Mental Health in the Commercial Fishing Industry:
Modern Uncertainties and Traditional Risks

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Abstract

Commercial fishers face a range of stressors that impact physical and mental health. However, there is limited research on the level of mental ill-health among fishers, and on the nature of stressors that contribute to their psychological distress. This paper focuses on the experiences of commercial wild-catch fishers, and analyses the results of an Australian national survey conducted in 2017 (n=872). We first assess underlying themes in perceived stressors, identifying three distinct categories termed 'traditional risks', 'modern uncertainties', and 'future concerns'. Second, we assess the level of self-reported psychological distress, demonstrating higher occurrence of high to very high psychological distress among commercial fishers in comparison to the national population. Third, we examine the relationship between different groups of stressors and psychological distress, finding that stronger perceptions of both 'traditional risks' and 'modern uncertainties' are associated with greater levels of psychological distress among fishers. Fourth, recognising diversity within the industry, we examine differences in these relationships among skippers and crew (work role), and inshore versus offshore fishers (fishing location).

Our analysis demonstrates that 'traditional risks' and 'modern uncertainties' differentially impact on fisher mental health, and depend on the individual's role in the industry and their fishing location. The findings suggest that changes to factors associated with modern uncertainty stressors—including government management techniques, red tape, media representation and political support—could significantly improve mental health in the commercial fishing sector.

1. Introduction

Commercial fishing poses a range of physical and mental challenges. Levels of physical injury and fatality exceed those of most other peacetime occupations, and labouring in dangerous or demanding environments can put pressure on the mental health of workers (Brooks, 2011; Pollnac, Poggie, & Cabral, 1998; Woodhead, Abernethy, Szaboova, & Turner, 2018). However, research also suggests that overcoming physical challenges and managing calculated risks can contribute to fisher job satisfaction (Pollnac et al., 1998; Seara, Pollnac, & Poggie, 2017; Seara, Pollnac, Poggie, et al., 2017). Many remain in the job long after it would be economically rational to leave because of an emotional attachment to the occupation and lifestyle (Dwyer, King, & Minnegal, 2008; Pollnac, Carothers, Seara, & Poggie, 2019 p.174). Understanding poor mental health that occurs within the fishing industry requires careful attunement to the culturally specific negotiation of risk and harm.

For over twenty years, researchers have suggested that the state of mental health among commercial fishers is cause for concern. In 1998, Johnson, Formichella, Thomas, Bhaumik, Degruy, & Riordan (1998) reported that 35% of 567 Gulf of Maine shrimp captains interviewed had a diagnosable mental health disorder, roughly double that of the general American male population. Since this alarming discovery, there has been little attention paid to understanding the state of mental health among commercial fishers (Woodhead et al., 2018). While qualitative social science has explored the nature of the problem and considered underlying drivers (King, Kilpatrick, Willis, & Speldewinde, 2015; Pollnac, Monnereau, Poggie, Ruiz, & Westwood, 2011), few have quantitatively measured the state of fishers' mental health until very recently (Laraqui et al., 2018; Scyphers, Steven Picou, & Grabowski, 2019; Turner, Szaboova, & Williams, 2018).

What drives poor mental health in any individual is complex and multifaceted, and incorporates environmental, biological, cultural and circumstantial factors. Some research links the physically risky nature of working at sea and the accompanying isolation with poor mental health (ITF Seafarers' Trust, 2017), however these assumptions remain largely untested. Seafarers also report that long periods of time spent in nature, or among a small group of like-minded colleagues, is an appealing, emotionally uplifting aspect of the occupation (Pickett & Hofmans, 2019; Seara, Pollnac, Poggie, et al., 2017; Swift, 2019).

Fishers often fall into social cohorts that tend to present with poorer-than-average mental health. While relationships between health metrics and particular cohorts are not necessarily causal, such observations are relevant to the formulation of effective, targeted health interventions. It is frequently proposed that men tend to suffer poorer mental health than women (Alston, 2012; James, Rich, & Kelly, 2020; Klingelschmidt et al., 2018; Milner & King, 2019). Other groups identified as being of particular risk to poor mental health include primary producers, such as farmers and fishers, who run businesses in complex and variable ecological and economic environments (King et al., 2015; Lunner Kolstrup et al., 2013), those living in rural and regional locations that are remote from health services (Bowers, Lo, Miller, Mawren, & Jones, 2018; Perceval, Kõlves, Ross, Reddy, & De Leo, 2019), those in isolated, confined, and extreme (ICE) jobs (Palinkas, Johnson, & Boster, 2004), and those in insecure employment (de Witte, Pienaar, & de Cuyper, 2016; Lübke, 2019; Urbanaviciute, De Witte, & Rossier, 2019). As predominantly male primary producers, subject to financial peaks and troughs, who often work in socially or physically isolated contexts (or both), according to work schedules that limit access to health services, it is unsurprising that commercial fishers have been found to be disposed to poorer-than-average mental health.

However, given that fishing communities have long been considered by social scientists as a cultural cohort in their own right (Acheson, 1981), it is necessary to explore factors specific to the industry, and particularly those elements fishers themselves see as contributing to poor mental health.

Research with Australian fishers has previously identified stressors that researchers have delineated into two categories: 'traditional risks' and 'modern uncertainties' (King, Kilpatrick, & Willis, 2014; King et al., 2015). The 'traditional risks' of fishing include the physically dangerous nature of the job, the variable weather, long and unsocial hours of work, being self-employed, managing crew dynamics, responding to fluctuating market conditions and variable catches. While it is impossible to eliminate these risks, fishers do have some day-to-day control over traditional risks through their skills, knowledge and experience. It is argued that fishers have traditionally faced these stressors with virtuosity, through some combination of a heightened tolerance for risk, a capacity to navigate and mitigate such risks through either learned or inherent characteristics and abilities, and through a willing trade-off between the perceived risks and rewards of the lifestyle (Jentoft & Davis, 1993; Pickett & Hofmans, 2019; Pollnac et al., 2011; Pollnac & Poggie, 2008). Australian fishers often refer to certain, particularly physical challenges and those associated with working in sometimes harsh marine environments, as being "what we signed up for".

In contrast, 'modern uncertainties' are defined as stressors that fishers are limited in their capacity to anticipate or manage, including those which undermine the reputation and identity of the group as a whole. Typically, modern uncertainties are related to increasing regulatory surveillance, oversight and compliance requirements, a reduction, removal or restructuring of access rights (including intergenerational access), negative representation in the media, and conflict with other stakeholders (e.g. anglers, energy developments, other commercial fishers). Modern uncertainties tend to emanate from policy decisions that have arisen in recent decades as the regulatory environment has tightened in response to actual and perceived environmental decline. While regulatory agencies purportedly make policy decisions about fisheries access and practices in a manner consistent with scientific evidence, the powerful role of public opinion, political negotiation and competing stakeholder advocacy has recently been emphasised (Brown, 2016; Cullen-Knox, Haward, Jabour, Ogier, & Tracey, 2017; King & O'Meara, 2018; Voyer, Barclay, McIlgorm, & Mazur, 2017). The unpredictability of governance decisions, including a sense of public disregard or even demonisation which potentially undermines political support for commercial fisheries, are both types of modern uncertainties that have added to the stressors already posed by traditional risks.

The focus of this paper is on the relationship between Australian commercial wild-catch fishers' level of psychological distress and their perceived stressors. We address the following research questions: 1) what is the current status of psychological distress among commercial wild-catch fishers in Australia? 2) what are the stressors perceived by Australian fishers, and are 'traditional risks' and 'modern uncertainties' distinguishable themes within these perceptions? 3) how do 'traditional risks' and 'modern uncertainties' relate to fishers' psychological distress? and 4) do psychological distress and perception of stressors differ according to work role or fishing location?

