FRDC
FISHERIES RESEARCH & DEVELOPMENT CORPORATION

2019-2021 National Recreational Fishing Survey – Appendices 2 to 7

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National Social and Economic Survey of Recreational Fishers 2018-2021
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Acknowledgement of Country

We acknowledge the Traditional Custodians of Australia and their continuing connection to land and sea, waters, environment and community. We pay our respects to the Traditional Custodians of the lands we live and work on, their culture, and their Elders past and present.

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Appendix 2.1 Questions included in 2018 Regional Wellbeing Survey

This Appendix shows the questions included in the 2018 Regional Wellbeing Survey that were drawn on in the NRFS. These included questions asking about (i) engagement in recreational fishing and (ii) socio-demographic, geographic and other relevant personal characteristics and experiences. Formatting of questions is indicative only, as the survey was conducted predominantly online.

REGIONAL*wellbeing* – 2018 survey

You and your local community

Where do you live? We ask this because we analyse and produce results for different communities. To do this, we need to ask you where you live. We make sure to protect the privacy of our survey participants when we report results. *If you live in more than one place, please put in your primary residence*	**State / territory you live in:** *e.g. VIC, SA* _____ **Rural locality, town or suburb you live in:** _____ **Postcode you live in:** _____

Part 2: Your health and wellbeing

Thinking about your own life and personal circumstances, how satisfied are you with the following?	**Completely DISSATISFIED** ⓪	①	②	③	④	⑤	⑥	⑦	⑧	⑨	**Completely SATISFIED** ⑩
Your life as a whole	○	○	○	○	○	○	○	○	○	○	○
Your standard of living	○	○	○	○	○	○	○	○	○	○	○
Your health	○	○	○	○	○	○	○	○	○	○	○
What you are currently achieving in life	○	○	○	○	○	○	○	○	○	○	○
Your personal relationships	○	○	○	○	○	○	○	○	○	○	○
How safe you feel	○	○	○	○	○	○	○	○	○	○	○
Feeling part of your community	○	○	○	○	○	○	○	○	○	○	○
Your future security	○	○	○	○	○	○	○	○	○	○	○

Thinking about your own life and personal circumstances, how do you feel about the following?	**Not at all** ⓪	①	②	③	④	⑤	⑥	⑦	⑧	⑨	**Very much so** ⑩
How meaningful does your life feel?	○	○	○	○	○	○	○	○	○	○	○
How much do you feel your life has purpose?	○	○	○	○	○	○	○	○	○	○	○
To what extent do you feel the things you do in your life are worthwhile?	○	○	○	○	○	○	○	○	○	○	○

How would you rate your general health? *Select one*

○ Excellent ○ Very good ○ Good ○ Fair ○ Poor

In the last four weeks, how often have you felt…	**None of the time**	**A little of the time**	**Some of the time**	**Most of the time**	**All of the time**

Nervous?	○	○	○	○	○
Hopeless?	○	○	○	○	○
Restless or fidgety?	○	○	○	○	○
Depressed?	○	○	○	○	○
That everything was an effort?	○	○	○	○	○
Worthless?	○	○	○	○	○

If you are feeling distressed or need assistance, you can contact the following services for assistance, 24 hours a day:
Beyond Blue - 1300 22 4636 Lifeline - 13 11 14

In the last <u>two years</u>, have any of the following happened in your household? *Select **ALL** that apply*	☐ I had poorer health than usual ☐ Others in my household had poorer health than usual ☐ My caring responsibilities increased e.g. you had a new child, had to care for unwell family member ☐ I lost my job ☐ I started a new job ☐ I shifted house	☐ I had a sudden big financial stress e.g. a large bill that was not planned for ☐ I separated from or divorced my partner ☐ A close family member passed away ☐ A close friend passed away ☐ I had other unexpected stress in my life ☐ None of these

Have you done any activities outside your home in the last 12 months?	**In the last 12 months I have done this:**						
	Never	**Once**	**2-5 times**	**6-10 times**	**11-19 times**	**20-52 times (once every week or two)**	**More than 52 times**
Going for a walk (other than bushwalking)	○	○	○	○	○	○	○
Bushwalking or hiking	○	○	○	○	○	○	○
Jogging or running	○	○	○	○	○	○	○
Cycling on roads or cycle paths	○	○	○	○	○	○	○
Mountain biking	○	○	○	○	○	○	○
Swimming	○	○	○	○	○	○	○
Playing sports with others (e.g., tennis, football)	○	○	○	○	○	○	○
Gone to gym or exercise classes e.g. yoga	○	○	○	○	○	○	○
Camping	○	○	○	○	○	○	○
Horse riding	○	○	○	○	○	○	○
Rock climbing, abseiling	○	○	○	○	○	○	○
Fishing (if your fishing is seasonal, indicate how often you fish during the open season)	○	○	○	○	○	○	○
Kayaking or canoeing	○	○	○	○	○	○	○
Aerial sports (e.g., paragliding, hang-gliding)	○	○	○	○	○	○	○
Snow sports (indicate how often you do this during the snow season)	○	○	○	○	○	○	○
Recreational hunting other than fishing (indicate how often you hunt during hunting season)	○	○	○	○	○	○	○
Other outdoor or sports activities	○	○	○	○	○	○	○

Part 3: You and your household

Do you identify as…

Select one

◯ Female ◯ Other e.g. gender fluid, inter-gender, no gender
◯ Male ◯ Prefer not to answer

How old are you?

Years: _____

How would you describe yourself?

Select one

◯ Australian-born
◯ Born overseas in an English speaking country e.g. UK, New Zealand
◯ Born overseas in a non-English speaking country e.g. China, France

Are you of Aboriginal or Torres Strait Islander origin? *Select all that apply*

◯ No ☐ Yes, Aboriginal ☐ Yes, Torres Strait Islander

Who lives in your household at the moment?

Total number of people, including yourself: _____

Number of children aged under 15: _____

Number of children aged 15 or over who are financially dependent on their parents: _____

Number of temporary residents e.g. 'couch surfers': _____

Which best describes you at the moment?

Select one

◯ Never married ◯ Divorced or separated
◯ Married or de facto ◯ Widowed

Do you identify as any of the following?
Select those that best apply

☐ Straight (heterosexual) ☐ Bisexual
☐ Lesbian or gay (homosexual) ☐ Other e.g. asexual

Which best describes your current housing?
Select one

◯ I am renting
◯ I have a house with a mortgage
◯ I own my house outright (or own it with partner/other person)
◯ I don't have any permanent accommodation
◯ Other

Have you completed any of the following formal qualifications?
*Select **ALL** that apply*

☐ Year 12 of high school or equivalent
☐ Certificate or diploma from TAFE
☐ University degree (undergraduate or postgraduate)
◯ None of these

Work, study, caring, retirement – what do you do?

Which of the following describes your situation right now?
*Select **ALL** that apply*

☐ Self-employed
☐ I have full-time paid work
☐ I have part-time paid work
☐ I have casual paid work
☐ Unemployed & looking for work
☐ Care for dependent child/children
☐ Care for person/people with disability, physical or mental illness or frailty, drug or alcohol dependency, or other chronic condition
☐ Retired
☐ Studying part-time or full-time
☐ Other (please describe below)

_____

Your money and finances

Financial information is very sensitive, but also important - financial issues do affect the wellbeing of many households. If you don't want to answer these questions, please continue to the next part of the survey.

In 2017-18, about how much was your <u>household</u> income <u>before</u> tax? *Select one* *This includes income earned by everyone in your household. Include income from government pensions, investments/dividends, and paid work. The categories below may look odd – they let us compare our survey results to those from the national census, so we can't change them.*	◯ Negative or nil income ◯ $1-10,399 ◯ $10,400-20,799 ◯ $20,800-31,199 ◯ $31,200-41,599 ◯ $41,600-51,999 ◯ $52,000-62,399	◯ $62,400-77,999 ◯ $78,000-103,999 ◯ $104,000-124,999 ◯ $125,000-155,999 ◯ $156,000-207,999 ◯ $208,000-259,999 ◯ $260,000 or more
Given your current needs and financial responsibilities, would you say that you and your family are... *Select one*	◯ Very poor ◯ Poor ◯ Just getting along	◯ Reasonably comfortable ◯ Very comfortable ◯ Prosperous

In the last year, did any of the following happen to you because you didn't have enough money? *Select all that apply*	☐ Had to delay or cancel non-essential purchases e.g. holiday, going to a restaurant or movie, buying clothes ☐ Could not pay bills on time e.g. electricity, rent, gas ☐ Went without meals, or was unable to heat or cool home ☐ Asked for financial help from friends or family ◯ None of these

How acceptable do you find the following activities in your LOCAL area?

If they don't currently happen locally, indicate how acceptable you would find them if they did occur

	NOT AT ALL acceptable 1	**2**	**3**	**4**	**5**	**6**	**VERY acceptable 7**	**Don't know**
Subdivision of agricultural land for 'rural residential' development	◯	◯	◯	◯	◯	◯	◯	◯
Establishment of 'solar farms' (large areas of solar panels)	◯	◯	◯	◯	◯	◯	◯	◯
Farm forestry for wood/paper (farmers growing trees on their land for timber production)	◯	◯	◯	◯	◯	◯	◯	◯
Farm forestry for carbon (farmers growing trees on their land for carbon sequestration)	◯	◯	◯	◯	◯	◯	◯	◯
Live animal export	◯	◯	◯	◯	◯	◯	◯	◯
Commercial timber plantations (companies purchasing or leasing agricultural land and growing trees for timber production on it)	◯	◯	◯	◯	◯	◯	◯	◯
Harvesting and regrowth of native forests for wood production	◯	◯	◯	◯	◯	◯	◯	◯
Controlled burning to reduce bushfire risk	◯	◯	◯	◯	◯	◯	◯	◯
Recreational fishing	◯	◯	◯	◯	◯	◯	◯	◯
Reducing numbers of carp (a pest fish) by releasing the carp herpes virus	◯	◯	◯	◯	◯	◯	◯	◯
Establishment of wind farms	◯	◯	◯	◯	◯	◯	◯	◯
Coal-seam gas extraction	◯	◯	◯	◯	◯	◯	◯	◯
Open cut or underground mining	◯	◯	◯	◯	◯	◯	◯	◯

Recreational hunting other than fishing	○	○	○	○	○	○	○	○
Regulations restricting farmers from clearing native vegetation	○	○	○	○	○	○	○	○
Growing of genetically modified crops	○	○	○	○	○	○	○	○
Using water for 'environmental watering'	○	○	○	○	○	○	○	○
Intensive livestock production e.g. chickens, pigs, feedlots	○	○	○	○	○	○	○	○

	Yes, in the last 12 months	**Yes, more than 12 months ago**	**No, never**	**Don't know**
Have you personally ever done any recreational fishing in Australia (whether you caught anything or not)? *This includes fishing, crabbing, yabbying, spearfishing and collecting shellfish*	○	○	○	○
Has any other member of your household done any recreational fishing in Australia (whether they caught anything or not)?	○	○	○	○

How likely are you or others in your household to do any kind of recreational fishing, crabbing etc. in the next 12 months?

	Very likely	**Quite likely**	**Not at all likely**	**Unsure**
In the coming 12 months, how likely is it that you personally will do any kind of recreational fishing, crabbing etc?	○	○	○	○
In the coming 12 months, how likely is it that one or more other members of your household will do any kind of recreational fishing, crabbing etc?	○	○	○	○

Thinking of all the fishing you have done over the last 12 months, in general how satisfied are you with the overall quality of the fishing in that time?

- ○ Very satisfied
- ○ Quite satisfied
- ○ Not very satisfied
- ○ Not at all satisfied
- ○ Unsure

How important to you are the following things about recreational fishing?

	Very important	Quite important	Not very important	Not at all important	Unsure
Relaxing/unwinding	○	○	○	○	○
Spending time outdoors	○	○	○	○	○
Spending time in nature	○	○	○	○	○
Spending time on your own	○	○	○	○	○
Spending time with family	○	○	○	○	○
Spending time with friends	○	○	○	○	○
Competing in fishing competitions (of any kind)	○	○	○	○	○
The enjoyment of catching fish	○	○	○	○	○
The challenge of catching fish	○	○	○	○	○
Catching fresh fish for myself or others in my household to eat	○	○	○	○	○
Learning about nature/the environment	○	○	○	○	○
Learning new skills e.g. handling equipment, fishing techniques, boats	○	○	○	○	○
Feeling a sense of achievement	○	○	○	○	○
Getting physically active	○	○	○	○	○

To what extent do you agree or disagree with the following statements about fishing?

	Strongly disagree	Mildly disagree	Neither agree or disagree	Mildly agree	Strongly agree
A fishing trip can still be successful, even if no fish/crabs/lobster are caught	○	○	○	○	○
I'd rather catch one or two bigger fish than ten smaller fish	○	○	○	○	○
I like to fish where there are several kinds of fish to catch	○	○	○	○	○

In 2019 we will be conducting a more detailed survey of recreational fishers. Would you be willing to be contacted about that survey? *Note: If you select 'yes', you are in no way obliged to participate; you will simply receive an email in 2019 inviting you to take part if you wish to.*

○ Yes (if you select this, you will be asked for your contact email or postal address at the end of the survey)

○ No

Appendix 2.2 Questions included in 2020 Regional Wellbeing Survey

Note: In addition to the questions listed below, the same information about demographic and geographic characteristics asked in the 2018 survey were asked (see Appendix 2.1).

Are any of the following important industries or activities in your region? *Select all that apply. We're asking this because different communities around Australia are known for different things – some are thought of as tourism communities, some as farming communities, others mining or retirement. Increasingly, providing services like retail shops or centralised health care defines some regional cities.*	☐ **Agriculture.** If you ticked this, which types of agriculture? ☐ Dairy farming ☐ Beef grazing ☐ Sheep grazing ☐ Crop growing e.g. wheat, barley, canola ☐ Cotton growing/ginning ☐ Rice growing ☐ Grape growing/wine production ☐ Fruit/vegetable growing ☐ Other agriculture (please describe) _____ ☐ **Mining** ☐ **Forest industry (tree harvesting, wood processing)** ☐ **Commercial fishing or seafood processing**	☐ **Tourism/recreation.** If you ticked this, what types of tourism are important? ☐ Recreational fishing ☐ Bushwalking/hiking ☐ Tourism in nature areas e.g. National Parks, beaches ☐ Culture/heritage ☐ Wine/food/brewers/food trail ☐ Festival/s ☐ Arts/entertainment ☐ Other (please describe) _____ ☐ **Retail, health, education.** If you ticked this, is your community known for… ☐ Shopping e.g. people come from other places to shop in your community ☐ Health care ☐ Education e.g. boarding schools, vocational training (TAFE/CIT), uni campus ☐ Retirement/aged care ☐ Other (please describe)

When did you most recently do the following activity?

	Within the last 12 months (1)	**1 to 5 years ago (2)**	**More than 5 years ago (3)**	**Never (4)**	**Don't know (5)**
Went for a walk near my home e.g. on local streets, nearby oval or park					
Went for a walk at a nature reserve near where I live					
Went for a walk at a nature area some distance from where I live					
Went jogging/running					
Visited swimming pool					
Went swimming in river/lake/ocean					
Went to the gym					
Went to an exercise class or trained with a sports team					
Went fishing					
Went bike riding (whether road cycling or mountain biking)					
Did exercise at home e.g. home treadmill, exercise bike, watching exercise video					
Did other exercise/active recreation (please describe below e.g. skiing)					

Appendix 2.3: Stage 1 recruitment material example

REGIONAL *wellbeing*
2018 Survey

You are invited to take part in our annual survey of the wellbeing of people living in different regions and communities across Australia

Help us improve wellbeing and quality of life across Australia by completing the survey online at

www.regionalwellbeing.org.au

Participation in this annual survey is voluntary, confidential and anonymous

Prefer to do the survey on paper or need help doing the survey?

Call us on **1800 981 499**
Or email us at **regionalwellbeing@canberra.edu.au**

Everyone who completes the survey by 14th December 2018 will be eligible to enter the prize draw for one of the 18 prizes. Winners will have their choice of either Flight Centre, Coles-Myer, WISH or Bunnings giftcards to the following value

First prize: **$2000**
Second prize: **$1000**
Third to eighth prize: **$500**
10 runner-up prizes of **$100**

For assistance with the survey, call **1800 981 499**
or email **regionalwellbeing@canberra.edu.au**

Terms and conditions of entry into 2018 Regional Wellbeing Survey prize draw

Terms and conditions of entry into the prize draw: Entry into the lottery is determined by the completion of a survey about your community and your wellbeing, promoted by mail-outs, emails and online advertising. Everyone who completes the survey online at www.regionalwellbeing.org.au or returns a completed paper survey will be eligible to enter the prize draw for one of 18 prizes to the total prize pool value of $7,000. Winners will have their choice of a Flight Centre, Coles-Myer, WISH or Bunnings gift card, to the following value: First prize: $2,000; Second prize: $1,000; third to eighth prize: $500; 10 runner-up prizes of $100. Entries for this competition open on November 1st 2018 and close December 14th 2018. The prize draw will be conducted 2pm January 4th 2019 at the Centre for Research and Action in Public Health, University of Canberra, Building 22/B, University Drive South, Bruce, ACT, 2617. The winner will be notified in writing, by email or mail, by January 11th 2019 and listed on www.regionalwellbeing.org.au and in The Advertiser newspaper by January 11th 2019. Gift cards will be posted to winners by registered post. The minimum age of prize draw participants is 18 years. Survey promoter: University of Canberra. Contact agent: Dr Jacki Schirmer, Associate Professor, University of Canberra, Building 22/B, University Drive South, Bruce ACT 2617, ABN 81 633 873 422. Phone 1800 981 499. Any prize redraw will occur three months after the first draw to give winners sufficient time to collect their prize. The prize redraw will happen on April 11th 2019 at 2pm at the same location as the original draw. The winner from the redraw will be notified by email or mail , by April 15th 2019 and listed on www.regionalwellbeing.org.au, and in The Advertiser newspaper on April 17th 2019. The winner from the redraw will be notified in writing, by email or mail, and all gift cards won in the redraw will be posted by registered post. The Licence No T18/1898 (South Australia), ACT TP18/02086 (ACT), LTPS/18/29153 (New South Wales & Northern Territory).

Appendix 2.4: Participant recruitment methods, 2018 Regional Wellbeing Survey

Table A2.1 Summary of participant recruitment methods used in the Regional Wellbeing Survey

	Population frame	Sampling method	Invitation method	Anticipated sample biases when using this population frame
Flyers to households	The population frame was Australian households included in the Australia on Disc database. At the time of surveying, this database included approx. 48% of all Australian private households. The flyer contained an invitation for current adult residents of the household to complete the survey.	Stratified random sampling, with stratification by region to over-sample rural and under-sample metropolitan areas. This ensured a sufficient sample of rural participants.	Flyers delivered via Australia post (see Appendix 2 for copy of flyer).	Likely to be over-represented: Those who own their home and have lived in one place for a long time. Likely to be under-represented: Those who have recently changed address, renters, those with limited literacy.
Online survey panel (Qualtrics)	Members of online survey panels. Participants were recruited by Qualtrics, a specialist online survey company. Qualtrics were selected as they use blended samples from multiple high quality online panels that have been assessed by Qualtrics as meeting key standards required for quality sampling. They were required to meet sample quotas for the following groups, with a goal of achieving sufficient sample to enable robust sample weighting based on these groupings: 48% male, 52% female; 27% aged 18-30, 27% aged 31-45, 27% aged 46-64, 20% aged 65 or older; 400 from each of the greater urban areas of Sydney, Melbourne, Adelaide, Brisbane, Perth; 300 from remainder Queensland, SA, WA; 200 from ACT, remainder NSW; 100 from Hobart, remainder Victoria, remainder Tasmania, and NT. Once quotas were met, Qualtrics continued collecting additional sample in each group rather than refusing additional completions.	Quota sampling from members of online survey panels. Rather than specify a quota that was representative of the adult population, the quotas were designed to ensure a sufficient sample of each group likely to represent a 'cell' in subsequent weighting.	Emailed invitation from survey panel to member of panel.	Unknown. This was assessed as part of this study.
Social media advertising (Facebook 80%, Instagram 20%)	The population frame was active Facebook and Instagram users in Australia. At the time, 83% of Australians aged 14 and over (17.1 million) visited Facebook at least once every month, and 8 million visited Instagram in an average 4 weeks (most of whom also access Facebook) (Roy Morgan 2019). Posts promoting the survey and inviting participation were boosted to all Australian adults over a 6-week period, with specification to display 50% of ads to areas outside major metropolitan centres and 50% within. There was theoretically an equal probability of any Facebook or Instagram user being shown the post in their feed within these specified quotas for display. 80% of budget was spent on Facebook and 20% on Instagram.	Opportunistic sampling with some characteristics of quota sampling and random sampling.	Posts displayed in a person's social media feed.	These sites are more often used by Generation X (87%), Gen Y (86%) and Baby Boomers (86%). Pre-Baby Boomers (born 1944 or earlier) have only 65% use of Facebook, and Gen Z (born 1997 onwards) have 82% usage (Roy Morgan 2019). Instagram, meanwhile, is largely skewed to Gen Z and Gen Y. This means people aged 73 and older were likely to be under-represented compared to other age groups across both platforms and Gen Y slightly over-represented in sampling.

	Population frame	Sampling method	Invitation method	Anticipated sample biases when using this population frame
Online word of mouth	People who completed the survey were encouraged to forward the invitation to participate to their social networks. Multiple community organisations also promoted the survey through their networks, in emails, newsletter items, and on social media sites.	Opportunistic, non-random sampling with no specific design.	Email, sharing of social media posts.	Unknown, but expected to have significant bias in sample achieved.
Existing survey participants (Regional Wellbeing Survey)	Participants who had previously completed the annual Regional Wellbeing Survey (RWS) were invited to participate in the 2018 RWS. They were asked questions about participation in fishing as part of the survey. These participants were originally recruited largely through mailing of flyers to randomly selected letterboxes, with stratified random sampling used.	The majority of this group were originally recruited using a random selection process. However, subsequent to initial recruitment some participants are more likely to continue participating than others.	Email or paper survey sent in mail (based on participant's stated preference).	Over time, some participants will stop participating. There is limited evidence on which participants, but evidence from longitudinal studies suggests those experiencing high levels of stress or disadvantage are more likely to drop out, and that older respondents may be more likely to continue participation.

Appendix 2.5 Stage 1 Statistical weighting: background and procedure

Weighting' refers to a statistical process in which known biases in the responses received are corrected for. This Appendix first describes weighting, and then explains the weighting procedure used in Stage 1 data weighting and shows the difference that weighting makes to the findings[1].

Weighting is a strategy employed in various types of research to adjust data that is for one reason or another not representative of the population of interest. Very often this data is derived from surveys which typically cannot achieve perfectly distributed and representative responses. To correct for discrepancies between the sample and the population, and to help to ensure that claims based on the sample are generalisable to the population 'weights' can be generated.

Weighting of survey responses is used in many surveys and is increasingly used in large household surveys conducted by national statistical agencies such as the Australian Bureau of Statistics (see for example ABS 2017), as well as in large probability-based sampling surveys conducted by both market research and non-market research organisations (Keeter et al. 2017). Despite its widespread use by government and private sector organisations conducting surveys, including most national statistical agencies conducting population surveys, not all survey researchers are familiar with statistical weighting or its use.

Understanding weighting is critical when using non-probability survey sampling, as 'non-probability approaches rely more heavily on … the selection, availability and quality of the variables used for respondent selection and *post hoc* adjustment' (Baker et al. 2013 p. 93). The post-hoc adjustment is the weighting process, and it is becoming increasingly important for probability surveys as reduced sample frame coverage and reducing response rates create challenges.

What is a 'weight'?

Weights are a "multiplying factor applied to some or all of the respondents in a survey" (Sharot, 1986, p. 1). Weights can be any positive number. Weights above one will increase the relative contribution of an individual response, whereas weights between 0 and 1 will reduce the contribution.

While the goal of all weighting approaches is to increase the representativeness of the sample, the underlying reasons for the non-representativeness will affect the choice of method. Non-representativeness can be classified into three broad categories:

1. "When unequal probabilities of selection are an integral part of the sample design (the sample is deliberately designed to have variable sampling fractions, or disproportionate sampling, for example by using stratified random sampling).
2. When the design has equal probabilities, but the achieved sample is visibly 'unrepresentative' when compared with (say) the population age structure (post-stratification).
3. When non-probability sampling methods are used, and weighting is used to achieve a 'balanced' sample" (Sharot, 1986, p. 1).

Typically, weights included to correct for the first type of non-representativeness are termed 'design weights' (also called 'sample weighting adjustments') as they have been planned for as part of the sampling process. When using weights to address the 2nd and 3rd types of non-representativeness, post-hoc/non-response adjustment weights (designed to correct for biases identified after data collection is complete) are used. The processes used for design and post-hoc weights are largely

[1] Some of this content was adapted from content produced in another report prepared by the Regional Wellbeing Survey team for the Victorian Department of Jobs, Precincts and Regions. Dominic Peel authored a substantial proportion of the original content that has been modified for this report.

similar, and in the following description we do not distinguish between the two, as it is relatively common for weighting to need to address both planned and unplanned bias in survey responses. Many people conduct weighting as an iterative process in which design weights are first put in place, followed by non-response weights, however others assign all weights in a single operation after survey data are collected (Kalton and Flores-Cervantes 2003). When using nonprobability survey recruitment methods, it is not always possible to use two-stage weighting, as properties of the people who were invited to participate in the survey are not always known (for example, those who were displayed an ad online or in a social media feed, or the number and type of online panel members sent an invitation to do the survey). Where those properties are known, two-stage weighting similar to probability-based surveys is possible and has been demonstrated to be effective in addressing selection/non-response bias (Arcos et al. 2020). However, Arcos et al. (2020) also found that using two separate steps was not necessary and that it was possible to weight by calibration to benchmark data on the panel used and the target population in a single step, rather than using a two-step process. In non-probability samples, weighting is typically undertaken as a single step process as it is not possible to separate sampling bias from non-response bias (Vehovar et al. 2016).

In the case of the data collected on fishing as part of the Regional Wellbeing Survey (RWS), all three types of non-representativeness may be present, with at least two being present for all five recruitment techniques (some used probability sampling, as described earlier, and so do not have the non-probability sampling form of non-representativeness). The sample is deliberately stratified in most cases, resulting in a need for design weights. The sample also has response bias, similar to almost all surveys, requiring post-hoc sample weights.

This means that weights need to be calculated before the survey data can be used to make inferences about the population. If it is only the characteristics of the sample that were of interest, and generalisability to the population of a region is not a concern, weights are not always necessary.

There are several different ways to calculate weights for a given sample. Three methods are discussed below, as all can be used in recreational fishing surveys: cell weighting, raking/rim weighting, and GREG weighting.

Cell weighting (also called adjustment cell weighting)

The simplest way to calculate weights for a survey sample is to compare the distribution of responses across one or more variables of interest to the broader population. This is known as ‘cell weighting’, as effectively ‘the sample of respondents is divided into a set of adjustment cells, and the respondents in each cell are weighted up in an attempt to compensate for the nonrespondents in those cells’ (Kaltan and Maligalig 1991, p. 415) using either benchmark data for the population from an external source, or using information on non-respondents from a sample survey. In this report, we focus on using benchmark data from an external source, as for the RWS, external data from the Australian Bureau of Statistics are used to identify what representation different groups of people have in the population.

For example, suppose that we knew, based on a census or some other source of reliable data, that the population was exactly 50% male and 50% female. We then randomly select 100 people from this population survey them. If responses to our survey items differed by gender, we may find that our sample is biased compared to the population. We check this and find that our sample contains 40 male and 60 female respondents.

As the goal of surveys is often to describe the way things are in the population, we will have to correct for this bias. One way to achieve this is to create a weight for our sample. We know that there are 60 female respondents and 40 male respondents, 60 is 1.5 times 40 (60/40=1.5), so we can give female respondents a weight of 1 and male respondents a weight of 1.5. We can now apply these weights:

(40 male * 1.5) + (60 female * 1) =

(60 male) + (60 female) =

120 respondents, 50% male and 50% female

This presents an additional problem, which is that the total number of weighted respondents is now 120 instead of 100. Most statistical software is able to account for this, but, in some cases, it may be important that the weighted total and the unweighted total are consistent. This can be achieved by calculating the ratio of the weighted total to the unweighted total: (weighted total 120) / (unweighted total 100) = 5/6. We then multiply the weights by this ratio, resulting in a weight of (1.5 * (5/6)) = 1.25 for male respondents and (1 * (5/6)) = approximately 0.833 for female respondents. We can now apply these weights to our sample:

(40 male * 1.25) + (60 female * 0.833) =

(50 male) + (50 female) =

100 respondents, 50% male and 50% female

Sometimes researchers want the weighted total of the sample to add up to the total of the population. If we suppose that the total population our sample is drawn from is 1000 persons, to calculate the weights we take the number of people in the population and to divide that by the number in the sample. In this example, the weights would be calculated as below

(500 males in population) / (40 males in sample) = 12.5

(500 females in population) / (60 females in sample) = 8.33

This example assumed a random sampling strategy, where every person in a population has an equal chance of being included in a survey sample. In many real-world cases this is not a safe assumption, as some types of respondents are more likely to be included in the survey sample than others. This is of particular importance when a stratified sampling strategy is employed, with different groups sampled at differing intensities – as is done in the RWS.

For example, suppose we have a population of 1000 children that attend five different schools with unequal populations. The population of each school is detailed in Table A2.2.

Table A2.2 Example population and sample

	Population				Sample		
School	Female	Male	Total	School	Female	Male	Total
A	60	40	100	A	10	12	22
B	77	110	187	B	15	20	35
C	51	49	100	C	23	12	35
D	35	40	75	D	9	18	27
E	50	45	95	E	35	7	42
F	65	35	100	F	17	14	31
G	60	25	85	G	22	19	41
H	80	20	100	H	30	8	38
I	60	60	120	I	14	24	38
J	20	18	38	J	6	5	11
Total	558	442	1000	Total	181	139	320

Table A2.2 shows that of a total population of 1000 we achieved a sample of 320, or 32% of the total population (in many real-world settings this would be a very high response rate). The response rate is not, however, constant across schools. Because of this, we cannot use a weight based on gender alone. If we did, the totals would be correct, but we could not look at schools individually.

School A, for example has a response rate of 22% while school C has a response rate of 35%. A child attending school C thus has a greater probability of being sampled than does a child attending school A.

We must create a weight that accounts not only for gender, but school. This is a relatively straight forward process to do manually, although it can be labour intensive if there are a large number of variables to weight by.

To generate arithmetic weights in this example, the numbers of respondents of each gender in each school are tabulated, as in Table 3, and the population divided by the sample. For a female respondent in School A, the weight would be calculated as below:

(60 School A females in population) / (10 School A females in sample) = 6.

As an increasing number of variables are added, it is common to have relatively small numbers of respondents in each 'cell' being weighted.

The primary advantage of cell weighting is its simplicity: the method is easy to use and able to be readily calculated using a simple spreadsheet. It is possible to calculate weights that incorporate several benchmark variables, and to cope with missing data by using available data and imputing a mean for missing data. Cell weighting is also advantageous in that the only assumption made is that data are missing at random, an assumption common to every weighting method and thus one whose problematic nature is not readily overcome.

However, the ability of cell weighting to be used even when the sample for a particular weight is small also leads to disadvantages, the principal one being the risk of increasing bias in the dataset if a large weight is given to a small number of respondents who are not representative. Kaltan and Maligalig (1991) describe this as the risk of losing precision in estimation due to variance introduced by the weighting process – while bias in sampling is reduced, variance can be increased. For example, imagine a sample is weighted by age, gender, whether a person is a farmer or not, and whether they live in a particular region or not. Depending on how many people were surveys in each of the categories included in the weighting process, some weights may be based on very small sample sizes. There may only have been five men aged under 30 who were farmers and lived in a given region, and if substantially under-represented in the sample compared to their proportion of the population, the weight assigned to those five men may give a weight of 4 or 5 to each response – magnifying any bias introduced if those five do not happen to be representative of male farmers aged under 30 who live in the region being examined.

To reduce the risk of this, two principles can be used. First, it is useful to set a minimum sample size permitted in any category that is weighted. Ideally, no weight would be calculated for a sample under a size of around 100 people, as this substantially reduces risk of high bias. However, this is not always realistic, particularly when weighting for groups that have relatively small populations. Balancing the need to be able to weight for characteristics that matter, and the need to have large enough groups to reduce risk of bias, we recommend that at least 50 people be in each category weighted, with smaller groups than this only included if there is reasonable evidence that there is a low risk of bias (for example if the groups do not differ substantially in their survey responses to other similar groups this may provide useful evidence). However, Kaltan and Maligalig (1991) recommended minimum samples for each cell of as little as 25, and consideration can be given to small sample sizes for each cell if there is a robust argument for doing so. In the 2018 RWS, the stratification of sampling was designed to ensure sufficient numbers in each category to support robust weighting – this was the core

rationale for the use of random stratified sampling and enabled a minimum of 50 responses per cell (and usually well over 200 per cell).

The second method that can be used is trimming the weights, also termed winsorising, in which the weights calculated are inspected to identify whether any are considered extreme in terms of reducing or increasing the weight of a small number of survey responses - the consequence of having a small number of observations corresponding to a particular benchmark category (Kaltan and Maligalig 1991, Central Statistics Office 2001). To control for extreme weights, weights can be winsorised by stating that no weight can be larger than a certain percentile of the total distribution of weights (e.g. the 95th percentile) thus limiting the effect of unrealistically high weights by removing outlier weights that are substantially higher or lower than others in the dataset. Winsorisation can be an appropriate method of adjusting the data when the source of data bias is known, and when comparison of winsorised and non-winsorised datasets against independent benchmarks for key variables showed that the winsorised data better reflects distributions seen in other datasets. Winsorisation at the 95th percentile is recommended for any weighting methods (whether arithmetic or using other weighting methodologies) if the data meets these two conditions.

Raking/rim weighting

Rim weighting (also called raking) is a weighting method that is used when 'interlaced' (cross-tabulated) benchmark data are not available to enable cell weighting, or when researchers want to weight by a larger number of variables than would be feasible with cell weighting (Sharot, 1986, p. 9) due to the very small numbers of respondents in some categories.

Rim weighting "operates only on the marginal distribution of the auxiliary variables" (Kalton & Flores-Cervantes, 2003, p. 86) (e.g. the variables we are using in our weighting method) and generates weights in an iterative way. For example, suppose we want to weight by two variables, age and gender. The sample is firstly weighted by one variable (e.g. age). It is then weighted by the second variable (e.g. gender) and a second set of weights are created. The first set of weights are multiplied by the second to create a final weight. This is slightly less prone to very high weights than adjustment cell weighting, although only to a small extent when an external benchmark data set is used according to Kaltan and Maligalig (1991), who also question whether raking/rim weighting has any meaningful differences to adjustment cell weighting in cases of having availability of an interlaced (cross-tabulated) external population benchmark dataset.

However, a number of specific raking algorithms have been developed that aim to iteratively optimise weighting using this method such that:

> "*The weighted sample will not be exactly balanced against any of the preceding variables, but the balance is (hopefully) better than prior to weighting. The whole process is then repeated, starting with the first variable, and continuing until either: (a) a satisfactory balance is achieved on all axes, (b) no further convergence can be obtained, (c) the number of iterations reaches a pre-set limit*" (Sharot, 1986, p. 9).

Essentially, raking is an iterative version of cell weighting in which the sample is iteratively weighted by one variable at a time, with the sum totals checked at each step and adjusted until 'convergence' is reached, interpreted as meaning the sum of the sample is the same as the sum of people in the population or the sum of the people who completed the survey.

See Kalton and Flores-Cervantes (2003) and Baxter (2016) for a review of different approaches to raking/rim weighting: beyond the simple approach described here, weight capping (similar to winsorisation) can be used at each step of weighting in raking/rim weighting to reduce the increase in sample error resulting from weighting; Baxter (2016) argues instead of using weight capping a process of asymmetric rim weighting should be used. Raking and rim weighting are sometimes considered better for situations with small sample sizes in individual cells, and some advocate use of a

mixed-method approach in which cell weighting is used where sample sizes are sufficiently large, and raking for small sample size cells (Kalton and Flores-Cervantes 2003).

In general, raking/rim weighting can reduce risk of large outlier weights that can result from cell weighting, but still has the same assumption that data are missing at random, and increases sampling error, with the overall argument being that the reduction in bias should be greater than the increase in sampling error (Baxter 2016). It is arguably able to be used with smaller cell sizes, with some recommending a minimum sample size of as little as 10 people for each category within variables used to iteratively weight the sample (Kulas et al. 2018).

Linear and regression weighting

Linear and regression weighting are two examples of *general calibration* approaches to weighting which enable the simultaneous inclusion of benchmark information and of potential restrictions to the range of weights to be produced (Vehovar et al. 2016).

Linear weighting is a form of raking/rim weighting in which a specific distance function is used that draws on generalised regression modelling. As with rim weighting, weights are based on the marginal distributions of the weighting variables. Here we focus on generalised regression (GREG) weighting rather than linear weighting, as GREG weighting is adjusted to remove the potential for negative weights that can occur with the simpler linear weighting (Kalton and Flores-Cervantes 2003).

Generalised regression weighting, or GREG weighting, is a form of linear weighting in which "weighted sample estimates for quantitative variables conform to population parameters" (Kalton & Flores-Cervantes, 2003, p. 88). The RWS has been weighted using the Australian Bureau of Statistics GREGwt in past years.

Other forms of regression weighting are also used, including logistic regression modelling to adjust for non-response (Kalton and Flores-Cervantes 2003); in this report GREG weighting is most relevant as it is designed to be used with external benchmark data sets whereas logistic modelling focuses on non-response within a given sample.

Common issues with weighting

The ability of weights to make a sample representative is, irrespective of the specific method used, always dependent on the variables used to construct the weights. For weights to be effective the variables must be correlated with (non-)response. Demographic variables such as age and gender typically address some of the bias, but there may be other important variables that will need to be included in the weighting procedure for estimates to be reliable. There must also be a robust benchmark data set available that can be used to assess response biases: this is often challenging, as even national census have some bias in responses and under- and over-represent some groups. Thus even with use of weights, a lack of accuracy in benchmark datasets, or lack of availability of benchmarks, can reduce effectiveness (Keeter et al. 2017).

In general, salience bias is the most challenging issue: this means the tendency of people to be more likely to do surveys that are of high interest to them and less likely to complete surveys of low interest, resulting in a bias of respondents towards those with greater interest in the topic of the survey. This can only be addressed in weighting if there is a benchmark dataset available that accurately describes what proportion of people have a strong versus moderate or low interest in specific topics, and that can be compared to level of interest recorded in survey questions.

An example of this is provided by a survey of television viewers in which there was a greater propensity for 'heavy viewers' to participate because they were more interested in the topic. Heavy, medium or light television viewing was not highly correlated with demographic variables, so for

estimates derived from the survey to be reliable the sample would have to include television viewing frequency/duration in the weighting procedure (Sharot, 1986, pp. 5–6).

In the television viewing example, the source of the bias is known and can be accounted for. In many surveys, however, sources of non-response are not known, thus cannot be included in the weighting procedure. In general, reliable benchmark data are not available for salience bias.

Propensity score adjustment

Propensity score adjustment (PSA) is a form of weighting that relies on having access to data on response propensities or otherwise conducting specific surveys that identify non-response probabilities (Greenacre 2016). Typically, a small probability-based reference survey is conducted on the same topic as the nonprobability survey. Findings from the probability based survey are then used to provide weights for the non-probability survey (Vehovar et al. 2016). This approach assumes that the probability survey will be highly robust and not have issues of sampling and non-response bias such as those described earlier in this section, an assumption that can be problematic. However, it is useful to compare findings of probability and non-probability sampling approaches more generally, and this report does this where feasible for fishing surveys. Propensity score weighting is increasingly used in a number of surveys, including non-probability surveys and some probability surveys where a higher quality reference probability survey is available (Arcos et al. 2020). Some new methods are also emerging for generating weights for blended surveys that use both probability and non-probability sample, and this area of weighting research is expected to advance considerably in the near future (e.g. Robbins et al. 2019).

What matters more: choosing the right variables, or weighting method?

Mercer et al. (2018a,b) compared different weighting methods and concluded that choice of weighting methodology was less important than ensuring optimal choice of variables used to weight the dataset – for example, should weighting be based on adjusting the survey sample so it is representative of gender and age of respondents, or of gender, age and educational attainment, or of gender and geographic location of residence? These decisions create large variance in the weights assigned. If too many variables are used in weighting, sampling error can increase substantially due to small cell sizes for some aspects of weighting; too few may miss important sources of bias in the dataset. Overall, Benford et al. (2009) recommend focusing on selecting the fewest possible variables that represent the greatest amount of bias in order to maximise efficiency of the weighting while reducing risk of substantial increase in sampling error by unnecessarily weighting using variables that are not as relevant.

In reality, the choice of variables also depends on availability of suitable benchmark data. Thus the decision becomes what available benchmark variables are suitable to use for weighting a dataset.

It is important to recognise that no approach to weighting should be expected to fully remove sample bias. To achieve this would require perfect external benchmark data that corresponds to 100% of the factors associated with sample bias – which is not realistic. Thus all survey data that use weights will have some remaining bias, although the extent of remaining bias is debated, with some arguing that it is difficult to remove more than 30-40% of bias (e.g. Mercer et al. 2018b) and others finding that up to two-thirds to three-quarters of bias can be removed (see Benford et al. 2009).

It is also important to carefully identify when weights should be applied and when they should not be used. Dey (1997) found that weights were appropriate to apply when conducting univariate analyses – i.e. basic descriptions of a population. However, Dey recommended that weighting not be used when conducting statistical analyses such as correlation tests and regression modelling, as in his study weighting did not improve quality of analyses that sought to examine what factors explain differences in characteristics. Therefore in this report and others, weighting is used when presenting overall 'descriptive' findings, to ensure they are representative of the population, but is not used when

examining analyses not seeking to make statements about the population such as those that identify what factors predict whether a person holds a particular attitude or fishes in particular ways.

The RWS sample is designed to ensure a large enough sample is achieved of each group (such as men, women, people aged 18-29, or people living in a particular region) that is expected to form a 'cell' when statistical weights are developed to enable analysis that produces findings that are representative of the adult population. This means that rather than attempting to recruit a sample that exactly represents the adult population of Australia, the goal is to achieve a minimum sample of all groups who may be analysed or for which bias in responses is expected to occur. Statistical weights are then developed to correct for both planned and unplanned bias in the sample and enable production of findings that are representative of the Australian population.

This approach means that a key part of preparing data for analysis is analysing the characteristics of the sample compared to the Australian population, followed by calculating statistical weights.

Table A2.3 summarises the characteristics of the sample by recruitment method and compares these characteristics to benchmark data from the 2016 Census of Population and Housing. Both the survey sample and data from the Census are for the adult Australian population as of 2016, defined as all those aged 18 or older. Table A2.3 shows that:

- As planned, all sampling methods other than the online survey panel oversampled farmers and those living in rural and regional areas outside major cities. This was a result of deliberate stratification/quota sampling.
- As planned, States and Territories with smaller populations were oversampled. This stratification ensured there would be a large enough sample from each to report results for every State and Territory (simple random sampling would result in very small samples for the Northern Territory, Tasmania and the Australian Capital Territory that would not enable separate reporting for these; stratified random sampling ensures sufficient sample to allow findings to be produced for these smaller population jurisdictions).
- There was bias towards female respondents in all recruitment methods. This was at the expected level in all recruitment methods except social media, where the bias towards female respondents was much higher than expected. This may be in part due to higher frequency of Facebook use by females, found in some previous work, which means that ads have a higher probability of being displayed on the Facebook feeds of females compared to males (Clement 2019). This suggests a need to specify boosts and ads be displayed to an equal number of males and females when booking them on social media; this may somewhat reduce the over-representation of females.
- As expected, flyers and existing participants were biased to older participants, while the online panel was biased towards younger participants. Social media advertising under-represented those aged 65 and older as expected, but did not over-represent the youngest age groups, consistent with expectations. The use of both social media and the online panel was essential to increasing recruitment of younger age groups to sample sizes that would enable statistical weighting to be used.

To be suitable for weighting, data need to have sufficient sample in every group that may form a 'cell' for weighting, to ensure that weighting does not cause substantial increase in error. This ideally requires a sample of at least 100, and at a minimum 50, people in each group that may be assigned weights (such as different age groups, gender, and those living in different regions). This was achieved in the sample.

Table A2.3 Comparison of Regional Wellbeing Survey respondents to characteristics of rural and regional Australians

Characteristic		Australia, 2016[1]	Regional Wellbeing Survey, 2018 (respondents to fishing questions)	Existing survey participant (stratified sample)	Online survey panel (stratified sample)	Flyers to households	Social media advertising	Word of mouth	Unknown
Expected bias due to deliberate stratification of sampling			Oversampled farmers, States/ Territories with smaller populations, rural/regional areas	Oversampled farmers, Victorians	Oversampled regions with smaller populations	Oversampled farming properties	None	Same as for RWS	Same as for RWS
Predicted response bias			Over-represent females, older age groups	Over-represent females, older age groups	Over-represent females, younger age groups	Over-represent females, older age groups	Overrepresent females, younger age groups	Unknown	Unknown
State	**NSW**	**32.0%**	25.4%	31.1%	15.6%	21.8%	41.7%	43.7%	18.1%
	Vic	**25.5%**	21.4%	34.6%	13.2%	21.9%	18.0%	26.2%	14.8%
	Qld	**19.9%**	14.5%	10.2%	18.4%	10.9%	18.5%	7.6%	17.5%
	SA	**7.3%**	13.1%	10.0%	18.7%	9.8%	5.0%	9.4%	17.6%
	WA	**10.5%**	14.3%	6.1%	22.6%	13.8%	6.1%	7.1%	20.8%
	Tas	**2.2%**	6.5%	6.2%	5.0%	14.2%	6.3%	5.2%	5.0%
	NT	**0.9%**	2.0%	0.9%	1.9%	5.7%	1.1%	0.5%	2.0%
	ACT	**1.7%**	2.8%	0.9%	4.6%	1.8%	3.3%	0.3%	4.2%
Gender	**Female**	**51.2%**	64.8%	62.4%	59.2%	62.2%	88.8%	73.0%	61.5%
	Male	**48.8%**	35.2%	37.7%	40.8%	37.8%	11.2%	27.0%	38.5%
Age	**18-34**	**30.3%**	22.5%	11.3%	37.0%	11.5%	26.9%	12.9%	34.4%
	35-44	**17.3%**	14.6%	10.9%	16.5%	11.1%	22.3%	13.4%	16.0%
	45-54	**17.1%**	16.6%	16.6%	13.1%	17.7%	23.4%	25.4%	14.1%
	55-64	**15.1%**	21.8%	30.7%	13.9%	27.5%	20.1%	28.8%	15.4%
	65+	**20.2%**	24.4%	30.5%	19.5%	32.1%	7.3%	19.6%	20.2%
Urban-rural	**Major cities**	**71.2%**	41.4%	7.8%	73.3%	35.1%	26.5%	12.2%	17.7%
	Regional/rural	**28.8%**	58.6%	92.2%	26.7%	64.9%	73.5%	87.8%	82.3%
Farmer[2]	**Farmer[2]**	**0.77%**	14.0%	17.3%	1.5%	6.5%	5.7%	15.7%	27.8%
	Non-farmer	**99.23%**	86.0%	82.7%	98.5%	93.5%	94.3%	84.3%	72.2%

[1]Data source: Australian Bureau of Statistics *Census of Population and Housing* 2016. Data accessed via TableBuilderPro.

[2] Estimates of employment as a farmer in the Census are likely to be an underestimate, as they do not include people whose secondary occupation is farming.

Survey weights were developed using a raking/rim weighting approach where weights were developed iteratively using one weighting variable at a time. This approach was chosen because it provides a good compromise between accuracy of the weights and avoiding issues that can occur in cell weighting where the sample is 'spread too thin' (Battaglia et al., 2009), causing some cells to have very low counts, which results in unrealistically high weights for some respondents.

The benchmark data set used was the Australian Bureau of Statistics 2016 *Census of Population and Housing.* The variables used to develop the weights were:

- Gender (male or female),
- Age (in four groups: 18-39, 40-54, 55-64 and 65+)
- Farmer status (farmer or non-farmer)
- Regional Development Australia (RDA) region (RDA boundaries are useful ways to not only address urban/rural differences in sampling, with RDAs split into urban versus non-urban regions, but also differences in State/Territory and remoteness in sampling.) For information about these regions, see https://www.rda.gov.au/.

These variables were chosen because preliminary investigation showed that respondents were, on average, more likely to be female, older, more likely to be farmers and were geographically distributed differently to the Australian population. Weighting by RDA region corrected for the over-representation of rural and regional areas in the dataset, as well as other stratification of sampling across different rural and regional areas.

Five iterations were performed, by which point the distribution of gender, age (in groups), farmer status and RDA in the survey sample was within 1% of that observed in the 2016 Census. This was deemed acceptable, and these weights were applied to all subsequent analyses.

The dataset was weighted as a blended sample, in which the weighting process was applied to the pooled sample achieved across all recruitment techniques, rather than to each individual sample recruited in different ways. This was done as assessment of responses identified that there was sufficient similarity in responses of participants recruited in different ways to support weighting the sample as a pooled sample (see Chapter 12). Weighting a pooled sample reduced risk of introducing error due to weighting small groups of people.

Appendix 2.6 Stage 2 survey questionnaire

Note: questions in blue font were asked only of those who indicated they were willing to complete the longer version of the questionnaire. Formatting presented in this Appendix is indicative only, with the survey predominantly conducted online.

Valuing recreational fishing

The national survey of fishers

What do you love about recreational fishing? Whether you fish one day a year or dozens of times, we want to hear from you Do any of the surveys held as part of the National Recreational Fishing Survey between 29 February and 22 May 2020 for a chance to win one of 12 weekly prize packs of tackle worth $600, drawn each Friday, three monthly holiday packs worth $1,800 each, and a grand prize fishing trip worth up to $5,000. The main survey was originally open until February 14th 2020, and those who participated by that date went into an earlier prize draw; we thank the Australian Fishing Trade Association for their generous donation of additional prizes that have allowed us to extend the time this survey is open. We want to hear from all fishers, including those who target species other than fish (such as yabbies, crays, crabs, shellfish and lobster), and those who use methods other than rod and line fishing, such as diving, spearfishing, potting or raking.

This study is documenting the different economic and social benefits of fishing for fishers, businesses, and communities. To do this, it asks you about many aspects of your fishing, including what you do and don't value about fishing, and what things improve or reduce the quality of your fishing experience. These include things you can put a dollar value on (such as how much is spent on fishing) and the things you can't (like the benefits of spending time with friends and family). The study is being conducted by the University of Canberra and the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES). It is funded by the Fisheries Research and Development Cooperation, the Australian Government, and supported by the Australian Recreational Fishing Foundation.

Everyone who participates between 29 February and 22 May 2020 can enter the draw to win weekly, monthly and a grand prize.

You can complete a short version of the survey (15-20 minutes) for one entry into the prize draw, or a long version (30-40 minutes) for four entries into the prize draw. Find out more about the project, how your confidentiality and privacy will be protected, and prize terms and conditions in the Information Sheet.

Need help, or prefer to do the survey on paper? Call 1800 981 499 and we can post a paper survey and reply-paid envelope out to you.

◯ Yes, I want to do the survey! Take me to the questions

◯ Not this time, thanks – I don't want to take part

Those who selected 'Not this time, thanks' were displayed the following questions before finishing the survey. Others were displayed the survey questions (starting on the next page).

The following item is displayed only to those who selected 'Not this time, thanks – I don't want to take part'

Before you go, do you mind if we ask why you chose not to take part in the survey today (select all that apply below)

☐ I don't fish very often

☐ I haven't fished for a long time

☐ I've never fished

☐ Not interested in the survey

☐ Don't have time to do the survey

☐ Other reasons (if you're willing, please let us know what they are) _____

Thanks for agreeing to take part in the survey!

Note that if your internet drops out, or you need to take a break, that's OK – as long as cookies are enabled on your device, the survey form will automatically remember what question you reached, and take you back to that point in the survey when you click on the survey link again.

To start, could you let us know whether you want to do a:

◯ Short survey (about 15-20 minutes, 1 entry into the prize draw)

◯ Long survey (about 30-40 minutes, but you get 4 entries into the prize draw) *Note: questions in blue font were displayed only to those who selected this option, and not to those who selected 'short survey'.*

Fishing here means catching fish and other species such as yabbies, crays, crabs, shellfish and lobster. It can be done using many methods, including rod and line fishing, diving, spearfishing, potting, raking and others.

The first questions ask how often you've been fishing in recent years, and whether the amount of fishing you're doing has been changing.

	Within the last 12 months	**2 to 5 years ago**	**More than 5 years ago**	**Never**	**Don't know**
When did you MOST RECENTLY go fishing (whether you caught anything or not)?	◯	◯	◯	◯	
When did another person living in your household MOST RECENTLY do any recreational fishing (whether they caught anything or not)? Answer based on whichever household member most recently went fishing.	◯	◯	◯	◯	◯

Note: those who selected 'more than 5 years ago' or 'never' were piped to the questions at the end of the survey starting with the statement 'You said you've never gone fishing, or you haven't gone in a long time. We're interested in finding out why – and if you answer a few short questions, you can then enter the prize draw for the survey.' They were not displayed other questions in the survey.

Comparing the fishing you did in the last 12 months to the previous year, did you go fishing… *Select one*	◯ More in the last 12 months than the previous year ◯ About the same amount of days in the last 12 months as the previous year ◯ Less days in the last 12 months than the previous year
Overall, would you say that in the last 12 months you have been able to fish…	◯ Much less than I wanted to ◯ A little less than I wanted to ◯ About as much as I wanted to ◯ A little more than I wanted to ◯ Much more than I wanted to

Note: throughout the online survey, display logic was used to only display questions that were applicable based on previous answers. For example, the next question was displayed only to those who had answered 'Much less than I wanted to' or 'A little less than I wanted to' for the previous question. The display logic used is not documented in detail in these questions; a copy of the survey including full display logic can be provided on request.

If you fished less than the previous year, or fished less than you wanted to, were any of the following reasons for this?

	No, not a reason for fishing less	One of the reasons I fished less	The main reason I fished less
Work – e.g. your work hours or workload stopped you going fishing as often as you would like	◯	◯	◯
Health problems	◯	◯	◯
I switched to doing a different hobby or sport than fishing	◯	◯	◯
My home commitments changed (e.g. you might have had a new baby, be renovating, or shifted house)	◯	◯	◯
Some of the people I used to fish with have stopped fishing or can't go fishing as often as they used to	◯	◯	◯
I can't get to my fishing spots as easily (e.g. because you have moved house)	◯	◯	◯
I sold a boat or other fishing equipment, and because of that I have fished less	◯	◯	◯
Access to fishing reduced around one or more of my fishing spots, e.g. there was an area closure or jetty closure.	◯	◯	◯
I couldn't afford to fish as often	◯	◯	◯
Fishing catch rates or quality of catch were poorer than usual			
Poor weather conditions (weather was often bad on days I wanted to go fishing)	◯	◯	◯
Poor environmental conditions (e.g. low water flows, water quality problems, concerns about fish health, etc.)	◯	◯	◯
No reason/unsure	◯	◯	◯
Other (please specify below)	◯	◯	◯

If you fished more than the previous year, were any of the following reasons for this?

	No, not a reason for fishing more	One of the reasons I fished more	The main reason I fished more
Retired, or reduced or changed work hours so I could go fishing more	◯	◯	◯
Improved health/fitness	◯	◯	◯
I started doing different types of fishing than I've done before	◯	◯	◯
My home commitments changed so I could do more fishing (e.g. you finished renovations, children moved out, etc.)	◯	◯	◯
I went fishing with new people I haven't fished with before	◯	◯	◯
The people I go fishing with were available to go fishing more often	◯	◯	◯
I moved to a different area where it's easier to go fishing	◯	◯	◯
I bought equipment such as a boat that makes it easier to go fishing	◯	◯	◯
Access to fishing improved in one or more of my fishing spots, e.g. improved jetty, boat ramp	◯	◯	◯
My finances allowed me to fish more often than I have previously	◯	◯	◯
Fishing opportunities improved e.g. strike rates increased, fishing was good for the species you like to target	◯	◯	◯
Good weather conditions (weather was good on a lot of days I wanted to go fishing)	◯	◯	◯
Improved environmental conditions e.g. better water flows, improved water or habitat quality, improved health of fish stock	◯	◯	◯
No reason/unsure	◯	◯	◯
Other (please specify below)	◯	◯	◯

If you fished more than you wanted to, what were the main reasons for this? (i.e. why did you do more fishing than you would have liked)	

What kinds of fishing do you do?

The next questions ask a bit more about the types of fishing you do. This will be used to understand how things like satisfaction with fishing, and expenditure on fishing, vary between fishers who do different types of fishing activities.

How often have you done the following types of fishing in the last 12 months? *Any day you went fishing on counts as a fishing day, whether you fished for an hour or eight hours.*	**In the last 12 months I have done this:**								
	Never	**1 or 2 days**	**3 or 4 days**	**5 to 9 days**	**10 to 14 days**	**15 to 19 days**	**20 to 29 days**	**30 to 51 days**	**52 or more days (once a week or more)**
ANY TYPE of fishing (including catching fish or other species such as yabbies, crays, crabs, shellfish and lobster, and using any method e.g. rod, line, diving, spearfishing or others.	○	○	○	○	○	○	○	○	○
How much of this was freshwater fishing (in inland rivers, lakes, dams)?	○	○	○	○	○	○	○	○	○
How much of this was estuary fishing (fishing in rivers or lakes that feed into the ocean, where water can be salty)?	○	○	○	○	○	○	○	○	○
How much of this was saltwater fishing in ocean waters or harbors/bays (whether from a boat, jetty, beach, rocks, diving etc.)?	○	○	○	○	○	○	○	○	○

You said you went fishing in FRESHWATER and/or ESTUARY areas in the last 12 months. How much of this involved the following? *(note that you can do more than one of these things in a single fishing trip – it's OK if your answers indicate you did multiple things on most trips)*	**None of my fishing**	**Some of my fishing**	**All my fishing trips**
Shore-based fishing (you fished from a jetty, river bank, etc.)	○	○	○
Boat-based fishing	○	○	○
Fishing competitions	○	○	○
Charter fishing/fishing with a guide	○	○	○

You said you went saltwater fishing in the last 12 months (ocean fishing or fishing in harbors/bays). How much of this fishing involved the following? *(note that you can do more than one of these things in a single fishing trip – it's OK if your answers indicate you did multiple things on most trips)*	**None of my fishing**	**Some of my fishing**	**All my fishing trips**
Shore-based fishing (you fished from a jetty, beach, rocks etc.)	○	○	○
Inshore fishing from a boat (defined as less than 5km offshore)	○	○	○
Offshore fishing (more than 5km offshore)	○	○	○
Fishing competitions	○	○	○
Charter fishing/fishing with a guide	○	○	○

*From this point, answer questions based on **all** your fishing activity – for example, in the following question, if about half your catch is in freshwater and half in saltwater, and in one you mostly catch and release while in the other you mostly eat your catch, you would answer that about half your catch is consumed and about half is catch and release.*

What do you do with your catch? *Don't include catch you return due to being under size limits, out of season/area, or outside catch limits.*	**None of my catch**	**Less than half of my catch**	**About half my catch**	**More than half but not all my catch**	**All my catch**
How much is consumed by members of your household (at home or at campsites etc)?	○	○	○	○	○
How much is given to other people?	○	○	○	○	○
How much is 'catch and release'? *(don't include catch you have to return)*	○	○	○	○	○
How much is used for bait?	○	○	○	○	○
How much is used in other ways? *(please describe)*	○	○	○	○	○

Some people usually fish alone, others go with family members or friends. In the last 12 months, how much of your fishing has involved…	**None of my fishing**	**Less than half of my fishing**	**About half my fishing**	**More than half but not all my fishing**	**All my fishing trips**	**N/A**
Fishing on your own (solo trips)	○	○	○	○	○	○
Fishing with other people who live in your household (tick N/A if you are one of the many Australians who live in a solo household)	○	○	○	○	○	○
Fishing with your children (whether they live with you or not; tick N/A if you don't have children)	○	○	○	○	○	○
Fishing with your partner/spouse/boyfriend/ girlfriend (whether they live with you or not; tick N/A if not applicable)	○	○	○	○	○	○
Fishing with family members you don't live with	○	○	○	○	○	○
Fishing with close friends	○	○	○	○	○	○
Fishing with your wider circle of friends (other than close friends)	○	○	○	○	○	○
Other (please describe below)	○	○	○	○	○	○

	Never	1 or 2 days	3 or 4 days	5 to 9 days	10 to 14 days	15 to 19 days	20 to 29 days	30 to 51 days	52 or more days (once a week or more)
In the last 12 months, about how often did other people in your household go fishing WITHOUT you? *(This may seem an odd question, but we're asking it to get a better understanding of 'fishing dynamics' within households – whether fishing is a 'contagious' hobby in households or often restricted to one household member)*	○	○	○	○	○	○	○	○	○

For some people, fishing is the main way they catch up with a lot of their friends, whereas for others they see friends and family a lot outside fishing. How much does fishing help keep you socially connected?

How important is fishing as a way of spending time and connecting with:	**FISHING is NOT AT ALL important to maintain my social connection** ⓪	①	②	③	④	⑤	⑥	⑦	⑧	⑨	**FISHING is VERY important to maintain my social connection** ⑩	N/A
Other people who live in your household (If applicable)	○	○	○	○	○	○	○	○	○	○	○	○
Your children (whether they live with you or not) (If applicable)	○	○	○	○	○	○	○	○	○	○	○	○
Your partner/spouse/boyfriend/ girlfriend (whether they live with you or not) (If applicable)	○	○	○	○	○	○	○	○	○	○	○	○
Family who don't live with you	○	○	○	○	○	○	○	○	○	○	○	○
Your closest friends	○	○	○	○	○	○	○	○	○	○	○	○
Your wider circle of friends (people you wouldn't say are your closest friends, but are part of your wider social circle)	○	○	○	○	○	○	○	○	○	○	○	○

Your overall health and wellbeing

The next questions ask you about your OVERALL health and wellbeing (in general, not just related to fishing). We're asking these questions to better understand whether participating in fishing has benefits for health and wellbeing. To be able to analyse this, we need to ask about your health and wellbeing, including whether you've experienced any events that may have had negative impacts on your health/wellbeing in the last two years.

The questions on this and the next page are standard questions asked in a lot of health and wellbeing surveys in Australia. We'll be able to use this information to compare recreational fishers to other people with similar characteristics (such as age and gender) across Australia. Please be honest in your answers – one important question for us to examine is whether going fishing helps people cope with hard times (or not), so it's just as important for us to know if you are experiencing difficulties or challenges, as it is to know whether your health and wellbeing are overall going well.

If any of the questions make you feel uncomfortable, you do not have to answer them (all questions are voluntary). If you are feeling distressed or need assistance, you can contact the following services for assistance, 24 hours a day:
Beyond Blue - 1300 22 4636 Lifeline - 13 11 14

Thinking about your own life and personal circumstances, how satisfied are you with the following?	**Completely DISSATISFIED** ⓪	①	②	③	④	⑤	⑥	⑦	⑧	⑨	**Completely SATISFIED** ⑩
Your life as a whole	○	○	○	○	○	○	○	○	○	○	○
Your standard of living	○	○	○	○	○	○	○	○	○	○	○
Your health	○	○	○	○	○	○	○	○	○	○	○
What you are currently achieving in life	○	○	○	○	○	○	○	○	○	○	○
Your personal relationships	○	○	○	○	○	○	○	○	○	○	○
How safe you feel	○	○	○	○	○	○	○	○	○	○	○
Feeling part of your community	○	○	○	○	○	○	○	○	○	○	○
Your future security	○	○	○	○	○	○	○	○	○	○	○

How would you rate your general health? *Select one*

○ Excellent ○ Very good ○ Good ○ Fair ○ Poor

In the last four weeks, how often have you felt…	**None of the time**	**A little of the time**	**Some of the time**	**Most of the time**	**All of the time**
Nervous?	○	○	○	○	○
Hopeless?	○	○	○	○	○
Restless or fidgety?	○	○	○	○	○
Depressed?	○	○	○	○	○
That everything was an effort?	○	○	○	○	○
Worthless?	○	○	○	○	○

In the last <u>two years</u>, have any of the following happened in your household? *Select **ALL** that apply*		
	☐ I had poorer health than usual	☐ I shifted house
	☐ Others in my household had poorer health than usual	☐ I had a sudden big financial stress e.g. a large bill that was not planned for
	☐ I lost my job	☐ I separated from or divorced my partner
	☐ I started a new job	☐ A close family member or friend passed away
	☐ My caring responsibilities increased e.g. you had a new child, had to care for unwell family member	☐ I had other unexpected stress in my life
		☐ None of these

The next question asks about how often you do different kinds of physical activity

In the last week, have you…	In the last week, how many times have you done this activity?	What do you estimate was the total time that you spent doing this activity in the last week?
Walking continuously, for at least 10 minutes, for recreation, exercise or to get to or from places	____ times	____ minutes OR ____ hours
Vigorous gardening or heavy work around the yard, which made you breathe harder or puff and pant	____ times	____ minutes OR ____ hours
Vigorous physical activity which made you breathe harder or puff or pant (e.g. jogging, cycling, aerobics, competitive tennis) - excluding household chores, gardening or yard work	____ times	____ minutes OR ____ hours
Any other more moderate physical activities that you have not already mentioned e.g. gentle swimming, social tennis, golf? - excluding household chores, gardening or yard work	____ times	____ minutes OR ____ hours

In an average 3 hours spent doing your most common type of fishing, how many minutes would you typically spend…	Type of fishing: _____ Walking or paddling/rowing briskly _____minutes Walking or paddling/rowing slowly _____minutes Standing/squatting _____ minutes Sitting _____minutes
In an average 3 hours spent doing your second most common type of fishing, how many minutes would you typically spend…	Type of fishing: _____ Walking or paddling/rowing briskly _____minutes Walking or paddling/rowing slowly _____minutes Standing/squatting _____ minutes Sitting _____minutes

Importance of fishing

For some people fishing is an occasional hobby that isn't the most important thing in their life, while for others it is their main passion in life. How important is fishing to you?

	NOT AT ALL important										**VERY important**
	⓪	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
Overall, how important would you say fishing is to your life?	○	○	○	○	○	○	○	○	○	○	○

The next questions ask what the most important aspects of fishing are to you. This helps us understand the ways fishing does and doesn't benefit different fishers – from providing opportunities to socialise, to providing a source of food, or providing physical and mental challenges. *When answering, please answer based on how important each thing is to some or all of your fishing (if it's important to one type of fishing you do but not others, based you answer on the type of fishing it is important to).*

How important are the following aspects of fishing to you?	**NOT AT ALL important**									**VERY important**	
	⓪	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
Relaxing/unwinding	○	○	○	○	○	○	○	○	○	○	○
Spending time outdoors/in nature	○	○	○	○	○	○	○	○	○	○	○
Spending time on your own	○	○	○	○	○	○	○	○	○	○	○
Spending time with family	○	○	○	○	○	○	○	○	○	○	○
Spending time with friends	○	○	○	○	○	○	○	○	○	○	○
Competing in fishing competitions (of any kind)	○	○	○	○	○	○	○	○	○	○	○
Experiencing physical and mental challenges e.g. due to weather conditions, terrain, process of catching fish	○	○	○	○	○	○	○	○	○	○	○
Catching fresh fish for myself or others to eat	○	○	○	○	○	○	○	○	○	○	○
Catching fish to release	○	○	○	○	○	○	○	○	○	○	○
Being able to focus on fishing and not think about other things	○	○	○	○	○	○	○	○	○	○	○
Learning about nature/the environment	○	○	○	○	○	○	○	○	○	○	○
Getting exercise	○	○	○	○	○	○	○	○	○	○	○

Sometimes fishing isn't as enjoyable as you want it to be – and that can reduce the benefits fishing provides. Understanding what things haven't been as good about your fishing experience lets us better identify how fishing experiences could be improved. The next set of questions asks if anything reduced how much you enjoyed fishing, or sometimes stopped you going fishing altogether by acting as a barrier to you going fishing.

