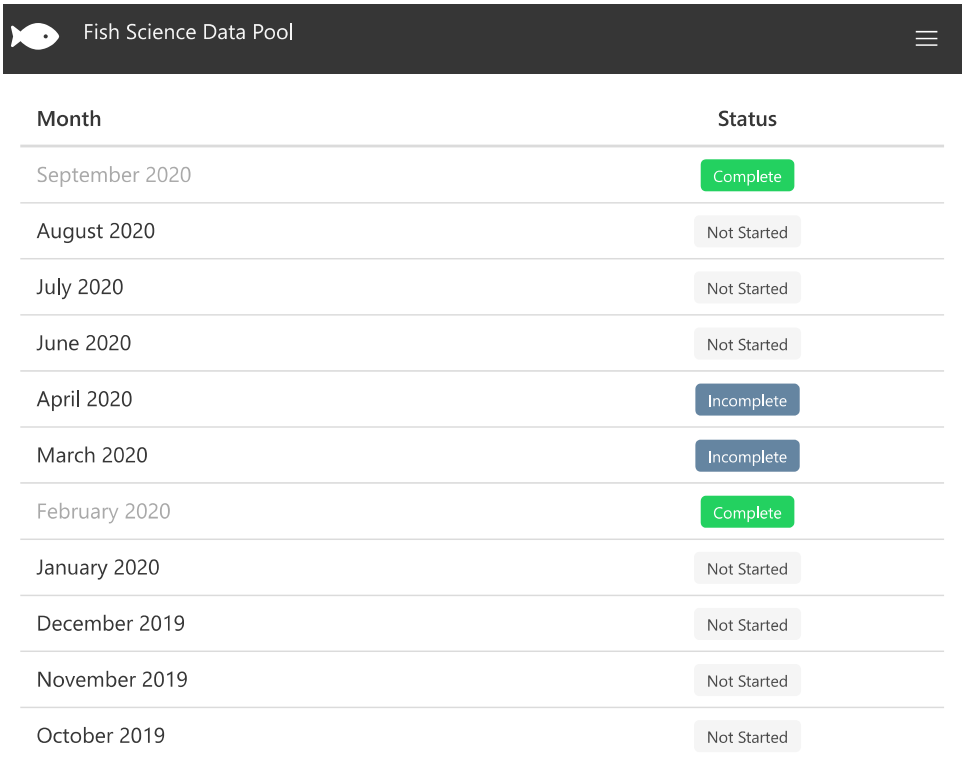
P.O. Box 10-118 Dominion Road | 114 Dominion Road, Mount Eden, Auckland 1024

20.8 App questionnaire



me Screen



Just checking, did you go saltwater marine fishing in the month of **August**?