2. Methods

This research used a 2017 national survey of Australian commercial wild-catch fishers to understand the state of health and wellbeing of the industry (Figure 1). The survey included questions to determine the level of reported psychological distress among fishers and the stressors related to 'traditional risks' and 'modern uncertainties'. These data were used to examine the relationship between the perception of stressors and reported psychological distress and whether psychological distress and perception of stressors differ according to work role or fishing location. The research received approval from the Deakin University Human Research Ethics Committee (2016-367).
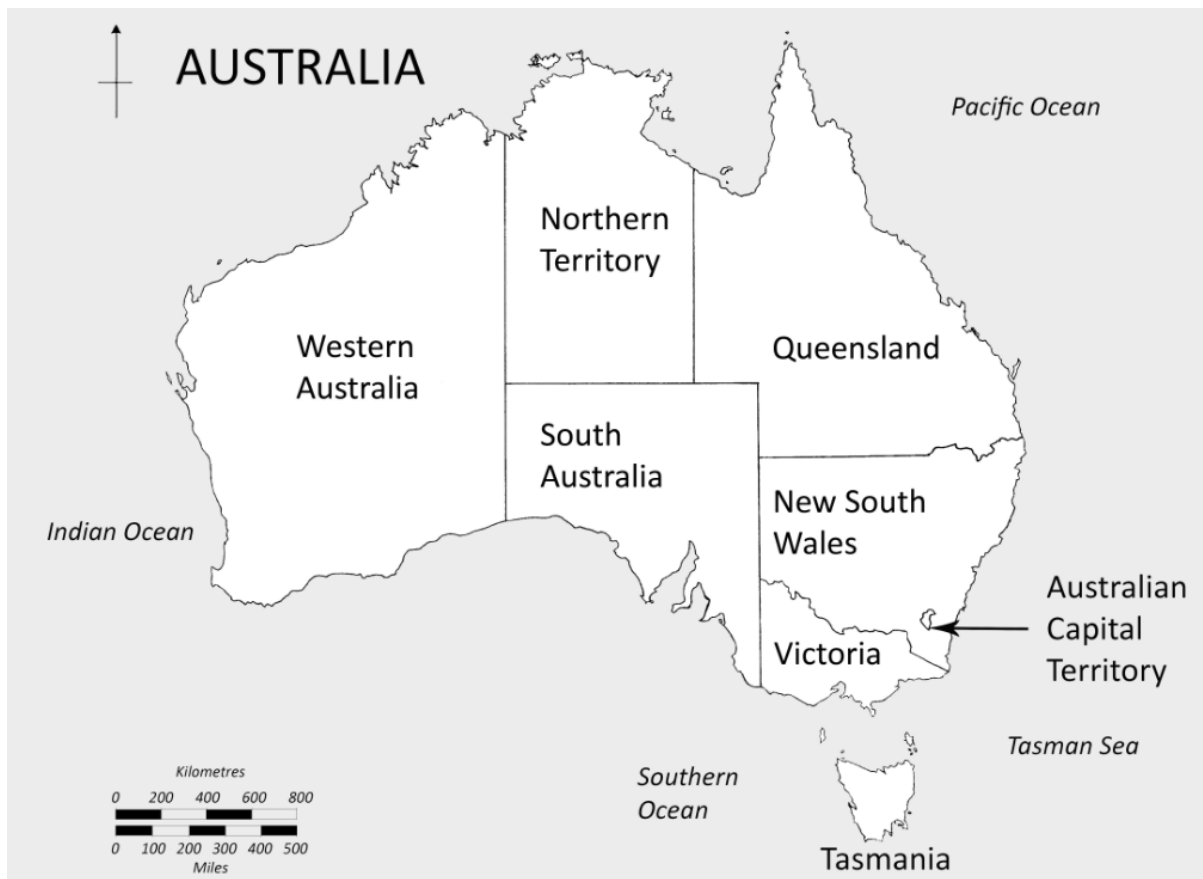
Figure 1. Australia, showing States and Territories canvassed in national survey.

2.1 Survey design

Survey development was informed by a project Advisory Committee and draft surveys were piloted with commercial fishers across the state of Victoria. The survey was divided into five sections: 1) personal health and wellbeing status; 2) personal health and wellbeing behaviours; 3) health, wellbeing and safety practices and perceptions in the respondent's fishery; 4) the role of the respondent in the industry; and 5) demographic information covering the respondent and their business. Most were closed questions, including Likert-type scale questions, with some opportunities for open-ended responses. A copy of the survey can be found in King et al. (2019).

2.1.1 Measuring stressors

Respondents were asked to assess the extent to which they perceived a range of stressors/risks on a five point scale (from 'not at all' to 'very much'). The list of 16 stressors presented were developed using existing literature, qualitative data and feedback from pilot testing (Table 1). The stressors included those considered to be traditional risks (such as physical danger, severe weather, fluctuating market prices) and modern uncertainties (such as changing regulations, poor media representation, and red tape).

Table 1. Range of stressors included in the survey. Responses were scored on a five-point scale from 'not at all' to 'very much' according to the extent to which each stressor was perceived.

Stressor
Severe weather
Fluctuating market prices
Changes to government regulations on access (e.g. area closures)
Government red tape
Uncertainty about future unknown changes to government regulations
Negative media representation, poor public image
Uncertainty about seafood stocks
Physical danger of fishing
General demands of running a business
Financial concerns
Recreational fishing sector
Climate change
Skills required to do your job (e.g. drive a boat, gutting skills)
Isolation
Relationship/s with co-worker/s
Succession planning

2.1.2 Measuring mental health

Self-reported mental health was assessed using the Kessler Psychological Distress Scale (K10 test) (Andrews & Slade, 2001; Kessler et al., 2002) (Table 2). The K10 test is a standard set of ten questions used widely as a measure of unspecified psychological distress in the anxiety-depression spectrum in Australia as well as internationally. Responses to each question are based on a five-point scale based on frequency of symptoms (from 'none of the time' to 'all of the time'). To enhance data comparability, other questions were drawn from existing health and wellbeing surveys, including the Australian National Survey of Mental Health and Wellbeing, annual Victorian (State) population health surveys, and complimentary research projects (Turner et al., 2018). Alignment of questions with the K10 test and other surveys allows comparison to the findings of the Australian national survey of fishers, and direct comparison with other segments of the community.

The survey asked respondents an open-ended question about the factors that affect health and wellbeing of fishers in their fishery. It required participants to list the five most important factors. Factors relating to mental health stressors were coded using a grounded theory approach (Strauss & Corbin, 1997), in which data are iteratively sorted into nested categories.

Table 2. Items included in the K10. Respondents answered on a five-point scale from 'none of the time' to 'all of the time'

Question	Item
In the last **four** weeks, how often have you felt:	Tired out for no good reason
	Nervous
	So nervous nothing could calm you down
	Hopeless
	Restless or fidgety
	So restless you could not sit still
	Depressed
	That everything was an effort
	So sad that nothing could cheer you up
	Worthless

2.2 Recruitment, distribution and response

In 2017, the survey was mailed to 4,584 fishers and aquaculture workers by fifteen industry bodies from all Australian jurisdictions on behalf of the researchers. The industry bodies mailed a reminder letter 3–4 weeks later, including details of where to obtain replacement or extra surveys. The survey was also made available online for those not captured by these industry bodies. Returns included 703 paper surveys (response rate = 15.3%) and 169 online surveys, giving a total of 872 responses. The response represents 15.1% of the Australian wild-catch employment of 5,777 at the 2016 Australian Bureau of Statistics (ABS) Census (Australian Bureau of Agricultural and Resource Economics and Sciences, 2018). Through comparison with data on the Australian fishing industry from the ABS 2014–2015 Census data (Australian Bureau of Statistics, 2015) and the ABS Labour Force Survey (Mobsby & Koduah, 2017), the survey sample was found to be representative in terms of age, gender and full/part time work status. Responses were not representative in terms of geographic distribution (see King et al., 2019, 26 for a breakdown of responses by region). As this paper addresses aggregated national data this irregularity is not unpacked here.

2.3 Data analysis

Of the 810 surveys with a response, 80% (n=645) were from skippers while 15% (n=124) were from crew in a fishing operation. Those involved in aquaculture were excluded from the analysis, as these fishers tend to be members of dedicated aquaculture industry representative groups, which were not targeted in the recruitment stage. Of the remaining 734 who answered the question, 48% (n=355) identified their usual fishing grounds as inshore (<3nm from the high water mark, including bays and beaches) while 52% (n=379) indicated that they fished offshore (>3nm).

2.3.1 Perceived stressors

Principal component analysis (PCA) was used to explore whether traditional risks and modern uncertainties represented distinct underlying themes in the stressors perceived by fishers. Analysis was conducted in R using the 'psych' package (Revelle, 2019). The PCA was based on a correlation matrix and was followed by varimax rotation of the principal

components (PCs) to help interpret indicator loadings. Only principal components (PCs) corresponding to eigenvalues ≥1 were retained (Legendre & Legendre, 2012). Each PC represented a subcomponent of the stressors perceived. To interpret each PC, only indicators with relatively high loadings (≥0.5) on that PC were considered. For each PC, individual scores were extracted for each respondent for further analysis.

2.3.2 Psychological distress

Scores for the ten questions about psychological distress were summed to calculate a K10 score for each respondent. Individual scores were classified as low, medium, high or very high following the classification used by the ABS: 10–15 = Low; 16–21 = Moderate; 22–19 = High, and 30–50 = Very High (Australian Bureau of Statistics, 2012). Chi squared tests were used to compare the frequency of responses in each category in the fisher survey to those reported by the ABS National Health Survey (Australian Bureau of Statistics, 2015), which represents the national population in terms of age and gender. Like the fisher survey in this project, the National Health Survey uses self-reporting of health conditions and diagnoses.