Has anything reduced your enjoyment of fishing in the last year, whether it happened only on one fishing trip or on a lot of fishing trips? *Type as little or as much as you like below*

How often have any of the following been issues for you when considering going fishing, or when out fishing, in the last 12 months?	I fished less than I otherwise would have because of this	Didn't happen in last year	Happened rarely in last year	Happened sometimes in last year	Happened regularly in last year
Overcrowding of fishing areas	☐	☐	☐	☐	☐
Long queues at boat ramps (if applicable)	☐	☐	☐	☐	☐
Fishing has been hard to afford	☐	☐	☐	☐	☐
Had difficulty getting boat down ramp (if applicable)	☐	☐	☐	☐	☐
I felt my fishing skills needed to improve or be higher	☐	☐	☐	☐	☐
I had difficulty getting advice in gear/tackle shops	☐	☐	☐	☐	☐
Difficulty catching species I was targeting	☐	☐	☐	☐	☐
Difficulty catching anything	☐	☐	☐	☐	☐
A lot of catch was under size	☐	☐	☐	☐	☐
There was a lot of rubbish in the area I was fishing	☐	☐	☐	☐	☐
Weather conditions were poor	☐	☐	☐	☐	☐
Drought impacted health of environment or quality of fishing	☐	☐	☐	☐	☐
Poor health of areas where you fish e.g. poor water quality, poor health of river banks/vegetation	☐	☐	☐	☐	☐
Lack of toilet facilities	☐	☐	☐	☐	☐
Lack of fish cleaning and disposal options	☐	☐	☐	☐	☐
I was worried about risk of crime when I went fishing (e.g. when fishing at night or at a spot where other people concerned you)	☐	☐	☐	☐	☐
Other fishers behaving poorly	☐	☐	☐	☐	☐

Many people have multiple hobbies, and recreational fishing will be just one of them. The next questions ask about the different hobbies and sports you get involved in – and which one you would choose to do on a nice weekend if you had to make a choice between fishing and another activity.

	I don't do this	I do this and as a sport or hobby it is…										
Do you do any of the following hobbies/sporting activities?		NOT AT ALL Important to me										VERY Important to me
		⓪	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
Bushwalking or hiking	○	○	○	○	○	○	○	○	○	○	○	○
Jogging or running	○	○	○	○	○	○	○	○	○	○	○	○
Cycling (road riding or mountain biking)	○	○	○	○	○	○	○	○	○	○	○	○
Playing game stations/online games	○	○	○	○	○	○	○	○	○	○	○	○
Swimming	○	○	○	○	○	○	○	○	○	○	○	○
Surfing	○	○	○	○	○	○	○	○	○	○	○	○
Playing sports with others (e.g., tennis, football)	○	○	○	○	○	○	○	○	○	○	○	○

Going to gym or exercise classes	○	○	○	○	○	○	○	○	○	○	○	○
Camping	○	○	○	○	○	○	○	○	○	○	○	○
Horse riding	○	○	○	○	○	○	○	○	○	○	○	○
Kayaking or canoeing	○	○	○	○	○	○	○	○	○	○	○	○
Four-wheel driving	○	○	○	○	○	○	○	○	○	○	○	○
Clothes shopping (no, we're not kidding and yes, there's a reason we're asking!)	○	○	○	○	○	○	○	○	○	○	○	○
Attending sports games or events as spectator (e.g. football game)	○	○	○	○	○	○	○	○	○	○	○	○
Recreational shooting or hunting (other than fishing)	○	○	○	○	○	○	○	○	○	○	○	○
Playing golf	○	○	○	○	○	○	○	○	○	○	○	○
Other outdoor or sports activities (please describe e.g. lawn bowls)	○	○	○	○	○	○	○	○	○	○	○	○

If given the following options on a nice weekend, at the same cost, which would you choose to do? Imagine you have to choose between them and can't do them at the same time on this particular weekend (we know many of these things are sometimes done at the same time).	**I'd do the first activity**	**I'd find it hard to choose (I like both equally)**	**I'd go fishing**
HUNTING or fishing?	○	○	○
CAMPING or fishing?	○	○	○
BUSHWALKING or fishing?	○	○	○
FOUR WHEEL DRIVING or fishing?	○	○	○
OUTDOOR PICNIC/BBQ or fishing?	○	○	○
CLOTHES SHOPPING or fishing?	○	○	○
ONLINE GAMES/GAME STATION or fishing?	○	○	○
GO TO SPORTS GAME (e.g. AFL, rugby, other game you follow) or fishing?	○	○	○
GYM/EXERCISE CLASS or fishing?	○	○	○
BIKE RIDING or fishing?	○	○	○
SWIMMING or fishing?	○	○	○
SURFING or fishing?	○	○	○
KAYAKING/CANOEING or fishing?	○	○	○
Ggolf or fishing?	○	○	○

The next questions ask a bit about you. This is important as we want to understand how the benefits of fishing differ for different types of fishers. Some of the questions may seem intrusive; if any make you feel uncomfortable you don't have to answer them – just skip those that you don't wish to answer and go on to the next question.

Socio-demographic and geographic characteristics

Do you identify as… *Select one*	○ Female ○ Other e.g. gender fluid, inter-gender, no gender ○ Male ○ Prefer not to answer
How old are you?	Years: _____
How would you describe yourself? *Select one*	○ Australian-born ○ Born overseas in an English-speaking country e.g. UK, New Zealand ○ Born overseas in a non-English speaking country e.g. Indonesia, France

Are you of Aboriginal or Torres Strait Islander origin? *Select all that apply*	◯ No ☐ Yes, Aboriginal ☐ Yes, Torres Strait Islander
How would you describe your overall cultural background (e.g. Australian, Chinese, Japanese, English, Zimbabwean)?	Cultural background: _____
Have you completed any of the following formal qualifications? *Select **ALL** that apply*	☐ Year 12 of high school or equivalent ☐ Certificate or diploma ☐ University degree (undergraduate or postgraduate) ◯ None of these
Which best describes you at the moment? *Select one*	◯ Never married ◯ Divorced or separated ◯ Married or de facto ◯ Widowed
Who lives in your household at the moment?	Total number of people, including yourself: _____ Number of children aged under 5_____ Number of children aged 5-17: _____
How many of the people who live in your household go fishing?	Total number of fishers in your household, including yourself: _____ Number of children who fish aged under 5:_____ Number of children who fish aged 5-17: _____

Where do you live? We ask this because we analyse and produce results for different regions. To do this, we need to ask you where you live. We make sure to protect the privacy of our survey participants when we report results. *If you live in more than one place, please put in your primary residence*	**State / territory you live in:** *e.g. VIC, SA* _____ **Suburb, town or rural locality you live in:** _____ **Postcode you live in:** _____

Which of the following describes your situation right now? *Select **ALL** that apply*	☐ Self-employed ☐ I have full-time paid work ☐ I have part-time paid work ☐ I have casual paid work ☐ Unemployed & looking for work ☐ Care for dependent child/children	☐ Care for person/people with disability, physical or mental illness or frailty, drug or alcohol dependency, or other chronic condition ☐ Retired ☐ Studying part-time or full-time ☐ Other (please describe below) _____

The next questions ask about your household income and financial wellbeing. We know these questions are personal. They do help us understand how the benefits of fishing differ for people on lower versus higher incomes: this will help us identify how best to ensure benefits of fishing to different groups are maintained over time.

In 2018-19, about how much was your <u>household</u> income <u>before</u> tax? *Select one* *This includes income earned by everyone in your household. Include income from government pensions, investments/dividends, and paid work. The categories below may look odd – they let us compare our survey results to those from the national census, so we can't change them.*	◯ Less than $20,800 ◯ $20,800-41,599 ◯ $41,600-64,999 ◯ $65,000-$90,999	◯ $91,000-$155,999 ◯ $156,000-$207,999 ◯ $208,000 or more
Given your current needs and financial responsibilities, would you say that you and your family are... *Select one*	◯ Very poor ◯ Poor ◯ Just getting along	◯ Reasonably comfortable ◯ Very comfortable ◯ Prosperous

Your expenditure on fishing

This part of the survey asks questions that help us identify the amount you spend on fishing, and where you spend it. We ask for a lot of detail in this section. We know this can be frustrating, but it helps us identify the 'flow on' effects of recreational fisher

spending to other parts of the economy. It will enable us to identify how recreational fishing contributes to the Australian economy, and to different States and Territories.

If you don't fish often or do many trips, this section won't be too hard to answer. If you fish a lot, it will be more complicated – we appreciate your time and patience filling it in.

First, we ask a bit about any vessels you own (boats, paddle craft, and jet skis). We then ask you to estimate much you spent overall on fishing and on different types of equipment and activities in the last year. Finally, we ask about your fishing trips to help us estimate travel-related spending that occurred due to fishing activities.

	Do you or anyone in your household own or part-own this type of vessel?	**If yes, how many are owned in the household?**
Power boat of any kind	◯ No ◯ Yes	Number:
Paddle craft (e.g. canoe, kayak)	◯ No ◯ Yes	Number:
Non-motorised boat (e.g. yacht, row boat)	◯ No ◯ Yes	Number:
Jet ski	◯ No ◯ Yes	Number:

You indicated you own or part-own some types of vessels. Can you tell us a bit more about each of them?

	Thinking of all the times the vessel was used in the last 12 months, what % of these times would have been for recreational fishing/ crabbing/ spearfishing? *e.g. if you used the boat 10 times and 8 were for fishing your answer would be '80-99%'*		**Is this vessel owned just by your household, or in partnership with other friends/ family etc?**
Watercraft 1:	◯ None ◯ <20% ◯ 20-39% ◯ 40-59%	◯ 60-79% ◯ 80-99% ◯ 100%	◯ Owned by people in household only ◯ Owned in partnership with other friends, family
Watercraft 2:	◯ None ◯ <20% ◯ 20-39% ◯ 40-59%	◯ 60-79% ◯ 80-99% ◯ 100%	◯ Owned by people in household only ◯ Owned in partnership with other friends, family
Watercraft 3: *Online survey displayed sufficient rows for all vessels reported in previous question and labelled them by type e.g. 'powerboat 1, powerboat 2'*	◯ None ◯ <20% ◯ 20-39% ◯ 40-59%	◯ 60-79% ◯ 80-99% ◯ 100%	◯ Owned by people in household only ◯ Owned in partnership with other friends, family

Overall household spending on fishing in the last 12 months

The next question asks you how much your HOUSEHOLD spent on recreational fishing in the last 12 months. This can be a hard question to answer as most people don't spend time thinking about their total expenditure, and sometimes you may go on holidays that involve both fishing and other activities. Please estimate to the best of your ability, even if you aren't sure.

Overall, what would you estimate your HOUSEHOLD as a whole spent on recreational fishing in the last 12 months – EXCLUDING spending on new vessels (e.g. boats/kayaks/ jet skis and equipment for them like echo sounders) and overseas fishing trips? ***Include*** *the costs of fishing gear, bait, fuel, licences/permits, boat maintenance, and travel-related spending (e.g. accommodation, meals out) related to all your household's fishing trips.* ***Exclude big*** *purchases of capital items like boats, vehicles, or boat equipment like echo sounders (we ask about that later)* **Please estimate if you are unsure.** *Select one*	◯ No spending ◯ <$100 ◯ $100-$499 ◯ $500-$999 ◯ $1,000-$1,999 ◯ $2,000-$2,999 ◯ $3,000-$3,999 ◯ $4,000-$4,999 ◯ $5,000-$5,999 ◯ $6,000-$6,999	◯ $7,000-$7,999 ◯ $8,000-$8,999 ◯ $9,000-$9,999 ◯ $10,000-$14,999 ◯ $15,000-$19,999 ◯ $20,000 or more If you selected $20,000 or more, please estimate below how much to the nearest $5,000) $_____

To get some detail about the overall expenditure you just told us about, the next questions ask about your HOUSEHOLD's expenditure on different fishing-specific items and activities in the last 12 months.

How much did your household spend in the last 12 months on the following items for boats or other vessels e.g. jet ski, kayak. Give the TOTAL spent (whether the spending was for fishing-related use or for other uses of your vessel/s)	Approximately how much did you spend in TOTAL the last 12 months on this (including when fishing and other times)?
Boat running costs (fuel/oil)	$_____ in last 12 months
Maintenance of boat/ canoe / kayak / jet ski / trailer	$_____ in last 12 months
Marina/mooring/ storage fees for boat (or canoe/jetski etc)	$_____ in last 12 months
Boat and/or trailer registration fees	$_____ in last 12 months
Insurance for boat/kayak/ski/trailer/s, fishing gear	$_____ in last 12 months
Boat safety gear e.g. flares, v-sheet, boat EPIRB	$_____ in last 12 months

How much did your <u>HOUSEHOLD</u> spend in the last 12 months on the following?	$0	$1-$99	$100 to $199	$200-$399	$400-$599	$600-$799	$800-$999	$1,000-$1,499	$1,500-$1,999	$2,000 or more (please estimate approx. how much)
Fishing permits/ licences	○	○	○	○	○	○	○	○	○	$_____
Fishing club membership fees	○	○	○	○	○	○	○	○	○	$_____
Fishing competition fees (e.g. entry fee)	○	○	○	○	○	○	○	○	○	$_____
Bait and berley	○	○	○	○	○	○	○	○	○	$_____
Fishing gear/tackles (rods, lines, lures, traps, diving gear, bins, knives, fish cleaning gear)	○	○	○	○	○	○	○	○	○	$_____
Personal safety gear and specialised clothing (fishing shirts, life jackets, personal EPIRB, wet weather gear etc.)	○	○	○	○	○	○	○	○	○	$_____
Ice	○	○	○	○	○	○	○	○	○	$_____
Purchase of fishing books/guides/magazines/ apps	○	○	○	○	○	○	○	○	○	$_____
Charter trip fees or fishing guide fees	○	○	○	○	○	○	○	○	○	$_____
Contribution to running costs of other people's boats/vessels you went fishing on (don't include spending on running cost of your own household's boats, which was asked about earlier)	○	○	○	○	○	○	○	○	○	$_____

How much did your household spend on 'capital equipment' for fishing in the last 5 years – meaning purchase of a boat/ jet ski/ kayak, purchase of large equipment items for a vessel like echo sounders, GPS, electric trolling motor etc, or purchase of a vehicle or accommodation intended largely for fishing.	Approximately how much did you spend in the last five years on this?
Boat or other vessel e.g. jet ski, paddle craft	$_____ in last 5 years
Other capital equipment e.g. echo sounder, GPS, electric trolling motor	$_____ in last 5 years
Vehicle – only estimate if when buying the vehicle you chose it partly or largely based on being able to use it for fishing	$_____ in last 5 years About what % of use of this vehicle is for fishing trips? _____%
Holiday house/unit caravan or other accommodation your household owns or partly own – only estimate if you chose to purchase this accommodation partly or largely because it would enable you to do fishing	$_____ in last 5 years About what % of use of this accommodation is for fishing trips? _____%

The next question asks where your spending typically happens on some key fishing-related items. Whether you bought an item directly from a shop or ordered it online, we're interested in knowing where the business you bought it from was located. This helps us identify which regions benefit from spending on recreational fishing.

	The business/businesses I bought this from are located…				
WHERE did you buy this (select all that apply if your spending on something happened in more than one location)	In my town/city or near where I live	Near a place/ places I went fishing (if they aren't the same as where you live)	Somewhere else in Australia	Overseas	Unsure where it is located
Fishing permits/ licences	☐	☐	☐	☐	☐
Fishing club membership fees	☐	☐	☐	☐	☐
Fishing competition fees (e.g. entry fee)	☐	☐	☐	☐	☐
Bait and berley, ice, charter trip fees, fishing guide fees	☐	☐	☐	☐	☐
Fishing and safety gear/tackles (rods, lines, lures, traps, diving gear, bins, knives, fish cleaning gear)	☐	☐	☐	☐	☐
Fishing books/magazines/ subscriptions	☐	☐	☐	☐	☐
Specialised clothing (fishing shirts, wet weather gear)	☐	☐	☐	☐	☐
Boat running costs (fuel, oil)	☐	☐	☐	☐	☐
Marina/mooring/storage fees	☐	☐	☐	☐	☐
Capital equipment	☐	☐	☐	☐	☐

If you bought this somewhere in Australia other than where you live or near where you fished. Where did spending that happened somewhere else in Australia occur?	Most common place I bought this from was business/es located in…	Second most common place I bought this from was business/es located in…
Fishing permits/ licences	Drop down list	Drop down list
Fishing club membership fees	Drop down list	Drop down list
Fishing competition fees (e.g. entry fee)	Drop down list	Drop down list
Bait and berley, ice, charter trip fees, fishing guide fees	Drop down list	Drop down list

Fishing and safety gear/tackles (rods, lines, lures, traps, diving gear, bins, knives, fish cleaning gear)	Drop down list	Drop down list
Fishing books/magazines/ subscriptions	Drop down list	Drop down list
Specialised clothing (fishing shirts, wet weather gear)	Drop down list	Drop down list
Boat running costs (fuel, oil)	Drop down list	Drop down list
Marina/mooring/storage fees	Drop down list	Drop down list
Capital equipment	Drop down list	Drop down list

For each of the items above, the drop-down list in the online survey had the following options:
For each have drop down list with following options:

- ACT
- NSW – Sydney
- NSW – other
- Vic – Melbourne
- Vic – other
- Qld – Brisbane
- Qld – other
- SA – Adelaide
- SA – other
- WA – Perth
- WA – other
- Tas – Hobart
- Tas - other
- NT – Darwin
- NT – other
- Unsure

Fishing travel and related expenditure

The next questions ask how much travel you did as part of your fishing in the last 12 months. To be able to identify the economic value of your fishing travel, we ask about how far you travelled, and the types of spending you did on accommodation and food when you travelled somewhere to fish (even if fishing was just part of the purpose of your trip, not the only activity you did).

Of your fishing trips members of your household went on in the last 12 months…	Number of trips
About how many were **day trips** (you went for the day but didn't stay away overnight)? - please enter number of day trips	_____ day trips
About how many were **overnight trips** in Australia (you stayed away one or more nights on a trip, with fishing one of the activities on that trip)? - please enter number of overnight trips	_____ overnight trips TOTAL DAYS you went FISHING across all trips: approx. _____ days *For example, if you went on two trips of 5 days each, and fished on 4 days of each trip, you would write '8'.. Estimate if you are lucky enough to do so many trips you can't remember all the days you fished on.*
How many were **overseas** fishing trips? - please enter number of overseas fishing trips	_____ overseas fishing trips Fished on about _____ days in total on the trip/s

You estimated you participated in [number] DAY fishing trips in the last 12 months.

On approximately how many of the {number} DAY fishing trips you did would you have travelled the following distances to fish?	**Travelled less than 50km from home**	**Travelled 50-99 km from home**	**Travelled 100km or more from home**
Approximately how many of your day trips involved travelling this distance from home to where you fished?	Number of day trips (one-way distance you travelled) <10km__ 10-19km___ 20-29km__ 30-39km___ 40-49km___	Number of day trips (one-way distance you travelled) 50-59km___ 60-69km___ 70-79km___ 80-89km___	No. day trips (one-way distance you travelled) 100-119km 120-139km 140-159km 160-179km 180-199km

		90-99km___	200km or more
What are the names of the main places you visited most often? (name up to 5; if there were more than 5, name the 5 you visited most often. Rather than naming fishing spots, name the town or locality nearest where you fished)	Fishing location 1 Locality: State/Territory Fishing location 2: Locality: State/Territory Fishing location 3: Locality: State/Territory Fishing location 4: Locality: State/Territory Fishing location 5: Locality: State/Territory	Fishing location 1 Locality: State/Territory Fishing location 2: Locality: State/Territory Fishing location 3: Locality: State/Territory Fishing location 4: Locality: State/Territory Fishing location 5: Locality: State/Territory	Fishing location 1 Locality: State/Territory Fishing location 2: Locality: State/Territory Fishing location 3: Locality: State/Territory Fishing location 4: Locality: State/Territory Fishing location 5: Locality: State/Territory

On approximately how many of the {number} DAY fishing trips you did would you have travelled the following distances to fish?	**Fishing trips where you travelled less than 50km from home**	**Fishing trips where you travelled 50-99 km from home**	**Fishing trips where you travelled 100km or more from home**
On about how many of these trips would fishing have been THE MAIN purpose of the trip?	NONE of the trips SOME but not all trips ALL the trips	NONE of the trips SOME but not all trips ALL the trips	NONE of the trips SOME but not all trips ALL the trips
On about how many of these trips would you have travelled in a car owned by you or someone else in your household?	NONE of the trips SOME but not all trips ALL the trips	NONE of the trips SOME but not all trips ALL the trips	NONE of the trips SOME but not all trips ALL the trips
If you travelled using a method other than a car from your household, on average how much would you have spent on EACH TRIP travelling to go fishing for a trip of this length e.g. bus/train ticket cost? Include spending by all people in your household who typically went on this type of trip, not just you (e.g. 4 train tickets if it was you and your three children).	Nothing $1-$5 $5-$9 $10-$19 $20-$29 $30-$39 $40-$49 $50-$59 $60-$69 $70-$79 $80-$89 $90-$99 $70-$79 $80-$99 $100-$149 $150-$199 $200 or more	Nothing $1-$5 $5-$9 $10-$19 $20-$29 $30-$39 $40-$49 $50-$59 $60-$69 $70-$79 $80-$89 $90-$99 $70-$79 $80-$99 $100-$149 $150-$199 $200 or more	Nothing $1-$5 $5-$9 $10-$19 $20-$29 $30-$39 $40-$49 $50-$59 $60-$69 $70-$79 $80-$89 $90-$99 $70-$79 $80-$99 $100-$149 $150-$199 $200 or more
On average, how much would you have spent on food, drinks and other non-fishing supplies on **EACH TRIP** of this length? Include spending by all people in your household who went on the trip, not just you.	Nothing $1-$5 $5-$9 $10-$19 $20-$29 $30-$39 $40-$49 $50-$59 $60-$69 $70-$79 $80-$89 $90-$99 $70-$79 $80+	Nothing $1-$5 $5-$9 $10-$19 $20-$29 $30-$39 $40-$49 $50-$59 $60-$69 $70-$79 $80-$89 $90-$99 $70-$79 $80+	Nothing $1-$5 $5-$9 $10-$19 $20-$29 $30-$39 $40-$49 $50-$59 $60-$69 $70-$79 $80-$89 $90-$99 $70-$79 $80+

You estimated you participated in [number] overnight fishing trips in Australia in the last 12 months.

How many OVERNIGHT fishing trips did you do where you travelled in a household vehicle, and approximately how far?	
Number of overnight trips where you travelled in a household vehicle	Total number of trips: _____ Estimate total kilometres travelled (all trips – add up the total return distance) _____km
What are the names of the five main places you visited on overnight trips (name up to 5; if there were more than 5, name the 5 you visited most often)	Fishing location 1 Locality: State/Territory Fishing location 2: Locality: State/Territory Fishing location 3: Locality: State/Territory Fishing location 4: Locality: State/Territory Fishing location 5: Locality: State/Territory
Number of overnight trips where you travelled in a friend's vehicle (don't include hire cars)	Total number of trips: _____ Estimate how much you contributed to vehicle costs for all trips (in total) $_____
Number of overnight trips where you travelled by other means e.g. hire car, plane, train	Total number of trips: _____ Estimate total amount spent on travel costs (hire car/plane/train costs only, exclude accommodation and food) for all trips $ _____
On about how many of your overnight trips would fishing have been THE MAIN purpose of the trip?	NONE of the trips SOME but not all trips ALL the trips
Total number of nights you stayed away from home across all trips (if you did two trips, and stayed away 2 nights on one and 4 nights on the other, the total would be 6)	Total nights away: ___
In total, how much did you spend on accommodation for yourself and other members of your household, across all trips?	Total $_____ (please estimate if you are unsure)
In total, how much did you spend on food, drinks and other non-fishing supplies for yourself and other members of your household, across all trips?	Total $_____ (please estimate if you are unsure)

Your views about fishing – priorities, information and what makes a good fishing trip

The final parts of the survey ask about your views on fishing. What makes a good fishing trip for you? What do you think are the most important investment priorities for recreational fishing? How do you prefer to access information about recreational fishing? They're a bit easier to answer than the questions earlier on – thanks for sticking with us to the last parts of the survey, especially if you're someone who does a lot of fishing and had to complete a lot of information when asked about your spending on fishing.

	Strongly disagree	Mildly disagree	Neither agree or disagree	Mildly agree	Strongly agree
A fishing trip can still be successful, even if no fish/crabs/lobster are caught	○	○	○	○	○
I'd rather catch one or two bigger fish than ten smaller fish	○	○	○	○	○
I like to fish where there are several kinds of fish to catch	○	○	○	○	○

If recreational fishing managers in your region had $1 million to spend on investing in improving recreational fishing, what percentage do you think should be spent on each of the following to get the best value for recreational fishers and the broader community?

What % should be invested in…	What % of $1 million should the recreational fishing organisation spend on this?
Reducing overcrowding at popular fishing spots	____%
Getting more people involved in recreational fishing	____%
Increased funding for fisheries inspectors to reduce irresponsible and illegal fishing activities	____%
Increasing fishing opportunities for recreational fishers by reducing commercial fishing in recreational fishing areas	____%
Increasing fish stocks through investing in fish breeding and stocking activity	____%
Increasing fish stocks through investing in habitat protection and improvement	____%
Increasing fish stocks through creating new habitat e.g. artificial reefs	
Improving recreational fishing facilities e.g. fish cleaning benches, jetties, boat ramps, access to toilets and disposal bins	____%

The last questions on the survey ask about your use of bait and berley. These have a different purpose to the rest of the survey. They're being asked to better understand the types of bait and berley being used in different parts of Australia, to help identify where education may be needed to reduce risk of biosecurity problems affecting fish stocks.

Have you used the following types of bait/berley when fishing in the last 12 months?	Yes	No
Prawns or shrimp? (saltwater or freshwater)	◯	◯
- If yes, were any of the prawns/shrimp bought from a **bait supplier** of any kind (tackle shop, service station etc), as a product packaged or sold as bait?	◯	◯
- If yes, were any of the prawns/shrimp bought from a **seafood retailer** where they were being sold for human consumption? (e.g. a supermarket)	◯	◯
Crabs? (mud, sand, spanner, rock etc)	◯	◯
Saltwater lobster/crayfish (including scampi and bugs)?	◯	◯
Freshwater crayfish (including yabbies, redclaw, marron etc)?	◯	◯
Abalone? (e.g. using gut from abalone as bait)	◯	◯
Other shellfish like oysters, mussels or pippies? (including cockles, scallops, clams)	◯	◯
Trout or salmon excluding Australian Salmon	◯	◯
Barramundi	◯	◯
Other saltwater fish like pilchards, mullet, garfish or yellowtail?	◯	◯
Carp	◯	◯
Other freshwater fish e.g. perch, guppies, goldfish	◯	◯
Sharks or stringrays? (any kind)	◯	◯
Octopus, squid or cuttlefish	◯	◯
Saltwater worms (e.g. beach, sand, blood – don't include garden worms)	◯	◯
Berley logs	◯	◯
Other bait/berley (please specify)	◯	◯

You indicated you used prawns/shrimp as bait in the last 12 months. Can you tell us a bit more about the origin of the prawns/shrimp and how you use this as bait – these questions help us in understanding biosecurity needs for the future relating to prawns/shrimp.

Were the prawns you bought from a seafood retailer and used as bait…	**Didn't use prawns from this source**	**Sometimes used prawns**	**Often used prawns from this source**	**Unsure**

		from this source		
Local prawns (caught in Australian waters)	◯	◯	◯	◯
Prawns/shrimp sourced from overseas (imported from other countries)	◯	◯	◯	◯

Were the prawns you bought from a seafood retailer and used as bait…	**None**	**Less than 1 kg**	**More than 1 kg**
Uncooked whole prawns (not shelled)	◯	◯	◯
Uncooked but shelled	◯	◯	◯
Cooked (not shelled)	◯	◯	◯
Cooked and shelled	◯	◯	◯
Processed e.g. on skewers, marinated, breaded/battered, part of a dumpling, spring roll or other product, or butterflied	◯	◯	◯
Did you wash the prawns before using them as bait?	◯	◯	◯

There's many reasons why fishers may buy prawns from a supermarket or fish shop to use as bait/berley instead of buying prawns specifically packaged as bait. The question below asks a bit about this.

Did you obtain the prawns you used as bait/berley from a seafood supplier for any of the following reasons (as opposed to buying prawns packaged as bait)?	**Not a reason**	**Sometimes a reason**	**Often a reason**
I needed prawns of the right size	◯	◯	◯
I needed prawns of the right form/shape	◯	◯	◯
I wanted to buy fewer prawns than I could get in a bait pack	◯	◯	◯
I wanted to buy more prawns than I could get in a bait pack	◯	◯	◯
I wanted to use particular prawn species not available as bait	◯	◯	◯
They're fresher than bait prawns	◯	◯	◯
They're better quality than bait prawns	◯	◯	◯
I couldn't buy bait prawns easily so had to buy prawns from a supermarket or seafood supplier	◯	◯	◯
I had bought the prawns to eat but ended up using them as bait	◯	◯	◯
Prawns were cheaper from the supermarket/fish shop	◯	◯	◯

The next question asks about prawns/shrimps used as bait and berley. It is being asked of all fishers, even if you haven't used any prawns/shrimps in the last 12 months.

Thinking about prawns used as bait, can you recall seeing or hearing anything which advised people NOT to use IMPORTED SEAFOOD PRAWNS as bait or berley or not?

Thinking about prawns used as bait, can you recall seeing or hearing anything which advised people NOT to use IMPORTED SEAFOOD PRAWNS as bait or berley?	◯ Yes ◯ No ◯ Unsure

Imported seafood products which are sold as food for humans should not be used as bait or berley. This is especially the case with imported prawns due to the disease risk to local prawn stocks (wild and aquaculture) and other crustaceans such as crabs, i.e. spot disease and other viruses/diseases (not in Australia) could be introduced. Imported prawns must not be used as bait and berley. If you'd like more information about this, go to http://www.agriculture.gov.au/import/goods/uncooked-prawns, or https://www.daf.qld.gov.au/checkyourbait

You said you've never gone fishing, or you haven't gone in a long time. We're interested in finding out why – and if you answer a few short questions, you can then enter the prize draw for the survey.

Many people have multiple hobbies, and recreational fishing will be just one of them. The next questions ask about the different hobbies and sports you get involved in – and which one you would choose to do on a nice weekend if you had to make a choice between fishing and another activity.

Do you do any of the following hobbies/sporting activities?	**I don't do this**	**I do this and as a sport or hobby it is…** NOT AT ALL Important to me ⓪	①	②	③	④	⑤	⑥	⑦	⑧	⑨	VERY Important to me ⑩
Bushwalking or hiking	○	○	○	○	○	○	○	○	○	○	○	○
Jogging or running	○	○	○	○	○	○	○	○	○	○	○	○
Cycling (road riding or mountain biking)	○	○	○	○	○	○	○	○	○	○	○	○
Playing game stations/online games	○	○	○	○	○	○	○	○	○	○	○	○
Swimming	○	○	○	○	○	○	○	○	○	○	○	○
Surfing	○	○	○	○	○	○	○	○	○	○	○	○
Playing sports with others (e.g., tennis, football)	○	○	○	○	○	○	○	○	○	○	○	○
Going to gym or exercise classes	○	○	○	○	○	○	○	○	○	○	○	○
Camping	○	○	○	○	○	○	○	○	○	○	○	○
Horse riding	○	○	○	○	○	○	○	○	○	○	○	○
Kayaking or canoeing	○	○	○	○	○	○	○	○	○	○	○	○
Four-wheel driving	○	○	○	○	○	○	○	○	○	○	○	○
Clothes shopping (no, we're not kidding and yes, there's a reason we're asking!)	○	○	○	○	○	○	○	○	○	○	○	○
Attending sports games or events as spectator (e.g. football game)	○	○	○	○	○	○	○	○	○	○	○	○
Recreational shooting or hunting (other than fishing)	○	○	○	○	○	○	○	○	○	○	○	○
Playing golf	○	○	○	○	○	○	○	○	○	○	○	○
Other outdoor or sports activities (please describe e.g. lawn bowls)	○	○	○	○	○	○	○	○	○	○	○	○

	Not at all interested in going fishing ⓪	①	②	③	④	⑤	⑥	⑦	⑧	⑨	**Would love to try fishing** ⑩
How would you describe your level of interest in fishing?	○	○	○	○	○	○	○	○	○	○	○

What's the main reasons you've never gone fishing? *Write as much or as little as you want.*	
What's the main reasons you haven't fished in the last 5 years? *Write as much or as little as you want.*	

How much do you agree or disagree with the following statements about fishing?	**Strongly DISAGREE** ①	②	③	④	⑤	⑥	**Strongly AGREE** ⑦	**Don't know**
I'm too busy to take up fishing	○	○	○	○	○	○	○	○
I'm interested in fishing but other things are higher priority to do	○	○	○	○	○	○	○	○

None or few of my friends and family go fishing	◯	◯	◯	◯	◯	◯	◯	◯
I don't have anyone who could teach me how to fish	◯	◯	◯	◯	◯	◯	◯	◯
It's too hard to learn the skills needed to go fishing	◯	◯	◯	◯	◯	◯	◯	◯
My health is too poor to take up fishing	◯	◯	◯	◯	◯	◯	◯	◯
I can't afford the cost of going fishing	◯	◯	◯	◯	◯	◯	◯	◯
I'd go fishing but don't want to have to buy fishing gear/ equipment	◯	◯	◯	◯	◯	◯	◯	◯
The behaviour or reputation of recreational fishers stop me wanting to fish	◯	◯	◯	◯	◯	◯	◯	◯
The risk of injury or accident stops me wanting to go fishing	◯	◯	◯	◯	◯	◯	◯	◯
Concern about welfare of fish means I wouldn't take up fishing	◯	◯	◯	◯	◯	◯	◯	◯
I don't like touching fish	◯	◯	◯	◯	◯	◯	◯	◯
I don't like eating fish	◯	◯	◯	◯	◯	◯	◯	◯
I don't know how to swim	◯	◯	◯	◯	◯	◯	◯	◯
I don't have anyone I could go fishing with	◯	◯	◯	◯	◯	◯	◯	◯

You've reached the end of the survey! The last question asks about your fishing plans in the coming year, and then you're asked if you want to hear about results, enter the prize draw, or do more future surveys (which will typically be much shorter than this one!)

How likely are you or others in your household to do any kind of recreational fishing, including catching fish or other species such as yabbies, crays, crabs, shellfish and lobster, and using any method e.g. rod, line, diving, spearfishing or others?	**Very likely**	**Quite likely**	**Not very likely**	**Not at all likely**	**Unsure**
In the coming 12 months, how likely is it that you personally will do any kind of recreational fishing?	◯	◯	◯	◯	◯
In the coming 12 months, how likely is it that one or more other members of your household will do any kind of recreational fishing?	◯	◯	◯	◯	◯

Those who had never fished, or most recently fished 5+ years previously, were also asked for the same socio-demographic and geographic information asked of all other respondents.

Thank you for completing the survey	
If you would like to enter the prize draw, access results, or participate in future research, please answer the questions below.	
How did you hear about this survey? *Select all that apply*	☐ An email from the researchers ☐ Flyer or survey in my letterbox ☐ Received an email from a fishing club or organisation ☐ Friends or family sent me the survey link ☐ Social media e.g. Facebook, Twitter, Instagram ☐ Radio, TV or newspaper ☐ Saw a flyer or poster in a shop
Is anyone else in your household doing the survey, or likely to do it?	☐ Another person in my household already did the survey ☐ Another person in my household is likely to do the survey (but hasn't yet) ☐ No-one else from my household has done or is likely to do the survey ☐ Don't know
Are you interested in participating in any future surveys? *We are asking some fishers to do a short monthly survey for the next 12 months, with prizes each month. We will also be doing a follow up survey in 12 months time.*	◯ Yes, you can contact me about future surveys ◯ No, I don't want to do any further surveys If you said yes, are you interested in…

	◯ Doing a short monthly survey (with the opportunity to enter a prize draw each month) ◯ Doing a repeat survey in a year's time (with a prize draw) ◯ Doing both monthly surveys and the repeat survey
Do you want to be entered in the prize draw? *Prize draw conditions are provided in the information sheet*	◯ Yes ◯ No
Do you want to be notified when results of the study are available?	◯ Yes ◯ No

If you ticked 'yes' to any of the above, please provide your contact details.

Name:	
Email address:	
Postal address or telephone number (to give us an alternative way to contact you):	

Appendix 2.7: Stage 2 recruitment material examples

2.7.1 Example 1: Wording of invitation sent to Stage 1 participants

Subject: Invitation to participate in recreational fishing survey

Dear NAME

Thank you for participating in the Regional Wellbeing Survey. We also appreciate you giving us permission to contact you about other surveys run by our team at the University of Canberra.

We are emailing to invite you to participate in another survey being run by the Regional Wellbeing team, exploring the social and economic contributions of recreational fishing in Australia.

> **We have invited a wide range of people to take part, from all over Australia. Please consider taking part in the survey, even if you have not gone fishing much or at all in past year.**
>
> The survey can be accessed here: [take the survey]
>
> Or can be accessed via the website: www.nationalrecsurvey.com.au

The survey includes questions about the importance of fishing to you, benefits of fishing, and how much time and money (if any) you have spent on recreational fishing. This will help us identify the importance and value of fishing across different regions of Australia.

Everyone aged 18 or older who participates by **midnight, 14th of February 2020** is eligible to enter the draw to win one of **16 prizes worth a total of $6,000,** drawn 28th February 2020. You can complete a short version of survey (15-20 minutes) for one entry into the prize draw, or a long version (30-40 minutes) for four entries into the prize draw.

Need help, or prefer to do the survey on paper? Call 1800 981 499 or email recreationalfishing@canberra.edu.au.

More information about the project and how your confidentiality and privacy will be protected can be accessed using the survey link. This project has been approved by the University of Canberra's Human Research Ethics Committee (Project Number 1913).

Yours sincerely

Jacki

Dr Jacki Schirmer
University of Canberra
National Social and Economic Recreational Fishing Survey

If you have trouble using the link above, you can copy and paste the URL below into your internet browser: xxx

If you don't want to receive future emails about this recreational fishing survey, you can click this link: Click here to unsubscribe

2.7.2 Example 2: Advertorial included in fishing magazine

The National Recreational Fishing Survey – calling all fishers to take part!

Back in 2000, recreational fishers spent $1.8 billion nationally on recreational fishing-related expenditure – a pretty big figure. However, we don't know how much they are spending now, and that makes it hard to communicate the true value of recreational fishing to decision makers across Australia.

It's been 20 years since an up-to-date nationwide picture of the economic value of recreational fishing in Australia has been produced. Back in 2000, the last national survey found that there was a fisho in almost one in every four households in Australia. However, since 2000, state-level surveys indicate more women are fishing, and that spending on fishing is likely to have changed a lot.

Since 2000, it's also been recognised that fishing has many social benefits. Recreational fishing has been found to support wellbeing through increasing people's connections with family and friends and with nature. Fishing can be both relaxing and challenging – and both these things can be positive for our wellbeing! Doing things that provide a challenge helps people increase their confidence in being able to overcome difficulty and achieve what they want to, while getting away from the everyday grind is critical for mental health. However, while rec' fishers know about these benefits on a personal level, and there's lots of studies that demonstrate the social benefits of recreational fishing on a small scale, to guide decision-making there's a need for a nationwide picture that shows the extent and types of social benefits generated by fishing.

You can help generate up-to-date information that ensures the full social and economic benefits of recreational fishing are recorded, and can be communicated to decision makers across Australia. **Participate in the National Rec Fishing Survey at nationalrecsurvey.com.au**, by February 14 2020, and after February participate in smaller surveys that will be advertised on the website. By doing so, you can help researchers at the University of Canberra and the Australian Bureau of Agricultural and Resource Economics and Sciences provide a comprehensive, up-to-date picture of recreational fishing in Australia.

Whether you fish once a year or every day of the year, it's important your voice is heard in the survey! And by the way – those who participate in the survey by February 14 get to enter a draw for one of several prizes worth a total of $6,000; after February there will be monthly short surveys with smaller prize draws as the researchers examine the different benefits of fishing in more detail.

Show your support for recreational fishing in Australia by giving your time to take part – and stay tuned for results of the survey in future editions of this magazine!

2.7.3 Example 3: Social media posts

December 19, 2019

National Recreational Fishing Survey 2019 - 2020
December 19, 2019 ·

http://www.nationalrecsurvey.com.au/

Recreational fishing is a part of life and culture for many Australians. Many fish once or twice a year, others fish most weeks... but everyone who fishes values fishing as a pastime.

We are not interested in your secret spots 😉 We have much bigger fish to fry (pun intended).

To understand the value of recreational fishing in Australia, it's important to understand the varied social and economic aspects of fishing, including how much spending is generated in different regions by recreational fishing activities, right through to how participating in recreational fishing influences our health and wellbeing.

We are asking rec' fishers across Australia to take part in our survey, answering questions about social and economic aspects of their fishing, like how you are found your fishing experiences in the last year, and how much you have spent on fishing, etc.

Please stand up and be counted. This is YOUR data. Please also SHARE with all your fishing mates and neighbours.

19 December 2019

December 20 2019

National Recreational Fishing Survey 2019 - 2020
December 20, 2019 ·

Fishing really DOES count... it means so much to so many of us and the National Recreational Fishing Survey will give us the power to demonstrate just HOW much it matters to our country. Let's get as many Australian fishers as possible to stand up and be counted before Valentine's Day (so they're all in the running for the prizes), even if they only fish occasionally. IT STILL COUNTS!

SHARE this with all your friends now. Let's see how far we can get this message of solidarity to travel.

Find out about this important survey here: http://www.nationalrecsurvey.com.au/

28 December 2019

National Recreational Fishing Survey 2019 - 2020 added a 3D photo.
December 28, 2019 ·

Does fishing feature in your festive season? We want to hear how... please take ten minutes this week to take part in the National Recreational Fishing Survey. Your answers will help us pinpoint the most up-to-date snapshot of the economic and social value of fishing in Australia since 2001. **BONUS** Participate before midnight on Valentines Day and register for a chance to win one of 16 prizes in our $6000 prize pool! Please SHARE with all your fishing pals, so that their rods count too.

20 February 2020

National Recreational Fishing Survey 2019 - 2020
February 14, 2020 ·

The countdown is on! Round One Participants Prize Draw closes tonight. Read more here...

NATIONALRECSURVEY.COM.AU
www.nationalrecsurvey.com.au

Like Comment Share

21 February 2020

National Recreational Fishing Survey 2019 - 2020
February 21, 2020 ·

How do you store your old tackle?

You may need to carefully consider your answer, if you're the lucky winner of $600 WORTH OF TACKLE!

YOU READ CORRECTLY! Everyone who submits a completed National Recreational Fishing Survey between NOW and 2pm February 28th will be eligible for entry into this lucky prize draw.

One winner will be selected randomly to receive a fishing tackle pack to the value of $600! So... where would you move all your old-style gear to?

To find out more and to review the terms and conditions, visit
www.nationalrecsurvey.com.au/prizes/

Jo Starling, Andy Moore and 4 others — 3 Comments 9 Shares

Like Comment Share

March 1 2020

National Recreational Fishing Survey 2019 - 2020
March 1, 2020 ·

The list of winners from the first round prize draw — which had $6000 of Gift Cards up for grabs — has been published! Do you know one of the 16 lucky winners?

Click the link to discover who they are...

http://www.nationalrecsurvey.com.au/prizes/

There are giveaways every week. SHARE with anyone you know who likes to fish, no matter how often. Every rod counts when it comes to valuing our sport.

March 23 2020

National Recreational Fishing Survey 2019 - 2020
March 23, 2020 ·

Did you get out to fish as much as you wanted over summer? We're trying to ensure that we understand the impact that the extraordinary past few months have had on fishers & the businesses they support. It's important that we clarify any affect the drought, fish kills, bushfires or this pandemic might have on the work we're doing to value rec fishing in Australia. So please, take this month's short 'extra' survey & help us out. You'll get extra chances to win 😉

Here's the link: https://canberrahealth.az1.qualtrics.com/.../SV...

24 March 2020

National Recreational Fishing Survey 2019 - 2020
March 24, 2020 ·

Are You Concerned About Results From The National Recreational Fishing Survey Locking You Out?

We understand your concerns. We are genuinely not interested in your secret spots... or any fishing spots, for that matter. We respect your right to keep those sacred... after all, we don't share ours!

There is not a single question in the survey about them.

We are working to document the different economic and social benefits of fishing for fishers, businesses and communities alike. To do this, the National Recreational Fishing Survey asks you about many aspects of your fishing, including what you do & don't value about fishing, as well as what things improve or lessen your fishing experience. Some things might have a dollar value (such as how much you spend on fishing), whereas others don't (like the benefits of spending time with friends & family, or what impact your fishing has on your well-being). We DON'T ask about (or have any interest in) your fishing spots.

So please, help us get an up-to-date social, well-being and economic value of Australian rec fishing, so that the decision-makers know what it's worth... to all of us.

Find Out More... http://www.nationalrecsurvey.com.au/

March 25 2020

National Recreational Fishing Survey 2019 - 2020
March 25, 2020 ·

The last time a comprehensive study was undertaken on the value of recreational fishing in Australia was in 2001, when the last national social and economic survey was done. That's basically two decades ago!

That 2001 study found that recreational fishing generated $1.85 billion in the 2000-01 financial year (that's roughly $2.87 billion in today's money). Since that time, a number of state-based surveys have examined expenditure on recreational fishing in different Australian states and a smaller number of studies have also sought to place a dollar value on the less tangible values of fishing, through asking fishers to identify how much they would be willing to pay to maintain recreational fishing, or identifying the value of the time people invest in recreational fishing, etc... but there have been no further national studies into the value of recreational fishing to Australia, until now.

In the 2019-2020 National Recreational Fishing Survey, we are again asking rec fishers about their expenditure so we can provide an updated estimate of the national value of recreational fishing. But, while expenditure is one useful measure of value, it doesn't — by itself — capture to full value of recreational fishing.

Many studies examining the benefits of spending time outdoors suggest that recreational fishing (like many other outdoor activities) is likely to have benefits for the health and wellbeing of many (if not all) of those who participate in it. For most people who fish, this can seem like a no-brainer: it's common for fishers to say that fishing makes them feel good and is important for their wellbeing.

However — despite this anecdotal evidence — when we reviewed the available evidence, we found that surprisingly few studies have actually examined whether, when and how recreational fishing might be beneficial for the health and wellbeing of those who do it.

To establish a true and complete value of recreational fishing to Australia — in today's money and society — It's important to develop a better understanding of how and when recreational fishing can benefit health and wellbeing, and how much money flows through the economy as a result of this beloved Aussie pastime.

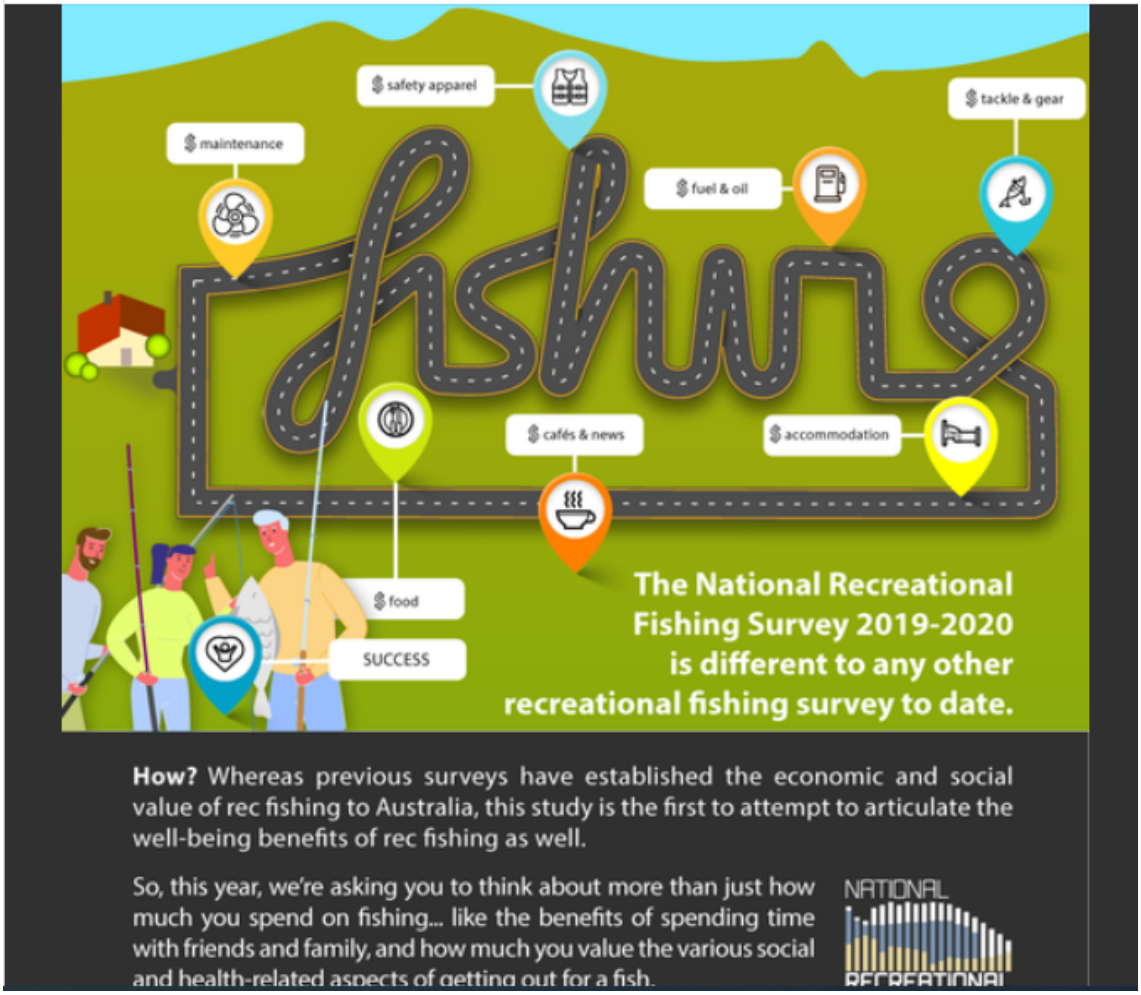
Make your rod count: http://www.nationalrecsurvey.com.au/national.../

26 March 2020

National Recreational Fishing Survey 2019 - 2020
March 26, 2020 ·

The last time a national survey on recreational fishing was done was two decades ago in 2000-2001! We know expenditure on boats & gear has increased dramatically for some anglers in that time. That's why the national recreational peak body, the Australian Recreational Fishing Foundation (ARFF) and the Australian Fishing Trade Association (AFTA) called for this survey, not only to see how much people spend on fishing, but also what fishing means to them & their wellbeing. This work is being undertaken for the recreational fishing sector, not for the government.

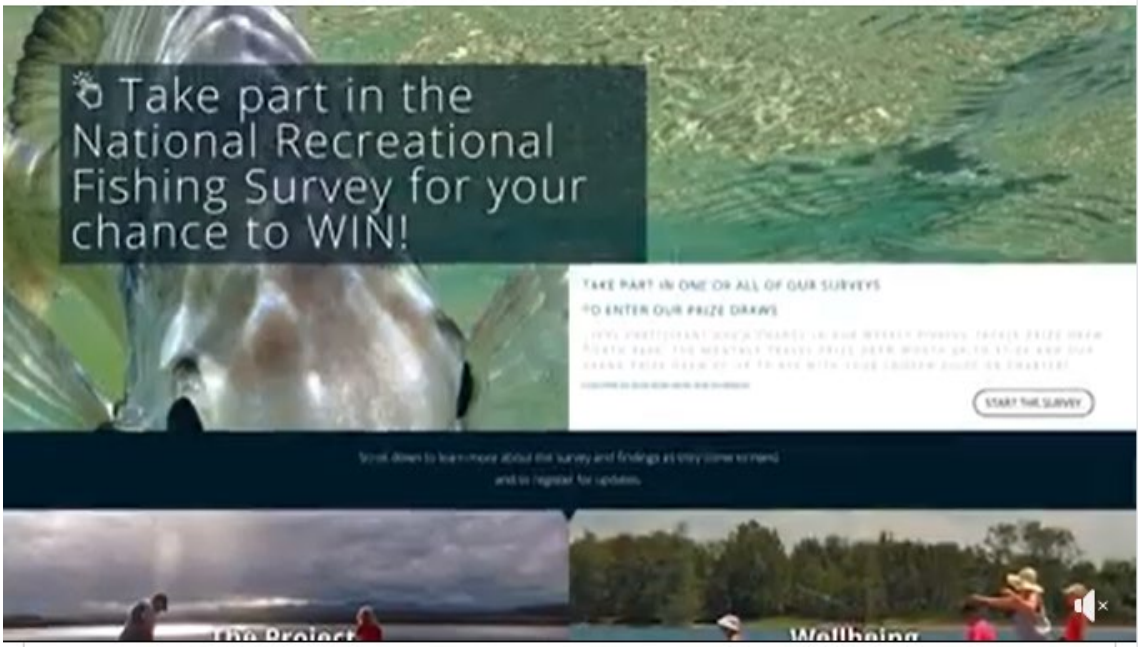
For more information, check out our website: www.nationalrecsurvey.com.au



April 9 2020

National Recreational Fishing Survey 2019 - 2020
April 9, 2020 ·

Thanks, Bergy! It's great to have your support 👍 Listen to this guy, people... he's got rec fishing tattooed across his heart 👇



Mark Berg's Fishing Addiction
April 9, 2020 ·

CALLING ALL FISHO'S. Help secure the future of fishing by completing the National Recreational Fishing Survey 2019 - 2020. It's super super important so the gov... See more

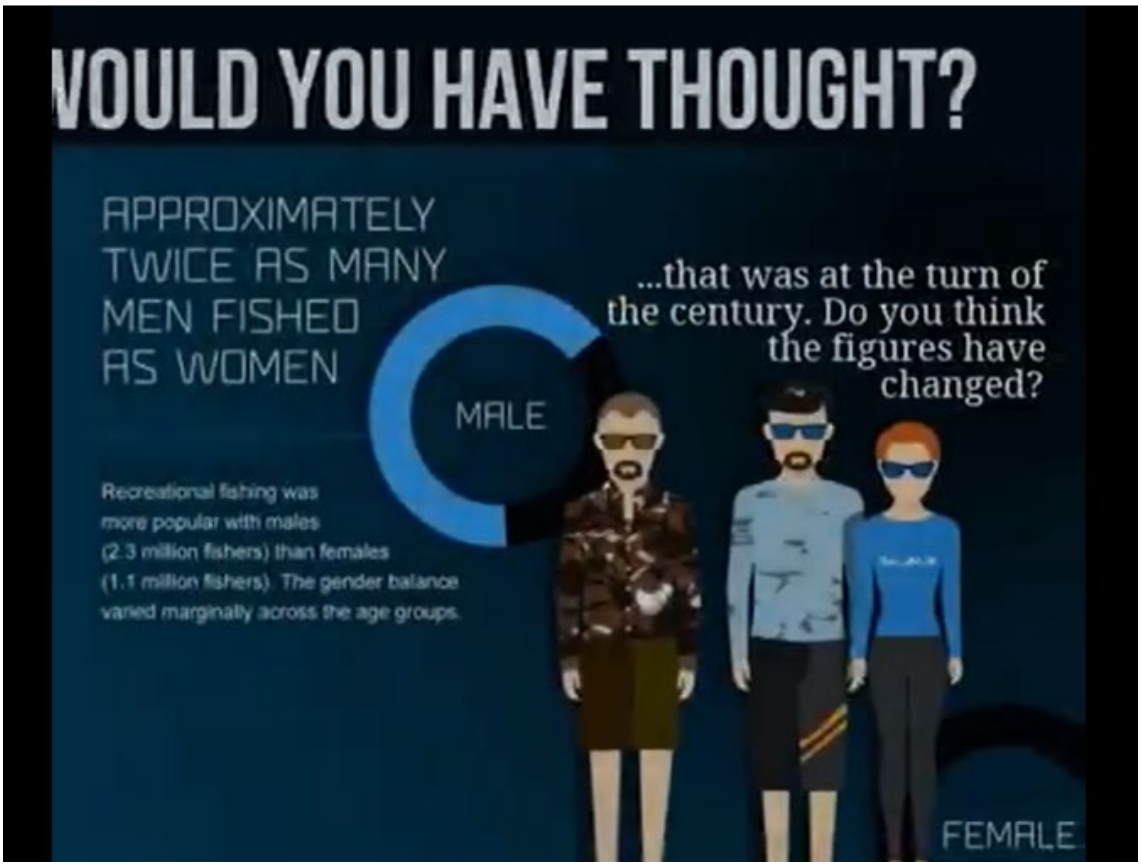
April 15 2020

National Recreational Fishing Survey 2019 - 2020
April 15, 2020 ·

It's twenty years since the last national survey was done into recreational fishing! Surely, things have changed. Take this stat for example... what do you think it would be today? And will you take the survey to help us all find out? 🤔

SHARE with your fishing mates. Let's see what they think.

#nationalrecreationalfishingsurvey #recreationalfishing #fishing #wellbeing #health #fishersmatter #unicanberra #outdoors #camping #tourism #prizedraw #fishingaustralia #australianfi... See more



12 May 2020

National Recreational Fishing Survey 2019 - 2020
May 12, 2020 ·

There's a LOT of incomplete surveys in the system, just waiting for their owners to log back in and finish the job... NOW is the time!

The National Recreational Fishing Survey is closing on the 22nd May, 2020. Your survey answers will help build the most complete picture of the value recreational fishing has for our nation. Don't let this one get away... log in, fill it in and hit SUBMIT today.

http://www.nationalrecsurvey.com.au/national.../

Appendix 2.8 Stage 2 weighting procedure

Stage 2 NRFS data were weighted using a model-based weighting procedure. In model-based weighting, rather than weighting based on design-based weights (probability of being recruited into a sample), weighting is done against a superpopulation that specifies the characteristics of the population being sampled – in this case, recreational fishers in Australia. As described in detailed in Chapter 12, this process uses model-based inference, rather than design-based inference. As sampling methods in social and economic surveys increasingly shift to use of non-probability and quasi-probabilistic recruitment, use of model-based weighting is becoming increasingly common (see Chapter 12 for discussion of this). Additionally, where a sample has been recruited with a known probability of selection of participants, the occurrence of response bias means it is common to weight the sample using a combination of design-based and model-based weights (discussed further in Chapter 12). A growing number of social and economic surveys are using blended recruitment techniques and, rather than a stepped weighting process in which design-based weights are followed by model-based weights, are using a single step model-based weighting. This was done in Stage 2.

This Appendix describes the process used to identify benchmarks used to specify the superpopulation model of current recreational fishers that formed the basis of weighting. It also presents findings of analysis comparing response to two different social media ads that advertised the survey using different approaches: one was very neutral, while the other promoted potential benefits of having improved data in ways that could trigger bias in responses. Differences in responses to each were analysed to identify whether bias was triggered by the second ad; this in turn was used to determine whether responses to social media advertisements could be analysed as a single group, or needed to be compared ad by ad, when considering potential for bias.

Developing statistical weights requires (i) building a superpopulation model which, put simply, specifies the known characteristics of the population being studied (in this case, current fishers), and (ii) identifying whether data collected are suitable for weighting using weights that adjust the distribution of the sample so it matches the superpopulation.

This Appendix first reviews available benchmark data for current recreational fishers able to be used to construct a superpopulation model. The rationale for the selection of characteristics included in the superpopulation model is explained. Sensitivity testing run to test sensitivity of estimates to change in estimated benchmarks for the superpopulation model are then presented, and the final composition of the superpopulation model presented.

Following this, the suitability of data collected for weighting using these benchmarks is examined. This is examined in detail in Chapter 12; this Appendix summarises findings, and provides findings of analysis examining the extent to which design/content of social media ads affected distribution of responses.

2.8.1 Availability of benchmark data to build a superpopulation model of recreational fishers

In model-based inference, inference to a population is done with reference to a model that specifies known key characteristics of the population. This ‘superpopulation model’ provides the information needed to develop statistical weights that are applied to a survey sample in order to enable production of results that are representative of the benchmark population.

For Stage 1 data, this was a relatively straightforward process: the population being studied was the adult population of Australia, and the superpopulation was constructed by sourcing data from the Australian Bureau of Statistics 2016 *Census of Population and Housing* and specifying key characteristics based on the known distribution of bias in the survey population. As the Regional Wellbeing Survey deliberately oversampled some states and territories compared to others, and farmers compared to others, these attributes were included in the superpopulation. As the survey had a bias to female and older respondents, gender and age were also included.

For the Stage 2 survey, the objective was to study the recreational fisher population. As discussed in Chapter 4, a recreational fisher can be defined in many ways, but almost all past studies conducted in Australia (and hence almost all available benchmark data that could be used to populate a superpopulation model for fishers) defined recreational fishers as people who had gone fishing at least once in the last 12 months for non-commercial purposes. For other definitions of ‘recreational fisher’ – for example, a person who intends to fish in future but has not fished in the last 12 months – there are no benchmark data available.

This meant that it was only feasible to build a superpopulation model for current fishers (those who have participated in recreational fishing in the last 12 months). Therefore, the objective was defined as building a suitable superpopulation model for current recreational fishers aged 18 and over, living in Australia.

Two types of benchmark data were available for this group. The first was data from the Stage 1 survey, which captured information on the distributions of characteristics of current fishers compared to the general adult population of Australia, including information such as age, gender, household income, etc. This is a useful benchmark but has some limitations, in that it relies on a weighted data set that was partly used to generate the sample for Stage 2. Given this, it was considered appropriate to use Stage 1 data to populate the superpopulation model only where no other data were available, or where Stage 1 data were consistent with other available data on recreational fishers.

The second were data from previous recreational fishing studies conducted between 2000 and 2018 that captured information on social and demographic characteristics of recreational fishers. A detailed list of these studies is provided in Appendix 3.1, and Chapter 4, section 4.2 reviews of variation in estimates of fishing participation amongst different sources of benchmark data. The challenge with the second source of data is that previous recreational fishing studies have predominantly focused on a single state or territory in Australia, and do not provide a nationwide picture (with the exception of the first National Recreational Fishing Survey). Additionally, some were conducted more than a decade prior to the data collection for this study, and it was possible some characteristics of recreational fishers might change over time.

2.8.2 Selection of superpopulation benchmark characteristics

Having determined potential data sources, the next step was to identify the benchmark characteristics to include in the recreational fisher superpopulation model. This was done in three steps:

1) Identification of areas of planned and likely bias in Stage 2 sample composition
2) Review of previous studies to identify whether social and economic aspects of recreational fishing were known to vary depending on socio-demographic attributes
3) Consultation with the Project Steering Committee to review selected characteristics.

The first step involved considering what biases were likely to result from sample recruitment methods used: these biases would need to be addressed by the weighting process, and that in turn meant the superpopulation model needed to include benchmarks for any attributes for which sampling bias was considered likely. Some of the sample recruitment methods were expected to oversample avid fishers (particularly sampling on social media and via fishing clubs), and it was expected that, consistent with other surveys, older fishers would be more likely to respond than younger fishers. This meant the superpopulation model should include information about the expected distribution of fishing avidity in the recreational fisher population, and the expected distribution of age. A person's educational attainment was also included, as it is also often a predictor of their likelihood of taking part in a survey.

Previous studies, when reviewed, provided relatively little consistent information on how social and economic attributes of fishing varied depending on socio-demographic characteristics of recreational fishers. However, there was documented evidence regarding variation in fishing participation: past studies had identified that participation in recreational fishing typically varied depending on a person's gender, age, and whether they identified as Aboriginal or Torres Strait Islander. Past studies also identified differences by whether a person lived in an urban or rural area, and by State and Territory. Some suggested that likelihood of fishing participation varied depending on whether a person was born in Australia or in another country, and their cultural background. Past studies examining expenditure on recreational fishing suggested that household income was a strong predictor of spending: as income can also be a predictor of likelihood of participating in a survey, this attribute was also explored.

After the three steps listed above, the following attributes were identified as potential components to include in the superpopulation model:

- Gender
- Age
- Geographic location of residence (urban/rural and State/Territory)
- Fishing avidity
- First Nations – whether a person identified as Aboriginal or Torres Strait Islander

- Whether a person was born in Australia or another country, and whether English was the main language spoken (as many English speaking countries have some similarities in recreational fishing culture)
- Household income
- Formal educational attainment.

Finally, to make inference to the Australian population, it was necessary that the model identify what proportion of the adult Australian population participates in recreational fishing.

When conducting model-based inference, the model should ideally include the smallest amount of characteristics possible to capture relevant variation in the population. This is critical as including too many variables can increase the risk of introducing bias during the weighting process, as it reduces the likely sample size available to weight in each individual 'cell'. For example, if a superpopulation model specifies the age distribution of recreational fishers using 5 year age intervals (20-24, 25-29, etc) then the sample being weighted needs to have sufficient numbers of survey respondents in each of these age groups to support applying a weight to each separately. If the survey sample has only small numbers of each group, and applies weighting to them, there is a significant risk of amplifying sample bias. If, however, it is known that the likelihood of participating in fishing does not change significantly with 5-year intervals, but is more likely to change over 10 or 20 year intervals, the model can use broader age ranges, such as 18-30, or 65 and older, and identify the proportion of fishers in each of these larger groups, then there is likely to be a larger sample in each group being weighted, and reduced risk of outlier responses being amplified as a result of weighting.

Therefore the goal when exploring benchmarks to include in the superpopulation model was to be parsimonious: to minimise the number of variables included in the model, and to include as few categories within each variable as possible while still capturing important variation in characteristics of the recreational fisher population.

To identify the specific benchmarks to be used, and whether all of the potential benchmark variables needed to be used, sources of data for each variable were reviewed and compared to identify their consistency, and sensitivity testing was conducted in which the degree of variation in key social and economic outcomes being measured as part of the NRFS caused by varying benchmark characteristics was examined.

2.8.3 Defining and testing sensitivity of benchmark characteristics

For each potential benchmark characteristic, the following was examined:

- Benchmark distribution: Estimates of distribution of the characteristic amongst recreational fishers produced in past studies, and how much they varied
- Contribution of proposed benchmark to variation in key outcome variables:
    - Self-reported total fishing expenditure
    - Agreement with 'a fishing trip can still be successful, even if no fish/crabs/lobster are caught'
    - Importance of fishing to life overall
    - Important of spending time with family & friends when fishing
    - Mean wellbeing score (global life satisfaction)
    - Importance of fishing vs camping (if given a choice would you prefer camping, fishing, hard to choose)
- Sensitivity of findings to variation in the setting of the benchmark variable (e.g. how much do estimates of fishing expenditure change).

Gender

Estimates of the proportion of fishers who are female versus male vary somewhat across studies (Table A2.8.1). All past studies have included only two gender classifications (male and female); while the 2018 RWS did collect data on identification as other gender, too few participants identified as having a gender identity other than binary male or female to assess their proportion of recreational fishers. Future studies should explicitly examine a broader range of gender definitions to identify participation in fishing by those of non-binary gender.

The majority of previous studies identified that somewhere between 28% and 34% of recreational fishers were female: two studies estimated higher participation (between 41% to 45% female participation estimated in the Regional Wellbeing Survey, and 47% in a Victorian study by EY), while one study estimated much lower participation (the Ausplay survey which, as discussed in Chapter 4, does not measure participation in recreational fishing using a suitable measure, and cannot be considered a true indication of participation). The differences between estimates could not be explained as being a change over time, as the estimates did not change consistently over time. However, most estimates were produced using data from a single Australian state or territory, and this may be a driver of some of the difference in estimates; additionally, some studies examined participation by those aged 5 and older and others participation in fishing by those aged 18 and older, which resulted in significant variation.

Given that most studies had a range of 28% to 34%, the one study with a lower estimate used a very different definitions of fishing participation not suited to this study, and two studies using the same definition had higher estimates of female participation, it was decided that the 'plausible range' of female participation was between 28% and 36%, but that sensitivity testing should also check the sensitivity of findings to a range from 28% to 45% as being the widest likely range in which the true value lay.

