



# QUANTIFYING THE WILD

## Workforce Methodology Report

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This report was prepared by Dr. Lisa Denny for the Tasmanian Seafood Industry Council to address objectives of the Tasmanian Seafood Industry Workforce Plan 2019:

- 1. To prepare the seafood industry for the new work order through a better understanding of workforce demand and training needs**
- 2. To deliver and extend workforce development outcomes and outputs to stakeholders**

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# Tasmanian Wildcapture Workforce:

## Quantifying the Wild

The size and composition of the Tasmanian wildcatch fishery workforce has fluctuated over the past two decades, reflecting changes in regulations, external impacts, such as SARS and COVID-19, and market demand, as well as an ageing workforce.

Given those who work in the wildcatch sector are either owner/operators or employed on casual, as-needed basis, which is impacted by weather, fishing seasons, catch limits, beach price and other external factors, estimating the size of the workforce, i.e. the number of people working in the wildcatch sector, is empirically challenging.

In consultation with the Institute for Marine and Antarctic Studies (IMAS) at the University of Tasmania, the Tasmanian Seafood Industry Council developed an estimation tool to calculate the number of fishers working in Tasmanian waters on a given day for each fishery sub-sector.

This tool applies a crew estimation assumption for each fishery sub-sector based on vessel size and associated regulatory crew requirements for that fishery. These assumptions were then tested with reported crew figures for both Rock Lobster and Scalefish sub-sectors and adjustments made to the initial assumptions. The result is a count of all fishers and crew on a day fished. See Table 2 for details of crew assumptions for each fishery.

To enable an age and region profile for the wildcatch workforce, birth year and postcode data for vessel supervisors is also extracted.

The number of fishers working on each day is determined by the 'date fished' and 'supervisor client ID' variables which provides a total count of supervisors and total crew, based on a maximum count measure for each supervisor for the period. The limitation of this approach is that there is a small chance that some deck hands will be double-counted if they worked with multiple supervisors during the reference period.

The term "Supervisor" refers to the fisher responsible for the license on the day of fishing. They may be an active owner/operator, or a supervisor operating/leasing a licence on behalf of the owner.

The tool has been cross-validated with known fishing operations and is a robust reflection of the actual workforce on any given day. It proves to be a valuable resource for policy makers and planners to gauge trends and potential impacts on the Tasmanian seafood industry wildcapture workforce.

## Introduction

The Australian Bureau of Statistics (ABS) Census of Population and Housing (Census) data has long been a contentious issue for the seafood industry. Refer to the Tasmanian Seafood Industry Workforce Profile Report 2017 for a full consideration of Census data. The national Fisheries Research and Development Corporation (FRDC) state that:

*“In the Corporation’s view, data collected by the ABS are not disaggregated in sufficient detail to be useful for planning and strategic purposes. These data tend to ‘under-report employees, including through attribution of some fishing industry activities to other industries such as transport and generalised food processing’ (FRDC 2005). Furthermore, ABS employment data do not appear to be consistent with data collected in connection with fishing vessels, fishing licences and other forms of fishing regulation. However, the latter sources are not sufficiently comprehensive to provide a substitute for ABS data.”*

The Tasmanian Seafood Industry Council (TSIC) conducted a validation process of Census data for the aquaculture sub-sector as a component of its workforce planning project in 2020 and concluded that analysis of Census data for the aquaculture sub-sector *is* a true representation of its workforce for the time period of analysis. However, the wildcatch fishing sector remains fraught with error when it comes to Census data. This is due to the time of year the Census is conducted (mid-Winter), the nature of small fishing businesses and working arrangements with deckhands.

Additionally, given the Census is undertaken five-yearly and workforce data is not publicly available until around 18 months after the data collection and that those who work in the wildcatch sector are either owner/operators, leasees or employed on casual, as-needed basis which is impacted by weather, fishing seasons, catch limits, beach price and other external factors, estimating the size of the workforce, i.e. the number of people working in the wildcatch sector at a point in time, or over a given period, is empirically challenging.