2.3.3 Relationship between perceived stressors and psychological distress

To understand how perceived stressors and psychological distress vary across diverse Australian fisheries and the people who work in them, we make a distinction between inshore and offshore fishing, which we anticipate face different stressors related to their fishing location and the different management regimes governing them. 'Inshore' fishing takes place in coastal waters, bays, estuaries, from the high-water mark to three nautical miles from shore, as well as inland waterways, and is managed by state governments. 'Offshore' fishing occurs in deeper water between three nautical miles and the 200 nautical mile Exclusive Economic Zone, typically using different fishing methods, and operating under Commonwealth jurisdiction. Individual fishers may be licenced to fish in both locations.

We anticipate that inshore fishers are more likely than offshore fishers to experience modern uncertainties, due to their heightened probability of coming into conflict with other users of the environment, particularly recreational fishers, and any subsequent management alterations that are enacted in order to balance the demands of all stakeholders. Inshore fishing is also typically regarded by fishers as less dangerous than working in the open ocean (Chauvin, Le Bouar, & Lardjane, 2017; King, 2011; Poggie, Pollnac, & Gersuny, 1976), and so we anticipate a lower perception of traditional risks among inshore fishers.

We also make a distinction between skippers, who may or may not own boats, licences and quotas but all engage the management of the fishing enterprise, on the one hand, and 'crew' which includes deckhands, on the other hand. We anticipated these two groups would face different stressors and/or levels of psychological distress, because of their differing levels of responsibility and involvement in decision-making.

First, t-tests were used to assess whether perceived stressors (PC scores) differed between the groups of (1) skippers vs crew and (2) inshore vs offshore fishers. Second, chi-square tests were used to assess whether K10 categories differed among these same groups. Third, a one-way Analysis of Variance (ANOVA) was used to assess whether perception of stressors (PC scores) differed in relation to K10 scores. Post-hoc testing was carried out where $p < 0.05$. The latter analysis was carried out for all respondents combined, and subsequently for

skippers versus crew and inshore versus offshore fishers separately. K10 classifications of High and Very High were combined to accommodate low frequencies.

3. Results

This section reports the results of quantitative analysis of survey data, illustrated by data from open ended question responses where appropriate.

3.1 Psychological distress

3.1.1 Overall

High or Very High levels of psychological distress were experienced by 22.9% of fisher respondents, and a Low level by 53.1%. This compares with 11.7% of Australians aged 18 years and over experiencing High or Very High levels and 68.0% a Low level of psychological distress in the 2014–15 national survey (ABS, 2015). Respondent scores for the K10 are compared in Table 3 to the most recent Australian available national K10 data from the ABS National Health Survey 2014–15 (ABS, 2015, Table 7: Psychological Distress). There was a significant difference between the percentages in each of the K10 categories when comparing the national fisher survey to the National Health Survey ($\chi^2_{(3,\ N=17,599)}$=94.60, p<0.001), with comparatively more fishers experiencing High and Very High levels of psychological distress.

Table 3. Fisher respondent K10 score categories compared to Australian population

K10 category: level of psychological distress	Respondents Fisher health survey (N=659)	Australians 18 years and over, National Health Survey 2014-15 (ABS, 2015) (n=17598)
Low	53.1% (350)	68.0% (12,066)
Medium	24.0% (158)	19.5% (3457)
High	16.5% (109)	8.0% (1415)
Very high	6.4% (42)	3.7% (660)

$\chi^2_{(3,\ N=17,599)}$=94.60, p<0.001

3.1.2 Differences among fishers

There was no statistically significant difference in the proportion of skippers and crew reporting Low, Moderate, and High/Very High levels of psychological distress ($\chi^2_{(2)}$=0.261, p=0.878) (Table 4). Nor was there a significant difference in the proportion of inshore and offshore fishers reporting Low, Moderate, and High/Very High levels of psychological distress ($\chi^2_{(2)}$=2.542, p=0.281) (Table 4).

Table 4. Fisher respondent K10 score categories by work role and location

K10 level of psychological distress	Responses							
	Work Role $(\chi^2_{(2)}=0.261, p=0.878)$				Fishing Location $(\chi^2_{(2)}=2.542, p=0.281)$			
	Skippers	%	Crew	%	Inshore	%	Offshore	%
Low	294	53%	56	55%	162	51%	188	55%
Moderate	135	24%	23	23%	73	23%	85	25%
High	90	16%	19	19%	62	20%	47	14%
Very high	39	7%	3	3%	19	6%	23	7%

3.2 Perceived stressors

3.2.1 Overall

The most commonly perceived stressors were those relating to changes in government regulation, red tape, and uncertainty about future regulatory changes (Table 5). Financial concerns, along with fluctuating prices and the demands of running a business were also widely perceived as stressors, as were issues of poor public image and conflict with the recreational sector. Climate change, co-worker relationships, isolation and skills were among the least commonly perceived stressors.

Principal components analysis (PCA) identified three underlying dimensions that together explained 57% of the variation in responses (Table 5). All stressors loaded strongly (>0.5) onto one component with the exception of succession planning. The first dimension, accounting for 22% of the variance, we interpreted as representing respondents' perceptions of modern uncertainties, including stressors relating to future uncertainty, red tape, changing regulations and access, negative media representation and opposition from the recreational fishing lobby. The second component, accounting for 22% of the variance, reflected what could primarily be interpreted as traditional risks, including the general demands of running a business and associated financial concerns, changes to weather and market prices, relationships with co-workers, and physical danger and isolation. In addition to the first two components, which reflected the categories of stressors we had anticipated, there was also a third component, accounting for 13% of the variance. Climate change and uncertainty about seafood stocks were the primary stressors loading on to this component, along with skills to do your job into the future, therefore we interpreted it as broadly reflecting 'future concerns'.

Table 5. Results of principal components analysis on stressors perceived by fishers showing factor loadings for the individual survey items. Only items strongly loading onto each component (loadings > 0.5) are shown. The column headings indicate the percentage of variance explained by each principal component. The percentage of respondents perceiving the stressor as high or very high indicates the proportion scoring 4 or 5 on a 5 point scale.

Stressor	% respondents perceiving stressor as high or very high	PC1 - modern uncertainties (22%)	PC2 traditional risks (22%)	PC3 future concerns (13%)
Uncertainty about *future* unknown changes to government regulations	75%	0.89		
Government red tape	75%	0.88		
Changes to government regulations on access	75%	0.86		
Negative media representation, poor public image	50%	0.72		
Recreational fishing sector	41%	0.64		
General demands of running a business	39%		0.73	
Financial concerns	50%		0.70	
Severe weather	35%		0.66	
Fluctuating market prices	49%		0.62	
Relationship/s with co-worker/s	14%		0.60	
Physical danger of fishing	20%		0.60	
Isolation	14%		0.60	
Climate change	14%			0.74
Uncertainty about seafood stocks	26%			0.62
Skills required to do your job	12%			0.57
Succession planning	18%			

The open-ended survey responses regarding traditional risks tended to be brief. They included financial burdens (pay and entitlements, running costs), harvesting-related stressors (catches, stocks, environment of fishing), competition and conflict (with imports, commercial fishers, recreational fishers), access to health services (distance to health services, cost, scheduling around fishing) and the masculinity of the fishing culture.

The modern uncertainties described by respondents captured two key contributors. The first was the regulatory environment, including regulation change (anticipated or experienced), quota and licence requirements, and the perceived lack of fairness and procedural justice. The second comes from fishers' perceptions of public and stakeholder

attitudes to the industry, including, negative media, and perceived 'anti-commercial fishing' lobby groups perceptions and activities.

Illustrative responses associated with traditional risks, modern uncertainties, and future concerns are shown in Table 6.

Table 6. Qualitative responses that are associated with traditional risks, modern uncertainties, and future concerns

Category of stressor	Illustrative quotes
Traditional risks	*"In the last two years I have not made enough to live because of weather effects on fishing and so I have used all our savings" Inshore skipper, 68, New South Wales*
	"The stress on relationships is caused by time away at sea. [This] Is probably more common in fisheries with longer trips" Inshore skipper, 65, Tasmania
	"Stress over where the next load of fish are" Offshore skipper, 58, Tasmania
Modern uncertainties	*"Stress from management is the major contributing factor in fisher health. Constant changes, new rules, new closures, new restrictions, forcing more investment (loans/money) to buy more shares to work less time in less areas. Utter contempt [for] fishers and imposing comparatively astronomical charges for the mismanagement that has been going on for 30 years plus." Inshore skipper, 58, New South Wales*
	"I cannot emphasise [enough] the stress related to [the] uncertainty [that] governments impose on the commercial sector, from access to stocks [to] continued pressure from [the] recreational sector" Inshore skipper, 65, New South Wales
	"There is no certainty in the fishing industry, no security" Inshore skipper, 53, Victoria
Future concerns	*"I have recently retired after 38 years of commercial fishing. I still own quota which allows my son to fish, but I feel sorry for the younger generation as the requirements to enter industry are too time consuming and expensive and [there is] far too much red tape. You will have to be a university graduate to enter industry and if you're that smart you will seek something with a lot less hours and a better future" Offshore ex-skipper, 70, New South Wales*

3.2.2 Differences among fishers

Principal component scores for modern uncertainties were significantly different between skippers and crew, with skippers showing greater perception of these stressors ($t_{(138.46)}$=8.484, p<0.001) (Table 7). In contrast, crew members showed higher perceptions of future concerns $t_{(146.08)}$=-2.896, p=0.004) (Table 7). There was no statistically significant

difference between skipper and crew scores in the principal component for traditional risks ($t_{(168.01)}$=-1.517, p=0.131) (Table 7).