Table A2.8.1 Estimates of proportion of current fishers who are male and female across previous studies and Stage 1 of this study

Source	Year	Region	Age range examined	Ratio female	Ratio male
Henry and Lyle 2003	1999-00	Aus	5+	32%	68%
West et al. 2015	2015	NSW	5+	29%	71%
West et al. 2012	2009	NT	5+	33%	67%
Taylor 2012	2010	Qld	5+	33%	67%
Webley 2015	2013	Qld	5+	32%	68%
Lyle et al. 2009	2007	Tas	5+	34%	66%
Lyle et al. 2014	2012	Tas	5+	33%	67%
Lyle et al. 2019	2017	Tas	5+	33%	67%
EY 2016** (report notes gender distribution unlikely to be realistic)	2015	Vic	18+	47%	53%
RWS (this study)	2018	Aus	18+	43% (41%-45%)	57% (55%-59%)
Ausplay surveys (see Chapter 4)	2020	Aus	15+	14%	86%

Bivariate statistical tests were used to examine whether gender explained a significant amount of variation in the different outcome variables (Table A2.8.2). This showed that gender predicted a significant amount of variation in all the outcome variables examined, with men spending more on fishing on average than women, finding fishing more important, and being more likely to choose fishing over camping, than women.

Table A2.8.2 Gender as a predictor of social and economic aspects of recreational fishing

Outcome	**Test**	**Effect size, p value**	Interpretation
12 month expenditure	Kruskal Wallis H	581.0, <0.000	Men spend more than women
Fishing trip can still be successful even if nothing caught	Kruskal Wallis H* Pearson chi square**	*8.1, 0.004 **56.8, <0.000	
Importance of fishing	Kruskal Wallis H	678.4, <0.000	Fishing is more important to men than women
Importance of spending time with family when fishing	Kruskal Wallis H	77.7, <0.000	
Importance of spending time with friends when fishing	Kruskal Wallis H	84.9, <0.000	
Global life satisfaction (wellbeing)	Kruskal Wallis H	50.4, <0.000	
Relative importance of fishing vs camping	Pearson chi-square	253.1, <0.000	Men are more likely to choose fishing over camping than women.

The final step was to identify whether outcome variables changed significantly if data were weighted to give different ratios of female versus male fishers. As shown in Table A2.8.3, the mean score for self-reported expenditure was 5.1 (on a scale from 0 to 15, with 0 = no spending and 15 = spending of $20,000 or more) if the weighting assumed 28% female participation. This fell slightly and insignificantly to 5.0 if the weighting was based on 36% female participation, and to 4.9 (still insignificantly different) at 43% female participation. At 45% female participation there was a slightly significant decline compared to 28% participation, at 4.8, but this would still result in less than 1% variation in estimates of total expenditure. When scores for the mean rating of importance of fishing (scored from 0 = not at all important to 10 = very important) were examined, the finding was similar: there was very small difference between estimates based on 28% to 36% participation, and only slight variation in estimates up to 45% female participation.

Table A2.8.3 Variation in (i) self-reported expenditure estimate and (ii) importance of fishing estimate based on weighting using differing assumptions about gender ratios

	12-month expenditure on fishing			Importance of fishing		
Fished in last 12 months	Mean score (1 to 15)	95.0% Lower CL for Mean	95.0% Upper CL for Mean	Mean score (0 to 10)	95.0% Lower CL for Mean	95.0% Upper CL for Mean
Unweighted (female 19%)	5.3	5.2	5.3	7.4	7.3	7.4
Female 28%	5.1	5.0	5.2	7.2	7.2	7.3
Female 32%	5.1	5.0	5.1	7.2	7.1	7.2
Female 36%	5.0	4.9	5.1	7.1	7.1	7.1
Female 43%	4.9	4.8	5.0	7.0	6.9	7.0
Female 45%	4.8	4.8	4.9	7.0	6.9	7.0

Gender was found to interact with other benchmark variables: in particular, the likelihood of a fisher being female declined with age, with older women much less likely to participate in fishing compared to younger women (using data from the 2018 RWS, 46.3% of fishers aged 18-29 were female, and 51.9% of fishers aged 30-44, but only 25.7% of fishers aged 60-74 and 5.9% of fishers aged 75 and over were female), and women living outside major cities more likely to participation in fishing than those living in major cities. Women were somewhat less likely to be avid fishers.

Based on these findings, gender was included as a benchmark variable in the superpopulation as, while most findings were relatively insensitive to changes in estimates of gender participation, gender was an important predictor of social and economic outcomes. The recommended benchmark was 34% female participation and 66% male participation in recreational fishing. The final superpopulation characteristics also needed to match the variation in gender by age, and be consistent with a higher proportion of rural fishers being women, and a lower proportion of avid fishers being women.

It is also recommended that there be regular collection in future of benchmark data on participation in fishing by gender to assist in producing more consistent estimates of participation by gender that can inform future superpopulation models.

Fishing avidity

Fishing avidity can be measured in many ways. The most common way it has been measured in recreational fishing studies in Australia is by examining the number of days fished during the previous 12 months. Different studies report days fished using different categories: some report the categories of 1-2, 3-5, 6-9, 10-19, 20+ days; others 1-4, 5-9, 10-19, 20+; and others use other combinations. The most consistent groupings possible across different studies were compared (Table A2.8.4). The two available national studies – Henry and Lyle (2003), and data from Stage 1 of this project – had relatively similar results, suggesting that across all Australian recreational fishers, around 2/3 fished less than 5 days a year, around 16-18% fished between 5 or 6 and 9 or 10 days, 10% fished between 10 and 19 days, and somewhere between 5% and 8% fished 20 or more days. Data from studies in individual states differs to this, with varying findings depending on the study suggesting anything up to 79% of fishers fish less than 4 or 5 days a year, and 2% to 4% fish 20 or more days a year.

The two national surveys were considered most likely to be suitable for use, given they covered the same regions, however the data by state and territory highlight that within this overall national average it should be expected avidity will vary somewhat depending on the state or territory being examined.

Table A2.8.4 Estimates of distribution of fishing avidity (number of days fished in previous 12 months) in previous studies and Stage 1 of this study

	1-4/5 days	5/6-9/10 days	10/11-19/20 days (19-RWS, 20-H&L)	20+ days
Henry and Lyle 2003	67%	18%	10%	5%
RWS 2018	66%	16%	10%	8%
NSW 2013-14	79%	13%	5%	2%
SA 2007-08	70%	21%	6%	3%
NT 2009-10	75%	14%	8%	3%
Tas 2017-18	64%	20%	11%	4%

Fishing avidity was a significant predictor of six of the seven social and economic aspects of fishing examined (Table A2.8.5), suggesting it was important to include it as a benchmark variable.

Table A2.8.5 Fishing avidity as a predictor of social and economic aspects of recreational fishing

Outcome	**Test**	**Effect size, p value**	**Description**
12 month expenditure	Spearman's *r*	0.438, <0.000	The more you fish, the more you spend
Fishing trip can still be successful even if nothing caught	Kruskal Wallis H* Spearman's *r***	116.1, <0.000 0.091, <0.000	The more you fish, the more you think a day is successful even if nothing caught
Importance of fishing	Spearman's *r*	0.452, <0.000	The more you fish, the more important it is to you
Importance of spending time with family when fishing	Spearman's *r*	0.023, 0.022	
Importance of spending time with friends when fishing	Spearman's *r*	0.083, 0.000	Fishing with friends is somewhat more important the more days you fish
Global life satisfaction (wellbeing)	Spearman's *r*	0.144, <0.000	The more you fish, the higher your wellbeing
Relative importance of fishing vs camping	Kruskal Wallis H	296.2, <0.000	Fishing more important if you fish more days

A set of benchmarks was developed for fishing avidity, and the sensitivity of findings to variation within the range tested. The 'plausible range' within which the true distribution of fishing avidity was considered likely to fall was:

- 1-4 days: 64% to 75% of fishers (67%-68% most plausible)
- 5-9 days: 14% to 21% (16% to 18% most plausible)
- 10-19 days: 5% to 11% (9% to 10% most plausible)
- 20+ days: 2% to 8% (5% to 7% most plausible)

Unweighted, fishing expenditure was an average of 5.3; this reduced to 3.7 at the most plausible avidity benchmark and was very similar for the low benchmark (3.6) and high benchmark (3.8) (Table A2.8.6). Varying the benchmarks from the lowest to highest range had relatively small influence, changing estimates of expenditure by approximately 4.5%. For importance of fishing, there was again a large difference between unweighted and weighted estimates, but relatively little between the low and high ends of the plausible weighting range.

Table A2.8.6 Variation in (i) self-reported expenditure estimate and (ii) importance of fishing estimate based on weighting using differing assumptions about gender ratios

4 groups (1-4, 5-9, 10-19, 20+ days)	12 month expenditure on fishing				Importance of fishing		
Fished in last 12 months	Mean score (1 to 15)	95.0% Lower CL for Mean	95.0% Upper CL for Mean	Sum	Mean score (0 to 10)	95.0% Lower CL for Mean	95.0% Upper CL for Mean
Unweighted	5.3	5.2	5.3	47772	7.4	7.3	7.4
Low (4 grp)	3.6	3.5	3.6	32229	6.0	6.0	6.1
Recommended/most plausible (4 grp)	3.7	3.7	3.8	33759	6.2	6.1	6.2
High (4 grp)	3.8	3.8	3.9	34724	6.2	6.2	6.3

Weighting using only four avidity groupings, as was done in Table A2.8.6, did not necessarily provide high sensitivity to the effect of changing avidity on expenditure. To test sensitivity of findings to variation in avidity grouping, an eight-group avidity grouping was tested (Table A2.8.7 and estimates compared. The eight-group approach (weighting those who fished the following numbers of days as separate groups: 1-2, 3-4, 5-9, 10-14, 15-19, 20-29, 30-51, 52+ days) resulted in near identical estimates, suggesting there was limited if any value in weighting using eight avidity groups rather than four.

Table A2.8.7 Variation in self-reported expenditure estimate when weighting data using eight fishing avidity groups

8 groups: 1-2, 3-4, 5-9, 10-14, 15-19, 20-29, 30-51, 52+ days	12 month expenditure on fishing			
Fished in last 12 months	Mean score (0 to 10)	95.0% Lower CL for Mean	95.0% Upper CL for Mean	Sum
Unweighted	5.3	5.2	5.3	47772
Low (4 grp)	3.6	3.5	3.6	32335
Recommended/most plausible (4 grp)	3.8	3.7	3.8	33995
High (4 grp)	3.9	3.8	3.9	34999

Fishing avidity varied depending on a person's gender (women were less avid), age, and geographic location (see Chapter 4 for analysis).

Given the significant effect of fishing avidity on outcome variables, and large difference between unweighted and weighted estimates, avidity was considered important to include as a variable in the superpopulation. Four avidity groups were used, and when developing the model, it needed to meet the criteria of having interaction between avidity and gender, age and geographic location consistent with that reported in Chapter 4.

Ideally, data on fishing avidity should be collected regularly to better understand how both short-term and long-term factors influence avidity: do large scale events such as the Black Summer bushfires result in a change in avidity?

Age

Relatively few previous studies provide breakdowns of the recreational fisher population by consistent age groups. Those that do have relatively similar findings, albeit with some potential decline in participation of people aged under 30 over time (Table A2.8.8): between 21% and 26% of fishers are estimated to be aged between 15 and 29 (with estimates on the lower side of this more common in recent years), between 20% and 30% aged 30 to 44, with national surveys finding between 30% and 33% and state and territory based surveys the lower proportions, between 21% and 25% aged 45-59, and between 21% and 31% aged 60 plus with 20% to 22% being most common.

Table A2.8.8 Estimates of distribution of recreational fishers by age group in previous studies and Stage 1 of this study

	Aged 15-29/18-29	Aged 30-44	Aged 45-59	Aged 60+
NRIFS 1999-00 (Henry and Lyle 2003)	26%	30%	24%	20%
This study, Stage 1 data, 2018 RWS	21%	33%	24%	22%
Tas 2017-18 (Lyle et al. 2019)	23%	21%	25%	31%
NSW 2013-14 (West et al. 2015)	22%	22%	21%	21%

Age has a significant effect on five of the seven social and economic outcomes examined (Table A2.8.9), supporting its inclusion as a variable in the superpopulation model.

Table A2.8.9 Recreational fisher age as a predictor of social and economic aspects of recreational fishing

Outcome	Test	Effect size, p value
12 month expenditure	Spearman's *r*	-0.006, 0.587
Fishing trip can still successful even if nothing is caught	Kruskal Wallis H* Spearman's *r***	147.5, <0.000 0.098, <0.000
Importance of fishing	Spearman's *r*	0.021, 0.032
Importance of spending time with family when fishing	Spearman's *r*	-0.067, <0.000
Importance of spending time with friends when fishing	Spearman's *r*	-0.053, <0.000
Global life satisfaction (wellbeing)	Spearman's *r*	0.138, <0.000
Relative importance of fishing vs camping	Kruskal Wallis H	9.945, 0.007

Overall recommendations were to include age given age is a predictor of key outcomes, and the sample was known to be biased towards older people. Findings were relatively insensitive to variation in specification of benchmarks between the higher and lower ends of the plausible range tested, and the middle of the range (the most plausible value) was used as a result. Similar to other variables, it is important to regularly collect data on participation in recreational fishing by age group to better inform superpopulation models, and also to track changing patterns of participation over time, similar to gender.

Formal educational attainment

Formal educational attainment was explored as a potential benchmark. While outcome variables were sensitive to variation in educational attainment when this was the only variable examined, they were *not* sensitive once weighting for household income was included in the modelling. As household income predicted greater variance in expenditure on fishing, it was included in the superpopulation model in preference to educational attainment.

Table A2.8.10 Educational attainment as a predictor of social and economic aspects of recreational fishing

Outcome	Test	Effect size, p value[a]
12 month expenditure	Kruskal Wallis H	29.4, <0.000
Fishing trip can still successful even if nothing is caught	Kruskal Wallis H* Pearson chi square**	*37.2, <0,.000 **76.2, <0.000
Importance of fishing	Kruskal Wallis H	128.7, <0.000
Importance of spending time with family when fishing	Kruskal Wallis H	104.2, <0.000
Importance of spending time with friends when fishing	Kruskal Wallis H	43.9, <0.000
Global life satisfaction (wellbeing)	Kruskal Wallis H	27.6, <0.000
Relative importance of fishing vs camping	Pearson chi-square	37.4, <0.000
[a]Comparing 'did not complete high school', 'completed high school', and 'completed tertiary qualification'		

Geographic location of residence - State/Territory

State/Territory of residence was included as a benchmark in the superpopulation model as sampling deliberately aimed to over-sample States and Territories with smaller populations. This meant that it was essential to include this as a characteristic of the superpopulation.

There were only two potential benchmark sources for this characteristic, as only two surveys have estimated recreational fishing participation across all states and territories at a single point in time using the same definition of recreational fishing used in this study: the first NRFS, and Stage 1 of this study. As shown in Table A2.8.11, estimates of the proportion of fishers residing in each state and territory were very similar across both these benchmarks. Based on this, the plausible range within which the 'true' answers were considered likely to fall was:

- NSW/ACT: 28% - 33% of recreational fisher population
- VIC: 16% - 21% of recreational fisher population
- QLD: 23%-27% of recreational fisher population
- SA: 8% - 10% of recreational fisher population
- WA: 11% - 15% of recreational fisher population
- TAS: 1.5% - 4% of recreational fisher population
- NT: 1%-2% of recreational fisher population

Table A2.8.11 Estimates of distribution of recreational fishers by State/Territory in previous studies and Stage 1 of this study

	NRIFS (Henry and Lyle 2003)	NRFS Stage 1 (RWS 2018)	RWS lower CL	RWS higher CL
NSW/ACT	31.3%	30.6%	28.9%	32.3%
VIC	16.3%	19.2%	17.8%	20.7%
QLD	23.3%	24.7%	23.2%	26.3%
SA	9.8%	8.9%	7.9%	10.0%
WA	14.3%	13.0%	11.8%	14.2%
TAS	3.7%	2.2%	1.7%	2.8%
NT	1.3%	1.5%	1.1%	2.0%
Aus	100%	100%	100%	100%

A person's state or territory of residence was a significant predictor of most of the social and economic outcomes examined (Table A2.8.12).

Table A2.8.12 State/Territory of residence as a predictor of social and economic aspects of recreational fishing

Outcome	**Test**	**Effect size, p value**
12 month expenditure	Kruskal Wallis H	199.0, <0.000 (driven by NT)
Fishing trip can still successful even if nothing is caught	Kruskal Wallis H* Pearson chi square**	*43.05, <0.000 **72.9, <0.000
Importance of fishing	Kruskal Wallis H	61.08, <0.000
Importance of spending time with family when fishing	Kruskal Wallis H	81.04, <0.000
Importance of spending time with friends when fishing	Kruskal Wallis H	49.28, <0.000
Global life satisfaction (wellbeing)	Kruskal Wallis H	24.09, 0.001
Relative importance of fishing vs camping	Pearson chi-square	19.3, 0.082

Geographic location of residence – urban/rural resident

Some studies suggest that people living in urban areas are less likely to participate in recreational fishing compared to those living in rural areas. As is discussed in Chapter 4, this was the case in data from the NRFS. The only benchmark data available were data from Stage 1 of the NRFS, and these were used to identify benchmarks for inclusion in the superpopulation model for Stage 2, with Chapter 4 setting out the data regarding rates of participation in fishing by urban versus rural area. Urban versus rural residential location was a significant predictor of six of the seven social and economic outcomes examined (Table A2.8.13).

Table A2.8.13 Urban/rural residential location as a predictor of social and economic aspects of recreational fishing

Outcome	Test	Effect size, p value
12 month expenditure	Kruskal Wallis H	41.1, <0.000
Fishing trip can still successful even if nothing is caught	Kruskal Wallis H* Pearson chi square**	*54.4, <0.000 **73.1, <0.000
Importance of fishing	Kruskal Wallis H	64.2, <0.000
Importance of spending time with family when fishing	Kruskal Wallis H	41.8, <0.000
Importance of spending time with friends when fishing	Kruskal Wallis H	0.116, 0.733
Global life satisfaction (wellbeing)	Kruskal Wallis H	11.8, 0.001
Relative importance of fishing vs camping	Pearson chi-square	31.6, <0.000

First Nations

Aboriginal and Torres Strait Islander peoples have been found to have a higher likelihood of participating in fishing in multiple studies. Depending on definitions of cultural versus recreational fishing, some studies record higher participation than others. In the second NRFS, anyone who self-identified their fishing as being recreational (non-commercial in nature) was encouraged to complete the survey: it is highly likely some Aboriginal and Torres Strait Islander participants undertook cultural and recreational fishing activities simultaneously, and therefore the data collected include culturally important fishing activities. The only benchmark data available were data from Stage 1 of the NRFS, and these were used to identify benchmarks for inclusion in the superpopulation model for Stage 2, with Chapter 4 setting out the data regarding rates of participation in fishing by those identifying as Aboriginal and/or Torres Strait Islander. Whether a person identified as Aboriginal or Torres Strait Islander was a significant predictor of five of the seven social and economic outcomes examined (Table A2.8.14).

Table A2.8.14 Aboriginal/Torres Strait Islander identification as a predictor of social and economic aspects of recreational fishing

Outcome	Test	Effect size, p value
12 month expenditure	Kruskal Wallis H	6.1, 0.013
Fishing trip can still successful even if nothing is caught	Kruskal Wallis H* Pearson chi square**	0.820, 0.052 **11.4, 0.023
Importance of fishing	Kruskal Wallis H	4.8, 0.029
Importance of spending time with family when fishing	Kruskal Wallis H	18.9, <0.000
Importance of spending time with friends when fishing	Kruskal Wallis H	9.2, 0.002
Global life satisfaction (wellbeing)	Kruskal Wallis H	1.87, 0.171
Relative importance of fishing vs camping	Pearson chi-square	4.1, 0.129

Country of birth

Similar to the previous two benchmarks, a person's cultural background is often identified as resulting in differing likelihood of participating in fishing. However, there is very little available benchmark data for this variable, with the Stage 1 NRFS data providing the only useable data for this purpose. In the Stage 1 dataset, three groups of people were compared: those born in Australia (irrespective of cultural background, as it was considered likely that those raised in Australia were more likely to adopt 'Australianised' rates of participation in recreational fishing), those born in other English speaking countries (most of which have somewhat similar recreational fishing cultures to Australia), and those born in non-English speaking countries (which have a wide range of variation in recreational fishing participation). This grouping predicted significant variation in social and economic outcomes (Table A2.8.15). Future studies should ideally more specifically identify whether more specific cultural background benchmarks should be used.

Table A2.8.15 Being born in Australia/other English-speaking country/non-English speaking country as a predictor of social and economic aspects of recreational fishing

Outcome	Test	Effect size, p value
12 month expenditure	Kruskal Wallis H	17.9, <0.000
Fishing trip can still successful even if nothing is caught	Kruskal Wallis H* Pearson chi square**	*1.4, 0.235 **66.8, <0.000
Importance of fishing	Kruskal Wallis H	18.2, <0.000
Importance of spending time with family when fishing	Kruskal Wallis H	37.8, <0.000
Importance of spending time with friends when fishing	Kruskal Wallis H	14.3, <0.000
Global life satisfaction (wellbeing)	Kruskal Wallis H	0.729, 0.393
Relative importance of fishing vs camping	Pearson chi-square	5.96, 0.202

Household income

Household income was considered likely to be a predictor of fishing expenditure, and higher income earners were also considered more likely to respond to the survey. Only one source of benchmark data was available: the Stage 1 NRFS data. Household income was a significant predictor of all social and economic outcome variables examined (Table A2.8.16). Given this, household income was included as a benchmark in the superpopulation model, based on Stage 1 RWS data.

Table A2.8.16 Household income as a predictor of social and economic aspects of recreational fishing

Outcome	Test	Effect size, p value
12 month expenditure	Spearman's *r*	0.332, <0.000
Fishing trip can still successful even if nothing is caught	Kruskal Wallis H* Spearman's *r***	*46.4, <0.000 **0.464, 0.008,
Importance of fishing	Spearman's *r*	0.078, <0.000
Importance of spending time with family when fishing	Spearman's *r*	0.054, <0.000
Importance of spending time with friends when fishing	Spearman's *r*	0.067, <0.000
Global life satisfaction (wellbeing)	Spearman's *r*	0.148, <0.000
Relative importance of fishing vs camping	Kruskal Wallis H	17.8, <0.000

Participation in fishing

The final element important to include in the superpopulation was an estimate of the proportion of Australians who participate in recreational fishing in a 12 month period. This is discussed in detail in Chapter 4. For purposes of the superpopulation model, the plausible range of fishing participation was considered to be at lowest 18% and at highest 22%, with the middle of this range – 20% - used in the benchmark model. Population-level findings, such as estimates of total economic contribution of fishing, are highly sensitive to change in this aspect of the superpopulation model: a change of 2% in estimates of participation (e.g. estimated 22% of Australians fish versus 20%) results in significant change in estimates of size of economic contribution of fishing (see Chapter 7, which includes testing of sensitivity of findings to variations in this assumption). This highlights a critical need for improvements in data collection on overall participation in fishing, and better understanding of short versus long term changes in participation. This can be best achieved through regular data collection at a national scale as part of omnibus surveys examining a range of topics.

2.8.4 Final recreational fisher superpopulation specifications

The final recreational fisher superpopulation specifications used were the 'benchmark recommended' category shown in Table A2.8.17. The recreational fisher superpopulation against which the sample was weighted specified the characteristics of Australian adult recreational fishers using the following criteria: gender, age, fishing avidity (days fished in last 12 months), state/territory of residence, whether the person lived in a major city or other location, household income, cultural background – whether a person identified as Aboriginal/Torres Strait Islander, cultural background - whether the person was born in Australia, in another English-speaking country, or in a country where English is not the main language spoken. To enable sensitivity testing, weights were generated for the 'Benchmark low', 'Benchmark recommended' and 'Benchmark high' superpopulations, and the overall weights generated from each compared. This formed the final stage of sensitivity testing. Table A2.8.18 compares the mean scores for four social and economic outcome variables. This shows that

Table A2.8.17 Benchmark categories for which sensitivity testing was conducted, and resulting recommended benchmark used in superpopulation model

Characteristic	Benchmark categories	Benchmark – low/one extreme	Benchmark - recommended	Benchmark – high/ other extreme
Gender	Female Male	32% 68%	**38%** **62%**	43% 57%
Age	18-29 30-44 45-59 60+	21% 23% 25% 31%	**23%** **27%** **23%** **27%**	26% 33% 21% 20%
Avidity (days fished last 12 months)	1-4 days 5-9 days 10-19 days 20+ days	75% 18% 5% 2%	**67%** **17%** **11%** **5%**	64% 17% 11% 8%
State/territory	NSW/ACT VIC QLD SA WA TAS NT	28% 16% 26% 10% 15% 4% 1%	**30.5%** **19%** **24.5%** **9%** **13%** **2.5%** **1.5%**	33% 21% 23% 8% 11% 2% 2%
Urban/rural (range based on 95% CI)	Major city Elsewhere	61.3% 38.7%	**59.5%** **40.5%**	57.7% 42.3%
Household income	<$20,800 $20,800-$41,599 $41,600-$77,999 $78,000-$124,999 $125,000 or more	12.6% 15.4% 26.1% 24.0% 22.3%	**11.4%** **14.0%** **24.4%** **25.6%** **24.5%**	10.3% 12.8% 22.9% 27.2% 26.9%
Aboriginal/Torres Strait Islander	ATSI Other	3.7% 96.3%	**4.4%** **95.6%**	5.2% 94.8%
Born in Australia, overseas	Born Aus Born o/s – English sp. Born o/s – non-English	78.0% 11.2% 10.8%	**79.5%** **10.8%** **9.7%**	81.0% 9.3% 9.7%
% Australians who participate in fishing		18%	**20%**	22%

Table A2.8.18 Sensitivity of findings to use of low, recommended, high superpopulation benchmarks

	Low weight	95.0% Lower CL for Mean	95.0% Upper CL for Mean	Recomm-ended weight	95.0% Lower CL for Mean	95.0% Upper CL for Mean	High weight	95.0% Lower CL for Mean	95.0% Upper CL for Mean
Expenditure on fishing	3.7	3.6	3.8	4.0	3.9	4.1	4.2	4.1	4.3
A fishing trip can be successful even if no fish are caught - mean score	4.0	3.9	4.0	4.0	3.9	4.0	4.0	3.9	4.0
Importance of fishing - mean score	6.1	6.1	6.2	6.2	6.2	6.3	6.3	6.2	6.3
Personal Wellbeing Index, mean score	70.9	70.5	71.4	71.5	71.0	71.9	71.7	71.3	72.2

Findings had relatively low sensitivity to variation of the superpopulation parameters. In all cases, testing of sensitivity of findings to variation in weights suggested that variation resulting from the change in weighting criteria was much smaller than estimates of overall sampling error and hence much smaller than estimated confidence intervals. This means that the confidence intervals reported throughout this report are likely to give a useful guide to the likely range of true values even if some weighting parameters are changed. Given this, the superpopulation used was the 'recommended' one that represented the 'mid-point' amongst estimates of the distribution of recreational fisher characteristics such as gender, age, place of residence, education and household income. Unless otherwise specified, analyses use these 'recommended' weights.

2.8.5 Suitability of Stage 2 data for statistical weighting – general

The overall suitability of data collected using different survey recruitment methods for inclusion in the data set to be weighted using the recreational fisher superpopulation is assessed in Chapter 12. The analysis presented in Chapter 12 and associated Appendices shows that data collected using all survey recruitment methods could be used as, after weighting for benchmark variables, survey recruitment method had very small effects on findings that were not meaningful and usually not statistically significant.

2.8.6 Suitability of Stage 2 data for statistical weighting – comparison of effect of social media ad content

Before assessing suitability of data for inclusion in analysis (Chapter 12 and Appendix 2.8.5), it was important to assess whether there was significant variation in responses to one survey recruitment method: social media advertisements. As multiple advertisements were used, each having different wording and emphasis, it was possible that the types of participants recruited may differ. Before being able to assess responses to social media advertisements as a single 'survey recruitment method', it was therefore important to examine whether there was significant variation in responses depending on the specific content of individual advertisements.

This was done by tracking click-through to the online survey from different social media ads and comparing the distribution of responses to different survey questions from people who clicked on different ads. Ads were then classified by whether the wording included was:

- Neutral – the wording encouraged participation in the survey but did not mention specific issues such as the survey aiming to find out the total economic value of fishing
- Potentially encouraging bias – the wording, while not suggesting participants should over-estimate things like expenditure, included wording suggesting it was important to know the true value of fishing, and/or suggesting there may have been growth in expenditure over time

The design of ads used on social media was done in three stages, to assist in tracking effect (this was important as a person might see more than one advertisement for the survey; by grouping ads it was possible to increase confidence regarding the type of social media ad for the survey a person may have seen in the days before opting to click on an ad to go to the survey). Early in the recruitment of Stage 2 participants, neutrally worded ads were used (see Appendix 2.7.3). This was done during 2019. During January to March 2020, ads used language that more directly encouraged participation through emphasising the importance of having data on social and economic aspects of fishing; ads during this second stage included language that could be argued to risk leading participants to feel they should report higher importance. In the third stage, there was a return to neutrally worded ads, which focused more on promoting the availability of a prize draw for survey participants and not on the importance of understanding social and economic dimensions of fishing.

An example of a 'potentially encouraging bias' ad is given to the right: this ad makes reference to 'we know expenditure on boats & gear has increased dramatically for some anglers', a statement that, while true, could risk influencing some people to believe they should report high expenditure on fishing.

Participants who completed the survey by clicking on an ad in these three stages were compared (Table A2.8).

Table A2.8 Comparison of participants who completed different types of ads

	Early neutral advertisements			Potentially leading advertisements			Late neutral advertisements		
	Value	Low CI	High CI	Value	Low CI	High CI	Value	Low CI	High CI
Female	27.5%	24.0%	31.3%	11.6%	9.1%	14.5%	9.8%	8.8%	10.9%
Male	72.5%	68.7%	76.0%	88.4%	85.5%	90.9%	90.2%	89.1%	91.2%
Fishing avidity (average score, measured 0-6)	4.6	4.4	4.8	5.3	5.1	5.5	5.4	5.4	5.5
Average fishing expenditure (measured on non linear scale, 0-16)	5.7	5.4	6.0	5.9	5.6	6.2	5.8	5.6	5.9
Fishing can be successful even if no fish are caught (measured 1-7)	4.0	3.9	4.1	4.0	3.9	4.1	4.1	4.1	4.2
Importance of fishing (measured 0-10)	7.3	7.1	7.5	7.6	7.4	7.8	7.9	7.9	8.0

Appendix 2.9 – Stage 3 survey questionnaires

The Stage 3 survey questionnaires had two types of questions. First, the same questions were repeated in each about several topics, namely number of fishing trips undertaken by month (if the survey asked about a two month period, respondents were asked to report for each month separately), fishing expenditure, wellbeing, and socio-demographic characteristics. Second, some surveys also asked questions about a 'special topic' that was only asked about in that specific survey.

Questions repeated in all surveys are shown first in this Appendix, followed by a listing of the 'special topics' questions asked.

2.9.1 Questions asked in all surveys

The example given is from the first monthly survey. In all subsequent surveys, dates and descriptions such as 'did you get to fish last summer' were changed to refer to the appropriate period.

NRFS Monthly Fishing Survey - March 2020

Did you get to fish last summer?

Tell us and go into our prize draw

Prefer to do the survey online? Go to www.nationalrecsurvey.com.au

This short survey asks you whether you were able to go fishing last summer - and whether events such as bushfire, smoke, storm or COVID19/coronavirus are changing the amount of fishing you're doing. It is the first of a series of short monthly surveys being conducted as part of the National Recreational Fishing Survey. You may have already taken part in our main survey (if you haven't, head to www.nationalrecsurvey.com.au and join the thousands of fishers who already have taken part). This month's survey will take 10-20 minutes to complete (less if you didn't get to fish last summer, more if you did). It is open until April 16th 2020.

Everyone who completes the survey can enter our prize draw, for a chance to win one of 12 weekly prize packs of tackle worth $600, drawn each Friday until May 22nd, three monthly holiday packs worth $1,800 each, and a grand prize fishing trip worth up to $5,000. If you want more chances to go into the prize draws, go to www.nationalrecsurvey.com.au each month to find a new survey waiting for you (we'll also email you about new survey opportunities if you decide to provide your contact details on the survey). If you need assistance or have any questions, call us on **1800 981 499**. Thank you for taking part in this survey – we appreciate your time and effort.

The 2019-20 summer was challenging for many people across Australia. This month's survey asks whether your plans to go fishing have been impacted by bushfires, smoke, drought, storms, floods, or Covid-19 (or any other events). We also ask what types of information you want to have access to about issues such as water quality and fish stocks after bushfires and rain events. We're asking about this to help understand the extent to which fishing was one of the activities impacted over the summer, which will help us estimate impacts on businesses that depend on recreational fishing, as well as on the wellbeing of fishers.

How many fishing trips did you do over the 2019-2020 summer (please answer even if it was none – that's important for us to know!)

In December, January and February how many fishing trips did you do?

Any day you went fishing counts as a fishing day, whether you fished for an hour or eight hours. ***INCLUDE ANY TYPE of*** *fishing (including catching fish or other species such as yabbies, crays, crabs, shellfish and lobster, and using any method e.g. rod, line, diving, spearfishing or others.*	How many DAY FISHING TRIPS did you go on? *(Where you didn't stay away overnight)*	How many OVERNIGHT FISHING TRIPS did you go on? *(Where you stayed away overnight)*	Did you do any fishing trips in countries other than Australia?
December 2019	Number:	Number:	Number:
January 2020	Number:	Number:	Number:
February 2020	Number:	Number:	Number:

Did other people in your household go on fishing trips WITHOUT YOU during the summer?

	Did other people in your household go on DAY TRIPS without you?	Did other people in your household go on OVERNIGHT TRIPS without you?	Did other people in your household go on INTERNATIONAL TRIPS without you?
December 2019	Number:	Number:	Number:
January 2020	Number:	Number:	Number:
February 2020	Number:	Number:	Number:

Later in the survey we'll ask for more information about your FEBRUARY fishing trips only, including things like how many nights you spent away on overnight trips.

Comparing the fishing you did last summer to the previous summer, did you go fishing… *Select one*	◯ More in the 2019-20 summer than the previous summer ◯ About the same amount in the 2019-20 summer as the previous summer ◯ Less in the 2019-20 summer than the previous summer
Overall, would you say that over the 2019-20 summer you were able to fish…	◯ Much less than I wanted to ◯ A little less than I wanted to ◯ About as much as I wanted to ◯ A little more than I wanted to ◯ Much more than I wanted to

You said you fished less than planned in one or more months last summer. Was this for any of the following reasons?

	No, not a reason for fishing less	One of the reasons I fished less	The main reason I fished less
Bushfire or smoke-related issues (e.g. you had to cancel a planned holiday, friends weren't available, travel wasn't possible, the area you planned to fish in was impacted)	○	○	○
Drought related issues	○	○	○
Rainfall, flooding, or storms	○	○	○
Work (e.g. your work hours or workload stopped you going fishing as often as you would like)	○	○	○
Health problems	○	○	○
I switched to doing a different hobby or sport than fishing	○	○	○
My home commitments changed (e.g. you might have had a new baby, be renovating, or shifted house)	○	○	○
Some of the people I usually fish with couldn't go fishing as much as expected	○	○	○
Access to fishing reduced around one or more of my fishing spots (e.g. there was an area closure or jetty closure)	○	○	○
I couldn't afford to fish as often	○	○	○
Fishing catch rates or quality of catch were poorer than usual	○	○	○
Poor weather conditions (weather was often bad on days I wanted to go fishing)			
Poor environmental conditions (e.g. low water flows, water quality problems, concerns about fish health, etc.)	○	○	○
No reason/unsure	○	○	○
Other (*please describe*)	○	○	○

You said you fished MORE than planned in one or more months last summer. Was this for any of the following reasons?

	No, not a reason for fishing more	One of the reasons I fished more	The main reason I fished more
My work hours reduced or business was slow so I had more time than expected to go fishing	○	○	○
Plans to do other activities changed due to bushfires, and as a result I had more time for fishing	○	○	○
Plans to do other activities changed due to storms, floods or drought, and as a result I had more time for fishing			
Good weather conditions (weather was good on a lot of days I wanted to go fishing)	○	○	○
Retired, or reduced or changed work hours so I could go fishing more	○	○	○
Improved health/fitness	○	○	○
Improved environmental conditions e.g. better water flows, improved water or habitat quality, improved health of fish stock	○	○	○
My home commitments changed so I could do more fishing (e.g. you finished renovations, children moved out etc.)	○	○	○
I went fishing with new people I haven't fished with before	○	○	○
The people I go fishing with were available to go fishing more often	○	○	○
I bought equipment such as a boat that makes it easier to go fishing	○	○	○
Access to fishing improved in one or more of my fishing spots (e.g. improved jetty, boat ramp)	○	○	○
My finances allowed me to fish more often than I have previously	○	○	○

Fishing opportunities improved (e.g. strike rates increased, fishing was good for the species you like to target)	◯	◯	◯
No reason/unsure	◯	◯	◯
Other (*please describe*)	◯	◯	◯

You said you went on [number] DAY fishing trips in [February]. The next questions ask about the types of fishing trips these were (we won't ask for details of your December and January trips). We ask for up to 10 day trips (if you did more than that, you're lucky, and we also won't ask you to provide details for every trip – the first 5 is plenty for us to get a good understanding of the types of fishing you do!). We ask about OVERNIGHT trips in the next part of the survey, so only answer this question for trips that didn't involve staying away overnight.

Fishing trip 1. Tell us more about your first day fishing trip in February. We're asking how the fishing was, how much you spent, and whether you went with others, as part of tracking the social and economic benefits of fishing for both fishers and the communities they fish in and near.

For each day fishing trip (up to maximum of 5 trips):
Tell us about the first/second/third day trip you did in February – what sort of fishing was it

- *Was it freshwater, saltwater or estuary fishing (if you did more than one of these, select the one you did most of)? – response options: Saltwater fishing/Freshwater fishing/Estuary fishing*
- *Did you fish from the shore or go out on a boat? Response options: Fished from shore (e.g. riverbank, jetty, rocks); Fished from boat – inshore (less than 5km from shore); Fished from boat – offshore (5km or more from shore)*
- *Was it a charter, competition or 'just fishing'? Response options: Charter boat/fishing guide; Fishing competition; Just fishing*
- *What was the main purpose of the trip on which you fished? Response options: Fishing of course!; Fishing and something else as well; Something other than fishing – fishing was just a bonus.*
- *How many people went fishing? Response options: Just me (fished on my own), 2 people total (including me), 3 people including me, 4 people including me … 9 people including me, 10 or more people including me*
- *How did you get there? Response options: Drove own vehicle or vehicle used by your household; Got a lift with someone who lives outside my household; Walked or rode a bicycle; Public transport (e.g. bus, train, tram); Other*
- *How much did you spend on*
    - *Transport related costs (e.g. fuel for your car, contribution to friend for getting a lift)*
    - *Bait, berley, ice, other fishing supplies*
    - *Food and drink you consumed while on the fishing trip*
    - *Fishing licence/permit fees (only include if you bought a licence/permit specifically for this trip – don't include fees for annual licences/permits)*
    - *Charter fees, fishing guide fees, competition fees*
    - *Boat running costs*
    - *Any other costs associated with this trip (please describe below)*

  Response options: Less than $10, $10 to $19, $20 to $29 … $190 to $199, $200 to $249, $250 to $299, $300 or more

For each overnight fishing trip (up to maximum of 3 trips):

Tell us about the first/second/third day trip you did in February – what sort of fishing was it

- *Was it freshwater, saltwater or estuary fishing (if you did more than one of these, select the one you did most of)? – response options: Saltwater fishing/Freshwater fishing/Estuary fishing*
- *Did you fish from the shore or go out on a boat? Response options: Fished from shore (e.g. riverbank, jetty, rocks); Fished from boat – inshore (less than 5km from shore); Fished from boat – offshore (5km or more from shore)*
- *Was it a charter, competition or 'just fishing'? Response options: Charter boat/fishing guide; Fishing competition; Just fishing*
- *What was the main purpose of the trip on which you fished? Response options: Fishing of course!; Fishing and something else as well; Something other than fishing – fishing was just a bonus.*
- *How many people went fishing? Response options: Just me (fished on my own), 2 people total (including me), 3 people including me, 4 people including me … 9 people including me, 10 or more people including me*
- *How did you get there? Response options: Drove own vehicle or vehicle used by your household; Got a lift with someone who lives outside my household; Walked or rode a bicycle; Public transport (e.g. bus, train, tram); Other*
- *How much did your household spend on this trip?* (don't include spending of other people on the trip, but do include all spending for people in your household)
    - *Transport related costs (e.g. fuel for your car, contribution to friend for getting a lift)*
    - *Bait, berley, ice, other fishing supplies*
    - *Food and drink you consumed while on the fishing trip*
    - *Fishing licence/permit fees (only include if you bought a licence/permit specifically for this trip – don't include fees for annual licences/permits)*
    - *Charter fees, fishing guide fees, competition fees*
    - *Boat running costs*
    - *Any other costs associated with this trip (please describe below)*

  Response options: Less than $10, $10 to $19, $20 to $29 … $190 to $199, $200 to $249, $250 to $299, $300 or more

The questions on this and the next page are standard questions asked in a lot of health and wellbeing surveys in Australia. We'll be able to use this information to compare recreational fishers to other people with similar characteristics (such as age and gender) across Australia. Please be honest in your answers – one important question for us to examine is whether going fishing helps people cope with hard times (or not), so it's just as important for us to know if you are experiencing difficulties or challenges, as it is to know whether your health and wellbeing are overall going well.

If any of the questions make you feel uncomfortable, you do not have to answer them (all questions are voluntary). If you are feeling distressed or need assistance, you can contact the following services for assistance, 24 hours a day:
Beyond Blue - 1300 22 4636 **Lifeline - 13 11 14**

Thinking about your own life and personal circumstances, how satisfied are you with the following?	**Completely DISSATISFIED** ⓪	①	②	③	④	⑤	⑥	⑦	⑧	⑨	**Completely SATISFIED** ⑩
Your life as a whole	○	○	○	○	○	○	○	○	○	○	○
Your standard of living	○	○	○	○	○	○	○	○	○	○	○
Your health	○	○	○	○	○	○	○	○	○	○	○
What you are currently achieving in life	○	○	○	○	○	○	○	○	○	○	○
Your personal relationships	○	○	○	○	○	○	○	○	○	○	○
How safe you feel	○	○	○	○	○	○	○	○	○	○	○
Feeling part of your community	○	○	○	○	○	○	○	○	○	○	○
Your future security	○	○	○	○	○	○	○	○	○	○	○

How would you rate your general health? *Select one*				
○ Excellent	○ Very good	○ Good	○ Fair	○ Poor

In the last four weeks, how often have you felt . . .	**None of the time**	**A little of the time**	**Some of the time**	**Most of the time**	**All of the time**
Nervous?	○	○	○	○	○
Hopeless?	○	○	○	○	○
Restless or fidgety?	○	○	○	○	○
Depressed?	○	○	○	○	○
That everything was an effort?	○	○	○	○	○
Worthless?	○	○	○	○	○

If you are feeling distressed or need assistance, you can contact the following services for assistance, 24 hours a day:
Beyond Blue - 1300 22 4636
Lifeline - 13 11 14

You and your household

We'd like to know a bit about you and your household. This information helps us understand if particular groups usually have higher or lower wellbeing, or are particularly vulnerable. Some of the questions are personal; we ensure your answers remain confidential.

Do you identify as… *Select one*	◯ Female ◯ Male ◯ Other (e.g. gender fluid, intergender, or don't identify with a gender) ◯ Prefer not to answer
How old are you?	**Years:**
How would you describe yourself? *Select one*	◯ Australian-born ◯ Born overseas in an English speaking country e.g. UK, New Zealand ◯ Born overseas in a non-English speaking country e.g. China, France, Indonesia
Are you of Aboriginal or Torres Strait Islander origin? *Select all that apply*	◯ No ☐ Yes, Aboriginal ☐ Yes, Torres Strait Islander
Have you completed any of the following formal qualifications? *Select one*	◯ Year 12 of high school or equivalent ◯ Certificate or diploma from TAFE ◯ University degree (undergraduate or postgraduate) ◯ None of these
Which of the following describes your situation right now?	☐ Self-employed ☐ I have full-time paid work ☐ I have part-time paid work ◯ I have casual paid work ◯ Unemployed and looking for paid work ◯ Care for dependent child/children ◯ Care for person/people with disability, physical or mental illness or frailty, drug or alcohol dependency, or other chronic condition ◯ Retired ◯ Studying part-time or full-time ◯ Other (please describe below) _____

You and your local community

This section asks about where you live, and the type of place you live in. This helps us later produce results for individual communities, and for people who live in different types of residences (for example, on a rural property versus in a town).

Where do you live? We ask this because we analyse and produce results for different regions. To do this, we need to ask you where you live. We make sure to protect the privacy of our survey participants when we report results. If you live in more than one place, please put in your primary residence	**State/Territory you live in:** *e.g. VIC, SA* **Locality, town or suburb you live in:** **Postcode:**

Thank you for completing the survey

If you want to enter the prize draw, be told when results of the study are available, or participate in future research, please complete the information below.

How did you hear about this survey? *Select all that apply*	☐ An email from the researchers ☐ Social media e.g. Facebook, Twitter, Instagram ☐ Fishing magazine ☐ Flyer or survey in my letterbox ☐ Received an email from a fishing club or organisation ☐ Friends or family sent me the survey link ☐ Radio, TV or newspaper ☐ Saw a flyer or poster in a shop ☐ Saw a survey kiosk in a shop ☐ Saw a link on a website
Do you give permission for us to contact you to invite you to participate in future surveys?	◯ Yes, you can contact me about future surveys ◯ No, I don't want to do any future surveys
If you've participated in a previous National Recreational Fishing Survey, or may participate in a future survey, do you give us permission to link your responses from different surveys together (this lets us understand how people's fishing changes over time). This only allows us to link together the surveys you personally do, and we are not permitted to pass your personal contact details to anyone else.	*We will always ensure your responses are confidential, and when storing the survey data will not include any of your contact details* ◯ Yes, I give permission for you to link my responses to surveys done as part of the National Recreational Fishing Survey ◯ No, I don't give permission
Do you want to be entered in the prize draw? Prize draw T&Cs inserted here	◯ Yes ◯ No
Do you want to be notified when results of the study are available?	◯ Yes ◯ No

If you ticked 'yes' to any of the above, please provide your contact details below.

These details will be stored separately to your survey response.

Name:	
Email address:	
Postal address:	**Address:** **Postcode:** ☐☐☐☐

2.9.2 Special topics questions

Survey 1

How is your March 2020 fishing looking at the moment (select one)

- Looks like I'll fish LESS than I planned to
- Looks like I'll fish ABOUT AS MUCH as I planned to
- Looks like I'll fish MORE than I planned to

If you look like fishing less than planned in March
Are any of the following reasons for cancelling some of the fishing trips you had planned?

- COVID-19/coronavirus (e.g. travel restrictions, or a fishing trip or competition was cancelled)
- Impacts of bushfires on water quality or fish stocks
- Impacts of bushfires on your ability to go fishing (e.g. you might not have had time to fish, or lacked the funds to do so, due to impacts of bushfires)
- Impacts of heavy rainfall/storms/floods on water quality or fish stocks
- Impacts of heavy rainfall/storms/floods on your ability to go fishing
- Impacts of drought on water quality or fish stocks
- Impacts of drought on your ability to go fishing
- Weather (e.g. poor weather stopped you fishing on one or more days you had planned to go)
- Other reasons (please describe)

How is your April to June fishing looking?

- Not sure, I don't usually plan that far ahead
- I've had to cancel some trips I planned to take
- I am likely to cancel one or more fishing trips in April to June, but haven't cancelled yet
- I expect to fish about as much as I had planned to
- It's looking like I might get to fish more than expected

If you look like fishing less than planned in April to June (selected had to cancel or likely to cancel)
Are any of the following reasons for cancelling or being likely to cancel some of the fishing trips you had planned?

- COVID-19/coronavirus (e.g. travel restrictions, or a fishing trip or competition was cancelled)
- Impacts of bushfires on water quality or fish stocks
- Impacts of bushfires on your ability to go fishing (e.g. you might not have had time to fish, or lacked the funds to do so, due to impacts of bushfires)
- Impacts of heavy rainfall/storms/floods on water quality or fish stocks
- Impacts of heavy rainfall/storms/floods on your ability to go fishing
- Impacts of drought on water quality or fish stocks
- Impacts of drought on your ability to go fishing
- Weather (e.g. poor weather stopped you fishing on one or more days you had planned to go)
- Other reasons (please describe)

Survey 2

Part 2: Helping fishers stay in touch with fishing during COVID-19 – what would you like to see?
Many people aren't getting to fish during COVID-19 lockdowns. With fishing being important to the health and wellbeing of many fishers, we're looking at how to keep fishers engaged with the fishing community during COVID-19. This section asks whether you'd like to see different types of online and app-based initiatives developed or made more widely available for fishers to help you stay in touch with fishing during social isolation.

Which of the following types of online actions would you like to see made available to help fishers engage with fishing while social distancing restrictions are in place (and potentially beyond that time)?

	Yes, I'd like to see this happen (or happen more if you already know some apps/websites doing this)	It's already easy enough to do this type of thing – we don't need more	I'm not really interested in doing this
Fishing photo competition – people submit photos of great fishing trips before social distancing and vote on each other's (	☐	☐	☐
Regular briefings on COVID-19 and what types of fishing activities are and are not permitted, and advice on how to maintain social distancing if fishing	☐	☐	☐
Daily interviews with well-known people in the fishing community e.g. fishing celebrities, fishing businesses, politicians, government representatives	☐	☐	☐
Interactive sessions with well-known people in the fishing community where you can log in, ask questions and get answers	☐	☐	☐
Online 'get-togethers' with other fishers across Australia to talk about fishing tips and techniques	☐	☐	☐
Virtual information 'how to' nights where you learn fishing tips and techniques from experts (similar to what many tackle stores hold in real life when social distancing isn't in place, but held online)	☐	☐	☐
Fishing quizzes, trivia nights or other online competitions done for fun with prizes on offer	☐	☐	☐
Talks on fishing sustainably, where you get to discuss and debate issues around how to an environmentally responsible fisher	☐	☐	☐
Talks on trailer and boat maintenance (with ability to ask questions, be interactive)	☐	☐	☐
Other things – tell us your ideas below!	☐	☐	☐

Part 3: Getting the information and knowledge you need

This part of the survey asks you how easy or difficult you find it to get the information you need and want about fishing. This includes things like information on rules and regulations about fishing, fish handling, and information about how you can report any problems you see. It also asks whether you want access to information about things like fish behaviour, fish stocks, and environmental conditions.

We're asking these questions as part of our partnership with the Australian Recreational Fishing Foundation and the Tacklebox app – your answers will help inform how the app is developed into the future.

We'll also make the results publicly available so others who provide fishers information can find out more about the types of information fishers want and how they want to access it.

When you are fishing, do you ever have difficulty with the following?	Never have DIFFICULTY doing this		Sometimes have DIFFICULTY			Often have DIFFICULTY doing this	
	①	②	③	④	⑤	⑥	⑦
Identifying which species you have caught	○	○	○	○	○	○	○
Identifying the boundaries where fishing rules change, such as boundaries of different zones in Marine Parks	○	○	○	○	○	○	○
Identifying whether your catch meets size requirements	○	○	○	○	○	○	○
Identifying fishing rules and regulations covering the specific area you are fishing in	○	○	○	○	○	○	○
Accessing information on weather conditions	○	○	○	○	○	○	○

Accessing information on safety of water conditions	○	○	○	○	○	○	○
Accessing information on water quality in the area you are in	○	○	○	○	○	○	○
Accessing information on the stock status of species you are targeting, for the region in which you are fishing	○	○	○	○	○	○	○
Accessing information on cultural and heritage values of the area you are fishing in	○	○	○	○	○	○	○
Finding out whether an area contains the types of habitat that support particular fish species you are interested in	○	○	○	○	○	○	○
Accessing information on the environmental habitats and species present in the place you are fishing in	○	○	○	○	○	○	○
Accessing information on best practice fish handling methods	○	○	○	○	○	○	○

What ways do you currently access information about fishing zones, catch limits, rules and regulations? (Select all that apply)

	Books/ magazines	**Radio or TV shows**	**Government agency website**	**Other websites (not government)**	**Social media e.g. Facebook**	**Fishing app on phone or tablet**	**Friends/ family**	**Signs/ notices posted at fishing areas e.g. boat ramps, jetties**	**I don't look for inform-ation on this**
Identifying the boundaries where fishing rules change, such as boundaries of different zones in Marine Parks	☐	☐	☐	☐	☐	☐	☐	☐	☐
Size limits for catch	☐	☐	☐	☐	☐	☐	☐	☐	☐
Fishing rules and regulations covering the specific area you are fishing in	☐	☐	☐	☐	☐	☐	☐	☐	☐

What ways do you currently access information about weather and water conditions? (Select all that apply)

	Books/ magazines	**Radio or TV shows**	**Government agency website**	**Other websites (not government)**	**Social media e.g. Facebook**	**Fishing app on phone or tablet**	**Friends/ family**	**Signs/ notices posted at fishing areas e.g. boat ramps, jetties**	**I don't look for inform-ation on this**
Water temperature	☐	☐	☐	☐	☐	☐	☐	☐	☐
Weather conditions	☐	☐	☐	☐	☐	☐	☐	☐	☐
Safety of water conditions	☐	☐	☐	☐	☐	☐	☐	☐	☐
Water quality in the area you are in	☐	☐	☐	☐	☐	☐	☐	☐	☐

What ways do you currently access information about species, fishing techniques, and the habitats and history of areas you fish in? (Select all that apply)

	Books/ magazines	Radio or TV shows	Government agency website	Other websites (not government)	Social media e.g. Facebook	Fishing app on phone or tablet	Friends/ family	Signs/ notices posted at fishing areas e.g. boat ramps, jetties	I don't look for inform-ation on this
Stock status of species you are targeting, for the region in which you are fishing	☐	☐	☐	☐	☐	☐	☐	☐	☐
Fish species identification	☐	☐	☐	☐	☐	☐	☐	☐	☐
Fishing tips and techniques	☐	☐	☐	☐	☐	☐	☐	☐	☐
Fish behaviour or biology	☐	☐	☐	☐	☐	☐	☐	☐	☐
Habitats present in different areas you want to fish in	☐	☐	☐	☐	☐	☐	☐	☐	☐
Cultural and heritage values of the area you are fishing in	☐	☐	☐	☐	☐	☐	☐	☐	☐

Increasingly, many fishers use apps on smartphones and tablets to access information before, during and after fishing trips, and sometimes to record catch.

Do you use apps for any of the following – and if you don't now, would you want to in future?	**Yes, I use an app for this**	**No, but I would like to use an app for this**	**No, and I am unlikely to**
To get information on **water/ocean conditions and schedules e.g. tides**	◯	◯	◯
To get information on **other weather conditions** e.g. wind, temperature, forecast rainfall	◯	◯	◯
To **record your catch**	◯	◯	◯
To **share pictures of your catch with others**	◯	◯	◯
To report **sightings of species** (e.g. to national organisations	◯	◯	◯
To get information on **size and bag limits, and other regulations**	◯	◯	◯
To get information on **best practice fish handling** for catch and release	◯	◯	◯
To get **fishing tips and techniques e.g. for bait, lures, gear use, knots, etc**	◯	◯	◯
To report **pollution or environmental problems** you observe when fishing	◯	◯	◯
To help you **identify fish species**	◯	◯	◯
To get information about **fish behaviour, biology, conservation status**	◯	◯	◯
To find out about **cultural and heritage sites and the history** of places you're fishing in	◯	◯	◯
To get information about **environmental health and conservation** near where you fish	◯	◯	◯

You said you use an app to access information about XXX. Can you tell us what app or apps you use?

	No	**I've downloaded**	**Yes, I've used it**

		it but not actively used it	
Have you tried the **Tackle Box** app?	◯	◯	◯

Those who have used the tackle box app (who said 'yes I've used it') will be asked the following:

What have you used the tackle box app for? *Select **ALL** that apply*	☐ Recording catch in a competition. ☐ Getting information ◯ Neither of these

Those who have used it to record catch in a competition will be asked the following

What competition (or competitions) have you used the tackle box app in?	Name/s of competition/s:
What did you like about recording catch in the app? *Write as much or as little as you like*	
What would you like to see improved when recording catch in the app? *Write as much or as little as you like*	

Those who have used it to access information will be asked the following

What types of information have you accessed in the app? *Select all that apply*	☐ National/World records ☐ Maps ☐ Water temperature ☐ Scientific articles on important species (marlin or tuna) ☐ Barotrauma factsheet ☐ National Code of Practice ☐ Marine Park Rules
What information did you find useful or helpful? *Write as much or as little as you like*	
What information wasn't as useful as hoped, and what could be done to improve it? *Write as much or as little as you like*	

All who have used the app will be asked the following

What additional functions would you like the tackle box app to have? *Write as much or as little as you like*	

What additional information would you like made available on the tackle box app? *Write as much or as little as you like*	

Part 4: Your views on how fishers can contribute

Fishers are increasingly asked to be active in protecting health of the environment, particularly as they often know the areas they fish and are likely to be the first to notice changes in environmental conditions at those sites. This part of the survey asks if you would be willing to contribute to supporting habitat quality and fish stocks.

In the past, have you ever experienced the following?	No	Yes, once or twice	Yes, a few times	Yes, regularly
Spotted an environmental problem when out fishing you thought needed to be acted on e.g. a spill or debris needing cleaning up, invasive species, or presence of disease	○	○	○	○
Seen people engaged in potentially illegal activities in fishing areas, e.g. illegal fishing, illegal dumping	○	○	○	○

Have you ever done the following?	Yes	No
Contributed to assessment of fish stocks by providing information about your fishing activities and catch (this might be completing a regular fishing diary, doing a phone interview, or completing a boat ramp or other survey)	○	○
Reported an environmental problems such as rubbish, presence of an invasive species, or water quality issues	○	○
Reported seeing potentially illegal activities	○	○
Tagged or caught fish as part of a scientific study	○	○
Collected samples of water for a scientific study for analysis e.g. for water quality, species DNA or other purposes	○	○
Recorded environmental or habitat conditions for a scientific study such as water temperature, environmental health, in fishing locations for later analysis	○	○
Reported sightings of particular species that are rare, endangered, or of interest more generally	○	○

Increasingly, fishers are being asked to get involved in 'citizen science' – collecting and reporting data that can help with things such as fish stock assessment and assessing health of freshwater and marine ecosystems. This contribution from fishers can make a significant difference to scientific knowledge and to ensuring the future of fisheries. However, in some cases concerns have also been raised by fishers who want to know about how information they provide may be used. What are your views about getting involved in citizen science activities in coming years?

Are you willing to get involved in any of the following types of activities in the future?	**Yes, definitely**	**Maybe (it depends)**	**No**
Reporting observations of environmental problems such as areas of pollution/ rubbish	○	○	○
Reporting your catch (species and amount) and the specific location in which the catch occurred, if the information would not be published publicly, but would be used to inform things like stock assessments.	○	○	○
Reporting your catch (species and amount) and the general area in which the catch occurred (e.g. reporting it occurred in a zone that covered a reasonable area so your specific spot wasn't identifiable), if this information would not be published publicly, but would be used to inform things like stock assessments.	○	○	○
Report sightings of specific fish or other aquatic species when you see them (irrespective of whether you are targeting/catching them or not)	○	○	○
Report sightings of bird species if you see them when fishing	○	○	○
Taking samples of water	○	○	○
Uploading photos of fish you catch to an app so they can be identified by others and the information contribute to stock assessment	○	○	○

Those who responded 'maybe', or 'no' will be asked to answer the following (it will not be displayed to those who answered 'yes, definitely', and only items for which they responded no or maybe will be displayed).

You answered 'maybe' or 'no' when asked if you were willing to get involved in the following. Is that for any of the following reasons? ***Select all that apply***	**I don't have the skills or knowledge to do this**	**I don't have time to do this sort of thing**	**Doing this is likely to interfere with my fishing**	**I don't trust people to use the data I collect responsibly**	**Doing this is less important than other things I would do instead**	**Other reasons**
Reporting observations of environmental problems such as areas of pollution/ rubbish	☐	☐	☐	☐	☐	☐
Reporting your catch (species and amount) and the specific location in which the catch occurred, if the information would not be published publicly, but would be used to inform things like stock assessments.	☐	☐	☐	☐	☐	☐
Reporting your catch (species and amount) and the general area in which the catch occurred (e.g. reporting it occurred in a zone that covered a reasonable area so your specific spot wasn't identifiable), if this information would not be published publicly, but would be used to inform things like stock assessments.	☐	☐	☐	☐	☐	☐
Report sightings of specific fish or other aquatic species when you see them (irrespective of whether you are targeting/catching them or not)	☐	☐	☐	☐	☐	☐
Report sightings of bird species if you see them when fishing	☐	☐	☐	☐	☐	☐
Taking samples of water	☐	☐	☐	☐	☐	☐

Uploading photos of fish you catch to an app so they can be identified by others and the information contribute to stock assessment	☐	☐	☐	☐	☐	☐

How much do you agree or disagree with the following statements about both getting involved in citizen science, and about accessing scientific information about fishing	**Strongly DISAGREE** ①	②	③	④	⑤	⑥	**Strongly AGREE** ⑦	**Don't know**
Recreational fishers should contribute to building knowledge through reporting their catch data	○	○	○	○	○	○	○	○
I need to know how data I provide will be used before I do things like report my catch	○	○	○	○	○	○	○	○
Anyone who asks for data should have to provide an easy to read report of results to the fishers who provided their data	○	○	○	○	○	○	○	○

Survey 3

Part 2: Is your fishing changing due to COVID-19?

As well as tracking whether the amount of fishing you're doing has changed due to COVID-19, we want to ask a bit more about *how* your fishing has changed. During May and June 2020, did you do more or less than usual of the following types of fishing trips and fishing activities? Note: if you normally don't do one of these things, and that hasn't changed, just select 'about the same as usual/don't do this'. Our apologies for asking some of these questions about fishing you may not have been able to do – we're asking as it's important to know whether you would normally have been doing some of these things, but haven't been able to.

Did your fishing change in May and June 2020?	About the same as usual/ don't do this	Less than usual	More than usual
I've gone fishing on my own	○	○	○
I've gone fishing with other people who live in my household	○	○	○
I've gone fishing with people who don't live in the same home as me	○	○	○
I've done short fishing trips where I fished for 1-2 hours	○	○	○
I've done half day fishing trips	○	○	○
I've done full day fishing trips (meaning you fished all day, but didn't stay away from home overnight)	○	○	○
I've gone away overnight for fishing trips (meaning you travelled somewhere and stayed away from home overnight)	○	○	○
I've gone fishing on weekdays	○	○	○
I've gone fishing on weekends	○	○	○
I participated in fishing competitions	○	○	○
I participated in fishing club activities	○	○	○
I've been fishing my usual fishing spots	○	○	○
I've tried out new fishing spots	○	○	○
The amount I've spent on fishing has been	○	○	○
The amount I've spent on fishing gear has been	○	○	○
The amount I've spent on bait/burley has been	○	○	○

The amount I've spent on fishing magazines, videos, subscriptions etc online has been	◯	◯	◯
I've been reading about fishing (e.g. magazines, books)	◯	◯	◯
I've been spending time on fishing websites/forums/social media	◯	◯	◯
I've been watching fishing shows/videos (whether on TV, DVD or online)	◯	◯	◯

You said you fished less than usual in May or June 2020, was this due to COVID-19?	Was this because of COVID-19?	If you said yes, let us know how COVID-19 changed your fishing e.g. whether you went fishing in new spots because your usual spots were closed or inaccessible to you. Write as much or as little as you like.
I've gone fishing on my own less because of COVID-19	◯ Yes ◯ No	
I've gone fishing with other people who live in my household less because of COVID-19	◯ Yes ◯ No	
I've gone fishing with people who don't live in the same home as me less because of COVID-19	◯ Yes ◯ No	
I've done short fishing trips where I fished for 1-2 hours less because of COVID-19	◯ Yes ◯ No	
I've done half day fishing trips less because of COVID-19	◯ Yes ◯ No	
I've done full day fishing trips (meaning you fished all day, but didn't stay away from home overnight) less because of COVID-19	◯ Yes ◯ No	
I've gone away overnight for fishing trips (meaning you travelled somewhere and stayed away from home overnight) less because of COVID-19	◯ Yes ◯ No	
I've gone fishing on weekdays less because of COVID-19	◯ Yes ◯ No	
I've gone fishing on weekends less because of COVID-19	◯ Yes ◯ No	
I participated in fishing competitions less because of COVID-19	◯ Yes ◯ No	
I participated in fishing club activities less because of COVID-19	◯ Yes ◯ No	
I've been fishing my usual fishing spots less because of COVID-19	◯ Yes ◯ No	
I've tried out new fishing spots less because of COVID-19	◯ Yes ◯ No	
The amount I've spent on fishing has been less because of COVID-19	◯ Yes ◯ No	
The amount I've spent on fishing gear has been less because of COVID-19	◯ Yes ◯ No	
The amount I've spent on bait/burley has been less because of COVID-19	◯ Yes ◯ No	
The amount I've spent on fishing magazines, videos, subscriptions etc online has been less because of COVID-19	◯ Yes ◯ No	
I've been reading about fishing (e.g. magazines, books) less because of COVID-19	◯ Yes ◯ No	
I've been spending time on fishing websites/forums/social media less because of COVID-19	◯ Yes ◯ No	
I've been watching fishing shows/videos (whether on TV, DVD or online) less because of COVID-19	◯ Yes ◯ No	

Some fishers have told us that aspects of their fishing have changed due to COVID-19, and we want to find out how common these things are. To what extent have you experienced any of the following when fishing in May and June?	**Strongly DISAGREE** ①	②	③	④	⑤	⑥	**Strongly AGREE** ⑦	**Not applic-able to me**
It's been hard to get hold of quality bait	○	○	○	○	○	○	○	○
I've been targeting different species than usual when fishing	○	○	○	○	○	○	○	○
I've fished from shore more than usual	○	○	○	○	○	○	○	○
I've fished from a boat more than usual	○	○	○	○	○	○	○	○
It's been more crowded than usual at some of my usual fishing spots	○	○	○	○	○	○	○	○
There's been a lot of new people out fishing	○	○	○	○	○	○	○	○
I've been concerned people may criticise me for being out fishing even if I'm meeting all social distancing requirements	○	○	○	○	○	○	○	○
Going fishing has sometimes felt more stressful than usual in the last few months due to having to meet COVID-19 restrictions	○	○	○	○	○	○	○	○
Going fishing has helped me cope with COVID-19 restrictions	○	○	○	○	○	○	○	○

Since April 2020, have you done any of the following?	**No, haven't done this or not relevant** ⓪	**Once or twice** ①	②	③	**A few times** ④	⑤	⑥	**Freq-uently** ⑦
Gone fishing instead of doing another activity you usually did before COVID-19 *e.g. you might have gone fishing as your sports club wasn't able to meet, or instead of catching up with friends*	○	○	○	○	○	○	○	○
Done another activity when COVID-19 stopped you being able to go fishing	○	○	○	○	○	○	○	○

You said you went fishing instead of doing another activity you usually did before COVID-19. What activity/activities did fishing replace?	
You said you replaced fishing with other activities when COVID-19 made it difficult to go fishing. What activity/activities did you do instead of fishing?	

Final survey questions

Valuing recreational fishing

The national survey of fishers

The National Recreational Fishing Survey has been asking recreational fishers about the social and economic aspects of their fishing for the last two years. This is the final survey for the study. The study is being conducted by the University of Canberra and the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES). It is funded by the Fisheries Research and Development Cooperation, the Australian Government, and supported by the Australian Recreational Fishing Foundation.

Everyone who participates by **November 22nd** can enter the draw to win one of 6 prizes worth a total of $3,000, drawn November 29th. **Winners will have their choice of a gift card or voucher to the fishing outlet of their choice (only applicable to stores that provide gift cards/vouchers), to the following values: 1st prize $1,000, 2nd prize $500, 3rd prize $300, 6 runner up prizes of $200 each.**

You can complete a short version of the survey (15-20 minutes) for one entry into the prize draw, or a long version (25-30 minutes depending on how much you fish) for four entries into the prize draw. Find out more about the project and how your confidentiality and privacy will be protected, here.

Need help, or prefer to do the survey on paper? Call 1800 981 499 and we can post a paper survey and reply-paid envelope out to you.

◯ Yes, I want to do the survey! Take me to the questions

◯ Not this time, thanks – I don't want to take part

Thanks for agreeing to take part in the survey!

Note that if your internet drops out, or you need to take a break, that's OK – as long as cookies are enabled on your device, the survey form will automatically remember what question you reached, and take you back to that point in the survey when you click on the survey link again.