For these reasons, the dearth of available data and increasing demand by policy makers and the industry to understand the impact on the workforce of external events such as SARS and COVID-19 and industry specific impacts such as policy, regulation or legislative changes in relation to seasons, catch limits, quotas, beach prices, and crew or vessel requirements etc, TSIC has committed to developing a method to calculate the relative size of the wildcatch workforce using locally collected data through the licencing and catch report requirements.

The aspiration of the methodological approach was to enable TSIC to:

- 1) Quantify the wildcatch workforce at a point in time, for each fishery sub-sector
- 2) To produce a demographic profile of the wild-catch workforce (number, type of licence holders, quota holders, age, sex, region for each sub-sector)
- 3) To assess the impact of external events such as SARS, COVID-19 or industry-specific changes on the wildcatch workforce at a point in time or over a period of time.
- 4) To undertake scenario modelling for future workforce projections

The project was undertaken under the auspices of Phase 1 of the *Delivering a New Workforce Plan* strategic initiative of the TSIC; the development of a current workforce profile. This methodology paper outlines the background, data sources, approach and method to determining the size of the fisheries workforce.

## Background

In 2019, the Tasmanian Seafood Industry Council (TSIC) assessed its industry priorities with a view to inform a 5 to 10-year strategic outlook for its workforce. The resulting *Delivering a New Workforce Plan* was driven by the Tasmanian Seafood Workforce Reference Group and is the culmination of industry input and strategic planning. The new plan follows the achievements of the first Seafood Industry Workforce Plan in 2013. The new plan aims to address the following workforce priorities:

- 1) Preparing the seafood industry for the new workforce expectations
- 2) Preparing the seafood workforce for innovation and technology changes
- 3) Support for workforce demand and new entrants created by growth
- 4) Making waves as agriculture leaders and attracting innovators
- 5) Closing gaps – assessing the outcomes of a workforce and training gap analysis
- 6) Supporting healthy minds – essential for growth and resilience
- 7) Know the trends – frequent workforce snapshot reporting

TSIC plans to address these priorities using a four-phased approach over a two-year period.

- 1) The new work order – prepare the industry for a new generation of workers
- 2) Improving capacity, capability and professionalism of new workforce entrants: creating a positive culture
- 3) Connecting workforce demand to meaningful training outcomes
- 4) Delivering the plan: promotion, communication and extension of workforce development needs and outcomes

Phase 1 of the New Plan commenced in 2020 and involves:

- i. a literature review outlining the expectations, experiences and attitudes of the future workforce in relation to work and study and how that relates to the seafood industry
- ii. audit/scan of all current accredited, non-accredited and tertiary level training and intended learning outcomes to determine whether offerings are still relevant (i.e. match needs) or whether they are deficient or surplus to needs, require modification or require redevelopment
- iii. analysis of skills and training data from relevant RTOs
- iv. the development of a current workforce profile

## Data

Fisheries Integrated Licensing and Monitoring System (FILMS) is a data set collected by the Tasmanian Department of Primary Industries, Parks, Water and the Environment (DPIPWE) through the regulatory framework in relation to fishing licencing and catch record requirements. The dataset links personal license information and quota holdings to catch and effort returns lodged by fishers on a daily basis.

Data is extracted from FILMS via a custom SQL query and includes the following tables and variables.

Variable	Type	Description
Fishery	table	Sub sector fishery codes and activity
Return Type/Docket Type	table	Catch return data linked to Vessel ID and Licence
Reporting date	table	Date the data was reported
ENTITLEMENT_ID	Variable (number)	Entitlement ID number
LICENCE_TYPE_CODE	Variable	Licence type code and link to Entitlement ID
VESSEL_ID	Variable (number)	Vessel ID and link to entitlement and ownership details
Vessel Length	Variable (number)	Vessel construction details
SUPERVISOR_CLIENT_ID	Variable (number)	Linked to Vessel
BIRTH_YEAR	Number	Year
PERSON_GENDER_CODE	Variable (char)	Sex
MAILING_POSTCODE	Variable (number)	Postcode
Reported RL Crew Number	Number	Rock Lobster crew records (historic, this was previously recorded)
Reported SF Crew Number	Number	Scalefish crew records (historic, this was previously recorded)
DATE_FISHED	Variable (date)	Date fished
MATRIX_CREW_VALUE	variable (number)	Output calculation based on Table 2

Table 1. FILMS Data variables used in Tasmanian Wildcapture Workforce Tool.