Offshore fishers showed higher perceptions of traditional risks than inshore fishers ($t_{(721.87)}$=3.999, p<0.001). In contrast, inshore fishers had higher values relating to modern uncertainties ($t_{(724.52)}$=-4.190, p<0.001) and future concerns, though the latter was not statistically significant ($t_{(731.73)}$=-1.795, p=0.073) (Table 5).

Table 7. Summary statistics of Principal Component scores comparing skipper (n=645) and crew (n=124), and inshore (<3nM) (n=273) and offshore ($\geq$3nM) (n=408) fishers. Offshore fishers include those who fish both inshore and offshore.

Perceived stressors	Mean PC score (SD)		T test p value	Mean PC score (SD)		T test p value
	Skipper	Crew		Inshore	Offshore	
Traditional risks	-0.022 (1.010)	0.122 (0.915)	0.131	-0.151 (1.020)	0.141 (0.963)	<0.001
Modern uncertainties	0.150 (0.888)	-0.818 (1.160)	<0.001	0.157 (0.899)	-0.147 (1.060)	<0.001
Future concerns	-0.050 (0.970)	0.273 (1.120)	0.004	0.068 (0.954)	-0.064 (1.040)	0.073

3.3 Relationship between perceived stressors and reported psychological distress

3.3.1 Traditional risks

Across all fishers there was a statistically significant difference in perceptions of traditional risks across the categories of psychological distress reported ($F_{(2)}$=26.200, p=<0.001). Figure 2 shows that greater perception of traditional risks was associated with greater psychological distress. This was consistent when comparing the data for skippers ($F_{(2)}$=20.460, p=<0.001) and crew ($F_{(2)}$=6.521, p=0.002) separately, indicating that concerns around traditional risks were associated with greater psychological distress in both groups (Figure 2a). The same trend was evident among both inshore ($F_{(2)}$=8.400, p=<0.001) and offshore fishers ($F_{(2)}$=22.430, p=<0.001) (Figure 2b).

3.3.2 Modern uncertainties

Across all fishers collectively, higher perceptions of modern uncertainties were associated with higher psychological distress ($F_{(2)}$=17.390, p<0.001). The same pattern was found for both inshore ($F_{(2)}$=13.040, p=<0.001) and offshore ($F_{(2)}$=5.383, p=0.005) fishers (Figure d), and for skippers as a distinct group ($F_{(2)}$=20.940, p=<0.001), but was not evident among crew ($F_{(2)}$=1.248, p=0.292) (Figure 2c).

3.3.3 Future concerns

There was no evidence of difference in perceived future concerns in relation to psychological distress in the sample as a whole ($F_{(2)}$=0.063, p=0.939), nor among inshore fishers ($F_{(2)}$=1.486, p=0.228), offshore fishers ($F_{(2)}$=1.452, p=0.236), or skippers ($F_{(2)}$=0.365,

p=0.694). However, stronger perceptions of future concerns were associated with greater psychological distress among crew ($F_{(2)}$=3.984, p=0.022) (Figure 2e–f).
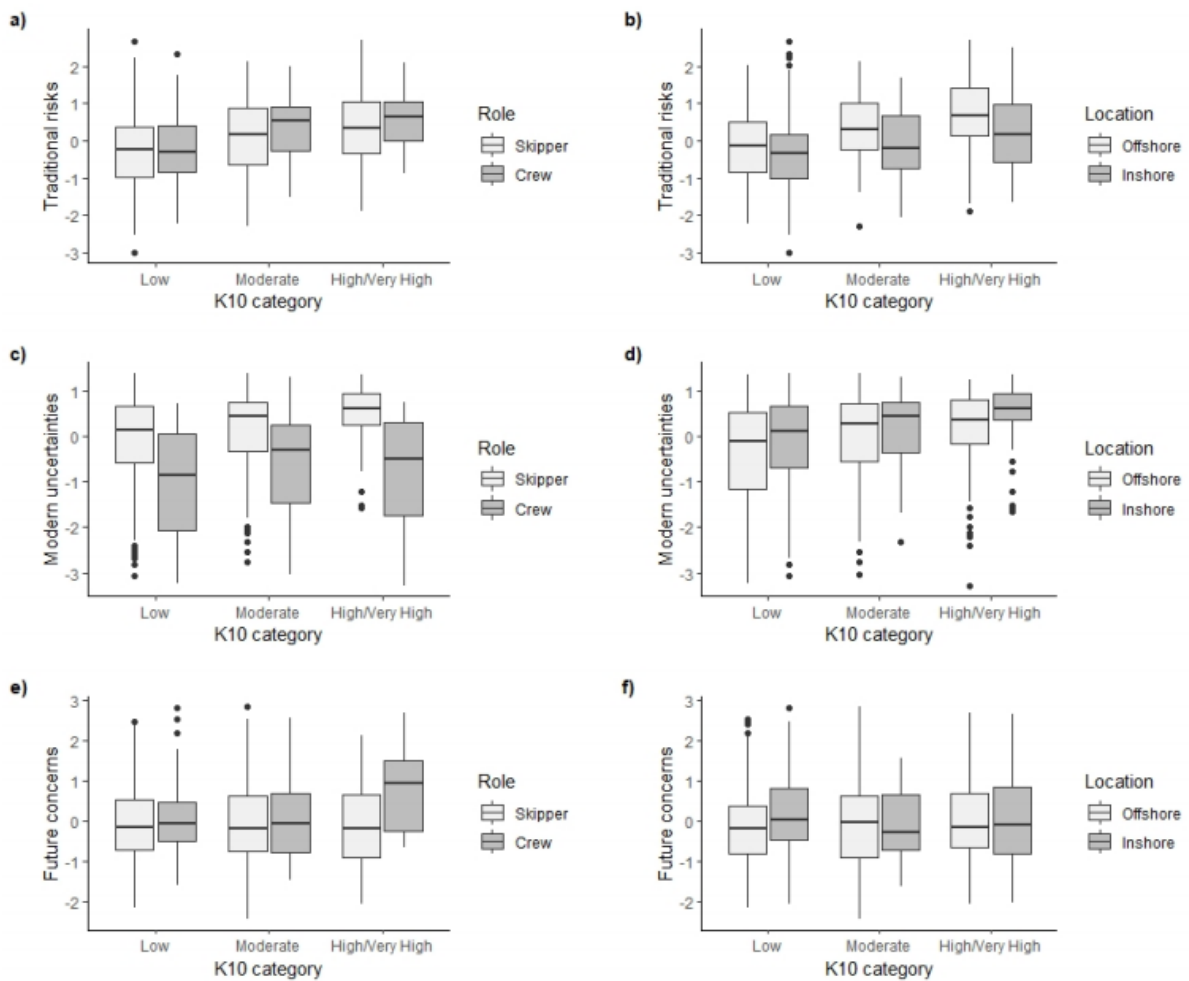
Figure 2. Distribution of respondents' principal component scores for traditional risks, modern uncertainties and future concerns, by job role (plots a, c, e) and fishing location (plots b, d, f) in relation to K10 scores for psychological distress. Relationships between principal component scores and K10 scores were tested using ANOVA (section 3.3). Differences between skippers and crew and between inshore and offshore fishers were assessed using chi squared tests (section 3.1.2)

4. Discussion

This study set out to explore the relationship between Australian commercial wild-catch fishers' level of psychological distress and their perceived stressors. Our findings reveal the extent to which the stressors perceived by Australian fishers can be characterised as 'traditional risks' and 'modern uncertainties', their relationship to fishers' psychological distress, and the heterogeneity within Australia's commercial fisheries.