To start, could you let us know whether you want to do a:

◯ Short survey (about 15-20 minutes, 1 entry into the prize draw)

◯ Long survey (about 30-40 minutes, but you get 4 entries into the prize draw)

Fishing here means catching fish and other species such as yabbies, crays, crabs, shellfish, and lobster. It can be done using many methods, including rod and line fishing, diving, spearfishing, potting, raking and others. The first questions ask how often you've been fishing in recent years, and whether the amount of fishing you're doing has been changing.

	Within the last 12 months	2 to 5 years ago	More than 5 years ago	Never	Don't know
When did you MOST RECENTLY go fishing (whether you caught anything or not)?	◯	◯	◯	◯	◯
When did another person living in your household MOST RECENTLY do any recreational fishing (whether they caught anything or not)? Answer based on whichever household member most recently went fishing.	◯	◯	◯	◯	◯

Comparing the fishing you did in the last 12 months to the previous year, did you go fishing? *Select one*	◯ I fished more in the last 12 months than the previous year ◯ I fished about the same amount of days in the last 12 months as the previous year ◯ I fished less days in the last 12 months than the previous year
Overall, would you say that in the last 12 months you have been able to fish…	◯ Much less than I wanted to ◯ A little less than I wanted to ◯ About as much as I wanted to ◯ A little more than I wanted to ◯ Much more than I wanted to

If you fished less than the previous year, or fished less than you wanted to, were any of the following reasons for this?	**No, not a reason for fishing less**	**One of the reasons I fished less**	**The main reason I fished less**
COVID-19 related restrictions	◯	◯	◯
Work – e.g. your work hours or workload stopped you going fishing as often as you would like	◯	◯	◯
Health problems	◯	◯	◯
I switched to doing a different hobby or sport than fishing	◯	◯	◯
My home commitments changed (e.g. you might have had a new baby, be renovating, or shifted house)	◯	◯	◯
Some of the people I used to fish with have stopped fishing or can't go fishing as often as they used to	◯	◯	◯
I can't get to my fishing spots as easily (e.g. because you have moved house)	◯	◯	◯
I sold a boat or other fishing equipment, and because of that I have fished less	◯	◯	◯
Access to fishing reduced around one or more of my fishing spots, e.g. there was an area closure or jetty closure.	◯	◯	◯
I couldn't afford to fish as often			
Fishing catch rates or quality of catch were poorer than usual	◯	◯	◯
Poor weather conditions (weather was often bad on days I wanted to go fishing)	◯	◯	◯
Poor environmental conditions (e.g. low water flows, water quality problems, concerns about fish health, etc.)	◯	◯	◯
No reason/unsure	◯	◯	◯
Other (please specify) _____	◯	◯	◯

If you fished more than the previous year, were any of the following reasons for this?	No, not a reason for fishing more	One of the reasons I fished more	The main reason I fished more
COVID-19 (for example, you may have done more fishing as other types of recreation or travel weren't possible)	◯	◯	◯
Retired, or reduced or changed work hours so I could go fishing more	◯	◯	◯
Improved health/fitness	◯	◯	◯
I started doing different types of fishing than I've done before	◯	◯	◯
My home commitments changed so I could do more fishing (e.g. you finished renovations, children moved out, etc.)	◯	◯	◯
I went fishing with new people I haven't fished with before	◯	◯	◯
The people I go fishing with were available to go fishing more often	◯	◯	◯
I moved to a different area where it's easier to go fishing	◯	◯	◯
I bought equipment such as a boat that makes it easier to go fishing	◯	◯	◯
Access to fishing improved in one or more of my fishing spots, e.g. improved jetty, boat ramp	◯	◯	◯
My finances allowed me to fish more often than I have previously	◯	◯	◯
Fishing opportunities improved e.g. strike rates increased, fishing was good for the species you like to target	◯	◯	◯
Question from previous page continued… **If you fished more than the previous year, were any of the following reasons for this?**	**No, not a reason for fishing more**	**One of the reasons I fished more**	**The main reason I fished more**
Good weather conditions (weather was good on a lot of days I wanted to go fishing)	◯	◯	◯
Improved environmental conditions e.g. better water flows, improved water or habitat quality, improved health of fish stock	◯	◯	◯
No reason/unsure	◯	◯	◯
Other (please specify below)	◯	◯	◯

If you fished more than you wanted to, what were the main reasons for this? Why did you do more fishing than you would have liked?	

What kinds of fishing do you do?

The next questions ask a bit more about the types of fishing you do. This will be used to understand how things like satisfaction with fishing, and expenditure on fishing, vary between fishers who do different types of fishing activities.

How often have you done the following types of fishing in the last 12 months? *Any day you went fishing on counts as a fishing day, whether you fished for an hour or eight hours.*	**In the last 12 months I have done this:**								
	Never	**1 or 2 days**	**3 or 4 days**	**5 to 9 days**	**10 to 14 days**	**15 to 19 days**	**20 to 29 days**	**30 to 51 days**	**52 or more days (once a week or more)**
ANY TYPE of fishing (including catching fish or other species such as yabbies, crays, crabs, shellfish and lobster, and using any method e.g. rod, line, diving, spearfishing or others.	○	○	○	○	○	○	○	○	○
How much of this was freshwater fishing (in inland rivers, lakes, dams)?	○	○	○	○	○	○	○	○	○
How much of this was estuary fishing (fishing in rivers or lakes that feed into the ocean, where water can be salty)?	○	○	○	○	○	○	○	○	○
How much of this was saltwater fishing in ocean waters or harbors/bays (whether from a boat, jetty, beach, rocks, diving etc.)?	○	○	○	○	○	○	○	○	○

You said you went fishing in FRESHWATER and/or ESTUARY areas in the last 12 months. How much of this involved the following? *(Note that you can do more than one of these things in a single fishing trip and it's OK if your answers indicate you did multiple things on most trips)*	**None of my fishing**	**Some of my fishing**	**All my fishing trips**
Shore-based fishing (you fished from a jetty, riverbank, etc.)	○	○	○
Boat-based fishing	○	○	○
Fishing competitions	○	○	○
Charter fishing/fishing with a guide	○	○	○

You said you went saltwater fishing in the last 12 months (ocean fishing or fishing in harbors/bays). How much of this fishing involved the following? *(Note that you can do more than one of these things in a single fishing trip and it's OK if your answers indicate you did multiple things on most trips)*	**None of my fishing**	**Some of my fishing**	**All my fishing trips**
Shore-based fishing (you fished from a jetty, beach, rocks etc.)	○	○	○
Inshore fishing from a boat (defined as less than 5km offshore)	○	○	○
Offshore fishing (more than 5km offshore)	○	○	○
Fishing competitions	○	○	○
Charter fishing/fishing with a guide	○	○	○

Many fishers mostly fish for recreation, while some also take part in fishing competitions. The next question asks you more about whether you take part in fishing competitions, and what types you take part in.

Have you ever participated in this type of event or tournament (no matter when it was)?	**No**	**Yes, last did this more than 5 years ago**	**Yes, last did this 2 to 5 years ago**	**Yes, did this in the last two years (since start of 2019)**
Major fishing competitions (often entered by competitors from around Australia)	○	○	○	○
These are formal sports fishing tournaments that provide a skills-based assessment of the winner, have technical requirements, and rank competitors, often across a series of events e.g. ABT tournaments, Berkley Super Series, Hobie Series, Yakhunters, Barrabasstasstic, Teams Fishing Australia, Barra Nationals, Barra Classic, Flathead Class				
Local competitions/events (club competitions, regional events that are mostly entered by local fishers or those from the same state)	○	○	○	○
These competitions provide prizes, sometimes (but not always) rank competitors, and are more locally based than the major competitions e.g. formal club series such as ANSA, EFA, MAAC, ABRSLFC, Cobram Barooga; one-off events such as SCF Research and Sustainability, Fishing Freshwater, Coast 2 Coast, Esperance Event; and opt-in competitions such as Pirtek Challenge, AFS				
Participation events (these focus on encouraging participation and fun rather than on formal competition) e.g. Boyne Tannum Hookup, EFA Annual Event, Boondooma Fishing Festival, Baffle Creek Fishing Festival, Hervey Bay Fishing Festival, Rainbow Beach Fishing Festival, Gone Fishing Day, or random win events such as Million Dollar Fish, Golden Barra	○	○	○	○

Fishers who indicate they participated in a fishing competition in the last two years will be asked the following question; others will not be displayed the question.

How many fishing competitions did you enter in (i) 2019 and (ii) 2020? *We're asking about both years as we know 2020 was not a typical year for fishing competitions.*	**Number of fishing competitions you entered in 2019**	**Number of fishing competitions you entered in 2020**
Major fishing competitions (often entered by competitors from around Australia) These are formal sports fishing tournaments that provide a skills-based assessment of the winner, have technical requirements, and rank competitors, often across a series of events e.g. ABT tournaments, Berkley Super Series, Hobie Series, Yakhunters, Barrabasstasstic, Teams Fishing Australia, Barra Nationals, Barra Classic, Flathead Class		
Local competitions/events (club competitions, regional events that are mostly entered by local fishers or those from the same state) These competitions provide prizes, sometimes (but not always) rank competitors, and are more locally based than the major competitions e.g. formal club series such as ANSA, EFA, MAAC, ABRSLFC, Cobram Barooga; one-off events such as SCF Research and Sustainability, Fishing Freshwater, Coast 2 Coast, Esperance Event; and opt-in competitions such as Pirtek Challenge, AFS		
Participation events (these focus on encouraging participation and fun rather than on formal competition) e.g. Boyne Tannum Hookup, EFA Annual Event, Boondooma Fishing Festivel, Baffle Creek Fishing Festival, Hervey Bay Fishing Festival, Rainbow Beach Fishing Festival, Gone Fishing Day, or random win events such as Million Dollar Fish, Golden Barra		

In future, do you plan to take part in this type of event?	Definitely no	Probably not	Probably yes	Definitely yes
Major fishing competitions often entered by competitors from around Australia e.g. ABT tournaments, Berkey Super Series, Barra Classic	○	○	○	○
Local competitions/events - club competitions/regional events that are mostly entered by local fishers or those from the same state e.g. ANSA, EFA, MAAC series, Coast 2 Coast, Pirtek Challenge	○	○	○	○
Participation events focused on encouraging participation and fun rather than on formal competition e.g. EFA Annual Events, Gone Fishing Day, Million Dollar Fish	○	○	○	○

Some people usually fish alone, others go with family members or friends. In the last 12 months, how much of your fishing has involved…	None of my fishing	Less than half of my fishing	About half my fishing	More than half but not all my fishing	All my fishing trips	N/A
Fishing on your own (solo trips)	○	○	○	○	○	○
Fishing with other people who live in your household (tick N/A if you are one of the many Australians who live in a solo household)	○	○	○	○	○	○
Fishing with your children (whether they live with you or not; tick N/A if you don't have children)	○	○	○	○	○	○
Fishing with your partner/spouse/boyfriend/girlfriend (whether they live with you or not; tick N/A if not applicable)	○	○	○	○	○	○
Fishing with family members you don't live with	○	○	○	○	○	○
Fishing with close friends	○	○	○	○	○	○
Fishing with your wider circle of friends (other than close friends)	○	○	○	○	○	○
Other (please describe) _____ _____ _____	○	○	○	○	○	○

In the last 12 months, other people living in my household went fishing WITHOUT me…									
	Never	**1 or 2 days**	**3 or 4 days**	**5 to 9 days**	**10 to 14 days**	**15 to 19 days**	**20 to 29 days**	**30 to 51 days**	**52 or more days (once a week or more)**
In the last 12 months, about how often did other people in your household go fishing WITHOUT you? *(This may seem an odd question, but we're asking it to get a better understanding of 'fishing dynamics' within households – whether fishing is a 'contagious' hobby in households or often restricted to one household member)*	○	○	○	○	○	○	○	○	○

Some fishers have told us that aspects of their fishing have changed due to COVID-19, and we want to find out how common these things are. **To what extent have you experienced any of the following when fishing since COVID-19 impacted Australia?**	**Strongly DISAGREE** ①	②	③	④	⑤	⑥	**Strongly AGREE** ⑦	**N/A to me**
I've been targeting different species than usual when fishing	○	○	○	○	○	○	○	○
I've fished from shore more than usual	○	○	○	○	○	○	○	○
I've fished from a boat more than usual	○	○	○	○	○	○	○	○
It's been more crowded than usual at some of my usual fishing spots	○	○	○	○	○	○	○	○
There's been a lot of new people out fishing	○	○	○	○	○	○	○	○
I've been concerned people may criticise me for being out fishing even if I'm meeting all social distancing requirements	○	○	○	○	○	○	○	○
Going fishing has sometimes felt more stressful than usual in the last few months due to having to meet COVID-19 restrictions	○	○	○	○	○	○	○	○
Going fishing has helped me cope with COVID-19 restrictions	○	○	○	○	○	○	○	○

Since April 2020, have you done any of the following?	No, haven't done this or not relevant ⓪	Once or twice ①	②	③	A few times ④	⑤	⑥	Freq-uently ⑦
Gone fishing instead of doing another activity you usually did before COVID-19 *e.g. you might have gone fishing as your sports club wasn't able to meet, or instead of catching up with friends*	○	○	○	○	○	○	○	○
Done another activity when COVID-19 stopped you being able to go fishing	○	○	○	○	○	○	○	○

You said you went fishing instead of doing another activity you usually did before COVID-19. **What activity/activities did fishing replace?**	
You said you replaced fishing with other activities when COVID-19 made it difficult to go fishing. **What activity/activities did you do instead of fishing?**	

For some people, fishing is the main way they catch up with a lot of their friends, whereas for others they see friends and family a lot outside fishing. How much does fishing help keep you socially connected?

How important is fishing as a way of spending time and connecting with:	FISHING is NOT AT ALL important to maintain my social connection ⓪	①	②	③	④	⑤	⑥	⑦	⑧	⑨	FISHING is VERY important to maintain my social connection ⑩	N/A
Other people who live in your household *If applicable*	○	○	○	○	○	○	○	○	○	○	○	○
Your children *If applicable (whether they live with you or not)*	○	○	○	○	○	○	○	○	○	○	○	○
Your partner/spouse/boyfriend/girlfriend *If applicable (whether they live with you or not)*	○	○	○	○	○	○	○	○	○	○	○	○
Family who don't live with you	○	○	○	○	○	○	○	○	○	○	○	○
Your closest friends	○	○	○	○	○	○	○	○	○	○	○	○
Your wider circle of friends *(People you wouldn't say are your closest friends, but are part of your wider social circle)*	○	○	○	○	○	○	○	○	○	○	○	○

Your overall health and wellbeing

The next questions ask you about your OVERALL health and wellbeing (in general, not just related to fishing). We're asking these questions to better understand whether participating in fishing has benefits for health and wellbeing. To be able to analyse this, we need to ask about your health and wellbeing, including whether you've experienced any events that may have had negative impacts on your health/wellbeing in the last two years.

The questions on this and the next page are standard questions asked in a lot of health and wellbeing surveys in Australia. We'll be able to use this information to compare recreational fishers to other people with similar characteristics (such as age and gender) across Australia. Please be honest in your answers – one important question for us to examine is whether going fishing helps people cope with hard times (or not), so it's just as important for us to know if you are experiencing difficulties or challenges, as it is to know whether your health and wellbeing are overall going well.

If any of the questions make you feel uncomfortable, you do not have to answer them (all questions are voluntary). If you are feeling distressed or need assistance, you can contact the following services for assistance, 24 hours a day:

Beyond Blue - 1300 22 4636 **Lifeline - 13 11 14**

Thinking about your own life and personal circumstances, how satisfied are you with the following?	**Completely DISSATISFIED** ⓪	①	②	③	④	⑤	⑥	⑦	⑧	⑨	**Completely SATISFIED** ⑩
Your life as a whole	○	○	○	○	○	○	○	○	○	○	○
Your standard of living	○	○	○	○	○	○	○	○	○	○	○
Your health	○	○	○	○	○	○	○	○	○	○	○
What you are currently achieving in life	○	○	○	○	○	○	○	○	○	○	○
Your personal relationships	○	○	○	○	○	○	○	○	○	○	○
How safe you feel	○	○	○	○	○	○	○	○	○	○	○
Feeling part of your community	○	○	○	○	○	○	○	○	○	○	○
Your future security	○	○	○	○	○	○	○	○	○	○	○

How would you rate your general health? *Select one*
○ Excellent ○ Very good ○ Good ○ Fair ○ Poor

In the last four weeks, how often have you felt…	**None of the time**	**A little of the time**	**Some of the time**	**Most of the time**	**All of the time**
Nervous?	○	○	○	○	○
Hopeless?	○	○	○	○	○
Restless or fidgety?	○	○	○	○	○
Depressed?	○	○	○	○	○
That everything was an effort?	○	○	○	○	○
Worthless?	○	○	○	○	○

In the last <u>two years</u>, have any of the following happened in your household? *Select **ALL** that apply*	☐ I had poorer health than usual	☐ I had a sudden big financial stress e.g. a large bill that was not planned for
	☐ Others in my household had poorer health than usual	☐ I separated from or divorced my partner
	☐ I lost my job	☐ A close family member or friend passed away
	☐ I started a new job	☐ I had other unexpected stress in my life
	☐ My caring responsibilities increased e.g. you had a new child, had to care for unwell family member	☐ None of these
	☐ I shifted house	

Importance of fishing

For some people fishing is an occasional hobby that isn't the most important thing in their life, while for others it is their main passion in life. How important is fishing to you?

	NOT AT ALL important										**VERY important**
	⓪	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
Overall, how important would you say fishing is to your life?	○	○	○	○	○	○	○	○	○	○	○

The next questions ask what the most important aspects of fishing are to you. This helps us understand the ways fishing does and doesn't benefit different fishers – from providing opportunities to socialise, to providing a source of food, or providing physical and mental challenges. *When answering, please answer based on how important each thing is to some or all of your fishing (if it's important to one type of fishing you do but not others, based you answer on the type of fishing it is important to).*

How important are the following aspects of fishing to you?	**NOT AT ALL important**										**VERY important**
	⓪	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
Relaxing/unwinding	○	○	○	○	○	○	○	○	○	○	○
Spending time outdoors/in nature	○	○	○	○	○	○	○	○	○	○	○
Spending time on your own	○	○	○	○	○	○	○	○	○	○	○
Spending time with family	○	○	○	○	○	○	○	○	○	○	○
Spending time with friends	○	○	○	○	○	○	○	○	○	○	○
Competing in fishing competitions (of any kind)	○	○	○	○	○	○	○	○	○	○	○
Experiencing physical and mental challenges e.g. due to weather conditions, terrain, process of catching fish	○	○	○	○	○	○	○	○	○	○	○
Catching fresh fish for myself or others to eat	○	○	○	○	○	○	○	○	○	○	○
Catching fish to release	○	○	○	○	○	○	○	○	○	○	○
Being able to focus on fishing and not think about other things	○	○	○	○	○	○	○	○	○	○	○
Learning about nature/the environment	○	○	○	○	○	○	○	○	○	○	○
Getting exercise	○	○	○	○	○	○	○	○	○	○	○

This section asks about whether you have been involved in any of a range of activities that aim to either build the ability of recreational fishers to fish responsibly (e.g. learning good fish handling techniques), or to use recreational fishers to help collect data or report sightings and environmental issues. It also asks about your future interest in these things, and what types of concerns or challenges you might have in doing some of these types of activities.

When you go fishing, are you confident that you…	**Not at all confident** ⓪	①	②	③	④	⑤	⑥	**Very confident** ⑦	**N/A**
Can accurately identify the species you catch	○	○	○	○	○	○	○	○	○
Can accurately identify boundaries where fishing rules change, such as boundaries of protected areas	○	○	○	○	○	○	○	○	○
Can accurately assess whether your catch meets size requirements	○	○	○	○	○	○	○	○	○
Can comply with the fishing rules and regulations covering the specific area you are fishing in	○	○	○	○	○	○	○	○	○
Have good information on the stock status of species you are targeting, for the region in which you are fishing	○	○	○	○	○	○	○	○	○
Are able to use best practice fish handling practice when doing catch and release	○	○	○	○	○	○	○	○	○

In the past, have you ever experienced the following?	**No**	**Yes, once or twice**	**Yes, a few times**	**Yes, regularly**
Spotted an environmental problem when out fishing you thought needed to be acted on e.g. a spill or debris needing cleaning up, invasive species, or presence of disease	○	○	○	○
Seen people engaged in potentially illegal activities in fishing areas, e.g. illegal fishing, illegal dumping	○	○	○	○

Have you ever done the following?	**Yes, within the last year**	**Yes, but not in the last year**	**No**
Read, listened to or watched guidance or demonstrations on **best practice fish handling practices**?	○	○	○
Attended a **seminar, workshop or training day on best practice fish handling**?	○	○	○
Picked up rubbish/litter when out fishing and taken it to an appropriate bin/disposal facility	○	○	○
Undertaken habitat rehabilitation or protection activities as part of a group activity e.g. an organised day working to help support health of a particular fishing area or increase habitat	○	○	○
Undertaken habitat rehabilitation or protection activities on my own	○	○	○
Taken part in a 'clean up' day where you help clean up rubbish in or around river, lake, estuary or ocean areas?	○	○	○
Donated to an organisation that seeks to improve health of aquatic environments or otherwise to support aquatic habitats?	○	○	○
Spoken to other fishers to encourage them to be responsible in some of their fishing activities	○	○	○

Taught people close to you fishing tips, techniques, skills (e.g. children, friends)	○	○	○
Taught people you don't know well about fishing tips, techniques, skills (e.g. you've volunteered to help teach people who are new to fishing)	○	○	○

Question from previous page continued… **Have you ever done the following?**	**Yes, within the last year**	**Yes, but not in the last year**	**No**
Taught people close to you about responsible fishing e.g. fish handling, how to ensure they are fishing responsibly and sustainably	○	○	○
Taught people you don't know well about responsible fishing e.g. fish handling, how to ensure they are fishing responsibly and sustainably	○	○	○
Contributed to assessment of fish stocks by providing information about your fishing activities and catch (this might be completing a regular fishing diary, doing a phone interview, or completing a boat ramp or other survey)	○	○	○
Reported an environmental problem such as rubbish, presence of an invasive species, or water quality issues	○	○	○
Reported seeing potentially illegal activities	○	○	○
Tagged or caught fish as part of a scientific study	○	○	○
Collected samples of water for a scientific study for analysis e.g. for water quality, species DNA or other purposes	○	○	○
Recorded environmental or habitat conditions for a scientific study such as water temperature, environmental health, in fishing locations for later analysis	○	○	○
Reported sightings of particular species that are rare, endangered, or of interest more generally	○	○	○

Increasingly, fishers are being asked to get involved in 'citizen science' – collecting and reporting data that can help with things such as fish stock assessment and assessing health of freshwater and marine ecosystems. This contribution from fishers can make a significant difference to scientific knowledge and to ensuring the future of fisheries. However, in some cases concerns have also been raised by fishers who want to know about how information they provide may be used. What are your views about getting involved in citizen science activities in coming years?

Are you willing to get involved in future in any of the following types of activities?	**Yes, definitely**	**Maybe (it depends)**	**No**
Picking up rubbish/litter when out fishing so it can be disposed of responsibly	○	○	○
Getting involved in habitat protection and rehabilitation activities	○	○	○
Teaching people you don't know well to fish responsibly e.g. if you were asked to help out in your local area by helping local areas	○	○	○
Reporting potentially illegal activities if you see them when fishing	○	○	○
Reporting observations of environmental problems such as areas of pollution/ rubbish	○	○	○
Reporting your catch (species and amount) and the specific location in which the catch occurred, if the information would not be published publicly, but would be used to inform things like stock assessments.	○	○	○
Reporting your catch (species and amount) and the general area in which the catch occurred (e.g. reporting it occurred in a zone that covered a reasonable area so your specific spot wasn't identifiable), if this information would not be published publicly, but would be used to inform things like stock assessments.	○	○	○
Reporting sightings of specific fish or other aquatic species when you see them (irrespective of whether you are targeting/catching them or not)	○	○	○

Question from previous page continued… **Are you willing to get involved in future in any of the following types of activities?**	**Yes, definitely**	**Maybe (it depends)**	**No**
Reporting sightings of bird species if you see them when fishing	◯	◯	◯
Taking samples of water	◯	◯	◯
Uploading photos of fish you catch to an app so they can be identified by others and the information contribute to stock assessment	◯	◯	◯

Those who responded 'maybe', or 'no' will be asked to answer the following (it will not be displayed to those who answered 'yes, definitely', and only items for which they responded no or maybe will be displayed).

You answered 'maybe' or 'no' when asked if you were willing to get involved in the following. **What are the main reasons you are unlikely to do this, or unsure if you would?** *Write as much or as little as you like.*	
Picking up rubbish/litter when out fishing so it can be disposed of responsibly	
Getting involved in habitat protection and rehabilitation activities	
Teaching people you don't know well to fish responsibly e.g. if you were asked to help out in your local area by helping local areas	
Reporting potentially illegal activities if you see them when fishing	
Reporting observations of environmental problems such as areas of pollution/ rubbish	
Reporting your catch (species and amount) and the specific location in which the catch occurred, if the information would not be published publicly, but would be used to inform things like stock assessments.	
Reporting your catch (species and amount) and the general area in which the catch occurred (e.g. reporting it occurred in a zone that covered a reasonable area so your specific spot wasn't identifiable), if this information would not be published publicly, but would be used to inform things like stock assessments.	
Report sightings of specific fish or other aquatic species when you see them (irrespective of whether you are targeting/catching them or not)	
Report sightings of bird species if you see them when fishing	
Taking samples of water	
Uploading photos of fish you catch to an app so they can be identified by others and the information contribute to stock assessment	

How much do you agree or disagree with the following statements about both getting involved in citizen science, and about accessing scientific information about fishing?	Strongly DISAGREE ①	②	③	④	⑤	⑥	Strongly AGREE ⑦	Don't know
Recreational fishers should contribute to building knowledge through reporting their catch data	○	○	○	○	○	○	○	○
I need guarantees about how data I provide will be used before I do things like report my catch	○	○	○	○	○	○	○	○
Anyone who asks for data should have to provide an easy to read report of results to the fishers who provided their data	○	○	○	○	○	○	○	○

How much do you agree or disagree with the following statements about environmental action	Strongly DISAGREE ①	②	③	④	⑤	⑥	Strongly AGREE ⑦	Don't know
Too much time and attention is given to environmental issues such as global warming or loss of species	○	○	○	○	○	○	○	○
I value protecting the environment, but it is not a priority for me personally	○	○	○	○	○	○	○	○
I try to make environmentally conscious decisions when it is affordable and easy to do so	○	○	○	○	○	○	○	○
I try to make environmentally conscious decisions even when they are expensive or inconvenient	○	○	○	○	○	○	○	○
I shape all the decisions and actions I take based on their impacts on the health of the environment	○	○	○	○	○	○	○	○

The next questions ask a bit about you. This is important as we want to understand how the benefits of fishing differ for different types of fishers. Some of the questions may seem intrusive; if any make you feel uncomfortable you don't have to answer them – just skip those that you don't wish to answer and go on to the next question.

Socio-demographic and geographic characteristics

Do you identify as… *Select one*	○ Female ○ Other e.g. gender fluid, inter-gender, no gender ○ Male ○ Prefer not to answer
How old are you?	Years: _____
How would you describe yourself? *Select one*	○ Australian-born ○ Born overseas in an English-speaking country e.g. UK, New Zealand ○ Born overseas in a non-English speaking country e.g. Indonesia, France
Are you of Aboriginal or Torres Strait Islander origin? *Select all that apply*	○ No ☐ Yes, Aboriginal ☐ Yes, Torres Strait Islander
How would you describe your overall cultural background (e.g. Australian, Chinese, Japanese, English, Zimbabwean)?	Cultural background: _____
Have you completed any of the following formal qualifications? *Select **ALL** that apply*	☐ Year 12 of high school or equivalent ☐ Certificate or diploma ☐ University degree (undergraduate or postgraduate) ○ None of these
Which best describes you at the moment? *Select one*	○ Never married ○ Divorced or separated ○ Married or de facto ○ Widowed

Who lives in your household at the moment?	Total number of people, including yourself: _____ Number of children aged under 5: _____ Number of children aged 5-17: _____
How many of the people who live in your household go fishing?	Total number of fishers in your household, including yourself: _____ Number of children who fish aged under 5: _____ Number of children who fish aged 5-17: _____

Where do you live? We ask this because we analyse and produce results for different regions. To do this, we need to ask you where you live. We make sure to protect the privacy of our survey participants when we report results. *If you live in more than one place, please put in your primary residence*	**State or territory you live in:** _____
	Suburb, town or rural locality you live in: _____
	Postcode you live in: _____

Which of the following describes your situation right now? *Select **ALL** that apply*	☐ Self-employed ☐ I have full-time paid work ☐ I have part-time paid work ☐ I have casual paid work ☐ Unemployed & looking for work ☐ Care for dependent child/children	☐ Care for person/people with disability, physical or mental illness or frailty, drug or alcohol dependency, or other chronic condition ☐ Retired ☐ Studying part-time or full-time ☐ Other (please describe below) _____

The next questions ask about your household income and financial wellbeing. We know these questions are personal. They do help us understand how the benefits of fishing differ for people on lower versus higher incomes: this will help us identify how best to ensure benefits of fishing to different groups are maintained over time.

In 2018-19, about how much was your <u>household</u> income <u>before</u> tax? *Select one* *This includes income earned by everyone in your household. Include income from government pensions, investments/dividends, and paid work. The categories below may look odd – they let us compare our survey results to those from the national census, so we can't change them.*	○ Less than $20,800 ○ $20,800-41,599 ○ $41,600-64,999 ○ $65,000-$90,999	○ $91,000-$155,999 ○ $156,000-$207,999 ○ $208,000 or more
Given your current needs and financial responsibilities, would you say that you and your family are... *Select one*	○ Very poor ○ Poor ○ Just getting along	○ Reasonably comfortable ○ Very comfortable ○ Prosperous

Your expenditure on fishing

This part of the survey asks questions that help us identify the amount you spend on fishing, and where you spend it. We ask for a lot of detail in this section. We know this can be frustrating, but it helps us identify the 'flow on' effects of recreational fisher spending to other parts of the economy. It will enable us to identify how recreational fishing contributes to the Australian economy, and to different States and Territories.

If you don't fish often or do many trips, this section won't be too hard to answer. If you fish a lot, it will be more complicated – we appreciate your time and patience filling it in.

First, we ask a bit about any vessels you own (boats, paddle craft, and jet skis). We then ask you to estimate much you spent overall on fishing and on different types of equipment and activities in the last year. Finally, we ask about your fishing trips to help us estimate travel-related spending that occurred due to fishing activities.

	Do you or anyone in your household own or part-own this type of vessel?		**If yes, how many are owned in the household?**
Power boat of any kind	◯ No	◯ Yes	Number:
Paddle craft (e.g. canoe, kayak)	◯ No	◯ Yes	Number:
Non-motorised boat (e.g. yacht, row boat)	◯ No	◯ Yes	Number:
Jet ski	◯ No	◯ Yes	Number:

Overall household spending on fishing in the last 12 months

The next question asks you how much your HOUSEHOLD spent on recreational fishing in the last 12 months. This can be a hard question to answer as most people don't spend time thinking about their total expenditure, and sometimes you may go on holidays that involve both fishing and other activities. Please estimate to the best of your ability, even if you aren't sure.

Overall, what would you estimate your HOUSEHOLD as a whole spent on recreational fishing in the last 12 months – EXCLUDING spending on new vessels (e.g. boats/kayaks/jet skis and equipment for them like echo sounders) and overseas fishing trips? *Select one*

***Include** the costs of fishing gear, bait, fuel, licences/permits, boat maintenance, and travel-related spending (e.g. accommodation, meals out) related to all your household's fishing trips*

***Exclude big** purchases of capital items like boats, vehicles, or boat equipment like echo sounders (we ask about that later)*

Please estimate if you are unsure

- ◯ No spending
- ◯ <$100
- ◯ $100-$499
- ◯ $500-$999
- ◯ $1,000-$1,999
- ◯ $2,000-$2,999
- ◯ $3,000-$3,999
- ◯ $4,000-$4,999
- ◯ $5,000-$5,999
- ◯ $6,000-$6,999
- ◯ $7,000-$7,999
- ◯ $8,000-$8,999
- ◯ $9,000-$9,999
- ◯ $10,000-$14,999
- ◯ $15,000-$19,999
- ◯ $20,000 or more

If you selected $20,000 or more, please estimate below how much to the nearest $5,000

$_____

To get some detail about the overall expenditure you just told us about, the next questions ask about your HOUSEHOLD's expenditure on different fishing-specific items and activities in the last 12 months.

How much did your household spend in the last 12 months on the following items for boats or other vessels e.g. jet ski, kayak? *Give the **TOTAL** spent (whether the spending was for fishing-related use or for other uses of your vessel/s)*	Approximately how much did you spend in TOTAL the last 12 months on this (including when fishing and other times)?
Boat running costs (fuel/oil)	$_____ in last 12 months
Maintenance of boat/ canoe / kayak / jet ski / trailer	$_____ in last 12 months
Marina/mooring/ storage fees for boat (or canoe/jet ski etc)	$_____ in last 12 months
Boat and/or trailer registration fees	$_____in last 12 months
Insurance for boat/kayak/ski/trailer/s, fishing gear	$_____ in last 12 months
Boat safety gear e.g. flares, v-sheet, boat EPIRB	$_____ in last 12 months

How much did your HOUSEHOLD spend in the last 12 months on the following?	**$0**	**$1 to $99**	**$100 to $199**	**$200 to $399**	**$400 to $599**	**$600 to $799**	**$800 to $999**	**$1,000 to $1,499**	**$1,500 to $1,999**	**$2,000 or more (please estimate approx. how much)**
Fishing permits/licences	○	○	○	○	○	○	○	○	○	$_____
Fishing club membership fees	○	○	○	○	○	○	○	○	○	$_____
Fishing competition fees (e.g. entry fee)	○	○	○	○	○	○	○	○	○	$_____
Bait and berley	○	○	○	○	○	○	○	○	○	$_____
Fishing gear/tackles (rods, lines, lures, traps, diving gear, bins, knives, fish cleaning gear)	○	○	○	○	○	○	○	○	○	$_____
Personal safety gear and specialised clothing (fishing shirts, life jackets, personal EPIRB, wet weather gear etc.)	○	○	○	○	○	○	○	○	○	$_____
Ice	○	○	○	○	○	○	○	○	○	$_____
Purchase of fishing books/guides/magazines/ apps	○	○	○	○	○	○	○	○	○	$_____
Charter trip fees or fishing guide fees	○	○	○	○	○	○	○	○	○	$_____

Table continued next page…

Contribution to running costs of other people's boats/vessels you went fishing on (don't include spending on running cost of your own household's boats, which was asked about earlier)	○	○	○	○	○	○	○	○	○	$_____

How much did your household spend on 'capital equipment' for fishing in the last 5 years – meaning purchase of a boat/ jet ski/ kayak, purchase of large equipment items for a vessel like echo sounders, GPS, electric trolling motor etc, or purchase of a vehicle or accommodation intended largely for fishing?	Approximately how much did you spend in the last five years on this?
Boat or other vessel e.g. jet ski, paddle craft	$_____ in last 5 years
Other capital equipment e.g. echo sounder, GPS, electric trolling motor	$_____ in last 5 years
Vehicle – only estimate if when buying the vehicle, you chose it partly or largely based on being able to use it for fishing	$_____ in last 5 years About what % of use of this vehicle is for fishing trips? _____%
Holiday house/unit caravan or other accommodation your household owns or partly own – only estimate if you chose to purchase this accommodation partly or largely because it would enable you to do fishing	$_____ in last 5 years About what % of use of this accommodation is for fishing trips? _____%

The next question asks where your spending typically happens on some key fishing-related items. Whether you bought an item directly from a shop or ordered it online, we're interested in knowing where the business you bought it from was located. This helps us identify which regions benefit from spending on recreational fishing.

Fishing travel and related expenditure

The next questions ask how much travel you did as part of your fishing in the last 12 months. To be able to identify the economic value of your fishing travel, we ask about how far you travelled, and the types of spending you did on accommodation and food when you travelled somewhere to fish (even if fishing was just part of the purpose of your trip, not the only activity you did).

Of your fishing trips members of your household went on in the last 12 months, about how many were…	**Number of trips**
Day trips (you/other household members went for the day but didn't stay away overnight)	_____ day trips
Overnight trips in Australia (you stayed away one or more nights on a trip, with fishing one of the activities on that trip)	_____ overnight trips TOTAL DAYS you went FISHING across all trips: approx. _____ days *For example, if you went on two trips of 5 days each, and fished on 4 days of each trip, you would write '8'.* *Estimate if you are lucky enough to do so many trips you can't remember all the days you fished on.*
Overseas fishing trips	_____ overseas fishing trips Fished on about _____ days in total on the trip/s

Thank you for completing the survey

If you would like to enter the prize draw, access results, or participate in future research, please answer the questions below.

How did you hear about this survey? *Select all that apply*	☐ An email from the researchers ☐ Flyer or survey in my letterbox ☐ Received an email from a fishing club or organisation ☐ Friends or family sent me the survey link ☐ Social media e.g. Facebook, Twitter, Instagram ☐ Radio, TV or newspaper ☐ Saw a flyer or poster in a shop
Do you want to be entered in the prize draw? *Prize draw conditions are provided in the information sheet*	◯ Yes ◯ No
Do you want to be notified when results of the study are available?	◯ Yes ◯ No

If you ticked 'yes' to any of the above, please provide your contact details.

Name:	
Email address:	

Appendix 3 Participation in recreational fishing – additional content

Appendix 3.1 Definitions of recreational fishing and estimates of recreational fishing participation across different Australian studies, 2000 to 2020

Defining recreational fishing and recreational fishers

In general, most definitions of recreational fishing agree that it is a non-commercial activity; some also specify that it is different to subsistence, cultural and heritage practice (Pawson et al. 2008), while others include cultural and heritage practices as part of the motivations that may define participation in recreational fishing (e.g. Arlinghaus and Cooke 2009). Pawson et al. (2008) found that many recreational fishing definitions set boundaries based on what recreational fishing does not involve, rather than what it does – for example, some state that recreational fishing is any fishing *not* undertaken for commercial purposes. Other definitions focus on the motivation for fishing, defining recreational fishing as being 'catching fish for fun' (Pitcher et al. 2002), or more broadly as something done primarily for recreation, enjoyment, sport or other non-commercial and non-subsistence motivation (Pawson et al. 2008). However, Arlinghaus and Cooke (2009) point out that many definitions based on motivations are 'not suitable to describe all forms of recreational fishing' (p. 40), as they reference only some of the possible motivations for participating in fishing while leaving others out.

Almost all definitions specify that recreational fishing involves attempting to catch fish or other aquatic organisms, using a wide range of gear and methods. For example, Arlinghaus and Cooke (2009) proposed the following definition (p. 40) 'Recreational fishing is fishing for aquatic animals that do not constitute the individual's primary resource to meet essential physiological needs.' The European Code of Practice for Recreational Fishing uses a similar, but more specified definition *'Recreational fishing is fishing of aquatic animals that do not constitute the individual's primary resource to meet nutritional needs and are not generally sold or otherwise traded on export, domestic or black markets'* (Arlinghaus et al. 2010). These definitions exclude commercial and subsistence fishing, and effectively suggest all other fishing constitutes recreational fishing.

However, this type of definition can be problematic to use as a basis for measuring the number of recreational fishers in Australia, as it does not specify how recently a person needs to have fished to be counted as a recreational fisher, or whether they need to be intending to continue going fishing to be considered a recreational fisher. This definition also excludes people who have a strong interest in recreational fishing, but are not able to physically go fishing, even if they are members of fishing clubs, assist in organising fishing tournaments, or undertake other activities related to recreational fishing. In recent years, this type of 'cerebral, social or institutional involvement' has increasingly been recognised as making an important contribution to many recreational activities (Lovelock et al. 2018, p. 406).

Australian recreational fishing studies which seek to measure fishing catch and effort usually define recreational fishers as *people who have fished in the last 12 months*, with fishing usually specified as involving non-commercial fishing for aquatic organisms (fish, crabs, shellfish, etc) using any method (line fishing, trapping, raking, spearing etc). This definition has been used to ensure consistency in estimates of catch and forms the basis of estimates produced in previous national, state and territory recreational fishing surveys (see for example Henry and Lyle 2003, Ernst and Young 2020, Giri and Hall 2015, Lyle et al. 2019, West et al. 2021). Australian studies of participation in physical recreation activities, in contrast, typically defined recreational fishing as a physical activity undertaken for sport, exercise or recreation (Australian Sports Commission 2016)[2]. This approach assumes recreational fishing is strongly associated with sports and physical activities; however, as discussed further in Section 4.2.3, many recreational fishers do not consider recreational fishing to be a sport or exercise-focused activity, and this means that studies of participation in recreation using this type of definition significantly underestimate participation in recreational fishing.

Estimates of recreational fishing participation across different Australian studies, 2000 to 2020

[2] At the time this report was prepared, reports and data from the AusPlay survey were available for download https://www.clearinghouseforsport.gov.au/research/ausplay

Participation in recreational fishing in Australia has been estimated in a number of studies of (i) recreational fishing, and (ii) surveys of participation in sporting and physical activities. These studies vary in comparability. Recreational fishing studies have usually estimated participation in fishing by people aged five and older; however some recent studies (including this one) have estimated participation by those aged 18 and older. This limits their comparability. Table A3.1 summarises estimates of participation in recreational fishing generated by specific recreational fishing studies conducted in Australia since 2000. These studies define participation in fishing as engaging in any activity considered to form part of recreational fishing (see the main body of Chapter 4 for discussion of this) within the last 12 months. While studies focused specifically on recreational fishing estimate participation rates of anywhere from 12% to 32%, studies of participation in recreational activities in Australia typically suggest that only 1% to 2% of Australians go recreational fishing as part of their sporting or exercise activities. For example, the national AusPlay survey, which examines participation of Australians in a wide range of sports and physical activities they participate in, estimated 2.0% of Australians aged 15 and older participated in recreational fishing during 2020 (AusPlay 2022); data provided in Appendix 3.1 shows that 20 years of previous sports and recreational surveys consistently estimated that between 1% and 2% of the Australian population participate in recreational fishing in a typical year.

Which estimates are correct - the 12% to 32% suggested by findings of recreational fishing studies, or the estimates of 1% to 2% suggested by national sport/physical activity surveys? The answer lies in the different way each type of survey defines recreational fishing. Surveys of participation in sporting and physical activities typically report data for two groups: those aged 15 and older, and those aged 5 to 14. They use a very different definition of participation in fishing to recreational fishing studies, as they are whole of population surveys seeking to quantify the extent to which Australians participate in a range of sport and recreation activities, usually focused predominantly on those involving active physical exercise. There have been three differently named surveys, each of which has used the same approach to defining recreational fishing: the *Exercise, Recreation and Sport Survey* (ERASS) was undertaken from 2001 to 2010, the Australian Bureau of Statistics *Participation in Sport and Physical Recreational* survey was undertaken in 2011-12 and 2013-14, and since 2015 the *AusPlay* survey has collected data (Australian Sports Commission 2016)[3]. All of these surveys have been undertaken by phone, and begin by asking 'in the last 12 months, did you participate in any physical activities'. If the interviewer needs to expand, they explain these are activities 'for sport, for exercise, or for recreation.' If the survey participant answers no, they are not asked whether they participate in fishing. If they answer yes, they are then asked 'In the last 12 months, what sports or physical activities have you done? Please start with the ones you have spent most time doing.' They are prompted to include activities they have only done once or twice in the last year after providing information on their most common activities. Up to ten activities are recorded. This means that a person is only recorded as being a recreational fisher if they indicate having participated in physical activities, and list fishing as being amongst the 'sports or physical activities' they have done. This is a relatively narrow definition of fishing as a physical activity, whereas it is likely many people do not consider their fishing to be either a 'sport' or a 'physical activity' and hence do not list it when asked to list their sporting and physical activities. Table A3.2 shows the estimates of rates of participation in fishing generated in these studies over time. Comparing Table A3.1 and A3.2, it is evident that the difference in definitions results in up to a ten-fold difference in estimates of participation in fishing: while the national sports surveys that use the constrained definition of participation in fishing have estimated between 1.2% and 2.6% of Australians fish in a 12 month period during the years data have been collected, recreational fishing studies have produced estimates of between 12% and 32% participation depending on the year and the state or territory.

Recreational fishing studies define a fisher as being any person who has sought to catch an aquatic organism for non-commercial purposes within the previous 12 months. Sports/physical activity surveys, meanwhile, use a much narrower definition: they only consider a person to be a fisher if that person had done some form of physical exercise in the last 12 months and listed fishing as one of their top forms of physical activity (usually one of their top 10). Many recreational fishers do not think of fishing as a form of physical exercise, and as a result are unlikely to include it when asked about their physical activities in surveys such as AusPlay. Given this, Figure 4.1 in the main report only compares estimates from studies that have included all those who went fishing recreationally in the last 12 months and excludes estimates from AusPlay and similar surveys that substantially undercount participation in recreational fishing.

[3] At the time this report was prepared, reports and data from the AusPlay survey were available for download https://www.clearinghouseforsport.gov.au/research/ausplay

Table A3.1 Estimates of rates of participation in fishing, generated by recreational fishing studies in Australia

Jurisdiction, year (age range included in estimate, measured in years)	**Estimated % of population who fished in last 12 months**	**Confidence interval** (CI) (reported if known or able to be calculated based on reported standard errors)	**Data source**
NSW/ACT, 1999-2000 (5+)	17.1%	1.2%	Henry and Lyle 2003
NSW/ACT, 1999-2000 (5+, adjusted)	16.6%		West et al 2015
NSW/ACT, 2012-13 (5+)	11.7%	0.8%	West et al 2015
NSW/ACT, 2017-18 (NRFS, 18+)	19.6%	1.1%	This study
Vic, 1999-2000 (5+)	12.7%	1.0%	Henry and Lyle 2003
Vic, 2008-09 (18+)	19.0%		EY 2009
Vic, 2013-14 (18+)	18.0%	3.8%	EY 2015
Vic, 2017-18 (NRFS, 18+)	16.4%	1.2%	This study
Vic, 2018-19 (18+)	21.7%		EY 2020
Qld, 1999-2000 (5+)	24.7%	1.6%	Henry and Lyle 2003
Qld, 2010-11 (5+)	17.0%	1.0%	Taylor et al. 2012
Qld, 2012-13 (5+)	15.1%	2.0%	Webley et al. 2015
Qld, 2019-20 (5+)	18.7%		Teixeira et al. 2020
Qld, 2017-18 (NRFS, 18+)	25.9%	1.6%	This study
SA, 1999-2000 (5+)	24.1%	2.0%	Henry and Lyle 2003
SA, 2007-08 (5+)	16.2%	2.4%	Jones 2009
SA, 2012-13 (5+)	18.3%	1.8%	Giri and Hall 2015
SA, 2017-18 (NRFS, 18+)	25.8%	2.7%	This study
WA, 1989-90	26.6%		Ryan et al. 2013
WA, 1999-2000 (5+)	28.5%	2.0%	Henry and Lyle 2003
WA, 2010-11 (5+)	32.0%		Ryan et al. 2013
WA, 2015-16 (5+)	31.1%		Ryan et al. 2017
WA, 2017-18 (5+)	25.0%		Tate et al. 2020
WA, 2017-18 (NRFS, 18+)	25.8%	2.2%	This study
WA, 2018-19 (5+)	25.6%		Tate et al. 2020
Tas, 1999-2000 (5+)	29.3%	2.0%	Henry and Lyle 2003
Tas, 2007-08 (5+)	26.1%	1.4%	Lyle et al. 2009
Tas, 2012-13 (5+)	21.9%	1.6%	Lyle et al. 2014
Tas, 2016-17 (5+)	24.1%	1.8%	Lyle et al. 2019
Tas, 2017-18 (NRFS, 18+)	26.2%	5.4%	This study
NT, 1999-2000 (5+)	31.6%	2.9%	Henry and Lyle 2003
NT, 2008-09 (5+)	22.0%	1.6%	West et al. 2012
NT, 2017-18 (5+, non-Indigenous)	27.0%		West et al. 2021
NT, 2017-18 (NRFS, 18+)	32.7%	7.4%	This study
NT, 2018-19 (5+, non-Indigenous)	18.4%		West et al. 2021

Table A3.2 Estimates of rates of participation in fishing, generated by Australia-wide surveys of participation in sport and physical activity

Source	Year	Age range examined	% population estimated to fish
Exercise, Recreation and Sport Survey (Clearinghouse for Sport, n.d.)	2001	15+	2.40%
	2002	15+	2.30%
	2003	15+	2.60%
	2004	15+	2.10%
	2005	15+	2.10%
	2006	15+	2.10%
	2007	15+	1.60%
	2008	15+	2.10%
	2009	15+	2.20%
	2010	15+	2.20%
ABS *Participation in Sport and Physical Recreation survey* (ABS 2015)	2005-06	15+	1.60%
	2009-10	15+	1.40%
	2011-12	15+	1.40%
	2013-14	15+	1.00%
AusPlay survey (Clearinghouse for Sport, 2022)	2015-16	15+	2.10%
	2016 (calendar)	15+	2.00%
	2016-17	15+	1.70%
	2017 (calendar)	15+	1.50%
	2017-2018	15+	1.30%
	2018 (calendar)	15+	1.20%
	2018-2019	15+	1.40%
	2019 (calendar)	15+	1.40%
	2019-20	15+	1.40%
	2020 (calendar)	15+	1.70%
	2021	15+	2.00%

Appendix 3.2 Detailed methods – Section 4.8

Section 4.8 analysed the specific subsample of people who had never fished or had last fished more than five years ago, collected as part of the Stage 2 survey. As this was a unique subsample, some specific data cleaning methods were used. This Appendix describes these.

Of those participating in the Stage 2 survey, 2,265 had fished more than 5 years ago and 1,899 had never fished. This formed the sample analysed in Section 4.8. When exploring data to identify socio-demographic patterns of likelihood of being a past or non-fisher, level of fishing interest was collapsed from 10 items (with categories ranging from no interest/none (0) to very high (10)) into three categories (none, low/med and high). An average score was also taken from each survey question relating to barriers to fishing participation (7 point Likert scale ranging from strongly disagree (1) to strongly agree (7)). Respondent age was relatively evenly distributed and was thus combined into four categories for interpretation and analysis:

- Young adult (18-35 years of age)
- Early middle age (35-50 years of age)
- Late middle age (51-65 years of age)
- Post retirement (66+ years of age)

All data analysed and presented in this chapter of the report are unweighted, since these data are being explored to identify properties of the sample and not the population more broadly (see methods section above). Except for assessing barriers to fishing participation, Pearson chi-square tests (X^2) were used to identify significant differences between two nominal data sets. When a bivariate test was significant, data were further explored using a pairwise test comparing column proportions to identify where the differences were. A total of 15 variables influencing fishing participation were initially explored by comparing means and confidence intervals (± CIs) by time recently fished, fishing interest and demographic characteristics. The spearman two-tail nonparametric test for non-normal data was then used to determine whether these variables were driven by either gender and/or age. Level of statistical significance for all tests was set at alpha = 0.05.

Exploratory factor analysis was conducted to assess the underlying factor structures of the data on barriers to fishing in relation to demographic data. Factor analysis was conducted using Principal Axis Factor (PAF) analyses, which is considered appropriate where assumptions of multivariate normality are potentially violated, with Direct Oblimin (nonorthoginal rotation) method. This method is considered most appropriate to accommodate correlated factors, i.e. factors with correlation scores above 0.3, as was the case in this study. Prior to performing PAF, the suitability of the data for such analyses was assessed. The Kaiser–Meyer–Olkin value was 0.845, exceeding the recommended minimum value of 0.6 (Kaiser, 1970), and the Bartlett's Test of sphericity reached statistical significance of 0.000 ($\chi 2$ =11925.08, d.f.= 105), supporting the factorability of the correlation matrix. In addition, the communalities were 0.3 or above for 13 of the 15 variables of interest, further confirming that each item shared some common variance with other items. Eigenvalues higher than 1 were used as a cut-off to determine the number of factors extracted for this study and a variable was retained if its regression coefficient was 0.3 or above. The Mann-Whitney test was used to determine whether a factor was significantly influenced by gender type and the Kruskal-Wallis test was used to determine whether a factor was significantly influenced by any of the four age categories (described above).

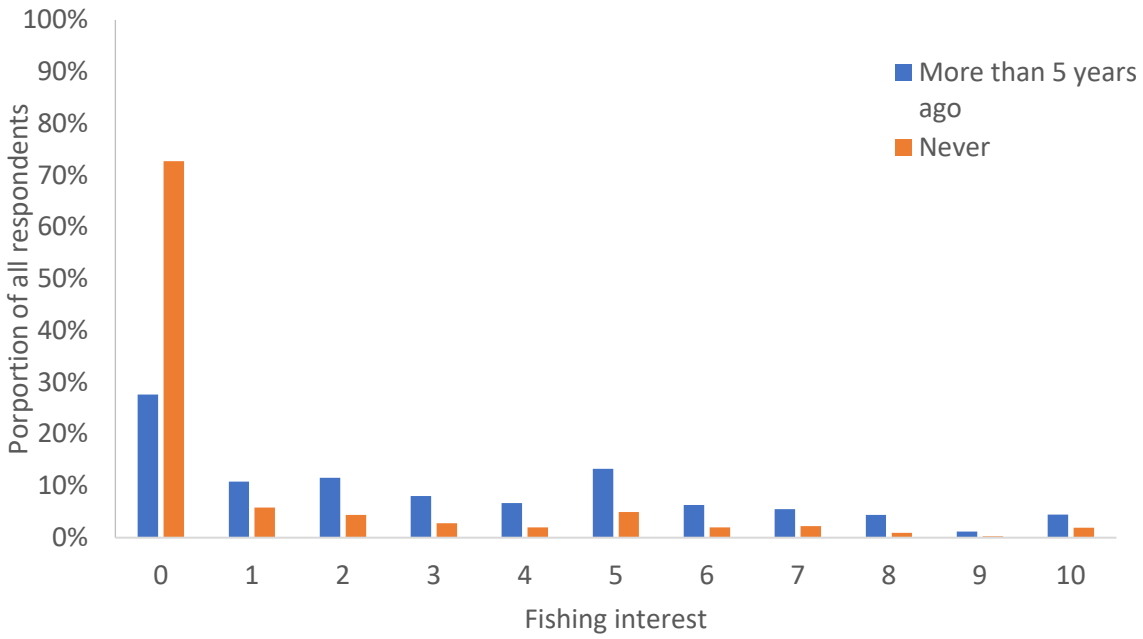


Figure A3.1 Proportional distribution of fishing interest (0= no interest, 10= very high interest) by respondents and time recently fished (fished > 5 years ago or never fished)

When grouped together, there was a significant difference between time recently fished and fishing interest for all respondents ($\chi 2$= 725.720, d.f.= 2, $p<0.001$), with significantly more respondents who have never fished having no fishing interest (pairwise test for proportions, n=1173, $p<0.001$, Figure A3.2) compared to those who have fished more than 5 years ago. In contrast there were significantly more respondents who have fished 5 years ago or more with low/medium and high fishing interest compared to those who have never fished (pairwise test for proportions, low/med fishing interest, n=1000, $p<0.001$, high fishing interest, n= 433, $p<0.001$).

There was a significant difference between gender and fishing interest for respondents who never fished ($\chi 2$= 22.988, d.f.= 4, $p<0.001$). Of the respondents who never fished, significantly more females had no fishing interest compared to males (pairwise test for proportions, n= 1164, $p<0.01$) and more males had a high interest in fishing compared to females (pairwise test for proportions, n= 114, $p< 0.001$) in this category. There were no significant differences between gender for those who had fished more than 5 years ago ($\chi 2$= 1.640, d.f.= 4, $p>0.05$).

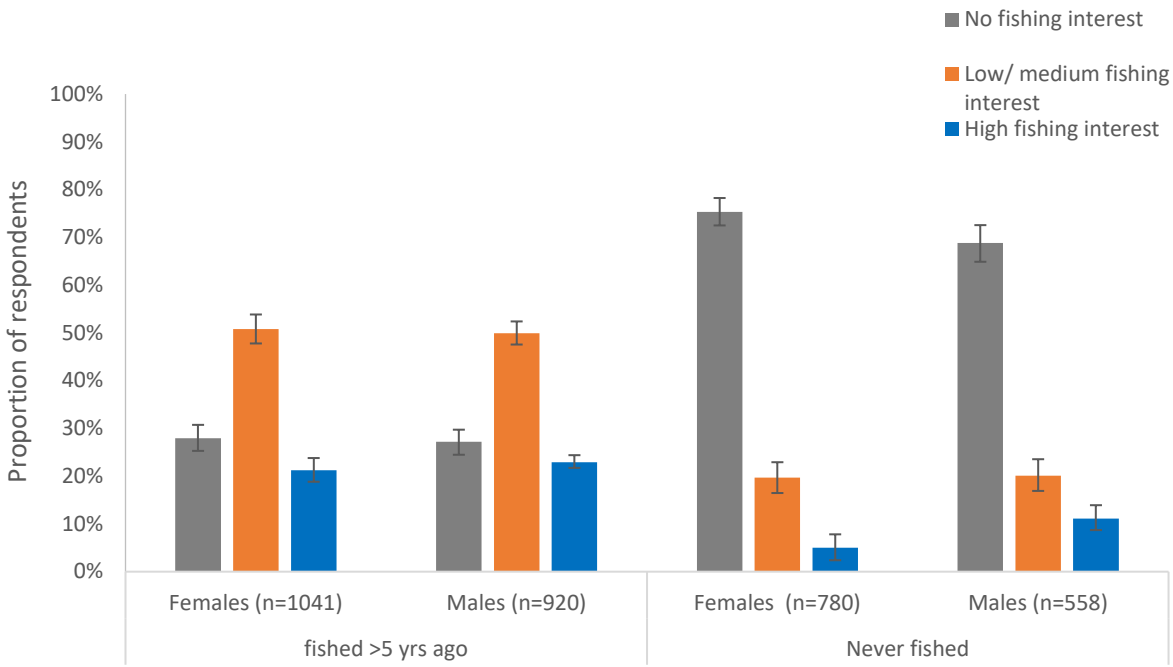


Figure A3.2 Level of fishing interest by gender and whether a person was a past or non-fisher

There was a significant difference between respondent age categories for all fishing interest categories and time recently fished (fished more than 5 years ago, $\chi 2 = 27.656$, d.f.= 6, $p<0.001$; never fished, $\chi 2 = 125.900$, d.f.= 6, $p<0.001$, Figure A3.3). Of respondents who have never fished, no fishing interest was significantly higher in the 36-50, 51-65 and 66+ age categories compared to the 18-35 year age group (pairwise test for proportions, n= 296, n= 364, n=290, respectively, $p<0.001$). Respondents with both low/medium and high fishing interest were significantly higher in the 18-35 year age group compared to all other three age categories (pairwise test for proportions, n=211 and n=98 respectively, $p<0.001$). Low/medium and high fishing interest were also significantly higher for respondents in the 36-50 year age group compared to the 51-65 and 66+ age categories (pairwise test for proportions, n= 228 and n= 108 respectively, $p<0.01$). Respondents with high fishing interest who never fished and aged 51-65 years old, were also significantly higher compared to those aged 66+ years (pairwise test for proportions, n= 22, $p<0.05$). Respondents who fished more than 5 years ago and had low/medium fishing interest were significantly higher in the 36-50 age group compared to the 51-65 age group (pairwise test for proportions, n=228, $p<0.05$). Respondents with no fishing interest were significantly higher in the 51-65 and 66+ age categories compared to the both the 18-35 and 36-50 age categories (pairwise test for proportions, n=187 and n= 173, respectively, $p<0.05$).

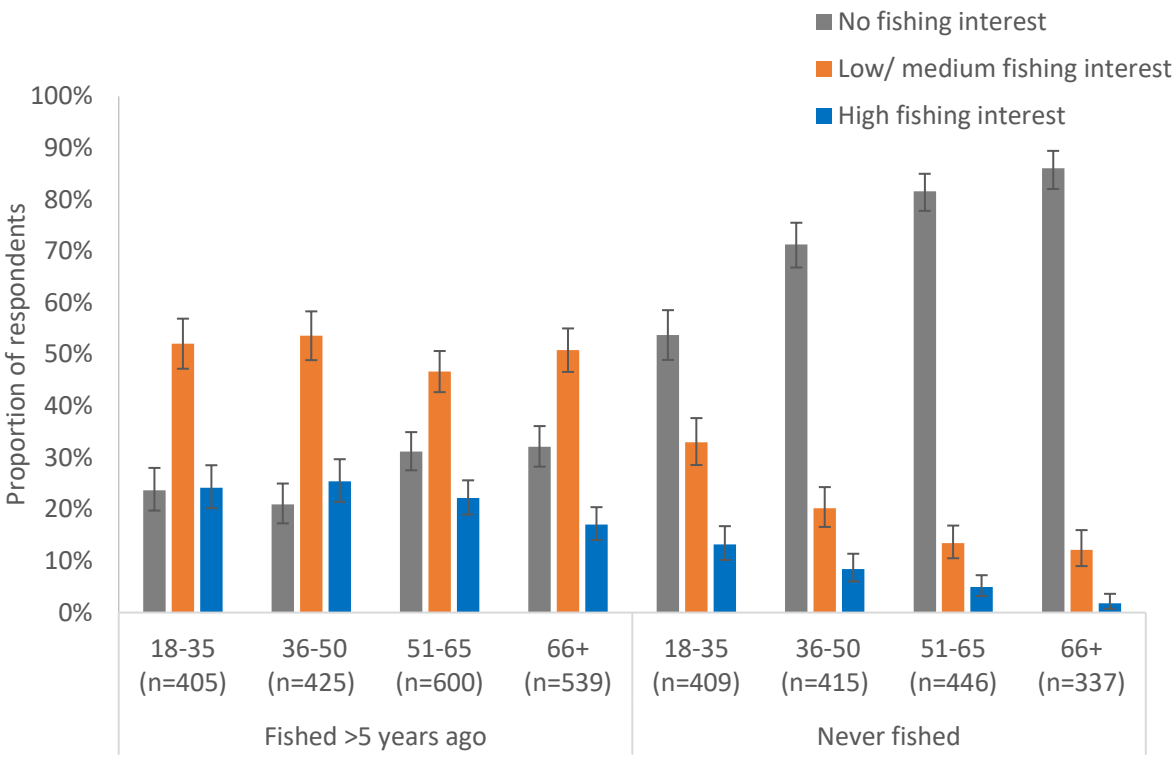


Figure A3.3 Level of fishing interest by age group and whether a person was a past or non-fisher

Table A3.3 Mean (±CI) variables influencing fishing participation by time recently fished (fished > 5 years ago or never fished) and fishing interest (None, Low/medium or High)

		too busy	other priorities	no or few friends/ family go fishing	noone to teach me	too hard to learn the skills	poor health	un- affordable	don't want to buy gear
Recent time fished	More than 5 years ago	4.09 (3.99-4.19)	3.95 (3.85-4.05)	**5.15 (5.06-5.24)**	3.62 (3.52-3.72)	2.98 (2.89-3.06)	2.83 (2.73-2.92)	3.37 (3.28-3.47)	3.58 (3.48-3.68)
	Never	3.91 (3.78-4.03)	2.57 (2.46-2.69)	**5.19 (5.07-5.3)**	***4.39 (4.26-4.52)***	3.57 (3.44-3.69)	2.5 (2.39-2.61)	3.58 (3.45-3.71)	3.01 (2.89-3.13)
Fishing interest	None	3.76 (3.63-3.89)	1.97 (1.87-2.07)	**5.22 (5.1-5.34)**	3.91(3.77-4.05)	3.12 (3-3.24)	2.42 (2.31-2.53)	3.29 (3.16-3.41)	2.57 (2.46-2.69)
	Low/ medium	4.19 (4.08-4.3)	4.24 (4.14-4.35)	**5.13 (5.03-5.24)**	3.96(3.84-4.08)	3.34 (3.24-3.44)	2.77 (2.66-2.89)	3.55 (3.44-3.66)	3.93 (3.82-4.04)
	High	4.33 (4.14-4.51)	**5.25 (5.12-5.39)**	***5.07 (4.9-5.23)***	3.97(3.78-4.17)	3.23 (3.06-3.41)	3.27 (3.08-3.45)	3.77 (3.58-3.95)	4.05 (3.87-4.24)

		fisher behaviour/ reputation	Injury /accident risk	fish welfare	dislike touching fish	dislike eating fish	don't swim	noone to go fishing with
Recent time fished	More than 5 years ago	2.88 (2.79-2.97)	2.68 (2.59-2.76)	3.22 (3.12-3.31)	3.29 (3.19-3.38)	2.67 (2.57-2.76)	2.5 (2.41-2.6)	***4.09 (3.98-4.2)***
	Never	3.00 (2.88-3.12)	2.72 (2.61-2.83)	3.6 (3.48-3.73)	4.23 (4.1-4.35)	3.12 (2.99-3.24)	2.89 (2.77-3.01)	4.07 (3.94-4.2)
Fishing interest	None	2.83 (2.71-2.96)	2.46 (2.35-2.57)	3.54 (3.41-3.67)	***4.14 (4.01-4.27)***	3.05 (2.92-3.17)	2.55 (2.44-2.67)	3.77 (3.64-3.9)
	Low/ medium	2.93 (2.83-3.03)	2.79 (2.69-2.89)	3.31 (3.19-3.42)	3.46 (3.35-3.57)	2.72 (2.6-2.83)	2.67 (2.56-2.78)	***4.40 (4.28-4.52)***
	High	3.16 (2.98-3.33)	3.14 (2.97-3.31)	3.10 (2.93-3.28)	2.95 (2.77-3.13)	2.66 (2.48-2.84)	3.01 (2.82-3.2)	4.18 (3.99-4.38)

Highest mean values are indicated in bold, second highest are indicated in italics.

Table A3.4. Mean (±CI) variables influencing fishing participation by gender

	too busy	other priorities	no or few friends/ family go fishing	noone to teach me	too hard to learn the skills	poor health	un- affordable	don't want to buy gear
Female	4.00 (3.89-4.1)	3.20 (3.1-3.3)	**5.15 (5.06-5.25)**	4.00 (3.89-4.11)	3.22 (3.12-3.32)	2.60 (2.5-2.69)	3.47 (3.37-3.58)	3.26 (3.15-3.36)
Male	4.01 (3.89-4.13)	3.56 (3.44-3.69)	**5.16 (5.05-5.27)**	3.82 (3.7-3.95)	3.20 (3.09-3.31)	2.80 (2.69-2.91)	3.42 (3.3-3.54)	3.42 (3.3-3.54)

	fisher behaviour/ reputation	injury/ accident risk	fish welfare	dislike touching fish	dislike eating fish	don't swim	noone to go fishing with
Female	2.96 (2.86-3.06)	2.69 (2.6-2.78)	3.64 (3.53-3.74)	***4.13 (4.03-4.24)***	2.97 (2.86-3.07)	2.73 (2.63-2.83)	4.02 (3.91-4.13)
Male	2.85 (2.74-2.96)	2.68 (2.57-2.78)	2.98 (2.87-3.1)	3.03 (2.92-3.15)	2.67 (2.56-2.79)	2.56 (2.45-2.67)	***4.14 (4.02-4.27)***

Highest mean values are indicated in bold, second highest are indicated in italics.