## Method

FILMS data, nor its data sources, was not designed nor intended for use to quantify the size of the fisheries workforce. Additionally, while FILMS data contains information about the supervisors on board the vessel on the given day fished, it does not provide any information about deckhands also working on board the vessel on the given day fished. For these reasons, a number of assumptions need to be made in order to estimate the size of the fisheries workforce on a given day or over a given period.

In consultation with the Institute for Marine and Antarctic Studies (IMAS) at the University of Tasmania, TSIC developed a crew matrix (supervisors plus deckhands) to apply to calculate the number of fishers working in Tasmanian waters on a given day for each fishery sub-sector.

This crew matrix applies a crew estimation assumption for each fishery sub-sector based on vessel size and associated regulatory crew requirements for that fishery in the *Marine Order 504* published by the Australian Maritime Safety Authority, minimum crew requirements based on vessel length. Note, older vessels (“grandfathered”) may hold exemptions to operate with less crew than required under the National Standard. The Tasmanian fishing fleet has a large number of these older vessels with “single handed operator” status (i.e. less crew than required under Marine Order 504), and matrix assumptions have been adjusted accordingly to reflect the proportion of these vessels.

These assumptions were then tested with reported crew figures for both Rock Lobster and Scalefish sub-sectors within the FILMS database and adjustments made to the initial assumptions. The result is a count of all crew (supervisor and deckhand/s) on a day fished for each fishery type and vessel size. See Appendix A for details of crew assumptions for each fishery. These matrix numbers were tested robustly against known industry operations and reflect a very real multiplier per sub-sector.

## Quantifying the workforce on a given day

Calculating the size of the fisheries workforce by sub-sector for a given period is a three-step process using the FILMS data and pivot tables within Microsoft Excel:

- 1) For the period (e.g. a month or year), for the given sub-sector, calculate the total crew (*MATRIX\_CREW\_VALUE*) for each vessel size (*Vessel Length*)
- 2) For the same period and sub-sector, calculate the number of days fished (*DATE\_FISHED*) for each vessel size (*Vessel Length*)
- 3) Divide (1) – the total number of crew working over the period for each vessel size (this count includes multiple counts of the same worker) by (2) – the total number of fishing days for each vessel size.

This calculation provides the total number of fishers who worked in the sub-sector during the given period.

## Workforce profile approach

Data extracted using the crew matrix tool allows for a snapshot workforce profile to be completed simply and quickly. The number of fishers working on each day is determined by the ‘date fished’ and ‘supervisor client ID’ variables which provide a total count of supervisors and total crew for each day of the chosen reference period. The maximum count formula is then applied to the reference period to identify the maximum number of crew who worked in the period. The limitation of this approach is that there is a small chance that some deck hands will be double-counted if they worked with multiple supervisors during the reference period.

To enable an age and region profile for the wildcatch workforce, birth year and postcode data for vessel supervisors during the reference period is also extracted. Analysis of this information provides a demographic profile of supervisors only and does not capture the age profile or regional location of crew members.

Table 2. Crew matrix size assumptions for the Tasmanian wildcatch sub-sectors based on vessel size.

Sub-sector	Vessel Size Class	Crew Assumption
Commercial-dive	0-<6 metres	2
	6<>10 metres	2
	10<>20 metres	2
	>20 metres	4
Giant crab	0-<6 metres	1
	6<>10 metres	1
	10<>20 metres	2
	>20 metres	3
Rock-lobster	0-<6 metres	1.5
	6<>10 metres	1
	10<>20 metres	2
	>20 metres	2.5
Scallop	0-<6 metres	2
	6<>10 metres	3
	10<>20 metres	4
	>20 metres	5
Scalefish	0-<6 metres	1.3
	6<>10 metres	1.5
	10<>20 metres	2
	>20 metres	2.5
Shellfish dive	0-<6 metres	2
	6<>10 metres	2
	10<>20 metres	2
	>20 metres	4