- (•) Yes
- ( ) No

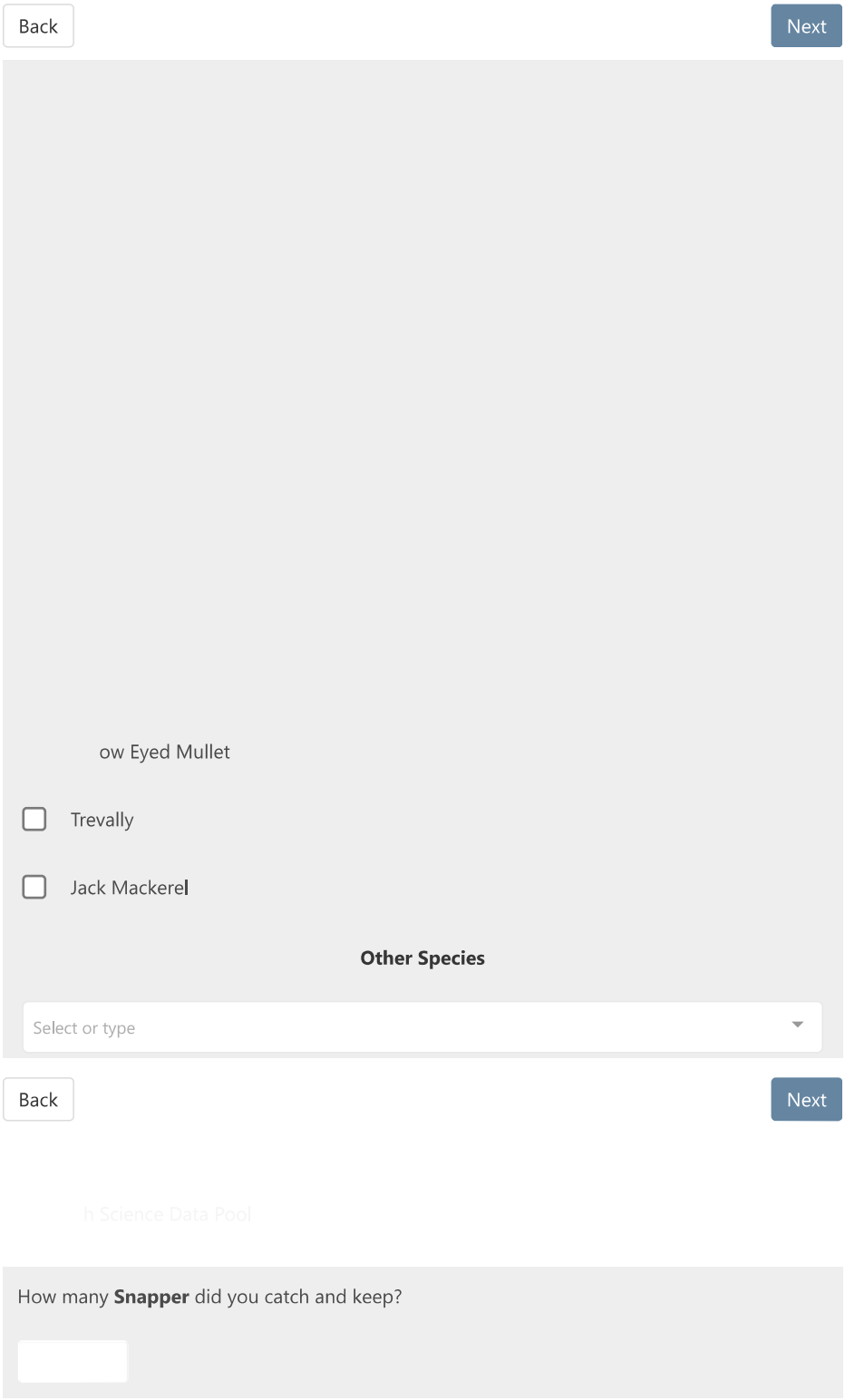
Back Next

On how many days in **August** did you go fishing, gathering and/or diving in seawater areas? Please include all days that you went out, even if you didn't catch anything.

Did you catch and keep any finfish in **August**? Please exclude shellfish and non fin species, they will be asked about separately.

- (•) Yes
- ( ) No

Back Next


Back
Next
ow Eyed Mullet
Trevally
Jack Mackerel
Other Species
Select or type
Back
Next
h Science Data Pool
How many **Snapper** did you catch and keep?

How many **Snapper** did you catch and release/discard?

How did you mostly catch the **Snapper**?

- Rod or Line
- Long line
- Net
- Floundering
- Spear
- Other

Which of these best describes what you mostly fished from?

- Trailer motor boat
- Larger motor boat or launch
- Trailer yacht
- Large yacht or keeler
- Kayak, canoe or row boat
- Off land
- Other

If you fished from a boat, which of these describes how you mostly launched?

- ○ Launched from a proper concrete-built ramp (public or club owned)
- ○ A marina
- ○ A mooring
- ○ Off the beach or from a gravel/informal ramp
- ○ A jetty or wharf
- ○ An anchorage
- ○ Other

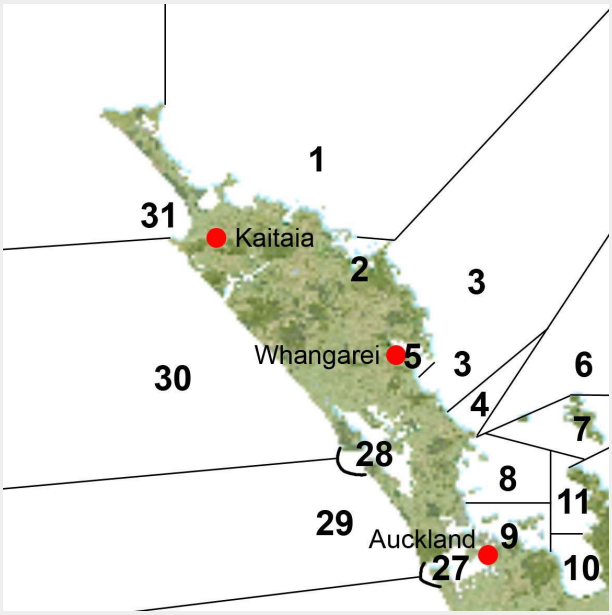
Back Next

In which of these areas were you mostly fishing for **Snapper**? or caught most, or if that is the same, then the first time you caught **Snapper** in **August**.