Table A3.5 Mean (±CI) variables influencing fishing participation by age category (years)

Age	too busy	other priorities	no or few friends/ family go fishing	noone to teach me	too hard to learn the skills	poor health	un- affordable	don't want to buy gear
18-35	***4.71 (4.55-4.86)***	3.59 (3.43-3.75)	**5.16 (5.02-5.29)**	4.38 (4.22-4.54)	3.63 (3.48-3.78)	2.45 (2.31-2.58)	3.79 (3.64-3.94)	3.73 (3.57-3.89)
36-50	***4.20 (4.03-4.36)***	3.42 (3.26-3.59)	**5.17 (5.02-5.32)**	4.15 (3.98-4.31)	3.39 (3.24-3.54)	2.47 (2.33-2.61)	3.40 (3.24-3.56)	3.42 (3.26-3.58)
51-65	3.66 (3.51-3.81)	3.13 (2.98-3.27)	**5.04 (4.89-5.18)**	3.55 (3.4-3.71)	2.86 (2.73-3)	2.57 (2.44-2.7)	3.32 (3.17-3.46)	3.07 (2.93-3.21)
66+	3.63 (3.47-3.79)	3.39 (3.23-3.54)	**5.35 (5.21-5.49)**	3.77 (3.6-3.94)	3.09 (2.94-3.24)	3.27 (3.11-3.43)	3.38 (3.22-3.55)	3.23 (3.07-3.39)

Age	fisher behaviour/ reputation	injury/ accident risk	fish welfare	dislike touching fish	dislike eating fish	don't swim	noone to go fishing with
18-35	3.35 (3.2-3.51)	2.94 (2.8-3.08)	3.97 (3.81-4.13)	4.32 (4.17-4.48)	3.62 (3.45-3.8)	2.90 (2.74-3.06)	4.12 (3.96-4.28)
36-50	3.00 (2.84-3.15)	2.74 (2.6-2.88)	3.52 (3.36-3.69)	3.91 (3.75-4.08)	3.22 (3.05-3.39)	2.64 (2.49-2.79)	4.06 (3.9-4.23)
51-65	2.59 (2.46-2.72)	2.33 (2.22-2.45)	3.08 (2.93-3.22)	3.51 (3.36-3.66)	2.60 (2.46-2.73)	2.54 (2.41-2.68)	***3.98 (3.82-4.14)***
66+	2.87 (2.72-3.02)	2.85 (2.71-3)	3.05 (2.9-3.21)	3.11 (2.96-3.26)	2.14 (2.01-2.28)	2.64 (2.49-2.8)	***4.20 (4.03-4.37)***

Highest mean values are indicated in bold, second highest are indicated in italics.

Principal axis factor analyses extracted three factors for determining barriers to fishing participation which accounted for 53% of the total variance, indicating three principal types of non-fishers (Table A3.6). These three types of non-fishers were labelled 'priority/risk aversion' (factor 1), 'fishing aversion' (factor 2) and 'socially-isolated' (factor 3), described below. A solution for four factors was also initially explored but deemed to not provide meaningful additional insight compared to the three factors extracted and so is not reported here. Thirteen of the 15 variables (or 'loadings') used in the factor analysis had a primary regression coefficient of 0.4 or above and 14 of the 15 variables had cross-loading regression coefficients of 0.3 or below.

Factor 1 ('priority/risk aversion') consisted of 9 variables and accounted for 31.6% of variance, with items associated with primarily choosing other priorities, health and safety risk aversion and perception of fishing as a leisure activity, as the main barriers to fishing participation. These variables also included limited time and skills, financial costs, as well as poor health and injury/accident concerns. Given that the variable with the highest loading was related to injury risk aversion, it suggests the underlying reasoning for not fishing may lie in this direction, but further investigation is required to better understand this non-fisher type.

Factor 2 ('fishing aversion') accounted for 12.2% of variance and was characterised by six variables which were a combination of issues related to aversion to fishing related activities and risks. These included fisher behaviour/reputation, safety concerns, fish welfare, and a dislike of touching and eating fish. 'Other priorities' was negatively correlated with this factor, compared to the other variables, indicating that the more strongly people were associated with fishing aversion, the less strongly they were associated with other priorities which prevented them from fishing.

Factor 3 ('socially-isolated') accounted for 9.2% of variance and was characterised by 4 variables in relation to having none or limited social networks which prevent the ability to go fishing. These included having no one or few friends/family to go fishing with, as well as no one to teach them and learn fishing skills from.

Significant differences were identified between gender and age for factors 1 and 2 (Table A3.7), with factor 1 ('priority/risk aversion') being a mix of young and older males aged 18-35 and 66+, and factor 2 ('fishing aversion') being mostly young females aged 18-35. There was no significant difference between gender for Factor 3 ('socially-isolated') indicating this group is typically gender neutral, however age was found to be significant, with this factor being characterised by young people in the 18-35 age category.

Table A3.6 Principal axis factor analysis with pattern matrix results for the individual variables by each factor

Factor	Priority/ risk aversion	Fishing aversion	Socially- isolated
	1	2	3
Eigenvalue	4.735	1.836	1.378
Variance explained	31.6 %	12.2 %	9.2 %
Too busy	0.3		
Other priorities	0.5	-0.3	
No or few friends/family go fishing			0.6
No one to teach me			0.9
Too hard to learn the skills	0.3		0.5
Poor health	0.5		
Unaffordable	0.5		
Don't want to buy gear	0.6		
Fisher behaviour/ reputation	0.5	0.5	
Injury/accident risk	0.7	0.3	
Fish welfare		0.6	
Dislike touching fish		0.6	
Dislike eating fish		0.6	
Don’t swim	0.3		
No one to go fishing with			0.6
Note: Variables with values greater or equal to ± 0.3 are included (other variables within the -0.3 to 0.3 range are not presented). Rotation method converged in 9 iterations.			

Table A3.7. Bivariate analysis for gender and age category for three factors (1=’ priority-burdened/risk aversion’, 2= ‘fishing aversion’, 3= ‘socially-isolated’)

	Mann-Whitney U and P value	Female*		Male*		Kruskal-Wallis H and P value	18-35 years~		36-50 years~		51-65 years~		66+ years~	
		Mean Rank	n	Mean Rank	n		Mean Rank	n	Mean Rank	n	Mean Rank	n	Mean Rank	n
Factor 1	725909.5, 0.03	1223.6	1433	**1287.8**	1068	50.589, 0.00	**1393.76**	605	1246.83	629	1119.17	728	**1309.31**	555
Factor 2	620053.5, 0.00	**1352.3**	1433	1115.1	1068	122.872, 0.00	**1486.20**	605	1343.96	629	1130.88	728	1083.10	555
Factor 3	755229.5, 0.58	1258.0	1433	1241.6	1068	59.007, 0.00	**1417.52**	605	1310.65	629	1129.72	728	1197.25	555

* two-tailed Mann-Whitney mean rank and number of responses (n)
~ Kruskal-Wallis mean rank and number of responses (n)
Highest significant mean rank variables are indicated in bold.

Appendix 4: Natural disasters and COVID-19 impacts - appendices

Appendix 4.1: Change in recreational fishing activity, December 2019 to June 2021 – detailed data tables

Table A4.1.1 Average number of recreational fishing day trips taken each month by jurisdiction, gender and age

	Jurisdiction						Gender		Age			
Month	NSW/ACT	Vic	Qld	SA	WA/NT	Tas	Female	Male	18-35	36-50	51-65	66+
Dec-19	4.5	4.3	4.1	3.4	3.3	3.7	2.6	4.3	5.3	4.8	3.6	3.7
Jan-20	4.0	4.6	4.0	3.5	2.6	2.8	2.0	4.2	4.7	4.7	3.5	3.8
Feb-20	3.4	3.7	3.0	2.4	2.2	2.3	1.7	3.3	4.8	3.7	2.7	3.0
Mar-20	2.8	1.5	2.2	1.7	2.8	2.8	1.1	2.4	3.2	2.1	2.1	2.4
Apr-20	2.8	0.3	2.5	1.3	2.9	2.7	0.9	2.1	2.7	2.0	1.8	2.1
May-20	3.7	2.6	3.3	3.9	2.3	4.2	2.3	3.4	4.1	2.9	3.1	3.8
Jun-20	3.8	3.3	3.6	3.7	3.0	4.2	3.0	3.6	4.1	3.2	3.4	4.2
Jul-20	3.3	2.7	3.2	2.4	2.4	1.6	2.3	3.0	3.6	3.2	2.7	2.8
Aug-20	3.4	2.7	3.8	2.8	2.4	2.6	2.3	3.3	4.4	3.4	2.8	3.3
Sep-20	3.1	3.3	3.9	3.2	2.4	3.0	2.3	3.3	3.2	3.8	2.5	3.8
Oct-20	2.7	2.5	3.2	2.5	2.4	3.0	1.7	2.8	2.9	2.9	2.5	2.8
Nov-20	3.0	3.3	3.2	2.3	2.3	3.2	2.0	3.1	3.0	3.3	2.6	3.3
Dec-20	3.7	3.0	3.2	2.9	3.7	5.0	2.8	3.5	5.1	3.5	3.1	3.8
Jan-21	4.3	3.5	3.7	3.8	3.8	4.3	2.8	4.0	4.7	4.3	3.4	4.3
Feb-21	5.1	3.9	4.8	5.1	5.6	3.5	2.9	4.8	3.1	4.9	4.6	5.5
Mar-21	3.6	2.5	3.1	2.7	4.1	2.1	2.9	4.8	3.1	4.9	4.6	5.5
Apr-21	3.6	2.5	3.1	2.7	4.1	2.1	1.8	3.2	2.0	3.5	2.9	3.5
May-21	2.8	2.1	3.0	3.2	2.1	1.1	1.7	2.6	2.0	2.4	2.3	3.1
Jun-21	2.6	2.1	2.9	1.9	2.5	1.1	2.4	2.4	2.3	2.6	2.2	2.8

Table A4.1.2 Relative level of fishing compared to 12 months earlier, by jurisdiction, age and gender

	Jurisdiction																	
	NSW/ACT			Vic			Qld			SA			WA/NT			Tas		
Month	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M
Dec-19 to Feb 20	56%	31%	13%	47%	38%	15%	48%	42%	11%	50%	35%	15%	60%	24%	16%	55%	32%	14%
Mar-Apr 20	63%	18%	18%	88%	5%	7%	56%	28%	17%	74%	13%	13%	61%	20%	20%	83%	5%	13%
May-20	58%	28%	14%	74%	15%	11%	52%	31%	17%	59%	29%	13%	59%	28%	13%	48%	48%	3%
Jun-20	53%	32%	15%	68%	18%	14%	48%	34%	18%	48%	39%	13%	61%	23%	16%	38%	45%	17%
Jul-20	53%	33%	14%	79%	14%	7%	44%	33%	23%	54%	36%	10%	48%	36%	16%	57%	35%	8%
Aug-20	49%	35%	16%	82%	14%	4%	45%	32%	23%	54%	31%	14%	57%	24%	19%	50%	39%	11%
Sep-20	47%	37%	16%	76%	16%	9%	47%	36%	17%	59%	28%	13%	54%	32%	14%	45%	41%	14%
Oct-20	51%	32%	17%	69%	23%	8%	47%	40%	14%	55%	36%	10%	57%	31%	12%	47%	42%	11%
Nov-20	47%	33%	20%	58%	30%	12%	53%	33%	14%	54%	24%	22%	55%	37%	8%	47%	42%	11%
Dec-20	40%	31%	29%	52%	34%	15%	40%	47%	14%	36%	51%	13%	44%	39%	17%	33%	53%	13%
Jan-21	38%	33%	29%	44%	31%	25%	35%	47%	18%	36%	42%	23%	42%	37%	21%	33%	60%	7%
Feb-Mar-21	36%	41%	23%	35%	34%	31%	22%	42%	36%	39%	35%	26%	38%	35%	27%	33%	52%	14%
Apr-21	39%	39%	22%	28%	35%	37%	31%	39%	31%	33%	48%	20%	33%	24%	43%	30%	50%	20%
May-21	45%	37%	18%	44%	38%	18%	36%	41%	23%	47%	39%	13%	46%	28%	26%	50%	36%	14%
Jun-21	48%	36%	17%	38%	41%	21%	43%	36%	21%	44%	33%	23%	48%	33%	19%	43%	50%	7%

L = less than 12 months earlier, S = Same as 12 months earlier, M = More than 12 months earlier. Proportion of respondents in each category are shown.

Table A4.1.2 continued.

	Gender						Age											
	Female			Male			18-35			36-50			51-65			66+		
Month	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M
Dec-19 to Feb-20	57%	25%	19%	52%	36%	13%	45%	29%	26%	49%	30%	21%	53%	36%	10%	54%	40%	6%
Mar-Apr-20	73%	17%	10%	69%	16%	15%	59%	20%	20%	71%	14%	15%	71%	17%	12%	68%	16%	16%
May-20	62%	29%	10%	61%	26%	14%	58%	16%	26%	56%	27%	17%	59%	29%	12%	67%	25%	8%
Jun-20	60%	29%	12%	55%	29%	16%	56%	18%	26%	49%	30%	20%	56%	32%	12%	59%	30%	11%
Jul-20	50%	42%	8%	59%	27%	14%	43%	39%	18%	57%	27%	16%	61%	25%	15%	60%	34%	6%
Aug-20	58%	31%	11%	58%	27%	15%	49%	34%	17%	58%	25%	17%	60%	26%	14%	60%	31%	9%
Sep-20	58%	40%	2%	55%	30%	15%	51%	38%	11%	51%	32%	17%	61%	26%	13%	53%	35%	12%
Oct-20	67%	31%	2%	55%	32%	14%	59%	28%	13%	52%	33%	16%	60%	29%	11%	49%	38%	13%
Nov-20	61%	33%	6%	52%	32%	15%	56%	34%	9%	49%	32%	20%	61%	27%	12%	45%	41%	15%
Dec-20	50%	41%	9%	43%	37%	20%	52%	24%	24%	36%	39%	24%	46%	34%	20%	45%	43%	12%
Jan-21	53%	38%	9%	39%	36%	25%	48%	24%	28%	38%	35%	27%	41%	37%	22%	39%	40%	21%
Feb-Mar-21	31%	40%	29%	34%	39%	27%	31%	31%	38%	34%	36%	30%	31%	39%	30%	38%	43%	19%
Apr-21	25%	43%	31%	34%	37%	29%	33%	37%	30%	31%	38%	31%	30%	38%	32%	36%	39%	25%
May-21	33%	55%	12%	45%	36%	20%	43%	39%	17%	38%	39%	23%	45%	36%	19%	46%	39%	15%
Jun-21	37%	51%	12%	45%	36%	20%	48%	30%	22%	33%	38%	29%	47%	37%	17%	49%	37%	14%

L = less than 12 months earlier, S = Same as 12 months earlier, M = More than 12 months earlier. Proportion of respondents in each category are shown.

Appendix 4.2 Did COVID-19 change fishing habits? Findings for different groups of fishers

Table 4.2.1 Changes to fishing resulting from COVID-19 by fisher group (a)

	I've been targeting different species than usual when fishing			I've fished from shore more than usual			I've fished from a boat more than usual			It's been more crowded than usual at some of my usual fishing spots		
	Mean	95.0% Lower CL	95.0% Upper CL	Mean	95.0% Lower CL	95.0% Upper CL	Mean	95.0% Lower CL	95.0% Upper CL	Mean	95.0% Lower CL	95.0% Upper CL
All recreational fishers	2.0	1.8	2.1	2.1	2.0	2.3	1.9	1.8	2.0	2.5	2.4	2.7
Female fishers	1.7	1.5	1.9	2.2	2.0	2.5	2.1	1.9	2.4	2.8	2.5	3.1
Male fishers	2.1	1.9	2.2	2.1	1.9	2.2	1.8	1.6	1.9	2.4	2.2	2.6
Aged 18-29	2.3	2.1	2.6	1.9	1.7	2.1	2.0	1.8	2.2	2.6	2.3	2.8
Aged 30-54	1.7	1.5	1.9	2.3	2.1	2.6	1.8	1.6	1.9	2.6	2.3	2.9
Aged 55-69	1.7	1.5	1.9	2.3	2.0	2.7	1.8	1.6	2.1	2.6	2.3	2.9
Aged 70+	1.7	1.3	2.0	2.0	1.5	2.4	1.9	1.5	2.3	2.3	1.8	2.7
Freshwater fisher	2.1	2.0	2.3	2.2	2.1	2.4	2.0	1.8	2.2	2.4	2.3	2.6
Estuary fisher	2.2	2.0	2.4	2.4	2.2	2.6	2.1	1.9	2.2	2.6	2.4	2.8
Saltwater fisher	2.1	2.0	2.3	2.3	2.1	2.4	2.0	1.8	2.1	2.6	2.4	2.8
Fished <5 days	1.5	1.3	1.7	1.8	1.6	2.0	1.6	1.4	1.8	2.1	1.9	2.3
Fished 5-9 days	1.5	1.3	1.8	2.0	1.7	2.4	1.5	1.3	1.7	2.9	2.5	3.2
Fished 10-19 days	2.0	1.8	2.2	2.6	2.3	2.9	2.3	2.0	2.6	2.9	2.6	3.2
Fished 20+ days	2.9	2.5	3.2	2.2	1.9	2.5	2.1	1.8	2.4	2.5	2.3	2.8
Fishing low/no importance	1.6	1.5	1.8	1.9	1.7	2.1	2.0	1.8	2.2	2.2	2.0	2.5
Fishing moderately important	1.6	1.5	1.8	2.1	1.9	2.3	1.6	1.5	1.8	2.5	2.3	2.7
Fishing highly important	3.1	2.8	3.5	2.5	2.2	2.8	2.2	2.0	2.5	3.2	2.8	3.5
NSW	1.7	1.4	1.9	1.9	1.6	2.1	2.0	1.7	2.3	2.3	2.0	2.6
NT	1.8	1.4	2.2	2.2	1.8	2.7	2.2	1.8	2.6	2.9	2.2	3.6
QLD	2.4	2.1	2.8	2.2	1.9	2.5	1.7	1.5	2.0	2.4	2.1	2.6
SA	1.2	1.1	1.3	1.7	1.3	2.2	1.6	1.2	1.9	2.4	1.9	2.9
TAS	1.7	0.9	2.4	2.1	0.9	3.3	1.5	0.7	2.2	2.1	1.2	2.9
VIC	2.0	1.8	2.3	2.4	2.1	2.7	2.1	1.8	2.4	2.7	2.4	3.0
WA	2.2	1.9	2.6	2.2	1.9	2.5	1.7	1.4	1.9	3.1	2.6	3.6

Table 4.2.1 Changes to fishing resulting from COVID-19 by fisher group (b)

	There's been a lot of new people out fishing			I've been concerned people may criticise me for being out fishing even if I'm meeting all social distancing requirements			Going fishing has sometimes felt more stressful than usual in the last few months due to having to meet COVID-19 restrictions			Going fishing has helped me cope with COVID-19 restrictions		
All recreational fishers	3.2	3.1	3.4	2.3	2.1	2.4	2.6	2.5	2.8	3.9	3.7	4.0
Female fishers	3.2	2.9	3.5	2.0	1.8	2.3	2.5	2.2	2.8	4.0	3.8	4.3
Male fishers	3.2	3.0	3.4	2.4	2.2	2.6	2.7	2.5	2.8	3.8	3.6	4.0
Aged 18-29	3.5	3.3	3.8	2.7	2.4	2.9	2.9	2.6	3.1	4.0	3.7	4.3
Aged 30-54	3.0	2.8	3.3	2.2	2.0	2.4	2.7	2.5	3.0	3.9	3.6	4.2
Aged 55-69	3.1	2.8	3.4	1.9	1.6	2.1	2.2	1.9	2.5	3.9	3.6	4.3
Aged 70+	2.6	2.2	3.1	1.8	1.4	2.1	2.0	1.6	2.4	3.2	2.7	3.8
Freshwater fisher	3.2	3.0	3.4	2.4	2.2	2.6	2.8	2.6	3.0	4.1	3.9	4.3
Estuary fisher	3.3	3.1	3.5	2.3	2.1	2.5	2.6	2.4	2.8	4.1	3.9	4.3
Saltwater fisher	3.4	3.2	3.6	2.3	2.2	2.5	2.6	2.4	2.8	3.9	3.7	4.1
Fished <5 days	2.6	2.3	2.8	1.9	1.7	2.2	2.4	2.1	2.6	3.0	2.7	3.3
Fished 5-9 days	3.4	3.0	3.8	2.9	2.5	3.3	3.1	2.7	3.5	4.1	3.7	4.5
Fished 10-19 days	3.3	3.0	3.7	2.5	2.2	2.8	2.8	2.5	3.2	4.1	3.8	4.5
Fished 20+ days	3.7	3.3	4.0	2.0	1.7	2.3	2.3	2.0	2.6	5.1	4.8	5.4
Fishing low/no importance	2.9	2.6	3.1	1.9	1.7	2.1	2.3	2.1	2.6	2.8	2.6	3.0
Fishing moderately important	2.9	2.7	3.2	2.3	2.1	2.6	2.6	2.4	2.9	4.1	3.8	4.3
Fishing highly important	4.3	3.9	4.6	2.6	2.3	3.0	2.9	2.5	3.2	5.6	5.3	5.9
NSW	2.9	2.6	3.2	2.3	2.0	2.5	2.8	2.5	3.1	3.6	3.2	3.9
NT	3.2	2.6	3.9	2.6	2.0	3.1	2.4	1.9	3.0	3.9	3.3	4.4
QLD	3.4	3.1	3.7	1.8	1.6	2.0	2.0	1.8	2.3	3.9	3.5	4.2
SA	3.4	2.8	4.0	2.4	2.0	2.9	2.7	2.2	3.2	3.9	3.4	4.5
TAS	2.3	1.4	3.3	1.4	0.8	1.9	1.4	0.8	2.1	2.4	1.1	3.7
VIC	3.1	2.8	3.4	2.7	2.4	3.0	3.0	2.7	3.4	4.5	4.2	4.8
WA	3.8	3.4	4.3	2.3	1.8	2.7	2.8	2.2	3.4	3.1	2.6	3.6

Appendix 5: Substitutability – appendices

Appendix 5.1 Literature review – substitutability of recreational activities

This Appendix provides a more detailed review of past studies examining substitution.

The substitutability of recreational activities has been a field of research since the 1970s, focusing mainly on outdoor recreational activities. Within the field of substitutability research, most studies examine substitutability of a wide range of recreational activities (sometimes, but not always, including recreational fishing). A smaller number of studies have specifically examined the substitutability of recreational fishing and other activities (e.g. Shelby 1984, Shelby and Vaske 1991, Ditton and Sutton 2004, Hyun and Ditton 2006, Hinrichs et al. 2020).

Research into the substitutability of different activities initially focused on identifying and examining common clusters of recreational activities (Section 6.2.1). This led to identification of: the importance of clearly defining substitutability (Section 6.2.2), development of specific methods to examine substitutability (Section 6.2.3), and understanding the factors that influence substitutability (Section 6.2.4). A small number of studies have applied these learnings to examine substitutability of recreational fishing (Section 6.2.5).

Early research examining substitutability of outdoor recreation, conducted in the 1970s and 1980s, often focused on identifying clusters of outdoor recreation activities that people undertook. For example, Yoesting (1975) asked people whether they participated in 45 different outdoor activities and used factor analysis to identify five common clusters of activities. This was often based on an underlying assumption that if people engaged in multiple activities, and these activities had common characteristics, the activities were likely to be substitutable with each other to some degree (Vaske et al. 1990).

However, later studies found that even if a person took part in a cluster of recreation activities, the different activities they participated in were not necessarily substitutes for each other. For example, Shelby (1984) found that many salmon fishers did not consider other outdoor activities they took part in to be equivalent substitutes for their salmon fishing, as they didn't provide similar benefits and satisfaction. Based on this, Shelby argued that activities assumed to be substitutes in previous studies should instead be considered 'alternatives' or 'complements' that provided differing experiences and benefits, rather than being directly substitutable for each other. Similarly, Vaske et al. (1990) found that turkey hunters rarely identified other outdoor activities they took part in as substitutes for their hunting, and concluded that while it is important to understand common clusters of activities people engage in, it is equally important to recognise they are often not substitutes for each other.

This recognition that the different recreational activities a person engages in are often not substitutes for each other led to development of a more complex field of research examining the substitutability of outdoor recreation activities. This has included developing definitions and typologies of substitution (Section 6.2.2), and methods for measuring substitutability (Section 6.3.3). Based on this, several factors that commonly influence substitutability of activities have been identified (Section 6.3.4).

Substitution is not a simple action, and recreationists commonly use multiple substitution strategies. For example, McCreary et al. (2019) found that people who recreated around Lake Superior responded to climate-induced constraints (e.g. poor weather) by using substitution strategies that included changing timing of recreation activities, sites used, gear used,

information sources accessed, and types of activity engaged in. Most substitution studies have focused on only one or two of this array of substitution activities with most focusing on substitution of sites (resources substitution) and of activities (activity substitution) (Brunson and Shelby 2004).

Definitions of recreation substitutability have evolved over time. In this study, the definition proposed by Brunson and Shelby (2004, p. 69) is used:

> *The term recreation substitutability refers to the interchangeability of recreation experiences such that acceptably equivalent outcomes can be achieved by varying one or more of the following: the timing of the experience, the means of gaining access, the setting, and the activity.*

This definition focuses on the idea of 'acceptably equivalent outcomes'. This means that a person may substitute activities that have differing benefits or qualities, but still overall provide equivalent outcomes. There is limited research examining what makes activities 'acceptable equivalents' (Brunson and Shelby 2004). Most define an acceptable equivalent activity as being one that provides a similar level – but not necessarily the same type – of satisfaction and benefits as the activity being replaced (Gentner and Sutton 2008, cited in Lovelock et al. 2018). Many studies have identified that it is common for people to report that there are few or no substitute activities that could provide the same benefit or satisfaction as the activity they are being asked to consider substitutes for (McCreary et al. 2019).

Where a person switches from one activity to another that provides a lower level of satisfaction or benefit, it is not considered a true substitute, but instead may be a complementary or alternative activity (Ditton and Sutton 2004). An alternative activity simply means another activity; a complementary activity is one that 'can potentially set up or introduce other leisure activities' (Harmon and Woosnam 2018, p. 424). This suggests the idea of one activity being a catalyst for others, or a 'gateway activity'. Very few studies have examined complementarity of activities.

This definition recognises that a person can use a range of substitution actions, and may use a mix of them. Whereas earlier definitions, such as that of Iso-Ahola (1986), focused on activities being able to meet 'motives, needs or preferences', Brunson and Shelby's definition focuses on 'acceptably equivalent outcomes' as this allows for the selection of substitute activities that may have different driving motivations or provide differing satisfaction – yet still be considered to provide, overall, equivalent outcomes even though these outcomes differ. They argued that the field of recreation substitutability research needed to continue investigating the relatively poorly understood question of what constitutes 'acceptable equivalence' and how this varies across different activities and individuals. They further argued that (p. 70):

> *The equivalence question is among the most fundamental issues that still confront substitutability researchers. What exactly must people substitute: A complete package of motives or benefits, or some subset of the complete package? Or is substitution simply a matter of choosing from a menu of remembered and imagined experiences likely to offer as much "fun" as the one that must be foregone? Research on this issue could offer valuable information not simply about substitutability but about recreation choice making in general.*

Generally, then, a substitutable activity is considered to be one that provides a similar level – but not necessarily the same type – of satisfaction and benefits as the activity being replaced (Gentner and Sutton 2008, cited in Lovelock et al. 2018). If a person changes to a replacement activity that provided a lower level of satisfaction or benefit, it can be considered a complementary or alternative activity, but not a true substitute (Ditton and Sutton 2004).

The idea of complementary activities has received relatively little attention, however recent studies have argued that rather than simply being another activity, it may be important to consider 'how one leisure activity can potentially set up or introduce other leisure activities' (Harmon and Woosnam 2018, p. 424). This suggests the idea of one activity being a catalyst for others, or a 'gateway activity'.

Multiple types of substitution have been identified, generally focusing on one or both of the factors that motivate the substitution, and/or the characteristics of the thing that is substituted (timing, resource and/or activity substitution).
Going beyond the overall definition of substitution, some substitution typologies have been developed. These are sometimes organised into types based on the factors motivating substitution, and sometimes based on the type of substitution strategy used.

The first approach is based on the idea that a person's willingness to substitute one activity for another may depend on the factors driving substitution (Lovelock et al. 2018). If a person is choosing to switch to a new activity simply because they want to, they may find a wider range of activities to be acceptable substitutes compared to one who feels forced to change activities, for example due to the original activity no longer being permitted or possible (Iso-Ahola 1986). Early substitution studies typically assumed a situation of 'forced substitution', in which a person had to change recreational activities due to an external constraint, such as a site being closed, regulations imposed, or overcrowding (Iso-Ahola 1986, Ditton and Sutton 2004, Harmon and Woosnam 2018). More recently, some studies have pointed out that forced substitution is not necessarily the most common reason for substitution. There can be many reasons for a person to 'abandon' an activity (also referred to as displacement, dropping out, disengagement, leisure discontinuation and lapsing). These include loss of interest in the activity, a more interesting or beneficial activity being identified, or social pressure (Harmon and Woosnam 2018, Lovelock et al. 2018). Additionally, some people actively seek to evolve the activities they participate in over time, with each activity they do acting as a stepping-stone to another more complex or challenging activity, and the change in activities enabling them to meet goals of personal growth or change (Harmon and Woosnam 2018). In this instance the purpose of finding a substitute may be to increase positive outcomes, rather than find equivalent outcomes (Harmon and Woosnam 2018). Substitution motivations also can be short-term or long-term: a person may temporarily substitute one activity for another when there is a constraint to doing the first; or may permanently switch from one to another (Brunson and Shelby 2004).

In this chapter, the focus is on voluntary substitution of activities by recreational fishers, rather than forced substitution. This is because the objective of examining substitutability was to shed light on the extent to which the social and economic benefits documented in other chapters of this report may be specific to fishing, versus being readily achieved by substituting another activity.

While this chapter mostly focuses on activity substitution (replacing one recreational activity with another), as noted earlier, this is one of a wider range of substitution behaviours. The three most common types of substitution behaviour are resource, temporal/strategic, and activity substitution. Activity substitution, the focus of this chapter, involves replacing one activity with another activity that has acceptably equivalent outcomes (Ditton and Sutton 2004).

Resource substitution involves changing the location of an activity or other aspects of the 'resources' being used. In fishing, this may involve changing fishing sites, species targeted, gear or skills used to fish in a different way (Ditton and Sutton 2004; Gentner and Sutton 2008; Oh et al. 2013; Murphy et al. 2019). However, different fishing sites are not always good substitutes for each other, with multiple studies finding that fishing experiences differ substantially across sites, as do cost and infrastructure availability (Shelby and Vaske 1991, Brunson and Shelby 1993, Hyun and Ditton 2006).

Temporal or strategic substitution involves changing the timing of an activity, or changing the method or gear/equipment used (Needham and Vaske 2013, McCreary et al. 2019). Temporal substitution is commonly discussed as a response to issues such as conflict between users of a site, overcrowding of a site, or poor weather conditions (McCreary et al. 2019). For example, during the COVID-19 lockdown of March to May 2020, Gundelund and Skov (2021) found that many fishers changed their fishing times from weekends to weekdays and from midday to early evening.

Measuring substitution

Methods used to measure substitutability can include the 'activity type', 'direct question' and 'observed action' approaches. The 'activity type' method involves recording the recreational activities a person participates in and identifying common clusters of activities. While it is now well recognised that co-occurrence of activities does not mean they are necessarily substitutes (e.g. Christensen and Yoesting 1977, Vaske et al. 1990), identifying these clusters can still provide useful insight into the range of activities that may be complements, alternatives, or substitutes.

In the 'direct question' method, a person is asked to identify substitutes for an activity by either listing alternative activities they feel would provide similar benefits and/or satisfaction (Vaske et al. 1990, Ditton and Sutton 2004, Needham and Vaske 2013), or selecting from a pre-set list of potential alternatives. Vaske et al. (1990) argued that an open-ended question was preferable, as it doesn't require a person to select from a long list of activities. However, open-ended questions also have limitations – in particular, providing a list of options helps reduce that risk that poor recall will limit the potential substitutes identified, and can produce a more complete data set identifying the extent to which a defined range of activities are considered substitutable, complements or alternatives. Using a pre-determined list of options also provides better ability to identify the attributes associated with a person finding an activity substitutable or not (Gentner and Sutton 2008).

Finally, the 'observed action' method involves observing actual patterns of recreational activity and choices made about which activity to engage in (e.g. Sutton et al. 2009, De Valck et al. 2016). A range of methods can be used to do this, from tracking licence use data (e.g. Hinrichs et al. 2020) to tracking activity using apps and other methods (e.g. De Valck et al. 2016), or surveys asking about participation choices over time. Relatively few studies have used this method approach, with most studies examining hypothetical choices about substitution rather than actual behaviour. Ditton and Sutton (2004) refer to these studies of hypothetical choice as examining views about 'substitutability' rather than actual substitution behaviour.

The methods described above emerged in the field of social psychology. Substitutability in recreation has also been examined in economic studies, through examining measures of demand and net benefits/welfare achieved from fishing (Gentner and Sutton 2008). This approach assumes that people make choices about substitution based on what will maximise utility/ benefit; it has many similarities to the social psychological approach (Gentner and Sutton 2008). Economic studies tend to focus more on net gain or loss of welfare, and less on the types of substitution choice made (e.g. type of activity chosen, or whether the person opts for temporal, resource, strategic or activity substitution).

Motivations for substitution

The factors causing a need or desire for substitution may themselves influence how willing a person is to substitute one activity for another: Lovelock et al. (2018) argued that it is just as important to understand the 'reasons for abandonment' of one activity as it is to understand the attributes of any substitute activity. As such, it is important to consider the circumstances a person is asked to consider potential substituting activities in. In particular, is it a circumstance

in which they feel forced to make a change, or in which they are able to freely choose? Iso-Ahola (1986) argued that the decision to substitute is a psychological process, and that (p. 367) 'perceived choice (or freedom) is the critical mediator of whether certain factors undermine or enhance one's willingness to substitute.' They believed that people who feel forced to substitute an activity will be less willing to do so, whereas those who feel the reason for the substitution is fair or appropriate will be more willing to substitute the activity. Despite this recognition, most studies have focused on the idea of forced substitution through actions such as new regulations or over-crowding – situations in which a person is actively or 'forcibly' constrained from participating in their usual activity and must decide whether to substitute it for another time, place or activity (Ditton and Sutton 2004). In fishing, this type of displacement could be triggered by change in personal health, in availability of people to fish with, availability of time, increased costs (e.g. through change in licence or permit requirements), or reduced access; fishers may respond to this by stopping fishing, fishing less often or spending less on fishing; these types of displacement may or may not be substituted by engaging in other activities.

Earlier studies typically assumed substitution was occurring due to an external constraint, such as a site being closed, or regulations imposed (Iso-Ahola 1`986, Harmon and Woosnam 2018). However, there can be many reasons for a person to 'abandon' an activity (also referred to as displacement, dropping out, disengagement, leisure discontinuation and lapsing). These include loss of interest in the activity, a more interesting activity being identified that may provide different or greater social or recreational benefit or outcomes, social pressure, physical constraints such as ability to access a site, and regulatory changes (Harmon and Woosnam 2018, Lovelock et al. 2018). A person may actively seek to evolve the activities they participate in over time, with a series of activities participated in, each acting as a stepping stone to another, and meeting goals of personal growth or change (Harmon and Woosnam 2018). In this instance the purpose of finding a substitute may be to increase positive outcomes, rather than find equivalent outcomes (Harmon and Woosnam 2018). There has been little to no systematic examination of why people may voluntarily choose to disengage from one activity and turn to another, according to Lovelock et al. (2018). Other chapters in this report consider reasons for disengagement from fishing, which contribute to this literature.

Substitution motivations can be short-term or long-term: a person may temporarily substitute one activity for another when there is a constraint to doing the first; or may permanently switch from one to another. As of 2004, most substitutability studies focused on shorter term substitution decisions, according to Brunson and Shelby (2004).

While this chapter does not examine motivations for substitution, it is nevertheless important to have a clear 'substitution context' to examine. The NRFS was not seeking to understand permanent changes or those imposed by changes in regulation. Instead, the objective of examining substitutability was to shed light on the extent to which the social and economic benefits documented in other chapters may be specific to fishing, versus benefits that could be achieved through engaging in a number of activities, of which fishing is only one. Therefore the focus was on voluntary substitution of activities by recreational fishers, driven by their personal preferences rather than by having to stop fishing. The way this was measured is described in the methods section of this chapter.

Substitution types

Recreation substitution is often classified into several types (Shelby and Vaske 1991, Gentner and Sutton 2008): resource substitution (substituting the resources used while undertaking the same activities), temporal/strategic substitution, and activity substitution. Some studies examined what mix of these strategies is used by recreationists, while others focus on understanding a particular form of substitution. For example, Hestetune et al. (2020) found that when anglers in Minnesota were faced with a need to change a planned fishing trip due to climatic variability, they were more likely to use resource substitution (changing fishing sites)

or activity substitution (undertaking an activity other than fishing), while temporal substitution in the form of rescheduling or cancelling a planned fishing trip was less preferred.

The NRFS predominantly examined activity substitution, however it is useful to briefly define resource and temporal substitution given there is interaction amongst differing types of substitution activity.

Resource substitution

Resource substitution is commonly discussed as changing the place in which a person does an activity. However, for an activity such as fishing, it can include changing any of the resources used in such a way as to allow the activity of fishing to continue, but in a different way. Fishers may change fishing sites, species targeted, gear or skills used to fish in a different way (Ditton and Sutton 2004; Gentner and Sutton 2008; Oh et al. 2013). For example, Murphy et al. (2019) found that when changes were made to fishing rules, many fishers responded by substituting targeting an alternative species when saltwater fishing. However, location substitution is not always appropriate: more than one fishing study has found that the site-specific attributes of many fishing sites, both in terms of types of fishing experience (such as expected catch rates based on the characteristics of the site) and broader amenity, mean there may not be readily available substitutes; cost and infrastructure availability also vary considerably across fishing sites, affecting likelihood of substituting fishing location (Shelby and Vaske 1991, Brunson and Shelby 1993, Hyun and Ditton 2006). More specialised fishers have been found in some studies to be less willing to substitute sites or, in some cases, species targeted, as have older fishers (see for example Hyun and Ditton 2006, Tseng and Ditton 2007 cited in Needham and Vaske 2013). More generally, willingness to substitute sites will depend on the type of recreation involved, how site specific it is, and how many sites with suitable infrastructure and amenity are available in a given area (e.g. De Valck et al. 2016). For some types of recreational activity, spatial substitution is preferred to activity or temporal substitution: this has been found amongst highly specialised recreationists involved in winter activities such as skiing, for example (e.g. Cocolas et al. 2016, Orr and Schneider 2018), McCreary et al. 2019), and amongst those displaced by over-crowding at a previous site they used (Fefer et al. 2021).

Temporal and strategic substitutability

Temporal or strategic substitutability involves 'participating in the same activity and location, but involves adjustments such as rescheduling to different times or using alternative strategies to gain access' (Needham and Vaske 2013, p. 236-237). Temporal substitution is commonly discussed as a response to issues such as conflicts, overcrowding of a site, or poor weather conditions (McCreary et al. 2019). For example, during the COVID-19 lockdown of March to May 2020, Gundelund and Skov (2021) found that many fishers changed their fishing times, from weekends to weekdays and from midday to early evening, possibly indicating a form of temporal substitution that responded to changing needs to socially distance and changing time availability. Temporal and resource substitution are sometimes compared, for example through studies that examine which type of substitution is preferred in response to experiencing crowding of a recreation site (Fefer et al. 2021).

More recently, there has been focus on the idea of 'strategic substitution'. This is sometimes grouped with temporal substitution, and sometimes considered a separate form of substitution. McCreary et al. (2019, p. 25) define strategic substitution as 'a variety of behaviors (not related to spatial, temporal, or activity substitution) that allow recreationists to overcome uncertain environmental conditions or climate-related constraints' including 'using different gear, equipment, or methods (e.g., bow hunting and rifle hunting, tent camping and using back-country shelters) to overcome constraints or goal interference'. This definition has some overlap with the extended definition of resource substitution described earlier, suggesting a lack of consistency in how different types of substitution action are defined. Lovelock et al. (2018, p.

406) add to this the idea of substituting 'a more cerebral, social or institutional involvement' in an activity when usual physical participation in it is constrained, for example by ill health. This is related to the concept of 'informational coping' in which recreationists use new and different forms of information to design substitution strategies, particularly strategic ones (McCreary et al. 2019).

Activity substitution

Activity substitution is, simply, substitution of one activity for another. To be considered a genuine substitute, as per the definition of substitutability discussed earlier, the replacement activity needs to generate acceptably equivalent outcomes (Ditton and Sutton 2004). Many studies have identified that it is common for recreationists to report that there are few or no substitute activities that could provide the same benefit or satisfaction as the activity they are being asked to consider substitutes for (McCreary et al. 2019). This has been found in several studies examining recreational fishing and hunting, including studies examining stated preference and actual behaviour. For example:

- Hinrichs et al. (2020) found that over a seven year period, fewer than 2% of anglers moved from angling to hunting, based on analysis of licence data
- Ditton and Sutton (2004) found 51% of anglers could identify one or more activities that could provide similar or better benefits and satisfaction as fishing
- Needham and Vaske (2013) found that in multiple studies of hunters, around half or a little more of hunters could identify acceptable substitutes for hunting
- Hyun and Ditton (2006) found 59% of saltwater fishers could identify recreational activities that would provide similar satisfaction and enjoyment to saltwater fishing (most often freshwater fishing, hunting, camping and golf)
- Christensen and Yoesting (1977) found 45% to 67% of recreationists could substitute recreation activities for each other with 'similar satisfaction' across four activity types: hunting and fishing, games and sports, nature appreciation, and motorized activities. They also found that hunting and fishing were the group of activities for which activity substitution was least likely.
- Shelby (1984) found that amongst salmon fishers, 80% of fishers in one location said no non-fishing activity would be a substitute for salmon fishing, while 65% in a second location felt this way.
- Hammit et al. (2004) found that 91.5% of trout anglers would rather find another stream to fish if they could no longer fish in a given location, instead of switching to another activity.
- In a study examining whether lapsed fishers did in fact take up other activities after stopping fishing temporarily or permanently, Sutton et al. (2009) found that 27% of lapsed fishers in Queensland reported a decrease in leisure activity and 28% a decrease in leisure satisfaction after ceasing fishing, with the remainder increasing participation in other activities in response to reducing fishing activity. This suggests a potentially higher rate of substitutability of up to 72%, depending on whether the measure used of overall leisure satisfaction reflects a true measure of acceptably equivalent outcomes.

Factors that influence the substitutability of activities

Several studies have developed theory and/or collected evidence on the factors that may influence whether a person can find acceptably equivalent substitute activities. Common factors examined include:

- Specialisation to an activity
- Perceived benefits/outcomes of different activities

- Constraints on substitution such as accessibility and affordability of activities, and
- Socio-demographic characteristics.

Specialisation

Specialisation broadly refers to how much a person 'specialises' in, or is dedicated to or invested in, a particular recreational activity. Some studies refer to specialisation as a continuum with 'novices' or 'beginners' at one end who 'do not consider the activity to be a central life interest or show strong preferences for equipment or techniques' (Needham and Vaske 2013, p. 236), and at the other end 'more avid participants who are committed to the activity and use more sophisticated methods.'

Higher levels of specialisation are argued to be associated with a stronger preference for the activity being specialised in, and reduced willingness to substitute other activities for it (Ditton and Sutton 2004; Tseng 2009; Needham and Vaske 2013, citing Bryan 1977 and Buchanan 1985; Sutton and Oh 2015). However, the evidence for this hypothesis is mixed. The findings of some studies support the hypothesis that more specialised recreationists are less likely to substitute activities, while other studies have found little evidence of this (Needham and Vaske 2013, Oh et al. 2013). For example, some studies of anglers have found higher specialisation to be associated with lower willingness to substitute (e.g. Manfredo and Anderson 1987, Ditton and Sutton 2004, Sutton 2006), while others have not identified significant differences in willingness to substitute based on the level of specialisation to fishing (e.g. Choi et al. 1994, Sutton and Ditton 2005).

A key challenge is identifying how to measure specialisation, which is a multidimensional concept that includes 'behavioural, cognitive and affective components' (Needham and Vaske 2013, p. 238). Different studies measure specialisation in different ways, including by asking a person how important an activity is to their life, identifying whether a person engages in one activity or in many, measuring the amount of time and money invested in the activity, and measuring the extent to which a person has invested in development of specialised skills, techniques or equipment related to the activity (Iso-Ahola 1986, Gentner and Sutton 2008, Needham and Vaske 2013, Oh et al. 2013). There is a lack of consensus on how to measure each aspect of specialisation, or how to combine them to form a single multidimensional measure. For example, perceived importance has been measured in some studies using a direct question, and in others by examining whether a person belongs to a formal organisation associated with a recreational activity (Needham and Vaske 2013).

Previous studies suggest a number of potential measures of specialisation, with little consensus on how best to measure it. Table 6.5 summarises the measures considered for use in this study, and identifies the three that were ultimately used: concentration, importance, and a measure combining both of these into a measure of overall specialisation.

Table A5.1 Measures of specialisation

Measure	Description	How can this be measured for recreational fishers?
Concentration	Proportion of recreation focused on a single activity. The higher the proportion of recreation focused on a single activity, the greater the level of specialisation.	This was measured in this study. Specialisation was defined as being high if a person reported engaging in no or one recreational activity other than fishing; as moderate if they participated in 2 to 4 activities other than fishing, and a person was considered not specialised to fishing if they engaged in five or more recreational activities other than fishing.
Importance	Those who are specialised will rate the activity they specialised in as being more important than other recreational activities they engage in.	This was measured in this study. Specialised fishers are defined as those who rate fishing as more important than all other recreational activities they engage in. Non-specialised fishers are those who identify one or more other activities they engage in as being just as or more important than fishing.
Overall specialisation	This blends measures of the concentration of activity and the relative importance of activities.	In this measure, a specialised fisher is one who is either moderately or highly specialised in terms of concentration *and* rates fishing as more important than other recreational activities.
Investment – money	Those who spend more on an activity are considered to be more specialised in it.	This measure has limitations when applied to recreational fishing, as the variety of types of fishing means it is likely some people who spend considerable time fishing spend less on their fishing compared to others who find fishing less important to their life, but have opted to purchase expensive gear/equipment. Given this concern, this measure of specialisation was not considered suitable for use in this study.
Investment – skills, equipment, time	Those who invest more time in skills development, equipment, or in joining or contributing to activity-specific groups/clubs/ committees are considered more specialised.	These measures are potentially useful, but again problematic in fishing, where the multiple types of skills, gear, fishing groups and clubs a person can be engaged in mean it is difficult to consistently measure the investment being made in fishing. Given this, this measure of specialisation was not considered suitable for use in this study.

Motivations and perceptions of benefits/outcomes

The types of benefits and outcomes desired from a recreational activity (motivations), and perceptions about the likelihood of achieving these from different activities, will influence a person's willingness to substitute activities. Recreational fishers have often widely varying motivations for participating in fishing. Magee et al. (2018, p. 107), for example, identified five distinct fisher classes using Latent Class Analysis – social fishers, trophy fishers, outdoor enthusiasts, generalists, hunter-gatherers 'each with distinct and significantly different combinations of catch and non-catch-related motivations'.

Motivations (also called 'experience preferences') are often divided into 'activity general' motivations – benefits people can achieve from any type of outdoor activity, such as relaxation or being with friends – or 'activity specific' motivations – benefits that are specific to a given activity (Sutton and Oh 2015). Common 'activity general' motivations for recreation (whether

fishing or another activity) include wanting to relax, to be outdoors, to spend time with family or friends, or to have a sense of achievement or competence (Baumgartner and Heberlein 1979, Iso-Ahola 1986, Sutton and Oh 2015).

Activity specific motivations, in contrast, are specific to a given activity. Amongst recreational fishers, common 'activity specific' motivations include wanting to build skills in specific fishing techniques, seeking to catch a trophy fish, or wanting to catch fish to eat, amongst others (Ditton and Sutton 2004; Sutton and Oh 2015). Some argue that those who have more activity specific motivations are likely to find it harder to substitute other activities for fishing, compared to those with more activity general motivations. However, evidence for this hypothesis is mixed. For example, Ditton and Sutton (2004) found that, amongst fishers, willingness to substitute was negatively related to one activity-specific motivation - the challenge of fishing - but not another - trophy seeking.

Constraints on substitution

The availability of acceptable substitutes will influence whether a person can substitute one activity for another. In particular, a lack of readily available acceptable substitutes can be a significant constraint to substitution (Brunson and Shelby 1993). This suggests a need to understand whether potential substitute activities can be easily accessed in terms of their location, affordability, having other people to do the activity with, and the level of skills and training required to participate successfully in them (Sutton and Oh 2015). A person who can identify a range of readily available recreational activities to participate in may be more willing to substitute one activity for another compared to a person who feels there are few readily affordable and accessible alternatives they can access (Iso-Ahola 1986).

Socio-demographic characteristics

Socio-demographic characteristics are often found to be associated with differences in willingness to substitute one activity for another. Characteristics found to be important in past studies include age, gender, education, income, size and life stage, amongst others (Ditton and Sutton 2004, Gentner and Sutton 2008).

Substitutability of recreational fishing: findings of previous studies

Studies examining the substitutability of recreational fishing have used a range of methods, and focused on varied countries and regions, types of fishing (e.g. freshwater, saltwater, shore-based or boat-based fishing), and target species (some studies examine all fishing in a given location irrespective of species targeted, while others focused on a specific target species such as salmon and trout).

One of the most common methods used in studies of the substitutability of recreational fishing for other activities has been to conduct surveys or interviews in which fishers are asked to describe activities that could provide similar levels of benefit and/or satisfaction to some or all of their fishing activities. The activities most commonly nominated include camping, hunting, golf and other sports, boating, SCUBA diving, hiking, surfing, water skiing, and swimming. However, even these most commonly nominated activities are often considered acceptable substitutes for fishing by only a small proportion of recreational fishers (Ditton and Sutton 2004, Gentner and Sutton 2008). In most studies, a significant proportion of fishers – between 40% and 80% depending on the study – have been unable to identify any substitute activities that they feel would have acceptably equivalent outcomes to fishing.

Similar findings have been identified in studies of hunters (Needham and Vaske 2013). Christensen and Yoesting (1977) found that of four common clusters of outdoor recreational activities - hunting and fishing; games and sports; nature appreciation; and motorized activities - activity substitution was least likely amongst the hunting and fishing group.

Studies that have examined actual substitution behaviour, rather than beliefs about likely substitutability, suggest possibly higher substitutability. In a study examining whether lapsed fishers took up other activities after stopping fishing temporarily or permanently, Sutton et al. (2009) found that 28% of lapsed fishers in Queensland reported a decrease in leisure satisfaction after ceasing fishing, and 27% a decrease in overall leisure activity. The remainder increased their participation in other activities in response to reduction in their fishing activity. This suggests a potentially higher rate of substitutability, of up to 72%, depending on whether overall leisure satisfaction is considered a measure of 'acceptable equivalence'.

Willingness to substitute other activities for fishing has been found to vary depending on factors including age, gender, length of time since stopping fishing, and fishing specialisation (Sutton et al. 2009). While the extent of specialisation amongst recreational fishers is not well studied, past studies suggest that older fishers with lower levels of formal education and high activity specific motivations are more likely to be specialised, while younger fishers with higher levels of formal education may be less likely to be specialised (Ditton and Sutton 2004). Greater specialisation to fishing sites, target species, or to consumptive aspects of fishing such as catching large numbers of fish, catching large fish, and catching to consume, have been associated with lower willingness to substitute amongst Texan anglers in the USA (Oh et al. 2013).

In addition to studies examining activity substitutability amongst recreational fishers, some studies have examined resource substitution amongst fishers. These have varying findings. For example, high willingness to substitute target species was found amongst women, younger fishers, more educated fishers, and those who are motivated to fish for 'trophy' catch in studies of saltwater anglers in Florida and Texas in the USA (Sutton and Ditton 2005). Willingness to substitute sites has been found to vary depending on level of connection to specific fishing sites, reasons for that connection, age, gender, income, boat ownership and importance of fishing (Hammit et al. 2004, Tseng and Ditton 2007).

Overall, the available evidence from past studies on substitutability of recreational fishing for other activities, and of one type or location of fishing for another, suggest that a significant cohort of recreational fishers may have few or no readily available substitutes. However, the evidence is also relatively limited, being based on a small number of studies that have used varying methods and examined different types of fishers and aspects of fishing.

Appendix 5.2 Recreational fishing clusters – detailed data tables

Table 5.2.1 Most common recreational activities undertaken by fishers and non-fishers, Stage 2 NRFS data – detailed, weighted data

		Fished in last 12 months				Fished 2-5 years ago				Fished more than 5 years ago				Never fished			
Weighted		N	Column N %	95.0% Lower CL	95.0% Upper CL	N	Column N %	95.0% Lower CL	95.0% Upper CL	N	Column N %	95.0% Lower CL	95.0% Upper CL	N	Column N %	95.0% Lower CL	95.0% Upper CL
Go bushwalking/hiking (0=no, 1=yes)	0	1856	42.1%	40.4%	43.7%	105	22.3%	18.2%	27.0%	864	44.1%	41.9%	46.3%	873	55.0%	52.6%	57.4%
	1	3385	57.9%	56.3%	59.6%	188	77.7%	73.0%	81.8%	1097	55.9%	53.7%	58.1%	714	45.0%	42.6%	47.4%
Go jogging/running (0=no, 1=yes)	0	2766	61.4%	59.7%	63.0%	152	42.3%	37.3%	47.7%	1083	55.2%	53.0%	57.4%	935	58.9%	56.5%	61.3%
	1	2475	38.6%	37.0%	40.3%	141	57.7%	52.3%	62.7%	878	44.8%	42.6%	47.0%	652	41.1%	38.7%	43.5%
Go bike riding (0=no, 1=yes)	0	2728	60.2%	58.6%	61.8%	154	43.2%	38.2%	48.6%	1146	58.4%	56.2%	60.6%	1022	64.4%	62.0%	66.7%
	1	2513	39.8%	38.2%	41.4%	139	56.8%	51.4%	61.8%	815	41.6%	39.4%	43.8%	565	35.6%	33.3%	38.0%
Play online games (0=no, 1=yes)	0	2640	50.6%	48.9%	52.2%	116	36.1%	31.1%	41.2%	837	42.7%	40.5%	44.9%	843	53.1%	50.7%	55.6%
	1	2601	49.4%	47.8%	51.1%	177	63.9%	58.8%	68.9%	1124	57.3%	55.1%	59.5%	744	46.9%	44.4%	49.3%
Go swimming (0=no, 1=yes)	0	2093	31.2%	29.6%	32.7%	112	24.2%	19.8%	28.9%	835	42.6%	40.4%	44.8%	853	53.7%	51.3%	56.2%
	1	3148	68.8%	67.3%	70.4%	181	75.8%	71.1%	80.2%	1126	57.4%	55.2%	59.6%	734	46.3%	43.8%	48.7%
Go surfing (0=no, 1=yes)	0	3353	61.2%	59.6%	62.8%	183	43.3%	38.2%	48.6%	1301	66.3%	64.2%	68.4%	1135	71.5%	69.3%	73.7%
	1	1888	38.8%	37.2%	40.4%	110	56.7%	51.4%	61.8%	660	33.7%	31.6%	35.8%	452	28.5%	26.3%	30.7%
Play sports with others (0=no, 1=yes)	0	2827	49.9%	48.2%	51.5%	167	41.4%	36.2%	46.5%	1169	59.6%	57.4%	61.8%	1075	67.7%	65.4%	70.0%
	1	2414	50.1%	48.5%	51.8%	126	58.6%	53.5%	63.8%	792	40.4%	38.2%	42.6%	512	32.3%	30.0%	34.6%
Gym/exercise classes (0=no, 1=yes)	0	2858	59.7%	58.1%	61.4%	141	33.8%	28.9%	38.8%	1034	52.7%	50.5%	54.9%	923	58.2%	55.7%	60.6%
	1	2383	40.3%	38.6%	41.9%	152	66.2%	61.2%	71.1%	927	47.3%	45.1%	49.5%	664	41.8%	39.4%	44.3%
Go camping (0=no, 1=yes)	0	1137	20.3%	19.0%	21.6%	122	32.4%	27.5%	37.3%	1128	57.5%	55.3%	59.7%	1083	68.2%	65.9%	70.5%
	1	4104	79.7%	78.4%	81.0%	171	67.6%	62.4%	72.2%	833	42.5%	40.3%	44.7%	504	31.8%	29.5%	34.1%
Go horse riding (0=no, 1=yes)	0	3840	63.5%	61.9%	65.1%	193	44.1%	38.7%	49.2%	1364	69.6%	67.5%	71.6%	1197	75.4%	73.3%	77.5%
	1	1401	36.5%	34.9%	38.1%	100	55.9%	50.5%	61.0%	597	30.4%	28.4%	32.5%	390	24.6%	22.5%	26.7%
	0	2649	60.8%	59.2%	62.4%	173	40.6%	35.6%	45.9%	1338	68.2%	66.1%	70.3%	1182	74.5%	72.3%	76.6%

Weighted		Fished in last 12 months				Fished 2-5 years ago				Fished more than 5 years ago				Never fished			
		N	Column N %	95.0% Lower CL	95.0% Upper CL	N	Column N %	95.0% Lower CL	95.0% Upper CL	N	Column N %	95.0% Lower CL	95.0% Upper CL	N	Column N %	95.0% Lower CL	95.0% Upper CL
Go canoeing/kayaking (0=no, 1=yes)	1	2592	39.2%	37.6%	40.8%	120	59.4%	54.1%	64.4%	623	31.8%	29.7%	33.9%	405	25.5%	23.4%	27.7%
Go 4-wheel driving (0=no, 1=yes)	0	1973	40.9%	39.2%	42.5%	169	40.1%	35.0%	45.4%	1278	65.2%	63.0%	67.3%	1154	72.7%	70.5%	74.9%
	1	3268	59.1%	57.5%	60.7%	124	59.9%	54.6%	65.0%	683	34.8%	32.7%	37.0%	433	27.3%	25.1%	29.5%
Do sports spectating (0=no, 1=yes)	0	2016	37.3%	35.7%	38.9%	128	36.9%	31.9%	42.1%	934	47.6%	45.4%	49.8%	916	57.7%	55.3%	60.1%
	1	3225	62.7%	61.1%	64.3%	165	63.1%	57.9%	68.1%	1027	52.4%	50.2%	54.6%	671	42.3%	39.9%	44.7%
Go rec shooting/hunting (0=no, 1=yes)	0	2918	53.8%	52.1%	55.4%	180	55.2%	50.0%	60.4%	1413	72.1%	70.0%	74.0%	1240	78.1%	76.1%	80.1%
	1	2323	46.2%	44.6%	47.9%	113	44.8%	39.6%	50.0%	548	27.9%	26.0%	30.0%	347	21.9%	19.9%	23.9%
Go golfing (0=no, 1=yes)	0	3306	54.7%	53.0%	56.3%	184	55.6%	50.2%	60.7%	1345	68.6%	66.5%	70.6%	1212	76.4%	74.2%	78.4%
	1	1935	45.3%	43.7%	47.0%	109	44.4%	39.3%	49.8%	616	31.4%	29.4%	33.5%	375	23.6%	21.6%	25.8%
Go clothes shopping (0=no, 1=yes)	0	2244	40.4%	38.8%	42.0%	84	27.3%	22.8%	32.2%	391	19.9%	18.2%	21.8%	465	29.3%	27.1%	31.6%
	1	2997	59.6%	57.9%	61.2%	209	72.7%	67.8%	77.2%	1570	80.1%	78.2%	81.8%	1122	70.7%	68.4%	72.9%
Do other physical activities (0=no, 1=yes)	0	3739	67.8%	66.2%	69.4%	188	55.1%	49.7%	60.1%	1415	72.2%	70.1%	74.1%	1251	78.8%	76.8%	80.8%
	1	1502	32.2%	30.6%	33.7%	105	44.9%	39.9%	50.3%	546	27.8%	25.9%	29.9%	336	21.2%	19.2%	23.2%

Table 5.2.2 Most common recreational activities undertaken by fishers and non-fishers, Stage 2 NRFS data – detailed, unweighted data

		Fished in last 12 months				Fished 2-5 years ago				Fished more than 5 years ago				Never fished			
Unweighted		N	Column N %	95.0% Lower CL	95.0% Upper CL	N	Column N %	95.0% Lower CL	95.0% Upper CL	N	Column N %	95.0% Lower CL	95.0% Upper CL	N	Column N %	95.0% Lower CL	95.0% Upper CL
Go bushwalking/hiking (0=no, 1=yes)	0	1856	35.4%	34.1%	36.7%	105	35.8%	30.5%	41.4%	864	44.1%	41.9%	46.3%	873	55.0%	52.6%	57.4%
	1	3385	64.6%	63.3%	65.9%	188	64.2%	58.6%	69.5%	1097	55.9%	53.7%	58.1%	714	45.0%	42.6%	47.4%
Go jogging/running (0=no, 1=yes)	0	2766	52.8%	51.4%	54.1%	152	51.9%	46.2%	57.6%	1083	55.2%	53.0%	57.4%	935	58.9%	56.5%	61.3%
	1	2475	47.2%	45.9%	48.6%	141	48.1%	42.4%	53.8%	878	44.8%	42.6%	47.0%	652	41.1%	38.7%	43.5%
Go bike riding (0=no, 1=yes)	0	2728	52.1%	50.7%	53.4%	154	52.6%	46.8%	58.2%	1146	58.4%	56.2%	60.6%	1022	64.4%	62.0%	66.7%
	1	2513	47.9%	46.6%	49.3%	139	47.4%	41.8%	53.2%	815	41.6%	39.4%	43.8%	565	35.6%	33.3%	38.0%
Play online games (0=no, 1=yes)	0	2640	50.4%	49.0%	51.7%	116	39.6%	34.1%	45.3%	837	42.7%	40.5%	44.9%	843	53.1%	50.7%	55.6%
	1	2601	49.6%	48.3%	51.0%	177	60.4%	54.7%	65.9%	1124	57.3%	55.1%	59.5%	744	46.9%	44.4%	49.3%
Go swimming (0=no, 1=yes)	0	2093	39.9%	38.6%	41.3%	112	38.2%	32.8%	43.9%	835	42.6%	40.4%	44.8%	853	53.7%	51.3%	56.2%
	1	3148	60.1%	58.7%	61.4%	181	61.8%	56.1%	67.2%	1126	57.4%	55.2%	59.6%	734	46.3%	43.8%	48.7%
Go surfing (0=no, 1=yes)	0	3353	64.0%	62.7%	65.3%	183	62.5%	56.8%	67.9%	1301	66.3%	64.2%	68.4%	1135	71.5%	69.3%	73.7%
	1	1888	36.0%	34.7%	37.3%	110	37.5%	32.1%	43.2%	660	33.7%	31.6%	35.8%	452	28.5%	26.3%	30.7%
Play sports with others (0=no, 1=yes)	0	2827	53.9%	52.6%	55.3%	167	57.0%	51.3%	62.6%	1169	59.6%	57.4%	61.8%	1075	67.7%	65.4%	70.0%
	1	2414	46.1%	44.7%	47.4%	126	43.0%	37.4%	48.7%	792	40.4%	38.2%	42.6%	512	32.3%	30.0%	34.6%
Gym/exercise classes (0=no, 1=yes)	0	2858	54.5%	53.2%	55.9%	141	48.1%	42.4%	53.8%	1034	52.7%	50.5%	54.9%	923	58.2%	55.7%	60.6%
	1	2383	45.5%	44.1%	46.8%	152	51.9%	46.2%	57.6%	927	47.3%	45.1%	49.5%	664	41.8%	39.4%	44.3%
Go camping (0=no, 1=yes)	0	1137	21.7%	20.6%	22.8%	122	41.6%	36.1%	47.3%	1128	57.5%	55.3%	59.7%	1083	68.2%	65.9%	70.5%
	1	4104	78.3%	77.2%	79.4%	171	58.4%	52.7%	63.9%	833	42.5%	40.3%	44.7%	504	31.8%	29.5%	34.1%
Go horse riding (0=no, 1=yes)	0	3840	73.3%	72.1%	74.5%	193	65.9%	60.3%	71.1%	1364	69.6%	67.5%	71.6%	1197	75.4%	73.3%	77.5%
	1	1401	26.7%	25.5%	27.9%	100	34.1%	28.9%	39.7%	597	30.4%	28.4%	32.5%	390	24.6%	22.5%	26.7%
Go canoeing/kayaking (0=no, 1=yes)	0	2649	50.5%	49.2%	51.9%	173	59.0%	53.3%	64.6%	1338	68.2%	66.1%	70.3%	1182	74.5%	72.3%	76.6%
	1	2592	49.5%	48.1%	50.8%	120	41.0%	35.4%	46.7%	623	31.8%	29.7%	33.9%	405	25.5%	23.4%	27.7%

Unweighted		Fished in last 12 months				Fished 2-5 years ago				Fished more than 5 years ago				Never fished			
		N	Column N %	95.0% Lower CL	95.0% Upper CL	N	Column N %	95.0% Lower CL	95.0% Upper CL	N	Column N %	95.0% Lower CL	95.0% Upper CL	N	Column N %	95.0% Lower CL	95.0% Upper CL
Go 4-wheel driving (0=no, 1=yes)	0	1973	37.6%	36.3%	39.0%	169	57.7%	52.0%	63.2%	1278	65.2%	63.0%	67.3%	1154	72.7%	70.5%	74.9%
	1	3268	62.4%	61.0%	63.7%	124	42.3%	36.8%	48.0%	683	34.8%	32.7%	37.0%	433	27.3%	25.1%	29.5%
Do sports spectating (0=no, 1=yes)	0	2016	38.5%	37.2%	39.8%	128	43.7%	38.1%	49.4%	934	47.6%	45.4%	49.8%	916	57.7%	55.3%	60.1%
	1	3225	61.5%	60.2%	62.8%	165	56.3%	50.6%	61.9%	1027	52.4%	50.2%	54.6%	671	42.3%	39.9%	44.7%
Go rec shooting/hunting (0=no, 1=yes)	0	2918	55.7%	54.3%	57.0%	180	61.4%	55.8%	66.9%	1413	72.1%	70.0%	74.0%	1240	78.1%	76.1%	80.1%
	1	2323	44.3%	43.0%	45.7%	113	38.6%	33.1%	44.2%	548	27.9%	26.0%	30.0%	347	21.9%	19.9%	23.9%
Go golfing (0=no, 1=yes)	0	3306	63.1%	61.8%	64.4%	184	62.8%	57.2%	68.2%	1345	68.6%	66.5%	70.6%	1212	76.4%	74.2%	78.4%
	1	1935	36.9%	35.6%	38.2%	109	37.2%	31.8%	42.8%	616	31.4%	29.4%	33.5%	375	23.6%	21.6%	25.8%
Go clothes shopping (0=no, 1=yes)	0	2244	42.8%	41.5%	44.2%	84	28.7%	23.7%	34.0%	391	19.9%	18.2%	21.8%	465	29.3%	27.1%	31.6%
	1	2997	57.2%	55.8%	58.5%	209	71.3%	66.0%	76.3%	1570	80.1%	78.2%	81.8%	1122	70.7%	68.4%	72.9%
Do other physical activities (0=no, 1=yes)	0	3739	71.3%	70.1%	72.6%	188	64.2%	58.6%	69.5%	1415	72.2%	70.1%	74.1%	1251	78.8%	76.8%	80.8%
	1	1502	28.7%	27.4%	29.9%	105	35.8%	30.5%	41.4%	546	27.8%	25.9%	29.9%	336	21.2%	19.2%	23.2%

Table 5.2.3 Self-rated importance of different recreational activities, Stage 2 NRFS data, detailed - unweighted

	Fished in last 12 months				Fished 2-5 years ago				Fished more than 5 years ago				Never fished			
	Mean (unweighted)	Lower CI	Higher CI	Valid N	Mean	Lower CI	Higher CI	Valid N	Mean	Lower CI	Higher CI	Valid N	Mean	Lower CI	Higher CI	Valid N
Camping	6.8	6.7	6.9	4043	5.6	5.1	6.1	167	4.1	3.9	4.3	843	3.4	3.1	3.7	476
Four-wheel driving	5.4	5.3	5.5	3236	5.0	4.4	5.7	119	3.4	3.1	3.6	648	2.9	2.5	3.2	382
Bushwalking or hiking	5.1	5.0	5.2	3250	5.5	5.0	5.9	177	5.2	5.0	5.3	1047	5.1	4.9	5.3	649
Swimming	4.1	4.0	4.2	3202	4.9	4.5	5.4	179	4.5	4.3	4.7	1146	4.2	4.0	4.4	695
Other outdoor or sports activities	4.3	4.1	4.5	1364	4.6	3.9	5.4	93	4.3	4.0	4.6	530	3.4	3.0	3.9	309
Attending sports games/events as spectator	4.3	4.2	4.4	3407	4.8	4.3	5.3	169	4.5	4.3	4.7	1062	4.1	3.9	4.4	664
Recreational shooting or hunting (exc. Fishing)	4.8	4.6	4.9	2287	4.4	3.7	5.0	107	3.0	2.7	3.3	521	2.0	1.7	2.3	314
Clothes shopping	2.7	2.6	2.8	3249	4.7	4.3	5.2	204	4.9	4.8	5.1	1582	5.2	5.1	5.4	1082
Playing sports with others (e.g. tennis, football)	4.2	4.1	4.3	2362	4.8	4.2	5.4	119	4.2	3.9	4.4	762	3.6	3.3	3.9	469
Playing games stations/online games	3.1	3.0	3.2	2466	4.5	4.0	4.9	168	4.6	4.4	4.8	1068	4.4	4.1	4.6	659
Going to gym or exercise classes	4.4	4.2	4.5	2196	5.6	5.1	6.2	140	5.0	4.7	5.2	897	5.1	4.8	5.4	614
Kayaking or canoeing	5.0	4.9	5.1	2535	4.6	4.0	5.2	115	3.0	2.7	3.2	623	2.7	2.4	3.0	371
Cycling (road riding/ mtn biking)	3.9	3.7	4.0	2348	4.8	4.3	5.4	130	3.8	3.6	4.0	745	3.7	3.4	4.0	488
Jogging or running	3.6	3.4	3.7	2322	4.3	3.8	4.9	140	4.2	3.9	4.4	822	4.3	4.1	4.6	582
Playing golf	3.4	3.3	3.6	1926	4.2	3.5	4.8	103	3.2	3.0	3.5	614	2.7	2.3	3.0	365
Surfing	3.0	2.9	3.2	1674	3.8	3.2	4.5	105	2.9	2.7	3.2	607	2.3	2.0	2.6	373
Horse riding	2.1	2.0	2.3	1136	3.9	3.2	4.6	95	3.0	2.8	3.3	578	2.3	2.0	2.6	359