Socioeconomic circumstances, ecological conditions and management approaches differ greatly among the world's fisheries. The stressors faced by those fishing commercially are different to those for whom seafood is harvested for subsistence. This research reflects the experiences of those who work within a highly interventionist management approach,

characterised by neoliberal principles (Pinkerton & Davis, 2015). The focus on metrics and bio-economic management tools are far more common in the Global North than in the Global South, though the distinction between management approaches—as between the geopolitical categories 'Global North' and 'Global South'—is not precise. Given the relevance of 'management intervention' as a perceived driver of poor mental health in this Australian study, it stands to reason that the findings will have the most direct relevance in contexts where similar economic imperatives and management interventions are present. However, the findings of this study have broader global relevance for two reasons. First, comparative studies between contrasting management contexts have considerable merit. Such a comparison was made by Seara, Pollnac, Poggie, et al. (2017, 19), who found that while fishers in both the US and in the Caribbean were similarly attached to certain aspects of fishing, the former's 'highly restrictive management environment' had 'significant impacts on levels of job satisfaction' and associated wellbeing. This study therefore has relevance to global fisheries as a case study for comparison or contrast. Second, with research suggesting that overexploitation of fisheries persists in smaller fisheries that are unassessed or unmanaged (Hilborn & Ovando 2014) continued momentum for more extensive management intervention means that some of these stressors may increasingly affect fishers around the world. In the following sections we discuss the key findings and their wider relevance.

4.1 Psychological distress

In Australia, nearly 23% of commercial fishers surveyed experienced High or Very High levels of psychological distress, compared to less than 12% in the general population. This research is the first of its kind to quantitatively demonstrate the state of mental health among Australian fishers, and that psychological distress is experienced at significantly higher levels than the comparable Australian population. This is striking particularly as our survey sample includes a disproportionately high number of men, and fewer younger people (under 30) and older people (over 64). The majority of respondents were between 30 and 64 years of age (80.4%), compared to only 70% of employed Australians in this age range at the 2016 Census. Physical health conditions are more prevalent among older adults, and it is well established that women are more commonly diagnosed with mood disorders than men, though this difference attenuates with age (Kiely, Brady & Byles, 2019); it could be expected that survey results would show better physical and mental health results than the general national survey.

In presenting these findings, we acknowledge that distinguishing between physical and mental health fails to reflect the interlinked nature of these health indicators. We take as established the notion that physical and mental health are related, and that stressors routinely associated with one kind of health issue can impact on others. However, these results highlight an important component of fishers' health that has to date received limited attention.

4.2 Perceived stressors

A focus of this research was not only to quantify the state of psychological distress among fishers, but to better understand the perceived stressors identified by fishers and reflected

in the qualitative research to date (Minnegal & Dwyer, 2008; Shaw, Johnson, & Dressler, 2011). The analysis of stressors in this study supports a distinction between 'traditional risks' and 'modern uncertainties' (King et al., 2015), and also revealed a third, albeit weaker, category of stressors which reflect 'future concerns'. Both traditional risks and modern uncertainties were associated with higher levels of psychological distress.

Traditional risks are described by fishers as "what we signed up for", or what they anticipated when they began their career. Fishers generally have—or anticipate acquiring—some ability to mitigate the stress of these pressures using their accumulated knowledge and skill. Modern uncertainties are more nebulous and mitigating them requires skill-sets including political lobbying, public relations and a command of social media. While members and advocates of the fishing industry are increasingly recognising and acquiring such skills, they still fall outside the traditional requirements of the profession, and for many represent a category of stress that is set apart from those anticipated. The capacity to distinguish between kinds of stressors identified by fishers has the potential to inform the development of bespoke solutions. The distinction between modern uncertainties, traditional risks, and the third category of future concerns, would benefit from further testing in order to explore the applicability of these categories in other contexts. In particular, though the third category of future concerns emerged as a distinct theme in the statistical analysis, it was linked to a small number of stressors. Given that future concerns may be interlinked with both traditional risks and modern uncertainties, this interpretation warrants further exploration.

Like Jentoft and Davis's so-called 'rugged' and 'utilitarian' individualisms, that they employ to explore expressions of identity relevant to small boat fishers labouring within capitalist industrial fisheries, our reference to 'traditional risks' and 'modern uncertainties' are not advanced as 'discrete entities' (1993, 359) but as tools for use within a particular context. These terms emphasise 'points of contrast' which resonate within discussions of stressors facing Australian fishers as part of their involvement with neoliberal fisheries management at a point in time—when our data was collected. Another useful contrast has been made by Coulthard & Britton (2015), who consider the similarities and distinctions between Northern Irish fishers who are undergoing 'adaptation' and those who are in the process of floundering (or to use their term, 'drowning') in response to particular demands on their flexibility. As in these studies, we offer the terms 'traditional risk' and 'modern uncertainty' with an awareness that the experiences of fishers are fluid across time and context, in telling and in memory and retrospect. These terms offer us a shorthand term that characterises overlapping—if not perfectly matched—ways of encountering a shared environment. Though these categories are certainly intertwined, difficult to disentangle, and potentially shifting, our findings confirm that there is a distinction in the underpinning themes of stressors perceived by fishers. In addition, these terms have had anecdotal resonance in our discussions with Australian fishers, managers and researchers. Though not a rigorous test in themselves, these conversations with the broader industry were germinal for this research and suggest that the concepts we introduce pass 'the pub test'.

4.3 Relationship between perceived stressors and reported psychological distress

Our analysis suggests that across respondents overall, stronger perceptions of both traditional risks and modern uncertainties were associated with greater levels of

psychological distress. The association between traditional risks and psychological distress may appear surprising given previous research suggesting fishers' capacity to respond, adapt and even thrive in the context of these challenges (Pollnac & Poggie, 2008). However, an examination of the factors contributing to traditional risks reveals that there may be connections between some of these stressors and those included under modern uncertainties. For example, 'traditional' stressors relating to the demands of running a business, financial concerns, and market prices may all be heightened in an environment of rapidly changing regulations and uncertainty about the future regulatory environment. The expansive work of Poggie, Pollnac, Seara and colleagues (e.g. Pollnac, Seara & Colburn 2015; Seara, Pollnac & Poggie, 2017), demonstrate the complexity of relationships between various measures of wellbeing (named in terms of 'job satisfaction') and external factors (including governance changes). Pollnac et al. (2019 p.175) propose a Human Impact Assessment (HIA) heuristic model that acknowledges and incorporates the complex interaction of factors (causal and otherwise), including 'management' and fisher 'wellbeing', which are linked via the intervening factor, 'job satisfaction'. Future research in the Australian context could benefit from drawing on lessons from this model. While our analysis does not demonstrate causal links between perceived stressors and psychological distress, and it is possible that fishers with poor mental health may have heightened sensitivity to stressors, it is nevertheless likely that reducing stressors will have a positive impact on levels of psychological distress.

4.4 Differences among fishers

Importantly, this study has begun to illuminate the relationship between what fishers do and where, and the kinds of stressors they are likely to face. This is the first study that we know of to quantitatively reflect the different kinds of stressors felt by skippers and crew, and to distinguish between inshore and offshore fisher experiences. While there was no significant difference in the overall level of psychological distress when analysed by role and location, there were significant differences in how stressors were perceived and how they related to levels of psychological distress. In other words, while fishers are unusually stressed as a cohort, the kinds of things that cause them stress differ depending on their role and where they fish.

Consistent with the findings of Pollnac et al. (Pollnac et al., 1998 p. 56), who found that "*All fishers manifested great concern with falling overboard, explosions in the engine room, and collisions at sea*" (original emphasis), there was no difference between skippers and crew, or inshore and offshore fishers, in the association between perceived traditional risks and psychological distress. However, Pollnac et al. (1998) did find differences in how particular cohorts responded to other, less serious, or more manageable risks. Similarly, in this study there were differences in how stressors were perceived. Offshore fishers, for example, were more likely than inshore fishers to perceive traditional risks as stressors, consistent with earlier research that links heightened concerns about safety to fishing that occurs in offshore locations (Chauvin et al., 2017; Malinowski, 1918). Among skippers, stronger perceptions of modern uncertainties and an association between these perceptions and higher levels of psychological distress may reflect skippers' greater responsibility for decision-making, meeting regulatory and reporting obligations, and their greater financial investment compared to crew. This finding reflects the growing body of literature exploring the relationship between fisheries management and well-being (Breslow et al., 2016;

Pollnac et al., 2019; Seara, Pollnac, & Poggie, 2017; Seara, Pollnac, Poggie, et al., 2017). Management decisions that are perceived to create or exacerbate, for example, social inequity in the community, may compromise the wellbeing of fishers: "It is changes in management that influence satisfaction with fishing which has a direct effect on wellbeing" (Pollnac et al., 2019, p.179). The current research supports these findings and extends them to shows that skippers, who are exposed more directly to management changes, may be disproportionately impacted by these stressors.