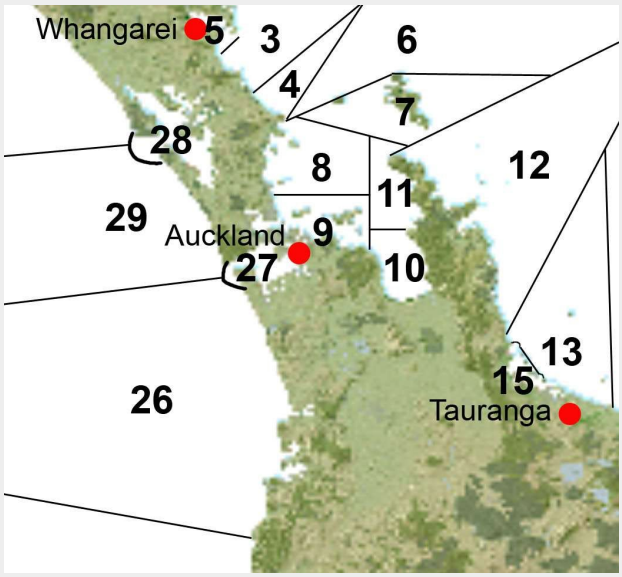
- ○ Northland
- ○ Auckland/Coromandel/Tauranga
- ○ Other North Island
- ○ Wellington, Tasman and Marlborough
- ○ Rest of South Island

Back Next

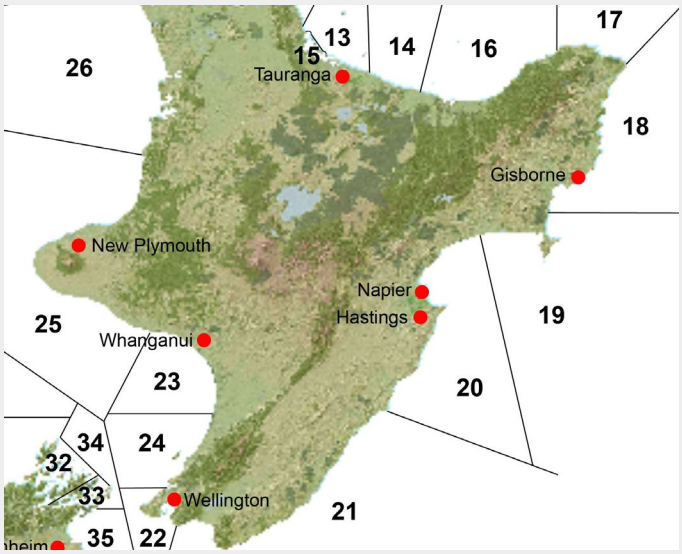
Please enter the area number from the map of Northland that shows where you did most of your fishing for **Snapper**



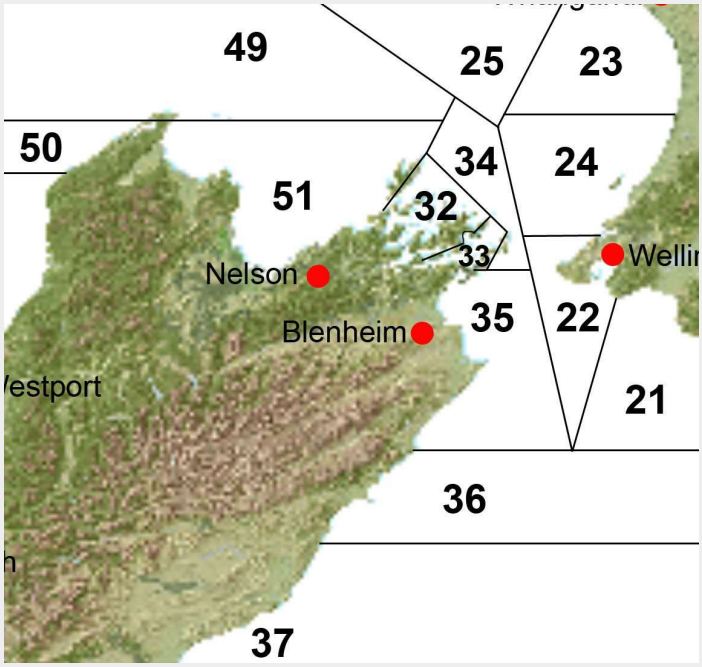
Please enter the area number from the map of Auckland/Coromandel/Tauranga that shows where you did most of your fishing for **Snapper**.