Table 5.2.4 Self-rated importance of different recreational activities, Stage 2 NRFS data, detailed - weighted

	Fished in last 12 months			
	Mean (unweighted)	Lower CI	Higher CI	Valid N
Camping	7.0	6.9	7.1	4043
Four-wheel driving	5.8	5.6	5.9	3236
Bushwalking or hiking	5.1	5.0	5.3	3250
Swimming	4.8	4.6	5.0	3202
Other outdoor or sports activities	4.8	4.4	5.0	1364
Attending sports games/events as spectator	4.7	4.5	4.9	3407
Recreational shooting or hunting (exc. Fishing)	3.9	3.7	4.1	2287
Clothes shopping	3.9	3.8	4.0	3249
Playing sports with others (e.g. tennis, football)	3.8	3.6	4.0	2362
Playing games stations/online games	3.5	3.3	3.7	2466
Going to gym or exercise classes	3.4	3.2	3.6	2196
Kayaking or canoeing	3.3	3.1	3.5	2535
Cycling (road riding/ mtn biking)	3.2	3.0	3.4	2348
Jogging or running	3.1	2.9	3.3	2322
Playing golf	3.0	2.8	3.2	1926
Surfing	1.7	1.6	1.8	1674
Horse riding	1.3	1.2	1.4	1136

Appendix 5.3: Specialisation to recreational fishing - detailed data tables

Table A5.3.1 Specialisation - concentration

Current fishers	n	Highly specialised: 0 or 1 activities other than fishing	*CI low*	*CI high*	Moderately specialised: Two to 4 activities other than fishing	*CI low*	*CI high*	Not specialised: 5 or more activities other than fishing	*CI low*	*CI high*
All	5200	6.4%	*5.8%*	*7.1%*	21.6%	*20.5%*	*22.7%*	72.0%	*70.8%*	*73.2%*
Fished <5 days in last year	580	7.8%	*5.8%*	*10.1%*	25.2%	*21.8%*	*28.8%*	67.1%	*63.2%*	*70.8%*
Fished 5-9 days in last year	474	2.7%	*1.5%*	*4.5%*	23.8%	*20.2%*	*27.8%*	73.4%	*69.3%*	*77.2%*
Fished 10-19 days in last year	1167	6.6%	*5.3%*	*8.1%*	22.8%	*20.5%*	*25.3%*	70.6%	*67.9%*	*73.2%*
Fished 20+ days in last year	2833	6.2%	*5.4%*	*7.1%*	19.8%	*18.4%*	*21.3%*	73.9%	*72.3%*	*75.5%*
Female	743	8.2%	*6.4%*	*10.3%*	23.4%	*20.5%*	*26.6%*	68.4%	*65.0%*	*71.6%*
Male	4457	6.1%	*5.4%*	*6.8%*	21.3%	*20.1%*	*22.5%*	72.6%	*71.3%*	*73.9%*
Aged 18-29	556	3.6%	*2.3%*	*5.4%*	11.5%	*9.1%*	*14.4%*	84.9%	*81.7%*	*87.7%*
Aged 30-44	1518	3.7%	*2.8%*	*4.7%*	17.4%	*15.5%*	*19.4%*	78.9%	*76.8%*	*80.9%*
Aged 45-59	1799	6.5%	*5.4%*	*7.7%*	23.0%	*21.1%*	*25.0%*	70.5%	*68.3%*	*72.6%*
Aged 60+	1226	10.4%	*8.8%*	*12.2%*	29.2%	*26.7%*	*31.8%*	60.4%	*57.6%*	*63.1%*
Born in Australia	4528	6.0%	*5.3%*	*6.7%*	21.1%	*19.9%*	*22.3%*	72.9%	*71.6%*	*74.2%*
Born overseas, English speaking country	463	9.5%	*7.1%*	*12.4%*	24.0%	*20.3%*	*28.0%*	66.5%	*62.1%*	*70.7%*
Born overseas, non-English speaking country	202	6.9%	*4.0%*	*11.1%*	25.7%	*20.1%*	*32.1%*	67.3%	*60.6%*	*73.5%*
Did not complete high school	624	10.3%	*8.1%*	*12.8%*	27.6%	*24.2%*	*31.2%*	62.2%	*58.3%*	*65.9%*
Highest qual. - high school	749	6.0%	*4.5%*	*7.9%*	25.0%	*22.0%*	*28.2%*	69.0%	*65.6%*	*72.3%*
Highest qual. – cert./dip.	2320	6.3%	*5.3%*	*7.3%*	22.0%	*20.4%*	*23.7%*	71.7%	*69.9%*	*73.5%*
Highest qual. - tertiary degree	1509	5.2%	*4.1%*	*6.4%*	17.0%	*15.1%*	*18.9%*	77.9%	*75.7%*	*79.9%*
Aboriginal/Torres Strait Islander	185	5.9%	*3.2%*	*10.1%*	20.0%	*14.7%*	*26.2%*	74.1%	*67.4%*	*80.0%*
Not Aboriginal/ Torres Strait Isl.	4982	6.4%	*5.8%*	*7.1%*	21.7%	*20.6%*	*22.9%*	71.9%	*70.6%*	*73.1%*
Lives in major city	1979	6.0%	*5.0%*	*7.1%*	20.5%	*18.7%*	*22.3%*	73.5%	*71.5%*	*75.4%*
Lives in regional/ rural area	2866	6.2%	*5.3%*	*7.1%*	22.6%	*21.1%*	*24.2%*	71.2%	*69.5%*	*72.8%*
ACT/NSW	1689	5.9%	*4.8%*	*7.1%*	20.0%	*18.2%*	*22.0%*	74.1%	*72.0%*	*76.2%*
VIC	930	5.3%	*4.0%*	*6.8%*	24.0%	*21.3%*	*26.8%*	70.8%	*67.8%*	*73.6%*
QLD	1074	6.1%	*4.7%*	*7.6%*	20.4%	*18.1%*	*22.9%*	73.6%	*70.9%*	*76.1%*
SA	410	9.5%	*7.0%*	*12.6%*	23.2%	*19.3%*	*27.4%*	67.3%	*62.7%*	*71.7%*
WA	394	6.9%	*4.7%*	*9.7%*	20.3%	*16.6%*	*24.5%*	72.8%	*68.3%*	*77.1%*
TAS	155	7.7%	*4.3%*	*12.7%*	31.6%	*24.7%*	*39.2%*	60.6%	*52.8%*	*68.1%*
NT	267	3.4%	*1.7%*	*6.1%*	19.5%	*15.1%*	*24.5%*	77.2%	*71.8%*	*81.9%*

Table A5.3.2 Specialisation - importance

	Current fishers	One or more non-fishing activities equally or more important than fishing (not specialised)	95.0% Lower CL	95.0% Upper CL	No non-fishing activities equally or more important than fishing (specialised)	95.0% Lower CL	95.0% Upper CL
All	5113	66.0%	64.7%	67.3%	34.0%	32.7%	35.3%
Fished <5 days in last year	570	76.5%	72.9%	79.8%	23.5%	20.2%	27.1%
Fished 5-9 days in last year	471	77.1%	73.1%	80.7%	22.9%	19.3%	26.9%
Fished 10-19 days in last year	1143	70.5%	67.8%	73.1%	29.5%	26.9%	32.2%
Fished 20+ days in last year	2788	60.0%	58.2%	61.8%	40.0%	38.2%	41.8%
Female	736	79.2%	76.2%	82.0%	20.8%	18.0%	23.8%
Male	4377	63.8%	62.4%	65.2%	36.2%	34.8%	37.6%
Poor/very poor	162	64.2%	56.6%	71.3%	35.8%	28.7%	43.4%
Just getting along	1410	66.2%	63.7%	68.6%	33.8%	31.4%	36.3%
Reasonably comfortable	2763	64.6%	62.8%	66.4%	35.4%	33.6%	37.2%
Very comfortable/prosperous	721	71.8%	68.5%	75.0%	28.2%	25.0%	31.5%
Aged 18-29	550	73.5%	69.6%	77.0%	26.5%	23.0%	30.4%
Aged 30-44	1497	69.7%	67.4%	72.0%	30.3%	28.0%	32.6%
Aged 45-59	1768	65.8%	63.5%	68.0%	34.2%	32.0%	36.5%
Aged 60+	1199	59.0%	56.2%	61.8%	41.0%	38.2%	43.8%
Born in Australia	4450	66.1%	64.7%	67.5%	33.9%	32.5%	35.3%
Born overseas, English speaking country	458	65.5%	61.1%	69.7%	34.5%	30.3%	38.9%
Born overseas, non-English speaking country	200	67.5%	60.8%	73.7%	32.5%	26.3%	39.2%
Did not complete high school	611	61.9%	58.0%	65.7%	38.1%	34.3%	42.0%
Highest qualification - high school	739	60.6%	57.1%	64.1%	39.4%	35.9%	42.9%
Highest qualification - certificate/diploma	2274	65.4%	63.4%	67.3%	34.6%	32.7%	36.6%
Highest qualification - tertiary degree	1492	71.2%	68.9%	73.5%	28.8%	26.5%	31.1%
Aboriginal or Torres Strait Islander	180	63.9%	56.7%	70.6%	36.1%	29.4%	43.3%
Not Aboriginal or Torres Strait Islander	4901	66.0%	64.7%	67.4%	34.0%	32.6%	35.3%
Did not complete high school	3138	66.4%	64.8%	68.1%	33.6%	31.9%	35.2%
Completed high school	1978	65.3%	63.1%	67.3%	34.7%	32.7%	36.9%
No certificate/diploma	2600	66.2%	64.4%	68.0%	33.8%	32.0%	35.6%
Certificate/diploma	2516	65.7%	63.9%	67.6%	34.3%	32.4%	36.1%
No tertiary qualification	3624	63.8%	62.2%	65.4%	36.2%	34.6%	37.8%
Has tertiary qualification	1492	71.2%	68.9%	73.5%	28.8%	26.5%	31.1%

One or more qualifications above year 10	4505	66.5%	65.2%	67.9%	33.5%	32.1%	34.8%
No qualifications beyond Year 10 high school	611	61.9%	58.0%	65.7%	38.1%	34.3%	42.0%
Lives in major city	1952	65.7%	63.6%	67.8%	34.3%	32.2%	36.4%
Lives outside major city	2816	66.5%	64.8%	68.2%	33.5%	31.8%	35.2%
ACT/NSW	1663	66.6%	64.3%	68.9%	33.4%	31.1%	35.7%
VIC	912	70.9%	67.9%	73.8%	29.1%	26.2%	32.1%
QLD	1056	63.8%	60.9%	66.7%	36.2%	33.3%	39.1%
SA	403	61.3%	56.5%	66.0%	38.7%	34.0%	43.5%
WA	391	66.8%	62.0%	71.3%	33.2%	28.7%	38.0%
TAS	151	58.9%	51.0%	66.6%	41.1%	33.4%	49.0%
NT	265	67.9%	62.1%	73.3%	32.1%	26.7%	37.9%

Table A5.3.3 Overall specialisation

	Current fishers	Moderate specialisation - fishing not highly important, but one of few recreational activities	95.0% Lower CL	95.0% Upper CL	Not specialised - fishing is of lower importance and they do many other activities	95.0% Lower CL	95.0% Upper CL	Specialised - fishing is more important than other activities, and they do few other activities	95.0% Lower CL	95.0% Upper CL	Moderate specialisation - fishing highly important, but do many activities	95.0% Lower CL	95.0% Upper CL
All	5113	13.3%	12.4%	14.3%	52.7%	51.3%	54.1%	14.4%	13.5%	15.4%	19.6%	18.5%	20.7%
Fished <5 days in last year	570	19.6%	16.5%	23.1%	56.8%	52.7%	60.9%	12.6%	10.1%	15.5%	10.9%	8.5%	13.6%
Fished 5-9 days in last year	471	16.8%	13.6%	20.3%	60.3%	55.8%	64.6%	10.0%	7.5%	12.9%	13.0%	10.1%	16.2%
Fished 10-19 days in last year	1143	14.8%	12.8%	16.9%	55.7%	52.8%	58.6%	13.9%	12.0%	16.0%	15.6%	13.6%	17.8%
Fished 20+ days in last year	2788	10.4%	9.3%	11.6%	49.6%	47.8%	51.5%	15.4%	14.1%	16.8%	24.5%	23.0%	26.2%
Female	736	18.8%	16.1%	21.7%	60.5%	56.9%	63.9%	12.8%	10.5%	15.3%	8.0%	6.2%	10.1%
Male	4377	12.4%	11.4%	13.4%	51.4%	49.9%	52.9%	14.7%	13.7%	15.8%	21.5%	20.3%	22.8%
Poor/very poor	162	16.0%	11.0%	22.3%	48.1%	40.5%	55.8%	22.2%	16.3%	29.1%	13.6%	9.0%	19.5%
Just getting along	1410	15.5%	13.7%	17.5%	50.6%	48.0%	53.2%	16.0%	14.2%	18.0%	17.8%	15.9%	19.9%
Reasonably comfortable	2763	12.6%	11.4%	13.8%	52.1%	50.2%	53.9%	13.7%	12.5%	15.0%	21.6%	20.1%	23.2%
Very comfortable/prosperous	721	11.8%	9.6%	14.3%	60.1%	56.4%	63.6%	11.4%	9.2%	13.8%	16.8%	14.2%	19.6%
Aged 18-29	550	7.5%	5.5%	9.9%	66.0%	62.0%	69.9%	7.5%	5.5%	9.9%	19.1%	16.0%	22.5%
Aged 30-44	1497	10.7%	9.2%	12.3%	59.1%	56.5%	61.5%	10.2%	8.8%	11.8%	20.0%	18.1%	22.1%
Aged 45-59	1768	14.7%	13.1%	16.4%	51.1%	48.7%	53.4%	14.5%	12.9%	16.2%	19.7%	17.9%	21.6%
Aged 60+	1199	17.3%	15.3%	19.6%	41.7%	38.9%	44.5%	22.1%	19.8%	24.5%	18.8%	16.7%	21.1%
Born in Australia	4450	12.9%	12.0%	14.0%	53.1%	51.7%	54.6%	13.8%	12.9%	14.9%	20.1%	18.9%	21.3%
Born overseas, English speaking country	458	15.5%	12.4%	19.0%	50.0%	45.4%	54.6%	17.9%	14.6%	21.6%	16.6%	13.4%	20.2%
Born overseas, non-English speaking country	200	17.0%	12.3%	22.7%	50.5%	43.6%	57.4%	15.5%	11.0%	21.0%	17.0%	12.3%	22.7%
Did not complete high school	611	16.9%	14.0%	20.0%	45.0%	41.1%	49.0%	20.5%	17.4%	23.8%	17.7%	14.8%	20.8%
Highest qualification - high school	739	14.5%	12.1%	17.2%	46.1%	42.6%	49.7%	16.1%	13.6%	18.9%	23.3%	20.3%	26.4%
Highest qualification - certificate/diploma	2274	13.5%	12.1%	15.0%	51.9%	49.8%	53.9%	14.6%	13.2%	16.1%	20.1%	18.4%	21.7%
Highest qualification - tertiary degree	1492	11.1%	9.6%	12.8%	60.1%	57.6%	62.6%	10.8%	9.3%	12.4%	18.0%	16.1%	20.0%
Aboriginal or Torres Strait Islander	180	10.6%	6.7%	15.7%	53.3%	46.0%	60.5%	15.6%	10.8%	21.4%	20.6%	15.1%	26.9%
Not Aboriginal or Torres Strait Islander	4901	13.5%	12.5%	14.4%	52.6%	51.2%	54.0%	14.3%	13.4%	15.3%	19.6%	18.5%	20.7%
Did not complete high school	3138	14.5%	13.3%	15.7%	52.0%	50.2%	53.7%	15.2%	14.0%	16.5%	18.4%	17.0%	19.7%
Completed high school	1978	11.6%	10.2%	13.0%	53.7%	51.5%	55.9%	13.1%	11.7%	14.6%	21.6%	19.9%	23.5%
No certificate/diploma	2600	13.7%	12.4%	15.1%	52.5%	50.6%	54.5%	14.5%	13.2%	15.9%	19.2%	17.8%	20.8%
Certificate/diploma	2516	13.0%	11.7%	14.4%	52.7%	50.8%	54.7%	14.2%	12.9%	15.6%	20.0%	18.5%	21.6%
No tertiary qualification	3624	14.3%	13.2%	15.4%	49.6%	47.9%	51.2%	15.9%	14.7%	17.1%	20.3%	19.0%	21.6%
Has tertiary qualification	1492	11.1%	9.6%	12.8%	60.1%	57.6%	62.6%	10.8%	9.3%	12.4%	18.0%	16.1%	20.0%
One or more qualifications above year 10 high school	4505	12.9%	11.9%	13.9%	53.7%	52.2%	55.1%	13.6%	12.6%	14.6%	19.9%	18.7%	21.1%
No qualifications beyond Year 10 high school	611	16.9%	14.0%	20.0%	45.0%	41.1%	49.0%	20.5%	17.4%	23.8%	17.7%	14.8%	20.8%
Lives in major city	1952	12.6%	11.2%	14.1%	53.1%	50.9%	55.3%	13.7%	12.2%	15.3%	20.6%	18.8%	22.4%
Lives outside major city	2816	14.2%	12.9%	15.5%	52.3%	50.5%	54.2%	14.3%	13.1%	15.6%	19.2%	17.8%	20.7%
ACT/NSW	1663	12.3%	10.8%	14.0%	54.3%	51.9%	56.7%	13.4%	11.8%	15.1%	20.0%	18.1%	21.9%

VIC	912	16.1%	13.8%	18.6%	54.8%	51.6%	58.0%	12.6%	10.6%	14.9%	16.4%	14.1%	19.0%
QLD	1056	11.6%	9.8%	13.7%	52.2%	49.2%	55.2%	14.4%	12.4%	16.6%	21.8%	19.4%	24.3%
SA	403	13.2%	10.1%	16.7%	48.1%	43.3%	53.0%	18.9%	15.3%	22.9%	19.9%	16.2%	24.0%
WA	391	14.1%	10.9%	17.8%	52.7%	47.7%	57.6%	13.3%	10.2%	16.9%	19.9%	16.2%	24.1%
TAS	151	21.2%	15.3%	28.2%	37.7%	30.3%	45.7%	18.5%	13.0%	25.3%	22.5%	16.4%	29.7%
NT	265	10.2%	7.0%	14.3%	57.7%	51.7%	63.6%	12.5%	8.9%	16.8%	19.6%	15.2%	24.7%

Appendix 5.4: Substitutability of recreational fishing and other activities - detailed data tables

Table A5.4.1 Proportion of current fishers who identified one or more substitute activities for fishing, by group – weighted data

		Unweighted n	Identified no substitute activities	95.0% Lower CL	95.0% Upper CL	Identified one or more substitute activities	95.0% Lower CL	95.0% Upper CL
Current fishers - all	1	5978	12.0%	10.9%	13.3%	88.0%	86.8%	89.1%
Fishing more important than other activities (1) or at least one other activity considered equally or more important than fishing (0)	0	3396	2.2%	1.7%	3.0%	97.8%	97.0%	98.3%
	1	1746	14.2%	10.9%	18.1%	85.8%	81.9%	89.1%
Specialisation measure: Specialised both in importance and concentration on fishing (11), fishing important but undertake many other activities (12), fishing not important but main activity undertaken (31), fishing not important and do many other activities (not specialised) (32)	11	739	45.8%	34.7%	57.3%	54.2%	42.7%	65.3%
	12	1007	6.4%	4.1%	9.8%	93.6%	90.6%	96.2%
	31	685	0.7%	0.3%	1.5%	99.3%	98.3%	99.6%
	32	2711	3.1%	2.2%	4.1%	96.9%	95.9%	97.8%
Specialisation – activities (1 = very specialised, 2 = moderately specialised, 3 = not specialised)	1	335	4.9%	2.6%	8.2%	95.1%	91.8%	97.4%
	2	1128	5.0%	3.3%	7.0%	95.0%	93.0%	96.7%
	3	3766	4.1%	3.2%	5.2%	95.9%	94.8%	96.8%
Fishing expenditure	< $1,000	1905	7.6%	6.4%	8.9%	92.4%	91.1%	93.6%
	$1,000 to $4,999	2425	15.3%	13.1%	17.9%	84.7%	82.1%	86.9%
	$5,000 to $9,999	1021	38.8%	31.0%	46.7%	61.2%	53.3%	69.0%
	$10,000+	523	55.8%	41.1%	69.4%	44.2%	30.6%	58.9%
Fishing days in last 12 months	1 to 4 days	171	9.2%	7.7%	10.8%	90.8%	89.2%	92.3%
	5 to 9 days	652	11.2%	9.1%	13.6%	88.8%	86.4%	90.9%
	10 to 19 days	552	7.1%	5.3%	9.5%	92.9%	90.7%	94.9%
	20 or more days	1357	41.3%	35.4%	47.6%	58.7%	52.4%	64.6%
Binary gender (male, female)	Male	3234	3.4%	2.1%	5.1%	96.6%	94.7%	97.8%
	Female	820	14.0%	12.6%	15.4%	86.0%	84.5%	87.3%
Age groups	Aged 18-29	5158	5.0%	2.2%	9.4%	95.0%	90.6%	97.8%

	Aged 30-44	598	2.5%	0.8%	5.3%	97.5%	94.7%	99.2%
	Aged 45-59	1701	20.2%	17.8%	22.7%	79.8%	77.3%	82.2%
	Aged 60+	2143	8.4%	7.1%	9.9%	91.6%	90.1%	92.9%
Country of birth	Born in Australia	5223	12.8%	11.6%	14.1%	87.2%	85.9%	88.4%
	Born overseas, English speaking	1429	2.3%	1.0%	5.4%	97.7%	94.6%	99.0%
	Born overseas, not English speaking	529	10.4%	3.9%	20.5%	89.6%	79.5%	96.1%
Highest level of formal educational attainment	Did not complete high school	218	46.7%	39.5%	54.0%	53.3%	46.0%	60.5%
	Year 10 of high school	765	8.7%	5.3%	14.3%	91.3%	86.5%	95.2%
	Certificate/diploma	876	6.1%	5.1%	7.4%	93.9%	92.6%	94.9%
	University degree	2671	15.4%	13.1%	17.9%	84.6%	82.1%	86.9%
Aboriginal/Torres Strait Islander	Not Aboriginal/ Torres Strait Islander	1665	11.8%	10.6%	13.0%	88.2%	87.0%	89.4%
	Aboriginal/Torres Strait Islander	232	17.6%	11.5%	25.0%	82.4%	75.0%	88.5%
Place of residence (urban, rural)	Urban	5702	7.4%	6.1%	8.8%	92.6%	91.2%	93.9%
	Rural	2229	16.6%	14.8%	18.6%	83.4%	81.4%	85.2%

Table A5.4.2 current fishers who identified one or more substitute activities for fishing, by group – unweighted data

		Unweighted n	Identified no substitute activities	95.0% Lower CL	95.0% Upper CL	Identified one or more substitute activities	95.0% Lower CL	95.0% Upper CL
Current fishers - all	1	5978	31.1%	29.9%	32.3%	68.9%	67.7%	70.1%
Fishing more important than other activities (1) or at least one other activity considered equally or more important than fishing (0)	0	3396	16.5%	15.3%	17.8%	83.5%	82.2%	84.7%
	1	1746	52.1%	49.8%	54.5%	47.9%	45.5%	50.2%
Specialisation measure: Specialised both in importance and concentration on fishing (11), fishing important but undertake many other activities (12), fishing not important but main activity undertaken (31), fishing not important and do many other activities (not specialised) (32)	11	739	60.4%	56.8%	63.8%	39.6%	36.2%	43.2%
	12	1007	46.1%	43.0%	49.2%	53.9%	50.8%	57.0%
	31	685	21.6%	18.6%	24.8%	78.4%	75.2%	81.4%
	32	2711	15.2%	13.9%	16.6%	84.8%	83.4%	86.1%

Specialisation – activities (1 = very specialised, 2 = moderately specialised, 3 = not specialised)	1	335	65.7%	60.5%	70.6%	34.3%	29.4%	39.5%
	2	1128	35.6%	32.9%	38.5%	64.4%	61.5%	67.1%
	3	3766	24.1%	22.7%	25.5%	75.9%	74.5%	77.3%
Fishing expenditure	< $1,000	1905	17.5%	15.9%	19.3%	82.5%	80.7%	84.1%
	$1,000 to $4,999	2425	32.8%	30.9%	34.7%	67.2%	65.3%	69.1%
	$5,000 to $9,999	1021	44.0%	41.0%	47.0%	56.0%	53.0%	59.0%
	$10,000+	523	48.6%	44.3%	52.8%	51.4%	47.2%	55.7%
Fishing days in last 12 months Binary gender (male, female)	1 to 4 days	171	33.3%	26.6%	40.6%	66.7%	59.4%	73.4%
	5 to 9 days	652	19.2%	16.3%	22.3%	80.8%	77.7%	83.7%
	10 to 19 days	552	17.9%	14.9%	21.3%	82.1%	78.7%	85.1%
	20 or more days	1357	24.8%	22.6%	27.2%	75.2%	72.8%	77.4%
	Male	3234	38.2%	36.5%	39.9%	61.8%	60.1%	63.5%
Binary gender (male, female) Age groups	Female	820	18.2%	15.6%	20.9%	81.8%	79.1%	84.4%
	Aged 18-29	5158	33.2%	31.9%	34.5%	66.8%	65.5%	68.1%
AgeGrps_29_30to44_4559_60plus Country of birth	Aged 30-44	598	27.8%	24.3%	31.4%	72.2%	68.6%	75.7%
	Aged 45-59	1701	31.6%	29.4%	33.8%	68.4%	66.2%	70.6%
	Aged 60+	2143	32.2%	30.2%	34.2%	67.8%	65.8%	69.8%
	Born in Australia	1429	30.0%	27.7%	32.4%	70.0%	67.6%	72.3%
aSOCIODEMGEOwhereborn2 Highest level of formal educational attainment	Born overseas, English speaking	5223	30.8%	29.5%	32.0%	69.2%	68.0%	70.5%
	Born overseas, not English speaking	529	32.7%	28.8%	36.8%	67.3%	63.2%	71.2%
	Did not complete high school	218	33.5%	27.5%	39.9%	66.5%	60.1%	72.5%
HighestQual1nohs2hs3cd4uni Aboriginal/Torres Strait Islander	Year 10 of high school	765	35.6%	32.2%	39.0%	64.4%	61.0%	67.8%
	Certificate/diploma	876	32.3%	29.3%	35.5%	67.7%	64.5%	70.7%
	University degree	2671	30.7%	28.9%	32.4%	69.3%	67.6%	71.1%
	Not Aboriginal/ Torres Strait Islander	1665	29.3%	27.2%	31.5%	70.7%	68.5%	72.8%
Aboriginal/Torres Strait Islander Place of residence (urban, rural)	Aboriginal/Torres Strait Islander	232	28.0%	22.5%	34.0%	72.0%	66.0%	77.5%
	Urban	5702	31.2%	30.0%	32.4%	68.8%	67.6%	70.0%
Place of residence (urban, rural) Current fishers - all	Rural	2229	32.0%	30.1%	33.9%	68.0%	66.1%	69.9%
	1		30.6%	29.1%	32.2%	69.4%	67.8%	70.9%

Appendix 6: Economic contribution - appendices

Appendix 6.1 Conversion from expenditure to output, by item

Once all expenditure items have been converted from expenditure to output by industry within each region, taking account of regional differences in industrial structure, the $12,690m of national expenditure becomes of $6,759m of output. Table A.6.1 summarises the resulting output after converting each expenditure item. Some categories of expenditure incorporate a higher proportion of output than others. For example, travel tends to have a high proportion as accommodation expenditure is necessarily provided locally, while capital items are often manufactured overseas or only a margin of their value is included (as with the holiday house example). What is left is the portion of expenditure which supports direct economic contribution.

Table A6.1 Output generated by different expenditure items

Category	**Item**	Expenditure ($m)	Output ($)	Output as a percentage of expenditure (%)
Capital	Equipment	241	101	42%
	Real estate[a]	1,318	40	3%
	Vehicle	796	279	35%
	Vessel	1,262	690	55%
Day travel	Household car	489	213	44%
	Non-fishing specific e.g. food	524	393	75%
	Other transport	400	400	100%
Fishing	Bait	394	205	52%
	Charter	282	282	100%
	Fishing club/mem	149	149	100%
	Competitions	161	161	100%
	Gear	854	359	42%
	Ice	205	205	100%
	Licence/permit	245	245	100%
	Media e.g. magazine	157	142	90%
	Other vessels	239	53	22%
	Personal protective equipment	396	186	47%
Overnight travel	Accommodation	560	560	100%
	Friend's car	88	38	43%
	Household car	796	342	43%
	Non-fishing specific	445	334	75%
	Other	151	151	100%
Vessel	Running costs	835	178	21%
	Insurance	382	38	10%
	Maintenance	631	631	100%
	Registration	270	270	100%
	Safety	224	94	42%
	Storage	194	19	10%
TOTAL	**TOTAL**	**12,690**	**6,759**	**53%**

[a]Only a small percentage of expenditure is included as direct output (3%), as most of the sale price represents a transfer of wealth in exchange for a valuable asset. This small proportion of new economic activity is generated for real estate agents in terms of business profits, taxes, wages and employment

Appendix 6.2 Strategic bias in expenditure survey data

As data in these studies was self-reported, the possibility that the growth in reported expenditure was a consequence of strategic bias in responses was explored. As noted in Chapter 3, strategic bias refers to the risk that survey participants will try to answer survey questions in a way they believe will achieve a desired outcome. Strategic bias is a well-documented issue in studies that use methods such as contingent valuation, stated preference studies, discrete choice experiments and choice modelling to place a value on a good, activity or service, as these types of economic valuation ask a person to state how much they prefer, choose or value particular options in theory, and there is a documented incentive for respondents to over-state how much they value things where they have an interest in achieving an outcome such as investment of public funds in an activity, or preservation of a particular site (see for example Lu et al. 2008, Burton 2010, Cheng et al. 2017, Meginnis et al. 2021). However, almost all investigations of strategic bias in economic studies focus on valuation studies that rely on a statement of preferences or rankings, rather than on reporting an amount of expenditure. There is clear evidence that, when asked to state preferences or rank alternatives, many survey respondents will seek to 'misrepresent their preferences and reveal evidence of strategic bias' (Meginnis et al. 2021). However, the same evidence has not been documented for studies in which a person is asked to document their recent expenditure on an activity using pre-specified categories of expenditure.

Most – although not all – previous studies measuring expenditure on recreational fishing have reduced risk of strategic bias through using survey recruitment methods that reduce likelihood of avid fishers with an incentive to over-state expenditure (for example, due to awareness of public debates around investment in recreational fishing and allocation of catch) 'opting in' to a survey. Almost all have used population-wide random phone calls to recruit samples, a method which reduces risk of recruiting participants with a high interest in public policy decision making related to recreational fishing. A brief review of articles in widely read fishing magazines and forums over the last 20 years did not identify evidence of an increase in articles or communication encouraging fishers to maximise estimates of expenditure or value as part of campaigns by the recreational fishing sector, something which might be expected if strategic bias was the primary factor leading to growing estimates of expenditure on fishing over time. There is therefore a lack of compelling evidence to suggest that the increase in expenditure observed over time based on previous studies is likely to primarily result from strategic bias amongst survey respondents. However, it remains possible that strategic bias has occurred and contributed in some way to the growth in expenditure documented.

The risk of strategic bias affecting results of *this* study is examined in detail in Chapter 3, in which the expenditure reported by fishers who heard about the survey via groups with greater likelihood to have an incentive to encourage over-stating of expenditure is compared to the expenditure reported by those recruited via whole of population surveys not focused specifically on fishing. This analysis found that, after adjusting for days spent fishing (which is highly correlated with expenditure on fishing), there was not a significant difference in the expenditure reported by these groups. Additionally, monitoring of recreational fishing social media sites and online forums during the period of data collection, as well as discussions with recreational fishing stakeholders, did not identify any evidence of concerted attempts to encourage fishers who over-state their expenditure on fishing when completing the survey.

Appendix 6.3 Expenditure survey questions

Table A6.2 Questions on recreational fishing expenditure included in Stage 2 survey

Type of expenditure or attribution	Time period	Response options
Overall, what would you estimate your HOUSEHOLD as a whole spent on recreational fishing in the last 12 months - EXCLUDING spending on any new vessels (e.g. boats/kayaks/jet skis and equipment for them like echo sounders), and overseas fishing trips)? ***Include*** *the costs of fishing gear, bait, fuel, licences/permits, boat maintenance, and travel-related spending (e.g. accommodation, meals out) related to all your household's fishing trips.* ***Exclude*** *big purchases of capital items like boats, vehicles, or boat equipment like echo sounders (we ask about that later)*	Last 12 months	Categories: No spending; $1-$99, $100-$499, $500-$999, $1,000-$1,999, $2,000-$2,999, $3,000-$3,999, $4,000-$4,999, $5,000-$5,999, $6,000-$6,999, $7,000-$7,999, $8,000-$8,999, $9,000-$9,999, $10,000-$14,999, $15,000-$19,999, $20,000 or more (please estimate how much to the nearest $5,000).
Spending on vessels (asked for each item): - Boat running costs (fuel/oil) - Maintenance of boat/canot/kayak/jey ski/trailer - Marina/mooring/storage fees for boat (or canoe/jetski etc) - Boat and/or trailer registration fees - Insurance for boat/kayak/ski/trailer/s, fishing gear - Boat safety gear e.g. flares, v-sheet, boat EPIRB	Last 12 months	Total amount spent (exact amount)
Attribution of vessel use For each vessel owned, survey participants were asked what % of use was for recreational fishing, and proportion of ownership if vessel co-owned with others.	Last 12 months	Percentage
Expenditure on fishing other than vessels or trip-related expenditure (asked for each item): - Fishing permits/licences - Fishing club membership fees - Fishing competition fees (e.g. entry fee) - Bait and berley - Fishing gear/trackle (rods, lines, lures, traps, diving gear, bins, knives, fish cleaning gear) - Personal safety gear and specialist clothing (fishing shirts, life jackets, personal EPIRB, wet weather gear etc) - Ice - Purchase of fishing books/guides/ magazines/ apps - Charter trip fees or fishing guide fees - Contribution to running costs of other people's boats/vessels person went fishing on	Last 12 months	Categories: $0, $1-$99, $100-$199, $200-$399, $400-$599, $600-$799, $800-$999, $1000-$1499, $1500-$1999, $2000 or more; if in top category person asked to estimate total spent in $
Spending on capital equipment (asked for each item): - Boat or other vessel e.g. jet ski, paddle craft - Other capital equipment e.g. echo sounder, GPS, electric trolling motor	Last 5 years	Total amount spent, % of use for fishing where item was not specific to use for fishing purposes

Type of expenditure or attribution	Time period	Response options
- Vehicle partly or largely chosen to enable use for fishing (% use for fishing also asked) - Holiday house/unit/caravan/shack/ other accommodation purchased largely to enable fishing (% use for fishing also asked)		
The next question asks where your spending typically happens on some key fishing-related items. Whether you bought an item directly from a shop or ordered it online, we're interested in knowing where the business you bought it from was located. This helps us identify which regions benefit from spending on recreational fishing. **WHERE did you buy this (select all that apply if your spending on something happened in more than one location) (asked for each item):** - Fishing permits/licences - Fishing club membership fees - Fishing competition fees (e.g. entry fee) - Bait, berley, ice, charter trip fees, fishing guide fees - Fishing and safety gear/tackle - Fishing books/magazines/subscriptions - Specialised clothing - Boat running costs (fuel, oil) - Marina/mooring/storage fees - Capital equipment	Last 12 months	Categories: In my town/city or near where I live; Near a place/places I went fishing (if they aren't the same as where you live); Somewhere else in Australia; Overseas; Unsure If person indicated 'Somewhere else in Australia' they were asked to specify first and second most common region they purchased it in, with each State/Territory specified, and the person asked to select whether it was in the capital city or other parts of the State/Territory.
Trip specific expenditure - Number of day and overnight fishing trips, and total days spent fishing on multiple day trips - Distance travelled - 5 most common day fishing locations (i) <50km from home, (ii) 50-99km from home, (iii) 100km+ from home - 5 most common locations for overnight trips - Proportion of trips for which fishing was the main purpose of the trip - Amount spent if using travel mode other than car from own household - Average amount spent per trip of different transport length on food, drink and non-fishing supplies - Amount spent on accommodation when on overnight trips - Proportion of food/drink bought near where fished	Last 12 months	Categories for distance travelled – day trips: <10km, 10-19km, 20-29km, 30-39km, 40-49km, 50-59km, 60-69km, 70-79km, 80-89km, 90-99km, 100-119km, 120-139km, 140-159km, 160-179km, 180-199km, 200km+ Overnight trips – people asked to estimate total kilometres travelled across all trips using household vehicle. If travelling in non-household vehicle, respondent asked to estimate contribution to vehicle costs, and amount spent on tickets etc.

Appendix 6.4 Expenditure survey weights

The average weight applied by region is shown in Table A6.3. The average weight applied ranged from 135 in regional NT and 149 in Darwin – reflecting the relative over-sampling of the Northern Territory compared to its proportion of the Australian population – to a high of 802 in Perth and 604 in Sydney, reflecting the relative under-sampling of major metropolitan areas relative to their proportion of the Australian population. Overall, the weights were generally smaller in areas with smaller samples, and larger in areas in which a larger sample was achieved. This was intended: ideally, weights that are larger should be based on a larger sample, as this reduces the risk of amplifying errors resulting from a bias in the sample responses.

Table A6.3 Sample of fishers who provided expenditure data, by region of residence

Region of usual residence	Sample size	Average weight
NSW – Sydney	1,101	604
NSW – Regional	1,800	295
Vic – Melbourne	919	582
Vic – Regional	929	276
Qld – Brisbane	739	697
Qld – Regional	1,314	382
SA – Adelaide	414	599
SA – Regional	332	392
WA – Perth	468	802
WA – Regional	320	497
Tas – Hobart	117	477
Tas – Regional	148	333
NT – Darwin	23	149
NT – Regional	428	135
ACT	184	432
National	9,236	451

Appendix 6.5 – Sensitivity testing

Table A6.4 Ranges tested in sensitivity testing

Characteristic	Benchmark categories	Benchmark – low/one extreme	Benchmark - recommended	Benchmark – high/ other extreme
Gender	Female Male	30% 70%	34% 66%	41% 59%
Age	18-29 30-44 45-59 60+	21% 23% 25% 31%	23% 27% 23% 27%	26% 33% 21% 20%
Avidity (days fished last 12 months)	1-4 days 5-9 days 10-19 days 20+ days	75% 18% 5% 2%	68% 17% 10% 5%	64% 17% 11% 8%
State/territory	NSW/ACT VIC QLD SA WA TAS NT	28% 16% 26% 10% 15% 4% 1%	30.5% 19% 24.5% 9% 13% 2.5% 1.5%	33% 21% 23% 8% 11% 2% 2%
Urban/rural	Major city Elsewhere	61.3% 38.7%	59.5% 40.5%	57.7% 42.3%
Household income	<$20,800 $20,800-$41,599 $41,600-$90,999 $91,000-$155,999 $156,000 or more	12.6% 15.4% 26.5% 33.5% 12.0%	11.4% 14.0% 24.5% 35.6% 14.5%	10.3% 12.8% 23.0% 37.4% 16.5%
Aboriginal/Torres Strait Islander	ATSI Other	3.7% 96.3%	4.4% 95.6%	5.2% 94.8%
Born in Australia, overseas	Born Aus Born o/s – English sp. Born o/s – non-English sp.	78.0% 11.2% 10.8%	79.5% 10.8% 9.7%	81.0% 9.3% 9.7%

Table A6.5 Sensitivity of total contribution to employment (fte) to weighting assumptions, 2018-19, by State/Territory

Region	Low	Mid	High	Low (%Δ)	High (%Δ)
NSW	26,355	32,493	36,937	-19%	14%
VIC	15,473	19,736	22,357	-22%	13%
QLD	21,935	23,602	23,333	-7%	-1%
SA	9,051	9,434	8,947	-4%	-5%
WA	8,523	9,380	9,256	-9%	-1%
TAS	2,749	2,670	2,621	3%	-2%
NT	1,598	2,524	3,548	-37%	41%
ACT	1,232	1,502	1,656	-18%	10%
National	86,917	101,342	108,655	-14%	7%

Table A6.6 Sensitivity of total economic contribution to national participation assumption, 2018-19, Australia

Assumed national participation in recreational fishing	Gross Domestic Product ($m)	Household Income ($m)	Employment (fte)

22%	12,674	7,788	111,476
20%	11,522	7,080	101,342
18%	10,370	6,372	91,208

Table A6.7 Sensitivity of total contributions to employment (fte) to weighting assumptions, 2018-19, by region

Region	Low	Mid	High	Low (%Δ)	High (%Δ)
NSW – Sydney	15,147	18,428	20,699	-18%	12%
NSW – Regional	11,208	14,065	16,239	-20%	15%
Vic – Melbourne	10,864	13,595	15,271	-20%	12%
Vic – regional	4,609	6,142	7,085	-25%	15%
Qld – Brisbane	8,575	9,025	8,689	-5%	-4%
Qld – Regional	13,360	14,577	14,644	-8%	0%
SA – Adelaide	5,203	5,301	4,953	-2%	-7%
SA – Regional	3,848	4,133	3,994	-7%	-3%
WA – Perth	4,854	5,387	5,357	-10%	-1%
WA – Regional	3,669	3,993	3,899	-8%	-2%
Tas – Hobart	1,084	1,120	1,086	-3%	-3%
Tas – Regional	1,665	1,550	1,535	7%	-1%
NT – Darwin	323	471	622	-31%	32%
NT – Regional	1,275	2,052	2,925	-38%	43%
ACT	1,232	1,502	1,656	-18%	10%
National	86,917	101,342	108,655	-14%	7%

Appendix 6.6 Review of previous studies on expenditure

Our findings strongly suggest that total real expenditure on fishing has increased over time, at a rate faster than would be caused by inflation and population growth alone. Adjusting for inflation and population growth, expenditure on fishing recorded in the 1999-00 National Recreational Fishing Survey would equate to $4 billion in 2018-19. Instead, expenditure of $12.7 billion was identified in this study for 2018-19 – suggesting a substantial increase real expenditure over a 20 year period. As the estimates are not completely comparable due to some differences in scope captured in the two studies, it is not possible to be confident in the exact magnitude of the growth, but it is likely to be in the order of growth of 200% to 300% in real expenditure per fisher during this 20 year period.

Table A6.8 Estimates of expenditure produced by different studies on recreational fishing in Australia, adjusted for inflation and population growth[4]

Scale	Year	2019 expenditure (adjusting for inflation and population growth
Australia	1999-00	$4000 million
	2018-19	$12690 million
NSW/ACT	1999-00	$1210 million
	2012	$2070 million
	2018-19	$4170 million
Vic	1999-00	$894.9 million
	2008-09	$3490 million
	2013-14	$3520 million
	2018-19	Not reported
Qld	1999-00	$746.87 million
	2019-20	$627.6 million
	2018-19	$3040 million
SA	1999-00	$279.82 million
	2018-19	$1340 million
WA	1999-00	$760.86 million
	2018	$2480 million
	2018-19	$1280 million
Tas	1999-00 NRFS	$95.13 million
	2012-13	$108.91 million
	2017-18	$168.23 million
	2018-19	$325 million
NT	1999-00 NRFS	$53.16 million
	2009-10	$56.01 million
	2018-19	$50 million
	2018-19 (this study)	$447 million

As noted earlier, this growth is not a consequence of a greater proportion of the population participating in recreational fishing, but instead reflects growth in the typical amount spent on fishing by a given fisher in a typical year. While this finding aligns with anecdotal evidence provided by businesses such as those in selling fishing bait and tackle, there is limited published data that can be drawn on to compare the magnitude of growth over time. The evidence that is available suggests the findings of this study are consistent with others that have found that the rate of growth in expenditure on outdoor recreation is growing at a faster rate than other spending, resulting in growth in the relative economic contribution of outdoor recreational activities such as fishing (see for example Highfill and Frank 2019, CRS 2019).

[4] Note: even with this adjustment, estimates are not generally comparable due to different scope of assessment across studies.

Appendix 7 Physical activity - appendices

Appendix 7.1 Exploratory Factor Analysis

Three factors were extracted for the physical activity preference scores (Table A7.1), which accounted for 54% of the overall variation in the data. The three factors have been labelled: 'Activity Oriented', 'Interactive Outdoor Oriented' and 'Urban Fitness/Visually Oriented/Gender Norm'. Our names for these variables were inspired by the types of activities that loaded onto each factor, as well as similarity of these factors to previous studies of outdoor physical activity preferences (Kloek *et al*., 2015; Evans and Rollins, 2015). For factor 3 - Urban Fitness/Visually Oriented/Gender Norm – a single name was not ascribed to this factor because the activities that align with this factor could relate to all three possible lifestyle choices, as will be discussed below.

Table A7.1 Principal axis factor analysis with pattern matrix results (regression coefficients) for the physical activity variables by each factor

Variable	Activity Oriented	Interactive Outdoor Oriented	Urban Fitness/Visually Oriented/Gender Norm Oriented
Attend Sports Games	0.53		
Bushwalk/Hike			-0.56
Camping		0.63	-0.43
Clothes shopping	0.48		
Cycle			-0.51
e-Games	0.62		
Four-wheel drive		0.62	
Fishing		0.35	
Golf	0.82		
Gym/ exercise class	0.47		
Horse riding	0.61		
Kayak/Canoe		0.37	-0.38
Play Other Sports	0.66		
Rec Shooting	0.55	0.41	
Running	0.47		-0.42
Surfing	0.49		-0.34
Swim			-0.53
Team Sport	0.68		
Only variables with regression co-efficient absolute values 0.3 and above are shown.			

The Activity Oriented factor had high factor loadings (>0.3) across 11 variables, after rotation, suggesting that those who score high on this factor have a wide range of physical activity interests and likely participate in various physical activities regularly. This factor includes activities that are individual-based as well as group or team-based; activities that involve watching as well as participating; and vigorous physical activities as well as moderate activities. Together, this indicates a general interest in physical activity itself as a prime motivator for individuals that score high on this factor, rather than social-, fitness-, or nature-based motives.

The Activity Oriented factor had five variables with higher female preference scores (attending sports games, clothes shopping, e-games, gym/exercise class, and horse riding), three with higher male preference scores (golf, recreational hunting and shooting and team sports) and two with relatively equal preference scores by gender (playing other sports and surfing). As such, the Activity Oriented factor should be considered gender neutral, with both men and women likely to align with this factor in relatively similar proportions.

The Interactive Outdoor Oriented factor had high factor loadings across five variables: camping, fishing, four-wheel drive, kayak and canoeing and recreational hunting and shooting. All of the variables that load onto this factor involve getting out into and interacting with nature, suggesting interaction with nature is a primary lifestyle motivator for people who score highly on this factor.

The Interactive Outdoor Oriented factor should be considered male oriented. It had higher preference scores among males for three activities (camping, fishing and recreational hunting and shooting) and similar preference scores among males and females for two activities (four-wheel driving and kayaking and canoeing). None of the activities that loaded onto this factor had higher preference scores among females.

The activities associated with this factor were rated among the highest in popularity overall across all activities, suggesting those individuals who score high on this factor have a strong affinity for this lifestyle and activities associated with this lifestyle. The activities that loaded onto this factor are broadly popular and as such not all individuals who score high on these variables can be expected to align with this factor. This is exemplified by two of the activities that loaded onto this factor, camping and kayaking and canoeing, cross-loading onto the Urban Fitness/Visually Oriented/Gender Norm factor, while recreational hunting and shooting, cross-loaded onto the Activity Oriented factor. The overall popularity of this factor also suggests that many women can be expected to also align with this lifestyle, but proportionally not to the same extent as men.

The Urban Fitness/ Visually Oriented/ Gender Norm factor had high factor loadings across seven variables: bushwalking, camping, cycling, jogging and running, kayaking and canoeing, surfing and swimming. Four of these activities (bushwalking, camping, jogging and running and swimming,) had higher preference scores among females and three of the activities (cycling, kayaking and canoeing and surfing) had relatively equal preference scores among females and males. As such this factor should be considered female oriented.

Most of the physical activities that load onto this factor are associated with an urban fitness setting, suggesting that fitness is a motivator for this lifestyle. However most of the activities that align with this factor are also consistent with the Visually Oriented recreational lifestyle identified by Evans and Rollins (2015), ie personal viewing and aesthetic appreciation of nature (bushwalking, camping, cycling, kayaking and canoeing, and running). The activities that align with this factor are also consistent with the female gendered stereotype identified by Wilde (2007), ie individual-based, non-contact, non-organised and non-competitive physical activities that require less strength (Wilde, 2007). It thus remains unclear whether the primary motivator for this lifestyle is fitness, aesthetic appreciation of nature, gendered stereotypes of women's engagement in physical activity, or some combination of these.

Appendix 8 Wellbeing and recreational fishing – appendices

Appendix 8.1 Literature review – wellbeing and recreational fishing

A8.1.1 Introduction

Recreational fishing is often described as having potential benefits for the health and wellbeing of those who participate in it (McManus et al. 2011). Despite widespread discussion of possible benefits, however, there is relatively little empirical evidence examining whether and when these benefits are achieved through going fishing. In 2011, McManus et al. found that only three published studies provided empirical evidence on health or wellbeing benefits of recreational fishing (McManus et al. 2011). A small number of studies, most since 2011, have examined the use of fishing as a specific health intervention to support the health and wellbeing of those who have experienced particular health problems, such as post-traumatic stress disorder. These have found evidence of positive health and wellbeing outcomes (Wheeler et al. 2020).

In addition to the limited evidence focused specifically on recreational fishing, there is a large and rapidly growing body of research examining the benefits of outdoor and nature-based activities for health and wellbeing. This literature has found consistent evidence that spending time outdoor in nature areas has positive benefits for health and wellbeing, with this finding confirmed across multiple studies in a wide range of settings. However, the many studies examining the health and wellbeing outcomes of engaging in outdoor, nature-focused activities have rarely examined the activity of fishing. For example, when identifying common nature-based interventions used to support health and wellbeing based on a review of the literature, recreational fishing was not one of the 27 types of nature-based intervention identified by Shanahan et al. (2019).

Despite this, the findings of this broader body of work suggest that fishing is likely to be amongst the many outdoor activities associated with benefits for health and wellbeing. For example, recreational fishing is an activity sometimes undertaken as part of many of these 27 types of intervention identified by Shanahan et al. (2019), including nature play, outdoor learning, wilderness/outdoor therapy, and outdoor education schemes.

A8.1.2 The importance of wellbeing

With spending on health increasing as a proportion of Australia's GDP from 8.3% in 2000-01 to 10% in 2017-18 (AIHW 2020), there is a clear need to invest in actions that can reduce ill-health and its costs for those who are ill, and more broadly for Australia's society and economy.

One of the ways to reduce the costs of poor health, both for the people who experience it and for society more broadly, is to invest in actions that help people maintain their long-term wellbeing. Studies have identified that those who have higher wellbeing live an average of seven to ten years longer – but with a lower healthcare spend across their lifespan compared to those with poorer wellbeing and shorter lifespan (Veenhoven 2008, Xu and Roberts 2010, Diener and Chan 2011). Multiple longitudinal studies have provided a strong body of evidence that those with higher wellbeing not only have better health outcomes, but are also more likely to engage in behaviours that are protective of good physical and mental health over time (Diener et al. 2018). Overall, there is strong and growing evidence that investing in maintaining and building wellbeing reduces rates of physical and mental ill-health, and associated costs of poor health such as time away from work and caring, and healthcare spending (McDaid and Cooper 2014).

This means that investing in wellbeing is an effective public health measure: investments in wellbeing have positive outcomes for health, the economy, and society as a whole, through reducing ill-health

and its negative consequences. In recognition of this, there is growing worldwide investment into strategies that maintain and grow wellbeing. These are occurring alongside an international movement that argues for a shift to measuring social progress using indicators of wellbeing, rather than economic growth. Multiple governments worldwide have implemented frameworks that seek to measure how wellbeing is changing, and to use this information to guide decision making:

> *…the generally growing awareness of the possibilities for well-being based measurement and policy, have led an increasing number of national and local governments to use happiness data and research in their search for policies that could enable people to live better lives. –* World Happiness Report, p.4 (Helliwell et al. 2015)

This is not just a symbolic shift involving producing indicators of wellbeing. Multiple governments have changed their budget decision making processes, shifting to 'wellbeing budgets' in which decisions on where and how to invest government funds are based on assessing the likely benefits of the investment for the wellbeing of the population or particular groups. Notable governments that have adopted the use of wellbeing budgeting include New Zealand, Canada and, within Australia the Australian Capital Territory (ACT Government 2020; What Works Centre for Wellbeing 2021; Jacquiery 2022). In mid-2022, the Australian government announced plans to use wellbeing budgeting processes in future budgets (Mizen 2022).

Growing evidence of the benefits of supporting wellbeing, and increasing consideration of wellbeing outcomes when making decisions about allocation of public funds, have led to high demand for information on 'what works' to support wellbeing. Many of the around 170,000 articles and books published worldwide on wellbeing in the 15 years to 2018 examined whether investing in different types of action works to support and build wellbeing (Diener et al. 2018).

A8.1.3 Understanding wellbeing

The term 'wellbeing' is used in many ways by different people. In this study, the term was used to refer to a person's subjective wellbeing. This section defines subjective wellbeing, and then examines what is known about how wellbeing 'works' through a person's lifespan. A brief overview is then given common measures of wellbeing, and the choices made about how to measure wellbeing in this study. Finally, common determinants of wellbeing are described, with a focus on identifying whether and how each may be something that is influenced by the activity of recreational fishing.

What is 'wellbeing' – and is 'illbeing' its opposite?

Wellbeing means, at it simplest, having a 'good life'. What it means to have a 'good life', however, has been the subject of ongoing debate in fields such as philosophy, sociology, psychology and economics. However, while early debate focused on whether wellbeing was about positive functioning and 'flourishing' in life, versus about feeling happy and satisfied, it is now generally agreed that wellbeing is a multidimensional concept that encompasses all of these aspects (Mansfield et al. 2020).

In this chapter, the overall definition of wellbeing used is that of the Center for Disease Control, who explain that, overall, there:

> *"… is general agreement that at minimum, well-being includes the presence of positive emotions and moods (e.g., contentment, happiness), the absence of negative emotions (e.g., depression, anxiety), satisfaction with life, fulfillment and positive functioning. … In simple terms, well-being can be described as judging life positively and feeling good."* (CDC 2018)

This definition focuses on how a person is experiencing their life – which is usually referred to as a person's subjective wellbeing. Subjective wellbeing is also sometimes referred to as being either

equivalent to, or closely related to, a person's quality of life, health related quality of life, happiness, or life satisfaction, amongst others (CDC 2018, Mansfield et al. 2020).

Subjective wellbeing is measured and understood very differently to objective measures of wellbeing. Objective assessments of wellbeing are made by measuring some observable characteristic of a person, household or community that is believed to be an indicator of their wellbeing. This might for example involve tracking longevity, wealth, income, formal educational qualifications, or quality of housing (Wiseman & Brasher, 2008). Common to all objective measures of wellbeing is that they measure factors known to be determinants of a person's quality of life (e.g. income), based on the assumption that these are useful indicators of the person's underlying wellbeing. Subjective measures, in contrast, ask people to provide an assessment of their own wellbeing, and usually enable them to consider the things important to them when making that assessment (Cummins et al., 2003).

When people discuss recreational fishing having an effect on wellbeing, they usually describe effects that are related to subjective wellbeing – things such as feeling happier, enjoying life, or finding meaning and challenge in life. Recreational fishing is not usually described as changing a person's income or wealth (except in potentially reducing wealth through spending on gear and boats), their education or lifespan. Subjective wellbeing measures were therefore considered more appropriate for the NRFS and were examined in this study. From this point, the term 'wellbeing' is only used to refer to subjective wellbeing.

Wellbeing measures examine what is going well in a person's life, or what they find satisfying or good about their life. Sometimes people contrast wellbeing with 'illbeing', although illbeing is typically poorly defined. Broadly speaking, wellbeing is not the opposite of illbeing, but is better understood as both reducing the risk of illbeing, and providing protection against the negative impacts of illbeing when it occurs (Ryan and Deci 2001) – in other words, having wellbeing protects against illbeing. This means there is not a simple continuum in which illbeing occurs at one end and wellbeing at the other. Some types of illbeing – such as feeling stressed, anxious, or a mental or physical illness – can in some cases co-exist with wellbeing (Winefield et al. 2012). For example, a person who has ongoing physical health problems causing limited mobility may be able to manage these in a way that enables them to still have a high quality of life. This person is simultaneously experiencing some aspects of 'illbeing' – an illness that limits movement and causes pain; but is managing to also maintain a high level of enjoyment of their life – in other words, they have a high level of wellbeing. This suggests a need to understand whether recreational fishing is associated with changes in (i) wellbeing and (ii) illbeing. Both were examined as part of the NRFS.

Wellbeing itself is often considered to have different dimensions or 'types'. Most commonly, wellbeing is considered to comprise three dimensions: hedonic, eudaimonic, and evaluative wellbeing. Hedonic wellbeing focuses on experiences of pleasure or happiness, and broadly focus on how much a person is enjoying life or experiences life positively, while eudaimonic measures focus on identifying the extent to which a person experiences meaning and purpose in their life, and evaluative measures examine how a person finds their life overall, without asking them to distinguish between hedonic and eudaimonic aspects of their wellbeing (Ryan and Deci 2001, Dolan et al. 2011, Jayawickreme et al., 2012, McMahan and Estes 2011, OECD 2013). In this study, the evaluative approach to wellbeing is focused on as this recognises that "wellbeing is probably best conceived as a multidimensional phenomenon that includes aspects of both the hedonic and eudaimonic conceptions" (Ryan and Deci 2001, p. 148).

How does wellbeing work?

Wellbeing does not operate as a simple scale in which a person can continue attaining ever higher levels of wellbeing 'units'. It is instead a more complex phenomenon, and it is important to review what is known about how it operates, and when and how wellbeing changes as a person experiences different life events.

For several decades, researchers measuring subjective wellbeing have observed an interesting phenomenon: levels of subjective wellbeing are surprisingly stable over time, both for an individual person, and across an entire population (Eid and Diener 2004, Cummins 2010, Cummins et al. 2014, Cummins and Wooden 2014, Richardson et al. 2016). When you repeatedly measure subjective wellbeing, it 'shows signs of homeostasis, meaning it always gravitates to one number (on average 75 on a scale of 1 to 100). The range around this average is also very small, suggesting that homeostasis is acting as a protective factor for wellbeing' (Tanton et al. 2012, p. iv). In other words, a person's wellbeing typically stays within a very small range over time. The only exception to this tends to be when significant life events occur, particularly stressful events, either in the form of an acute stress, or a long-term chronic stress that impacts the person over a long period of time with no resolution. These are typically associated with a decline in subjective wellbeing. However, subjective wellbeing then typically returns to previous levels once the stressor causing the decline has passed, or if the person is able to adapt to the stressor and reclaim their quality of life despite it.

The 'homeostatic theory of wellbeing' was developed to explain this phenomenon. This theory states that a person has a natural level of wellbeing, which they will return to and stay at under normal conditions, with very little variation in this level from day to day, month to month, or year to year. This is argued to occur due to a person's 'homeostatically protected mood' (HPMood) – meaning a person has a natural underlying mood that determines their normal level of wellbeing. This mood is very different to day to day rapidly varying emotions: a person who feels temporarily frustrated or stressed will not experience change in their underlying mood (Richardson et al. 2016). This is reflected in low correlation of measures that examine 'point in time' feelings or emotions, versus those examining evaluation of life more generally, with the latter being reflective of subjective wellbeing (Fritjers 2020). Typically it takes significant events to shift subjective wellbeing away from the 'set point' it would normally sit at based on this underlying mood.

Evidence consistent with homeostasis theory has been identified across multiple longitudinal studies of subjective wellbeing (Cummins 2010, Cummins et al. 2014, Cummins and Wooden 2014, Richardson et al. 2016). Minor life events and day to day frustrations typically cause little to no change in a person's subjective wellbeing score over several years; in contrast, experiencing significant life events such as separation/divorce, loss of a close friend or family members, or employment loss, are commonly associated with significant change in wellbeing (Diener et al. 2013; Cummins and Wooden 2014). Tanton et al. (2012), for example, found that life events significantly likely to cause homeostatic failure included relationship breakdown, worsening of health, and reduction in leisure time, while also finding that the risk of homeostatic failure was reduced by the birth of children and by having a higher income.

After experiencing a stressor that reduces wellbeing, some people experience a temporary decline followed by recovery of wellbeing to normal levels. However, significant life events can also cause long-term shifts in wellbeing (Lucas 2007): some people experience long-term lower levels of wellbeing, a phenomenon called 'homeostatic defeat'. Homeostatic defeat occurs if something has such an impact on a person's life that their subjective wellbeing level declines to a point where it cannot readily, if ever, recover to the HPMood determined set-point. Homeostasis theory suggests that the risk of long-term decline in wellbeing (homeostatic defeat) will depend on factors including the person's level of wellbeing prior to experiencing challenges that triggered a decline in wellbeing, their access to resources that help them protect their wellbeing in the face of these challenges, and the 'cumulative level of challenge' experienced by that person (Cummins and Wooden 2014, p. 230).

What does this mean for understanding the potential effect of recreational fishing for wellbeing? Homeostasis theory suggests that recreational fishing, on its own, is unlikely to be the type of major event that triggers a significant decrease or increase in wellbeing away from the homeostatic level. However, it also suggests that having access to resources that help protect wellbeing is critical to enabling a person to maintain their wellbeing at homeostasis, and to recovering wellbeing to this point after experiencing stressors that cause decline. The term 'resources' here can mean many things: for

example, having a high level of income, supporting social networks, and being able to engage in activities that bring enjoyment and satisfaction (Tanton et al. 2012, Newman et al. 2014).

A person will engage in a range of activities that help them to either remain at their homeostatic 'set point' of wellbeing, reducing the risk of homeostatic defeat, and/or that help them to recover their level of wellbeing when it has shifted away from its normal level due to a person experiencing stressors. Amongst these, leisure activities are well documented across many studies to be a key 'resource' people use to both maintain their wellbeing at healthy levels in normal times, and to help them build their wellbeing back towards normal levels when stressful events are experienced (Newman et al. 2014, Pomfret 2021). Further, there is growing evidence that the type of leisure activity chosen matters: highly passive leisure activities such as watching television are less beneficial for wellbeing compared to other leisure activities (Kuykendall et al. 2020). In particular, as reviewed in detail subsequently in this chapter, multiple studies have found that participating in outdoor and nature-based activities is associated with higher levels of wellbeing, suggesting these are particularly useful for protecting a person's homeostatic wellbeing.

Recreational fishing is an important leisure activity for many people, and involves outdoor and nature based activity. Given the strong evidence that leisure activities, and outdoor and nature-based leisure activities in particular, are important resources used to protect wellbeing, this suggests recreational fishing has potential to be an activity used to help maintain wellbeing in normal times, and to reduce the level of decline in wellbeing and support recovery back to normal levels when a person experiences stressful times.

Measuring wellbeing

The specific ways a person's subjective wellbeing is measured vary considerably, with a large number of wellbeing measures and tools developed and used worldwide over recent decades (Mansfield et al. 2020).

Measures of subjective wellbeing vary from single item measures that assess overall life satisfaction with a single question, to multiple item measures that examine different aspects or dimensions of wellbeing and then use answers to these multiple items to create an overall wellbeing scale.

There are important differences between 'wellbeing' focused measures and 'health' focused measures. For example, Griffiths et al. (2017) argued for the use of the Medical Outcomes Study Short-Form 36 Health Survey (SF-36) measure to examine health-related quality of life of those engaged in recreational fishing. This measure is commonly used to evaluate overall health status of a person, focusing on how well they are functioning in relation to different domains of health. However, this is a health-focused measures, and does not capture broader wellbeing. As a result, some studies comparing its use to measures that are focused more specifically on subjective wellbeing have found that wellbeing-focused measures better capture some aspects of wellbeing compared to the SF-36 tool (see for example Anderson et al. 1998). Specifically, the SF-36 does not capture some dimensions of wellbeing that form a core part of many subjective wellbeing measures, including satisfaction with financial situation, personal relationships and other aspects of life known to be important to having a high quality of life. This is important as it means SF-36 may measure absence of ill-being, but not necessarily presence of wellbeing. It may not identify where a person has managed to maintain a high quality of life despite having limitations in key areas of physical or mental health functioning (see for example Borg et al. 2010, who found differences in outcomes between the SF-36 and life satisfaction based measures of wellbeing in their study consistent with this).

Many measures of subjective wellbeing have been developed and validated: for example, Ong et al. found 56 subjective wellbeing scales used in multiple studies published between 2015 and 2019, and this likely reflects just a small subset of measures. There is ongoing debate about which measures of wellbeing are most appropriate. In particular, there is argument about the use of single item measures versus longer measures that use multiple questions to evaluate a person's wellbeing: VanderWeele et al. (2020a,b) argued that while longer measures are preferable where possible, shorter measures that

have been well validated are appropriate to use in situations in which there is limited space on a survey or other concerns about high levels of burden on survey participants. Ryff et al. (2020) disagreed, arguing that the complexity of wellbeing cannot be captured in a single survey question. Multiple studies have identified that single-item measures of life satisfaction (a common measure of wellbeing) are typically highly correlated with multi-item measures, and the differences between the two are subtle (Cheung and Lucas, 2014, Jovanovic 2016).

A range of subjective wellbeing measures have been used in studies examining connections between outdoor/nature-based recreation/exercise/activity and wellbeing. These have predominantly involved affect-based measures that focus on either measuring a person's experience of different emotions over a relatively short period of time before and after engaging in nature (Cartwright et al. 2018, Mansfield et al. 2020), or longer-term measures of satisfaction with life as a whole or aspects of life (e.g. Biedenweg et al. 2017, White et al. 2019). The ways measures are then analysed also vary: some examine mean wellbeing scores, while others group people into categories that identify the proportion with low wellbeing versus high wellbeing (White et al. 2019). Short-term measures of affect are problematic for understanding the types of wellbeing associated with long-term benefits such as longer life span and reduced incidence of ill health: a short term change in emotions is not always associated with longer term changes in wellbeing that are associated with these benefits. Given that the objective in this chapter is to understand changes in long-term wellbeing associated with more positive outcomes over a person's lifespan, short term affect measures were not used, and measures of longer-term wellbeing were focused on instead.

For this study, criteria for selecting measures of wellbeing were that they should:

- Be recognised and commonly used in the academic literature
- Be suitable for use in the general population, and ideally used in existing Australian surveys, demonstrating suitability for use amongst Australian recreational fishers
- Be relatively brief and able to be asked as part of a survey that included questions about multiple topics
- Include a measure of ill-being as well as measures of wellbeing.