Heightened psychological distress among skippers who perceive greater stressors from modern uncertainties, and crew who more strongly perceive future concerns, may reflect that some fishers perceive their livelihoods to be under threat. These findings are consistent with wider research demonstrating that job insecurity is linked to declining mental health (Lübke, 2019). The reasons for greater perceptions of future concerns being associated with higher levels of psychological distress among crew are unclear. It may be that these are new uncertainties that crew are starting to worry about in terms of how they may affect their livelihoods in the future, while skippers are more focussed on modern uncertainties impacting them in the present. It may also be related to the younger average age of crew, among whom there tends to be a greater concern about environmental issues (Lee, 2008), though this requires further investigation.

Inshore fishers were more likely than offshore fishers to name modern uncertainties as stressors. This is not surprising, given that inshore fishers in Australia in recent years have experienced increasing resource conflict with other sectors including oil and gas, and renewable energy, coastal tourism and recreation, aquaculture, and particularly recreational fishing, and that this conflict has often resulted in management interventions that reduce commercial fisher access. The coast is the site of social, political, cultural and legal conflicts, and Jentoft (2017) argues that, as the most politically marginalised, small-scale inshore fisheries are perhaps the most vulnerable to external pressures from other stakeholders. In the Australian context, the impact of resource conflict, particularly across the eastern states, has been linked to widespread accounts of poor mental health and low job satisfaction (Alexander & Abernethy, 2019).

Understanding the matrix of stressors and risk factors contributing to the higher incidence of psychological distress among Australian fishers overall, could be used to inform targeted intervention strategies for skippers (as well as owners and those in charge of operations) during future periods of management change.

4.5 Recommendations

Quantification of the relative mental health status of fishers provides a robust rationale for action on this issue where in the past there has been little more than hand-wringing. In a positive step, since the preliminary release of these findings several industry-led mental health programs have been initiated, and the Australian Commonwealth government has committed funding in excess of A$600,000 towards these and other mental health programs for the commercial fishing industry (Seafood Industry Australia, 2020; Tasmanian Seafood Industry Council, 2020; Women in Seafood Australasia, 2019). The recommendations from this research, as outlined in the final report to the funding agency (King et al. 2019), have been partially taken up within this suite of initiatives. For example, mental health first aid training has been delivered to three industry members who have been designated 'trusted

industry members' within their region, as part of a Seafood Industry Australia pilot of this approach (Seafood Industry Australia, 2020). In addition, thirty-five A$2,000 grants have been made available for grassroots groups to raise awareness, combat stigma, and explore approaches to locally tailored mental health support (Seafood Industry Australia, 2021). However, there has yet to be a commitment to implement 'Social impact assessments on all those affected, including fishers and their businesses … before all major policy reforms, with a particular focus on the physical and mental health of those impacted' (King et al. 2019, 7). Given this research argues there is a significant role played by actual, understood or anticipated government reforms on fisher mental health, such a commitment would demonstrate government willingness to address the problems in the industry closer to their perceived source. While it is a significant step for the Commonwealth government to acknowledge the mental health problems facing the industry, rendering the issues visible and funding acute care is just the first step in addressing the structural factors that this research highlights.

5. Conclusion

This study provides robust quantitative evidence supporting the call for greater attention to fishers' mental health. There has already been significant work done by researchers and practitioners to identify ways to improve mental health in cohorts with which fishers overlap (e.g. 'men', 'primary producers'), and opportunities exist for tailored remedial measures to be modelled on proven techniques (Cole & Bondy, 2019; Pirkis et al., 2019). The novelty of this study is that it delineates stressors in a way that allows a clearer understanding of the threats that are specific to fishers—and therefore possible avenues for even more bespoke solutions—to improve mental health in the fishing industry.

This study differentiates between the categories of stressor that are expected to affect the mental wellbeing of fishers, namely 'modern uncertainties', which are largely beyond fishers' individual control, and 'traditional risks', where some individual mitigation actions are possible, and adds the category of 'future concerns'. The finding that modern uncertainties had a significantly greater impact on skippers than crew, supports the idea that these stressors are likely to be more detrimental to their mental health than those traditional risks they "signed up for". In contrast, the younger crew cohort were more likely than skippers to experience future concerns about climate change and changing skill requirements.

These findings provide strong evidence that changes to factors associated with modern uncertainty stressors— government management techniques, media representation, political support —could significantly improve mental health and wellbeing in the commercial fishing sector. Possible avenues of change may be streamlined administrative requirements, more explicit support from political representatives, and positive media representation.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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2017

ALL SURVEYS ARE CONFIDENTIAL

You are invited to participate in a study being conducted by Deakin University. We would like to know about the health and wellbeing of those in the commercial fishing industry, and about factors that may contribute to stress and poor mental health. We are particularly interested in how your reported health and wellbeing compares to that of other Australians (particularly farmers), and fishers from overseas.

This survey is part of a wider project about fisher health, wellbeing and safety. Deakin researchers are working with Victoria's Western District Health Service, the University of Tasmania, and Exeter University (Cornwall, UK). The project is funded by the Fisheries Research Development Corporation (FRDC) (project 2016-400). The FRDC are not involved in the research design or analysis, and funding is not dependent on the research outcomes.

We will use the results to provide policy advice to government, industry stakeholders and health providers, as well as to write academic papers and communicate more widely through the media about the health and wellbeing status of Australian commercial fishers. No information on any **individual** will be reported in a way that would allow them to be identified. Only aggregate (or group) data will be reported. Any comments you choose to add will be made anonymous.

You have been invited to participate because you are associated with an industry peak body. Your peak body is voluntarily helping us with our research by affixing your address to the sealed and pre-paid envelopes we have provided, containing this survey and a reply-paid envelope. Nationally, we are inviting nearly 4,000 people involved in the fishing industry to participate in the survey, including concession/licence owners, lease-dependent skippers, deckhands and owner-operators.

In order to assure the confidentiality of your responses, Deakin researchers will **never** have access to the list (ie. names and addresses) of those invited to participate in the study, and peak bodies will **never** have access to completed surveys, which will be posted directly to Deakin.

If you do not wish to participate in this survey, please do nothing, and ignore the one reminder letter we will send you. Completed surveys will be kept securely at Deakin University for at least six years, then destroyed.

Your consent to participate in this project is implied by your completion and return of the survey. Please note that withdrawal from this project will not be possible, because once completed, we have no way of knowing the identity of people who completed the survey.

This survey is thirteen pages long and will take **approximately twenty minutes** of your time to complete.

If you have any questions about the content of this survey, or would like to know more about the research, please contact the project Chief Investigator, Dr Tanya King, on 0427889917 (EST) or tanya.king@deakin.edu.au

Complaints

If you have any complaints about any aspect of the project, the way it is being conducted or any questions about your rights as a research participant, then you may contact:

The Manager, Ethics and Biosafety, Deakin University, 221 Burwood Highway, Burwood Victoria 3125, Telephone: 9251 7129, research-ethics@deakin.edu.au

Please quote project number [**2016-367**].

WHERE TO SEND YOUR COMPLETED SURVEY

☐   When you have completed this survey, please post it back in the enclosed reply-paid envelope provided. No stamp is required.

☐   If you have misplaced the envelope, the survey can be returned to:

Tanya King, SHSS, Locked Bag 20,000, Geelong, Vic, 3220.

No stamp is needed if posted within Australia.

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1. YOUR PERSONAL HEALTH AND WELLBEING STATUS

These questions are designed to assess your general health and wellbeing, and will be used for comparison with other jurisdictions, etc. This section relates to your personal experience. Your individual results will not be made available, only aggregate (or group) results.

Q1. How would you rate your general health?

☐ Excellent

☐ Very good

☐ Good

☐ Fair

☐ Poor

Q2. How much bodily pain have you had during the past four weeks?

☐ None

☐ Very mild

☐ Moderate

☐ Severe

☐ Very severe

Q3. When was your last general check-up? _____

Q4. When did you last go to the dentist? _____

Q5. Who usually makes **your** appointments to see the doctor or other health professionals?

☐ I do

☐ My spouse or partner

☐ Someone else
*(Who?)*_____

Q6. How much did your health interfere with your normal activities (outside and/or inside the home) during the past **four** weeks?

☐ Not at all

☐ Slightly

☐ Moderately

☐ Quite a bit

Q7. In the past **12 months**, around how many days **that you could have worked** did you stay home because of a personal health or wellbeing concern? (Include major injuries, as well as any days that you felt too low or despondent to go to work).

_____

Q8. In the past **12 months**, around how many days **that you could have worked** did you stay home because one or more of the people you work with (e.g. deckhand, skipper, diver), could not work because of a health or wellbeing concern?