Please enter the area number from the map of Other North Island that shows where you did most of your fishing for **Snapper**.

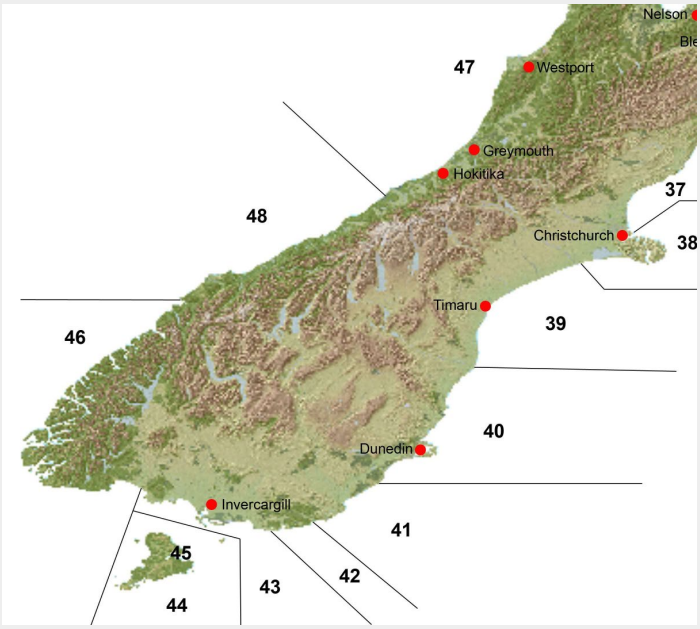


Please enter the area number from the map of Wellington/Tasman/Marlborough that shows where you did most of your fishing for **Snapper**.



Fish Science Data Pool

Please enter the area number from the map of the rest of the South Island that shows where you did most of your fishing for **Snapper**.

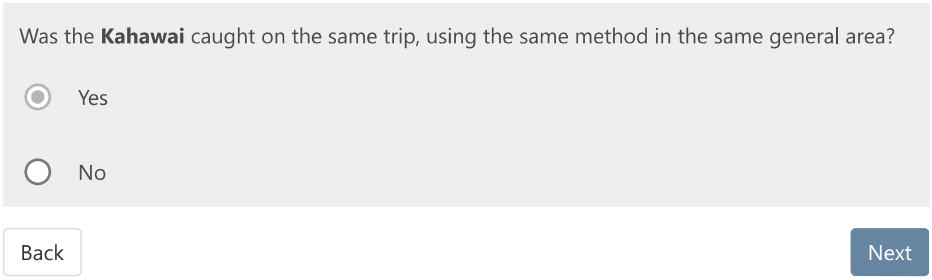


Science Data Pool

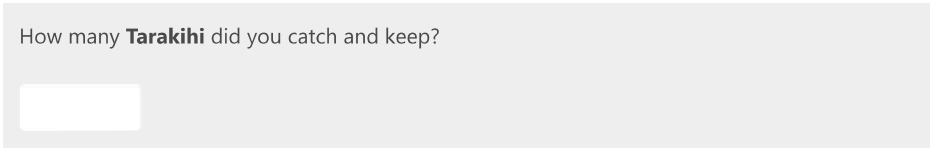
How many **Kahawai** did you catch and keep?