Two measures of wellbeing, and one measure of illbeing, were used in this study. The measures of wellbeing used were (i) a single item measure – Global Life Satisfaction, and (ii) short multiple item measure – Personal Wellbeing Index. Each of these uses an evaluative approach to measuring wellbeing. The measure of illbeing used was the Kessler 6 psychological distress scale, which measures symptoms of generalised distress:

- Global Life Satisfaction (GLS): This single item wellbeing measure asks a person to rate their overall satisfaction with their life, using the question 'how satisfied are you with your life as a whole?" (OECD, 2013a). While having the limitation of being a single item measure, the GLS has been used in a large number of studies and found to be highly correlated with other longer measures assessing wellbeing, as well as to predict significant life outcomes (Cheung & Lucas, 2014). The GLS measure is easy to include in a survey, and lets every person evaluate their satisfaction with their life based on the aspects of life that matter most to them (Cummins, 2018). It is used in multiple long-term surveys in Australia.
- Personal Wellbeing Index (PERSONAL WELLBEING INDEX): The PERSONAL WELLBEING INDEX measures satisfaction with seven domains of life: (1) standard of living, (2) health, (3) achievement in life, (4) personal relationships, (5) safety, (6) community connectedness and (7) future security (The International Well Being Group, 2013). These domains were selected as each loaded independently onto a person's overall life satisfaction. The PERSONAL WELLBEING INDEX is widely used in Australia and internationally In some international applications, an eighth domain is also measured, examining spirituality; this is not included in all countries and typically not when using the measure in Australia. The average score across the different domains is used to create an overall index of wellbeing that

weights each domain equally (Cummins et al., 2003). The PERSONAL WELLBEING INDEX is measured in several Australian surveys.

- Kessler 6 Psychological Distress scale (K6): This measure is widely used, and its use described in multiple references (Andrews and Slade 2001). This measure asks 'In the last four weeks, how often have you felt (i) Nervous (ii) Hopeless (iii) Restless or fidgety (iv) So sad that nothing could cheer you up (v) That everything was an effort (vi) Worthless'. Response options for each statement are: None of the time (1), A little of the time (2), Some of the time (3), Most of the time (4), All of the time (5). The scores of the 6 items are summed, resulting in a score from 5-30. The K6 measure (or the related K10, which includes the K6 as six of its ten items) is used in a wide range of Australian and international surveys: usage in Australia includes the Regional Wellbeing Survey, the ABS National Health Survey, and the Household Income and Labour Dynamics in Australia (HILDA) survey, amongst others.

While representing only a small subset of the possible wellbeing (or illbeing) measures that can be examined, these three measures are all well validated, widely used, and their scoring and meaning well established. They are also relatively short, meaning they can be relatively easily incorporated into a survey instrument that contains questions about multiple topics, of which wellbeing is only one – a key requirement for the NRFS, where surveys asked about multiple topics.

Determinants of wellbeing

If recreational fishing has benefits for a person's wellbeing, it will likely do this by changing one or more of the factors known to influence, or 'determine' the level of a person's wellbeing. These are commonly described as determinants of wellbeing.

There are hundreds of potential determinants of wellbeing. However, amongst these hundreds, some determinants are known to have a particularly strong effect on a person's overall wellbeing, and as such are commonly measured as part of wellbeing frameworks. These are the person's (Wilkinson and Marmot 2003, Schirmer et al. In press):

- Physical and mental health
- Standard of living, encompassing both income/wealth and the standard of living accessible where a person lives in the form of safe and suitable housing
- Social and cultural capital: having strong social ties to friends, family and community, and being able to freely express identity and maintain strong ties to a person's culture
- Ability to achieve desired outcomes in life (often described as a person's human capital or self-efficacy)
- Access to leisure time and having work-life balance
- Safety and security, including the safety of the home and community they live in
- Access to infrastructure and services in the places they live and work
- Access to stable and functioning government and institutions.

Many definitions of wellbeing refer to these key determinants of wellbeing as part of the definition. For example, the Canadian Index of Wellbeing (2016) defines wellbeing as:

> *"The presence of the highest possible quality of life in its full breadth of expression focused on but not necessarily exclusive to: good living standards, robust health, a sustainable environment, vital communities, an educated populace, balanced time use, high levels of democratic participation, and access to and participation in leisure and culture." (p. 11)*

Engaging in recreational fishing has potential to influence some types of wellbeing determinants more than others. For example, it is unlikely that going fishing will change the extent to which a person lives in a fair and free country with a stable a functioning government. It is more likely that going

fishing may help a person experience benefits associated with leisure time (reviewed in the next section), and make new or reinforce existing social connections.

The next section draws on the extensive literature examining outdoor/nature recreation and wellbeing to identify the potential 'pathways to wellbeing' by which engaging in these activities may support wellbeing.

A8.1.4 Pathways between outdoor/nature recreation and wellbeing

There is growing interest in the specific role of outdoor recreation and spending time in nature areas or 'green spaces' on health and wellbeing. This forms part of a broader set of studies examining the role of quality leisure time in supporting a person's wellbeing (e.g. Kuykendall et al. 2020, Pomfret 2021). This area of research has emerged as a result of growing interest in understanding when and how outdoor and nature-based recreation can support wellbeing, as well as concerns about declining time spent exercising or spending time outdoors by the populations of many countries (Pretty et al. 2005). As Pretty et al. (2005) stated:

> *'A fitter and emotionally more content population would clearly cost the economy less, as well as reducing individual human suffering … increasing support for and access to a wide range of green exercise activities for all sectors of society should produce substantial economic and public health benefits.'*

There is substantial and growing evidence that nature-based leisure has benefits for a person's wellbeing. Nature based activities include spending time in 'green space' (land-based nature) and 'blue space' (in and near water and ocean areas) (see for example Barton et al. 2016, Britton et al. 2018, Gascon et al. 2017, Lovell 2016, Markevych et al. 2017, Twohig-Bennett and Jones 2018 Van den Berg et al. 2015). However, despite this strong and growing evidence that spending time in nature is associated with higher levels of wellbeing, there remains a lack of clear understanding of *how* being in nature improves wellbeing (Brymer et al. 2021).

This section reviews what is known about the potential pathways by which spending time outdoors and engaged in nature-based recreation may influence a person's wellbeing. This formed a basis for identifying potential ways recreational fishing may influence wellbeing, and was used to inform design of questions included in NRFS surveys and the analyses presented in this chapter.

The wide and varied literature examining the role of outdoor and nature-based activities on wellbeing uses a range of terms to describe the pathways by which these activities may influence wellbeing. These include the following:

- Positive emotions and experiences
- Restoration
- Specific health interventions
- Nature contact, nature connection and place connection
- Self-efficacy
- Social connection, sociability, community identification
- Physical and mental health
- Stewardship/improvement in environmental health

Each of these pathways is briefly described in this section, followed by identifying challenges and opportunities related to understanding the potential influence of outdoor/nature recreation on wellbeing, and commonly used approaches to measurement. It is important to note that several of the pathways involve similar or overlapping concepts. For example, studies examining the ways spending time outdoors may provide positive emotions and experiences often identify that these positive experiences involve nature or place connection, or positive social interaction.

Positive emotions and experiences

A widespread literature has identified that engaging in outdoor recreational and leisure activities is associated with positive emotions and experience (Capaldi et al. 2015). These range from overall increase in feelings of happiness and pleasure and decrease in negative emotions (e.g. Bielinis et al. 2019), to having more specific experiences such as (i) feeling a state of focus or clarity with similarities to states of meditation or mindfulness, described with terms such as experiencing 'flow' or being 'in the moment'; (ii) feeling a sense of sanctuary, respite or safety from stress, (iii) feeling spiritual connection; and (iv) gaining a 'sense of perspective' that is reassuring (Wheaton et al. 2020, Brymer 2021).

Most studies identifying these changes are short term in nature, typically comparing a person's mood before and after engaging in outdoor/nature recreation, or before and after other forms of nature connection such as seeing visual imagery or recordings of nature. These studies generally do not provide insight into whether longer term engagement with nature leads to longer term experience of consistently more positive emotions/moods, although there is evidence of long-term positive change from the few that have examined this (Capaldi et al. 2015).

Studies on motivations for recreational fishing often describe states such as those highlighted above, including being in the moment, sanctuary, and connection to nature (e.g. Cooke et al. 2018, Leong et al. 2020). This suggests that, similar to other outdoor/nature oriented activities, supporting positive feelings and mood may be an important pathway by which fishing contributes to wellbeing.

Restoration

Some of the positive emotions and experiences described in the previous section are associated with the concept of 'restoration', or a person having an experience that helps them restore their capacity to function. This is linked to theories such as Ulrich et al.'s (1991) Stress Reduction Theory and Kaplan and Kaplan's (1989) Attention Restoration Theory. These theories argue that spending time in nature provides time away from stressful urban/constructed environments and enables re-charging and restoration of a person's capabilities and psychological functioning. In addition to the multiple studies finding spending time in nature is associated with positive emotions suggestive of restoration (such as feeling more relaxed, restored, etc), some have specifically tested whether cognitive functioning changes as a result of spending time in nature. These have typically found a positive effect on cognitive functioning, consistent with the theory of nature having restorative effects (see for example van Hedger et al. 2019).

Theories of restoration are consistent with the language used in multiple studies examining motivations for recreational fishing. Common motivations for fishing include seeking to relax, recharge, 'get away' or to otherwise achieve things associated with restoration, suggesting that restoration may be an important pathway by which going fishing contributes to wellbeing (e.g. Elliott et al. 2018).

Coping with and recovery from ill-health

Some studies have examined the role of specific nature-based interventions in reducing severity of illness symptoms, or in increasing the rapidity of recovery. For example, Wheeler et al. (2020) found that military veterans with PTSD who participated in group outdoor activities – including a fishing-based activity – had significant reduction in PTSD symptoms at two weeks and four months post the intervention. Other examples include interventions to support recovery from cancer treatment, particularly using fly fishing (McManus et al. 2011, Poff et al. 2019). Amongst children experiencing mental health problems or with development and other disorders such as ADHD, spending time fishing has been found to achieve positive outcomes (McManus et al. 2011).

Nature contact, nature connection and place connection

Multiple theories exist regarding how spending time in natural areas, or in human-created outdoor 'green spaces' such as parks with planted vegetations, lead to wellbeing benefits. One of the best known is Edward O. Wilson's *Biophilia hypothesis*, which argues that humans have an 'urge to affiliate with other forms of life' (Wilson 1984, p. 85), and that this means spending time in nature is necessary for human wellbeing. This theory argues that simply spending more time in, or in close proximity to nature areas, is beneficial wellbeing. Evidence consistent with this theory has been found in multiple studies that have examined time spent outdoors in nature areas, as well as proximity of a person's residence to nature areas, presence of nature features within a short distance of a person's home, and having a view of nature from a building, are associated with higher wellbeing (see White et al. 2020 for a brief review).

Nature connection is also argued to lead to improved wellbeing through stimulating the positive emotions described earlier. For example, Brymer et al. (2021) found that being in nature was associated with positive feelings such as gratitude, awe, and feeling humbled, and that these experiences may help explain what nature connection may mean and how it may affect wellbeing (p. 394).

Nature contact (spending time in nature) and nature connection (feeling connected to or a sense of kinship with nature areas) are two separate concepts, although typically studied together and difficult to separate in terms of their effects. Capaldi et al. (2015) argued that there is evidence for positive wellbeing benefits from both: wellbeing may be supported by nature contact, even if the person doesn't feel strongly connected to nature or the specific nature place they spend time in; and by feeling a strong sense of nature connection, even if the person is not able to directly spend time in nature.

Strongly associated with the concept of nature connection, but somewhat distinct from it, is the idea of place connection or 'sense of place' as a pathway to wellbeing. This theory suggests that being able to spend time in specific places that have particular meaning, spiritual or cultural significance for a person, or to which they are personally attached or connected in other ways, is beneficial for wellbeing (Biedenweg et al. 2017, White et al. 2020).

Recreational fishing involves contact with nature areas in almost all cases, and can often involve a sense of nature connection. For many, recreational fishing is associated with a sense of connection to specific places (e.g. Voyer et al. 2015). Thus it is likely that these types of pathways are ones by which engaging in fishing may contribute to wellbeing.

Self-efficacy

Several studies suggest that 'green exercise' or recreating in nature has benefits for a person's self-efficacy (Pretty et al. 2005). As noted earlier, self-efficacy is a person's confidence in their ability to achieve desired outcomes in life and in their capabilities, and is a well-documented determinant of overall subjective wellbeing (Deci and Ryan 2001). In Pretty et al's (2005) examination of 10 different 'green exercise' activities, improvements in self-esteem – a common correlate of self-efficacy – were identified in nine out of ten, and the second largest improvement in self-esteem occurred in the activity that involved recreational fishing. A common motivation for fishing is desiring challenge or skills building (e.g. Cooke et al. 2018), suggesting potential for self-efficacy to be an important pathway to wellbeing.

Social connection, sociability, community identification

A growing body of work is finding that spending time in nature promotes healthy social connection and is associated with stronger and more positive social interactions and connections, particularly water-based nature experiences:

> ‘There is growing evidence that compared to greenspaces, blue spaces may be particularly important for promoting positive social relationships … blue space environments are ideal locations for people to spend high quality time with friends and family.’ (White et al. 2020, p. 5)

More broadly, engaging in sport and recreation activities has been found to support positive social relationships and reduce social tensions (Chalip et al. 1996), and living near nature areas has been found to act as a buffer against the negative wellbeing effects of social isolation and loneliness (Cartwright et al. 2018).

Social connection as a pathway to wellbeing may be particularly important for recreational fishing, as previous studies have found that social interaction/connection is commonly a motivation for going fishing, and that this motivation is more common for fishing than for many other outdoor nature-based recreation activities (see for example Elliott et al. 2018).

Physical and mental health

Multiple studies have found that physical exercise undertaken in nature areas has relatively greater benefits for physical and mental health compared to the same level and type of exercise undertaken in urban or indoor environments; this effect has been found across differing types of recreation/exercise, and different intensity/duration of recreation/exercise (Pretty et al. 2005). Other studies have found that living nearer nature areas is associated with greater participation in physical activity, and with longer duration of physical activity, and through this improved physical and mental health (White et al. 2020). While achieving physical exercise is not the most common motivation for recreational fishing, with social connection and relaxation more common reasons for doing fishing (Elliott et al. 2018), fishing can – as discussed in Chapter 8 - contribute significantly to meeting minimum physical activity guidelines.

Stewardship/improvement in environmental health

Some argue that outdoor recreation and activity may improve wellbeing through promoting greater engagement in pro-environmental behaviours (stewardship) and resulting improvements in environmental health (e.g. White et al. 2020). There is relatively little evidence regarding the nature of these relationships: for example Martin et al. (2020) found that there were complex associations between nature connectedness, nature contract, wellbeing and pro-environmental behaviours. Visiting nature once or more a week was associated with greater engagement in pro-environmental behaviours and nature connectedness with both pro-environmental behaviours and wellbeing.

Challenges and opportunities

While much is known about how engaging in nature-based recreation may support wellbeing, there are also many gaps in knowledge, and challenges in this literature to be addressed. In particular, studies have focused on a relatively narrow range of people; it is unclear ‘how much’ nature exposure is required to achieve a benefit from it; and most studies are based on Western cultural views of nature.

Many studies examining the links between green exercise/recreation and wellbeing focus on those who already spend time outdoors – who, as Pretty et al. (2005) noted, are often relatively physically fit and mentally healthy. This suggests a need to better address barriers to those with significant health and wellbeing issues participating in outdoor activities (Pretty et al. 2005), as well as to conduct further work examining specifically the effects of green exercise/recreation on those groups experiencing poor wellbeing or health. More generally, it suggests a need to actively encourage ‘social groups that are perceived to be lacking the personal, cultural or material resources to participate in the specific amount of physical activity required for health (and thus national economic) benefits’ to take part in green exercise/recreation (Tink et al. 2020).

Nature areas can be places of social exclusion, and a small but growing number of studies are actively examining who is able to achieve wellbeing benefits from engaging in outdoor leisure/recreation activities – and who is excluded from experiencing these benefits, either through being excluded from participation, or having negative experiences when seeking to recreate outdoors (e.g. Tink et al. 2020, Wheaton et al. 2020). For example, if a person feels unsafe when spending time in nature/outdoors, they are less likely to achieve wellbeing benefits.

A key group of interest is older people, whose engagement in leisure and recreation activities in general has been shown to decrease substantially as they age, while health and wellbeing have been found to be substantially higher amongst those elderly people who maintain engagement in a range of leisure and recreational activities (van der Pas and Koopman-Boyden 2009). Leisure and recreation activities that enable social interaction were found to be particularly important for elderly people by van der Pas and Koopman-Boyden (2009).

A small number of studies have also suggested that the wellbeing benefits of nature may be greater for those who are poorer financially compared to wealthier people, as well as for socio-economically disadvantaged populations more generally (see White et al. 2020 for a brief review). Others have found that wellbeing benefits are similar across all types of groups, irrespective of characteristics such as age or experience of long-term diagnosed health problems (White et al. 2019). This is important in the context of fishing, with some studies having identified that fishing is relatively more popular than other outdoor recreational activities amongst those who experience socioeconomic disadvantage (e.g. Elliott et al. 2018). Fishing is also identified in the literature as an outdoor activity that can often be more accessible for those who have a disability or long-term health problems compared to other outdoor activities (McManus et al. 2011).

There are varying findings about the role of a 'dose-response' relationship – in other words, whether the wellbeing levels increase as time spent outdoors increased, or whether the wellbeing benefits of spending time outdoors are not dependent on the quantity of time spent outdoors. White et al. (2019) round that it requires 120 minutes or more of weekly contact with nature before a measurable increase in average level of wellbeing was identified; and that beyond 200-300 minutes a week of contact, there was no further significant increase in subjective wellbeing. This suggests that there is not a simple linear relationship between nature-based recreation/activity and wellbeing.

More generally, there is some concern that studies examining the links between wellbeing and nature connection/'green exercise' are based on Western-culture centric assumptions that suggest nature areas exist for the supply of wellbeing to people, and fail to consider or incorporate other cultural ways of understanding and being with nature, and how people develop relationships with nature (e.g. Wheaton et al. 2020).

Appendix 8.2 Detailed data output– wellbeing and recreational fishing

8.2.1 Association between participation in recreational fishing and subjective wellbeing/psychological distress

Table A8.2.1 Association between (i) participation in recreational fishing and (ii) subjective wellbeing/psychological distress, 2018 RWS

		Did not go fishing in the last 12 months			Went fishing in the last 12 months			Last fished more than 12 months ago			Has never gone fishing		
2018 RWS, weighted data		Did not go fishing in the last 12 months	95.0% Lower CL	95.0% Upper CL	Went fishing in the last 12 months	95.0% Lower CL	95.0% Upper CL	Has fished more than 12 months ago %	95.0% Lower CL	95.0% Upper CL	Column N %	95.0% Lower CL	95.0% Upper CL
Personal Wellbeing Index	Low wellbeing (score <60)	30.9%	30.0%	31.7%	24.7%	23.1%	26.3%	29.3%	28.0%	30.6%	31.5%	30.2%	32.7%
	Typical or high wellbeing (score 60+)	69.1%	68.3%	70.0%	75.3%	73.7%	76.9%	70.7%	69.4%	71.9%	68.5%	67.3%	69.8%
Global Life Satisfaction	Low wellbeing (score <60)	26.4%	25.6%	27.3%	21.1%	19.7%	22.7%	25.1%	23.9%	26.3%	26.5%	25.3%	27.7%
	Typical or high wellbeing (score 60+)	73.6%	72.7%	74.4%	78.9%	77.3%	80.3%	74.9%	73.7%	76.1%	73.5%	72.3%	74.7%
Kessler 6 Psychological Distress scale (K6)	Low distress (score of 6-12)	57.7%	56.7%	58.6%	57.2%	55.3%	59.0%	58.6%	57.2%	59.9%	57.8%	56.5%	59.2%
	Moderate distress (score of 13-18)	26.5%	25.7%	27.4%	26.9%	25.3%	28.6%	26.7%	25.5%	28.0%	25.8%	24.7%	27.0%
	High distress (score of 19-30)	15.8%	15.1%	16.5%	15.9%	14.6%	17.3%	14.7%	13.7%	15.7%	16.3%	15.4%	17.3%

Table A8.2.2 Association between (i) participation in recreational fishing and (ii) subjective wellbeing/psychological distress, 2019-20 NRFS

		Last fished 2-5 years ago (unweighted)			Went fishing in the last 12 months (weighted)		
2019-20 NRFS Stage 2 survey, unweighted data		Did not go fishing in the last 12 months	95.0% Lower CL	95.0% Upper CL	Went fishing in the last 12 months	95.0% Lower CL	95.0% Upper CL
Personal Wellbeing Index	Low wellbeing (score <60)	32.1%	29.0%	35.3%	20.3%	19.4%	21.3%
	Typical or high wellbeing (score 60+)	67.9%	64.7%	71.0%	79.7%	78.7%	80.6%
Global Life Satisfaction	Low wellbeing (score <60)	36.7%	33.5%	40.1%	27.9%	26.9%	29.0%
	Typical or high wellbeing (score 60+)	63.3%	59.9%	66.5%	72.1%	71.0%	73.1%
Kessler 6 Psychological Distress scale (K6)	Low distress (score of 6-12)	65.1%	60.1%	69.9%	53.7%	52.0%	55.5%
	Moderate distress (score of 13-18)	22.9%	18.8%	27.4%	30.9%	29.3%	32.6%
	High distress (score of 19-30)	12.0%	9.0%	15.6%	15.3%	14.1%	16.6%

Table A8.2.3 Association between (i) participation in recreational fishing and (ii) subjective wellbeing/psychological distress, 2020 RWS

		Did not go fishing in the last 12 months			Went fishing in the last 12 months			1 to 5 years ago			More than 5 years ago			Never		
2020 RWS, weighted data		Did not go fishing in the last 12 months	95.0% Lower CL	95.0% Upper CL	Went fishing in the last 12 months	95.0% Lower CL	95.0% Upper CL	Column N %	95.0% Lower CL	95.0% Upper CL	Column N %	95.0% Lower CL	95.0% Upper CL	Column N %	95.0% Lower CL	95.0% Upper CL
Personal Wellbeing Index	Low wellbeing (score <60)	28.3%	28.3%	28.4%	20.6%	20.5%	20.6%	25.1%	25.0%	25.1%	30.1%	30.0%	30.1%	28.8%	28.8%	28.8%
	Typical or high wellbeing (score 60+)	71.7%	71.6%	71.7%	79.4%	79.4%	79.5%	74.9%	74.9%	75.0%	69.9%	69.9%	70.0%	71.2%	71.2%	71.2%
Global Life Satisfaction	Low wellbeing (score <60)	23.8%	23.7%	23.8%	17.5%	17.5%	17.6%	21.5%	21.5%	21.6%	25.2%	25.1%	25.2%	23.9%	23.9%	23.9%
	Typical or high wellbeing (score 60+)	76.2%	76.2%	76.3%	82.5%	82.4%	82.5%	78.5%	78.4%	78.5%	74.8%	74.8%	74.9%	76.1%	76.1%	76.1%
Kessler 6 Psychological Distress scale (K6)	Low distress (score of 6-12)	61.6%	61.5%	61.6%	63.3%	63.2%	63.4%	58.5%	58.4%	58.6%	62.5%	62.4%	62.5%	62.5%	62.5%	62.6%
	Moderate distress (score of 13-18)	24.0%	24.0%	24.0%	24.4%	24.4%	24.5%	27.9%	27.9%	28.0%	21.6%	21.5%	21.6%	23.7%	23.7%	23.8%
	High distress (score of 19-30)	14.4%	14.4%	14.5%	12.3%	12.2%	12.3%	13.5%	13.5%	13.6%	15.9%	15.9%	16.0%	13.7%	13.7%	13.8%

8.2.2 Regression modelling output

The following sections provide output from regression modelling conducted in SPSS 21. The output is provided in whole to enable replication of analyses. For each regression model, the following information is provided:

- Variables entered/removed – details what variables were included in modelling, including variables entered in different steps if applicable
- Model summary – provides information on overall model parameters
- ANOVA – provides data on results of ANOVA testing examining model fit, including F and p statistics
- Coefficients – summarises findings on the effect size and significance of each coefficient (independent variable) included in the modelling

Regression model 1: Dependent variable Global Life Satisfaction, independent variables income/gender/age/fishing/place of residence, Unweighted Stage 1 2018 RWS data

UNWEIGHTED 2018

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Household income, Urban/rural, Binary gender (female, male), Current fisher status, Age (individual years)[b]		Enter

a. Dependent Variable: Global Life Satisfaction

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.278[a]	0.077	0.077	20.081

a. Predictors: (Constant), Household income, Urban/rural, Binary gender (female, male), Current fisher status, Age (individual years)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	361408.093	5	72281.619	179.245	.000[b]
	Residual	4306370.960	10679	403.256		
	Total	4667779.053	10684			

a. Dependent Variable: Global Life Satisfaction

b. Predictors: (Constant), Household income, Urban/rural, Binary gender (female, male), Current fisher status, Age (individual years)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	46.872	1.063		44.107	0.000
	Binary gender (female, male)	-1.138	0.419	-0.026	-2.715	0.007
	Current fisher status	3.085	0.467	0.063	6.613	0.000
	Urban/rural	1.318	0.408	0.031	3.230	0.001
	Age (individual years)	0.271	0.012	0.217	22.061	0.000
	Household income	1.217	0.061	0.189	20.024	0.000

a. Dependent Variable: Global Life Satisfaction

Regression model 2: Dependent variable Personal Wellbeing Index, independent variables income/gender/age/fishing/place of residence, Unweighted Stage 1 2018 RWS data

UNWEIGHTED

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Household income, Urban/rural, Binary gender (female, male), Current fisher status, Age (individual years)[b]		Enter

a. Dependent Variable: Personal Wellbeing Index

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.326[a]	0.106	0.106	###########

a. Predictors: (Constant), Household income, Urban/rural, Binary gender (female, male), Current fisher status, Age (individual years)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	390530.727	5	78106.145	251.367	.000[b]
	Residual	3284993.298	10572	310.726		
	Total	3675524.025	10577			

a. Dependent Variable: Personal Wellbeing Index

b. Predictors: (Constant), Household income, Urban/rural, Binary gender (female, male), Current fisher status, Age (individual years)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	43.264	0.939		46.090	0.000
	Binary gender (female, male)	-0.083	0.370	-0.002	-0.224	0.823
	Current fisher status	2.721	0.411	0.062	6.616	0.000
	Urban/rural	1.953	0.360	0.052	5.424	0.000
	Age (individual years)	0.245	0.011	0.221	22.616	0.000
	Household income	1.421	0.054	0.247	26.456	0.000

a. Dependent Variable: Personal Wellbeing Index

Regression model 3: Dependent variable Psychological distress, independent variables income/gender/age/fishing/place of residence, Unweighted Stage 1 2018 RWS data

UNWEIGHTED

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Household income, Urban/rural, Binary gender (female, male), Current fisher status, Age (individual years)[b]		Enter

a. Dependent Variable: Kessler 6 Psychological Distress

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.418[a]	0.174	0.174	4.9171

a. Predictors: (Constant), Household income, Urban/rural, Binary gender (female, male), Current fisher status, Age (individual years)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	54526.483	5	10905.297	451.049	.000[b]
	Residual	258047.740	10673	24.178		
	Total	312574.222	10678			

a. Dependent Variable: Kessler 6 Psychological Distress

b. Predictors: (Constant), Household income, Urban/rural, Binary gender (female, male), Current fisher status, Age (individual years)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	21.770	0.260		83.634	0.000
	Binary gender (female, male)	-0.094	0.103	-0.008	-0.920	0.358
	Current fisher status	-0.290	0.114	-0.023	-2.536	0.011
	Urban/rural	-0.516	0.100	-0.047	-5.163	0.000
	Age (individual years)	-0.123	0.003	-0.381	-40.911	0.000
	Household income	-0.327	0.015	-0.196	-21.963	0.000

a. Dependent Variable: Kessler 6 Psychological Distress

Regression model 4: Dependent variable Global Life Satisfaction, independent variables income/gender/age/fishing/place of residence, Unweighted Stage 2 data

Stage 2 survey

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Household income, Place of residence (urban, rural), Binary gender (male, female), Current fisher status, Age (single years)[b]		Enter

a. Dependent Variable: Global Life Satisfaction
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.194[a]	0.038	0.037	1.959

a. Predictors: (Constant), Household income, Place of residence (urban, rural), Binary gender (male, female), Current fisher status, Age (single years)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1339.530	5	267.906	69.837	.000[b]
	Residual	34130.218	8897	3.836		
	Total	35469.749	8902			

a. Dependent Variable: Global Life Satisfaction
b. Predictors: (Constant), Household income, Place of residence (urban, rural), Binary gender (male, female), Current fisher status, Age (single years)

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	5.322	0.133		40.037	0.000
	Current fisher status	0.930	0.078	0.125	11.895	0.000
	Binary gender (male, female)	0.153	0.053	0.031	2.920	0.004
	Age (single years)	0.017	0.001	0.125	11.685	0.000
	Place of residence (urban, rural)	0.090	0.042	0.022	2.133	0.033
	Household income	0.000	0.000	-0.019	-1.828	0.068

a. Dependent Variable: Global Life Satisfaction

Regression model 5: Dependent variable Personal Wellbeing Index, independent variables income/gender/age/fishing/place of residence, Unweighted Stage 2 data

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Household income, Place of residence (urban, rural), Binary gender (male, female), Current fisher status, Age (single years)[b]		Enter

a. Dependent Variable: Personal Wellbeing Index
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.183[a]	0.034	0.033	17.15732

a. Predictors: (Constant), Household income, Place of residence (urban, rural), Binary gender (male, female), Current fisher status, Age (single years)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	89256.483	5	17851.297	60.642	.000[b]
	Residual	#########	8721	294.374		
	Total	#########	8726			

a. Dependent Variable: Personal Wellbeing Index
b. Predictors: (Constant), Household income, Place of residence (urban, rural), Binary gender (male, female), Current fisher status, Age (single years)

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	55.043	1.177		46.782	0.000
	Current fisher status	8.611	0.694	0.132	12.407	0.000
	Binary gender (male, female)	1.797	0.464	0.042	3.869	0.000
	Age (single years)	0.109	0.013	0.091	8.456	0.000
	Place of residence (urban, rural)	0.958	0.372	0.027	2.575	0.010
	Household income	-0.002	0.001	-0.019	-1.842	0.065

a. Dependent Variable: Personal Wellbeing Index

Regression model 6: Dependent variable Psychological distress, independent variables income/gender/age/fishing/place of residence, Unweighted Stage 2 data

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Household income, Place of residence (urban, rural), Binary gender (male, female), Current fisher status, Age (single years)[b]		Enter

a. Dependent Variable: Kessler 6 Psychological Distress
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.251[a]	0.063	0.062	4.45087

a. Predictors: (Constant), Household income, Place of residence (urban, rural), Binary gender (male, female), Current fisher status, Age (single years)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7317.666	5	1463.533	73.877	.000[b]
	Residual	#########	5507	19.810		
	Total	#########	5512			

a. Dependent Variable: Kessler 6 Psychological Distress
b. Predictors: (Constant), Household income, Place of residence (urban, rural), Binary gender (male, female), Current fisher status, Age (single years)

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	17.200	0.458		37.549	0.000
	Current fisher status	-0.974	0.272	-0.047	-3.585	0.000
	Binary gender (male, female)	-1.016	0.168	-0.080	-6.051	0.000
	Age (single years)	-0.073	0.004	-0.219	-16.621	0.000
	Place of residence (urban, rural)	-0.148	0.122	-0.016	-1.216	0.224
	Household income	0.000	0.000	0.012	0.948	0.343

a. Dependent Variable: Kessler 6 Psychological Distress

Regression model 7: Dependent variable Global Life Satisfaction, independent variables income/gender/age/fishing/place of residence, Unweighted Stage 1 2020 RWS data

UNWEIGHTED 2020

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Urban/rural, Household income, Binary gender (female, male), Current fisher status, Age[b]		Enter

a. Dependent Variable: Global Life Satisfaction
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.263[a]	0.069	0.068	2.012

a. Predictors: (Constant), Urban/rural, Household income, Binary gender (female, male), Current fisher status, Age

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2545.867	5	509.173	125.823	.000[b]
	Residual	34365.025	8492	4.047		
	Total	36910.892	8497			

a. Dependent Variable: Global Life Satisfaction
b. Predictors: (Constant), Urban/rural, Household income, Binary gender (female, male), Current fisher status, Age

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	5.575	0.165		33.691	0.000
	Current fisher status	-0.378	0.054	-0.074	-6.936	0.000
	Household income	0.242	0.014	0.194	17.835	0.000
	Age	0.028	0.001	0.230	20.082	0.000
	Binary gender (female, male)	-0.136	0.047	-0.032	-2.882	0.004
	Urban/rural	0.010	0.048	0.002	0.216	0.829

a. Dependent Variable: Global Life Satisfaction

Regression model 8: Dependent variable Personal Wellbeing Index, independent variables income/gender/age/fishing/place of residence, Unweighted Stage 1 2020 RWS data

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Urban/rural, Household income, Binary gender (female, male), Current fisher status, Age[b]		Enter

a. Dependent Variable: Personal Wellbeing Index
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.331[a]	0.109	0.109	17.04264

a. Predictors: (Constant), Urban/rural, Household income, Binary gender (female, male), Current fisher status, Age

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	292883.911	5	58576.782	201.675	.000[b]
	Residual	2387221.533	8219	290.452		
	Total	2680105.445	8224			

a. Dependent Variable: Personal Wellbeing Index
b. Predictors: (Constant), Urban/rural, Household income, Binary gender (female, male), Current fisher status, Age

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	52.785	1.425		37.031	0.000
	Current fisher status	-3.730	0.469	-0.084	-7.953	0.000
	Household income	2.852	0.117	0.264	24.403	0.000
	Age	0.280	0.012	0.264	23.136	0.000
	Binary gender (female, male)	-0.566	0.406	-0.015	-1.393	0.164
	Urban/rural	0.578	0.410	0.015	1.410	0.159

a. Dependent Variable: Personal Wellbeing Index

Regression model 9: Dependent variable Psychological distress, independent variables income/gender/age/fishing/place of residence, Unweighted Stage 1 2020 RWS data

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Urban/rural, Household income, Binary gender (female, male), Current fisher status, Age[b]		Enter

a. Dependent Variable: Kessler 6 Psychological Distress
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.401[a]	0.161	0.160	4.772

a. Predictors: (Constant), Urban/rural, Household income, Binary gender (female, male), Current fisher status, Age

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	36017.710	5	7203.542	316.295	.000[b]
	Residual	187982.642	8254	22.775		
	Total	224000.352	8259			

a. Dependent Variable: Kessler 6 Psychological Distress
b. Predictors: (Constant), Urban/rural, Household income, Binary gender (female, male), Current fisher status, Age

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	18.924	0.398		47.559	0.000
	Current fisher status	0.603	0.131	0.047	4.607	0.000
	Household income	-0.524	0.033	-0.168	-16.065	0.000
	Age	-0.123	0.003	-0.403	-36.526	0.000
	Binary gender (female, male)	-0.152	0.114	-0.014	-1.340	0.180
	Urban/rural	-0.179	0.115	-0.016	-1.561	0.119

a. Dependent Variable: Kessler 6 Psychological Distress

Appendix 8.3 Association between wellbeing and experience of significant negative life events

Table A8.3.1 Mean wellbeing scores of those who did and didn't experience different types of personal stress event, 2018 Regional Wellbeing Survey

Average Personal Wellbeing Index score - 2018 RWS (unweighted)	Experienced this	95.0% Lower CL for Mean	95.0% Upper CL for Mean	Did not experience this	95.0% Lower CL for Mean	95.0% Upper CL for Mean
All types of stress event	69.0	68.6	69.3	77.7	77.0	78.4
Poor health (own)	64.6	64.0	65.1	74.2	73.8	74.6
Poor health of others in household	68.9	68.3	69.5	70.9	70.5	71.3
Increased caring responsibilities	68.8	68.1	69.5	70.8	70.4	71.1
Loss of job	60.1	58.9	61.3	71.3	71.0	71.7
Changing to new job/new job	68.8	68.1	69.6	70.6	70.3	71.0
Shifted house	66.6	65.8	67.4	71.1	70.8	71.5
Sudden significant financial stress	61.8	61.1	62.4	73.5	73.1	73.8
Divorce/separation	58.1	56.4	59.7	70.9	70.6	71.3
Death of close family member	69.6	68.9	70.3	70.5	70.2	70.9
Death of close friend	70.5	69.7	71.3	70.3	69.9	70.6
Other significant personal stress	63.5	63.0	64.1	74.5	74.2	74.9

Appendix 8.4 Fishing participation and avidity amongst those who have and haven't experienced negative life events

Table A8.4.1 Fishing participation in last 12 months by those who did and didn't experience different types of personal stress event, 2018 Regional Wellbeing Survey

% who went fishing in last 12 months (RWS 2018, unweighted)	Experienced this	95.0% Lower CL for Mean	95.0% Upper CL for Mean	Did not experience this	95.0% Lower CL for Mean	95.0% Upper CL for Mean
All types of stress event	24.5%	23.7%	25.4%	20.6%	18.7%	22.6%
Poor health (own)	23.7%	22.5%	24.9%	24.1%	23.1%	25.1%
Poor health of others in household	26.0%	24.5%	27.5%	23.1%	22.2%	24.0%
Increased caring responsibilities	26.1%	24.4%	27.7%	23.3%	22.4%	24.1%
Loss of job	25.1%	22.6%	27.7%	23.8%	23.0%	24.6%
Changing to new job/new job	29.3%	27.3%	31.3%	22.8%	21.9%	23.6%
Shifted house	25.7%	23.9%	27.6%	23.5%	22.7%	24.4%
Sudden significant financial stress	26.7%	25.2%	28.3%	22.8%	21.9%	23.8%
Divorce/separation	28.0%	24.5%	31.7%	23.7%	22.9%	24.5%
Death of close family member	27.0%	25.3%	28.8%	23.1%	22.2%	23.9%
Death of close friend	27.0%	25.0%	29.1%	23.4%	22.5%	24.2%
Other significant personal stress	24.8%	23.6%	26.1%	23.3%	22.4%	24.4%

Table A8.1.6. Fishing avidity n in last 12 months by those who did and didn't experience different types of personal stress event, 2018 Regional Wellbeing Survey

Mean fishing avidity score (from 1-6, 1 = less fishing) (RWS 2018, unweighted)	Experienced this	95.0% Lower CL for Mean	95.0% Upper CL for Mean	Did not experience this	95.0% Lower CL for Mean	95.0% Upper CL for Mean
All types of stress event	2.45	2.40	2.50	2.60	2.47	2.74
Poor health (own)	2.46	2.38	2.53	2.48	2.42	2.54
Poor health of others in household	2.47	2.39	2.55	2.47	2.42	2.53
Increased caring responsibilities	2.39	2.31	2.48	2.50	2.44	2.55
Loss of job	2.50	2.34	2.65	2.47	2.42	2.52
Changing to new job/new job	2.45	2.35	2.55	2.48	2.42	2.53
Shifted house	2.50	2.39	2.61	2.46	2.41	2.51
Sudden significant financial stress	2.47	2.39	2.56	2.47	2.42	2.53
Divorce/separation	2.50	2.29	2.72	2.47	2.42	2.52
Death of close family member	2.52	2.42	2.61	2.46	2.40	2.51
Death of close friend	2.66	2.55	2.78	2.43	2.38	2.48
Other significant personal stress	2.40	2.33	2.47	2.52	2.46	2.58

Appendix 8.5 Wellbeing and different types of fishing: regression model

The following table provides output from regression modelling conducted in SPSS 21. The output is provided in whole to enable replication of analyses. For each regression model, the following information is provided:

- Variables entered/removed – details what variables were included in modelling, including variables entered in different steps if applicable
- Model summary – provides information on overall model parameters
- ANOVA – provides data on results of ANOVA testing examining model fit, including F and p statistics
- Coefficients – summarises findings on the effect size and significance of each coefficient (independent variable) included in the modelling

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
a. Dependent Variable: Personal Wellbeing Index			
b. All requested variables entered.			

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.269[a]	0.073	0.070	15.28293
a. Predictors: (Constant), Self-rated importance of fishing, Whether fished less or right amount/more than desired, Place of residence (urban, rural), Age (single years), Negative Fishing Experiences, Fishing compared to previous year (binary), Binary gender (male, female), Current fisher status, Fishing avidity (full scale)				

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	67079.457	9	7453.273	31.911	.000[b]
	Residual	857193.919	3670	233.568		
	Total	924273.376	3679			
a. Dependent Variable: Personal Wellbeing Index						
b. Predictors: (Constant), Self-rated importance of fishing, Whether fished less or right amount/more than desired, Place of residence (urban, rural), Age (single years), Negative Fishing Experiences, Fishing compared to previous year (binary), Binary gender (male, female), Current fisher status, Fishing avidity (full scale)						

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	58.076	2.078		27.953	0.000
	Age (single years)	0.067	0.019	0.058	3.563	0.000
	Binary gender (male, female)	0.630	0.744	0.014	0.847	0.397
	Place of residence (urban, rural)	0.593	0.517	0.018	1.147	0.251
	Current fisher status	4.172	1.333	0.058	3.130	0.002
	Fishing avidity (full scale)	0.582	0.143	0.087	4.082	0.000
	Fishing compared to previous year (binary)	3.407	0.688	0.084	4.951	0.000
	Whether fished less or right amount/more than desired	2.513	0.573	0.072	4.386	0.000
	Negative Fishing Experiences	-0.271	0.033	-0.136	-8.261	0.000
	Self-rated importance of fishing	0.659	0.130	0.096	5.090	0.000
a. Dependent Variable: Personal Wellbeing Index						

Appendix 9 – Collecting social and economic data appendices

Appendix 9.1: Bivariate exploration of variation by sample method, age group and gender, 2018 RWS

Table 9.1.1 Variation in findings by age group and gender, 2018 RWS – Females aged 18 to 34

Female 18-34	All respondents	Online panel	Past participants	Flyer/ letter	Word of mouth	Social media
Total sample	6300	395	430	193	837	246
Sample of fishers	1406	125	125	76	266	84

Female 18-34	All respondents	Online panel	Past participants	Flyer/ letter	Word of mouth	Social media	Unspecified	All respondents		Online panel		Past participants		Flyer/ letter		Word of mouth		Social media		Unspecified	
								CI low	CI high	CI low	CI high	CI low	CI high	CI low	CI high	CI low	CI high	CI low	CI high	CI low	CI high
Fishing avidity - mean score (measured 1-6)	2.4	2.3	2.2	2.6	2.3	2.4	2.4	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.4	0.2	0.2	0.5	0.5
Satisfaction with fishing - mean score	2.8	2.8	2.6	3.0	3.0	2.8	2.7	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.2
A fishing trip can still be successful, even if no fish/crabs/lobster are caught	3.6	3.5	3.8	3.9	3.7	3.8	4.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.4	0.4	0.2	0.2	0.3	0.3
I'd rather catch one or two bigger fish than ten smaller fish	3.2	3.1	3.3	3.4	3.1	3.3	3.2	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.2	0.3	0.3
I like to fish where there are several kinds of fish to catch	3.3	3.3	3.3	3.3	3.3	3.4	3.2	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.1	0.1	0.2	0.2
Went fishing in last 12 months	25.8%	22.3%	31.6%	29.1%	39.4%	31.8%	34.2%	2.0%	2.1%	2.3%	2.4%	7.9%	8.8%	7.6%	8.7%	11.1%	12.0%	5.5%	5.9%	9.7%	10.9%
Relaxing/unwinding	80.7%	79.7%	83.5%	76.1%	80.0%	84.4%	81.4%	2.4%	2.3%	3.2%	2.9%	8.9%	6.7%	10.8%	8.8%	13.3%	9.6%	5.7%	4.7%	11.3%	8.3%
Spending time outdoors	88.2%	85.9%	92.0%	92.0%	88.9%	91.8%	90.3%	2.0%	1.8%	2.8%	2.5%	7.0%	4.3%	7.7%	4.6%	11.5%	6.7%	4.5%	3.3%	9.2%	5.5%
Spending time in nature	88.3%	87.0%	91.9%	93.2%	86.7%	89.1%	88.5%	2.0%	1.8%	2.7%	2.4%	7.2%	4.4%	7.4%	4.1%	12.1%	7.6%	5.0%	3.8%	9.7%	6.2%
Spending time on your own	55.7%	64.6%	32.5%	41.7%	33.3%	47.6%	43.5%	2.9%	2.9%	3.7%	3.6%	9.3%	10.5%	10.9%	11.5%	12.4%	14.5%	7.0%	7.1%	11.8%	12.4%
Spending time with family	88.2%	89.0%	89.4%	90.4%	88.9%	87.0%	79.4%	2.0%	1.8%	2.5%	2.2%	7.8%	5.2%	8.3%	5.2%	11.5%	6.7%	5.3%	4.2%	11.2%	8.5%
Spending time with friends	81.9%	82.6%	77.8%	82.2%	86.4%	81.8%	78.3%	2.3%	2.2%	3.0%	2.7%	9.9%	8.0%	9.9%	7.4%	12.3%	7.7%	5.9%	5.0%	11.6%	8.9%
Competing in fishing competitions	12.1%	17.5%	3.5%	2.8%	11.1%	4.2%	1.6%	1.8%	2.0%	2.7%	3.0%	2.5%	5.5%	2.2%	5.8%	6.7%	11.5%	2.2%	3.6%	1.4%	5.7%
The enjoyment of catching fish	53.1%	56.1%	51.7%	45.9%	51.1%	49.2%	45.2%	2.9%	2.9%	3.8%	3.7%	10.4%	10.3%	11.0%	11.3%	14.3%	14.2%	7.0%	7.1%	11.9%	12.4%
The challenge of catching fish	50.9%	54.5%	50.0%	39.2%	47.7%	45.2%	46.8%	2.9%	2.9%	3.8%	3.7%	10.3%	10.3%	10.5%	11.4%	14.2%	14.5%	7.0%	7.1%	12.0%	12.3%
Catching fresh fish for myself or others in my household to eat	40.0%	40.0%	37.2%	34.7%	43.2%	42.9%	41.0%	2.9%	2.9%	3.7%	3.8%	9.7%	10.5%	10.2%	11.4%	13.8%	14.7%	6.9%	7.1%	11.7%	12.5%
Learning about nature	72.0%	74.4%	64.4%	67.1%	68.9%	68.1%	75.0%	2.7%	2.6%	3.4%	3.2%	10.4%	9.5%	11.3%	9.9%	14.4%	12.0%	6.8%	6.3%	12.0%	9.6%
Learning new skills	62.7%	67.7%	47.7%	56.9%	51.1%	57.6%	60.7%	2.9%	2.8%	3.6%	3.5%	10.3%	10.5%	11.5%	11.0%	14.3%	14.2%	7.1%	6.9%	12.5%	11.5%
Feeling a sense of achievement	75.0%	78.7%	65.5%	65.3%	62.2%	72.1%	77.0%	2.6%	2.5%	3.2%	3.0%	10.4%	9.4%	11.2%	10.0%	14.6%	13.0%	6.7%	6.0%	11.6%	9.1%
Getting physically active	77.7%	81.0%	57.0%	72.0%	62.8%	78.8%	82.0%	2.5%	2.4%	3.1%	2.8%	10.6%	10.1%	10.9%	9.2%	14.9%	13.2%	6.2%	5.4%	11.0%	8.1%

Table 9.1.2 Variation in findings by age group and gender, 2018 RWS – Females aged35 to 54

Female, aged 35-54	All respondents	Online panel	Past participants	Flyer/ letter	Word of mouth	Social media
Total sample	5331	2445	1403	646	1527	704
Sample of fishers	1035	620	365	211	463	215

	All respondents		Online panel		Past participants		Flyer/ letter		Word of mouth		Social media		Unspecified	
	All respondents	Online panel	Past participants	Flyer/ letter	Word of mouth	Social media	Unspecified	CI low	CI high	CI low	CI high	CI low	CI high	CI low	CI high	CI low	CI high	CI low	CI high	CI low	CI high
Fishing avidity - mean score (measured 1-6)	2.3	2.3	2.2	2.4	2.2	2.3	2.4	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3
Satisfaction with fishing - mean score	2.8	2.8	2.8	3.0	2.7	2.9	2.8	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.2
A fishing trip can still be successful, even if no fish/crabs/lobster are caught	3.9	3.8	4.0	4.0	4.1	3.8	4.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.2
I'd rather catch one or two bigger fish than ten smaller fish	3.3	3.3	3.2	3.4	3.4	3.3	3.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.2
I like to fish where there are several kinds of fish to catch	3.3	3.4	3.3	3.3	3.3	3.4	3.3	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2
Went fishing in last 12 months	25.2%	19.4%	25.4%	26.0%	32.7%	30.3%	30.5%	1.7%	1.7%	2.5%	2.7%	3.5%	3.8%	4.6%	5.0%	6.3%	6.8%	4.1%	4.4%	6.2%	6.8%
Relaxing/unwinding	80.9%	82.5%	80.0%	78.8%	82.2%	79.7%	82.1%	2.0%	1.8%	3.5%	3.1%	4.3%	3.8%	6.2%	5.3%	7.1%	5.7%	4.8%	4.2%	7.1%	5.8%
Spending time outdoors	87.9%	89.2%	86.0%	87.5%	88.6%	88.2%	87.6%	1.6%	1.5%	2.9%	2.4%	3.8%	3.2%	5.1%	4.0%	6.0%	4.5%	3.9%	3.2%	6.3%	4.7%
Spending time in nature	88.7%	89.1%	87.0%	89.5%	89.2%	89.1%	88.4%	1.6%	1.4%	2.9%	2.5%	3.7%	3.1%	4.8%	3.7%	6.0%	4.3%	3.8%	3.1%	6.1%	4.5%
Spending time on your own	49.4%	57.7%	45.2%	42.3%	47.8%	48.4%	43.7%	2.4%	2.4%	4.3%	4.2%	5.0%	5.1%	6.8%	7.0%	8.3%	8.4%	5.5%	5.5%	8.2%	8.4%
Spending time with family	86.3%	86.9%	79.4%	87.0%	85.4%	89.4%	94.2%	1.7%	1.6%	3.1%	2.7%	4.3%	3.9%	5.2%	4.1%	6.6%	5.2%	3.7%	3.0%	4.8%	3.0%
Spending time with friends	68.9%	76.3%	63.0%	63.6%	60.9%	68.9%	72.1%	2.3%	2.2%	3.8%	3.5%	5.0%	4.8%	6.9%	6.5%	8.3%	7.8%	5.3%	4.9%	7.9%	7.0%
Competing in fishing competitions	5.1%	11.0%	2.4%	3.1%	3.6%	2.2%	2.2%	1.0%	1.1%	2.5%	2.9%	1.2%	1.9%	1.8%	3.1%	2.2%	4.1%	1.2%	2.1%	1.5%	3.5%
The enjoyment of catching fish	48.8%	55.2%	47.1%	46.3%	48.6%	44.8%	41.3%	2.4%	2.4%	4.3%	4.2%	5.0%	5.1%	6.8%	6.9%	8.2%	8.3%	5.4%	5.5%	8.0%	8.3%
The challenge of catching fish	47.9%	55.3%	43.9%	46.5%	47.8%	43.8%	40.6%	2.4%	2.4%	4.3%	4.2%	5.0%	5.1%	6.8%	6.9%	8.3%	8.4%	5.4%	5.5%	7.9%	8.3%
Catching fresh fish for myself or others in my household to eat	42.2%	44.3%	40.8%	44.0%	46.8%	37.1%	41.7%	2.3%	2.4%	4.2%	4.3%	4.9%	5.0%	6.8%	6.9%	8.2%	8.3%	5.1%	5.4%	8.0%	8.3%
Learning about nature	71.0%	73.8%	70.4%	72.1%	72.9%	65.8%	69.6%	2.2%	2.1%	3.9%	3.6%	4.8%	4.5%	6.5%	5.8%	7.8%	6.8%	5.3%	5.0%	8.0%	7.2%
Learning new skills	51.4%	58.1%	48.4%	49.0%	51.8%	47.9%	46.3%	2.4%	2.4%	4.3%	4.2%	5.0%	5.0%	6.8%	6.9%	8.3%	8.2%	5.5%	5.5%	8.2%	8.4%
Feeling a sense of achievement	65.8%	73.7%	60.3%	63.1%	57.0%	64.9%	65.9%	2.3%	2.2%	3.9%	3.6%	5.0%	4.9%	6.9%	6.5%	8.4%	8.1%	5.4%	5.1%	8.3%	7.6%
Getting physically active	72.3%	78.7%	66.5%	69.3%	68.3%	70.4%	75.6%	2.2%	2.1%	3.7%	3.3%	4.9%	4.6%	6.6%	6.1%	8.0%	7.3%	5.2%	4.8%	7.7%	6.7%

Table 9.1.3 Variation in findings by age group and gender, 2018 RWS – Females aged 55 and older

Female, aged 55+	All respondents	Online panel	Past participants	Flyer/ letter	Word of mouth	Social media
Total sample	7734	11958	5150	1243	1271	2110
Sample of fishers	870	1357	593	222	270	334

	All respondents	Online panel	Past participants	Flyer/ letter	Word of mouth	Social media	Unspecified	All respondents		Online panel		Past participants		Flyer/ letter		Word of mouth		Social media		Unspecified	
								CI low	CI high	CI low	CI high	CI low	CI high	CI low	CI high	CI low	CI high	CI low	CI high	CI low	CI high
Fishing avidity - mean score (measured 1-6)	2.4	2.6	2.2	2.2	2.3	2.7	2.1	0.1	0.1	0.3	0.3	0.2	0.2	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.3
Satisfaction with fishing - mean score	2.8	2.9	2.7	2.8	3.0	2.8	2.8	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.2
A fishing trip can still be successful, even if no fish/crabs/lobster are caught	4.0	3.9	4.0	4.0	4.0	4.0	4.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2
I'd rather catch one or two bigger fish than ten smaller fish	3.2	3.2	3.2	3.3	3.1	3.3	3.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2
I like to fish where there are several kinds of fish to catch	3.2	3.3	3.2	3.3	3.1	3.3	3.2	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1
Went fishing in last 12 months	13.0%	11.2%	11.3%	11.5%	17.9%	21.2%	15.8%	1.2%	1.2%	2.0%	2.3%	1.8%	2.0%	2.7%	3.1%	4.9%	5.8%	4.6%	5.3%	4.1%	4.8%
Relaxing/unwinding	74.3%	79.8%	70.3%	71.3%	73.7%	80.2%	69.9%	2.1%	2.0%	3.8%	3.4%	3.8%	3.6%	5.7%	5.2%	8.6%	7.4%	6.4%	5.4%	7.6%	6.8%
Spending time outdoors	81.0%	85.6%	77.7%	76.3%	81.7%	88.8%	78.5%	1.9%	1.8%	3.3%	2.9%	3.5%	3.2%	5.4%	4.8%	7.8%	6.2%	5.2%	4.0%	6.8%	5.8%
Spending time in nature	80.5%	84.1%	78.6%	77.6%	77.9%	86.7%	76.7%	1.9%	1.8%	3.5%	3.0%	3.4%	3.1%	5.3%	4.7%	8.3%	6.9%	5.5%	4.4%	6.9%	6.0%
Spending time on your own	49.9%	53.9%	48.7%	42.7%	49.1%	50.8%	54.0%	2.3%	2.3%	4.5%	4.4%	4.1%	4.1%	6.0%	6.1%	9.1%	9.2%	7.3%	7.3%	7.7%	7.6%
Spending time with family	76.9%	84.8%	71.7%	75.1%	74.1%	79.7%	75.2%	2.0%	1.9%	3.4%	3.0%	3.8%	3.6%	5.5%	4.9%	8.7%	7.4%	6.4%	5.4%	7.1%	6.2%
Spending time with friends	66.0%	74.4%	61.3%	60.4%	66.1%	65.9%	68.5%	2.2%	2.2%	4.0%	3.8%	4.0%	3.9%	6.0%	5.8%	9.0%	8.2%	7.2%	6.6%	7.4%	6.8%
Competing in fishing competitions	2.5%	4.6%	1.2%	1.9%	4.3%	2.8%	0.6%	0.7%	0.8%	1.6%	2.1%	0.7%	1.1%	1.2%	2.2%	2.7%	4.9%	1.7%	3.3%	0.6%	2.3%
The enjoyment of catching fish	42.6%	51.0%	36.9%	43.0%	43.6%	48.3%	30.6%	2.3%	2.3%	4.5%	4.5%	3.8%	4.0%	5.9%	6.0%	8.7%	9.1%	7.3%	7.4%	6.7%	7.4%
The challenge of catching fish	43.6%	51.1%	37.8%	44.0%	44.3%	49.4%	33.1%	2.3%	2.3%	4.5%	4.5%	3.9%	4.0%	5.9%	6.0%	8.8%	9.1%	7.3%	7.3%	6.9%	7.5%
Catching fresh fish for myself or others in my household to eat	43.6%	49.8%	40.5%	42.6%	40.9%	45.5%	38.5%	2.3%	2.3%	4.5%	4.5%	3.9%	4.0%	5.8%	6.0%	8.7%	9.1%	7.2%	7.4%	7.3%	7.7%
Learning about nature	70.0%	74.9%	67.9%	67.3%	69.2%	70.1%	68.2%	2.2%	2.1%	4.0%	3.7%	3.8%	3.7%	5.8%	5.5%	8.8%	7.8%	7.0%	6.4%	7.6%	6.9%
Learning new skills	40.7%	43.4%	38.8%	40.5%	39.7%	43.8%	36.3%	2.3%	2.3%	4.4%	4.5%	3.9%	4.0%	5.8%	6.0%	8.6%	9.1%	7.1%	7.3%	7.2%	7.7%
Feeling a sense of achievement	62.3%	73.4%	55.5%	58.1%	60.9%	65.0%	58.0%	2.3%	2.2%	4.1%	3.8%	4.0%	4.0%	6.1%	5.9%	9.1%	8.6%	7.2%	6.7%	7.8%	7.5%
Getting physically active	69.9%	78.7%	65.4%	65.4%	67.0%	69.3%	70.7%	2.2%	2.1%	3.8%	3.5%	3.9%	3.8%	5.9%	5.6%	8.9%	8.1%	7.0%	6.4%	7.3%	6.6%

Table 9.1.4 Variation in findings by age group and gender, 2018 RWS – Males aged 18 to 34

Male, 18-34	All respondents	Online panel	Past participants	Flyer/ letter	Word of mouth	Social media
Total sample	2136	57	115	33	140	56
Sample of fishers	676	26	54	14	56	33

	All respondents	Online panel	Past participants	Flyer/ letter	Word of mouth	Social media	Unspecified	All respondents		Online panel		Past participants		Flyer/ letter		Word of mouth		Social media		Unspecified	
								CI low	CI high	CI low	CI high	CI low	CI high	CI low	CI high	CI low	CI high	CI low	CI high	CI low	CI high
Fishing avidity - mean score (measured 1-6)	2.4	2.4	2.5	2.1	3.4	2.1	2.6	0.2	0.2	0.2	0.2	1.2	1.2	0.3	0.3	1.9	1.9	0.5	0.5	0.7	0.7
Satisfaction with fishing - mean score	2.9	3.0	2.9	2.6	2.6	3.4	2.6	0.1	0.1	0.1	0.1	0.6	0.6	0.3	0.3	0.9	0.9	0.3	0.3	0.4	0.4
A fishing trip can still be successful, even if no fish/crabs/lobster are caught	3.5	3.4	4.2	3.9	3.8	4.0	3.2	0.1	0.1	0.1	0.1	0.6	0.6	0.4	0.4	0.6	0.6	0.5	0.5	0.6	0.6
I'd rather catch one or two bigger fish than ten smaller fish	3.3	3.3	3.6	3.3	3.4	3.4	2.7	0.1	0.1	0.1	0.1	0.6	0.6	0.3	0.3	0.5	0.5	0.5	0.5	0.6	0.6
I like to fish where there are several kinds of fish to catch	3.4	3.4	4.1	3.5	3.8	3.8	2.9	0.1	0.1	0.1	0.1	0.5	0.5	0.3	0.3	0.5	0.5	0.4	0.4	0.6	0.6
Went fishing in last 12 months	34.3%	31.6%	45.8%	46.9%	42.9%	40.0%	59.1%	3.4%	3.5%	3.7%	3.8%	18.5%	19.5%	13.5%	13.8%	22.6%	25.2%	16.0%	17.8%	20.6%	18.4%
Relaxing/unwinding	82.1%	82.9%	100.0 %	77.1%	76.9%	73.9%	73.3%	3.6%	3.2%	4.1%	3.5%	100.0%	- 100.0 %	15.7%	11.4%	26.7%	16.1%	20.0%	14.4%	25.0%	16.9%
Spending time outdoors	81.5%	80.5%	94.1%	83.3%	84.6%	86.4%	80.0%	3.7%	3.3%	4.2%	3.7%	18.5%	5.2%	14.5%	9.4%	25.5%	12.0%	18.5%	9.6%	24.4%	14.0%
Spending time in nature	79.8%	79.9%	94.1%	77.8%	84.6%	73.9%	73.3%	3.8%	3.4%	4.3%	3.8%	18.5%	5.2%	15.4%	11.1%	25.5%	12.0%	20.0%	14.4%	25.0%	16.9%
Spending time on your own	62.2%	64.6%	58.8%	42.9%	61.5%	59.1%	57.1%	4.4%	4.3%	4.9%	4.7%	23.2%	20.5%	15.3%	16.4%	26.5%	22.0%	20.6%	18.4%	25.2%	22.6%
Spending time with family	79.9%	81.8%	82.4%	70.6%	84.6%	65.2%	73.3%	3.8%	3.4%	4.1%	3.6%	22.4%	12.4%	16.5%	13.2%	25.5%	12.0%	20.3%	16.8%	25.0%	16.9%
Spending time with friends	80.8%	81.3%	82.4%	82.4%	75.0%	86.4%	61.5%	3.7%	3.4%	4.2%	3.7%	22.4%	12.4%	15.2%	9.9%	27.9%	17.4%	18.5%	9.6%	26.5%	22.0%
Competing in fishing competitions	28.0%	33.3%	16.7%	2.7%	0.0%	8.7%	33.3%	3.9%	4.2%	4.6%	4.9%	11.7%	21.5%	2.4%	9.2%	0.0%	0.0%	6.8%	16.4%	20.9%	27.9%
The enjoyment of catching fish	64.4%	67.6%	44.4%	57.1%	46.2%	60.9%	50.0%	4.4%	4.2%	4.8%	4.6%	20.7%	22.3%	16.4%	15.3%	24.0%	25.6%	20.3%	17.7%	24.1%	24.1%
The challenge of catching fish	62.8%	65.7%	38.9%	60.0%	46.2%	60.9%	42.9%	4.4%	4.3%	4.9%	4.7%	19.5%	22.8%	16.5%	14.9%	24.0%	25.6%	20.3%	17.7%	22.6%	25.2%
Catching fresh fish for myself or others in my household to eat	52.4%	56.5%	38.9%	36.4%	23.1%	43.5%	46.7%	4.5%	4.5%	5.1%	5.0%	19.5%	22.8%	14.7%	17.0%	16.1%	26.7%	18.5%	20.0%	22.8%	23.9%
Learning about nature	68.8%	70.3%	70.6%	60.6%	75.0%	65.2%	53.3%	4.3%	4.1%	4.8%	4.5%	23.6%	17.2%	17.0%	15.2%	27.9%	17.4%	20.3%	16.8%	23.9%	22.8%
Learning new skills	70.4%	73.0%	52.9%	62.9%	46.2%	68.2%	66.7%	4.2%	4.0%	4.6%	4.3%	22.6%	21.7%	16.5%	14.5%	24.0%	25.6%	20.8%	16.3%	25.1%	19.3%
Feeling a sense of achievement	76.5%	78.9%	70.6%	66.7%	53.8%	69.6%	73.3%	4.0%	3.6%	4.3%	3.9%	23.6%	17.2%	16.2%	13.7%	25.6%	24.0%	20.2%	15.7%	25.0%	16.9%
Getting physically active	73.4%	76.4%	58.8%	61.1%	53.8%	69.6%	66.7%	4.1%	3.8%	4.5%	4.1%	23.2%	20.5%	16.3%	14.6%	25.6%	24.0%	20.2%	15.7%	25.1%	19.3%

Table 9.1.5 Variation in findings by age group and gender, 2018 RWS – Males aged 35 to 54

Male, 35-54	All respondents	Online panel	Past participants	Flyer/ letter	Word of mouth	Social media
Total sample	2081	642	392	135	198	195
Sample of fishers	595	258	143	54	91	82

	All respondents	Online panel	Past participants	Flyer/ letter	Word of mouth	Social media	Unspecified	All respondents		Online panel		Past participants		Flyer/ letter		Word of mouth		Social media		Unspecified	
								CI low	CI high	CI low	CI high	CI low	CI high	CI low	CI high	CI low	CI high	CI low	CI high	CI low	CI high
Fishing avidity - mean score (measured 1-6)	2.7	2.6	2.7	2.1	2.5	3.4	3.4	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.7	0.7	0.4	0.4	0.8	0.8
Satisfaction with fishing - mean score	2.8	2.9	2.9	2.7	2.5	2.5	2.9	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.4	0.4	0.3	0.3	0.5	0.5
A fishing trip can still be successful, even if no fish/crabs/lobster are caught	3.6	3.4	3.9	4.0	3.8	3.8	3.6	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.5	0.5	0.4	0.4	0.4	0.4
I'd rather catch one or two bigger fish than ten smaller fish	3.4	3.4	3.4	3.6	3.6	3.4	3.1	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.4	0.3	0.3
I like to fish where there are several kinds of fish to catch	3.6	3.6	3.5	3.7	3.5	3.7	3.5	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.3	0.3
Went fishing in last 12 months	33.7%	28.6%	40.2%	36.5%	40.0%	46.0%	42.1%	2.9%	3.0%	3.7%	3.9%	6.8%	7.1%	9.1%	9.9%	13.3%	14.6%	13.3%	13.7%	14.6%	15.8%
Relaxing/unwinding	81.4%	83.6%	76.0%	80.0%	77.1%	91.9%	76.7%	3.1%	2.8%	4.1%	3.6%	7.3%	6.3%	10.1%	7.8%	15.7%	11.4%	12.0%	5.8%	17.1%	12.2%
Spending time outdoors	84.5%	85.6%	82.8%	81.6%	77.1%	86.5%	86.7%	2.9%	2.6%	3.9%	3.4%	6.6%	5.4%	9.8%	7.5%	15.7%	11.4%	13.6%	8.2%	15.3%	8.7%
Spending time in nature	82.3%	83.7%	77.6%	82.9%	80.6%	89.2%	83.3%	3.0%	2.7%	4.1%	3.6%	7.1%	6.1%	9.6%	7.2%	15.0%	10.3%	12.9%	7.0%	16.1%	10.0%
Spending time on your own	55.8%	62.6%	43.0%	44.7%	52.9%	61.1%	58.6%	3.8%	3.7%	5.1%	4.9%	7.7%	8.0%	10.8%	11.2%	16.4%	16.0%	16.3%	14.6%	18.0%	16.4%
Spending time with family	78.7%	79.9%	77.3%	74.7%	83.8%	86.1%	69.0%	3.2%	3.0%	4.4%	3.9%	7.2%	6.1%	10.6%	8.8%	14.2%	9.2%	13.9%	8.4%	18.0%	14.4%
Spending time with friends	71.2%	76.1%	64.4%	69.7%	70.3%	66.7%	48.1%	3.5%	3.3%	4.6%	4.2%	7.9%	7.4%	10.9%	9.4%	15.8%	12.8%	16.2%	13.7%	17.9%	18.2%
Competing in fishing competitions	14.5%	23.9%	5.2%	2.7%	2.8%	7.9%	3.6%	2.5%	2.8%	4.2%	4.7%	2.7%	4.4%	2.1%	5.6%	2.5%	9.5%	5.6%	11.7%	3.2%	11.9%
The enjoyment of catching fish	58.9%	62.7%	55.6%	59.7%	42.9%	57.9%	53.3%	3.7%	3.6%	5.1%	4.9%	7.9%	7.7%	11.1%	10.4%	15.3%	16.4%	15.8%	14.6%	17.5%	16.9%
The challenge of catching fish	63.2%	65.1%	64.5%	63.2%	47.2%	65.8%	51.7%	3.7%	3.6%	5.1%	4.8%	7.8%	7.3%	11.2%	10.2%	15.6%	16.0%	15.8%	13.5%	17.6%	17.3%
Catching fresh fish for myself or others in my household to eat	46.8%	55.1%	34.2%	46.8%	36.1%	32.4%	43.3%	3.7%	3.8%	5.2%	5.1%	7.2%	7.8%	10.9%	11.1%	14.1%	16.3%	13.3%	16.0%	16.4%	17.7%
Learning about nature	64.8%	69.9%	55.9%	62.7%	61.1%	64.9%	60.0%	3.6%	3.5%	4.9%	4.6%	7.9%	7.7%	11.3%	10.3%	16.3%	14.6%	16.0%	13.8%	17.8%	16.0%
Learning new skills	58.0%	64.2%	51.0%	48.1%	36.1%	64.9%	58.6%	3.7%	3.7%	5.1%	4.9%	7.9%	7.9%	10.9%	11.1%	14.1%	16.3%	16.0%	13.8%	18.0%	16.4%
Feeling a sense of achievement	67.4%	72.7%	59.9%	65.8%	44.4%	73.0%	60.7%	3.6%	3.4%	4.8%	4.4%	7.9%	7.5%	11.1%	9.9%	15.3%	16.1%	15.6%	12.2%	18.4%	16.3%
Getting physically active	68.1%	75.9%	53.6%	59.7%	61.1%	70.3%	72.4%	3.6%	3.4%	4.7%	4.2%	8.0%	7.8%	11.1%	10.4%	16.3%	14.6%	15.8%	12.8%	17.8%	13.6%

Table 9.1.6 Variation in findings by age group and gender, 2018 RWS – Males aged 55 and older

Male, 55+	All respondents	Online panel	Past participants	Flyer/ letter	Word of mouth	Social media
Total sample	3978	4803	2340	417	154	1029
Sample of fishers	861	1504	714	131	54	389

	All respondents		Online panel		Past participants		Flyer/ letter		Word of mouth		Social media		Unspecified	
	All respondents	Online panel	Past participants	Flyer/ letter	Word of mouth	Social media	Unspecified	CI low	CI high	CI low	CI high	CI low	CI high	CI low	CI high	CI low	CI high	CI low	CI high	CI low	CI high
Fishing avidity - mean score (measured 1-6)	2.7	2.7	2.6	2.7	2.8	3.4	2.8	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.5	0.5	0.8	0.8	0.3	0.3
Satisfaction with fishing - mean score	2.8	2.9	2.8	2.8	2.8	3.6	2.9	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.4	0.4	0.2	0.2
A fishing trip can still be successful, even if no fish/crabs/lobster are caught	3.9	3.9	3.9	4.0	3.9	3.5	3.8	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.5	0.5	0.2	0.2
I'd rather catch one or two bigger fish than ten smaller fish	3.4	3.4	3.4	3.4	3.2	3.5	3.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.4	0.4	0.2	0.2
I like to fish where there are several kinds of fish to catch	3.5	3.6	3.5	3.5	3.4	3.5	3.3	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.4	0.4	0.2	0.2
Went fishing in last 12 months	28.0%	21.6%	31.3%	30.5%	31.4%	35.1%	37.8%	1.8%	1.9%	2.7%	2.9%	3.2%	3.3%	4.4%	4.7%	8.3%	9.3%	13.8%	16.0%	8.3%	8.9%
Relaxing/unwinding	76.5%	83.7%	70.2%	78.0%	76.6%	73.1%	71.4%	2.2%	2.1%	3.3%	3.0%	4.0%	3.7%	5.4%	4.8%	10.3%	8.4%	18.8%	14.0%	9.8%	8.5%
Spending time outdoors	81.9%	86.4%	77.6%	83.1%	80.8%	85.7%	79.6%	2.0%	1.9%	3.1%	2.7%	3.6%	3.3%	5.0%	4.2%	9.8%	7.5%	16.2%	9.3%	9.0%	7.2%
Spending time in nature	79.4%	83.1%	74.9%	82.5%	79.2%	78.6%	76.3%	2.1%	2.0%	3.4%	3.0%	3.7%	3.5%	5.0%	4.3%	10.0%	7.9%	17.5%	12.0%	9.4%	7.7%
Spending time on your own	49.3%	58.5%	42.4%	43.1%	59.0%	60.7%	44.4%	2.5%	2.5%	4.2%	4.1%	4.1%	4.2%	6.0%	6.2%	11.1%	10.4%	18.4%	16.3%	10.0%	10.3%
Spending time with family	70.0%	77.2%	64.4%	70.5%	64.9%	60.7%	66.7%	2.4%	2.3%	3.8%	3.5%	4.1%	4.0%	5.8%	5.4%	11.1%	10.0%	18.4%	16.3%	10.1%	9.1%
Spending time with friends	67.1%	72.2%	60.9%	69.8%	66.7%	67.9%	70.3%	2.4%	2.3%	4.0%	3.7%	4.2%	4.1%	5.8%	5.4%	10.9%	9.7%	18.4%	14.9%	9.9%	8.6%
Competing in fishing competitions	4.6%	8.4%	2.4%	2.7%	3.9%	0.0%	3.4%	1.0%	1.2%	2.1%	2.6%	1.1%	1.6%	1.5%	2.6%	2.8%	6.2%	0.0%	0.0%	2.4%	5.4%
The enjoyment of catching fish	56.2%	64.2%	49.4%	58.1%	54.4%	24.0%	55.4%	2.5%	2.5%	4.2%	4.0%	4.2%	4.2%	6.1%	5.9%	11.0%	10.7%	13.3%	18.9%	10.2%	9.9%
The challenge of catching fish	60.4%	67.0%	53.6%	65.0%	60.3%	44.4%	56.0%	2.5%	2.4%	4.1%	3.9%	4.2%	4.2%	5.9%	5.6%	11.1%	10.3%	17.4%	18.5%	10.3%	9.9%
Catching fresh fish for myself or others in my household to eat	49.9%	54.8%	44.1%	53.5%	51.3%	33.3%	49.5%	2.5%	2.5%	4.3%	4.2%	4.1%	4.2%	6.1%	6.0%	11.0%	10.9%	15.4%	18.8%	10.1%	10.2%
Learning about nature	64.7%	67.3%	62.5%	64.2%	67.9%	57.1%	65.2%	2.4%	2.4%	4.1%	3.9%	4.1%	4.0%	5.9%	5.6%	10.9%	9.6%	18.3%	16.9%	10.1%	9.1%
Learning new skills	49.5%	54.8%	43.8%	50.2%	56.4%	39.3%	51.1%	2.5%	2.5%	4.3%	4.2%	4.1%	4.2%	6.0%	6.0%	11.1%	10.6%	16.3%	18.4%	10.2%	10.2%
Feeling a sense of achievement	61.8%	71.5%	53.9%	60.5%	66.7%	60.7%	54.9%	2.5%	2.4%	4.0%	3.7%	4.2%	4.1%	6.0%	5.8%	10.9%	9.7%	18.4%	16.3%	10.2%	9.9%
Getting physically active	67.8%	75.3%	61.3%	68.8%	70.5%	64.3%	62.6%	2.4%	2.3%	3.8%	3.5%	4.1%	4.0%	5.8%	5.4%	10.7%	9.2%	18.4%	15.7%	10.2%	9.4%

Appendix 9.2: Regression models – is sample recruitment method a predictor of fishing participation in 2018 RWS data after controlling for superpopulation benchmark characteristics?