_____

Q9. During the past **12 months**, have you experienced any of the following symptoms? *Please tick all that apply.*

Persistent back pain	☐	Poor eyesight	☐
Persistent joint pain	☐	Problems with hearing	☐
Infection in cut or abrasion	☐	Toothache or sore gums	☐
Indigestion or heartburn	☐	Stomach problems	☐
Chest infection	☐	Persistent cough that doesn't clear up	☐
Asthma (since childhood)	☐	Asthma (adult onset)	☐
Breathing problems	☐	Migraines and/or frequent headaches	☐
Hayfever	☐	Skin rash or allergy	☐
Sunburn (so bad your skin peels)	☐	Sunburn (so bad your skin blisters)	☐
Fatigue	☐	Panic attacks	☐
Stress	☐	Trouble sleeping	☐
Trouble with memory	☐	Trouble concentrating	☐
Blood in urine	☐	Blood in poo	☐
Haemorrhoids (piles)	☐	*Other……………………………..*	☐

Q10. Have you ever been diagnosed with any of the following conditions/illnesses? *Please tick all that apply.*

High blood sugar/Diabetes	☐	Irregular pulse	☐
High blood pressure	☐	High cholesterol	☐
Kidney problems	☐	Asthma (excl. childhood asthma)	☐
Heart attack	☐	Chest infection	☐
Stroke	☐	Eye infection	☐
TIA (mini-stroke)	☐	Ear infection	☐
Depression	☐	Anxiety	☐
ADD or ADHD	☐	Gout	☐
Cancer	☐	*Other*………………………………	☐

Q11. The following question relates to how you feel about your local community. Do you agree or disagree with the following statements?

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
"I feel welcome here"	☐	☐	☐	☐	☐
"I feel part of my community"	☐	☐	☐	☐	☐
"We are all 'in it together' in my community"	☐	☐	☐	☐	☐
"I feel like an outsider here"	☐	☐	☐	☐	☐

Q12. 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
Tired out for no good reason	☐	☐	☐	☐	☐
Nervous	☐	☐	☐	☐	☐

So nervous nothing could calm you down	☐	☐	☐	☐	☐
Hopeless	☐	☐	☐	☐	☐
Restless or fidgety	☐	☐	☐	☐	☐
So restless you could not sit still	☐	☐	☐	☐	☐
Depressed	☐	☐	☐	☐	☐
That everything was an effort	☐	☐	☐	☐	☐
So sad that nothing could cheer you up	☐	☐	☐	☐	☐
Worthless	☐	☐	☐	☐	☐

2. YOUR PERSONAL HEALTH AND WELLBEING BEHAVIOURS

Q13. **How often** you engage in the following personal behaviours, from **never**, to **every day**:

	Never	Rarely	Some of the time	Usually	Every day
I wear a lifejacket or PFD when I'm out at sea	☐	☐	☐	☐	☐
I smoke	☐	☐	☐	☐	☐
I drink alcohol until I am at least a little drunk	☐	☐	☐	☐	☐
I drink four or more cups of coffee per day	☐	☐	☐	☐	☐
I wear sun protection (sunscreen, wide-brimmed hat, sunglasses) when I'm outside for long periods	☐	☐	☐	☐	☐
I exercise for 30 minutes per day (activity that makes you breathe faster and feel warmer. May include work).	☐	☐	☐	☐	☐

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
I eat fresh or lightly cooked vegetables (excluding potatoes)	☐	☐	☐	☐	☐
I eat fresh fruit	☐	☐	☐	☐	☐
I do something to help me relax for 30 minutes (e.g. meditate, yoga, alone-time, watch television).	☐	☐	☐	☐	☐

Q14. The boat I work on, (or which his attached to my main fishing concession). *Please tick all that apply.*

☐ Is designated 'alcohol free'

☐ Is designated 'smoke free'

☐ Has a drug and alcohol policy (e.g. 'zero tolerance'; 'must not interfere with work')

☐ Has a sun-shade

☐ *Requires* employees to wear sun protection

☐ Has a 'no-bullying' policy

☐ Has good phone/internet reception

☐ Not applicable (I don't work on a boat)

Q15. What makes it difficult or deters you from seeking advice or treatment from a doctor or other healthcare professional? *How much do you agree with the following statements?*

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
I can't afford to stop working to seek treatment	☐	☐	☐	☐	☐
Appointments and medications are too expensive	☐	☐	☐	☐	☐
It takes too long to get there	☐	☐	☐	☐	☐
The cost of travelling there is too high (e.g. fuel)	☐	☐	☐	☐	☐
My health issues aren't that serious	☐	☐	☐	☐	☐

I don't think my health concerns are reducing my productivity	☐	☐	☐	☐	☐
I don't want to let my co-workers/employees down by taking time off to seek treatment	☐	☐	☐	☐	☐
I don't want my co-workers/employees to know there is anything wrong with me	☐	☐	☐	☐	☐
Appointments often clash with work	☐	☐	☐	☐	☐
The doctor's explanations are often unclear and I feel left in the dark	☐	☐	☐	☐	☐
The doctor doesn't understand the pressures of the fishing industry	☐	☐	☐	☐	☐
I find talking about my body and health issues embarrassing	☐	☐	☐	☐	☐
I am uncomfortable talking openly with my local health professional	☐	☐	☐	☐	☐

The remainder of the questions in this section ask about how you **currently** access health and wellbeing information, and how you would **prefer** to get this information.

Q16. If you found you had a health or wellbeing concern, what source of information (if any) would you consult **first**? *Select only one response for each health or wellbeing issue.*

Health or wellbeing issue…	**Internet (via computer or phone)**	**Friends or family**	**Doctor or health specialist**	**Phone service or help line**	**I would not seek help – I would wait and see if the problem went away**
A major physical health concern (e.g. cancer, diabetes)	☐	☐	☐	☐	☐
A minor physical issue or injury (e.g. cut or rash)	☐	☐	☐	☐	☐

An embarrassing issue	☐	☐	☐	☐	☐
Bodily pain that made working uncomfortable	☐	☐	☐	☐	☐
Bodily pain that prevented you from working	☐	☐	☐	☐	☐
Mental health issue that made it difficult to work	☐	☐	☐	☐	☐
Mental health issue that prevented you from working	☐	☐	☐	☐	☐
A sexual health issue (e.g. impotence, a concerning rash)	☐	☐	☐	☐	☐
Feeling 'down' for two weeks or more	☐	☐	☐	☐	☐

The next question is about 'tele-health' or 'e-health' services. These terms refer to when you receive a health or medical service over the phone, or over the internet. For example, can you have a 'consultation' with your specialist via Skype? Or, can you communicate with your doctor about your blood-sugar levels, anxiety levels or blood pressure over the phone?

Q17. Are 'tele-health' or 'e-health' services available in your region?

☐ YES, and I **have** used the service/s

☐ YES, but I have **not** used the service/s.

       Why?_____

☐ No, and I **would not** use the service/s if they were available

       Why?_____

☐ No, but I **would** use the service/s if they were available

☐ Not sure

☐ Other_____

The following two questions refer to preventative health information rather than advice you might seek from your doctor for a personal health issue, even if it is fishing related. For

example, information about how to prevent and treat sting-ray injuries, rather than information on an *actual* sting-ray injury you have yourself.

Q18. **How** would you prefer to receive general health and wellbeing information **specific** to the fishing industry? *Tick up to **three** options.*

☐ <u>Talking and listening</u> in person, one-on-one

☐ <u>Talking and listening</u> in a group of people (such as at a field-day or information evening)

☐ <u>Talking and listening</u> over the phone (i.e. having a conversation with someone)

☐ <u>Listening</u> to a radio or podcast

☐ <u>Watching</u> a video or animation (e.g. on television, or on the internet)

☐ <u>Reading</u> information on the internet (e.g. email, social media, website)

☐ <u>Reading</u> information in hardcopy (e.g. a brochure or pamphlet or book)

Q19. **From whom** would you prefer to receive general health and wellbeing information **specific** to the fishing industry? In each case the information would be the same. We are asking about **whom you would prefer to communicate with**. *Tick up to **three** options.*

☐ General health organisation (e.g. community nurse or health worker)

☐ Research institute staff (e.g. from a university, CSIRO)

☐ Specific-health-issue organisation (e.g. staff from Cancer Council, Beyond Blue)

☐ Another member of the fishing industry (e.g. another fisher, a processor)

☐ A non-government industry organisation (e.g. someone from your peak body, or co-op)

☐ A government industry organisation (e.g. fisheries department staff)

☐ Someone completely removed from the fishing industry (e.g. a paid consultant, or facilitator)

☐Other_____

3. HEALTH, WELLBEING AND SAFETY IN YOUR FISHERY

The following questions relate to your perception of health issues in your fishery. They may relate to your personal experience, but may also reflect your views of the fishery as a whole and the experiences of other fishers.

Q20. What do you think are the most important factors that affect the health and wellbeing of fishers in your fishery? (Maximum of five).

1…………………………………………………………………………………………
.