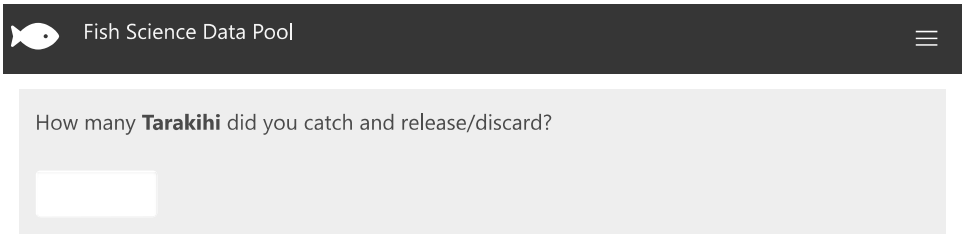
Fish Science Data Pool

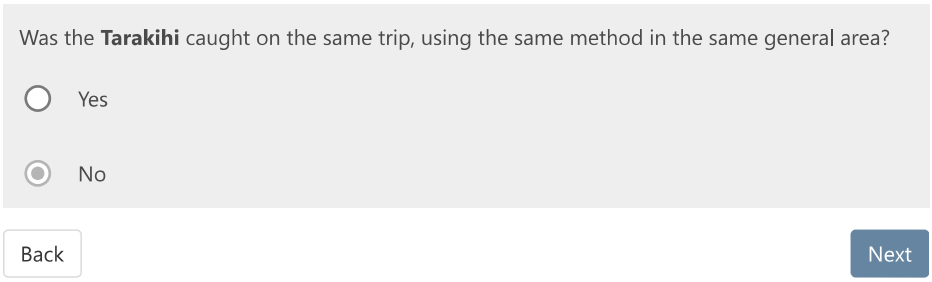
How many **Kahawai** did you catch and release/discard?


Was the **Kahawai** caught on the same trip, using the same method in the same general area?
Yes
No
Back
Next

Science Data Pool


How many **Tarakihi** did you catch and keep?


Fish Science Data Pool
How many **Tarakihi** did you catch and release/discard?


Was the **Tarakihi** caught on the same trip, using the same method in the same general area?
Yes
No
Back
Next

How did you mostly catch the **Tarakihi**?

- ○ Rod or Line
- ○ Long line
- ○ Net
- ○ Floundering
- ○ Spear
- ○ Other

Science Data Pool

Which of these best describes what you mostly fished from?

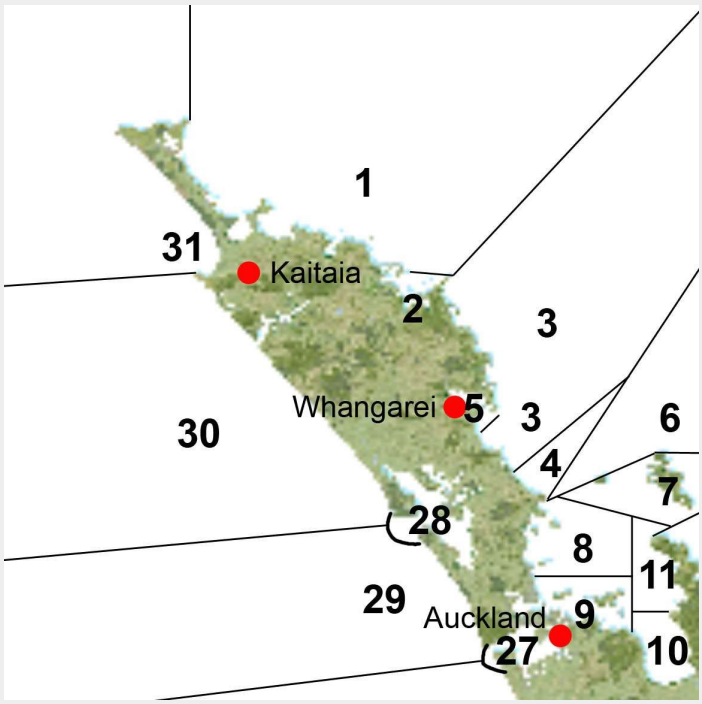
- ○ Trailer motor boat
- ○ Larger motor boat or launch
- ○ Trailer yacht
- ○ Large yacht or keeler
- ○ Kayak, canoe or row boat
- ○ Off land
- ○ Other