The following sections provide output from logistic regression modelling conducted in SPSS 21. The output is provided in whole to enable replication of analyses. The regression conducted was a two step logistical regression model.

Logistic Regression

Block 1: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	42.232	5	.000
	Block	42.232	5	.000
	Model	42.232	5	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	11591.576[a]	.004	.006

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Classification Table[a]

			Predicted		
			Current fisher status		
	Observed		0	1	Percentage Correct
Step 1	Current fisher status	0	8108	0	100.0
		1	2517	0	.0
	Overall Percentage				76.3

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Recruitment method - online panel	-.202	.144	1.977	1	.160	.817
	Recruitment method - past RWS participant	-.107	.143	.558	1	.455	.898
	Recruitment method - mail	-.058	.149	.149	1	.700	.944
	Recruitment method - friends/family/networks	.198	.158	1.578	1	.209	1.219
	Recruitment method - social media	.227	.151	2.255	1	.133	1.254
	Constant	-1.085	.139	60.700	1	.000	.338

a. Variable(s) entered on step 1: Recruitment method - online panel, Recruitment method - past RWS participant, Recruitment method - mail, Recruitment method - friends/family/networks, Recruitment method - social media.

Block 2: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	602.710	10	.000
	Block	602.710	10	.000
	Model	644.943	15	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	10988.865[a]	.059	.089

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Classification Table[a]

			Predicted		
			Current fisher status		
	Observed		0	1	Percentage Correct
Step 1	Current fisher status	0	8007	101	98.8
		1	2410	107	4.3
	Overall Percentage				76.4

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Recruitment method - online panel	-.275	.154	3.187	1	.074	.760
	Recruitment method - past RWS participant	-.119	.148	.645	1	.422	.888
	Recruitment method - mail	.006	.155	.002	1	.967	1.006
	Recruitment method - friends/family/networks	.190	.163	1.364	1	.243	1.209
	Recruitment method - social media	.268	.156	2.929	1	.087	1.307
	Binary gender (female, male)	.795	.050	248.141	1	.000	2.215
	Urban/rural	.655	.063	109.053	1	.000	1.925
	Farmer/Not farmer	.278	.090	9.478	1	.002	1.321
	Age (individual years)	-.023	.002	216.304	1	.000	.977
	Resides in NSW/ACT - binary	-.338	.165	4.202	1	.040	.713
	Resides in Vic. - binary	-.397	.166	5.693	1	.017	.672
	Resides in Qld - binary	.030	.168	.031	1	.860	1.030
	Resides in SA - binary	.163	.169	.937	1	.333	1.177
	Resides in WA - binary	.144	.168	.740	1	.390	1.155
	Resides in Tas. - binary	-.379	.178	4.552	1	.033	.684
	Constant	-1.954	.269	52.693	1	.000	.142

a. Variable(s) entered on step 1: Binary gender (female, male), Urban/rural, Farmer/Not farmer, Age (individual years), Resides in NSW/ACT - binary, Resides in Vic. - binary, Resides in Qld - binary, Resides in SA - binary, Resides in WA - binary, Resides in Tas. - binary.

Appendix 9.3: Regression models – is sample recruitment method a predictor of fishing avidity in 2018 RWS data after controlling for superpopulation benchmark characteristics?

Regression

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Recruitment method - social media, Recruitment method - friends/family/networks, Recruitment method - mail, Recruitment method - past RWS participant, Recruitment method - online panel[b]	.	Enter
2	Resides in Qld - binary, Binary gender (female, male), Resides in SA - binary, Farmer/Not farmer, Resides in Tas. - binary, Resides in WA - binary, Age (individual years), Resides in Vic. - binary, Urban/rural, Resides in NSW/ACT - binary[b]	.	Enter

a. Dependent Variable: Fishing avidity
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.050[a]	.003	.001	1.26653
2	.192[b]	.037	.031	1.24682

a. Predictors: (Constant), Recruitment method - social media, Recruitment method - friends/family/networks, Recruitment method - mail, Recruitment method - past RWS participant, Recruitment method - online panel
b. Predictors: (Constant), Recruitment method - social media, Recruitment method - friends/family/networks, Recruitment method - mail, Recruitment method - past RWS participant, Recruitment method - online panel, Resides in Qld - binary, Binary gender (female, male), Resides in SA - binary, Farmer/Not farmer, Resides in Tas. - binary, Resides in WA - binary, Age (individual years), Resides in Vic. - binary, Urban/rural, Resides in NSW/ACT - binary

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.717	5	2.143	1.336	.246[b]
	Residual	4221.979	2632	1.604		
	Total	4232.696	2637			
2	Regression	156.646	15	10.443	6.718	.000[c]
	Residual	4076.050	2622	1.555		
	Total	4232.696	2637			

a. Dependent Variable: Fishing avidity
b. Predictors: (Constant), Recruitment method - social media, Recruitment method - friends/family/networks, Recruitment method - mail, Recruitment method - past RWS participant, Recruitment method - online panel
c. Predictors: (Constant), Recruitment method - social media, Recruitment method - friends/family/networks, Recruitment method - mail, Recruitment method - past RWS participant, Recruitment method - online panel, Resides in Qld - binary, Binary gender (female, male), Resides in SA - binary, Farmer/Not farmer, Resides in Tas. - binary, Resides in WA - binary, Age (individual years), Resides in Vic. - binary, Urban/rural, Resides in NSW/ACT - binary

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	2.703	.132		20.484	.000
	Recruitment method - online panel	-.262	.139	-.097	-1.885	.060
	Recruitment method - past RWS participant	-.272	.136	-.095	-2.001	.046
	Recruitment method - mail	-.218	.142	-.064	-1.538	.124
	Recruitment method - friends/family/networks	-.263	.152	-.054	-1.728	.084
	Recruitment method - social media	-.140	.143	-.040	-.979	.328
2	(Constant)	1.845	.271		6.819	.000
	Recruitment method - online panel	-.112	.142	-.041	-.787	.432
	Recruitment method - past RWS participant	-.314	.135	-.110	-2.331	.020
	Recruitment method - mail	-.238	.141	-.070	-1.684	.092
	Recruitment method - friends/family/networks	-.203	.151	-.042	-1.347	.178
	Recruitment method - social media	-.025	.142	-.007	-.179	.858
	Binary gender (female, male)	.322	.052	.127	6.178	.000
	Urban/rural	.300	.064	.110	4.682	.000
	Farmer/Not farmer	-.204	.092	-.045	-2.209	.027
	Age (individual years)	.004	.002	.052	2.378	.017
	Resides in NSW/ACT - binary	-.336	.181	-.116	-1.856	.064
	Resides in Vic. - binary	-.372	.182	-.117	-2.039	.042
	Resides in Qld - binary	-.395	.184	-.114	-2.152	.032
	Resides in SA - binary	-.469	.185	-.125	-2.530	.011
	Resides in WA - binary	-.224	.184	-.062	-1.213	.225
	Resides in Tas. - binary	-.361	.188	-.082	-1.915	.056

a. Dependent Variable: Fishing avidity

Excluded Variables[a]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance
1	Binary gender (female, male)	.133[b]	6.755	.000	.131	.960
	Urban/rural	.110[b]	4.853	.000	.094	.735
	Farmer/Not farmer	-.032[b]	-1.565	.118	-.030	.921
	Age (individual years)	.089[b]	4.193	.000	.081	.831
	Resides in NSW/ACT - binary	.000[b]	-.014	.989	.000	.952
	Resides in Vic. - binary	.002[b]	.114	.909	.002	.949
	Resides in Qld - binary	-.021[b]	-1.068	.286	-.021	.982
	Resides in SA - binary	-.046[b]	-2.337	.020	-.046	.974
	Resides in WA - binary	.030[b]	1.489	.136	.029	.961
	Resides in Tas. - binary	.022[b]	1.090	.276	.021	.941

a. Dependent Variable: Fishing avidity

b. Predictors in the Model: (Constant), Recruitment method - social media, Recruitment method - friends/family/networks, Recruitment method - mail, Recruitment method - past RWS participant, Recruitment method - online panel

Appendix 9.4: Regression models – is sample recruitment method a predictor of fishing preferences in 2018 RWS data after controlling for superpopulation benchmark characteristics?

Regression

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Recruitment method - social media, Recruitment method - friends/family/networks, Recruitment method - mail, Recruitment method - past RWS participant, Recruitment method - online panel[b]	.	Enter
2	Resides in Tas. - binary, Resides in Qld - binary, Binary gender (female, male), Resides in SA - binary, Farmer/Not farmer, Age (individual years), Resides in Vic. - binary, Resides in WA - binary, Urban/rural, Resides in NSW/ACT - binary[b]	.	Enter

a. Dependent Variable: "I like to fish where there are several kinds of fish to catch"
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.038[a]	.001	.001	1.005
2	.120[b]	.014	.012	.999

a. Predictors: (Constant), Recruitment method - social media, Recruitment method - friends/family/networks, Recruitment method - mail, Recruitment method - past RWS participant, Recruitment method - online panel
b. Predictors: (Constant), Recruitment method - social media, Recruitment method - friends/family/networks, Recruitment method - mail, Recruitment method - past RWS participant, Recruitment method - online panel, Resides in Tas. - binary, Resides in Qld - binary, Binary gender (female, male), Resides in SA - binary, Farmer/Not farmer, Age (individual years), Resides in Vic. - binary, Resides in WA - binary, Urban/rural, Resides in NSW/ACT - binary

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.650	5	2.130	2.107	.062[b]
	Residual	7342.018	7264	1.011		
	Total	7352.668	7269			
2	Regression	106.398	15	7.093	7.101	.000[c]
	Residual	7246.270	7254	.999		
	Total	7352.668	7269			

a. Dependent Variable: "I like to fish where there are several kinds of fish to catch"
b. Predictors: (Constant), Recruitment method - social media, Recruitment method - friends/family/networks, Recruitment method - mail, Recruitment method - past RWS participant, Recruitment method - online panel
c. Predictors: (Constant), Recruitment method - social media, Recruitment method - friends/family/networks, Recruitment method - mail, Recruitment method - past RWS participant, Recruitment method - online panel, Resides in Tas. - binary, Resides in Qld - binary, Binary gender (female, male), Resides in SA - binary, Farmer/Not farmer, Age (individual years), Resides in Vic. - binary, Resides in WA - binary, Urban/rural, Resides in NSW/ACT - binary

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	3.285	.070		46.944	.000
	Recruitment method - online panel	.126	.072	.062	1.737	.082
	Recruitment method - past RWS participant	.058	.072	.026	.812	.417
	Recruitment method - mail	.121	.075	.041	1.605	.109
	Recruitment method - friends/family/networks	.010	.081	.002	.124	.901
	Recruitment method - social media	.089	.076	.028	1.171	.242
2	(Constant)	3.050	.133		22.972	.000
	Recruitment method - online panel	.111	.074	.055	1.497	.135
	Recruitment method - past RWS participant	.042	.072	.018	.586	.558
	Recruitment method - mail	.108	.075	.037	1.438	.150
	Recruitment method - friends/family/networks	.012	.080	.003	.152	.879
	Recruitment method - social media	.121	.077	.038	1.580	.114
	Binary gender (female, male)	.227	.025	.109	8.946	.000
	Urban/rural	.061	.031	.030	2.006	.045
	Farmer/Not farmer	-.017	.046	-.004	-.359	.719
	Age (individual years)	-.001	.001	-.012	-.975	.330
	Resides in NSW/ACT - binary	-.110	.083	-.049	-1.332	.183
	Resides in Vic. - binary	-.177	.083	-.070	-2.120	.034
	Resides in Qld - binary	-.079	.085	-.028	-.927	.354
	Resides in SA - binary	-.148	.085	-.051	-1.740	.082
	Resides in WA - binary	-.097	.085	-.034	-1.143	.253
	Resides in Tas. - binary	-.217	.089	-.055	-2.432	.015

a. Dependent Variable: “I like to fish where there are several kinds of fish to catch”

Excluded Variables[a]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance
1	Binary gender (female, male)	.105[b]	8.797	.000	.103	.958
	Urban/rural	.022[b]	1.552	.121	.018	.693
	Farmer/Not farmer	.007[b]	.544	.587	.006	.915
	Age (individual years)	.007[b]	.572	.567	.007	.884
	Resides in NSW/ACT - binary	.011[b]	.916	.360	.011	.952
	Resides in Vic. - binary	-.022[b]	-1.857	.063	-.022	.942
	Resides in Qld - binary	.019[b]	1.604	.109	.019	.983
	Resides in SA - binary	-.011[b]	-.936	.349	-.011	.974
	Resides in WA - binary	.006[b]	.486	.627	.006	.948
	Resides in Tas. - binary	-.018[b]	-1.491	.136	-.017	.984

a. Dependent Variable: “I like to fish where there are several kinds of fish to catch”
b. Predictors in the Model: (Constant), Recruitment method - social media, Recruitment method - friends/family/networks, Recruitment method - mail, Recruitment method - past RWS participant, Recruitment method - online panel

Appendix 9.5: Regression models – is sample recruitment method a predictor of importance of different aspects of fishing in 2018 RWS data after controlling for superpopulation benchmark characteristics?

9.5.1 Nature connection

Logistic Regression

Block 1: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	30.699	5	.000
	Block	30.699	5	.000
	Model	30.699	5	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	6061.294[a]	.004	.008

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Classification Table[a]

			Predicted Importance of nature connection when fishing		
	Observed		.00	1.00	Percentage Correct
Step 1	Importance of nature connection when fishing (binary)	.00	0	1118	.0
		1.00	0	5721	100.0
	Overall Percentage				83.7

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Recruitment method - online panel	.201	.198	1.030	1	.310	1.223
	Recruitment method - past RWS participant	-.150	.196	.583	1	.445	.861
	Recruitment method - mail	.085	.206	.171	1	.679	1.089
	Recruitment method - friends/family/networks	.083	.222	.141	1	.708	1.087
	Recruitment method - social media	.432	.215	4.017	1	.045	1.540
	Constant	1.532	.191	64.003	1	.000	4.627

a. Variable(s) entered on step 1: Recruitment method - online panel, Recruitment method - past RWS participant, Recruitment method - mail, Recruitment method - friends/family/networks, Recruitment method - social media.

Block 2: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	56.194	10	.000
	Block	56.194	10	.000
	Model	86.893	15	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	6005.100[a]	.013	.021

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Classification Table[a]

			Predicted		
			Importance of nature connection when fishing		
	Observed		.00	1.00	Percentage Correct
Step 1	Importance of nature connection when fishing (binary)	.00	0	1118	.0
		1.00	0	5721	100.0
	Overall Percentage				83.7

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Recruitment method - online panel	.248	.207	1.434	1	.231	1.281
	Recruitment method - past RWS participant	-.087	.198	.193	1	.660	.917
	Recruitment method - mail	.185	.210	.780	1	.377	1.203
	Recruitment method - friends/family/networks	.050	.223	.050	1	.823	1.051
	Recruitment method - social media	.315	.218	2.089	1	.148	1.371
	Binary gender (female, male)	-.283	.069	16.640	1	.000	.754
	Urban/rural	.217	.088	6.132	1	.013	1.242
	Farmer/Not farmer	.016	.125	.017	1	.897	1.016
	Age (individual years)	-.010	.002	20.090	1	.000	.990
	Resides in NSW/ACT - binary	.214	.229	.872	1	.350	1.239
	Resides in Vic. - binary	.153	.230	.444	1	.505	1.166
	Resides in Qld - binary	.231	.235	.964	1	.326	1.260
	Resides in SA - binary	.357	.238	2.251	1	.134	1.429
	Resides in WA - binary	.324	.237	1.872	1	.171	1.383
	Resides in Tas. - binary	.096	.247	.152	1	.697	1.101
	Constant	1.817	.371	23.997	1	.000	6.156

a. Variable(s) entered on step 1: Binary gender (female, male), Urban/rural, Farmer/Not farmer, Age (individual years), Resides in NSW/ACT - binary, Resides in Vic. - binary, Resides in Qld - binary, Resides in SA - binary, Resides in WA - binary, Resides in Tas. - binary.

9.5.2 Relaxing/unwinding

Logistic Regression

Block 1: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	46.291	5	.000
	Block	46.291	5	.000
	Model	46.291	5	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	6902.848[a]	.007	.011

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Classification Table[a]

			Predicted		
			Importance of relaxing/unwinding when fishing		
	Observed		.00	1.00	Percentage Correct
Step 1	Importance of relaxing/ unwinding when fishing (binary)	.00	0	1431	.0
		1.00	0	5267	100.0
	Overall Percentage				78.6

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Recruitment method - online panel	.301	.181	2.775	1	.096	1.351
	Recruitment method - past RWS participant	-.165	.178	.861	1	.353	.848
	Recruitment method - mail	-.033	.186	.032	1	.858	.967
	Recruitment method - friends/family/networks	.067	.201	.111	1	.739	1.069
	Recruitment method - social media	.259	.193	1.800	1	.180	1.295
	Constant	1.202	.174	47.677	1	.000	3.326

a. Variable(s) entered on step 1: Recruitment method - online panel, Recruitment method - past RWS participant, Recruitment method - mail, Recruitment method - friends/family/networks, Recruitment method - social media.

Block 2: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	38.000	10	.000
	Block	38.000	10	.000
	Model	84.291	15	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	6864.848[a]	.013	.019

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Classification Table[a]

			Predicted		
			Importance of relaxing/unwinding when fishing		
	Observed		.00	1.00	Percentage Correct
Step 1	Importance of relaxing/ unwinding when fishing (binary)	.00	0	1431	.0
		1.00	0	5267	100.0
	Overall Percentage				78.6

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Recruitment method - online panel	.382	.189	4.105	1	.043	1.465
	Recruitment method - past RWS participant	-.187	.180	1.081	1	.298	.829
	Recruitment method - mail	.044	.190	.055	1	.814	1.045
	Recruitment method - friends/family/networks	.029	.202	.021	1	.885	1.030
	Recruitment method - social media	.240	.196	1.503	1	.220	1.272
	Binary gender (female, male)	.074	.065	1.311	1	.252	1.077
	Urban/rural	.272	.080	11.609	1	.001	1.312
	Farmer/Not farmer	.314	.121	6.737	1	.009	1.369
	Age (individual years)	-.007	.002	11.576	1	.001	.993
	Resides in NSW/ACT - binary	.268	.205	1.706	1	.192	1.307
	Resides in Vic. - binary	.209	.206	1.027	1	.311	1.232
	Resides in Qld - binary	.433	.212	4.176	1	.041	1.542
	Resides in SA - binary	.390	.213	3.358	1	.067	1.477
	Resides in WA - binary	.296	.211	1.967	1	.161	1.344
	Resides in Tas. - binary	.180	.222	.663	1	.416	1.198
	Constant	.663	.335	3.920	1	.048	1.941

a. Variable(s) entered on step 1: Binary gender (female, male), Urban/rural, Farmer/Not farmer, Age (individual years), Resides in NSW/ACT - binary, Resides in Vic. - binary, Resides in Qld - binary, Resides in SA - binary, Resides in WA - binary, Resides in Tas. - binary.

9.5.3 Spending time with friends an important part of fishing

Logistic Regression

Block 1: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	125.118	5	.000
	Block	125.118	5	.000
	Model	125.118	5	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	8033.787[a]	.018	.026

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Classification Table[a]

			Predicted Importance of time with friends/family when fishing (binary)		
	Observed		.00	1.00	Percentage Correct
Step 1	Importance of time with friends/family when fishing (binary)	.00	0	1970	.0
		1.00	0	4791	100.0
	Overall Percentage				70.9

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Recruitment method - online panel	.664	.163	16.521	1	.000	1.942
	Recruitment method - past RWS participant	-.045	.161	.077	1	.781	.956
	Recruitment method - mail	.152	.168	.816	1	.366	1.164
	Recruitment method - friends/family/networks	.156	.181	.743	1	.389	1.168
	Recruitment method - social media	.370	.172	4.623	1	.032	1.448
	Constant	.565	.157	12.912	1	.000	1.759

a. Variable(s) entered on step 1: Recruitment method - online panel, Recruitment method - past RWS participant, Recruitment method - mail, Recruitment method - friends/family/networks, Recruitment method - social media.

Block 2: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	84.090	10	.000
	Block	84.090	10	.000
	Model	209.208	15	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	7949.697[a]	.030	.043

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Classification Table[a]

			Predicted		
			Importance of time with friends/family when fishing (binary)		
	Observed		.00	1.00	Percentage Correct
Step 1	Importance of time with friends/family when fishing (binary)	.00	3	1967	.2
		1.00	2	4789	100.0
	Overall Percentage				70.9

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Recruitment method - online panel	.574	.170	11.401	1	.001	1.776
	Recruitment method - past RWS participant	.020	.163	.015	1	.903	1.020
	Recruitment method - mail	.211	.171	1.522	1	.217	1.235
	Recruitment method - friends/family/networks	.159	.182	.758	1	.384	1.172
	Recruitment method - social media	.332	.175	3.586	1	.058	1.393
	Binary gender (female, male)	.067	.059	1.289	1	.256	1.069
	Urban/rural	.044	.072	.375	1	.540	1.045
	Farmer/Not farmer	.234	.105	4.990	1	.025	1.263
	Age (individual years)	-.014	.002	61.044	1	.000	.986
	Resides in NSW/ACT - binary	-.167	.195	.730	1	.393	.846
	Resides in Vic. - binary	-.021	.197	.012	1	.913	.979
	Resides in Qld - binary	-.016	.200	.006	1	.937	.984
	Resides in SA - binary	.102	.202	.252	1	.615	1.107
	Resides in WA - binary	.132	.202	.426	1	.514	1.141
	Resides in Tas. - binary	-.207	.209	.986	1	.321	.813
	Constant	1.159	.309	14.030	1	.000	3.187

a. Variable(s) entered on step 1: Binary gender (female, male), Urban/rural, Farmer/Not farmer, Age (individual years), Resides in NSW/ACT - binary, Resides in Vic. - binary, Resides in Qld - binary, Resides in SA - binary, Resides in WA - binary, Resides in Tas. - binary.

Appendix 9.6: Regression models – is sample recruitment method a predictor of fishing-related outcomes in Stage 2 data?

9.6.1 Regression model, Stage 2 data – dependent variable 'I like to fish where there are several types of fish'

Current fishers (went fishing in last 12 months)

Variables Entered/Removed[a,b]

Model	Variables Entered	Variables Removed	Method
1	Recruitment method - mail, Recruitment method - email, Recruitment method - traditional media, Recruitment method - friends/family, Recruitment method - fishing club/org, Recruitment method - online panel, Recruitment method - social media[c]	.	Enter
2	Aboriginal/Torres Strait Islander, Born in Australia or overseas, Household income, Place of residence (urban, rural), Binary gender (male, female), Fishing avidity (full scale), Age (single years)[c]	.	Enter

a. Current fishers (went fishing in last 12 months)
b. Dependent Variable: "I like to fish where there are several kinds of fish to catch"
c. All requested variables entered.

Model Summary[a]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.028[b]	.001	.000	.986
2	.049[c]	.002	.000	.986

a. Current fishers (went fishing in last 12 months)
b. Predictors: (Constant), Recruitment method - mail, Recruitment method - email, Recruitment method - traditional media, Recruitment method - friends/family, Recruitment method - fishing club/org, Recruitment method - online panel, Recruitment method - social media
c. Predictors: (Constant), Recruitment method - mail, Recruitment method - email, Recruitment method - traditional media, Recruitment method - friends/family, Recruitment method - fishing club/org, Recruitment method - online panel, Recruitment method - social media, Aboriginal/Torres Strait Islander, Born in Australia or overseas, Household income, Place of residence (urban, rural), Binary gender (male, female), Fishing avidity (full scale), Age (single years)

ANOVA[a,b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.980	7	.711	.732	.645[c]
	Residual	6162.311	6338	.972		
	Total	6167.290	6345			
2	Regression	14.546	14	1.039	1.069	.381[d]
	Residual	6152.744	6331	.972		
	Total	6167.290	6345			

a. Current fishers (went fishing in last 12 months)
b. Dependent Variable: "I like to fish where there are several kinds of fish to catch"
c. Predictors: (Constant), Recruitment method - mail, Recruitment method - email, Recruitment method - traditional media, Recruitment method - friends/family, Recruitment method - fishing club/org, Recruitment method - online panel, Recruitment method - social media
d. Predictors: (Constant), Recruitment method - mail, Recruitment method - email, Recruitment method - traditional media, Recruitment method - friends/family, Recruitment method - fishing club/org, Recruitment method - online panel, Recruitment method - social media, Aboriginal/Torres Strait Islander, Born in Australia or overseas, Household income, Place of residence (urban, rural), Binary gender (male, female), Fishing avidity (full scale), Age (single years)

Coefficients[a,b]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	3.911	.046		85.678	.000
	Recruitment method - online panel	-.017	.036	-.007	-.465	.642
	Recruitment method - email	.093	.050	.039	1.852	.064
	Recruitment method - social media	.036	.046	.018	.797	.426
	Recruitment method - traditional media	.030	.064	.007	.473	.636
	Recruitment method - fishing club/org	.012	.050	.004	.249	.803
	Recruitment method - friends/family	.020	.055	.006	.368	.713
	Recruitment method - mail	.078	.086	.012	.900	.368
2	(Constant)	3.676	.130		28.168	.000
	Recruitment method - online panel	.012	.042	.005	.283	.777
	Recruitment method - email	.090	.050	.038	1.788	.074
	Recruitment method - social media	.047	.046	.024	1.020	.308
	Recruitment method - traditional media	.036	.064	.008	.566	.571
	Recruitment method - fishing club/org	.020	.050	.007	.394	.693
	Recruitment method - friends/family	.036	.055	.010	.646	.518
	Recruitment method - mail	.089	.087	.014	1.032	.302
	Binary gender (male, female)	.044	.034	.018	1.307	.191
	Age (single years)	.001	.001	.014	.976	.329
	Aboriginal/Torres Strait Islander	.071	.061	.015	1.165	.244
	Born in Australia or overseas	.022	.036	.008	.595	.552
	Household income	-.012	.008	-.020	-1.496	.135
	Place of residence (urban, rural)	.039	.026	.020	1.498	.134
	Fishing avidity (full scale)	-.001	.006	-.003	-.212	.832

a. Current fishers (went fishing in last 12 months)
b. Dependent Variable: “I like to fish where there are several kinds of fish to catch”

Excluded Variables[a,b]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance
1	Binary gender (male, female)	.017[c]	1.248	.212	.016	.893
	Age (single years)	.022[c]	1.591	.112	.020	.840
	Aboriginal/Torres Strait Islander	.014[c]	1.101	.271	.014	.982
	Born in Australia or overseas	.007[c]	.522	.602	.007	.982
	Household income	-.022[c]	-1.735	.083	-.022	.969
	Place of residence (urban, rural)	.020[c]	1.504	.133	.019	.933
	Fishing avidity (full scale)	-.001[c]	-.089	.929	-.001	.814

a. Current fishers (went fishing in last 12 months)
b. Dependent Variable: “I like to fish where there are several kinds of fish to catch”
c. Predictors in the Model: (Constant), Recruitment method - mail, Recruitment method - email, Recruitment method - traditional media, Recruitment method - friends/family, Recruitment method - fishing club/org, Recruitment method - online panel, Recruitment method - social media

9.6.2 Regression model, Stage 2 data – dependent variable importance of spending time outdoors

Current fishers (went fishing in last 12 months)

Variables Entered/Removed[a,b]

Model	Variables Entered	Variables Removed	Method
1	Recruitment method - mail, Recruitment method - email, Recruitment method - traditional media, Recruitment method - friends/family, Recruitment method - fishing club/org, Recruitment method - online panel, Recruitment method - social media[c]	.	Enter
2	Aboriginal/Torres Strait Islander, Born in Australia or overseas, Household income, Place of residence (urban, rural), Binary gender (male, female), Fishing avidity (full scale), Age (single years)[c]	.	Enter

a. Current fishers (went fishing in last 12 months)
b. Dependent Variable: Self-rated importance of fishing for spending time outdoors
c. All requested variables entered.

Model Summary[a]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.274[b]	.075	.074	1.522
2	.321[c]	.103	.101	1.500

a. Current fishers (went fishing in last 12 months)
b. Predictors: (Constant), Recruitment method - mail, Recruitment method - email, Recruitment method - traditional media, Recruitment method - friends/family, Recruitment method - fishing club/org, Recruitment method - online panel, Recruitment method - social media
c. Predictors: (Constant), Recruitment method - mail, Recruitment method - email, Recruitment method - traditional media, Recruitment method - friends/family, Recruitment method - fishing club/org, Recruitment method - online panel, Recruitment method - social media, Aboriginal/Torres Strait Islander, Born in Australia or overseas, Household income, Place of residence (urban, rural), Binary gender (male, female), Fishing avidity (full scale), Age (single years)

ANOVA[a,b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1193.373	7	170.482	73.596	.000[c]
	Residual	14695.564	6344	2.316		
	Total	15888.937	6351			
2	Regression	1637.885	14	116.992	52.023	.000[d]
	Residual	14251.051	6337	2.249		
	Total	15888.937	6351			

a. Current fishers (went fishing in last 12 months)
b. Dependent Variable: Self-rated importance of fishing for spending time outdoors
c. Predictors: (Constant), Recruitment method - mail, Recruitment method - email, Recruitment method - traditional media, Recruitment method - friends/family, Recruitment method - fishing club/org, Recruitment method - online panel, Recruitment method - social media
d. Predictors: (Constant), Recruitment method - mail, Recruitment method - email, Recruitment method - traditional media, Recruitment method - friends/family, Recruitment method - fishing club/org, Recruitment method - online panel, Recruitment method - social media, Aboriginal/Torres Strait Islander, Born in Australia or overseas, Household income, Place of residence (urban, rural), Binary gender (male, female), Fishing avidity (full scale), Age (single years)

Coefficients[a,b]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	8.616	.070		122.792	.000
	Recruitment method - online panel	-.985	.056	-.257	-17.675	.000
	Recruitment method - email	.107	.077	.028	1.384	.166
	Recruitment method - social media	.192	.070	.060	2.745	.006
	Recruitment method - traditional media	.257	.098	.036	2.625	.009
	Recruitment method - fishing club/org	.133	.077	.027	1.734	.083
	Recruitment method - friends/family	-.019	.084	-.003	-.221	.825
	Recruitment method - mail	.019	.132	.002	.142	.887
2	(Constant)	8.265	.198		41.717	.000
	Recruitment method - online panel	-.730	.063	-.190	-11.534	.000
	Recruitment method - email	.114	.076	.030	1.499	.134
	Recruitment method - social media	.146	.070	.046	2.086	.037
	Recruitment method - traditional media	.177	.097	.025	1.821	.069
	Recruitment method - fishing club/org	.043	.076	.009	.557	.578
	Recruitment method - friends/family	-.022	.084	-.004	-.264	.792
	Recruitment method - mail	.033	.130	.003	.251	.802
	Binary gender (male, female)	-.076	.051	-.019	-1.473	.141
	Age (single years)	.004	.001	.034	2.542	.011
	Aboriginal/Torres Strait Islander	-.271	.093	-.035	-2.922	.003
	Born in Australia or overseas	-.044	.055	-.010	-.794	.427
	Household income	.026	.012	.026	2.134	.033
	Place of residence (urban, rural)	-.058	.040	-.018	-1.459	.145
	Fishing avidity (full scale)	.121	.009	.177	13.269	.000

a. Current fishers (went fishing in last 12 months)
b. Dependent Variable: Self-rated importance of fishing for spending time outdoors

Excluded Variables[a,b]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance
1	Binary gender (male, female)	.008[c]	.632	.528	.008	.894
	Age (single years)	.023[c]	1.706	.088	.021	.838
	Aboriginal/Torres Strait Islander	-.037[c]	-3.043	.002	-.038	.982
	Born in Australia or overseas	-.010[c]	-.810	.418	-.010	.982
	Household income	.027[c]	2.219	.026	.028	.968
	Place of residence (urban, rural)	-.007[c]	-.570	.569	-.007	.932
	Fishing avidity (full scale)	.176[c]	13.312	.000	.165	.813

a. Current fishers (went fishing in last 12 months)
b. Dependent Variable: Self-rated importance of fishing for spending time outdoors
c. Predictors in the Model: (Constant), Recruitment method - mail, Recruitment method - email, Recruitment method - traditional media, Recruitment method - friends/family, Recruitment method - fishing club/org, Recruitment method - online panel, Recruitment method - social media

9.6.3 Regression model, Stage 2 data – dependent variable importance of relaxing/unwinding

Current fishers (went fishing in last 12 months)

Variables Entered/Removed[a,b]

Model	Variables Entered	Variables Removed	Method
1	Recruitment method - mail, Recruitment method - email, Recruitment method - traditional media, Recruitment method - friends/family, Recruitment method - fishing club/org, Recruitment method - online panel, Recruitment method - social media[c]	.	Enter
2	Aboriginal/Torres Strait Islander, Born in Australia or overseas, Household income, Place of residence (urban, rural), Binary gender (male, female), Fishing avidity (full scale), Age (single years)[c]	.	Enter

a. Current fishers (went fishing in last 12 months)
b. Dependent Variable: Importance of fishing for relaxing/ unwinding
c. All requested variables entered.

Model Summary[a]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.214[b]	.046	.045	1.748
2	.263[c]	.069	.067	1.728

a. Current fishers (went fishing in last 12 months)
b. Predictors: (Constant), Recruitment method - mail, Recruitment method - email, Recruitment method - traditional media, Recruitment method - friends/family, Recruitment method - fishing club/org, Recruitment method - online panel, Recruitment method - social media
c. Predictors: (Constant), Recruitment method - mail, Recruitment method - email, Recruitment method - traditional media, Recruitment method - friends/family, Recruitment method - fishing club/org, Recruitment method - online panel, Recruitment method - social media, Aboriginal/Torres Strait Islander, Born in Australia or overseas, Household income, Place of residence (urban, rural), Binary gender (male, female), Fishing avidity (full scale), Age (single years)

ANOVA[a,b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	933.004	7	133.286	43.599	.000[c]
	Residual	19482.955	6373	3.057		
	Total	20415.959	6380			
2	Regression	1410.124	14	100.723	33.737	.000[d]
	Residual	19005.835	6366	2.986		
	Total	20415.959	6380			

a. Current fishers (went fishing in last 12 months)
b. Dependent Variable: Importance of fishing for relaxing/ unwinding
c. Predictors: (Constant), Recruitment method - mail, Recruitment method - email, Recruitment method - traditional media, Recruitment method - friends/family, Recruitment method - fishing club/org, Recruitment method - online panel, Recruitment method - social media
d. Predictors: (Constant), Recruitment method - mail, Recruitment method - email, Recruitment method - traditional media, Recruitment method - friends/family, Recruitment method - fishing club/org, Recruitment method - online panel, Recruitment method - social media, Aboriginal/Torres Strait Islander, Born in Australia or overseas, Household income, Place of residence (urban, rural), Binary gender (male, female), Fishing avidity (full scale), Age (single years)

Coefficients[a,b]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	8.331	.080		103.739	.000
	Recruitment method - online panel	-.732	.064	-.169	-11.454	.000
	Recruitment method - email	.100	.088	.023	1.130	.259
	Recruitment method - social media	.318	.080	.088	3.965	.000
	Recruitment method - traditional media	.301	.112	.037	2.689	.007
	Recruitment method - fishing club/org	.203	.088	.037	2.306	.021
	Recruitment method - friends/family	-.139	.097	-.021	-1.434	.151
	Recruitment method - mail	-.081	.151	-.007	-.533	.594
2	(Constant)	7.567	.228		33.172	.000
	Recruitment method - online panel	-.400	.073	-.092	-5.498	.000
	Recruitment method - email	.101	.088	.024	1.149	.251
	Recruitment method - social media	.285	.080	.079	3.540	.000
	Recruitment method - traditional media	.218	.111	.027	1.960	.050
	Recruitment method - fishing club/org	.108	.088	.020	1.236	.217
	Recruitment method - friends/family	-.114	.096	-.017	-1.181	.237
	Recruitment method - mail	-.051	.150	-.004	-.337	.736
	Binary gender (male, female)	.076	.059	.017	1.288	.198
	Age (single years)	.006	.002	.049	3.620	.000
	Aboriginal/Torres Strait Islander	-.238	.107	-.027	-2.223	.026
	Born in Australia or overseas	-.062	.064	-.012	-.969	.333
	Household income	.010	.014	.009	.711	.477
	Place of residence (urban, rural)	-.016	.046	-.004	-.351	.726
	Fishing avidity (full scale)	.120	.010	.155	11.418	.000

a. Current fishers (went fishing in last 12 months)
b. Dependent Variable: Importance of fishing for relaxing/ unwinding

Excluded Variables[a,b]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance
1	Binary gender (male, female)	.042[c]	3.231	.001	.040	.894
	Age (single years)	.047[c]	3.502	.000	.044	.838
	Aboriginal/Torres Strait Islander	-.030[c]	-2.396	.017	-.030	.982
	Born in Australia or overseas	-.013[c]	-1.050	.294	-.013	.981
	Household income	.008[c]	.614	.539	.008	.969
	Place of residence (urban, rural)	.006[c]	.472	.637	.006	.932
	Fishing avidity (full scale)	.158[c]	11.740	.000	.146	.813

a. Current fishers (went fishing in last 12 months)
b. Dependent Variable: Importance of fishing for relaxing/ unwinding
c. Predictors in the Model: (Constant), Recruitment method - mail, Recruitment method - email, Recruitment method - traditional media, Recruitment method - friends/family, Recruitment method - fishing club/org, Recruitment method - online panel, Recruitment method - social media

9.6.4 Regression model, Stage 2 data – dependent variable importance of spending time with friends

Current fishers (went fishing in last 12 months)

Variables Entered/Removed[a,b]

Model	Variables Entered	Variables Removed	Method
1	Recruitment method - mail, Recruitment method - email, Recruitment method - traditional media, Recruitment method - friends/family, Recruitment method - fishing club/org, Recruitment method - online panel, Recruitment method - social media[c]	.	Enter
2	Aboriginal/Torres Strait Islander, Born in Australia or overseas, Household income, Place of residence (urban, rural), Binary gender (male, female), Fishing avidity (full scale), Age (single years)[c]	.	Enter

a. Current fishers (went fishing in last 12 months)
b. Dependent Variable: Importance of fishing for spending time with friends
c. All requested variables entered.

Model Summary[a]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.096[b]	.009	.008	2.718
2	.175[c]	.031	.029	2.689

a. Current fishers (went fishing in last 12 months)
b. Predictors: (Constant), Recruitment method - mail, Recruitment method - email, Recruitment method - traditional media, Recruitment method - friends/family, Recruitment method - fishing club/org, Recruitment method - online panel, Recruitment method - social media
c. Predictors: (Constant), Recruitment method - mail, Recruitment method - email, Recruitment method - traditional media, Recruitment method - friends/family, Recruitment method - fishing club/org, Recruitment method - online panel, Recruitment method - social media, Aboriginal/Torres Strait Islander, Born in Australia or overseas, Household income, Place of residence (urban, rural), Binary gender (male, female), Fishing avidity (full scale), Age (single years)

ANOVA[a,b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	434.004	7	62.001	8.395	.000[c]
	Residual	46608.742	6311	7.385		
	Total	47042.746	6318			
2	Regression	1447.826	14	103.416	14.298	.000[d]
	Residual	45594.920	6304	7.233		
	Total	47042.746	6318			

a. Current fishers (went fishing in last 12 months)
b. Dependent Variable: Importance of fishing for spending time with friends
c. Predictors: (Constant), Recruitment method - mail, Recruitment method - email, Recruitment method - traditional media, Recruitment method - friends/family, Recruitment method - fishing club/org, Recruitment method - online panel, Recruitment method - social media
d. Predictors: (Constant), Recruitment method - mail, Recruitment method - email, Recruitment method - traditional media, Recruitment method - friends/family, Recruitment method - fishing club/org, Recruitment method - online panel, Recruitment method - social media, Aboriginal/Torres Strait Islander, Born in Australia or overseas, Household income, Place of residence (urban, rural), Binary gender (male, female), Fishing avidity (full scale), Age (single years)

Coefficients[a,b]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	6.311	.126		50.271	.000
	Recruitment method - online panel	.096	.100	.015	.966	.334
	Recruitment method - email	.058	.138	.009	.422	.673
	Recruitment method - social media	.545	.125	.099	4.345	.000
	Recruitment method - traditional media	.333	.175	.027	1.898	.058
	Recruitment method - fishing club/org	.628	.137	.075	4.567	.000
	Recruitment method - friends/family	.569	.151	.056	3.764	.000
	Recruitment method - mail	.666	.235	.038	2.833	.005
2	(Constant)	6.147	.357		17.220	.000
	Recruitment method - online panel	.167	.114	.025	1.467	.142
	Recruitment method - email	.163	.137	.025	1.183	.237
	Recruitment method - social media	.343	.126	.062	2.728	.006
	Recruitment method - traditional media	.100	.175	.008	.574	.566
	Recruitment method - fishing club/org	.492	.137	.059	3.583	.000
	Recruitment method - friends/family	.460	.151	.045	3.053	.002
	Recruitment method - mail	.591	.234	.033	2.527	.012
	Binary gender (male, female)	.606	.093	.088	6.537	.000
	Age (single years)	-.015	.003	-.081	-5.786	.000
	Aboriginal/Torres Strait Islander	-.372	.167	-.028	-2.222	.026
	Born in Australia or overseas	-.176	.099	-.022	-1.773	.076
	Household income	.070	.022	.041	3.197	.001
	Place of residence (urban, rural)	-.146	.072	-.027	-2.039	.042
	Fishing avidity (full scale)	.078	.016	.066	4.779	.000

a. Current fishers (went fishing in last 12 months)
b. Dependent Variable: Importance of fishing for spending time with friends

Excluded Variables[a,b]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance
1	Binary gender (male, female)	.090[c]	6.800	.000	.085	.893
	Age (single years)	-.080[c]	-5.889	.000	-.074	.839
	Aboriginal/Torres Strait Islander	-.032[c]	-2.553	.011	-.032	.981
	Born in Australia or overseas	-.026[c]	-2.064	.039	-.026	.981
	Household income	.064[c]	5.048	.000	.063	.967
	Place of residence (urban, rural)	-.031[c]	-2.367	.018	-.030	.932
	Fishing avidity (full scale)	.080[c]	5.743	.000	.072	.812

a. Current fishers (went fishing in last 12 months)
b. Dependent Variable: Importance of fishing for spending time with friends
c. Predictors in the Model: (Constant), Recruitment method - mail, Recruitment method - email, Recruitment method - traditional media, Recruitment method - friends/family, Recruitment method - fishing club/org, Recruitment method - online panel, Recruitment method - social media

9.6.5 Regression model, Stage 2 data – dependent variable fishing expenditure – self-reported estimated total

Current fishers (went fishing in last 12 months)

Variables Entered/Removed[a,b]

Model	Variables Entered	Variables Removed	Method
1	Recruitment method - mail, Recruitment method - email, Recruitment method - traditional media, Recruitment method - friends/family, Recruitment method - fishing club/org, Recruitment method - online panel, Recruitment method - social media[c]	.	Enter
2	Aboriginal/Torres Strait Islander, Born in Australia or overseas, Household income, Place of residence (urban, rural), Binary gender (male, female), Fishing avidity (full scale), Age (single years)[c]	.	Enter

a. Current fishers (went fishing in last 12 months)
b. Dependent Variable: Self-estimated total fishing expenditure
c. All requested variables entered.

Model Summary[a]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.315[b]	.099	.098	3.516
2	.527[c]	.278	.276	3.151

a. Current fishers (went fishing in last 12 months)
b. Predictors: (Constant), Recruitment method - mail, Recruitment method - email, Recruitment method - traditional media, Recruitment method - friends/family, Recruitment method - fishing club/org, Recruitment method - online panel, Recruitment method - social media
c. Predictors: (Constant), Recruitment method - mail, Recruitment method - email, Recruitment method - traditional media, Recruitment method - friends/family, Recruitment method - fishing club/org, Recruitment method - online panel, Recruitment method - social media, Aboriginal/Torres Strait Islander, Born in Australia or overseas, Household income, Place of residence (urban, rural), Binary gender (male, female), Fishing avidity (full scale), Age (single years)

ANOVA[a,b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8704.702	7	1243.529	100.584	.000[c]
	Residual	78851.634	6378	12.363		
	Total	87556.336	6385			
2	Regression	24301.939	14	1735.853	174.836	.000[d]
	Residual	63254.397	6371	9.928		
	Total	87556.336	6385			

a. Current fishers (went fishing in last 12 months)
b. Dependent Variable: Self-estimated total fishing expenditure
c. Predictors: (Constant), Recruitment method - mail, Recruitment method - email, Recruitment method - traditional media, Recruitment method - friends/family, Recruitment method - fishing club/org, Recruitment method - online panel, Recruitment method - social media
d. Predictors: (Constant), Recruitment method - mail, Recruitment method - email, Recruitment method - traditional media, Recruitment method - friends/family, Recruitment method - fishing club/org, Recruitment method - online panel, Recruitment method - social media, Aboriginal/Torres Strait Islander, Born in Australia or overseas, Household income, Place of residence (urban, rural), Binary gender (male, female), Fishing avidity (full scale), Age (single years)

Coefficients[a,b]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	4.235	.161		26.231	.000
	Recruitment method - online panel	-1.555	.129	-.173	-12.090	.000
	Recruitment method - email	.208	.178	.023	1.169	.243
	Recruitment method - social media	1.371	.161	.184	8.497	.000
	Recruitment method - traditional media	1.858	.225	.110	8.247	.000
	Recruitment method - fishing club/org	2.462	.177	.217	13.921	.000
	Recruitment method - friends/family	.919	.194	.067	4.731	.000
	Recruitment method - mail	1.801	.304	.075	5.923	.000
2	(Constant)	-.516	.416		-1.241	.215
	Recruitment method - online panel	-.245	.133	-.027	-1.843	.065
	Recruitment method - email	.370	.160	.042	2.313	.021
	Recruitment method - social media	.892	.146	.119	6.087	.000
	Recruitment method - traditional media	1.155	.203	.068	5.685	.000
	Recruitment method - fishing club/org	1.886	.160	.166	11.789	.000
	Recruitment method - friends/family	.680	.175	.049	3.881	.000
	Recruitment method - mail	1.919	.274	.080	7.013	.000
	Binary gender (male, female)	.474	.108	.051	4.393	.000
	Age (single years)	-.009	.003	-.036	-3.004	.003
	Aboriginal/Torres Strait Islander	-.594	.195	-.033	-3.048	.002
	Born in Australia or overseas	-.318	.116	-.030	-2.750	.006
	Household income	.638	.026	.278	24.994	.000
	Place of residence (urban, rural)	.108	.083	.014	1.293	.196
	Fishing avidity (full scale)	.511	.019	.319	26.728	.000

a. Current fishers (went fishing in last 12 months)
b. Dependent Variable: Self-estimated total fishing expenditure

Excluded Variables[a,b]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance
1	Binary gender (male, female)	.101[c]	8.065	.000	.100	.893
	Age (single years)	-.087[c]	-6.739	.000	-.084	.839
	Aboriginal/Torres Strait Islander	-.034[c]	-2.840	.005	-.036	.981
	Born in Australia or overseas	-.042[c]	-3.544	.000	-.044	.981
	Household income	.298[c]	25.911	.000	.309	.968
	Place of residence (urban, rural)	.005[c]	.381	.703	.005	.932
	Fishing avidity (full scale)	.342[c]	27.395	.000	.324	.812

a. Current fishers (went fishing in last 12 months)
b. Dependent Variable: Self-estimated total fishing expenditure
c. Predictors in the Model: (Constant), Recruitment method - mail, Recruitment method - email, Recruitment method - traditional media, Recruitment method - friends/family, Recruitment method - fishing club/org, Recruitment method - online panel, Recruitment method - social media

9.6.7 Regression model, Stage 2 data – dependent variable fishing expenditure – calculated from individual items

Current fishers (went fishing in last 12 months)

Variables Entered/Removed[a,b]

Model	Variables Entered	Variables Removed	Method
1	Recruitment method - mail, Recruitment method - email, Recruitment method - traditional media, Recruitment method - friends/family, Recruitment method - fishing club/org, Recruitment method - online panel, Recruitment method - social media[c]	.	Enter
2	Aboriginal/Torres Strait Islander, Born in Australia or overseas, Household income, Place of residence (urban, rural), Binary gender (male, female), Fishing avidity (full scale), Age (single years)[c]	.	Enter

a. Current fishers (went fishing in last 12 months)
b. Dependent Variable: Total fishing expenditure calculated from reported expenditure on multiple fishing related items
c. All requested variables entered.

Model Summary[a]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.124[b]	.015	.014	19612.218	.015	14.054	7	6349	.000
2	.216[c]	.047	.045	19307.220	.031	29.882	7	6342	.000

a. Current fishers (went fishing in last 12 months)
b. Predictors: (Constant), Recruitment method - mail, Recruitment method - email, Recruitment method - traditional media, Recruitment method - friends/family, Recruitment method - fishing club/org, Recruitment method - online panel, Recruitment method - social media
c. Predictors: (Constant), Recruitment method - mail, Recruitment method - email, Recruitment method - traditional media, Recruitment method - friends/family, Recruitment method - fishing club/org, Recruitment method - online panel, Recruitment method - social media, Aboriginal/Torres Strait Islander, Born in Australia or overseas, Household income, Place of residence (urban, rural), Binary gender (male, female), Fishing avidity (full scale), Age (single years)

ANOVA[a,b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	37839504605.263	7	5405643515.038	14.054	.000[c]
	Residual	2442073631128.835	6349	384639097.673		
	Total	2479913135734.098	6356			
2	Regression	115813720225.418	14	8272408587.530	22.192	.000[d]
	Residual	2364099415508.680	6342	372768750.474		
	Total	2479913135734.098	6356			

a. Current fishers (went fishing in last 12 months)
b. Dependent Variable: Total fishing expenditure calculated from reported expenditure on multiple fishing related items
c. Predictors: (Constant), Recruitment method - mail, Recruitment method - email, Recruitment method - traditional media, Recruitment method - friends/family, Recruitment method - fishing club/org, Recruitment method - online panel, Recruitment method - social media
d. Predictors: (Constant), Recruitment method - mail, Recruitment method - email, Recruitment method - traditional media, Recruitment method - friends/family, Recruitment method - fishing club/org, Recruitment method - online panel, Recruitment method - social media, Aboriginal/Torres Strait Islander, Born in Australia or overseas, Household income, Place of residence (urban, rural), Binary gender (male, female), Fishing avidity (full scale), Age (single years)

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	5817.005	902.356		6.446	.000
	Recruitment method - online panel	-4165.819	718.607	-.087	-5.797	.000
	Recruitment method - email	1056.631	991.980	.022	1.065	.287
	Recruitment method - social media	2218.723	901.436	.056	2.461	.014
	Recruitment method - traditional media	2271.549	1257.216	.025	1.807	.071
	Recruitment method - fishing club/org	5376.757	987.882	.089	5.443	.000
	Recruitment method - friends/family	2001.846	1085.977	.027	1.843	.065
	Recruitment method - mail	3940.181	1700.994	.031	2.316	.021
2	(Constant)	-6439.678	2556.906		-2.519	.012
	Recruitment method - online panel	-803.445	815.734	-.017	-.985	.325
	Recruitment method - email	1245.050	982.188	.026	1.268	.205
	Recruitment method - social media	1330.583	899.631	.033	1.479	.139
	Recruitment method - traditional media	857.440	1245.613	.010	.688	.491
	Recruitment method - fishing club/org	3997.844	982.024	.066	4.071	.000
	Recruitment method - friends/family	1630.534	1076.238	.022	1.515	.130
	Recruitment method - mail	4315.189	1681.523	.033	2.566	.010
	Binary gender (male, female)	661.627	664.040	.013	.996	.319
	Age (single years)	15.140	18.849	.011	.803	.422
	Aboriginal/Torres Strait Islander	-2144.392	1201.078	-.022	-1.785	.074
	Born in Australia or overseas	-101.818	711.553	-.002	-.143	.886
	Household income	1466.848	156.692	.120	9.361	.000
	Place of residence (urban, rural)	414.274	511.491	.010	.810	.418
	Fishing avidity (full scale)	1175.245	117.295	.138	10.020	.000

Excluded Variables[a,b]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance
1	Binary gender (male, female)	.038[c]	2.891	.004	.036	.893
	Age (single years)	-.012[c]	-.862	.389	-.011	.838
	Aboriginal/Torres Strait Islander	-.021[c]	-1.680	.093	-.021	.981
	Born in Australia or overseas	-.007[c]	-.545	.585	-.007	.981
	Household income	.122[c]	9.749	.000	.121	.968
	Place of residence (urban, rural)	.006[c]	.500	.617	.006	.932
	Fishing avidity (full scale)	.146[c]	10.687	.000	.133	.812

a. Current fishers (went fishing in last 12 months)
b. Dependent Variable: Total fishing expenditure calculated from reported expenditure on multiple fishing related items
c. Predictors in the Model: (Constant), Recruitment method - mail, Recruitment method - email, Recruitment method - traditional media, Recruitment method - friends/family, Recruitment method - fishing club/org, Recruitment method - online panel, Recruitment method - social media

9.6.7 Regression model, Stage 2 data – dependent variable fished less days than previous year or same/more

Current fishers (went fishing in last 12 months)

Logistical regression

Block 1: Method = Enter

Omnibus Tests of Model Coefficients[a]

		Chi-square	df	Sig.
Step 1	Step	39.904	7	.000
	Block	39.904	7	.000
	Model	39.904	7	.000

a. Current fishers (went fishing in last 12 months)

Model Summary[a]

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	5931.594[b]	.006	.010

a. Current fishers (went fishing in last 12 months)
b. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Classification Table[a,b]

			Predicted		
			Fishing compared to previous year (binary)		
	Observed		.00	1.00	Percentage Correct
Step 1	Fishing compared to previous year (binary)	.00	0	1141	.0
		1.00	0	5186	100.0
	Overall Percentage				82.0

a. Current fishers (went fishing in last 12 months)
b. The cut value is .500

Variables in the Equation[a]

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[b]	Recruitment method - online panel	-.064	.093	.482	1	.487	.938
	Recruitment method - email	.070	.147	.227	1	.634	1.072
	Recruitment method - social media	.373	.140	7.153	1	.007	1.453
	Recruitment method - traditional media	.884	.214	17.134	1	.000	2.421
	Recruitment method - fishing club/org	.322	.150	4.609	1	.032	1.379
	Recruitment method - friends/family	.302	.161	3.516	1	.061	1.352
	Recruitment method - mail	.221	.237	.869	1	.351	1.248
	Constant	1.205	.140	74.379	1	.000	3.337

a. Current fishers (went fishing in last 12 months)
b. Variable(s) entered on step 1: Recruitment method - online panel, Recruitment method - email, Recruitment method - social media, Recruitment method - traditional media, Recruitment method - fishing club/org, Recruitment method - friends/family, Recruitment method - mail.

Block 2: Method = Enter

Omnibus Tests of Model Coefficients[a]

		Chi-square	df	Sig.
Step 1	Step	382.495	7	.000
	Block	382.495	7	.000
	Model	422.399	14	.000

a. Current fishers (went fishing in last 12 months)

Model Summary[a]

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	5549.099[b]	.065	.106

a. Current fishers (went fishing in last 12 months)
b. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Classification Table[a,b]

			Predicted		
			Fishing compared to previous year (binary)		
	Observed		.00	1.00	Percentage Correct
Step 1	Fishing compared to previous year (binary)	.00	17	1124	1.5
		1.00	14	5172	99.7
	Overall Percentage				82.0

a. Current fishers (went fishing in last 12 months)
b. The cut value is .500

Variables in the Equation[a]

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[b]	Recruitment method - online panel	.409	.108	14.276	1	.000	1.505
	Recruitment method - email	.205	.149	1.896	1	.168	1.228
	Recruitment method - social media	.153	.141	1.179	1	.278	1.166
	Recruitment method - traditional media	.581	.215	7.301	1	.007	1.787
	Recruitment method - fishing club/org	.105	.151	.484	1	.487	1.111
	Recruitment method - friends/family	.250	.165	2.291	1	.130	1.285
	Recruitment method - mail	.278	.244	1.302	1	.254	1.321
	Binary gender (male, female)	.325	.086	14.384	1	.000	1.384
	Age (single years)	-.011	.003	15.514	1	.000	.990
	Aboriginal/Torres Strait Islander	.013	.171	.006	1	.940	1.013
	Born in Australia or overseas	-.161	.095	2.838	1	.092	.851
	Household income	.080	.022	13.501	1	.000	1.084
	Place of residence (urban, rural)	-.109	.072	2.278	1	.131	.897
	Fishing avidity (full scale)	.283	.017	285.020	1	.000	1.327
	Constant	-.098	.353	.077	1	.781	.907

a. Current fishers (went fishing in last 12 months)
b. Variable(s) entered on step 1: Binary gender (male, female), Age (single years), Aboriginal/Torres Strait Islander, Born in Australia or overseas, Household income, Place of residence (urban, rural), Fishing avidity (full scale).

Appendix 9.7 Regression models, Stage 3 data

9.7.1 Regression model, Stage 3 data – dependent variable fishing avidity

Regression

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Stage 3 wash up survey participant, Second monthly Stage 3 survey participant[b]	.	Enter
2	Binary gender (male, female), Age (single years)[b]	.	Enter

a. Dependent Variable: Fishing avidity (full scale)
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.145[a]	.021	.021	2.553
2	.283[b]	.080	.080	2.474

a. Predictors: (Constant), Stage 3 wash up survey participant, Second monthly Stage 3 survey participant
b. Predictors: (Constant), Stage 3 wash up survey participant, Second monthly Stage 3 survey participant, Binary gender (male, female), Age (single years)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1397.466	2	698.733	107.244	.000[b]
	Residual	64677.665	9927	6.515		
	Total	66075.131	9929			
2	Regression	5310.504	4	1327.626	216.848	.000[c]
	Residual	60764.626	9925	6.122		
	Total	66075.131	9929			

a. Dependent Variable: Fishing avidity (full scale)
b. Predictors: (Constant), Stage 3 wash up survey participant, Second monthly Stage 3 survey participant
c. Predictors: (Constant), Stage 3 wash up survey participant, Second monthly Stage 3 survey participant, Binary gender (male, female), Age (single years)

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	4.327	.027		158.276	.000
	Second monthly Stage 3 survey participant	1.125	.089	.142	12.628	.000
	Stage 3 wash up survey participant	.094	.140	.008	.673	.501
2	(Constant)	1.468	.127		11.588	.000
	Second monthly Stage 3 survey participant	.950	.087	.120	10.952	.000
	Stage 3 wash up survey participant	.003	.137	.000	.019	.985
	Binary gender (male, female)	1.516	.062	.240	24.361	.000
	Age (single years)	.004	.002	.021	2.108	.035

a. Dependent Variable: Fishing avidity (full scale)

Excluded Variables[a]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance
1	Binary gender (male, female)	.244[b]	25.189	.000	.245	.991
	Age (single years)	.066[b]	6.565	.000	.066	.976

a. Dependent Variable: Fishing avidity (full scale)
b. Predictors in the Model: (Constant), Stage 3 wash up survey participant, Second monthly Stage 3 survey participant

9.7.2 Regression model, Stage 3 data – dependent variable fishing importance

Regression

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Stage 3 wash up survey participant, Second monthly Stage 3 survey participant[b]	.	Enter
2	Binary gender (male, female), Age (single years)[b]	.	Enter

a. Dependent Variable: Self-rated importance of fishing
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.116[a]	.014	.013	2.499
2	.296[b]	.087	.087	2.404

a. Predictors: (Constant), Stage 3 wash up survey participant, Second monthly Stage 3 survey participant
b. Predictors: (Constant), Stage 3 wash up survey participant, Second monthly Stage 3 survey participant, Binary gender (male, female), Age (single years)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	848.904	2	424.452	67.970	.000[b]
	Residual	61959.904	9922	6.245		
	Total	62808.808	9924			
2	Regression	5486.749	4	1371.687	237.380	.000[c]
	Residual	57322.059	9920	5.778		
	Total	62808.808	9924			

a. Dependent Variable: Self-rated importance of fishing
b. Predictors: (Constant), Stage 3 wash up survey participant, Second monthly Stage 3 survey participant
c. Predictors: (Constant), Stage 3 wash up survey participant, Second monthly Stage 3 survey participant, Binary gender (male, female), Age (single years)

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	6.989	.027		260.967	.000
	Second monthly Stage 3 survey participant	.861	.087	.112	9.905	.000
	Stage 3 wash up survey participant	.114	.137	.009	.830	.406
2	(Constant)	4.031	.124		32.555	.000
	Second monthly Stage 3 survey participant	.688	.084	.089	8.194	.000
	Stage 3 wash up survey participant	.053	.132	.004	.400	.689
	Binary gender (male, female)	1.701	.061	.274	27.981	.000
	Age (single years)	-.001	.002	-.008	-.841	.401

a. Dependent Variable: Self-rated importance of fishing

Excluded Variables[a]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance
1	Binary gender (male, female)	.273[b]	28.318	.000	.273	.991
	Age (single years)	.043[b]	4.273	.000	.043	.977

a. Dependent Variable: Self-rated importance of fishing
b. Predictors in the Model: (Constant), Stage 3 wash up survey participant, Second monthly Stage 3 survey participant