2…………………………………………………………………………………………
.
3…………………………………………………………………………………………
.
4…………………………………………………………………………………………
.
5…………………………………………………………………………………………

Q21. The following question asks you to comment on factors that affect Australian fisher health. **Do you agree** that these factors impact on the health and wellbeing of fishers in **your** fishery?

	Do not agree at all	**Agree a little**	**Agree**	**Agree quite a bit**	**Totally agree**
Poor diet	☐	☐	☐	☐	☐
Stress	☐	☐	☐	☐	☐
Wear-and-tear on joints, (e.g. knees, hips, shoulders)	☐	☐	☐	☐	☐
Injuries from tool use, including cuts from knives, crush injuries	☐	☐	☐	☐	☐
Sun exposure	☐	☐	☐	☐	☐

22. Have you or your crew ever provided assistance to other vessels (and crew) if they have run into trouble at sea? *Please tick all that apply. Tick 'yes' even if you've just towed a broken-down boat in.*

☐ Yes, another fishing vessel and crew

   *How many incidents in the last five years?*_____

☐ Yes, a recreational fishing vessel and crew

   *How many incidents in the last five years?*_____

☐ No

Q23. How much do following factors contribute to **stress** among those in your fishery?

Stress caused by…	Not at all	Slightly	Moderately	Quite a bit	Severely
Severe weather	☐	☐	☐	☐	☐
Fluctuating market prices	☐	☐	☐	☐	☐
Changes to government regulations on access (e.g. area closures)	☐	☐	☐	☐	☐
Government red tape	☐	☐	☐	☐	☐
Uncertainty about *future* unknown changes to government regulations	☐	☐	☐	☐	☐
Negative media representation, poor public image	☐	☐	☐	☐	☐
Uncertainty about seafood stocks	☐	☐	☐	☐	☐
Physical danger of fishing	☐	☐	☐	☐	☐
General demands of running a business	☐	☐	☐	☐	☐
Financial concerns	☐	☐	☐	☐	☐
Recreational fishing sector	☐	☐	☐	☐	☐
Climate change	☐	☐	☐	☐	☐
Skills required to do your job (e.g. drive a boat, gutting skills)	☐	☐	☐	☐	☐
Isolation	☐	☐	☐	☐	☐
Relationship/s with co-worker/s	☐	☐	☐	☐	☐
Succession planning	☐	☐	☐	☐	☐

Q24. Between 1–5, how physically risky is **your** fishery compared to other Australian fisheries?

Far less risky	**1**	**2**	**3**	**4**	**5**	Far more risky

4. YOUR ROLE IN THE FISHING INDUSTRY

Q25. Are you currently an active fisher or seafood harvester? (e.g. skipper, deckhand, diver)

☐ Yes

☐ Normally I am fishing, but I am temporarily not fishing (e.g. injured, working elsewhere)

☐ No, I have never fished (e.g. I'm a licence holder, or business partner)

☐ No, I have retired from actively fishing

Other _____

Q26. What is your **main** working role in the fishing industry?

☐ Skipper, or in charge of harvesting operations

☐ Crew or worker

☐ Not applicable (e.g. I am an investor)

Q27. Is your role in the fishing industry:

☐ Full time

☐ Part time

Q28. Who does the bulk of the administrative or book-work in your fishing business?

☐ I do

☐ Someone else

   Who? (e.g. my wife, my brother, my accountant?) _____

Q29. We would like to ask you if you own, or part-own, a licence/concession. Which of the following applies to your situation? *Please tick all that apply*

☐ I own a licence/concession

☐ I own a licence/concession, which I lease to someone else

☐ I lease a licence/concession, to use in my own business

☐ None of the above

Q30. We would like to ask you if you own, or part-own, quota (include 'units', 'days', etc.). Which of the following applies to your situation? *Please tick all that apply*

☐ I own quota

☐ I own quota, which I lease to someone else

☐ I lease quota, to use in my own business

☐ None of the above

Q31. Do you own or co-own a commercial fishing vessel?

☐ Yes

☐ No

Q32. Do you own or co-own other fishing, harvesting, or processing gear? (e.g. pots, nets)

☐ Yes

☐ No

Q33. As part of your role in the fishing industry, do you receive:

☐ A stable wage

☐ A percentage of the catch/take

☐ Both a stable wage *plus* a percentage of the catch/take

☐ Not relevant

Q34. If you feel your role has not been fully identified in Q24-32, please describe below your role or additional roles you have in the fishing industry (e.g. owning a retail outlet)

_____

Q35. Do you personally supplement your income in the fishing industry with other paid work?

☐ YES

☐ NO

If so, what do you do? _____

Consider what you would call your **main** fishery, or the fishery that takes up most of your **time**. If you can't decide between multiple fisheries (e.g. if you're are equally involved in shark and lobster, or you invest in a number of fisheries but don't physically operate any), your main fishery would be the fishery you **most recently** worked in or were associated with operating.

Q36. What best describes your **main** fishing business/activity?

☐ Inshore or coast (within 3nm of the high water mark)

☐ Offshore (more than 3nm than the high water mark)

☐ Bays, estuaries and/or inlets

☐ Beach (e.g. cockles, pipis)

☐ Aquaculture (marine)

☐ Aquaculture (fresh water)

☐ Freshwater (wildcatch)

Q37. What gear is used for your main fishery? *Please tick all that apply.*

☐ Pots or traps

☐ Trawl

☐ Dredge

☐ Net

☐ Dive

☐ Line (e.g. longline, troll, rod and reel, dropline, jig)

☐ Hand collection (no boat) (e.g. pipis)

☐ Floating farms

☐ Pump

☐ *Other*_____

Q38. How many people typically work in the harvesting process (e.g. on the boat, or on the beach) used in your main fishery? (include yourself, if applicable)._____

Q39. How long is a typical fishing trip (or harvesting period) for your main fishery?

…………………Hours (if less than a day)   …………………….Days (if more than 24 hours)

Q40. What kind of phone/s do you use while fishing? *Please tick all that apply.*

☐ Mobile phone (no internet connection)

☐ Mobile phone (with internet connection)

☐ I don't have a mobile phone. *Please go to section 5.*

☐ I can't use my phone when I fish (e.g. no reception). *Please go to section 5.*

☐ Other (e.g. satellite phone)_____

Q41. How do you use your phone while at sea? *Please tick all that apply*.

☐ Communicate with business partners   ☐ To check the news

☐ Communicate with other fishers   ☐ To get health information

☐ Communicate with fisheries officials   ☐ To check the weather

☐ Communicate with friends and loved ones   ☐ To use social media

☐ To access electronic logbooks   ☐ Videos or movies or games

☐ Other official reporting (not electronic logbooks)   ☐ To take photos/videos

☐ *Other…………………….*

5. PARTICIPANT INFORMATION

This section asks some basic questions about you. They are very important to our research so we can see how these factors impact on your health, separate to your role in the fishing industry.

Q42. First, what is your gender?

☐ Male

☐ Female

☐ Other

☐ Rather not say

Q43. How old are you?_____

Q44. In which country were you born?_____

Q45. Are you of Aboriginal or Torres Strait Islander origin? *Please tick all that apply.*

☐ No

☐ Yes, Aboriginal

☐ Yes, Torres Strait Islander

Q46. How would you describe your ancestry? Provide up to two ancestries only. Examples of 'other': Vietnamese, Lebanese, Indonesian, Maori, Hmong.

☐ Australian

☐ English

☐ Greek

☐ Irish

☐ Italian

☐ *Other*_____

Q47. Do you consider yourself a religious person?

☐ No

☐ Yes

Q48. How many people live in your household?

☐ I live alone

☐ Myself and _____ other people

Q49. How many people in your household contribute to your household income?

☐ Only me

☐ Myself and _____ other people

Q50. What is your relationship status?

☐ Single, never married

☐ Single, but in a committed relationship

☐ Widowed

☐ Divorced

☐ Separated but not divorced

☐ Married

Q51. What is the highest year of primary or secondary school you have *completed*?

Q52. What is the level of the *highest* qualification you have *completed*?

Q53. Would you like to be kept personally informed of the results of this research, or to participate in future research? If so, either write your name and email address here, or send an email to tanya.king@deakin.edu.au with the subject line: **Fisher health**

THANK YOU VERY MUCH FOR FILLING OUT THE SURVEY! WE HOPE OUR FINDINGS WILL HELP BRING ATTENTION TO THE HEALTH AND WELLBEING OF THE COMMERCIAL FISHING INDUSTRY.

Please feel free to include any additional comments or information.

If you think you might benefit from talking to someone about any health and wellbeing challenges you are facing, please contact the following organisations:

Lifeline	**13 11 14**
Beyond Blue	**1300 22 4636**
Suicide	**1300 659 467**
Kids Help Line	**1800 55 1800**