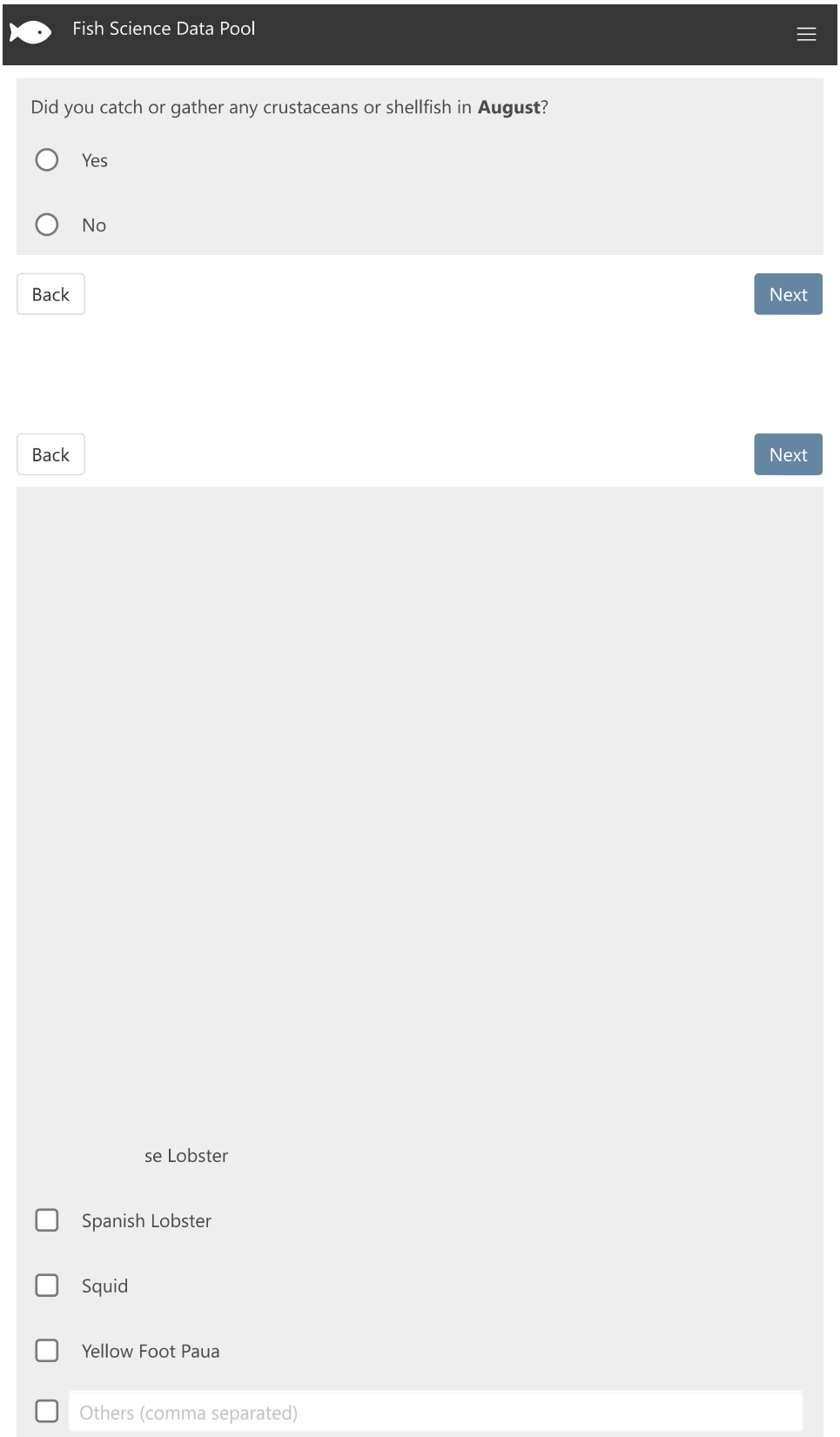
In which of these areas were you mostly fishing for **Tarakihi**? or caught most, or if that is the same, then the first time you caught **Tarakihi** in **August**.

- ○ Northland
- ○ Auckland/Coromandel/Tauranga
- ○ Other North Island
- ○ Wellington, Tasman and Marlborough
- ○ Rest of South Island

Back Next

Please enter the area number from the map of Northland that shows where you did most of your fishing for **Tarakihi**




Fish Science Data Pool
Did you catch or gather any crustaceans or shellfish in **August**?
Yes
No
Back
Next
Back
Next
se Lobster
Spanish Lobster
Squid
Yellow Foot Paua
Others (comma separated)

sh Science Data Pool

How many **Pipi** did you gather/catch and keep?

Fish Science Data Pool

How many **Pipi** did you catch and release/discard?

How did you mostly catch the **Pipi**?

- Hand gathering
- Diving/Snorkelling
- Pot
- Dredging
- Other

Science Data Pool

Which of these best describes what you mostly fished from?

- ○ Trailer motor boat
- ○ Larger motor boat or launch
- ○ Trailer yacht
- ○ Large yacht or keeler
- ○ Kayak, canoe or row boat
- ○ Off land
- ○ Other

If you fished from a boat, which of these describes how you mostly launched?

- ○ A proper concrete-built ramp (public or club owned)
- ○ A marina
- ○ A mooring
- ○ Off the beach or from a gravel/informal ramp
- ○ A jetty or wharf
- ○ An anchorage
- ○ Other

k

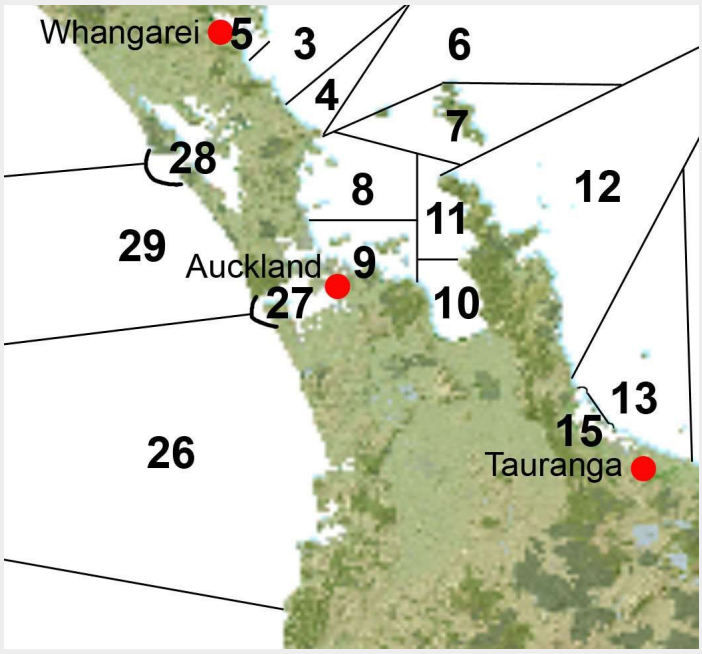
Next

Which of these areas were you mostly fishing for **Pipi** in? or caught most, or if that is the same, then the first time you caught **Pipi** in **August**.

- ○ Northland
- ○ Auckland/Coromandel/Tauranga
- ○ Other North Island
- ○ Wellington, Tasman and Marlborough
- ○ Rest of South Island

Back Next

Please enter the area number from the map of Auckland/Coromandel/Tauranga that shows where you did most of your fishing for **Pipi**.



Thank you, your data builds the science of sustainable recreational fishing. Please leave any additional comments below

20.9 Showcard

SHOWCARD

PLEASE CALL OUT THE LETTER OR NUMBER FOR AGE, ETHNIC GROUPS AND MARINE FISHING GROUP.

AGE GROUP Which age group do you/does he/she fall into?

15 to 19 years — 1
20 to 24 years — 2
25 to 34 years — 3
35 to 44 years — 4
45 to 54 years — 5
55 to 64 years — 6
65 to 74 years — 7
75 years or over — 8

CULTURAL OR ETHNIC GROUP (You can choose more than one)

Which ethnic group or groups do you/he/she identify as?

New Zealand European — 1
Māori — 2
Samoan — 3
Cook Island Māori — 4
Tongan — 5
Niuean — 6
Chinese — 7
Indian — 8
Filipino — 9
Korean — 10
Other (please specify) — 11

MARINE FISHING GROUP

Which group describes your/his/her fishing for food or recreation in the **sea or salt** water?
('Fishing' includes rod, line, net, dredge, dive and hand gathering)

Never. — *A1*

Used to, gave it up, retired from it now. — *A2*

Occasionally, but no more than 3 times a year. — *B*

Several times a year, mostly over spring and summer, mostly in the holidays or on long weekends. About 4-9 times a year. — *C*

Regularly: Almost every week or fortnight over spring and summer, 10 times a year and more. — *D*

Marine fishing group defined by the frequency of fishing; these are also the "avidity" groups.